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(Free On Line Dictionary of Philosophy)

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-ism

<[philosophical terminology](#)> a general suffix commonly used to designate varieties of [philosophical opinion](#). Although useful for some purposes, such labels should not be taken too seriously. Individual philosophers nearly always deal creatively with complex specific issues, developing [arguments](#) in defense of their own views. It is only later that we who read them find it convenient to invent simple names for positions that several of them seem to share. Study of [philosophy](#) benefits more from careful reading of the texts themselves than from the artificial classification of their themes.

[[A Dictionary of Philosophical Terms and Names](#)]

<[2002-1-18](#)>

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A Dictionary of Philosophical Terms and Names

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[A Dictionary of Philosophical Terms and Names](#). This is a concise guide to technical terms and personal names often encountered in the study of philosophy. What you will find here naturally reflects my own philosophical interests and convictions, but everything is meant to be clear, accurate, and fair, a reliable source of information on Western philosophy for a broad audience.

By Garth Kemerling (editor).

28-10-2001

a fortiori

<[logic, epistemology](#)> "to the stronger," or "even more so".

We are bound to accept an a fortiori claim because of our [prior](#) acceptance of a weaker application of the same [reasoning](#) or [truth](#). Thus, for example: Frank can't run to the store in less than five minutes, and the restaurant is several blocks further away than the store. Thus, a fortiori, Frank can't run to the restaurant in less than five minutes.

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

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A Philosophical Glossary

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A Philosophical Glossary (<http://www.hfac.uh.edu/phil/leiber/!glossar.htm>) edited by Justin Leiber, Philosophy department, University of Houston, USA.

Some definitions in this dictionary are based on the version published in 2001-04-05.

25-04-2001

a posteriori

<logic, epistemology>

a [sentence](#), [proposition](#), [thought](#), or [judgement](#) is a posteriori (literally "after") if its truth is dependent on how our actual [experience](#) (experiment and observation) turns out. Many have thought that the truths of the empirical, or nonmathematical, sciences are entirely a posteriori, though the rationalists and some recent philosophers such as S. [Kripke](#) & N. [Chomsky](#) seem to deny this. Some take synthetic and a posteriori to be equivalence. Compare [a priori](#)

[[A Philosophical Glossary](#)]

25-04-2001

a priori

<logic, epistemology>

a [sentence](#), [proposition](#), [thought](#) or [judgement](#) is [a priori](#) (literally "before") if its truth is not dependent on how our actual [experience](#) (experiment and observation) happens to turn out. Some [a priori truths](#) ([axioms](#) or [first principles](#)) are held to be directly [intuited](#); the rest are supposed to be [deducible](#) from these. Euclid' s geometr provides the [model](#) for this traditional conception. With [a posteriori knowledge](#) or statements, on the other hand, justification does invoke sensory experience either directly via [perception](#) or indirectly via [induction](#). Many have thought that the truths of [logic](#) and mathematics are a priori, though J. S. [Mill](#) and W. V. O. [Quine](#) might be thought to maintain the contrary position. Some equate a priori and [analytic](#). The [ontological argument](#) for the [existence of God](#) is deemed a priori.

based on [[A Philosophical Glossary](#)], [[Philosophical Glossary](#)]

28-07-2001

a-consciousness

[access consciousness](#)

13-02-2004

A-Life

[artificial life](#)

13-02-2004

abduction

<logic> the process of [inference](#) to the best [explanation](#).

The term is sometimes used to mean just the generation of hypotheses to explain [observations](#) or [conclusions](#), but the former [definition](#) is more common both in philosophy and computing.

The notion was first introduced by Peirce (CP 2.511, 623; 5.270) in an attempt to classify a certain form of [syllogism](#).

Abductive inferences are of the following form:

- i) All beans from this bag are white.
- ii) These beans are white.

iii) Therefore, these beans are from this bag.

This inference results in an explanation of the observation in the second premise.

The [semantics](#) and the [implementation](#) of abduction cannot be reduced to those for [deduction](#), as explanation cannot be reduced to [implication](#).

Though this method of reasoning is not logically valid (as the beans may be from a different source), Peirce argues that scientists regularly engage in this sort of inferential reasoning. Though scientific hypotheses are not valid by virtue of how they are abducted, abductive reasoning was thought to constitute "a logic of discovery" in one of Peirce' s four steps of scientific investigation. These steps are:

- 1) observation of an anomaly
- 2) abduction of hypotheses for the purposes of explaining the anomaly
- 3) inductive testing of the hypotheses in [experiments](#)
- 4) deductive [confirmation](#) that the selected hypothesis predicts the original anomaly

Abduction is currently thought not to be well understood and Peirce' s formulation has been criticised as being restricted to language-like mediums (Shelley, 1996). It should be noted that for Peirce, abduction was restricted to the generation of explanatory hypotheses.

The more general characterisation of abduction as inference to the best explanation is a more recent interpretation.

Applications include fault diagnosis, plan formation and default reasoning.

Negation as failure in [logic programming](#) can both be given an abductive interpretation and also can be used to implement abduction. The abductive [semantics](#) of negation as failure leads naturally to an argumentation-theoretic interpretation of default reasoning in general.

References

Peirce, C. (1958) Volume 2, paragraph 511, 623; Volume 5, paragraph 270. In Hartshoren and Weiss.

Levesque (1989). A knowledge level account of abduction. In Sridharan 1989 pp. 1061-1067.

Shelley, C. (1996) Visual abductive reasoning in archaeology. Philosophy of Science Association, 63. 278-301.

abscissa

<[mathematics](#)> The x coordinate on an (x, y) graph; the input of a function against which the output is plotted. y is the "[ordinate](#)". See [Cartesian coordinates](#).

Based on [\[FOLDOP\]](#) and Chris Eliasmith - [\[Dictionary of Philosophy of Mind\]](#) Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

Abelard Peter

<[scholasticism](#), [medieval philosophy](#), [logic](#)>, <[aristotelianism](#), [theology](#)>, <[realism](#), [nominalism](#), [rhetoric](#), [dialectics](#), [ethics](#)>

french [scholastic](#) logician (1079-1142) whose sexual relationship with his teen-aged student Heloise provoked the vengeful anger of her uncle, Fulbert, in 1118. Despite the many distractions of the turbulent life he described in *Historia Calamitatum Mearum* (The History of my Misfortunes), Abelard embarked on a monastic career of detached contemplation marked by [intellectual independence](#) from both [traditional](#) authorities and contemporaneous fashions. In commentaries on the logic of Aristotle and his own [Dialectica](#), Abelard invented a novel [solution](#) to the problem of universals that rejected both [realism](#) and [nominalism](#) in their most extreme forms. Only [individual things exist](#) for Abelard, but general terms have universal applicability to things whose common features are known by a [process](#) of mental abstraction. Abelard also wrote on the difficulties involved in [scriptural interpretation](#) in *Sic et Non* (For and Against) (1122) and on the importance of human intentions for [theological ethics](#) in *Scito te Ipsum* (Know Thyself).

Recommended Reading:

Five Texts on the Mediaeval Problem of Universals, ed. by Paul Vincent Spade (Hackett, 1994);
John Marenbon, *The Philosophy of Peter Abelard* (Cambridge, 1999);
Letters of Abelard and Heloise, ed. by Betty Radice (Penguin, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

abscissa

<[mathematics](#)> The x coordinate on an (x, y) graph; the input of a function against which the output is plotted.

y is the [ordinate](#).

See [Cartesian coordinates](#).

Based on [FOLDOC] and Chris Eliasmith - [Dictionary of Philosophy of Mind] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

03-02-2004

Absolute

<[substance](#), [essence](#), [Infinite](#), [ontology](#), [metaphysics](#), [absolut spirit](#), [Romanticism](#)> the solitary, uniquely unconditioned, utterly independent, and ultimately all-encompassing being that comprises all of [reality](#) according to such Romantic idealists as [Schelling](#), and [Hegel](#). British philosopher F.H. Bradley emphasized that the Absolute must [transcend](#) all of the [contradictory appearances](#) of ordinary experience, while American [Josiah Royce](#) took the Absolute to be a spiritual entity whose self-consciousness is reflected only imperfectly in the totality of human thought.

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

absolute consistency

<[logic](#)> A system S is absolutely [consistent](#) iff at least one [wff](#) of the [formal language](#) of S is not a [theorem](#).

[Glossary of First-Order Logic]

16-03-2001

absolute inconsistency

<[logic](#)> A system is absolutely inconsistent iff all its wffs are [theorems](#).

16-03-2001

absolutism

<[ethics](#), [metaphysics](#), [political philosophy](#)> the belief that there is one and only one [truth](#). Those who espouse absolutism usually also believe that they know or have access to what this absolute truth is.

In [ethics](#), absolutism is usually contrasted to [relativism](#).

See also [authoritarianism](#) in political theory.

Based on [\[Ethics Glossary\]](#)

28-04-2001

absorption

<logic, mathematics, tautology> a rule of inference of the form:

$$\frac{p \rightarrow q}{p \rightarrow (p \& q)}$$

Example: "If Mary comes to the party, then so will George. Therefore, if Mary comes to the party, then both Mary and George will."

As a simple truth-table shows, any argument of this form is valid.

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

abstract class

<PI> In object-oriented programming, a class designed only as a parent from which sub-classes may be derived, but which is not itself suitable for instantiation.

Often used to "abstract out" incomplete sets of features which may then be shared by a group of sibling sub-classes which add different variations of the missing pieces.

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16-03-2001

abstract data type

<PI> (ADT) A type whose internal form is hidden behind a set of access functions. Objects of the type are created and inspected only by calls to the access functions. This allows the implementation of the type to be changed without requiring any changes outside the module in which it is defined.

Abstract data types are central to object-oriented programming where every class is an ADT.

A classic example of an ADT is a stack data type for which functions might be provided to create an empty stack, to push values onto a stack and to pop values from a stack.

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16-03-2001

Abstract entity

Sorts of things that do not occupy spacetime but are considered to have some kind of existence. For examples, properties, relations, propositions and mathematical objects are commonly considered as abstract entities. The main philosophical question about abstract entities is whether they really exist. This problem is strictly connected to the definition one attaches to the concept of existence.

Giuseppina Ronzitti

See :

- Michael Jubien, Contemporary Metaphysics, Blackwell (1997).
- Bob Hale, Abstract objects, Oxford, Blackwell (1987).

28-01-2004

abstract interpretation

<computing> A partial execution of a program which gains information about its [semantics](#) (e.g. control structure, flow of information) without performing all the calculations. Abstract interpretation is typically used by compilers to analyse programs in order to decide whether certain optimisations or transformations are applicable.

The objects manipulated by the program (typically values and functions) are represented by points in some [domain](#). Each abstract domain point represents some set of real ("concrete") values.

For example, we may take the abstract points "+", "0" and "-" to represent positive, zero and negative numbers and then define an abstract version of the multiplication operator, *#, which operates on abstract values:

```
*# | + 0 -
---|-----
+ | + 0 -
0 | 0 0 0
- | - 0 +
```

An interpretation is "safe" if the result of the abstract operation is a safe approximation to the abstraction of the concrete result. The meaning of "a safe approximation" depends on how we are using the results of the analysis.

If, in our example, we assume that smaller values are safer then the "safety condition" for our interpretation (#) is

$$a\# \ * \ b\# \leq (a \ * \ b)\#$$

where a# is the abstract version of a etc.

In general an interpretation is characterised by the [domains](#) used to represent the basic types and the abstract values it

assigns to constants (where the constants of a language include primitive functions such as *). The interpretation of constructed types (such as user defined functions, sum types and product types) and expressions can be derived systematically from these basic domains and values.

A common use of [abstract interpretation](#) is [strictness analysis](#).

See also standard interpretation.

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16-03-2001

abstract machine

1. <language> A processor design which is not intended to be implemented as hardware, but which is the notional executor of a particular intermediate language (abstract machine language) used in a compiler or interpreter. An abstract machine has an instruction set, a register set and a model of memory. It may provide instructions which are closer to the language being compiled than any physical computer or it may be used to make the language implementation easier to [port](#) to other platforms.

A virtual machine is an abstract machine for which an interpreter exists.

Examples: ABC, [Abstract Machine Notation](#), [ALF](#), CAML, F-code, FP/M, Hermes, LOWL, Christmas, SDL, S-K reduction machine, SECD, Tbl, Tcode, TLO, [WAM](#).

2. <theory> A procedure for executing a set of instructions in some formal language, possibly also taking in input data and producing output. Such abstract machines are not intended to be constructed as hardware but are used in thought experiments about [computability](#).

Examples: [Finite State Machine](#), [Turing Machine](#).

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16-03-2001

Abstract Machine Notation

<language> (AMN) A language for specifying [abstract machine](#) in the B-Method, based on the mathematical theory of Generalised Substitutions.

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16-03-2001

abstract syntax

<language, data> A representation of data (typically either a message passing over a communications link or a program being compiled) which is independent of machine-oriented structures and encodings and also of the physical representation of the data (called "[concrete syntax](#)" in the case of compilation or "transfer syntax" in communications).

A compiler' s internal representation of a program will typically be specified by an abstract syntax in terms c categories such as "statement", "expression" and "identifier". This is independent of the source syntax ([concrete syntax](#)) of the language being compiled (though it will often be very similar). A parse tree is similar to an abstract syntax tree but it will typically also contain features such as parentheses which are syntactically significant but which are implicit in the structure of the [abstract syntax tree](#).

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16-03-2001

abstract syntax tree

<compiler> (AST) A data structure representing something which has been parsed, often used as a compiler or interpreter' s internal representation of a program while it is being optimised and from which code generation i performed. The range of all possible such structures is described by the [abstract syntax](#).

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16-03-2001

Abstract-Type and Scheme-Definition Language

<language> (ASDL) A language developed as part of Esprit project GRASPIN, as a basis for generating language-based editors and environments. It combines an object-oriented type system, syntax-directed translation schemes and a target-language interface.

["ASDL - An Object-Oriented Specification Language for Syntax-Directed Environments", M.L. Christ-Neumann et al, European Software Eng Conf, Strasbourg, Sept 1987, pp.77-85].

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16-03-2001

abstraction

1. Generalisation; ignoring or hiding details to capture some kind of commonality between different instances. Examples are [abstract data type](#) (the representation details are hidden), [abstract syntax](#) (the details of the [concrete syntax](#) are ignored), [abstract interpretation](#) (details are ignored to analyse specific properties).

2. <PI> Parameterisation, making something a function of something else. Examples are [lambda abstraction](#) (making a term into a function of some variable), higher-order functions (parameters are functions), bracket abstraction (making a term into a function of a variable).

Opposite of concretisation.

[FOLDOC]

16-03-2001

abstractionism

<[metaphysics](#), [aesthetics](#)>

- 1) in [metaphysics](#) see [idealism](#).
- 2) in [aesthetics](#) see [modernism](#), also called abstract [expressionism](#).

28-04-2001

absurd

<[logic](#), [Aristotle](#), [Leibniz](#), [Kant](#), [epistemology](#)>, <[modus ponens](#), [modus tollens](#), [mathematics](#)>, <[possible](#), [impossible](#), [paradox](#), [existentialism](#)> Contrary to reason or beyond the limits of rationality; paradoxical, nonsensical, or meaningless. According to [Camus](#), [Sartre](#), and other existentialists, absurdity is an inescapable [consequence](#) of any sensitive effort to live in the face of an indifferent [reality](#). The human tendency to [desire](#) most passionately what we can never have is absurd in this sense.

Recommended Reading:

Donald A. Crosby, Specter of the Absurd: Sources and Criticisms of Modern Nihilism (SUNY, 1988);
Richard E. Baker, The Dynamics of the Absurd in the Existentialist Novel (Peter Lang, 1993);
Martin Esslin, The Theatre of the Absurd (Viking, 1992).

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16-11-2001

Abunaser

<[Aristotle](#), [aristotelianism](#), [mathematics](#), [astronomy](#)>, <[medicine](#), [Plato](#), [neoplatonism](#), [islamic philosophy](#), [logic](#)>, <[theology](#), [existence of god](#)> Latinized [form](#) of the name of Persian philosopher al-Farabi.

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

Acceptable Use Policy

<[networking](#)> (AUP) Rules applied by many transit networks which restrict the use to which the network may be put. A well known example is NSFNet which does not allow commercial use. Enforcement of AUPs varies with the network.

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16-03-2001

acceptance testing

<[PI](#)> Formal testing conducted to determine whether a system satisfies its acceptance criteria and thus whether the customer should accept the system.

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16-03-2001

acceptor

[Finite State Machine](#)

04-02-2004

access consciousness

<[philosophy of mind](#)> Also known as a-consciousness, is a kind of direct [control](#).
A [representation](#) is access-conscious if it is poised to be under direct control of [reasoning](#), reporting and [action](#).

References

Ned Block. On a confusion about a function of consciousness
(<http://www.cogsci.soton.ac.uk/bbs/Archive/bbs.block.html>)

Behavioral and Brain sciences, 1995, 18: 227-287.

A. Khwaja

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

13-02-2004

accident

<[ontology](#), [metaphysics](#), [Aristotle](#), [substance](#), [essence](#)>, <[scholasticism](#), [empiricism](#), [idealism](#)> A [feature](#) that something happens to have but might have existed without having, since this feature is no [part](#) of the very nature of the [thing](#), in contrast to the [essence](#) without which the thing could not be at all.

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

accident fallacy of

<[Pietro Ispano](#), [scholasticism](#), [syllogism](#), [Aristotle](#), [logic](#)>, <[antinomy](#), [fallacia in dictione](#), [fallacia extra dictione](#)> (Lat. a dicto simpliciter ad dictum secundum quid) the [informal fallacy](#) of applying a generally reliable rule to a particular case without considering the qualifying features that make it an exception to the [rule](#).

Example: "Since authors of best-selling books usually appear on television talk shows, and the Pope is in fact the author of a best-selling book, it follows that the Pope will soon appear on a television talk show".

Unlimited applicability to every [instance](#) would follow syllogistically only from a genuinely [universal proposition](#), the [truth](#) of which is often difficult to defend. Merely probable guidelines are easier to establish as "rules of thumb", but do not deserve to be applied so indiscriminately.

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

accidentalism

<[metaphysics](#)> the position according to which some [events](#) are [accidental](#), that is, either they are not predictable or they lack a [cause](#). Accidentalism is part of some defenses of the [freedom of the will](#) (see [libertarianism](#)).

See also [indeterminism](#)

[[The Ism Book](#)]

Edited by Giovanni Benzi

24-03-2001

accuracy

<[mathematics](#)> How close to the real value a measurement is.

Compare [precision](#).

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16-03-2001

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Justin Leiber, [A Philosophical Glossary](#)

Peter Suber, Glossary of First-Order Logic

Peter Saint-Andre' [The Ism Book](#)

Garth Kemerling, [A Dictionary of Philosophical Terms and Names](#)

28-10-2001

acronym

An identifier formed from some of the letters (often the initials) of a phrase and used as an abbreviation..

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16-03-2001

act - rule utilitarianism

<[ethics](#), [utilitarianism](#), [Stuart Mill](#), [pleasure](#)>, <[good](#), [happiness](#), [moral philosophy](#), [liberalism](#)> <[Davide Ricardo](#)> Distinction between ways of applying the greatest [happiness principle](#) for moral evaluation on [utilitarian](#) grounds. Act-utilitarianism supposes that each particular action should be evaluated solely by references to its own consequences, while rule-utilitarianism considers the consequences of widespread performance of similar actions. The act-utilitarian asks, "How much pleasure or [pain](#) would result if I did this now?" The rule-utilitarian asks, "What pleasure or pain would result if everyone were always to do this?" Since the answers to these questions may be quite different, they may lead to distinct recommendations about moral conduct. Although [Mill](#) noted that reliance on moral rules may be of practical use in decision-making, he argued that their influence should remain defeasible in particular circumstances.

Recommended Reading:

J. J. C. Smart and Bernard Williams,
Utilitarianism: For and Against (Cambridge, 1973).

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

action

<[ethics](#), [philosophy of mind](#), [philosophy of AI](#)> that which an [agent](#) or [actor](#) A does, in contrast to that which merely happens to A or to A' s parts.

16-03-2001

action theory

<[philosophy of action](#), [action](#), [Absolute](#), [romanticism](#)>, <[moralism](#), [Blondel](#), [philosophy of politics](#), [Sorel](#), [violence](#)>, <[activism](#), [pragmatism](#), [William James](#), [Dewey](#), [behavior](#)> branch of [philosophy](#) concerned with the [analysis](#) and [explanation](#) of what human beings do. [Understanding](#) the [relation](#) between [choice](#) or [volition](#) and the performance of an [action](#) seems crucial for the ascription of [responsibility](#) in [ethics](#).

Recommended Reading:

Readings in the Theory of Action, ed. by Norman S. Care and Charles Landesman (Indiana, 1968);

The Philosophy of Action, ed. by Alfred R. Mele (Oxford, 1997);

Philosophical Perspectives: Action Theory and Philosophy, ed. by James E. Tomberlin (Ridgeview, 1990).

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16-11-2001

active object

<[PI](#)> An [object](#) each [instance](#) of which has its own [thread](#) running as well as its own copies of the object' instance variables.

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16-03-2001

actor

1. <[PI](#)> In object-oriented programming, an [object](#) which exists as a concurrent process.

2. <[operating system](#)> In Chorus, the unit of resource allocation.

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16-03-2001

Actors

<[theory](#)> A model for [concurrency](#) by [Carl Hewitt](#). Actors are autonomous and concurrent [objects](#) which execute [asynchronously](#). The Actor model provides flexible mechanisms for building parallel and [distributed](#) software systems.

(<http://osl.cs.uiuc.edu/>).

["Laws for Communicating Parallel Processes", C. Hewitt et al, IFIP 77, pp. 987-992, N-H 1977].

["ACTORS: A Model of Concurrent Computation in Distributed Systems", Gul A. Agha , Cambridge Press, MA, 1986].

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16-03-2001

actual

<[actualism](#), [ontology](#), [logic](#), [potential](#), [contingent](#)> what really is the [case](#), as opposed to what' [possible](#) (could be the case) and to what' [necessary](#) (must be the case); all of which are opposed to what' [impossible](#) (can' be the case). Concerning the latter "opposition": the categories possible and impossible are jointly exhaustive (everything is either one or the other). Concerning the former "opposition": [necessity](#), [actuality](#), and possibility are not mutually exclusive: everything [necessary](#) is also actual (what must be the case is the case) and everything actual is possible (whatever is possible). In other words, necessity entails actuality, and actuality entails possibility. (Also see [contingent](#).)

[[Philosophical Glossary](#)]

29-05-2001

actuality - potentiality

<[act](#), [action](#), [metaphysics](#), [Aristotle](#), [matter](#), [Aquinas](#)>, <[Scholasticism](#), [reality](#)> (Gr. *energeia* / *dynamis*) Aristotle' s distinction between what really is the case and what merely has the power to change or come to b the case. Thus, for example, this fresh acorn is actually a seed but only potentially an oak tree.

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16-11-2001

ad hoc

<[methodology](#)> Contrived purely for the purpose in hand rather than planned carefully in advance. E.g. "We didn' t know what to do about the sausage rolls, so we set up an adhoc committee".

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16-03-2001

ad hominem argument

<[logic](#), [fallacy](#), [antinomy](#), [dialectic](#)> (argument against the person) the [informal fallacy](#) of supposing that a [proposition](#) should be denied because of some disqualifying features of the person who affirms it. This [fallacy](#) is the mirror image of the appeal to [authority](#). In its abusive form, ad hominem is a direct (and often inflammatory) attack on the [appearance](#), character, or personality of the [individual](#).

Example: "Jeremy claims that Susan was at the party, but since Jeremy is the kind of person who has to ride to work on the city bus, it must be false that she was there."

A circumstantial ad hominem accuses the person of having an [alternative motive](#) for defending the proposition or points out its [inconsistency](#) with the person' s other views. Tu quoque (the "so do you" fallacy) uses [similar method](#) in response to criticism of a position already held.

Recommended Reading: Douglas Walton, Ad Hominem Arguments (Alabama, 1998).

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

adaptive learning

<[algorithm](#)> (Or "[Hebbian](#) learning") Learning where a system programs itself by adjusting weights or strengths until it produces the desired output.

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16-03-2001

Addams Jane

<[pragmatism](#), [politics](#), [ethics](#)> American pragmatist and social worker (1860-1935). Concerned by the dismal living conditions endured by women, minorities, and the working poor, Addams established Hull House in Chicago as a social settlement in 1889 and campaigned tirelessly for women' s suffrage, world peace, an economic justice. Her address to the Chicago Liberty Meeting, Democracy or Militarism (1899) and the pamphlet Why Women Should Vote (1909) are representative expressions of her belief that women properly exert a pacifistic influence on American political life.

Her writings on social issues include [Democracy](#) and Social Ethics (1902), Newer Ideals of Peace (1907), A New [Conscience](#) and an Ancient Evil (1911), Twenty Years at Hull House (1912), The Larger Aspects of the Women' s Movement (1914), and Women, War, and Suffrage (1915).

Addams shared the 1931 Nobel Prize for peace.

Recommended Reading:

Allen F. Davis, American Heroine (Ivan R. Dee, 2000); Mary Jo Deegan, Jane Addams and the Men of the Chicago School, 1892-1918 (Transaction, 1990).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

addition

<[logic](#), [mathematics](#)> a [rule of inference](#) of the [form](#):

$$p$$

$$p \vee q$$

Example: "It is raining. Therefore, either it is raining or the sun is shining". Although its use in ordinary [thought](#) is notably rare, this [pattern](#) of [reasoning](#) serves a vital role in the construction of formal proofs in many systems of logic.

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

additive

<[mathematics](#)> A function $f : X \rightarrow Y$ is additive if for all $Z \subseteq X$ $f(\text{lub } Z) = \text{lub } \{f(z) : z \in Z\}$ (f "preserves lubs").

All additive functions defined over [cpos](#) are [continuous](#).

[\[FOLDOP\]](#)

16-03-2001

adiaphora

<[stoicism](#), [action](#), [ethics](#), [skepticism](#), [cynicism](#), [happiness](#)>, <[Kant](#), [rigorism](#), > greek [term](#) used by the [classical Stoics](#) to designate [actions](#) that are morally indifferent. On this view, we have no direct obligation either to [perform](#) or to avoid such actions, even when they might indirectly affect our general well-being. Thus, for example, although there is no [duty](#) to preserve one' s own health, doing so is advisable, since it will probabl feel [good](#) and improve one' s capacity for doing what is [right](#). [Pyrrho](#), [Carneades](#), and other Skeptics, on the other hand, argued that there can be no [coherent reason](#) for preferring beneficial acts unless they are themselves virtuous.

Recommended Reading:

F. E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

adjectival numerals

numeral

13-02-2004

Adler Alfred

<[Psychology](#)> Austrian psychiatrist (1870-1937); author of such books as Studie ueber Minderwertigkeit von Organen (Study of Organ Inferiority and its Psychical Compensation) (1907), [Praxis](#) und [Theorie](#) der Individualpsychologie (Practice and [Theory](#) of Individual Psychology) (1918), and Der Sinn des Lebens (What Life Should Mean to You) (1934).

Influenced by the [philosophy](#) of Hans Vaihinger, Adler' s "individual psychology" focussed on the efforts people invariably make in order to compensate for their (self-perceived) inferiority to others, whether it originally arose from a specific physical defect, relative position in the family constellation, particular experiences of humiliation, or a general lack of social feeling for others.

Recommended Reading:

Individual Psychology of Alfred Adler: A Systematic Presentation in Selections from His Writings (Harpercollins, 1989);

Superiority and Social Interest: A Collection of Later Writings, ed. by Heinz L. Ansbacher and Rowena R. Ansbacher (Norton, 1979);

Harold H. Mosak and Michael Maniacci, A Primer of Adlerian Psychology: The Analytic-Behavioral-Cognitive Psychology of Alfred Adler (Brunner/Mazel, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

Adorno Theodor Wiesengrund

<[sociology](#), [aesthetics](#), [Frankfurt school](#)>, <[philosophy of history](#), [dialectic](#), [storicism](#)>, <[marxism](#), [capitalism](#)> German musicologist, social critic, and political philosopher (1903-1969); author of Philosophie der neuen Musik (The [Philosophy](#) of Modern Music) (1949) and Noten zur Literatur (Notes to Literature) (1958-74). A leading member of the [Frankfurt school](#), Adorno traced the [development](#) and failure of Western reliance on reason in Dialektik der Aufklaerung (Dialectic of Enlightenment) (1947). In The Authoritarian Personality (1951) Adorno described the ways conformity to the demands of social propriety imposes [paradox](#) and [contradiction](#) on the lives of individual human beings. Negative Dialektik ([Negative Dialectics](#)) (1966) openly defends the [critical task](#) of exposing, dissolving, and undermining the harmful influence of rigid conceptual schemes.

Recommended Reading:

The Adorno Reader, ed. by Brian O' Connor (Blackwell, 2000);

Simon Jarvis, Adorno: A Critical Introduction (Routledge, 1998);

Martin Jay, Adorno (Harvard, 1984); Hauke Brunkhorst, Adorno and [Critical Theory](#) (U of Wales, 1999);

The Actuality of Adorno: Critical Essays on Adorno and the Postmodern, ed. by Max Pensky (SUNY, 1997).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

aesthetic

<[philosophy of art](#), [beauty](#)>, <[sublime](#), [imitation](#), [creation](#), [romanticism](#)> branch of [philosophy](#) that studies [beauty](#) and taste, including their specific manifestations in the tragic, the comic, and the [sublime](#). Its central issues include questions about the origin and status of aesthetic judgments: are they objective statements about genuine features of the [world](#) or purely subjective expressions of personal attitudes; should they include any [reference](#) to the intentions of artists or the reactions of patrons; and how are they related to judgments of moral value? Aesthetics is a significant component of the philosophical work of [Plato](#), [Aristotle](#), [Kant](#), and [Santayana](#).

Recommended Reading:

A Companion to Aesthetics, ed. by David Cooper, Crispin Sartwell, and Joseph Margolis (Blackwell, 1995);

Aesthetics, ed. by Patrick Maynard and Susan Feagin (Oxford, 1998);

Anne D. R. Sheppard, Aesthetics: An Introduction to the Philosophy of Art (Oxford, 1987).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

aestheticism

<[ethics](#)> the position according to which the highest [values](#) (including the highest ethical values) are ultimately aesthetic values. The idea is often associated with nineteenth-century [romanticism](#) and personally with Friedrich [Schiller](#), author of The Aesthetic Education of Man, and with Friedrich [Nietzsche](#), both of whom sometimes exhorted their readers to "make your life a work of art".

[[The Ism Book](#)]

Edited by Giovanni Benzi

24-03-2001

aesthetics

<[philosophy of art](#)> the philosophy of art. The study of contemplation or appreciation of the ([nature](#) of) artistic value of beauty.

[[Philosophical Glossary](#)]

29-05-2001

affirmative action

<[ethics](#), [political thought](#)> a [policy](#) of providing reverse preferences favoring [members](#) of classes previously disadvantaged to compensate victims of previous racial and sexual discrimination, to remedy lingering effects of such discrimination, or to combat ongoing institutionalized and unintentional discriminatory practices.

[[Philosophical Glossary](#)]

29-05-2001

affirmative conclusion from negative premise

<[logic](#), [syllogism](#)> the [formal fallacy](#) committed in a [categorical syllogism](#) that violates a syllogistic rule by having an [affirmative conclusion](#) derived from at least one [negative proposition](#) as a [premise](#).

Example: "All senators are eligible to vote on legislation, but no homeless people are senators, so all homeless people are eligible to vote on legislation." The problem with any such reasoning is that the exclusion of one class from another cannot provide deductively certain grounds for the inclusion of either of these classes with another.

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

affirmative proposition

<[logic](#), [assertion](#), [Aristotle](#), [judgment](#), [assent](#)> a [statement](#) whose propositional quality is determined by its [assertion](#) that some or all [members](#) of one [class](#) of things are also included as members of some other class.

Examples: "All spaniels are dogs." and "Some children are people who play word games." The first affirms that every spaniel also belongs to the class of dogs, while the latter affirms that there is at least one member commonly included among both children and people who play word games.

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

affirming the alternative

<[logic](#), [alternative proposition](#)> a fallacious inference having the [form](#):

$$\begin{array}{l} p \vee q \\ p \\ \hline \sim q \end{array}$$

Example: "The softball team will win either Tuesday' s game or Thursday' s. It will win Tuesday' s ga Therefore, it will not win Thursday' s game".

[Arguments](#) of this form should not be confused with legitimate applications of [Disjunctive Syllogism](#).

The [logical relation](#) of [disjunction](#) expressed by the symbol "V" purposefully allows for the possibility that both of its [terms](#) are [true propositions](#). In order to exclude that possibility, one must explicitly declare that one or the other of the terms is [true](#), but not both, using the form:

$(p \vee q) \ \& \ \sim (p \ \& \ q)$.

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

affirming the consequent

<[logic](#), [consequence](#), [Aristotle](#), [syllogism](#), [stoicism](#)>, <[ockamism](#), [conditional proposition](#), [neopositivism](#)> a [fallacy](#) having the [form](#):

$$\begin{array}{l} p \rightarrow q \\ q \\ \hline p \end{array}$$

Example: "If Dole had been elected President in 1996, then he would no longer be a Senator. Dole is no longer a Senator. Therefore, Dole was elected President in 1996."

[Arguments](#) of this form should not be confused with a [legitimate instance](#) of [Modus Ponens](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

agent

<[action](#), [politics](#), [ethics](#), [scholasticism](#)> the person who performs an [action](#). Ethical conduct is usually taken to presuppose the possibility that individual human agents are capable of acting responsibly.

Recommended Reading:

Hugh J. McCann, The Works of Agency: On Human Action, Will, and Freedom (Cornell, 1998);

Relational Autonomy: Feminist Perspectives on Autonomy, Agency, and the Social Self, ed. by Catriona MacKenzie and Natalie Stoljar (Oxford, 2000);

Carol A. Rovane, The Bounds of Agency (Princeton, 1997).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

aggregate type

<[PI](#)> A data [type](#) composed of multiple elements. An aggregate can be homogeneous (all elements have the same type) e.g. an array, a list in a functional language, a string of characters, a file; or it can be heterogeneous (elements can have different types) e.g. a [structure](#). In most languages aggregates can contain elements which are themselves aggregates. e.g. a list of lists.

See also [union](#).

[\[FOLDOPC\]](#)

16-03-2001

aggregation

<PI> A composition technique for building a new [object](#) from one or more existing objects that support some or all of the new object' s required interfaces.

[[FOLDOC](#)]

16-03-2001

agnosticism

<[ethics](#), [metaphysics](#), [philosophy of religion](#)> the position according to which one cannot (or should not) take either a positive or a negative stance with respect to the existence of [God](#). Agnosticism takes a wait-and-see attitude towards the existence of God. It is often based on [skepticism](#), which argues that one cannot know whether God exists, although this can also lead to [fideism](#). It may be accompanied with a further conviction that one need not care whether God exists or not. It should not be confused with [atheism](#), which argues against the existence of God.

24-03-2001

agreement method of

<[method of experimental research](#), [logic](#), [difference](#)>, <[concomitance](#), [method of residues](#), [epistemology](#)> one of Mill' s Methods for discovery of causalrelationships. If a specific[antecedent](#) circumstance is found to be present on every [occasion](#) on which a [phenomenon](#) occurs, it may be inferred to be the [cause](#) of that [phenomenon](#).

Example: "It snowed in October only three times during the past seventeen years, and each time was during an "El Nin~o" year, so the warm Pacific waters probably [caused](#) our early snows."

Recommended Reading:

John Stuart Mill, System of Logic (Classworks, 1986).

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

AI

[artificial intelligence](#)

13-02-2004

AI-complete

<[artificial intelligence](#), [jargon](#)> /A-I k*m-pleet' / (MIT, Stanford: by analogy with "NPcomplete") A term used to describe problems or subproblems in [artificial intelligence](#), to indicate that the solution presupposes a solution to the "strong AI problem" (that is, the synthesis of a human-level intelligence). A problem that is AI-complete is, in other words, just too hard.

See also Gedanken.

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

aisthaesis

<[epistemology](#), [sense perception](#), [Eleatics](#), [Atomists](#), [Platonism](#), [Aristotle](#), [noesis](#), [empiricism](#)> Greek [term](#) for sense perception, the epistemic significance of which was vigorously debated. The [Eleatics](#) argued that mere [sensation](#) is inferior to [noesis](#), while [Empedocles](#) and the Atomists regarded it as a vital [connection](#) with the natural world. [Plato](#) took [perception](#) to be unreliable as a source of [knowledge](#), since it deals only with temporal objects. For [Aristotle](#), on the other hand, aisthaesis is a basic activity of living organisms, through which they acquire [information](#) about [material](#) things.

Recommended Reading:

F.E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

aition

<[ontology](#), [metaphysics](#), [epistemology](#), [Aristotle](#), [causality](#)>, <[reason](#), [scholasticism](#), [Aquinas](#), [occasionalism](#)>, <[foundation](#), [deduction](#), [physics](#), [Laplace](#)> the most [general](#) Greek [term](#) for [cause](#) or [responsibility](#), used by [Aristotle](#) especially in [reference](#) to any one of the four kinds of answer it is legitimate to give in response to any "Why...?" question.

Recommended Reading:

F.E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967).

[\[A Dictionary of Philosophical Terms and Names\]](#)

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aka

also known as

16-11-2003

akrasia

<[aristotelianism](#), [ethics](#), [Socrates](#), [psychology](#), [will](#)> literally, "bad mixture," the Greek [term](#) for the character flaw of [incontinence](#) or weakness of the [will](#), the [condition](#) in which an [agent](#) is unable to perform [actions](#) that are known to be [right](#). Although [Socrates](#) apparently held that doing [good](#) follows directly from knowing what is good, [Aristotle](#) believed akratic human behavior to be commonplace, and offered an extended account of its origin and consequences.

Recommended Reading:

Alfred R. Mele, Irrationality: An Essay on Akrasia, Self-Deception, and Self-Control (Oxford, 1992);
Justin Gosling, Weakness of the Will (Routledge, 1990).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

AL

[Artificial Life](#)

16-11-2003

Albert the Great

<[theology](#), [medieval philosophy](#), [Aquinas](#)>, <[aristotelianism](#), [arabic philosophy](#), [neoplatonism](#), [Avicenna](#)>, <[Nicholas of Cusa](#), [philosophy of science](#)> German Dominican philosopher and Bishop of Ratisbon (1206-1280). Revered by his contemporaries as "[doctor universalis](#)" for the breadth of his [philosophical knowledge](#). Albert tried to synthesize many disparate philosophical positions from the tradition but also encouraged empirical study as a source of knowledge of the natural world. He is remembered chiefly as the teacher and colleague who encouraged [Thomas Aquinas](#) to apply Aristotelian arguments to Christian thought.

[[A Dictionary of Philosophical Terms and Names](#)]

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aleph 0

<[mathematics](#)> The [cardinality](#) of the first [infinite ordinal](#), [omega](#) (the number of [natural numbers](#)).

Aleph 1 is the cardinality of the smallest [ordinal](#) whose cardinality is greater than aleph 0, and so on up to aleph omega and beyond. These are all kinds of [infinity](#).

The [Axiom of Choice](#) (AC) implies that every set can be well-ordered, so every [infinite cardinality](#) is an aleph; but in the absence of AC there may be sets that can't be well-ordered (don't possess [bijection](#) with any [ordinal](#)) and therefore have cardinality which is not an aleph.

These sets don't in some way sit between two alephs; they just float around in an annoying way, and can't be compared to the alephs at all. No [ordinal](#) possesses a [surjection](#) onto such a set, but it doesn't surject onto an sufficiently large ordinal either.

[[FOLDOC](#)]

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aletheia

<[epistemology](#), [truth](#), [doxa](#), [opinion truth as correspondence](#), [Platon](#), [validity](#), [conformity](#), [utility](#), [coherence](#), [metaphysics](#), [thought](#), [language](#), [logos](#), [stoicism](#), [epicureism](#), [rappresentation](#), [sense experience](#), [subject](#), [object](#), [Thomas Aquinas](#), [essence](#), [medieval philosophy](#), [scholasticism](#), [god](#), [Cartesio](#), [logic](#), [empiricism](#), [idealism](#), [Kant](#), [romanticism](#), [neo-kantian](#), [neo-empiricism](#), [phenomenology](#), [Husserl](#), [Heidegger](#), [philosophy of science](#), [mathematics](#), [Tarski](#), [semantics](#)> Greek word for truth, which generally marks the [distinction](#) between [doxa](#) (mere belief) and [episteme](#) genuine knowledge in the [philosophy](#) of [Plato](#). According to [Aristotle](#), truth appears in our propositional judgments, whose logical structure mirrors the nature of things.

Recommended Reading:

F.E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967).

[[A Dictionary of Philosophical Terms and Names](#)]

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Alexander Samuel

<[ethics](#), [aesthetics](#), [perceptual realism](#), [idealism](#), [evolution](#)>, <[Bergson](#), [existensialism](#)> Australian-English philosopher (1859-1938). Alexander defended perceptual realism as an alternative to the [idealism](#) of his contemporaries. His [theory](#) regarding the "emergent [evolution](#)" of [mind](#) within the natural order, proposed in [Space, Time, and Deity](#) (1920), was [similar](#) in many respects to the views of [Henri Bergson](#). Alexander also developed a thorough [axiology](#) in [Beauty](#) and other Forms of Value (1933).

During his tenure at Manchester, Alexander helped Zionist colleague Chaim Weizmann secure the Balfour agreement, an initial step toward creation of the modern state of Israel.

Recommended Reading:

Samuel Alexander, Collected Works (Thoemmes, 2000);

Samuel Alexander, Philosophical and Literary Pieces (Ayer, 1940).

[[A Dictionary of Philosophical Terms and Names](#)]

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Algazel

<[arabic philosophy](#), [theology](#), [sufism](#), [medieval philosophy](#)> Latinized name of al-Ghazàli.

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

algebra

<[mathematics](#), [logic](#)> 1. A loose term for an [algebraic structure](#).

2. A [vector space](#) that is also a [ring](#), where the vector space and the ring share the same addition operation and are related in certain other ways.

An example algebra is the set of 2x2 matrices with real numbers as entries, with the usual operations of addition and matrix multiplication, and the usual scalar multiplication. Another example is the set of all polynomials with real coefficients, with the usual operations.

In more detail, we have:

(1) an underlying [set](#),

(2) a [field](#) of scalars,

(3) an operation of scalar multiplication, whose input is a scalar and a member of the underlying set and whose output is a member of the underlying set, just as in a [vector space](#),

(4) an operation of addition of members of the underlying set, whose input is an ordered pair of such members and whose output is one such member, just as in a vector space or a ring,

(5) an operation of multiplication of members of the underlying set, whose input is an ordered pair of such members and whose output is one such member, just as in a ring.

This whole thing constitutes an 'algebra' iff:

(1) it is a vector space if you discard item (5) and

(2) it is a ring if you discard (2) and (3) and

(3) for any scalar r and any two members A, B of the underlying set we have $r(AB) = (rA)B = A(rB)$. In other words it doesn't matter whether you multiply members of the algebra first and then multiply by the scalar, or multiply one of them by the scalar first and then multiply the two members of the algebra. Note that the A comes before the B because the multiplication is in some cases not commutative, e.g. the matrix example.

Another example (an example of a Banach algebra) is the set of all bounded linear operators on a Hilbert space, with the usual [norm](#). The multiplication is the operation of [composition](#) of operators, and the addition and scalar multiplication are just what you would expect.

Two other examples are tensor algebras and Clifford algebras.

[I. N. Herstein, "Topics_in_Algebra"].

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16-03-2001

algebraic

<[mathematics](#)> In [domain theory](#), a [complete partial order](#) is algebraic if every element is the [least upper bound](#) of some [chain](#) of [compact](#) elements. If the set of compact elements is [countable](#) it is called omega-algebraic.

[Significance?]

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16-03-2001

algebraic data type

<PI> (Or "sum of products type") In [functional programming](#), new types can be defined, each of which has one or more [constructors](#). Such a type is known as an algebraic data type. E.g. in Haskell we can define a new type, "Tree":

```
data Tree = Empty | Leaf Int | Node Tree Tree
```

with constructors "Empty", "Leaf" and "Node". The constructors can be used much like functions in that they can be (partially) applied to arguments of the appropriate type. For example, the Leaf constructor has the functional type `Int -> Tree`.

A constructor application cannot be reduced (evaluated) like a function application though since it is already in normal form. Functions which operate on algebraic data types can be defined using [pattern matching](#):

```
depth :: Tree -> Int
depth Empty = 0
depth (Leaf n) = 1
depth (Node l r) = 1 + max (depth l) (depth r)
```

The most common algebraic data type is the list which has constructors Nil and Cons, written in Haskell using the special syntax "[]" for Nil and infix ":" for Cons.

Special cases of algebraic types are product types (only one constructor) and enumeration types (many constructors with no arguments). Algebraic types are one kind of constructed type (i.e. a type formed by combining other types).

An algebraic data type may also be an [abstract data type](#) (ADT) if it is exported from a module without its constructors. Objects of such a type can only be manipulated using functions defined in the same module as the type itself.

In set theory the equivalent of an algebraic data type is a discriminated union - a set whose elements consist of a tag (equivalent to a constructor) and an object of a type corresponding to the tag (equivalent to the constructor arguments).

[[FOLDOP](#)]

16-03-2001

algebraic structure

<[mathematics](#)> Any formal mathematical system consisting of a set of objects and operations on those objects. Examples are [Boolean algebra](#), numerical algebra, set algebra and matrix algebra.

[Is this the most common name for this concept?]

[[FOLDOP](#)]

16-03-2001

algorithm

<[algorithm](#), [PI](#)> A detailed sequence of actions to perform to accomplish some task. Named after an Iranian mathematician, Al-Khwarizmi.

Technically, an algorithm must reach a result after a [finite](#) number of steps, thus ruling out [brute force](#) search methods for certain problems, though some might claim that brute force search was also a valid (generic) algorithm. The term is also used loosely for any sequence of actions (which may or may not terminate).

Dictionary of Algorithms, Data Structures, and Problems (<http://hissa.nist.gov/dads/terms.html>).

[[FOLDOP](#)]

16-03-2001

Algorithmic Model

<PI> A method of estimating software cost using mathematical [algorithms](#) based on the parameters which are considered to be the major cost drivers. These estimate of effort or cost are based primarily on the size of the software or Delivered Source Instructions (DSI)s, and other productivity factors known as Cost Driver Attributes.

See also [Parametric Model](#).

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16-03-2001

alias

1. <[operating system](#)> A name, usually short and easy to remember and type, that is translated into another name or string, usually long and difficult to remember or type. Most command interpreters (e.g. Unix' s `csf` allow the user to define aliases for commands, e.g. "alias l ls -al". These are loaded into memory when the interpreter starts and are expanded without needing to refer to any file.

2. <[networking](#)> One of several alternative hostnames with the same Internet address. E.g. in the Unix hosts database (`/etc/hosts` or NIS map) the first field on a line is the Internet address, the next is the official hostname (the "canonical name" or "CNAME") and any others are aliases.

Hostname aliases often indicate that the host with that alias provides a particular network service such as `archie`, `finger`, [FTP](#), or World-Wide Web. The assignment of services to computers can then be changed simply by moving an alias (e.g. `www.doc.ic.ac.uk`) from one Internet address to another, without the clients needing to be aware of the change.

3. <[file system](#)> The name used by Apple computer, Inc. for symbolic links when they added them to the System 7 operating system in 1991.

[FOLDOC]

16-03-2001

aliasing

1. <[jargon](#)> When several different identifiers refer to the same object. The term is very general and is used in many contexts.

See [alias](#), aliasing bug, anti-aliasing.

2. <[hardware](#)> (Or "shadowing") Where a hardware device responds at multiple addresses because it only decodes a subset of the address lines, so different values on the other lines are ignored.

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16-03-2001

alienation

<[communism](#), [political thought](#), [philosophy of politics](#)> (Ger. Entaeusserung or Entfremdung) extreme separation from one' s own [nature](#), from the products of one' s labor, or from social reality, which often results i an indifference or outright aversion toward some aspects of life that might otherwise be attractive and significant.

[Hegel](#) introduced the [term](#), pointing out that human life, unless comprehended through the [Absolute](#), easily becomes estranged from the natural world. [Feuerbach](#), on the other hand, emphasized the dangerous practical consequences of an [extreme](#) detachment from one' s own nature and [activities](#). [Marx](#) carried this line of [thought](#) further, by noting that conditions in a capitalist society make it [impossible](#) for workers to live meaningfully in [relation](#) to each other, to the products of their labor, or even to themselves. Simone de Beauvoir and other feminist thinkers point out that women in a patriarchal culture undergo additional forms of alienation when they are pervasively treated as the objects of male sexual desire and effectively coerced into submitting to male-based [political](#), [social](#), and [intellectual](#) norms.

Recommended Reading:

Istvan Meszaros, Marx' s Theory of Alienation (Merlin, 1986);

Bertell Ollman, Alienation: Marx' s Conception of Man in Capitalist Society (Cambridge, 1977);

Arthur G. Neal and Sara F. Collas, Intimacy and Alienation: Forms of Estrangement in Female/Male

Relationships (Garland, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

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alife

[artificial life](#)

16-11-2003

alpha-categoricity

<[logic](#)> A first order theory is alpha-categorical [iff](#) (1) it has a normal model of cardinality alpha and (2) any two normal models of cardinality alpha are isomorphic.

[Glossary of First-Order Logic]

16-03-2001

alphanumeric

<[character](#)> A decimal digit or a letter (upper or lower case). Typically, "letters" means only English letters ([ASCII](#) A-Z plus a-z) but it may also include non-English letters in the Roman alphabet, e.g., e-acute, c-cedilla, the thorn letter, and so on. Perversely, it may also include the underscore character in some contexts.

[[FOLDOC](#)]

16-03-2001

Alpharabius

<[arabic philosophy](#), [Aristotle](#), [aristotelianism](#), [islamism](#), [neoplatonism](#), [mathematics](#), [astronomy](#), [medicine](#)>
Latinized name of al-Farabi.

[[A Dictionary of Philosophical Terms and Names](#)]

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alternation

<[logic](#), [alternative proposition](#), [disjunction](#)> [Logical relation](#) holding between [propositions](#) at least one of which is [true](#); see: [disjunction](#).

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

alternative occurrence

<[logic](#), [inductive logic](#), [probability](#), [arithmetic of probability](#)> the complex event comprising the [occurrence](#) of one or the other (or both) of its constituent events. The [probability](#) of an alternative occurrence may be calculated by the [formula](#): $P(A \vee B) = P(A) + P(B) - P(A \& B)$. Thus, for example, the chances of getting "heads" at least once in two flips of a coin are [equal](#) to the chances of getting "heads" on the first toss (1/2) plus the chances of getting "heads" on the second toss (1/2) minus the chances of getting "heads" both times (1/4), or 3/4.

Recommended Reading:

Richard Lowry, The [Architecture](#) of Chance: An Introduction to the [Logic](#) and Arithmetic of Probability (Oxford, 1989);

Ian Hacking, An Introduction to [Probability](#) and Inductive Logic (Cambridge, 2001);

Donald Gillies, *Philosophical Theories of Probability* (Routledge, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

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Althusser Louis

<[epistemology](#), [structuralism](#), [marxism](#), [dialectics](#)>, <[political thought](#)> Algerian-French social philosopher (1918-1990). In *Pour Marx* (For Marx) (1965), *Lénin et la philosophie* (Lenin and Philosophy) (1969), and *Lire le Capital* (Reading Capital) (1970), Althusser offered a structuralist re-interpretation of the later work of Marx. According to Althusser, social organization is determined wholly by ideological consequences expressed in economic and [political power](#), enforced in home and family as well as in the workplace. The differential roles to which individuals are assigned in a society, he argued, are clearly signified not only by the [presence](#) of [particular notions](#) in its cultural paradigms, but even more dramatically by the [absence](#) of others. *Elements d' autocritique* (Essays in Self-Criticism) (1974) includes retractions from many of these central [themes](#).

Recommended Reading:

Althusser: A Critical Reader, ed. by Gregory Elliott (Blackwell, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

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altruism

<[ethics](#)> selfless concern for other people purely for their own sake. Altruism is usually contrasted with selfishness or [egoism](#) in [ethics](#). As a theoretical position, it is the view according to which the happiness of others ought to be given greatest importance in the [agent'](#) s ethical decisions.

Altruism could give rise to forms of [eudaimonism](#), e.g. when there is only one individual, the agent, involved, or when the agent' s happiness coincides with the happiness of all the others. In practice, eudaimonism is always kind of [individualism](#) or [egoism](#). Some forms of altruism put the emphasis more on duty or moral law rather than on the actual [interests](#) of other people, for example [Kantianism](#) and various other forms of [deontologism](#). Obviously, altruistic forms of [utilitarianism](#) and [pragmatism](#) put a practical emphasis on [consequences](#) (see [consequentialism](#)), that is, on helping or having regard for the welfare of other people, rather than on some sort of abstract formulation like "moral law".

Altruism is often taken to be a positive thing, especially by the average citizen. However, one has to tread carefully here, because in this common usage, "altruism" does not always refer to self-sacrifice, but sometimes only to an attitude of benevolence toward others (for example, dictionaries often define "altruistic" as "benevolent"). As always, but especially in this case, it is best to get the other person to clarify what he means before you "go on the offensive". Technical philosophical definitions do not always agree with any given individual' s understanding of altruism. (References from [collectivism](#), [communism](#), [consequentialism](#), [deontologism](#), [hedonism](#), [humanism](#), and [utilitarianism](#)).

Recommended Reading:

Thomas Nagel, *The Possibility of Altruism* (Princeton, 1979);

Altruism, ed. by Jeffrey Paul, Ellen F. Paul, and Fred D. Miller, Jr. (Cambridge, 1993);

Matt Ridley, *The Origins of Virtue: Human Instincts and the Evolution of Cooperation* (Penguin, 1998).

Based on the [[Ethics Glossary](#)] and [[The Ism Book](#)]

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

ambiguity

<[logic](#), [anphiboly](#), [dialectics](#), [semantics](#), [language](#), [euristic](#)>, the [presence](#) of two or more distinct meanings for a single [word](#) or [expression](#). *In itself*, ambiguity is a [common](#), harmless, and often amusing [feature](#) of ordinary language. When unnoticed in the [context](#) of otherwise careful reasoning, however, it can lead to one of several informal fallacies.

Example: "I'll give you a ring tomorrow." could signify either the promise of a gift of jewelry or merely a [intention](#) to telephone.

Note the [difference](#) between ambiguity and [vagueness](#).

Recommended Reading:

Israel Scheffler, *Beyond the Letter: A Philosophical Inquiry into Ambiguity, Vagueness and Metaphor* in

Language (Routledge, 1981);
Douglas Walton, Fallacies Arising from Ambiguity (Kluwer, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

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amoral

<[ethics](#), [moral philosophy](#), [judgment](#), [moral decision](#)> having no bearing on, declining to be influenced by, or making no [reference](#) to, moral values or judgments.

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16-11-2001

amphiboly

<[logic](#), [fallacy](#), [antinomy](#), [dialectic](#), [ambiguity](#)>, <[fallacia in dictione](#), [Kant](#)> the [informal fallacy](#) that can result when a [sentence](#) is ambiguous because of its grammatical structure, even if all of its [terms](#) are clear.

Example: "One morning in Africa, Captain Spaulding shot an elephant in his pajamas. Therefore, it is dangerous for large animals to wear [human](#) clothing."

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analog

<[spelling](#)> American spelling of [analogue](#).

16-11-2003

analogue

<[electronics](#)> (US: "analog") A description of a continuously variable signal or a circuit or device designed to handle such signals. The opposite is "discrete" or "[digital](#)".

Analogue circuits are much harder to design and analyse than digital ones because the designer must take into account effects such as the gain, linearity and power handling of components, the resistance, capacitance and inductance of PCB tracks, wires and connectors, interference between signals, power supply stability and more. A digital circuit design, especially for high switching speeds, must also take these factors into account if it is to work reliably, but they are usually less critical because most digital components will function correctly within a range of parameters whereas such variations will corrupt the outputs of an analogue circuit.

See also [analogue computer](#).

[[FOLDOP](#)]

16-03-2001

analogue computer

<[computer](#), [hardware](#)> A machine or electronic circuit designed to work on numerical data represented by some physical quantity (e.g. rotation or displacement) or electrical quantity (e.g. voltage or charge) which varies continuously, in contrast to [digital](#) signals which are either 0 or 1.

For example, the turning of a wheel or changes in voltage can be used as input. Analogue computers are said to operate in real time and are used for research in design where many different shapes and speeds can be tried out quickly. A computer model of a car suspension allows the designer to see the effects of changing size, stiffness and damping.

[FOLDOC]

16-03-2001

analogy

<[philosophy of science](#), [logic](#), [epistemology](#)> a systematic comparison between usually two [structures](#) that relies on properties of, and relations between, features (usually entities) of a source structure to infer properties of, and relations between, features (usually entities) of a target structure.

Analogy is an important method of reasoning, contributing to such cognitive tasks as [explanation](#), planning, and decision making. Analogical [arguments](#) are sometimes used in philosophy, for example to argue that there exist other minds analogous to one's own. In [artificial intelligence](#), analogy is often called case-based reasoning.

References

Gentner, D., Markman, A. B. (1997). Structure mapping in analogy and similarity. *American Psychologist*, 52, 45-56.

Holyoak, K. J., Thagard, P. (1995). *Mental leaps: Analogy in creative thought*. Cambridge, MA: MIT Press/Bradford Books.

Kolodner, J. (1993). *Case-based reasoning*. San Mateo, CA: Morgan Kaufmann.

Paul Thagard

Chris Eliasmith - [\[Dictionary of Philosophy of Mind\]](#)Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

analysis

<[logic](#), [mathematics](#), [function](#), [complexity](#), [semantics](#)>, <[epistemology](#), [process](#), [knowledge](#), [understanding](#), [concept](#)> [process](#) of breaking up a complex concept or [expression](#) in order to reveal its simpler constituents, thereby elucidating its [implicit meaning](#). The significance and [value](#) of this [method](#) is challenged by the [paradox](#) that analyses seem bound either to be inadequate or incorrect (if they propose major revisions in our understanding) but trivial and uninformative (if they do not).

[\[A Dictionary of Philosophical Terms and Names\]](#)

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analytic

<[logic](#), [Kantian ethics](#), [Kantian aesthetics](#)> [true](#) by [definition](#), or the denial of which would lead to a [contradiction](#).

Example: "all triangles have three angles" and "all bachelors are unmarried males".

Some philosophers have maintained that all the truths of mathematics are analytic, and that all necessary and [a priori](#) truths are analytic. Contrast term: [synthetic](#). Kant coined this terminology and stressed this distinction. Many contemporary analytic philosophers, following Quine, deny its cogency.

based on [\[A Philosophical Glossary\]](#), [\[Philosophical Glossary\]](#)

28-07-2001

analytic - synthetic

<[logic](#), [Kantian ethics](#), [epistemology](#), [semantics](#)>, <[truth](#), [tautology](#), [knowledge](#), [neo-positivism](#), [judgement](#)> distinction between judgments or propositions. A [judgment](#) is [analytic](#) if the [concept](#) of its [predicate](#) is already contained in that of its [subject](#); if the concepts of its subject and predicate are [independent](#), it is [synthetic](#). Alternatively, a [proposition](#) is analytic if it is [true](#) merely by [virtue](#) of the [meaning](#) of its [terms](#) or tautologous; otherwise, it is synthetic.

For example: "Golden retrievers are dogs" is analytic. "Dogs enjoy chasing squirrels" is synthetic.

Empiricists generally suppose that this distinction coincides with the [a priori](#) / [a posteriori](#) and [necessary](#) / [contingent](#) distinctions, while [Kant](#) held that synthetic a priori judgments are [possible](#). [Quine](#) has argued that no strict distinction can be maintained, since the analyticity of any proposition can be denied, with suitable revisions of the entire [system](#) of [language](#) in which it is expressed.

Recommended Reading: Analyticity: Selected Readings, ed. by James F. Harris, Jr. and Richard H. Severens (Quadrangle, 1970);

Arthur Pap, Semantics and Necessary Truth (Yale, 1958);

Willard V. Quine, From a Logical Point of View: Nine Logico-Philosophical Essays (Harvard, 1980).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

analytic philosophy

<[logic](#), [positivism](#), [neopositivism](#), [epistemology](#), [semantics](#)>, <[ontology](#), [metaphysics](#), [analytical](#), [ethics](#), [pragmatism](#)>, <[knowledge](#)> twentieth-century methods of philosophizing, generally characterized by the careful effort to uncover [logical](#) and philosophical suppositions concealed beneath the superficial [structure](#) of statements in ordinary uses of [language](#), pursuit of clarity in the treatment of genuine [philosophical issues](#), and a deep respect for the achievements of natural science. In a variety of distinct forms, philosophical analysis was practiced by [Moore](#), [Russell](#), [Wittgenstein](#), the [logical positivists](#), Ryle, [Austin](#), [Bergmann](#), and [Quine](#). Greatly influential in England and America, analytic philosophy is sometimes criticized for its excessive professionalization of the discipline.

Recommended Reading:

James Baillie, Contemporary Analytic Philosophy (Prentice-Hall, 1996);

Michael Dummett, Origins of Analytical Philosophy (Harvard, 1996);

Avrum Stroll, Twentieth-Century Analytic Philosophy (Columbia, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

Analytical Engine

<[history](#)> A design for a general-purpose digital computer proposed by Charles Babbage in 1837 as a successor to his earlier special-purpose [Difference Engine](#).

The Analytical Engine was to be built from brass gears powered by steam with input given on punched cards. Babbage could never secure enough funding to build it, and so it was, and never has been, constructed.

(<http://www.fourmilab.ch/babbage/>).

[\[FOLDOP\]](#)

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Analytical Machine

[Analytical Engine](#)

16-11-2003

anamnaesis

<Plato, Croce, storiography, epistemology, aisthaesis>, psyche, learning> Greek [term](#) for recollection as a source of [human knowledge](#). Socrates himself may have argued that recollection establishes mathematical truths independently of sensory experience (Gk. [aisthaesis](#)). In the mature [philosophy](#) of Plato, however, our ability to recollect the immutable form (Gk. [eidos](#)) is taken to provide direct [evidence](#) of the pre-existence of the human [soul](#) (Gk. psychae).

Recommended Reading:

Dominic Scott, Recollection and Experience: Plato' s Theory of Learning and Its Successors (Cambridge 1995);

F.E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

anankae

<Aristotle, necessity, logic> Greek [word](#) for the [logical](#) or causal necessity of anything cannot be otherwise than as it is. According to Aristotle, for example, the [efficient cause](#) of a thing produces its [effect](#) and the [conclusion](#) of a valid syllogism produces its conclusion with anankae .

Recommended Reading:

F.E. Peters, Greek Philosophical Terms:A Historical Lexicon (NYU, 1967).

[\[A Dictionary of Philosophical Terms and Names\]](#)

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anarchism

<[ethics](#), [political philosophy](#)> anarchism was a sometimes violent political movement around the turn of the century, but the word also describes a moral-political [ideal](#) of a society untouched by relations of power and domination among human beings. This moral ideal has most often expressed itself in what is the technical meaning of the term, namely the "total absence of government". Anarchism, in this sense, differs from the position of classical [liberalism](#) or [libertarianism](#) in politics (which upholds not a lack of government but limited government), but in its moral sense (the abolition of force and domination from human relations) it is consonant with a rational [ethics](#). Note, however, that this ethical aspect is overshadowed in popular understanding by the political aspect, and by the former political movement. (Reference from [pacifism](#).)

Recommended Reading:

Peter Kropotkin, The Conquest of Bread (Black Rose, 1989);

Todd May, The Political Philosophy of Poststructuralist Anarchism (Penn. State, 1994);

Michael Taylor, Community, Anarchy and Liberty (Cambridge, 1983);

Robert Paul Wolff, In Defense of Anarchism (California, 1998).

based on [\[The Ism Book\]](#),

[\[A Dictionary of Philosophical Terms and Names\]](#)

24-03-2001

Anaxagoras of Clazomenae

<[ancient greek philosophy](#), [mathematics](#), [astronomy](#)>, <[presocratic school](#), [philosophy of nature](#)> [Presocratic](#) philosopher (500-428 BC) who taught at Athens, leaving fragments of his philosophical work. Despite his rejection of a fundamental distinction between [appearance](#) and [reality](#) and adoption of an atomistic natural philosophy, Anaxagoras was the first philosopher in the Western tradition to draw a substantial distinction between inert and chaotic matter on the one hand and [mind](#) as an active principle and source of [order](#) on the other hand.

Recommended Reading:

Malcolm Schofield, An Essay on Anaxagoras (Cambridge, 1980).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

Anaximander

<[apeiron](#), [ancient greek philosophy](#), [mathematics](#), [astronomy](#)>, <[Milesian school](#), [philosophy of nature](#)> presocratic philosopher (611-547 BC). According to fragmentary reports from other philosophers, Anaximander speculated that all [matter](#) results from the distillation of hot, cold, dry, and wet elements from [apeiron](#) (the [Boundless](#)), an [infinite](#), intelligent, living whole. Examination of fossil [evidence](#) persuaded Anaximander that living beings develop from simpler to more complex forms over time.

Recommended Reading:

Charles H. Kahn, *Anaximander and the Origins of Greek Cosmology* (Hackett, 1994);
Paul Seligman, *The Apeiron of Anaximander; A Study in the Origin and Function of Metaphysical Ideas* (Greenwood, 1974).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

Anaximenes

<[ancient greek philosophy](#), [Milesian school](#), [philosophy of nature](#)> [Presocratic](#) philosopher (c. 550 BC). In fragmentary reports from other philosophers, Anaximenes is said to hold that condensation and evaporation of vapor or mist produces the physical world of [earth](#), water, and fire.

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AND

<[logic](#)> (Or "conjunction") The [Boolean](#) truth-function which is true only if all its [arguments](#) (called conjuncts) are true. Also the connective denoting this [function](#); also the compound proposition built from this connective.

The [truth table](#) for the two argument AND function is:

A		B		A AND B
---	+	-----	+	-----
F		F		F
F		T		F
T		F		F
T		T		T

Notation: $p \text{ o } q$; sometimes also $p \ \& \ q$ or pq or $p \wedge q$.

In the [C](#) programming language it is represented by the [&&](#) (logical and) [operator](#).

16-03-2001

andreia

<[Plato](#), [ancient ethics](#), [politics](#)> the Greek [term](#) for bravery or [courage](#) (from andreios - "manly" or "stubborn"). According to [Plato](#), this is the [virtue](#) properly exemplified by soldiers in the ideal state.

Recommended Reading:

Walter T. Schmid, *On Manly Courage: A Study of Plato' s Laches* (Southern Illinois, 1992).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

Angst

<[anxiety](#), [psycology](#), [emotion](#), [existensialism](#)> German [word](#) for the anxiety or anguish produced by an acute [awareness](#) of the implications of human freedom. An important [notion](#) for existentialist philosophers, including especially [Kierkegaard](#) and [Heidegger](#).

Recommended Reading:

Martin Heidegger, *Being and Time*, tr. by Joan Stambaugh (SUNY 1997);
Soren Kierkegaard, *The Concept of Anxiety*, ed. by Albert B. Anderson (Princeton, 1981);
James Leonard Park, *Existential Anxiety: Angst* (Existential Books, 1996).

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16-11-2001

anima

<[soul](#), [psychae](#), [substance](#), [psycology](#), [entelecheia](#), [body](#)>, <[neo-platonism](#), [scholasticism](#), [Agostino](#), [ockamism](#), [Descartes](#), [Spinoza](#), [dualism](#), [nous](#), [matter](#), [philosophy of religions](#)> Latin [term](#) for wind, breath, [life](#). Thus, for [Descartes](#) and other philosophers, the rational soul of any human being.

[[A Dictionary of Philosophical Terms and Names](#)]

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animal rights

<[ontology](#), [ethics](#), [moral philosophy](#)> the ontological status accorded to non-human animals has obvious consequences for the [morality](#) of our willingness to use them for our own purposes. [Kant](#) argued that [animals](#) do not qualify as members of the kingdom of ends among whom [morality](#) properly holds, while [Bentham](#) supposed that the [evident pleasure](#) and [pain](#) experienced by animals deserve to be included in any utilitarian calculation. More recently, [Mary Midgley](#) makes concern for animals central to moral philosophy, [Peter Singer](#) shows that mistreatment of animals is the [result](#) of a morally indefensible 'speciesism,' and Tom Regan argu that animals are entitled to [basic rights](#).

Recommended Reading:

Mary Midgley, *Animals and Why They Matter* (Georgia, 1998);
Tom Regan, *The Case for Animal Rights* (California, 1985);
Peter Singer, *Animal Liberation* (Avon, 1991);
Richard Alan Young and Carol J. Adams, *Is God a Vegetarian? Christianity, Vegetarianism, and Animal Rights* (Open Court, 1998);
Michael P. T. Leahy, *Against Liberation: Putting Animals in Perspective* (Routledge, 1994).

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16-11-2001

animals

<[aristotelism](#), [scholasticism](#), [idealism](#), [empiricism](#), [language](#)> many philosophers of the Western tradition have considered the relationship between human beings and other species of animals. Although some have been impressed with the obvious similarities in organic structure and behavior, most have tried to draw a clear distinction between the two. Only recently have a few taken seriously the extent of our moral obligations to fellow sentient beings. [Plato](#), [Aristotle](#), [Augustine](#), and [Aquinas](#) all supposed that the ability to [reason](#) makes human souls uniquely superior to those of all other beings. [Descartes](#) regarded it as a [consequence](#) of mind-body dualism that non-human animals are mere machines incapable of [thought](#) of any sort. But [Locke](#), E/tienne de Condillac, and [Bayle](#) noticed that many of the capacities and activities exhibited by animals are similar to those of human beings, and [La Mettrie](#) argued that purely mechanistic explanations could be given for both human and animal behavior.

Recommended Reading:

Leonora Cohen Rosenfield, *From Beast-Machine to Man-Machine: Animal Soul in French Letters from Descartes to La Mettrie* (New York, 1941);
Marc D. Hauser, *Wild Minds: What Animals Really Think* (Holt, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

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animism

<[cultural anthropology](#), [philosophy of religion](#), [sociology](#)>, <[preanimism](#), [magic](#)> [belief](#) that everything in the [universe](#) (or the universe itself) has some kind of [soul](#) or is a living being.

Recommended Reading:

Edward Clodd, Animism: The Seed of Religion (Holmes, 1993).

See also [panpsychism](#)

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annealing

[simulated annealing](#)

16-11-2003

anomalous monism

<[philosophy of mind](#)> the view put forward by Donald Davidson that all mental events are identical to physical events, and that the only [laws](#) that govern the [relations](#) between events are [physical](#), not [psychological](#), laws.

References

Anomalous Monism Biblio (<http://ling.ucsc.edu/~chalmers/biblio3.html#3.5d>)

Davidson, D. (1970). Mental Events. In (L. Foster and J. Swanson, eds.) Experience and Theory. Humanities Press. Reprinted in Davidson (1980) Essays on Actions and Events. Oxford: Oxford University Press.

See [monism](#), [supervenience](#), [token identity thesis](#), [physicalism](#)

Pete Mandik

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)]
Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

Anselm - Anselm of Canterbury

<[medieval philosophy](#), [christianism](#), [philosophy of religion](#)>, <[faith](#), [ethics](#), [metaphysics](#), [existence of god](#), [logic](#)>, <[ontology](#), [ontological argument](#), [scholasticism](#), [dialectic](#)>, <[neoplatonism](#), [epistemology](#)> although born at Aosta in Alpine Italy and educated in Normandy, Anselm (1033-1109) became a Benedictine monk, teacher, and abbot at Bec and continued his ecclesiastical career in England. Having been appointed the second Norman archbishop of Canterbury in 1093, Anselm secured the Westminster Agreement of 1107, guaranteeing the (partial) [independence](#) of the [church](#) from the [civil state](#). In a [series](#) of short works such as De Libertate Arbitrii (On [Free Will](#)), De Casu Diaboli (The Fall of the [Devil](#)), and Cur Deus Homo (Why [God](#) became [Man](#)), Anselm propounded a [satisfaction theory](#) of the atonement, upon which the incarnation promises relief from the strict demands of divine justice. He defended a notion of the [relation](#) between [philosophy](#) and [theology](#) that, like Augustine's, emphasized the methodological priority of [faith](#) over [reason](#), since [truth](#) is to be achieved only through "fides quaerens intellectum" ("[faith](#) seeking understanding"). Anselm's combination of Christianity, neoplatonic metaphysics, and Aristotelean logic in the [form](#) of dialectical question-and-answer was an important influence in the development [scholasticism](#) during the next several centuries. As a philosopher, Anselm is most often remembered for his attempts to prove the existence of god: In De Veritate (Of Truth) he argued that all [creatures](#) owe their being and [value](#) to [god](#) as the source of all truth, to whom a [life](#) lived well is the highest praise. In the Monologion he described deity as the one most truly good thing, from which all [real](#) moral values [derive](#) and whose [existence](#) is required by the [reality](#) of those values. Most famously, in the Proslogion (Addition), Anselm proposed the famous Ontological Argument, according to which god is understood as "aliquid quod maius non cogitari potest" ("that than which nothing greater can be conceived"). The being so conceived must necessarily exist in reality as well as in [thought](#), he argued, since otherwise it would in fact be [possible](#) to conceive something greater-namely, something exactly similar except that it really does exist. Thus, at least for Anselmian believers guided by a prior faith, god must truly exist as the simple, unified source of all perfections, a reality that excludes corruption, imperfection, and [deception](#) of every sort.

Recommended Reading.

Primary sources:

Sancti Anselmi opera omnia (Schmitt, 1938-61);
Anselm of Canterbury: The Major Works, edited by Brian Davies and G. R. Evans (Oxford, 1998).

Additional on-line information about Anselm includes:

The thorough collection of resources at EpistemeLinks.com.
R.J. Kilcullen' s lectures on the Monologion and the Proslogion.
Thomas Williams' s article in The Stanford Encyclopedia of Philosophy.
Marilyn McCord Adams' s article in The Oxford Companion to Philosophy.
Also see: credo ut intelligam, medieval philosophy, the ontological argument, and [scholasticism](#).
A paper on Anselm' s Proof from Gyula Klima.
An article in The Internet Encyclopedia of Philosophy.
The article in the Columbia Encyclopedia at Bartleby.com.
W.H. Kent' s article in The Catholic Encyclopedia.
A brief entry in The Macmillan Encyclopedia 2001.

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antecedent

<[logic](#), [mathematics](#), [consequence](#), [syllogism](#), [stoicism](#)>, <[dialectic](#), [conditional statement](#)> the [element](#) that states the prior condition in any conditional statement. For example, "It doesn' t rain" is the [antecedent](#) in both "If it doesn' t rain, then we' ll have a picnic" and "It will reach ninety degrees today if it doesn' t rain." [Intrae material implication](#), the truth of its antecedent is incompatible with the falsity of its [consequent](#).

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Anthony Susan Brownell

<[femminist philosophy](#), [political philosophy](#), [revolution](#)>, <[rights of women](#), [ethics](#)> American political activist (1820-1906). As head of the American Woman Suffrage Association and editor of the radical newspaper, The Revolution, Anthony campaigned vigorously for the abolition of slavery the rights of women. Having cast a ballot in the election of 1872, Anthony was arrested and fined; despite her tireless efforts, she did not live to see wide-spread adoption of women' s right to vote.

Recommended Reading:

The Elizabeth Cady Stanton-Susan B. Anthony Reader: Correspondence, Writings, Speeches, ed. by Ellen Carol Dubois and Gerda Lerner (Northeastern, 1992);
Geoffrey C. Ward, Martha Saxton, Ann D. Gordon, Ellen Carol Dubois, and Paul Barnes, Not for Ourselves Alone: The Story of Elizabeth Cady Stanton and Susan B. Anthony: An Illustrated History (Knopf, 1999).

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16-11-2001

anthropic principle

<[epistemology](#), [metaphysics](#), [ethics](#), [idealism](#)> [belief](#) that the [existence](#) of human life entails certain features of the physical world. In a minimal [form](#), this view merely points out that we would not be here to observe natural phenomena were they not compatible with our existence. Stronger versions of the anthropic principle, however, seem to rely upon the idealistic notion that the [universe](#) could not exist without intelligent observers.

Recommended Reading:

John D. Barrow and Frank J. Tipler, The Anthropic Cosmological Principle (Oxford, 1988);
Errol E. Harris, Cosmos and Theos: Ethical and Theological Implications of the Anthropic Cosmological Principle (Humanity, 1992).

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16-11-2001

anthropomorphism

<[ancient philosophy](#), [philosophy of religion](#), [metaphysics](#)>, <[cultural anthropology](#)> attribution of human characteristics to non-human things. Thus, an anthropomorphic religion treats [god](#) as a personal being, and anthropomorphic natural theories may suppose that plants, animals, or the [earth](#) itself think and feel in the same ways that we do.

Recommended Reading:

Eileen Crist, *Images of Animals: Anthropomorphism and Animal Mind* (Temple, 2000);
 Anthropomorphism, Anecdotes, and Animals, ed. by Robert W. Mitchell, Nicholas S. Thompson, and H. Lyn Miles (SUNY, 1996).

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16-11-2001

antichain

<[mathematics](#)> A subset S of a [partially ordered set](#) P is an antichain if, for all x, y in S , $x \leq y \Rightarrow x = y$, i.e. no two different elements are related.

[[FOLDOC](#)]

16-03-2001

antinomy

<[logic](#), [epistemology](#)> [Kant](#) believed that when [reason](#) goes beyond possible experience it often falls into various antinomies, or equally rational but contradictory views. [Reason](#) cannot here play the role of establishing rational truths because it goes beyond possible experience and becomes [transcendent](#). E.g. [Kant](#) thought that one could reason from the assumption that the world had a beginning in time to the conclusion that it did not, and vice versa. This was part of [Kant](#)'s critical program of determining limits to science and philosophic inquiry.

[[A Philosophical Glossary](#)]

25-04-2001

Antisthenes

<[greek ancient philosophy](#), [cynism](#), [logic](#), [ethics](#)> Greek philosopher, friend of [Socrates](#), and founder of [cynicism](#) (445-360 BC). Fragmentary reports suggest that Antisthenes denied the possibility of [contradiction](#) and supposed that the wise can never [act](#) foolishly.

Recommended Reading:

The Cynics: The Cynic Movement in Antiquity and Its Legacy, ed. by R. Bracht Branham and Marie Odile Goulet-Caze (California, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

antisymmetric

<[mathematics](#)> A [relation](#) R is antisymmetric if, for all x and y , $x R y$ and $y R x \Rightarrow x = y$. I.e. no two different elements are mutually related.

Partial orders and total orders are antisymmetric. If R is also [symmetric](#) ($x R y \Rightarrow y R x$) then $x R y \Rightarrow x = y$. I.e. different elements are not related.

[[FOLDOC](#)]

16-03-2001

antitheorem

<logic> A wff whose negation is a theorem.

[Glossary of First-Order Logic]

16-03-2001

antithesis

reversal of an initial conviction;

see: thesis / antithesis / synthesis.

[A Dictionary of Philosophical Terms and Names]

16-11-2001

apeiron

<ancient philosophy, ontology, material principle>, <Anaximander, infinite, boundless, Plato, neoplatonic>
<philosophy, metaphysics> Anaximander' s Greek word for the boundless extent of the universe as undifferentiated matter. Although Plato made only scant reference to this notion of what is unlimited, the neoplatonic philosophy of Plotinus elevated it as the material principle of all change.

Recommended Reading:

Paul Seligman, The Apeiron of Anaximander; A Study in the Origin and Function of Metaphysical Ideas (Greenwood, 1974);

F.E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967).

[A Dictionary of Philosophical Terms and Names]

16-11-2001

APF

associated propositional formula

16-11-2003

apodeictic

<epistemology, demonstrative, logic, Aristotle, necessary>, the characteristic feature of any proposition that states what is necessary (or impossible), perfectly certain (or inconceivable), or demonstrably true (or false).

See: problematic / assertoric / apodeictic.

[A Dictionary of Philosophical Terms and Names]

16-11-2001

apodosis

implication

16-11-2003

aporia

<[logic](#), [Aristotle](#), [rational doubt](#), [reasoning](#), [conclusion](#)>, Greek [term](#) for a difficulty or puzzle (literally, "with no pathway"). [Aristotle](#) commonly used this term to signify a group of individually plausible but collectively inconsistent statements. The reconciliation of such statements by considering [alternative](#) solutions, he supposed, is the chief business of [philosophy](#).

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

appearance - reality

<[reality](#), [Parmenide](#), [being](#)>, <[truth](#), [doxa](#), [opinion](#), [sensation](#), [knowledge](#), [homomensura](#)>, <[experience](#), [objective](#), [subjective](#), [Protagora](#)>, <[epistemology](#), [correspondence](#), [skepticism](#), [neoplatonism](#)>, <[idealism](#), [empiricism](#), [phenomenology](#), [existensialism](#)> [distinction](#) between the way things seem to be and the way they are. The merely [apparent](#) is often supposed to be [internal](#), [subjective](#), or [temporal](#), but available for direct awareness, whereas the the [real](#) is supposed to be [external](#), objective, or [eternal](#), but [known](#) only inferentially. Drawn in [different terms](#) and applied in various contexts, the distinction is important in the philosophies of [Plato](#), [Descartes](#), [Kant](#), and [Bradley](#).

Recommended Reading:

Julius Moravcsik, [Plato and Platonism: Plato's Conception of Appearance and Reality in Ontology Epistemology, and Ethics, and Its Modern Echoes](#) (Blackwell, 2000);

John W. Yolton, [Realism and Appearances: An Essay in Ontology](#) (Cambridge, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

apperception

<[self-conscious awareness](#), [sensory perception](#), [epistemology](#)>, <[internal](#), [external](#), [Leibniz](#), [animals](#), [plants](#), [reflection](#)>, <[Wolff](#), [psychology](#), [genuine apperception](#), [Kant](#), [representation](#)>, <[objectivity](#), [idealism](#), [consciousness](#), [Herbart](#)> Self-conscious awareness (as opposed to sensory perception of external objects), including especially the [operation](#) of the [will](#), in the [philosophy](#) of [Leibniz](#) and [Kant](#).

Recommended Reading:

Mark Kulstad, [Leibniz on Apperception, Consciousness and Reflection](#) (Philosophia Verlag, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

Appiah Kwame Anthony

African American philosopher whose work on the [foundations](#) of probabilistic semantics is exemplified in [Assertions and Conditionals](#) (1985) and [Truth in Semantics](#) (1986). He is also the author of [In My Father's House: Africa in the Philosophy of Culture](#) (1992), a discussion of the influence of racial concepts on the development of African literature and [art](#), and [Color Conscious: The Political Morality of Race](#) (1996). A native of Ghana, Appiah is Past President of the Society for African Philosophy in North America.

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

applied ethics

branch of [ethics](#) that considers the [practical](#) application of ethical principles to specific issues of [social](#) or personal concern.

Recommended Reading:

Peter Singer, Applied Ethics (Oxford, 1986); Peter Singer, Practical Ethics (Cambridge, 1993); Anthony Weston, A 21st Century Ethical Toolbox (Oxford, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

approximation algorithm

<[algorithm](#)> An [algorithm](#) for an optimisation problem that generates feasible but not necessarily [optimal](#) solutions.

Unlike "[heuristic](#)", the term "approximation algorithm" often implies some proven worst or average case bound on performance. The terms are often used interchangeably however.

[[FOLDOP](#)]

16-03-2001

Aquinas Thomas

<[theology](#), [aristotelianism](#), [scholasticism](#), [mataphysics](#), [ontology](#), [ethics](#), [essence](#), [existence of god](#), [epistemology](#), [politics](#), [Albert the Great](#), [William of Moerbeke](#)> Born to an aristocratic family living in Roccasecca, Italy, Thomas Aquinas (1224-1274) joined the Dominican order while studying [philosophy](#) and [theology](#) at Naples. Later he pursued additional studies in Paris and Koeln, where he was exposed to Aristotelean thought by [Albert the Great](#) and [William of Moerbeke](#). During the rest of his [life](#), he taught at Paris and Rome, writing millions of words on philosophical and theological issues and earning his reputation among the scholastics as "the angelic doctor."

Aquinas developed in massive detail a [synthesis](#) of Christianity and Aristotelian philosophy that became the official [doctrine](#) of Roman Catholic theology in 1879. De Ente et Essentia (On Being and Essence) includes a basic [statement](#) of Aquinas' s metaphysical position. His literary [activity](#) stopped abruptly as the result of a religious experience a few months before his [death](#). Although he wrote many commentaries on the works of [Aristotle](#) and a comprehensive Summa de Veritate Catholicae Fidei contra Gentiles (Summa Contra Gentiles) (1259-1264), Aquinas' s unfinished Summa Theologica (1265-1273) represents the most complete statement of his [philosophical system](#). The sections of greatest interest for survey courses include his views on the [nature of god](#), including the [five ways to prove](#) god' s existence, and his exposition of [natural law](#). Although matters of such importance should be accepted on the basis of [divine revelation](#) alone, Aquinas held, it is at least [possible](#) (and perhaps even desirable) in some circumstances to achieve genuine [knowledge](#) of them by means of the rigorous application of human reason. As embodied souls (hylomorphic composites), human beings naturally rely on sensory information for their knowledge of the [world](#).

Reading hint: Although the rigidly formal structure of the Summa articles can be rather confusing to a modern reader, the central portion beginning with the words, "I answer that..." is always a direct statement of Aquinas' own position.

Recommended Reading.

Primary sources:

Opera omnia (Rome, 1882-);

Thomas Aquinas, Selected Writings, ed. by Ralph McInerny. (Penguin, 1999);

Thomas Aquinas, Selected Philosophical Writings, tr. By Timothy McDermott (Oxford, 1998);

Thomas Aquinas, Summa Theologiae: A Concise Translation, ed. by Timothy McDermott (Christian Classics, 1997);

An Aquinas Reader, ed. by Mary T. Clark (Fordham, 2000);

Thomas Aquinas, On [Law](#), [Morality](#), and [Politics](#), ed. by William P. Baumgarth and Richard J.Regan, S.J. (Hackett, 1988).

Secondary sources:

Etienne Gilson, The Philosophy of St. Thomas Aquinas (Dorset, 1981);

The Cambridge Companion to Aquinas, ed. by Norman Kretzmann and Eleonore Stump (Cambridge, 1993);

Ralph McInerny, St. Thomas Aquinas (Notre Dame, 1982);

The Christian Philosophy of St. Thomas Aquinas, by Etienne Gilson, tr. by I. T. Shook (Notre Dame, 1994);

Ralph McInerny, Ethica Thomistica: The Moral Philosophy of Thomas Aquinas (Catholic University of America, 1997);

Guide to Thomas Aquinas by Josef Pieper (Ignatius, 1997).

Additional on-line information about Aquinas includes:

Daniel J. Kennedy' s extremely thorough treatment of Aquinas and treatise on his relation to medieval thought at The Jacques Maritain Center.

The thorough collection of resources at EpistemeLinks.com.

Alexander Broadie' s article in The Oxford Companion to Philosophy.

Also see: concupiscence, the [cosmological argument](#), the first cause argument, the five ways, human nature, medieval philosophy, moral philosophy, neo-Thomism, ratiocination, philosophy of religion, [scholasticism](#), suicide, [Thomism](#), analytical Thomism, traversal of the [infinite](#), and just [war](#).

An article in The Internet Encyclopedia of Philosophy.

The excellent bibliography prepared by ThÈrÈsa Bonin. Walter Farrell' s masterly Companion to the Summa.

The article in the Columbia Encyclopedia at Bartleby.com.

Snippets from Aquinas (Latin and English) in The Oxford Dictionary of Quotations.

Gyula Klima' s essay on [faith](#) and [reason](#) in Aquinas.

The extensive biography of Aquinas at Brother Michael' s Internet Catholic Church.

Robert Sarkissian' s philosophical summary.

The Bloomsbury Guide to Human Thought on Natural Theology.

Bob Beard' s brief guide to Aquinas studies.

A brief entry in The Macmillan Encyclopedia 2001.

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

arche

<[principle](#), [Milesian philosophers](#), [foundation](#), [cause](#)>, <[Anaximander](#), [apeiron](#), [Empedocles](#)>, <[mataphysics](#), [ontology](#), [epistemology](#)>, <[absolute principle](#)> Greek [term](#) for beginning or ultimate principle. The Milesian philosophers looked for a single [material](#) stuff of which the entire [universe](#) is composed, while [Empedocles](#) identified no fewer than four elements whose mixture makes up ordinary things. For both [Plato](#) and [Aristotle](#), however, the arch most worth seeking would be an originating power from which the material order flows and upon which [theoretical knowledge](#) of its [nature](#) might be grounded logically.

Recommended Reading:

F. E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

Archimedes

<[geometry](#), [mathematics](#), [ancient philosophy](#), [physics](#), [science](#)>, <[epistemology](#), [machine](#)> Sicilian geometrician (287-212 BCE) who calculated an accurate [value](#) for p, demonstrated the relationship between the volume of spheres and cylinders, discovered methods for determining the center of gravity of plane figures, and provided a [foundation](#) for the [science](#) of hydrostatics. Archimedes also invented many ingenious machines, including a pump for raising water, effective levers and compound pulleys, and a mechanical planetarium. He died defending Syracuse against a Roman seige during the second Punic war.

Recommended Reading:

E. J. Dijksterhuis, Archimedes (Princeton, 1987).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

architecture

<[architecture](#)> Design, the way components fit together. The term is used particularly of processors, both individual and in general. "The [ARM](#) has a really clean architecture". It may also be used of any complex system, e.g. "software architecture", "network architecture".

[\[FOLDOP\]](#)

16-03-2001

Arendt Hannah

<[philosophy of women](#), [political philosophy](#), [ethics](#)>, <[moral philosophy](#), [phenomenology](#), [philosophy of history](#)>, <[existentialism](#), [metaphysics](#), [human action](#), [totalitarianism](#)>, <[anti-semitism](#), [philosophy of mind](#), [human condition](#)>, <[political action](#), [sociology](#)> German-American political philosopher (1906-1975). Although she had studied with [Jaspers](#) and [Heidegger](#) in Heidelberg, Arendt fled Germany in 1933 and, from her new home in the United States, wrote powerfully about the anti-Semitism of the Nazi regime, describing its emergence as an [instance](#) of "the eerie banality of [evil]" in *Eichmann in Jerusalem: A Report on the Banality of Evil* (1963). Arendt's *The Origins of Modern Totalitarianism* (1951) decried the concentration of [political power](#) engendered by [imperialism](#) of every sort. In *The Human Condition* (1958), *On Revolution* (1963), and *The Life of the Mind* (1978), however, she expressed a profound [skepticism](#) about the prospect that [philosophical thought](#) could significantly influence the [individual](#) actions that determine the political structure of human culture.

Recommended Reading:

The Portable Hannah Arendt, ed. by Peter Baehr (Penguin, 2000);
Hannah Arendt / Karl Jaspers Correspondence 1926-1969, ed. by Lotte Kohler and Hans Saner (Harcourt Brace, 1993); Margaret Canovan, *Hannah Arendt: A Reinterpretation of Her Political Thought* (Cambridge, 1994);
Feminist Interpretations of Hannah Arendt, ed. by Bonnie Honig (Penn. State, 1995);
 Dana Richard Villa, *Arendt and Heidegger* (Princeton, 1995).

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

Ares

<[arete](#), [philosophy of religion](#), [anthropomorphism](#)> Greek [god](#) of destruction, slaughter, and [war](#), later called Mars by the Romans. Hence, for poets and philosophers, a [symbol](#) of strife and discord generally.

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

aretae

<[ethics](#)> the Greek word for "excellence" or "[virtue](#)". For the Greeks, this was not limited to human beings. A guitar, for example, has its arete' ' in producing harmonious music; just as a hammer has its excellence or virtue in pounding nails into wood well. So, too, the virtue of an Olympic swimmer is in swimming well, and the virtue of a national leader lies in motivating people to work for the common good.

26-03-2001

arg

[argument](#)

10-02-2004

argument

1. <[logic](#)>

a. an [inference](#)

b. input to a [function](#)

c. a subject-term for a [predicate](#).

See also [corresponding argument](#)

[Glossary of First-Order Logic]

2. <[PI](#)> ("arg" or parameter) A value or reference passed to a [function](#), [procedure](#), [subroutine](#), command or program, by the caller. For example, in the function:

square(x) = x * x

x is the formal argument and in the call

y = square(3+3)

3+3 is the [actual argument](#). This will execute the function square with x having the value 6.

There are many different conventions for passing arguments to functions and procedures including call-by-value, call-by-name, call-by-need. These affect whether the value of the argument is computed by the caller or the callee (the function) and whether the callee can modify the value of the argument as seen by the caller (if it is a variable).

Arguments to a program are usually given after the command name, separated by spaces, e.g.:

```
cat myfile yourfile hisfile
```

Here "cat" is the command and "myfile", "yourfile", and "hisfile" are the arguments.

[[FOLDOP](#)]

16-03-2001

argument form

<[logic](#), [syllogism](#), [logic](#), [mathematics](#), [dialectic](#)>, <[epistemology](#), [deduction](#), [induction](#), [demonstration](#), [proof](#)>, the [general logical structure](#) of an [argument](#) considered apart from any of its [specific content](#). In [categorical logic](#), an [argument form](#) is any one of the 256 distinct varieties of [categorical syllogism](#). In the [propositional calculus](#), an argument form is a set of two or more [statement forms](#) such that the [substitution](#) of an [actual statement](#) for each of its statement [variables](#) would [result](#) in an argument.

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

argument from evil

<[ethics](#), [teleological argument](#), [metaphysics](#)> [argument](#) from the existence of evil to the non existence of an omnipotent, omniscient and perfectly benevolent being such as [God](#) is supposed to be. Since [evil](#) exists, it' argued, either God can' t prevent it (and so, is not omnipotent) or doesn' t know about it (and so, is r omniscient) or doesn' t wish to remove it (and so, is not perfectly benevolent). Contrast: teleological argument.

[[Philosophical Glossary](#)]

06-06-2001

argumentum

<[argument](#), [appeal to force](#), [ad hominem argument](#)>

... ad baculum: see appeal to force.

... ad hominem: see [ad hominem argument](#).

... ad ignoratiam: see appeal to ignorance.

... ad misericordiam: see appeal to pity.

... ad populum: see appeal to emotion.

... ad verecundiam: see appeal to authority.

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

argumentum ad populum[emotion appeal](#)

15-11-2003

Aristippus

<[ancient philosophy](#), [platonism](#), [Cyrenaic school](#), [edonism](#)>, ethics, pleasure, cynism, wisdom, happiness> North African philosopher (435-356 BC). Originally a student of [Socrates](#), Aristippus (and his eponymous grandson) established the Cyrenaic school of [philosophy](#), according to which sensual pleasure in the present moment, tempered only by moderation, is the genuine good for human life.

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

aristocracy

<[political theory](#), [philosophy of history](#)> political theory that advocates the rule of "the best" whom it identifies, generally, with a hereditary upper [class](#). Contrast: [autocracy](#), [democracy](#), oligarchy.

[\[Philosophical Glossary\]](#)

06-06-2001

aristotelian logic

<[logic](#), [Aristotle](#)> [traditional categorical logic](#), as developed originally in the Organon of [Aristotle](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

aristotelianism

<[peripatetic school](#), [Aristotle](#), [arabic philosophy](#), [medieval philosophy renaissance](#), [substance](#), [ontology](#), [methaphysics](#), [logic](#), [dialectic](#), [epistemology](#), [politics](#), [ethics](#), [philosophy](#), [scholasticism](#), [psycology](#)> A [tradition](#), dating from the medieval period, concerned with promoting and defending significant portions of the [philosophy](#) of [Aristotle](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

Aristotle

<[aristotelianism](#), [peripatetic school](#)> born at Stagira in northern Greece, Aristotle (384-322 BC) was the most notable product of the educational program devised by [Plato](#); he spent twenty years of his [life](#) studying at the Academy. When Plato died, Aristotle returned to his native Macedonia, where he is supposed to have participated in the education of Philip' s son, Alexander (the Great). He came back to Athens with Alexander' approval in 335 and established his own school at the Lyceum, spending most of the rest of his life engaged there in research, teaching, and writing. His students acquired the name "peripatetics" from the master' s habit of strolling about as he taught.

Although the surviving works of Aristotle probably represent only a fragment of the whole, they include his investigations of an amazing range of subjects, from [logic](#), [philosophy](#), and [ethics](#) to physics, biology, [psychology](#), [politics](#), and rhetoric. Aristotle appears to have thought through his views as he wrote, returning to significant issues at [different](#) stages of his own development. The [result](#) is less a [consistent system](#) of thought than a [complex](#) record of Aristotle' s thinking about many significant issues.

The aim of Aristotle' s logical treatises (known collectively as the Organon) was to develop a universal method of reasoning by means of which it would be [possible](#) to learn everything there is to know about reality. Thus, the Categories proposes a scheme for the description of [particular](#) things in terms of their properties, states,

and activities. On [Interpretation](#), [Prior](#) Analytics, and [Posterior](#) Analytics examine the [nature](#) of [deductive inference](#), outlining the system of syllogistic reasoning from true propositions that later came to be known as [categorical logic](#).

Though not strictly one of the logical works, the [Physics](#) contributes to the universal method by distinguishing among the four causes which may be used to explain everything, with special concern for why things are the way they are and the apparent role of [chance](#) in the operation of the [world](#). In other treatises, Aristotle applied this [method](#), with its characteristic emphasis on [teleological explanation](#), to astronomical and biological explorations of the natural world.

In [Metaphysics](#) Aristotle tried to justify the entire enterprise by grounding it all in an [abstract](#) study of being qua being. Although Aristotle rejected the Platonic theory of forms, he defended his own vision of ultimate reality, including the eternal existence of [substance](#).

On [The Soul](#) uses the notion of a hylomorphic composite to provide a detailed account of the functions exhibited by living things-vegetable, [animal](#), and human-and explains the use of [sensation](#) and [reason](#) to achieve genuine knowledge. That Aristotle was interested in more than a strictly scientific exploration of human nature is [evident](#) from the discussion of literary art (particularly tragedy) in [Poetics](#) and the methods of persuasion in the [Rhetoric](#).

Aristotle made several efforts to explain how [moral](#) conduct contributes to the good life for human agents, including the [Eudemian Ethics](#) and the [Magna Moralia](#), but the most complete surviving [statement](#) of his views on morality occurs in the [Nicomachean Ethics](#). There he considered the natural desire to achieve [happiness](#), described the operation of human volition and moral deliberation, developed a [theory](#) of each virtue as the mean between [vicious](#) extremes, discussed the [value](#) of three kinds of friendship, and defended his conception of an ideal life of intellectual pursuit. But on Aristotle's view, the lives of individual human beings are invariably linked together in a social context. In the [Politics](#) he speculated about the origins of the state, described and assessed the relative merits of various types of government, and listed the obligations of the individual citizen. He may also have been the author of a [model](#) Constitution of Athens, in which the [abstract notion](#) of [constitutional government](#) is applied to the [concrete](#) life of a [particular society](#).

Recommended Reading:

Primary sources:

Aristotelis opera, ed. by I. Bekker (Prussian Academy, 1831-70);
 The Complete Works of Aristotle, ed. by Jonathan Barnes. (Princeton, 1984)
 - vol. 1: includes the logical works, [Physics](#), treatises on astronomy and animals, and [Of the Soul](#)
 - vol. 2: includes additional scientific treatises, [Metaphysics](#), the works on ethics, [Politics](#), [Rhetoric](#), and [Poetics](#). Basic Works of Aristotle, ed. by Richard McKeon (Random House, 1941);
 Aristotle: Introductory Readings, tr. by Terence Irwin and Gail Fine (Hackett, 1996);
 Nichomachean Ethics, tr. By Terence Irwin (Hackett, 1985).

Secondary sources:

The Cambridge Companion to Aristotle, ed. by Jonathan Barnes (Cambridge, 1995);
 Aristotle the Philosopher, ed. by J.L. Ackrill (Oxford, 1981);
 Henry Veatch, Aristotle, a Contemporary Appreciation (Indiana, 1974);
 Jonathan Lear, Aristotle: The [Desire](#) to Understand (Cambridge, 1998);
 Feminist Interpretations of Aristotle, ed. by Cynthia A. Freeland (Penn. State, 1998);
 Kenneth McLeish, Aristotle (Routledge, 1999);
 Joseph Owens, Doctrine of Being in the Aristotelian Metaphysics (Pontifical Institute, 1978);
 Essays on Aristotle's [De Anima](#), ed. by Martha Nussbaum and Amelie Rorty (Clarendon, 1996);
 John M. Cooper, Reason and [Emotion](#) (Princeton, 1998);
 Sarah Broadie, Ethics with Aristotle (Oxford, 1995);
 Aristotle's Ethics: Critical Essays, ed. by Nancy Sherman (Rowman & Littlefield, 1999);
 J. O. Urmson, Aristotle's Ethics (Blackwell, 1988);
 Anthony Kenny, Aristotle's Theory of the Will (Yale, 1979);
 Fred D. Miller, Jr., Nature, Justice, and Rights in Aristotle's [Politics](#) (Oxford, 1997).

Additional on-line information about Aristotle includes:

Richard Hooker's excellent treatment.
 A thorough article in The Internet Encyclopedia of Philosophy.
 William Turner's full treatment in The Catholic Encyclopedia.
 articles in The Stanford Encyclopedia of Philosophy on:
 Aristotle's logic by Robin Smith.
 Aristotle's metaphysics by S. Marc Cohen.
 Aristotle's ethics by Richard Kraut.
 Aristotle's political theory by Fred D. Miller, Jr.
 David Charles's article in The Oxford Companion to Philosophy.

Also see: active and passive intellects, [akrasia](#), ancient philosophy, [Aristotelianism](#), categories, [catharsis](#), final causes, focal meaning, form and matter, friendship, genus and species, the greatest good, good-in-itself, the great-souled man, hylomorphism, [kinesis](#), laws of thought, [logic](#), master and slave, the doctrine of the mean, [metaphysics](#), moral philosophy, [motion](#), [Peripatetics](#), [phronaesis](#), [pleasure](#), the principle of plenitude, political philosophy, potentiality, prime matter, the prime mover, rhetoric, right action, self-control, the third man argument, the verb 'to be', tragedy, universals, virtues, [being](#), and why.

The thorough collection of resources at EpistemeLinks.com.

Gordon L. Ziniewicz on the physics and metaphysics and the ethics of Aristotle. the excellent treatment of virtue ethics from Lawrence Hinman.

The article in the Columbia Encyclopedia at Bartleby.com.

A bibliography of recent articles from S. Marc Cohen.

Snippets from Aristotle in The Oxford Dictionary of Quotations.

Bjoern Christensson's guide to Aristotle studies.

MHBER on Aristotle and Renaissance Aristotelianism.
Eric Weisstein' s entry in Treasure Trove o[Scientific](#)

Biography.

Aristotle and the morally excellent brain, from David DeMoss.

A paper on Aristotle' s treatment of homosexuality by Guy Bouchard.

An article by D. K. House on whether Aristotle understood Plato.

A literary [analysis](#) in The Perseus Encyclopedia.

The Bloomsbury Guide to [Human Thought](#) on Tragedy.

A brief entry in Oxford' s Concise Dictionary of [Linguistics](#).

An entry in The Oxford Dictionary of Scientists.

An account of Aristotle' s contribution to mathematics from

Mathematical MacTutor a brief entry in The Macmillan Encyclopedia 2001.

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

arithmetisation

<[logic](#)> A generalized form of [Goedel numbering](#) in which distinct [numerals](#) Are assigned to distinct symbols in the alphabet of a [formal language](#).

As a result every [wff](#) of the language can be re-expressed as a Numeral concatenating all the numerals for its component symbols).

When done well, there can easily be an effective method for translating [wffs](#) into numerals and vice versa.

[Glossary of First-Order Logic]

16-03-2001

arity

<[Pi](#)> The number of [arguments](#) a [function](#) or [operator](#) takes. In some languages functions may have variable arity which sometimes means their last or only argument is actually a list of arguments.

[\[FOLDOP\]](#)

16-03-2001

Arnauld Antoine

<[theology](#), [metaphysics](#), [ethics](#), [logic](#), [epistemology](#)>, <[occasionalism](#), [rationalism](#), [Port-Royal logic](#)> French theologian and philosopher (1612-1694). Influential as co-author (with Pierre Nicole) of La logique, ou l' art d penser (The "Port-Royal" Logic) (1662), Arnauld was active in the seventeenth-century French philosophical community that also included [Mersenne](#) and [Pascal](#). Arnauld wrote the fourth set of Objections that were published along with Descartes' s Meditations (1641), criticized the occasionalist philosophical system an theological views of [Malebranche](#) in Traite de vraies et fausses idees (On True and False Ideas) (1683), and engaged in a lengthy correspondence with [Leibniz](#).

Recommended Reading:

Steven Nadler, Arnauld and the Cartesian Philosophy of Ideas (Princeton, 1989).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

Arrow Kenneth Joseph

<[sociology](#), [economics](#)> American economist and social theorist (1921-). In [Social Choice](#) and [Individual Values](#) (1951). Arrow introduced the general impossibility theorem, which shows that the rationally collective preference of a group cannot always be derived from the transitive preferences of its individual members. (This point is often illustrated with instances of the [voting paradox](#).) Arrow won the Nobel Prize in [Economic Sciences](#) in 1972.

Recommended Reading:

Kenneth Joseph Arrow, *The Limits of Organization* (Norton, 1974)

Kenneth Joseph Arrow, *Markets, Information, and Uncertainty: Essays in Economic Theory in Honor of Kenneth J. Arrow*, ed. by Graciela Chichilnisky (Cambridge, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

Artificial Life

<[PL](#)> (a-life) The study of synthetic systems which behave like natural living systems in some way. Artificial Life complements the traditional biological sciences concerned with the analysis of living organisms by attempting to create lifelike behaviours within computers and other artificial media. Artificial Life can contribute to theoretical biology by modelling forms of life other than those which exist in nature. It has applications in environmental and financial modelling and network communications.

There are some interesting implementations of artificial life using strangely shaped blocks. A video, probably by the company Artificial Creatures who build insect-like robots in Cambridge, MA (USA), has several mechanical implementations of artificial life forms.

See also evolutionary computing, [Life](#).

[Christopher G. Langton (Ed.), "Artificial Life", *Proceedings Volume VI*, Santa Fe Institute Studies in the Sciences of Complexity. Addison-Wesley, 1989].

Yahoo! (http://www.yahoo.com/Science/Artificial_Life/).

Santa Fe Institute (<http://alife.santafe.edu/>).

The Avida Group

(<http://www.krl.caltech.edu/avida/Avida.html>).

[[FOLDOC](#)]

16-03-2001

artificial neural network

<[artificial intelligence](#)> (ANN, commonly just "neural network" or "neural net") A network of many very simple processors ("units" or "neurons"), each possibly having a (small amount of) local memory. The units are connected by unidirectional communication channels ("connections"), which carry numeric (as opposed to symbolic) data. The units operate only on their local data and on the inputs they receive via the connections.

A neural network is a processing device, either an [algorithm](#), or actual hardware, whose design was inspired by the design and functioning of animal brains and components thereof.

Most neural networks have some sort of "training" rule whereby the weights of connections are adjusted on the basis of presented patterns. In other words, neural networks "learn" from examples, just like children learn to recognise dogs from examples of dogs, and exhibit some structural capability for generalisation.

Neurons are often elementary non-linear signal processors (in the limit they are simple threshold discriminators). Another feature of NNs which distinguishes them from other computing devices is a high degree of interconnection which allows a high degree of parallelism. Further, there is no idle memory containing data and programs, but rather each neuron is pre-programmed and continuously active.

The term "neural net" should logically, but in common usage never does, also include biological neural networks, whose elementary structures are far more complicated than the mathematical models used for ANNs.

See [Aspirin](#), [Hopfield network](#), McCulloch-Pitts neuron.

[Usenet](#) newsgroup: <news:comp.ai.neural-nets>.

[[FOLDOC](#)]

16-03-2001

asceticism

<[ethics](#)> the position according to which the pleasures of this world should be renounced, usually for the sake of some "higher" purpose like intellectual discipline or mystical insight. The doctrine is often connected with the mind-body dichotomy, as it consists of an extreme emphasis on the mind and the pleasures of thought (somewhat akin to psychological [rationalism](#)). For the opposite view, see sensualism. (References from [Buddhism](#), Cynicism, [Kantianism](#), Pythagoreanism, sensualism, and spiritualism.)

Based on [\[The Ism Book\]](#)

Edited by Giovanni Benzi

24-03-2001

aspectual shape

<[philosophy of mind](#)>

Similar to the notion of [sense](#) introduced by John Searle in 1992.

Chris Eliasmith - [\[Dictionary of Philosophy of Mind\]](#)
Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

assent

<[apprehension](#), [stoicism](#), >, <[evident](#), [Descartes](#), [epistemology](#), [empiricism](#)> make a [judgment](#). For many philosophers of the modern period, assent is the mental act of accepting the [truth](#) of a [statement](#), whether or not one has adequate [evidence](#) for knowing it.

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

assertion

<[PI](#)>

1. An expression which, if false, indicates an [error](#). Assertions are used for debugging by catching can' t happen errors.

2. fact or [rule](#) added to the database by the program at run time. This is an extralogical or impure feature of logic programming languages.

[\[FOLDOP\]](#)

16-03-2001

assertoric

<[epistemology](#), [demonstrative](#), [logic](#), [Aristotle](#), [necessary](#)>, a [proposition](#) stating that something actually is the [case](#), rather than [necessary](#) or merely [possible](#). See: [problematic](#) /assertoric / [apodeictic](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

assignment

<PI> Storing the value of an expression in a [variable](#). This is commonly written in the form "v = e". In Algol the assignment operator was ":= " (pronounced "becomes") to avoid mathematicians qualms about writing statements like $x = x+1$.

Assignment is not allowed in functional languages, where an identifier always has the same value.

See also referential transparency, single assignment, zero assignment.

[[FOLDOC](#)]

16-03-2001

assignment problem

<[mathematics](#), [algorithm](#)> (Or "linear assignment") Any problem involving minimising the sum of $C(a, b)$ over a set P of pairs (a, b) where a is an element of some set A and b is an element of set B , and C is some function, under constraints such as "each element of A must appear exactly once in P " or similarly for B , or both.

For example, the a 's could be workers and the b 's projects.

The problem is "linear" because the "cost function" $C()$ depends only on the particular pairing (a, b) and is independent of all other pairings.

(<http://forum.swarthmore.edu/epigone/comp.soft-sys.matlab/bringhyclu>).

(<http://www.soci.swt.edu/capps/prob.htm>).

(<http://mat.gsia.cmu.edu/GROUP95/0577.html>).

(<http://www.informs.org/Conf/WA96/TALKS/SB24.3.html>).

[[FOLDOC](#)]

16-03-2001

associated propositional formula

<[logic](#)> A [wff](#) A of propositional logic created from a [wff](#) B of [predicate](#) logic by (1) removing the quantifiers from B , and (2) replacing each [predicate](#) symbol (and its [arguments](#)) in B with a propositional symbol. Notation: $B^{\text{prop}} = p$.

[Glossary of First-Order Logic]

16-03-2001

association

<[equivalence](#), [analogy](#), [similarity](#), [epistemology](#), [logic](#)>, <[semantics](#)> a [rule](#) of replacement of the [forms](#):

$$(p \vee (q \vee r)) = ((p \vee q) \vee r)$$

$$(p \wedge (q \wedge r)) = ((p \wedge q) \wedge r)$$

Example: "Harold is over 21, and so are Jane and Kelly." Is [equivalent](#) to "Harold and Jane are over 21, and so is Kelly." The associativity of both [disjunction](#) and [conjunction](#) can be demonstrated by truth-table [analysis](#).

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

association of ideas

<[epistemology](#), [Plato](#), [memory](#), [learning](#), [imagine](#), [empiricism](#)>, <[imagination](#), [contiguity](#), [psychology](#), [Skinner](#), [Gestalttheorie](#)>, <[associationism](#), [semantics](#)> presumed regularities in the co-existence or succession of [particular mental contents](#). Noted as unreliable by [Locke](#), the process of [association](#) became a central [feature](#) of human thought in the [philosophy](#) of [Hume](#) and [Mill](#) and in the [psychology](#) of [Skinner](#).

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

associationalism

<[epistemology](#), [philosophy of mind](#)> psychological theory of knowledge which holds that all of our concepts come about through the [association](#) of images. David [Hume](#) is often called the first associationalist, but the idea enjoyed its great heyday in the late nineteenth century in tandem with [sensationalism](#).

[[The Ism Book](#)]

Edited by Giovanni Benzi

24-03-2001

assumption

<[premise](#), [conclusion](#), [reasoning](#), [proof](#), [evidence](#), [hypothesis](#)>, <[logic](#), [epistemology](#), [philosophy of science](#)> a [proposition](#) accepted without [proof](#) or [evidence](#) as the basis for some further [conclusion](#).

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

ataraxia

<[Epicureanism](#), [Democritus](#), [stoicism](#), [tranquillity](#), [freedom](#), [Pyrrho](#), [Epicurus](#), [apathy](#), [ethics](#), [pleasure](#), [haedonae](#)> The Greek [term](#) used by [Pyrrho](#) and [Epicurus](#) for tranquillity, or the [freedom](#) from disturbance and pain that characterizes a balanced [mind](#) and constitutes its first step toward the achievement of [pleasure](#) (Gk. haedonae).

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

atheism

<[ethics](#), [philosophy of religion](#)> the belief that, or the philosophical position according to which, God, gods, deities, and supernatural powers do not exist. In this respect it is similar to [secularism](#) and opposed to any variety of [theism](#).

In the last two centuries, some of the most influential atheistic hilosophers have been Karl Marx, Friedrich Nietzsche, Bertrand Russell, and Jean-Paul Sartre.

Atheism is to be contrasted with [agnosticism](#), which takes a doubtful attitude towards the existence of God(s) but does not proclaim disbelief.

Popularly, atheism is often taken to imply a lack of any ideals or [values](#) whatsoever (see [immoralism](#)), but this connotation rests on the controversial assumption that religious or supernatural values are the only real values. (References from [agnosticism](#), [secularism](#), and [theism](#).)

26-03-2001

atomism

<[metaphysics](#), [ontology](#), [epistemology](#)> metaphysical or cosmological position according to which reality is fundamentally made up only of indivisible particles, independent, extremely small, self-sufficient atoms (nothing more). According to atomism, a complete description of the universe might be given by specifying the location and movements of all the atoms composing it.

Democritus is the most notable ancient atomist. According to Leibniz monads are "the true atoms." Locke' corpuscular hypothesis is also a version of Atomism.

based on [[Giovanni Benzi, A Philosophical Glossary](#)],
[[Philosophical Glossary](#)]

28-07-2001

attribute

, <[Descartes](#), [limited substance](#), [monism](#), [Spinoza](#)> a [property](#) or [feature](#) possessed by a [substance](#). In the [philosophical](#) nomenclature employed by [Aquinas](#) and [Descartes](#), attributes are commonly regarded as essential to the substances that have them.

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

Aufklaerung

<[enlightenment](#), [spirit of reason](#), [Kant](#)>, German [term](#) for [Enlightenment](#), the modern spirit of reliance on reason espoused by such philosophers as [Mendelssohn](#) and [Kant](#).

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

Augustine

<[theology](#), [ontology](#), [metaphysics](#), [christian philosophy](#)>, <[stoicism](#), [neoplatonism](#), [political thought](#), [ethics](#)>, <[manicheism](#), [rhetoric](#), [medieval philosophy](#)> <[skepticism](#), [epistemology](#), [philosophy of religion](#)>, <[Pelagianism](#), [theodicy](#), [original sin](#), [escathology](#)>, <[philosophy of history](#)> born to a Christian mother and pagan father at Tagaste in North Africa, Augustine (354-430) was a confirmed [Manichaeon](#) during his early years as a student and teacher of rhetoric at Carthage and Rome. But in Milan, during his early thirties, he began to study Neoplatonic philosophy under the guidance of [Ambrose](#) and eventually converted to [Christianity](#). An account of his early [life](#) and conversion, together with a reasoned defense of his Neoplatonic principles, may be found in the Confessiones (Confessions) (401). He was named the Christian bishop of Hippo (Annaba, Algeria) in 396, and devoted the remaining decades of his [life](#) to the formation of an [ascetic](#) religious community.

Augustine argued against the skeptics that genuine human [knowledge](#) can be established with certainty. His explanation of human nature and agency combined stoic and Christian elements. But it was by reference to the abstract philosophy of [Plato](#) that Augustine sought to prove the existence of god. Acknowledging the difficulties of divine control and foreknowledge, he used an analysis of the nature of time to defend human freedom in De Gratia et Libero Arbitrio (On [Grace](#) and [Free Will](#)). In De Civitate Dei (The City of [God](#)) (413-427) Augustine distinguished [religion](#) and [morality](#) from [politics](#) and tried to establish the proper relations among them, arguing for the church' s strict [independence](#) from (if not its outright superiority to) the civil state. You might be interested in viewing portions of a Dutch library' s copy of a fifteenth century illuminated manuscript of this text.

Recommended Reading:

Primary sources:

Sancti Aurelii Augustini opera omnia (Paris, 1679-1700);
The Essential Augustine, ed. by Vernon J. Bourke (Hackett, 1974);
Augustine, The Confessions, ed. by Susan B. Varenne (Vintage, 1998);
Augustine, City of God, tr. by Marcus Dods (Modern Library, 2000).

Secondary sources:

Henry Chadwick, Augustine (Oxford, 1986);
James Wetzel, Augustine and the Limits of Virtue (Cambridge, 1992).

Additional on-line information about Augustine includes:

James J. O' Donnell' s excellent survey of Internet resources.

The thorough collection of resources at EpistemeLinks.com.
 John F. Callahan' s lecture on Augustine and the Greek Philosophers.
 a thorough article in The Internet Encyclopedia of Philosophy.
 Michael Mendelson' s article in The Stanford Encyclopedia of [Philosophy](#).
 Christopher Kirwan' s article in The Oxford Companion to Philosophy.

Also see: the [problem](#) of [evil](#), [medieval philosophy](#), [original sin](#), [Pelagius](#), [philosophy of religion](#), [theodicy](#), and just [war](#).

The article in the Columbia Encyclopedia at Bartleby.com.
 A lecture on Augustine from Charles Ess.
 Snippets from Augustine (Latin and English) in The Oxford Dictionary of Quotations.
 Björn Christensson' s brief guide to Augustine studies.
 Robert Sarkissian' s philosophical summary.
 A brief entry in The Macmillan Encyclopedia 2001.

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

Austin John

<[utilitarianism](#), [ethics](#), [philosophy of Law](#), [Bentham](#)>, <[legal positivism](#), [moral philosophy](#)> British legal theorist (1790-1859). Although he shared many of the [utilitarian](#) goals of his friend [Bentham](#), Austin became the foremost representative of [legal positivism](#).

He argued in The Province of Jurisprudence Determined (1832) and the unfinished Lectures on Jurisprudence (1863) that, as a matter of [practical fact](#), the law is nothing more than the command of a legitimate sovereign, enforced by the imposition of effective moral sanctions.

Recommended Reading:

Wilfrid E. Rumble, The Thought of John Austin: Jurisprudence, Colonial Reform, and the British Constitution (Athlone, 1985).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

Austin John Langshaw

<[semantics](#), [linguistics](#)>, <[philosophy of language](#), [analytic philosophy](#)> J.L. Austin (1911-1960) was born in Lancaster and educated at Oxford, where he became a professor of [philosophy](#) following several years of service in British [intelligence](#) during [World War II](#). Although greatly admired as a teacher, Austin published little of his [philosophical work](#) during his brief lifetime. Students gathered his papers and lectures in books that were published posthumously, including Philosophical Papers (1961) and [Sense](#) and Sensibilia (1962).

In "A Plea for Excuses" (1956), Austin explained and illustrated his [method](#) of approaching philosophical issues by first patiently analyzing the subtleties of ordinary language. In How to Do Things with Words (1961), the transcription of Austin' s James lectures at Harvard, application of this method distinguishes between what we say, what we mean when we say it, and what we accomplish by saying it, or between [speech acts](#) involving [locution](#), [illocution](#) (or "[performative utterance](#)"), and [perlocution](#).

Recommended Reading:

Primary sources:

J.L. Austin, How to Do Things with Words (Harvard, 1975);
 J.L. Austin, Philosophical Papers, ed. by J. O. Urmson and Geoffrey J. Warnock (Oxford, 1990);
 J.L. Austin, Sense and Sensibilia, ed. by Geoffrey J. Warnock (Oxford, 1962).

Secondary sources:

G.J. Warnock, J.L. Austin (Routledge, 1991).

Additional on-line information about Austin includes:

Jennifer Hornsby' s article in The Oxford Companion to Philosophy.

Also see: analytic philosophy, constatives, English philosophy, linguistic acts, linguistic philosophy, the linguistic turn, ordinary language and philosophy, and Oxford philosophy.

The article in the Columbia Encyclopedia at Bartleby.com.
 The thorough collection of resources at EpistemeLinks.com.
 Warren Hedges' s notes on key concepts from Austin.
 Brief entries in Oxford' s Concise Dictionary of Linguistics on Austin, speech acts, illocutionary, locutionary, perlocutionary.
 A short article in Oxford' s Who' s Who in the Twentieth Century.
 A brief entry in The Macmillan Encyclopedia 2001.

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

authentication

the verification of the identity of a person or process. In a communication system, authentication verifies that messages really come from their stated source, like the signature on a (paper) letter.

16-03-2001

authenticity

<[authentic](#), [existensialism](#), [ethics](#), [psychology](#), [Angst](#)>, <[anxiety](#), [Jaspers](#), [Dasein](#), [identity](#), [Heidegger](#)> Self-conscious appropriation of the conditions of one' s ow[existence](#) and [identity](#). According to [Heidegger](#), such deliberate [reflection](#) about the goals and values of [life](#) is the only successful response to the experience of Angst without falling into self-deception.

Recommended Reading:

Michael E. Zimmerman, Eclipse of the Self: The Development of Heidegger' s Concept of Authenticity (Ohic 1986) Heidegger, Authenticity, and Modernity: Essays in Honor of Hubert L. Dreyfus (MIT, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

authoritarianism

<[political philosophy](#)> term used to describe the political practice or philosophical defense of the subordination by force of the wishes and aims of the individual to the interests of the state. Following the usage of Jeanne Kirkpatrick, authoritarianism is sometimes held to involve a less egregious violation of individual [rights](#) than [totalitarianism](#). (References from [absolutism](#), [collectivism](#), [communism](#), legalism, and [totalitarianism](#).)

[\[The Ism Book\]](#)

Edited by Giovanni Benzi

24-03-2001

authority appeal to

<[logic](#), [argumentum](#), [argument](#), [syllogysm](#), [fallacia](#)>, <[epistemology](#), [opinion](#), [authority](#)> (argumentum ad verecundiam). The [informal fallacy](#) of claiming that we ought to accept the [truth](#) of a [proposition](#) because of some personal [feature](#) of the [individual](#) who affirms it.

Example: "The former Governor believes that aliens have landed in the Arizona desert, so aliens must have landed in the Arizona desert."

Recommended Reading: Douglas Walton, Appeal to Expert Opinion: Arguments from Authority (Penn. State, 1997).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

autocracy

<[political theory](#)> one person rule. Where the rulership is hereditary, the government in question is a "monarchy"; where nonhereditary, a "dictatorship."

Contrast: [democracy](#).

[[Philosophical Glossary](#)]

06-06-2001

automata

[automaton](#)

13-02-2004

automata theory

[automaton](#)

13-02-2004

automation

Automatic, as opposed to human, operation or control of a process, equipment or a system; or the techniques and equipment used to achieve this. Most often applied to computer (or at least electronic) control of a manufacturing process.

See also design automation, office automation, manularity, Manufacturing Automation Protocol, PEARL, QBE.

[[FOLDOC](#)]

16-03-2001

automatism

<[PI](#), [metaphysics](#)> the doctrine that all animal activities are mechanistically determined. The view is part of [Cartesianism](#), since [Descartes](#) held to a strict [determinism](#) in biological affairs. The view is rather extreme, but persists in some circles under different names see, for example, behaviorism.

[[The Ism Book](#)]

Edited by Giovanni Benzi

24-03-2001

automaton

<[robotics](#), [mathematics](#), [algorithm](#)> (Plural automata) A machine, [robot](#), or formal system designed to follow a precise sequence of instructions.

Automata theory, the invention and study of automata, includes the study of the capabilities and limitations of computing processes, the manner in which systems receive input, process it, and produce output, and the relationships between behavioural theories and the operation and use of automated devices.

See also [cellular automaton](#), [finite state machine](#).

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16-03-2001

autonomy

<[ethics](#)> etymologically, it goes back to the Greek words for "self" and "law." This term is most strongly associated with Immanuel Kant, for whom it meant the ability to give the moral law to oneself. The term may have a weaker and a stronger meaning, depending on the nature of the agent:

1. the ability of an [agent](#) A to determine A' s course of action. An artificial agent like an applet can b autonomous in this sense.
2. the ability of a human subject S to determine S' s own course in life freely. In this sense autonomy require [freedom](#).

13-02-2004

autonomy - heteronomy of the will

<[Kantian ethics](#), [categorical imperativ](#), [willing](#), [metaphysics](#)>, <[relational autonomy](#), [freedom](#), [action](#), [philosophy of action](#)> Kant' [distinction](#) between ways of choosing how to [act](#).

Autonomous agents are self-legislating; they act according to the categorical imperative of willing only what is universalizable as moral law. Heteronomous agents derive principles of action from outside themselves, by considering the objects or consequences of their choices or [being](#) influenced by the [will](#) of others.

Recommended Reading:

Immanuel Kant, Grounding for the Metaphysics of Morals, tr. by James W. Ellington (Hackett, 1993);

Thomas E. Hill, Jr., [Autonomy](#) and Self-Respect (Cambridge, 1991);

Thomas E. Hill, Jr., Relational Autonomy: Feminist Perspectives on Autonomy, Agency, and the Social Self, ed. by Catriona MacKenzie and Natalie Stoljar (Oxford, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

avatar

1. <[chat](#), [virtual reality](#)> An [image](#) representing a user in a multi-user [virtual reality](#) (or VR-like, in the case of Palace) space.

2. (CMU, Tektronix) root, superuser. There are quite a few Unix computers on which the name of the superuser account is "avatar" rather than "root". This quirk was originated by a [CMU](#) hacker who disliked the term "superuser", and was propagated through an ex-CMU hacker at Tektronix.

[\[Jargon File\]](#) and [\[FOLDOP\]](#)

16-03-2001

Averroes

<[arabic philosophy](#), [medieval philosophy](#), [scholasticism](#)>, <[averroism](#), [onsotology](#), [metaphysics](#), [epistemology](#)> Latinized name of the Islamic philosopher Ibn Rushd.

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

Avicbron

<[Jewish philosophy](#)> Latinized name of the Jewish philosopher [Ibn Gabirol](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

Avicenna

<[Persian philosophy](#), [alchemy](#), [magic](#)> Latinized name of Persian philosopher Ibn Sina.

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

axiology

<[epistemology](#), [ethics](#), [aesthetics](#)> branch of [philosophy](#) that studies judgments about [value](#), including those of both [aesthetics](#) and [ethics](#).

Recommended Reading:

Rem B. Edwards, Formal Axiology And Its Critics (Rodopi, 1995)

Rem B. Edwards, Forms of Value and Valuation, ed. by John W. Davis and Rem B. Edwards (Univ.Pr. of Am., 1992).

[[A Dictionary of Philosophical Terms and Names](#)]

16-11-2001

axiom

<[logic](#)> A [wff](#) that is taken to be true without proof in the construction of a [theory](#) or stipulated as unproved premise for the proof of other [wffs](#) inside a formal system (compare [lemma](#)).

axiom schema (plural: schemata)

A formula containing variables of the metalanguage which becomes an axiom when its variables are instantiated to [wffs](#) of the [formal language](#).

logical axiom

An axiom that is a logically valid [wff](#) of the language of the system. See [logical validity](#)

proper axiom

An axiom that is not a logically valid [wff](#) of the language of the system (but is a closed [wff](#)).

[[Glossary of First-Order Logic](#)] and [[FOLDOP](#)]

16-03-2001

Axiom of Choice

<[mathematics](#), [logic](#)> (AC, or "Choice", also called the multiplicative axiom) A controversial [axiom](#) of [set theory](#) asserting that for a non-empty set A of non-empty disjoint sets, there is a set B with exactly one member from each of the disjoint sets comprising A.

Sometimes the axiom is written so as to assert that there is a function for choosing the members of the disjoint sets comprising A that will become the members of B:

if X is a set, and S is the union of all the elements of X, then there exists a function $f: X \rightarrow S$ such that for all non-empty sets x in X, $f(x)$ is an element of x.

In other words, we can always choose an element from each set in a set of sets, simultaneously.

Function f is a "choice function" for X - for each x in X, it chooses an element of x.

Most people's reaction to AC is: "But of course that's true! From each set, just take the element that's big stupidest, closest to the North Pole, or whatever". Indeed, for any [finite](#) set of sets, we can simply consider each set in turn and pick an arbitrary element in some such way. We can also construct a choice function for most simple [infinite sets](#) of sets if they are generated in some regular way. However, there are some infinite sets for which the construction or specification of such a choice function would never end because we would have to consider an infinite number of separate cases.

For example, if we express the [real number](#) line R as the union of many "copies" of the [rational numbers](#), Q, namely Q, Q+a, Q+b, and infinitely (in fact uncountably) many more, where a, b, etc. are irrational numbers no two of which differ by a rational, and

$Q+a == q+a : q \text{ in } Q$

we cannot pick an element of each of these "copies" without AC.

An example of the use of AC is the theorem which states that the [countable](#) union of countable sets is countable. I.e. if X is countable and every element of X is countable (including the possibility that they're finite), then the subset of X is countable. This requires AC to be true in general. Even if one accepts the axiom, it doesn't tell you how to construct a choice function, only that one exists. Most mathematicians are quite happy to use AC if they need it, but those who are careful will, at least, draw attention to the fact that they have used it. There is something a little odd about Choice, and it has some alarming consequences, so results which actually "need" it are somehow a bit suspicious, e.g. the Banach-Tarski paradox. On the other side, consider Russell's Paradox.

AC is not a [theorem](#) of Zermelo-Fraenkel set theory (ZF). Goedel and Paul Cohen proved that AC is independent of ZF, i.e. if ZF is consistent, then so are ZFC (ZF with AC) and ZF(\sim C) (ZF with the negation of AC). This means that we cannot use ZF to prove or disprove AC.

[\[FOLDOP\]](#) and [\[Glossary of First-Order Logic\]](#)

16-03-2001

Axiom of Comprehension

[<mathematics, logic>](#) An [axiom schema](#) of [set theory](#) which states:

if $P(x)$ is a [property](#) then $\{x : P\}$ is a set. I.e. all the things with some property form a set.

Acceptance of this axiom leads to Russell's Paradox which is why [Zermelo set theory](#) replaces it with a restricted form.

[\[FOLDOP\]](#)

16-03-2001

axiomatic set theory

[<mathematics, logic>](#) [Set theory](#), if approached naively, leads to all sorts of problems, the most famous being Russell's paradox. For this reason mathematicians do set theory axiomatically: that is, there is an [informal language](#) for talking about sets, and a collection of axioms describing how they behave, and the only legitimate way of drawing conclusions about sets is to use the axioms.

There are many different axiomatisations for set theory. Each takes a slightly different approach to the problem of finding a theory that captures as much as possible of the intuitive idea of what a set is, while avoiding the [paradoxes](#) that result from accepting all of it.

The main source of trouble in naive set theory is the idea that you can specify a set by saying whether each object in the universe is in the "set" or not. Accordingly, the most important differences between different axiomatisations of set theory concern the restrictions they place on this idea (known as "comprehension").

Zermelo-Fraenkel set theory, the most commonly used axiomatisation, gets round it by (in effect) saying that you can only use this principle to define subsets of existing sets.

NBG (von Neumann-Bernays-Goedel) set theory sort of allows comprehension for all [formulae](#) without restriction, but distinguishes between two kinds of set, so that the sets produced by applying comprehension are only second-class sets. NBG is exactly as powerful as ZF, in the sense that any statement that can be formalised in both theories is a theorem of ZF if and only if it is a theorem of ZFC.

MK (Morse-Kelley) set theory is a strengthened version of NBG, with a simpler axiom system. It is strictly stronger than NBG, and it is possible that NBG might be consistent but MK inconsistent.

NF (<http://math.idbsu.edu/faculty/holmes/nf.html>) ("New Foundations"), a theory developed by Willard Van Orman Quine, places a very different restriction on comprehension: it only works when the formula describing the membership condition for your putative set is "stratified", which means that it could be made to make sense if you worked in a system where every set had a level attached to it, so that a level- n set could only be a member of sets of level $n+1$. (This doesn't mean that there are actually levels attached to sets in NF). NF is very different from ZF; for instance, in NF the universe is a set (which it isn't in ZF, because the whole point of ZF is that it forbids sets that are "too large"), and it can be proved that the [Axiom of Choice](#) is false in NF!

ML ("Modern Logic") is to NF as NBG is to ZF. (Its name derives from the title of the book in which Quine introduced an early, defective, form of it). It is stronger than ZF (it can prove things that ZF can't), but if NF is consistent then ML is too.

[\[FOLDOP\]](#)

16-03-2001

Ayer Alfred Jules

<[neopositivism](#), [the Vienna Circle](#), [semantics](#)>, <[philosophy of language](#), [logic](#), [theology](#), [logical positivism](#)>, English philosopher (1910-1989). After studying with members of the Vienna [circle](#), Ayer published [Language, Truth, and Logic](#) (1936), an excellent [statement](#) of the central views of [logical positivism](#), including the [use](#) of [verifiability](#) as a criterion of meaning, the rejection of [metaphysics](#) and [theology](#) as meaningless, and an emotivist ethical theory. His later works include [Foundations of Empirical Knowledge](#) (1940), [The Problem of Knowledge](#) (1956), [Logical Positivism](#) (1966), and [The Central Questions of Philosophy](#) (1972).

Recommended Reading:

The Philosophy of A. J. Ayer, ed. by Lewis Edwin Hahn (Open Court, 1992);

Oswald Hanfling, Ayer (Routledge, 1999);

Ben Rogers, A. J. Ayer: A Life (Grove, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-11-2001

B-tree

<[algorithm](#)> A multi-way [balanced tree](#). The "B" in B-tree has never been officially defined. It could stand for "balanced" or "Bayer", after one of the original designers of the algorithms and structure. A B-tree is not (necessarily?) a "[binary tree](#)".

A B+-tree (as used by [IBM](#)' [sVSAM](#)) is a B-tree where the leaves are also linked sequentially, thus allowing both fast [random access](#) and sequential access to data.

[Knuth' s Art of Computer Programming].

[Example algorithm?]

[\[FOLDOC\]](#)

16-03-2001

Babbage Charles

<[history of philosophy](#), [biography](#)> english mathematician (1792-1871). A century before the development of electronic computers, [Babbage](#) invented a mechanical "difference engine" for the calculation of arithmetical functions and set out plans for an "[analytical engine](#)" whose operation would have included logarithmic and trigonometric functions as well. [Babbage](#)' s interest in the practical conduct of business led to an extensive commentary on the inefficiency of common practices in [The Economy of Machinery and Manufactures](#) (1832), [Comparative View of the Various Institutions for the Assurance of Lives](#), and [Reflections on the Decline of Science in England](#).

Recommended Reading:

Charles Babbage: Passages from the Life of a Philosopher, ed. by Martin Campbell-Kelly (Rutgers, 1994)

Bruce Collier and James MacLachlan, Charles Babbage and the Engines of Perfection (Oxford, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

Bachelard Gaston

<[history of philosophy](#), [biography](#)> french [philosopher of science](#) (1884-1962); author of [Psychoanalyse du feu](#) (Psychoanalysis of Fire) (1937), [Le nouvel esprit scientifique](#) (The New Scientific Spirit) (1934), and [L' Actualité de l' histoire des sciences](#) (History of Science) (1951).

Rejecting both naive [realism](#) and absolute [idealism](#), [Bachelard](#) maintained that scientific knowledge emerges from an imaginative interaction between the [mind](#) and experimental evidence. His emphasis on discontinuity in the progress of [science](#) anticipated portions of the work of Thomas [Kuhn](#).

Recommended Reading:

Mary Tiles, Bachelard: Science and Objectivity (Cambridge, 1985).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

back-propagation

<[networking](#)> (Or "backpropagation") A learning [algorithm](#) for modifying a feed-forward [neural network](#) which minimises a continuous "error function" or "objective function."

Back-propagation is a "gradient descent" method of training in that it uses gradient information to modify the network weights to decrease the value of the error function on subsequent tests of the inputs. Other gradient-based methods from numerical analysis can be used to train networks more efficiently.

Back-propagation makes use of a mathematical trick when the network is simulated on a digital computer, yielding in just two traversals of the network (once forward, and once back) both the difference between the desired and actual output, and the derivatives of this difference with respect to the connection weights.

[FOLDOP]

16-03-2001

Background

<[philosophy of mind](#)> a [set](#) of nonrepresentational capacities that enable all representing to take place. The Background includes biological and cultural capacities, skills, stances, [assumptions](#) and presuppositions. Introduced in Searle (1978).

1. Introduction

It should be noted right off that the [hypothesis](#) of the Background is, by Searle' s admission, marked b "obscurity" (1991, p. 289), and accordingly, its developing theorisation has involved a number of shifts and clarifications (1992, pp. 186- 187; cf. 1991 generally) since it was first introduced to explain the fixing of literal [meaning](#) (1978). The general explanatory function of the Background has remained constant, however, and that is to account for how [intentions](#) are grounded and how skills can be applied.

The Background can be seen as one solution to the rule- or representation-grounding problem: how does one prevent an [infinite regress](#) in the interpretation of a [rule](#) or a [representation](#)? Searle' s basic [argument](#) is that no [rule](#) or [meaning](#) is self-interpreting; a person needs a contextual understanding in order to arrive at the correct application or interpretation.

According to Searle the literal [meaning](#) of a [sentence](#) underdetermines its truth conditions; our correct literal reading of, e.g., a verb can only be secured given a certain Background in relation to which a clarifying interpretive context can be established (1995, p. 132; 1992, pp. 178-179; 1983, pp. 145-148). The Background, then, functions as the precondition for the intelligibility of [representation](#) and [intentionality](#) generally.

2. The Topography and Make-Up of the Background

Searle has described the Background as consisting of two major divisions which he calls the Deep Background and the Local Background (1983, p. 143-144).

The Deep Background is composed of biological skills and universally human capacities, such as eating, walking, and seeing given patterns of perceptual stimuli as discrete objects.

The Local Background, by contrast, is composed of culturally-bound skills and capacities, such as knowing what culturally-specific objects are for, recognising culturally-specific situations as appropriate or inappropriate for certain types of [behaviour](#), and so forth. Within each of these major divisions, Searle further distinguishes between knowing how things are and knowing how to do things (1983, p. 144) -- roughly, between presuppositions and stances on the one hand, and skills on the other (see knowledge how). What becomes apparent almost immediately is the sheer heterogeneity of the items said to make up the Background. Some appear to be entirely physical skills dependent on automatised sequences of motor activity. For example, Searle describes the case of a skier who first learns the basics of balance by being taught certain [rules](#), and who, after having skied enough times, no longer is mindful of those [rules](#) but instead lets the learned responses of the body take over (1983, pp. 150-151). At this point the skills required for skiing have become part of the skier' s Background; his or her "repeated experiences" have effectively created the right kind c "physical capacities" (1983, p. 150).

Other Background capacities appear to consist in what might be described as habits. These capacities, which seem to belong largely to the Local Background, are characterised as skills and abilities that are "functionally equivalent" to the systems of [rules](#) guiding socially- or culturally-situated behaviours and practices, but without involving any "representation or internalisation of those [rules](#)" (1995, p. 142). Rather than internalising [rules](#), Searle holds, we "evolve a set of dispositions that are sensitive to the [rule structure](#)" (1995, p. 145).

A third category of Background capacities consists of the [cognitive](#) capacities inhering in stances, presuppositions, pretheoretical commitments, and the like. One such presupposition or stance, according to Searle, is the sense that objects are solid, which he claims is simply manifested in one' s behaviour without one' s having to have any [belief](#) or conviction about the matter (1992, p. 185). My sitting, walking, and manipulation of objects for instance, are executed in such a way that manifests my taking for granted the

solidity of things like tables, chairs, the ground beneath me, and so forth (1992, p. 186; 1983, pp. 142-143). Searle emphasizes that such stances are not **beliefs** or expectations, but rather are simply presupposed by the **agent** in performing the **actions** manifesting them (1992, p. 186; 1983, pp. 156-157).

3. Is the Background a Form of tacit knowledge?

There would seem to be a certain amount of ambiguity in the Background. A major source of this ambiguity, as Searle acknowledges, is the difficulty of avoiding terms associated with mental representation per se for describing the Background' s nonrepresentational capacities (1983, pp. 156-157). But we might point to another source, and that is the fact that, in at least some cases, the notion of an embodied commitment is liable to explanatory elimination.

At one level, some Background capacities can be described as the automatised effects of our having acquired certain skills (e.g., of grasping objects or walking) under **contingent** circumstances. To the extent that **contingent facts** about our learning how to walk (i.e., that we did so on Earth with its solid ground, particular gravitational force, etc. rather than in a weightless environment) have produced the physical habits that afford our walking, we can describe those habits as automatised physical responses to a given environment, and perhaps leave it at that. What is embodied is simply a certain causal history that has left the right kinds of traces in the appropriate neural pathways. While the characterisation of Background capacities in terms of neurophysiological structures is consistent with Searle' s thesis (1995, p. 130; 1992, p. 188), it is difficult to see how purely automatised physical skills or habits could qualify as mental.

But to the extent that these physical responses can be associated with properly **cognitive** commitments regarding the environment, i.e., that it will be reasonably like that in which the physical responses were formed in the first place, we can say that there is an element of expectation involved, if not of **hypothesis** formation. This raises the possibility that at least some Background capacities can be described as a kind of tacit knowledge or **cognitive** unconscious in the sense of Reber (1995), which may implicate them as induced abstract generalisations of some sort. That Background stances can be individuated in terms of specific contents would further seem to indicate that they are a kind of tacit knowledge.

Searle' s response to the suggestion that the Background' **cognitive** capacities are a kind of tacit knowledge would probably be that Background capacities are not themselves a form of **knowledge** (such as **beliefs**, theories, empirical hypotheses, and so forth) but rather are the preconditions of **knowledge**. He might further argue -- as he in fact does (1983 pp. 156-157) -- that though it is very difficult to describe the contents of the Background other than in **language** that is more appropriate to the description of **representational** content, Background capacities are not **representational**. By this he means that Background capacities are not "features of the world independent of the mind" (1991, p. 291). (For Searle, **mental representation** is defined in terms of such mind-independent features as conditions of **satisfaction**, and directions of fit and **causation**).

Still, the case for understanding some Background items as elements in a **cognitive unconscious** is compelling. Much of what Searle consigns to the Background does seem to contain **information** about how the world is, and as with hypotheses is subject to **falsification**, as in cases of breakdown (1992, pp. 184-185; 1983, p. 155). In addition, a Background at least partly composed of induced generalizations would flesh out the otherwise vague suggestion that the Background is (or contains) a mechanism that is sensitive to the appropriate features of the world, such as socially- or culturally-specific **rules** (1995, p. 146).

4. The Background as a Mental Causal Mechanism

What Searle wants to capture with the postulation of a Background is a causal mechanism that is mental. Not only are Background mechanisms described as "causal structures generally" (1995, p. 129), but as specifically neurophysiological structures (1995, p. 130; 1992, p. 188). While the latter stipulation can be understood to follow from Searle' s overall position of "biological naturalism" in regard to **mental phenomena** (1992, p. 1), it also seems to mean that Background capacities, to the extent that they remain in the Background and do not manifest themselves in **intentional** states or **behaviours**, are simply "neurophysiological rather than psychological" (1992, p. 188). Although it is difficult to say for certain, Searle here seems to be saying that the Background as such simply is the capacity for certain neurophysiological **events** to occur and thus to produce mental **events** with their associated intentional contents. The **relation** of this view of the Background to the Background skills described above as automatised motor skills is obscure, as the latter seem more or less independent of the generation of psychological events.

But the postulation of the Background as a physical, causal mechanism also can be interpreted as showing the way out of a difficulty that turns up in a certain **class** of **explanatory** theories. These are theories of "practices" such as Bourdieu' s, to which Searle' s theory of the Background bears some resemblance (1995, p. 132; 1992, p. 177). ("Practices" can be defined, roughly, as consisting in the agreements and regularities, behavioural and otherwise, characterising given social groups and communities.) Such theories, as Turner has pointed out (1995), often suffer from a vagueness regarding "where" practices are located, what kind of entities they may be, and what exact causal role they may play in producing **behaviour**. By positing a Background that is in people' s brains, Searle effectively addresses these issues by redescribing "practices" as ultimately physical mechanisms in individuals, and thus provides the kind of causal explanation that such theories require.

Recommended Reading:

- Lepore, E. and Van Gulick, R., eds. (1991). John Searle and His Critics. Cambridge, MA, Blackwell.
- Searle, J. (1978). "Literal Meaning." In Erkenntnis 1, pp. 207-224. Reprinted in Searle (1979).
- Searle, J. (1979). Expression and Meaning: Studies in the Theory of Speech Acts. New York, Cambridge University Press.
- Searle, J. (1983). Intentionality: An Essay in the Philosophy of Mind. New York, Cambridge University Press.
- Searle, J. (1991). "Response: The Background of Intentionality and Action." In Lepore and Van Gulick (1991).
- Searle, J. (1992). The Rediscovery of the Mind. Cambridge, MA, MIT Press.
- Searle, J. (1995). The Construction of Social Reality. New York, Free Press.
- Turner, S. (1995). The Social Theory of Practices. Chicago, University of Chicago Press.

See also [intentionality](#), intention-in-action, [implicit memory](#), [tacit knowledge](#)

Daniel Barbiero

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

backtracking

<[algorithm](#)> A scheme for solving a series of sub-problems each of which may have multiple possible solutions and where the solution chosen for one sub-problem may affect the possible solutions of later sub-problems.

To solve the overall problem, we find a solution to the first sub-problem and then attempt to recursively solve the other sub-problems based on this first solution. If we cannot, or we want all possible solutions, we backtrack and try the next possible solution to the first sub-problem and so on. Backtracking terminates when there are no more solutions to the first sub-problem.

This is the algorithm used by [logic programming](#) languages such as [Prolog](#) to find all possible ways of proving a [goal](#). An optimisation known as "intelligent backtracking" keeps track of the dependencies between sub-problems and only re-solves those which depend on an earlier solution which has changed.

Backtracking is one [algorithm](#) which can be used to implement non-determinism. It is effectively a depth-first search of a problem space.

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16-03-2001

backward analysis

<<[mathematics](#), [logic](#)> An analysis to determine properties of the inputs of a program from properties or context of the outputs. E.g. if the output of this function is needed then this argument is needed.

Compare [forward analysis](#).

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16-03-2001

backward chaining

<[algorithm](#)> An [algorithm](#) for proving a goal by recursively breaking it down into sub-goals and trying to prove these until facts are reached. Facts are goals with no sub-goals which are therefore always true. Backward training is the program execution mechanism used by most [logic programming](#) language like Prolog.

Opposite: [forward chaining](#).

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16-03-2001

Bacon Francis

<[history of philosophy](#), [biography](#)> english [politician](#) and [philosopher](#) (1561-1626). [Bacon](#) became Lord Chancellor of England in 1618, but was driven immediately from office under charges of official corruption. As an early [empiricist](#), he rejected scholastic accounts of the natural world in favor of a new method for achieving [knowledge](#), based exclusively on careful [observation](#) and cautious [induction](#), which he described in The Advancement of Learning (1605) and Novum Organum (New Organon) (1620).

[Bacon](#) warned that effective [reasoning](#) must be freed from the "idoltrous" influence of personal interest, [human nature](#), social conventions, and [academic philosophy](#). In The New Atlantis (1626), [Bacon](#) described the far-reaching social consequences of his [epistemological program](#). [Bacon](#)' s Essays (1601) address the whole range of his philosophical and social interests.

Recommended Reading:

Selected Philosophical Works, ed. by Rose-Mary Sargent (Hackett, 1999);

The Cambridge Companion to Bacon, ed. by Markku Peltonen (Cambridge, 1996);

Stephen Gaukroger, Francis Bacon and the Transformation of Early Modern Philosophy (Cambridge, 2001).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

Bacon Roger

<[history of philosophy](#), [biography](#)> english [philosopher](#) (1214-1292) who translated many Aristotelean treatises from Arabic into Latin. Although passionately interested in [alchemy](#) and magic, Roger defended reliance upon mathematics and experimental methods for the improvement of human knowledge generally and theological [understanding](#) in particular in the Opus Maius (Greater Work) (1267) and On Experimental Science (1268). His novel educational doctrines were supposed to violate the condemnation of 1277, and much of Roger' s late work, including the Compendium Studii Theologiae (1292) was suppressed.

Recommended Reading:

Roger Bacon' s Philosophy of Nature, tr. by David C. Lindberg (St. Augustine, 1997);
Stewart C. Easten, Roger Bacon and His Search for a Universal Science (Greenwood, 1984).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

baculum argumentum ad

<[logic](#), [philosophy of science](#)> see appeal to [force](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

bad faith

<[ontology](#), [ethics](#)> in the philosophy of [Sartre](#), an effort to avoid anxiety by denying the full extent of one' s ow [freedom](#). [Bad faith](#), on this view, is an especially harmful variety of self-deception, since it forestalls authentic appropriation of [responsibility](#) for ourselves.

Recommended Reading:

Jean-Paul Sartre, Being and Nothingness, tr. by Hazel E. Barnes (Washington Square, 1993);
Ronald E. Santoni, Bad Faith, Good Faith, and Authenticity in Sartre' s Early Philosophy (Temple, 1995).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

Baier Annette

<[history of philosophy](#), [biography](#)> american [moral philosopher](#) (1929-). From a thoughtful reading of [Hume](#), [Baier](#) derives an ethical stance that emphasizes the importance of membership within a moral community in A Progress of Sentiments: Reflections on Hume' s Treatise (1991). In "What Do Women Want in a Moral Theory?" (1983), she argues that the [concept](#) of trust provides a vital link between traditional (male) accounts of rational obligation and the equally traditional (female) "ethics of love." Her most recent publications include and Moral Prejudices: Essays on Ethics (1994) and The Commons of the Mind (Open Court, 1997).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

Baier Kurt

<[history of philosophy](#), [biography](#)> american [moral philosopher](#) (1917-). In The Moral Point of View (1958), [Baier](#) argues that practical [reasoning](#) that takes into account both individual and social considerations is the appropriate method for deciding "what is the best thing to do" in particular circumstances. Thus, we are moral because it is rational so to be, even when our private interests are outweighed by the welfare of others.

Recommended Reading:

Kurt Baier, The Rational and the Moral Order: The Social Roots of Reason and Morality (Open Court, 1994);
Reason, Ethics, and Society: Themes from Kurt Baier With His Responses, ed. by Kurt Baier and J.B. Schneewind (Open Court, 1996).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

Bakunin Mikhail Alexandrovich

<[history of philosophy](#), [biography](#)> russian [philosopher](#) and political [anarchist](#) (1814-1876); author of *Marxism, Freedom, and the State* (1872) and *God and the State* (1916). [Bakunin](#) participated in several European revolutionary movements in an effort to derive practical benefits from the theories of [Marx](#) and [Proudhon](#). His philosophical writings emphasized the use of negative arguments as a dialectical method for defining creative results rather than relying upon pseudo-scientific theories of government.

Recommended Reading:

The Basic Bakunin: Writings 1869-1871, ed. by Robert M. Cutler (Prometheus, 1992)
 Brian Morris, Bakunin: The Philosophy of Freedom (Consortium, 1996).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

Banach algebra

<[mathematics](#)> An [algebra](#) in which the [vector space](#) is a [Banach space](#).

[\[FOLDOC\]](#)

16-03-2001

Banach inverse mapping theorem

<[mathematics](#)> In a [Banach space](#) the inverse to a [continuous](#) linear mapping is continuous.

[\[FOLDOC\]](#)

16-03-2001

Banach space

<[mathematics](#)> A [complete normed vector space](#). Metric is induced by the norm: $d(x,y) = ||x-y||$. Completeness means that every [Cauchy sequence](#) converges to an element of the space. All finite-dimensional [real](#) and [complex](#) normed vector spaces are complete and thus are Banach spaces.

Using absolute value for the norm, the real numbers are a Banach space whereas the rationals are not. This is because there are sequences of rationals that converges to irrationals.

Several theorems hold only in Banach spaces, e.g. the [Banach inverse mapping theorem](#). All finite-dimensional real and complex vector spaces are Banach spaces. Hilbert spaces, spaces of integrable functions, and spaces of [absolutely convergent series](#) are examples of infinite-dimensional Banach spaces. Applications include wavelets, signal processing, and radar.

[Robert E. Megginson, "An Introduction to Banach Space Theory", Graduate Texts in Mathematics, 183, Springer Verlag, September 1998].

[\[FOLDOC\]](#)

16-03-2001

Banach-Tarski paradox

<[mathematics](#)> It is possible to cut a solid ball into finitely many pieces (actually about half a dozen), and then put the pieces together again to get two solid balls, each the same size as the original.

This [paradox](#) is a consequence of the [Axiom of Choice](#).

[[FOLDOC](#)]

16-03-2001

Barbara

<[logic, philosophy of science](#)> name given by medieval [logicians](#) to any [categorical syllogism](#) whose standard form may be designated as AAA-1. Example: All finches are birds, and all cardinals are finches, so all cardinals are birds. This most common of all patterns in syllogistic reasoning is one of only fifteen forms that are always valid.

[[A Dictionary of Philosophical Terms and Names](#)]

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Baroco

<[logic, philosophy of science](#)> name given by medieval [logicians](#) to a [categorical syllogism](#) whose standard form is AOO-2. Example: All cats are furry mammals, but some housepets are not furry mammals, so some housepets are not cats. This is another of the fifteen forms in which syllogisms are always valid.

[[A Dictionary of Philosophical Terms and Names](#)]

28-09-2001

base

<[mathematics](#)> [radix](#).

20-11-2003

base class

<PI> (Or "superclass") The [class](#) from which another class (a "subclass") inherits.

"base class" is the term used in C++. The term "superclass" is perhaps confusing since objects of the subclass have a superset of the fields of objects in the superclass.

See [inheritance](#).

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16-03-2001

basis

[mathematical induction](#)

20-11-2003

Bayes Thomas

<[history of philosophy](#), [biography](#)> english clergyman and [mathematician](#) (1702-1761). "Bayes theorem," first stated in his Essay towards solving a problem in the doctrine of chances (1764), proposes that evidence confirms the likelihood of an [hypothesis](#) only to the degree that the appearance of this evidence would be more probable with the [assumption](#) of the [hypothesis](#) than without it.

Recommended Reading:

Bradley P. Carlin and Thomas A. Louis, Bayes and Empirical Bayes Methods for Data Analysis (CRC, 2000);
Empirical Bayes and Likelihood Inference, ed. by S. E. Ahmed and N. Reid (Springer Verlag, 2000);
John Earman, Bayes or Bust?: A Critical Examination of Bayesian Confirmation (Bradford, 1992).

[[A Dictionary of Philosophical Terms and Names](#)]

28-09-2001

Bayle Pierre

<[history of philosophy](#), [biography](#)> although born in France and educated at Toulouse and Geneva, Pierre [Bayle](#) (1647-1706) spent most of his life in Holland, as the leading member of an active intellectual community at Rotterdam. The early writings of this French Protestant include a plea for broad political toleration of divergent opinions on [religion](#). His greatest work is the incredibly ambitious Dictionnaire historique et critique (Historical and Critical Dictionary) (1697), which could reasonably be regarded as Western culture' s first significant [hypertext](#) document. Although its articles about obscure ancient and modern figures sometimes contain little information of direct interest, [Bayle](#) used them as the starting-points for a complex series of endnotes, sidenotes, and footnotes in which he addressed contemporary philosophical and theological concerns.

[Bayle](#)' s predominant theme was a profound [skepticism](#) about human knowledge, derived originally from his admiration of the ancient Pyrrhonists but applied strictly to the new [science](#) and [philosophy](#) of his own time. He used the fact of animal thinking as evidence against [Cartesian](#) efforts to establish the unique status of an immaterial human soul. On the other hand, he also argued that the untenability of the primary / secondary quality distinction poses an insurmountable difficulty for both [rationalism](#) and [empiricism](#).

On religious matters, [Bayle](#) delighted in pointing out [contradictions](#) between theological tenets and the self-evident dictates of [reason](#). This declaration of the fundamental irrationality of Christianity, however, left ample room for adherence to a rigorous fideism about god and revelation. [Bayle](#)' s treatment of such issues pose important challenges for the development of modern thought and were greatly influential on the [philosophy](#) of [Hume](#).

Recommended Reading:

Primary sources: Pierre Bayle, Historical and Critical Dictionary: Selections, ed. by Richard H. Popkin and Craig Bush (Hackett, 1991);
Pierre Bayle, Political Writings (Cambridge, 2000).

Secondary sources:

Thomas M. Lennon, Reading Bayle (Toronto, 1999).

Additional on-line information about Bayle includes:

Gianluca Mori' s comprehensive treatment at the Centro Interdipartimentale di Servizi Informatici, Università di Torino.

Paul F. Johnson' s article in The Oxford Companion to Philosophy.

Also see: dictionaries and encyclopaedias of philosophy, Pyrrhonism, and skepticism.

The thorough collection of resources at EpistemeLinks.com;

The article in the Columbia Encyclopedia at Bartleby.com.

A brief entry in The Macmillan Encyclopedia 2001.

[[A Dictionary of Philosophical Terms and Names](#)]

28-09-2001

beauty

<[aesthetics](#), [ethics](#), [metaphysics](#)> the characteristic feature of things that arouse [pleasure](#) or delight, especially to the senses of a human observer. Thus, "[beauty](#)" is the most general term of aesthetic appreciation. Whether judgments about [beauty](#) are [objective](#) or [subjective](#) has been a matter of serious philosophical dispute.

Recommended Reading:

James Kirwan, Beauty (Manchester, 1999)

Philosophies of Art and Beauty, ed. by Hugh Bredin and Liberato Santoro-Brienza (Edinburgh, 2000).

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28-09-2001

Beauvoir Simone de

<[history of philosophy](#), [biography](#)> born and educated in Paris, Simone de [Beauvoir](#) (1908-1986) was among the first women permitted to complete a program of study at the École Normale Supérieure. Through her lifelong friendship with [Sartre](#), she contributed significantly to the development and expression of existentialist philosophy.

In *Le Deuxième Sexe* (The Second Sex) (1949), de [Beauvoir](#) traced the development of male oppression through historical, literary, and mythical sources, attributing its contemporary effects on women to a systematic objectification of the male as a positive norm. This consequently identifies the female as Other, which commonly leads to a loss of social and [personal identity](#), the variety of [alienation](#) unique to the experience of women. Her works of fiction focus on women who take [responsibility](#) for themselves by making life-altering decisions, and the many volumes of her own autobiography exhibit the application of similar principles in reflection on her own experiences.

Recommended Reading:

Primary sources:

Simone De Beauvoir: A Critical Reader, ed. by Elizabeth Fallaize (Routledge, 1998);
 Simone de Beauvoir, *The Second Sex*, tr. by H. M. Parshley (Vintage, 1989);
The Prime of Life: The Autobiography of Simone de Beauvoir (Marlowe, 1994).

Secondary sources:

Margaret A. Simons, *Beauvoir and the Second Sex: Feminism, Race, and the Origins of Existentialism* (Rowman & Littlefield, 1999);
 Debra B. Bergoffen, *The Philosophy of Simone de Beauvoir: Gendered Phenomenologies, Erotic Generosities* (SUNY, 1996);
Simone de Beauvoir's The Second Sex: New Interdisciplinary Essays, ed. by Ruth Evans (St. Martin's, 1998);
Feminist Interpretations of Simone De Beauvoir, ed. by Margaret A. Simons (Penn. State, 1995); Sally Scholz, *On De Beauvoir* (Wadsworth, 1999).

Additional on-line information about Beauvoir includes:

Melanie Garneau's excellent site on Beauvoir.
 Jane O' Grady's article in *The Oxford Companion to Philosophy*.

Also see: French philosophy, feminist philosophy, and women in philosophy.

The article in the *Columbia Encyclopedia* at Bartleby.com.

The thorough collection of resources at EpistemeLinks.com.

An article in *The Macmillan Dictionary of Women's Biography*.

An entry in the *Penguin Biographical Dictionary of Women*.

Snippets from de Beauvoir (French and English) in *The Oxford Dictionary of Quotations*.

A brief summary at *The Window*; Kristin Switala's brief bibliography at the *Feminist Theory Website*.

An analysis of philosophical influences on *The Second Sex* from Margaret Simons.

A brief entry in *The Macmillan Encyclopedia 2001*.

A short article in *Oxford's Who's Who in the Twentieth Century*.

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

bedeutung

<[logic](#), [mathematics](#)> [Frege](#)'s German term for the reference of [a concept](#). See Sinn / Bedeutung.

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

begging the question

<[logic](#), [philosophy of science](#)> circular reasoning. The "[informal fallacy](#)" of (explicitly or implicitly) assuming the [truth](#) of the [conclusion](#) of an argument as one of the [premises](#) employed in an effort to demonstrate its [truth](#). Example: "Since firefighters must be strong men willing to face danger every day, it follows that no woman can be a firefighter." Although arguments of this sort are formally valid because it is impossible for their conclusions to be [false](#) if their premises are [true](#), they fail to provide [logical support](#) for their conclusions, which have already been accepted without [proof](#) at the outset. Known also as *petitio principii*.

Recommended Reading:

Douglas N. Walton, *Begging the Question* (Greenwood, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

28-09-2001

begriff

<[logic](#), [gnoseology](#)> german term for idea or concept.

[[A Dictionary of Philosophical Terms and Names](#)]

28-09-2001

belief

<[metaphysics](#), [gnoseology](#), [philosophy of science](#), [logic](#), [theology](#), [ethics](#)> affirmation of, or conviction regarding, the [truth](#) of a [proposition](#), especially when one is not (yet) in possession of evidence adequate to justify a claim that the [proposition](#) is known with certainty.

Recommended Reading:

Kenneth Malcolm Sayre, *Belief and Knowledge: Mapping the Cognitive Landscape* (Rowman-Littlefield, 1997); Michael Williams, *Groundless Belief* (Princeton, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

28-09-2001

belief revision

<[artificial intelligence](#)> The area of [theory change](#) in which preservation of the information in the theory to be changed plays a key role.

A fundamental issue in belief revision is how to decide what information to retract in order to maintain consistency, when the addition of a new belief to a theory would make it inconsistent.

Usually, an ordering on the sentences of the theory is used to determine priorities among sentences, so that those with lower priority can be retracted. This ordering can be difficult to generate and maintain.

The postulates of the AGM Theory for Belief Revision describe minimal properties a revision process should have.

[Better definition?]

[[FOLDOP](#)]

16-03-2001

bell curve

<[statistics](#)> [normal distribution](#).

20-11-2003

benchmark

<[benchmark](#)> A standard program or set of programs which can be run on different computers to give an inaccurate measure of their performance.

"In the computer industry, there are three kinds of lies: lies, damn lies, and benchmarks."

A benchmark may attempt to indicate the overall power of a system by including a "typical" mixture of programs or it may attempt to measure more specific aspects of performance, like graphics, I/O or computation (integer or floating-point).

Others measure specific tasks like rendering polygons, reading and writing files or performing operations on matrices. The most useful kind of benchmark is one which is tailored to a user's own typical tasks. While no one benchmark can fully characterise overall system performance, the results of a variety of realistic benchmarks can give valuable insight into expected real performance.

Benchmarks should be carefully interpreted, you should know exactly which benchmark was run (name, version); exactly what configuration was it run on (CPU, memory, compiler options, single user/multi-user, peripherals, network); how does the benchmark relate to your workload?

Well-known benchmarks include Whetstone, Dhrystone, Rhexstone (see h), the Gabriel benchmarks for Lisp, the SPECmark suite, and LINPACK.

See also machoflops, MIPS, smoke and mirrors.

Usenetnewsgroup: news:comp.benchmarks.

A database of some benchmark results (<http://netlib2.cs.utk.edu/performance/html/PDSreports.html>).

[[Jargon File](#)]

[[FOLDOC](#)]

16-03-2001

Bentham Jeremy

<[history of philosophy](#), [biography](#)> english [philosopher](#) and [political radical](#) (1748-1832). In A Fragment on Government (1776) and An Introduction to the Principles of Morals and Legislation (1789) [Bentham](#) outlined an ethical system based on a purely hedonistic calculation of the [utility](#) particular actions with a view to the greatest [happiness](#) of all, a view later to be defended in modified form by [Mill](#) and others. [Bentham](#) supposed that consistent application of this [principle](#) in social and political life would resolve many difficulties in human conduct, using proportional but perfectly certain punishment to render unacceptably painful to the prospective criminal any behavior that would otherwise be likely to cause injury to others. [Bentham](#)'s unusual bequest still remains at University College, London.

Recommended Reading:

The Works of Jeremy Bentham, ed. by John Bowring (Thoemmes, 1997);

Ross Harrison, Bentham (Routledge, 1999);

Essays on Bentham, ed. by H. L. A. Hart (Oxford, 1983);

Gerald J. Postema, Jeremy Bentham: Moral, Political, and Legal Philosophy (Ashgate, 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

28-09-2001

Berdyaev Nicolai Alexandrovich

<[history of philosophy](#), [biography](#)> ukrainian [philosopher](#) (1874-1948) who participated in the Revolution but was exiled to France in 1922. Distressed by [totalitarian](#) developments in [communism](#), [Berdyaev](#) adopted a religious version of [existentialism](#) in which the themes of anxiety and [authenticity](#) are conveyed through the medium of traditional Christian mythology about sin and redemption. Vselenskost' i konfessionalizm (Universality and Confessionalism) (1933) exemplifies the passionate [individualism](#) of this self-styled "believing freethinker," which seldom won institutional approval.

Recommended Reading:

Nicolai Berdyaev, The Bourgeois Mind and Other Essays (Ayer, 1934);

Nicolai Berdyaev, Origin of Russian Communism (Michigan, 1960);

Nicolai Berdyaev, The Russian Idea (Lindisfarne, 1992);

Howard A. Slaatte, Personality, Spirit, and Ethics: The Ethics of Nicholas Berdyaev (Peter Lang, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

28-09-2001

Bergmann Gustav

<[history of philosophy](#), [biography](#)> Gustav [Bergmann](#) (1906-1987) studied [mathematics](#), [law](#), and [philosophy](#) in his native Vienna and participated in the Vienna Circle discussions of [logical positivism](#). After emigrating to the United States in 1938, [Bergmann](#) taught in the Departments of Philosophy and Psychology at the University of Iowa for forty years, where his Philosophy of Science (1957) was the basis for a popular undergraduate course of study. Although he shared many of the substantive convictions of his fellow positivists, [Bergmann](#) was more keenly aware than most of the metaphysical commitments presupposed within their ways of thinking.

Pursuing methods of [philosophical analysis](#) derived from those of [Moore](#), the early [Wittgenstein](#), and [Carnap](#), [Bergmann](#) sought to resolve philosophical problems by informally discussing the construction of an "ideal language" whose semantic features would indicate the most fundamental structure of reality.

Thus, for [Bergmann](#), the basic question of [ontology](#) is: what kinds of things must exist in order for us to devise a [formal language](#) in which everything can be perspicuously expressed? In three collections of essays, The Metaphysics of Logical Positivism (1954), Meaning and Existence (1959), and Logic and Reality (1964), [Bergmann](#) sharply criticized the philosophical methods and results of his contemporaries, developing an extreme realism that drew him ever further from the mainstream of twentieth-century analysis.

His Realism: A Critique of Brentano and Meinong (1967) returned to the work of Brentano and Meinong, significant figures from the turn of the century, for an understanding of philosophical difficulties against the background of which he could best express his own views. The posthumously published New Foundations of Ontology (1992) contains Bergmann' s final reflections on the serious issues with which he had been concerned for many decades. Bergmann' s contributions to philosophy are explained, honored, and challenged in a collection of essays by his former students and colleagues, The Ontological Turn (1974).

Recommended Reading:

Primary sources:

Gustav Bergmann, The Philosophy of Science (Wisconsin, 1966).
 Gustav Bergmann, The Metaphysics of Logical Positivism (Wisconsin, 1954).
 Gustav Bergmann, Meaning and Existence (Wisconsin, 1959).
 Gustav Bergmann, Logic and Reality (Wisconsin, 1964).
 Gustav Bergmann, Realism: A Critique of Brentano and Meinong (Wisconsin, 1967).
 Gustav Bergmann, New Foundations of Ontology, ed. by William Heald and Edwin B. Allaire (Wisconsin, 1992).

Secondary sources:

The Ontological Turn, ed. by Moltke S. Gram and E. D. Klemke (Iowa, 1974).

Additional on-line information about Bergmann includes:

William Heald' s discussion of Bergmann' s philosophy.
 Works by Bergmann collected by Steve Bayne.
 Edwin B. Allaire' s article in The Oxford Companion to Philosophy.
 Also see: artificial language, logically perfect language, realism and anti-realism, and synthetic a priori judgments.
 The thorough collection of resources at EpistemeLinks.com.

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

Bergson Henri

<[history of philosophy](#), [biography](#)> french [philosopher](#) (1859-1941). Rejecting sterile mechanistic accounts of the [natural world](#), including those of [Darwin](#) and [Spencer](#), [Bergson](#) developed an account that emphasized the subjective experience of time as the ground for human freedom in Essai sur les données immédiates de la conscience (Time and Free Will: An Essay on the Immediate Data of Consciousness) (1889), Matière et mémoire (Matter and Memory) (1896), and The Creative Mind: An Introduction to Metaphysics (1934). In L'Évolution créatrice (Creative Evolution) (1907) [Bergson](#) argued that [thought](#), creativity, motion, and evolution are all products of a creative impulse (Fr. Élan vital) that emerges in opposition to material [entropy](#). [Bergson](#) won the Nobel Prize for literature in 1927.

Recommended Reading:

Leszek Kolakowski, Bergson (St. Augustine, 2000);
 F. C. T. Moore, Bergson: Thinking Backwards (Cambridge, 1996);
 John Mullarkey, Bergson and Philosophy (Notre Dame, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

Berkeley George

<[history of philosophy, biography](#)> irish clergyman George [Berkeley](#) (1685-1753) completed his most significant philosophical work before turning thirty, during his years as a student, fellow, and teacher at Trinity College, Dublin. Using material from his collegiate notebooks on [philosophy](#), he developed a series of texts devoted to various aspects of a single central thesis: that [matter](#) does not exist. In *An Essay Towards a New Theory of Vision* (1709), for example, he argued that the [phenomena](#) of visual sensation can all be explained without presupposing the reality of external material substances; the objects we see are merely ideas in our minds and that of [god](#). [Berkeley](#) spent most of his mature years in London, travelling briefly to Rhode Island in the vain hope of securing financial support for a college to be established in Bermuda. He was appointed Anglican bishop of Cloyne in 1734.

His later writings, which rarely receive philosophical attention, include: criticisms of [Newton](#)'s calculus and a theory of space in *De Motu* (1721) and *The Analyst* (1734); a defence of traditional Christian doctrine in the *Alciphron* (1734); and, in the interminable *Siris* (1744), a lengthy disquisition on the presumed benefits to health of "tar-water." It is the earlier immaterialist philosophy, in which he employed strictly empiricist principles in defence of the view that only minds or spirits exist, for which Berkeley is now remembered. He opened *A Treatise concerning the Principles of Knowledge* (1710) rather technically, with an extended attack on [Locke](#)'s theory of abstract ideas. The book continues with arguments designed to show that sensible qualities-both secondary and primary-can exist only when perceived, as ideas in our minds. Since physical objects are, on [Berkeley](#)'s view, nothing more than collections of such qualities, these sensible objects, too, are merely ideas.

In what he believed to be his most devastating point, [Berkeley](#) argued that it is literally inconceivable that anything like a material substance could exist independently of the spirits or active thinking substances that perceive it. Through the remainder of the *Principles*, [Berkeley](#) tried to distinguish his position from that of [Malebranche](#), defended its application to the achievements of modern science, and extolled its beneficial consequences for traditional religion. The same central doctrine, supported by a very similar train of [thought](#), is expressed in different form in *Three Dialogues between Hylas and Philonous* (1713). Here [Berkeley](#) spoke through [Philonous](#) ("Mind-lover"), who tries to convince his reluctant friend [Hylas](#) ("Woody") that it is only by rejecting the artificial philosophical concept of material substance that [skepticism](#) can be finally defeated and the truths of common-sense secured.

Recommended Reading:

Primary sources:

The Works of George Berkeley, ed. by A. A. Luce and T. E. Jessop. (London: T. Nelson, 1948-1957);
George Berkeley, *Principles of Human Knowledge / Three Dialogues Between Hylas and Philonous*, ed. by Roger Woolhouse (Penguin, 1988).

Secondary sources:

Kenneth P. Winkler, *Berkeley: An Interpretation* (Clarendon, 1994);
Geoffrey J. Warnock, *Berkeley* (Penguin, 1969);
Ian C. Tipton, *Berkeley: The Philosophy of Immaterialism* (Thoemmes, 1994);
David Berman, *Berkeley* (Routledge, 1999);
Berkeley: Critical and Interpretive Essays, ed. by Colin Murray Turbayne (Minnesota, 1982);
Douglas M. Jesseph, *Berkeley's Philosophy of Mathematics* (Chicago, 1993);
George J. Stack, *Berkeley's Analysis of Perception* (Peter Lang, 1992);
Margaret Atherton, *Berkeley's Revolution in Vision* (Cornell, 1990).

Additional on-line information about Berkeley includes:

Peter Lloyd's excellent collection of Berkeley Studies.
Geoffrey J. Warnock's article in *The Oxford Companion to Philosophy*.
Also see: abstraction, the egocentric predicament, English philosophy, esse est percipi, idealism, Irish philosophy, jaundice, primary and secondary qualities, spirit, and tar-water.
The thorough collection of resources at [EpistemeLinks.com](#).
Allan F. Randall on Berkeley's rejection of abstract ideas.
A thorough article in *The Internet Encyclopedia of Philosophy*.
G. J. Matthey's lecture notes on Berkeley.
The article in the *Columbia Encyclopedia* at [Bartleby.com](#).
A section on Berkeley from Alfred Weber's history of philosophy.
Snippets from Berkeley in *The Oxford Dictionary of Quotations*.
D.R. Wilkins' survey of online materials.
Björn Christensson's brief guide to Berkeley studies.
A discussion of Berkeley's views on mathematics at [Mathematical MacTutor](#).
A brief entry in *The Macmillan Encyclopedia* 2001.

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

Berlin Isaiah

<[history of philosophy](#), [biography](#)> russian-British [historian](#), diplomat, and [political philosopher](#) (1909-1997). In Four Essays on Liberty (1969), [Berlin](#) drew an important distinction between the positive freedom to act and the negative freedom from interference in so acting. Societies that differ in their conceptions of liberty, [Berlin](#) argued, are likely to exhibit profoundly different social structures. Karl Marx: His Life and Environment (1939) and Historical Inevitability (1954) criticize the [philosophy](#) of [Marx](#), with special treatment of his view of [history](#).

Recommended Reading:

Isaiah Berlin, The Crooked Timber of Humanity, ed. by Henry Hardy (Princeton, 1998); The Proper Study of Mankind: An Anthology of Essays, ed. by Roger Hausheer and Noel Annan (Farrar, Strauss, and Giroux, 2000); John Gray, Isaiah Berlin (Princeton, 1997); and The Legacy of Isaiah Berlin, ed. by Mark Lilla, Ronald Dworkin, and Robert Silvers (NY Review, 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

28-09-2001

Bernstein condition

<[parallel](#)> Processes cannot execute in parallel if one effects values used by the other. Nor can they execute in parallel if any subsequent process uses data effected by both, i.e. whose value might depend on the order of execution.

[[FOLDOC](#)]

16-03-2001

best first search

<[algorithm](#)> A [graph](#) search [algorithm](#) which optimizes breadth first search by ordering all current paths according to some [heuristic](#). The heuristic attempts to predict how close the end of a path is to a solution. Paths which are judged to be closer to a solution are extended first.

See also beam search, hill climbing.

[[FOLDOC](#)]

16-03-2001

Best Fit

<[algorithm](#)> A resource allocation scheme (usually for [memory](#)). Best Fit tries to determine the best place to put the new data. The definition of 'best' may differ between implementations, but one example might be to and minimize the wasted space at the end of the block being allocated - i.e. use the smallest space which is big enough.

By minimising wasted space, more data can be allocated overall, at the expense of a more time-consuming allocation [routine](#).

Compare First Fit.

[[FOLDOC](#)]

16-03-2001

best of all possible worlds

<[metaphysics](#), [philosophy of science](#), [logic](#), [ethics](#)> the qualitative character of [reality](#), according to the [Stoics](#), who supposed that all is as it should be. In a similar vein, [Leibniz](#) argued that an omnipotent and benevolent god would create nothing less, though [Voltaire](#) found the claim absurdly naive. In a venerable witticism, the optimist says brightly, "This is the best of all possible worlds," whereupon the pessimist sighs, "I'm afraid you're right."

Recommended Reading:

Gottfried Wilhelm Leibniz, Discourse on Metaphysics and the Monadology, tr. by R. Montgomery (Prometheus, 1992)
Voltaire, Candide (Bantam, 1984).

[[A Dictionary of Philosophical Terms and Names](#)]

28-09-2001

beta abstraction

[lambda-calculus] The conversion of an expression to an [application](#) of a [lambda abstraction](#) to an argument expression. Some subterm of the original expression becomes the argument of the abstraction and the rest becomes its body. E.g.

$$4+1 \rightarrow (x . x+1) 4$$

The opposite of beta abstraction is [beta reduction](#). These are the two kinds of [beta conversion](#).

16-03-2001

beta conversion

<[mathematics](#), [logic](#)> A term from lambda-calculus for [beta reduction](#) or [beta abstraction](#).

[FOLDOC]

16-03-2001

beta reduction

[lambda-calculus] The application of a [lambda abstraction](#) to an argument expression. A copy of the body of the lambda abstraction is made and occurrences of the bound variable being replaced by the argument. E.g.

$$(x . x+1) 4 \rightarrow 4+1$$

Beta reduction is the only kind of [reduction](#) in the pure lambda-calculus. The opposite of beta reduction is [beta abstraction](#). These are the two kinds of [beta conversion](#).

See also name capture.

[FOLDOC]

16-03-2001

bewusstsein

<[psychology](#), [gnoseology](#), [ethics](#)> german term for [consciousness](#).

[A Dictionary of Philosophical Terms and Names]

28-09-2001

Bezier curve

<[graphics](#)> A type of curve defined by mathematical formulae, used in computer graphics. A curve with coordinates $P(u)$, where u varies from 0 at one end of the curve to 1 at the other, is defined by a set of $n+1$ "control points" $(X(i), Y(i), Z(i))$ for $i = 0$ to n .

$$P(u) = \sum_{i=0..n} [(X(i), Y(i), Z(i)) * B(i, n, u)]$$

$$B(i, n, u) = C(n, i) * u^i * (1-u)^{(n-i)}$$

$$C(n, i) = n! / (i!(n-i)!)$$

A Bezier curve (or surface) is defined by its control points, which makes it invariant under any affine mapping (translation, rotation, parallel projection), and thus even under a change in the axis system. You need only to transform the control points and then compute the new curve. The control polygon defined by the points is itself affine invariant.

Bezier curves also have the variation-diminishing property. This makes them easier to split compared to other types of curve such as Hermite or B-spline.

Other important properties are multiple values, global and local control, versatility, and order of continuity.

[[FOLDOP](#)]

16-03-2001

Bezier surface

<[graphics](#)> A surface defined by mathematical formulae, used in computer graphics. A surface $P(u, v)$, where u and v vary orthogonally from 0 to 1 from one edge of the surface to the other, is defined by a set of $(n+1) \times (m+1)$ "control points" $(X(i, j), Y(i, j), Z(i, j))$ for $i = 0$ to n , $j = 0$ to m .

$$P(u, v) = \sum_{i=0..n} \sum_{j=0..m} [(X(i, j), Y(i, j), Z(i, j)) * B(i, n, u) * B(j, m, v)]$$

$$B(i, n, u) = C(n, i) * u^i * (1-u)^{(n-i)}$$

$$C(n, i) = n! / (i! * (n-i)!)$$

Bezier surfaces are an extension of the idea of [Bezier curves](#), and share many of their properties.

[[FOLDOP](#)]

16-03-2001

biconditional

<[philosophy of science](#), [logic](#)> the [conjunction](#) of two conditionals, the [antecedent](#) of each of which is the [consequent](#) of the other; that is, any [statement](#) of the form: "P if and only if Q." Although they may have other uses, all biconditionals involve at least the logical structure of [material equivalence](#).

See [equivalence](#).

[[A Dictionary of Philosophical Terms and Names](#)]

28-09-2001

bijection

<[mathematics](#), [logic](#)> A [function](#) is bijective or a bijection or a one-to-one correspondence if it is both injective (no two values map to the same value) and [surjective](#) (for every element of the [codomain](#) there is some element of the [domain](#) which maps to it). I.e. there is exactly one element of the domain which maps to each element of the codomain.

Only bijective functions have inverses f^{-1} where $f^{-1}(f(x)) = f(f^{-1}(x)) = x$.

See also [injection](#), [surjection](#), [isomorphism](#).

[[FOLDOP](#)]

16-03-2001

binaries

[binary file](#)

20-11-2003

binary

1. <[mathematics](#)> [Base](#) two. A number representation consisting of zeros and ones used by practically all computers because of its ease of implementation using digital electronics and [Boolean algebra](#).

2. <[file format](#)> Any file format for [digital](#) data encoded as a sequence of [bits](#) but not consisting of a sequence of printable characters (text). The term is often used for executable machine code.

Of course all digital data, including characters, is actually binary data (unless it uses some (rare) system with more than two discrete levels) but the distinction between binary and text is well established.

3. [<programming>](#) A description of an operator which takes two arguments. See also unary, ternary.

[\[FOLDOC\]](#)

16-03-2001

binary file

[<storage, operating system>](#) A file containing arbitrary bytes or words, as opposed to a text file containing only printable characters (e.g. ASCII characters with codes 10, 13, and 32-126).

On modern operating systems a text file is simply a binary file that happens to contain only printable characters, but some older systems distinguish the two file types, requiring programs to handle them differently.

A common class of binary files is programs in machine language ("executable files") ready to load into memory and execute. Binary files may also be used to store data output by a program, and intended to be read by that or another program but not by humans. Binary files are more efficient for this purpose because the data (e.g. numerical data) does not need to be converted between the binary form used by the CPU and a printable (ASCII) representation. The disadvantage is that it is usually necessary to write special purpose programs to manipulate such files since most general purpose utilities operate on text files. There is also a problem sharing binary numerical data between processors with different endianness.

Some communications protocols handle only text files, e.g. most [electronic mail](#) systems, though as of 1995 this is changing slowly. The Unix utility uuencode can be used to convert binary data to text for transmission by e-mail. The FTP utility must be put into "binary" mode in order to copy a binary file since in its default "ascii" mode translates between the different text line terminator characters used on the sending and receiving computers.

Confusingly, some files produced by wordprocessors, and rich text files, are actually binary files because they contain non-printable characters and require special programs to view, edit, and print them.

[\[FOLDOC\]](#)

16-03-2001

binary search

[<algorithm>](#) A search [algorithm](#) which repeatedly divides an ordered search space in half according to how the required (key) value compares with the middle element.

The following pseudo-[C](#) routine performs a binary search return the index of the element of vector "thing [first..last]" equal to "target": if (target < thing[first] || target > thing[last]) return NOT_FOUND; while (first < last) mid = (first+last)/2; /* truncate to integer */ if (target < thing[mid]) last = mid; else if (target > thing[mid]) first = mid+1; else return mid; if (target == thing[last]) return last; return NOT_FOUND;

[\[FOLDOC\]](#)

16-03-2001

binary tree

(btree) A [tree](#) in which each node has at most two successors or child nodes. In Haskell this could be represented as data BTree a = NilTree | Node a (BTree a) (BTree a)

See also balanced tree.

[\[FOLDOC\]](#)

16-03-2001

binding-time analysis

<[compiler](#)> An analysis to identify sub-expressions which can be evaluated at compile-time or where versions of a function can be generated and called which are specialised to certain values of one or more arguments.

See partial evaluation.

[[FOLDOC](#)]

16-03-2001

bit

<[unit](#)> (b) binary digit. The unit of information; the amount of information obtained by asking a yes-or-no question; a computational quantity that can take on one of two values, such as true and false or 0 and 1; the smallest unit of storage - sufficient to hold one bit.

A bit is said to be "set" if its value is true or 1, and "reset" or "clear" if its value is false or 0. One speaks of setting and clearing bits. To toggle or "invert" a bit is to change it, either from 0 to 1 or from 1 to 0.

The term "bit" first appeared in print in the computer-science sense in 1949, and seems to have been coined by early computer scientist John Tukey. Tukey records that it evolved over a lunch table as a handier alternative to "bigit" or "binit".

See also flag, trit, mode bit, [byte](#), word.

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

bivalence principle of

<[philosophy of science](#), [epistemology](#), [logic](#)> [supposition](#) that every [proposition](#) must be either [true](#) or [false](#). The status of this [supposition](#) is controversial, especially with respect to future propositions about human action. Thus, for example, if "I will vacuum the carpet tomorrow." were regarded as already [true](#) (or [false](#)) today, it would seem that I cannot freely choose whether or not to clean. Note the difference between bivalence and excluded middle.

Recommended Reading:

Ermanno Bencivenga, Logic, Bivalence and Denotation (Ridgeview, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

28-09-2001

black box

<[jargon](#)> An abstraction of a device or system in which only its externally visible behaviour is considered and not its implementation or "inner workings".

See also functional testing.

[[FOLDOC](#)]

16-03-2001

black-box testing

functional testing

20-11-2003

Blanshard Brand

<[history of philosophy, biography](#)> american philosopher and long-time professor at Yale University (1892-1987).

In *The Nature of Thought* (1939), [Blanshard](#) defended absolute idealism and argued that causal necessity is a genuine feature of the [natural world](#). According to *Blanshard's Reason and Analysis* (Open Court, 1962), the philosophical methods of Anglo-American philosophers during the twentieth century were fundamentally misguided. He also rejected the prevalent non-cognitivism of twentieth-century ethicists by defending a thoroughly naturalistic moral theory in *Reason and Goodness* (1962).

Recommended Reading:

Brand Blanshard, *On Philosophical Style and Philosophy of Brand Blanshard*, ed. by Paul Arthur Schilpp (Open Court, 1980).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

Bocardo

<[logic, philosophy of science](#)> name given by medieval logicians to a [categorical syllogism](#) whose standard form has the mood and figure designated as OAO-3. Example: Some local jails are not maximum-security prisons, but since all local jails are correctional institutions, it follows that some correctional institutions are not maximum-security prisons. This is one of the fifteen forms of valid syllogism.

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

Boethius Anicius Manlius Severinus

<[history of philosophy, biography](#)> roman [logician](#) (480-524). His *Commentary on the Isagoge of Porphyry* (itself a discussion of [Aristotle's](#) *Categories*) carefully distinguished Aristotelean essences from Platonic Forms setting the basic terms employed in subsequent medieval discussion of the problem of universals. *De consolazione philosophiae* (*The Consolation of Philosophy*), written during the imprisonment that preceded his execution, considers the possibility of achieving human happiness despite the inescapable presence of evil, extols the benefits of reason even in the face of misfortune and bad advice, and proposes a compatibilist account of human freedom in the face of divine foreknowledge.

Recommended Reading:

Five Texts on the Mediaeval Problem of Universals, ed. by Paul Vincent Spade (Hackett, 1994).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

Boetius of Dacia

<[history of philosophy, biography](#)> swedish Dominican philosopher (1230-1285). Doubts about personal immortality and the espousal of a fideistic account of the relation between [faith](#) and [reason](#) during his service in Romania resulted in the condemnation of his teachings, along with those of Siger of Brabant and the other radical Aristoteleans.

Recommended Reading:

Boethius of Dacia: On the Supreme Good, on the Eternity of the World, on Dreams, tr. by John F. Wippel (Pontifical Inst., 1987).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

Bohr Niels Henrik David

<[history of science](#), [philosophy of science](#)> danish [physicist](#) (1885-1962). Although best known for his contributions to [atomic theory](#) and [quantum mechanics](#), [Bohr](#) also reflected on [epistemological issues](#), defending a sophisticated variety of [cultural relativism](#). [Bohr](#) won the Nobel Prize in [Physics](#) in 1922.

Recommended Reading:

Dugald Murdoch, Niels Bohr' s Philosophy of Physics (Cambridge, 1989);
Abraham Pais, Niels Bohr' s Times: In Physics, Philosophy, and Polity (Oxford, 1993);
Andrew Whitaker, Einstein, Bohr and the Quantum Dilemma (Cambridge, 1996).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

Bolzano Bernard

<[history of philosophy](#), [biography](#)> austrian [mathematician](#), [theologian](#), and [philosopher](#) (1781-1848). In opposition to the [idealism](#) of [Kant](#) and [Hegel](#), [Bolzano](#) maintained that [numbers](#), [ideas](#), and [truths](#) all exist independently of the [human beings](#) who think about them. His Wissenschaftslehre (1837) and Gr–ssenlehre (1850) offer a [philosophical foundation](#) for [mathematics](#), employing a modern [theory of classes](#) to define the [real numbers](#). [Bolzano](#)' s work was a significant influence on that of [Husserl](#), [Frege](#), [Lukasiewicz](#), and [Tarski](#).

Recommended Reading:

Jan Sebestik, Logique et mathÈmatique chez Bernard Bolzano (Paris, 1992).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

Bonaventure

<[history of philosophy](#), [biography](#)> franciscan [philosopher](#) and [theologian](#), known also as Giovanni di Fidanza (1221-1274). Following [Augustine](#), [Bonaventure](#) held that reason is valuable only in support of [faith](#). [Bonaventure](#)' [philosophy](#) was predominantly neoplatonic; he accepted [Aristotle](#)' s philosophical principles only when they could be used in service of his Christian aims, but argued against the eternal [reality](#) of the [universe](#). In Itinerarium mentis in deum (The Journey of the Mind to God) (1259) he argued that human beings, as emanations of the [deity](#), embody a footprint (Lat. Vestigium) of the divine nature.

Recommended Reading:

Etienne Gilson, The Philosophy of St. Bonaventure (Franciscan, 1965).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-09-2001

Boole George

<[history of philosophy](#), [biography](#)> british [logician](#) (1815-1864) whose The Mathematical Analysis of Logic (1847) proposed the "[Boolean algebra](#)" of propositional connectives representing [negation](#) and [conjunction](#). An Investigation into the Laws of Thought (1859) further develops a symbolic system for the expression and evaluation of [categorical syllogisms](#), understood as elements in the logic of classes.

Recommended Reading:

A Boole Anthology: Recent and Classical Studies in the Logic of George Boole, ed. by James Gasser (Kluwer, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

09-10-2001

Boolean

<[mathematics](#), [logic](#)> 1. Boolean algebra.

<[programming](#)> 2. (bool) The type of an expression with two possible values, "true" and "false". Also, a variable of Boolean type or a function with Boolean arguments or result.

The most common Boolean functions are AND, OR and NOT.

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16-03-2001

Boolean algebra

<[mathematics](#), [logic](#)> (After the logician George Boole)

1. Commonly, and especially in computer science and digital electronics, this term is used to mean two-valued logic.

2. This is in stark contrast with the definition used by pure mathematicians who in the 1960s introduced "Boolean-valued [models](#)" into logic precisely because a "Boolean-valued model" is an interpretation of a [theory](#) that allows more than two possible truth values!

Strangely, a Boolean algebra (in the mathematical sense) is not strictly an [algebra](#), but is in fact a [lattice](#). A Boolean algebra is sometimes defined as a "complemented [distributive lattice](#)".

Boole' s work which inspired the mathematical definition concerned [algebras](#) of [sets](#), involving the operations of intersection, union and complement on sets. Such algebras obey the following identities where the operators \wedge , \vee , \neg and constants 1 and 0 can be thought of either as set intersection, union, complement, universal, empty; or as two-valued logic AND, OR, NOT, TRUE, FALSE; or any other conforming system.

$a \wedge b = b \wedge a$ $a \vee b = b \vee a$ (commutative laws)

$(a \wedge b) \wedge c = a \wedge (b \wedge c)$

$(a \vee b) \vee c = a \vee (b \vee c)$ (associative laws)

$a \wedge (b \vee c) = (a \wedge b) \vee (a \wedge c)$

$a \vee (b \wedge c) = (a \vee b) \wedge (a \vee c)$ (distributive laws)

$a \wedge a = a$ $a \vee a = a$ (idempotence laws)

$\neg\neg a = a$

$\neg(a \wedge b) = (\neg a) \vee (\neg b)$

$\neg(a \vee b) = (\neg a) \wedge (\neg b)$ (de Morgan' s laws)

$a \wedge \neg a = 0$ $a \vee \neg a = 1$

$a \wedge 1 = a$ $a \vee 0 = a$

$a \wedge 0 = 0$ $a \vee 1 = 1$

$\neg 1 = 0$ $\neg 0 = 1$

There are several common alternative notations for the " \neg " or [logical complement](#) operator.

If a and b are elements of a Boolean algebra, we define $a \leq b$ to mean that $a \wedge b = a$, or equivalently $a \vee b = b$. Thus, for example, if \wedge , \vee and \neg denote set intersection, union and complement then \leq is the inclusive subset relation. The relation \leq is a [partial ordering](#), though it is not necessarily a linear ordering since some Boolean algebras contain incomparable values.

Note that these laws only refer explicitly to the two distinguished constants 1 and 0 (sometimes written as [LaTeX](#) op and ot), and in two-valued logic there are no others, but according to the more general mathematical definition, in some systems variables a , b and c may take on other values as well.

[FOLDOC]

16-03-2001

Boolean logic

<[mathematics](#), [logic](#)> A [logic](#) based on [Boolean algebra](#).

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16-03-2001

Boolean search

<[information science](#)> (Or "Boolean query") A query using the [Boolean](#) operators, [AND](#), [OR](#), and [NOT](#), and parentheses to construct a complex condition from simpler criteria. A typical example is searching for combinations of keywords on a World-Wide Web search engine.

Examples:

car or automobile

"New York" and not "New York state"

The term is sometimes stretched to include searches using other operators, e.g. "near".

Not to be confused with [binary search](#).

See also: weighted search.

[[FOLDOC](#)]

16-03-2001

bootstrap

1. <[operating system](#)> (From "to pull oneself up by one' s bootstraps") To load and initialise the operating system on a computer. Normally abbreviated to "boot".

See bootstrap loader.

2. <[compiler](#)> (From "to pull oneself up by one' s bootstraps") to use a [compiler](#) to compile itself.

The usual process is to write an [interpreter](#) for a language, L, in an existing language, M. The compiler is then written in L and the interpreter is used to run it. This produces an executable for compiling programs in L from the source of the compiler in L.

This technique is often used to verify the correctness of a compiler. It was first used in the [LISP](#) community.

See also my favourite toy language.

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16-03-2001

Bordo Susan

<[history of philosophy, biography](#)> american philosopher (1947-). In *The Flight to Objectivity: Essays on Cartesianism and Culture* (1987) she explores the masculinization of thought in Cartesian modernism. [Bordo'](#) *Unbearable Weight: Feminism, Western Culture, and the Body* (1993) is a cultural exploration of the significance of social constructions of the human body.

Similar themes are explored in [Bordo'](#) s *Twilight Zones: The Hidden Life of Cultural Images from Plato to O.* (1997) and *The Male Body: A New Look at Men in Public and in Private* (1999).

[[A Dictionary of Philosophical Terms and Names](#)]

09-10-2001

Bosanquet Bernard

<[history of philosophy, biography](#)> british [philosopher](#) (1848-1923) who defended a modified version of [Hegel'](#) absolute idealism in *Logic, or the Morphology of Knowledge* (1888), *The Principle of Individuality and Value* (1912), and *The Value and Destiny of the Individual* (1914). According to Bosanquet, all contradictions are merely apparent and are wholly harmonized as part of the [Absolute](#), a process said to account for the possibility of judgments about [beauty](#) in his *History of Aesthetics* (1892).

[Bosanquet](#) further argued in *The Philosophical Theory of the State* (1899) that individual human beings are properly understood only in terms of their social and cultural efforts at transcendence.

Recommended Reading:

The Collected Works of Bernard Bosanquet, ed. by William Sweet (Thoemmes, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

09-10-2001

bottom

<[mathematics](#), [logic](#)> The least defined element in a given [domain](#). Often used to represent a non-terminating computation.

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16-03-2001

bottom-unique

<[mathematics](#)> In [domain theory](#), a function f is bottom-unique if $f\ x = \text{bottom} \Leftrightarrow x = \text{bottom}$ A bottom-unique function is also [strict](#).

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16-03-2001

bottom-up implementation

<[PI](#)> The opposite of top-down design. It is now received wisdom in most programming cultures that it is best to design from higher levels of abstraction down to lower, specifying sequences of action in increasing detail until you get to actual code. Hackers often find (especially in exploratory designs that cannot be closely specified in advance) that it works best to *build* things in the opposite order, by writing and testing a clean set of primitive operations and then knitting them together.

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

bottom-up model

<[PI](#)> A method for estimating the cost of a complete software project by combining estimates for each component.

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16-03-2001

bound variable

1. <[logic](#)> A bound variable or formal argument in a function definition is replaced by the actual argument when the function is applied. In the [lambda abstraction](#) $x . M$ x is the bound variable. However, x is a [free variable](#) of the term M when M is considered on its own. M is the [scope](#) of the binding of x .

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2. <[predicate logic](#)> In [predicate](#) logic, an individual variable at least one of whose occurrences lies within the scope of a quantifier on the same letter. Because other occurrences may be free, a variable may be both free and bound in the same [wffs](#). to bind a variable to add a quantifier on an individual variable, x , to a [wff](#) so that one or more previously free occurrences of x lie inside the scope of that quantifier.

See [closure](#), [free variable](#)

[Glossary of First-Order Logic]

16-03-2001

bounded

<[mathematics](#)> In [domain theory](#), a subset S of a cpo X is bounded if there exists x in X such that for all s in S, s <= x. In other words, there is some element above all of S. If every bounded subset of X has a least upper bound then X is boundedly [complete](#).

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16-03-2001

bounded minimization

[minimization](#)

21-11-2003

boundedly complete

<[mathematics](#)> In domain theory, a complete partial order is boundedly complete if every bounded subset has a least upper bound. Also called consistently complete.

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16-03-2001

boundless the

<<[metaphysics](#), [history of philosophy](#)> the [eternal](#), [infinite](#), undifferentiated stuff from which [Anaximander](#) believed the material world to be formed.

[[A Dictionary of Philosophical Terms and Names](#)]

09-10-2001

bourgeois

<[political theory](#), [political philosophy](#)> <[philosophy of history](#), [communism](#), [marxism](#), [proletarian](#)> in its original designation the [term](#) referred to the medieval "middle class" of shopkeepers and artisans. In Communist theory it refers to the capitalist class of owners of the means and forces of production which, as Marx recounts, is historically descended from this medieval middle class. Contrast: [proletarian](#). See: [communism](#).

[[Philosophical Glossary](#)]

22-06-2001

Boyle Robert

<[history of science](#), [philosophy of science](#)> english scientist (1627-1692) who discovered the relationship between the temperature, pressure, and volume of a gas and founded The Royal Society. In The Sceptical Chymist (1661) and The Origins of Forms and Qualities (1666), [Boyle](#) helped to establish the discipline of chemistry and drew a careful distinction between primary and secondary qualities, later used by his friend [Locke](#). A principled corpuscularian, [Boyle](#) defended the reliability of mechanistic philosophy in The Excellency and Grounds of the Corpuscular or Mechanical Philosophy (1674) and in extended controversies with [Spinoza](#) and Henry [More](#). [Boyle](#) employed the teleological argument for [god](#)' s existence and defended traditional theology in The Excellence of Theology (1674) and The Christian Virtuoso (1690).

Recommended Reading:

Selected Philosophical Papers of Robert Boyle (Hackett, 1991);

Robert Boyle on Natural Philosophy, ed. by Marie Boas Hall (Greenwood, 1980);

Peter Alexander, Ideas, Qualities and Corpuscles: Locke and Boyle on the External World; Peter R. Anstey, The Philosophy of Robert Boyle (Routledge, 2000);

Rose-Mary Sargent, The Diffident Naturalist: Robert Boyle and the Philosophy of Experiment (Chicago, 1995).

[[A Dictionary of Philosophical Terms and Names](#)]

09-10-2001

Bradley Francis Herbert

<[history of philosophy](#), [biography](#)> english [philosopher](#) (1846-1924) and absolute idealist. His Ethical Studies (1876) criticized [Mill's utilitarianism](#) and defended an [ethics](#) of self-realization, understood as the conquest of the bad self by the [good](#). [Bradley's](#) metaphysical views, akin to those of [Hegel](#), with a special emphasis on the internal relations of the [Absolute](#) are developed at length in Appearance and Reality (1893) and defended in Essays on Truth and Reality (1914). Bradleian metaphysics became the primary target for the anti-idealistic polemics of [Moore](#) and [Russell](#).

Recommended Reading:

F. H. Bradley, Writings on Logic and Metaphysics, ed. by James W. Allard and Guy Stock (Oxford, 1994);
The Collected Works of F. H. Bradley, ed. by W.J. Mander and Carol Keene (Thoemmes, 1999);
Phillip Ferreira, Bradley and the Structure of Knowledge (SUNY, 1999);
W. J. Mander, Perspectives on the Logic and Metaphysics of F.H. Bradley (St. Augustine, 1997).

[\[A Dictionary of Philosophical Terms and Names\]](#)

09-10-2001

branch

1. <[mathematics](#)> An [edge](#) in a [tree](#).
2. <[programming](#)> A jump.

[\[FOLDOC\]](#)

16-03-2001

branch prediction

<[processor](#), [algorithm](#)> A technique used in some processors with instruction prefetch to guess whether a conditional branch will be taken or not and prefetch code from the appropriate location.

When a branch instruction is executed, its address and that of the next instruction executed (the chosen destination of the branch) are stored in the Branch Target Buffer. This information is used to predict which way the instruction will branch the next time it is executed so that instruction prefetch can continue. When the prediction is correct (and it is over 90% of the time), executing a branch does not cause a [pipeline break](#).

Some later CPUs simply prefetch both paths instead of trying to predict which way the branch will go. An extension of the idea of branch prediction is speculative execution.

[\[FOLDOC\]](#)

16-03-2001

Brentano Franz Clemens

<[history of philosophy](#), [biography](#)> german philosopher and psychologist (1838-1917). An early phenomenologist, [Brentano](#) proposed the notion that [intentionality](#) is the mark of the [mental](#) in Psychologie vom empirischen Standpunkt (Psychology from an Empirical Standpoint) (1874). He developed an associated [theory of truth](#) in Wahrheit und Evidenz (The True and the Evident) (1930) and applied [phenomenological methods](#) to ethical issues in Vom Ursprung sittlicher Erkenntnis (The Origin of Our Knowledge of Right and Wrong) (1889), defending a pluralistic view of objective intrinsic value.

Recommended Reading:

Victor Velarde, On Brentano (Wadsworth, 1999);
Barry Smith, Austrian Philosophy: The Legacy of Franz Brentano (Open Court, 1996).

[\[A Dictionary of Philosophical Terms and Names\]](#)

09-10-2001

brittle

<[jargon](#)> Said of [software](#) that is functional but easily broken by changes in operating environment or configuration, or by any minor tweak to the software itself. Also, any system that responds inappropriately and disastrously to abnormal but expected external stimuli; e.g. a file system that is usually totally scrambled by a power failure is said to be brittle. This term is often used to describe the results of a research effort that were never intended to be robust, but it can be applied to commercially developed software, which displays the quality far more often than it ought to.

Opposite of [robust](#).

[[Jargon File](#)]

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16-03-2001

Broad Charlie Dunbar

<[history of philosophy, biography](#)> english philosopher (1887-1971). Although he criticized the extravagant speculation of absolute idealists like [McTaggart](#) in his Examination of McTaggart' s Philosophy (1933, 1938) [Broad](#) was more willing than his contemporaries [Russell](#) and [Moore](#) to engage in metaphysical as well as epistemological theorizing. The philosophy of mind expressed in Scientific Thought (1923) and The Mind and its Place in Nature (1925) clearly defended the [reality](#) of physical and mental phenomena, including (notoriously) the possibility of genuine parapsychological phenomena.

Recommended Reading:

Philosophy of C. D. Broad, ed. by Paul A. Schilpp (Open Court, 1964).

[[A Dictionary of Philosophical Terms and Names](#)]

09-10-2001

Bruno Giordano

<[history of philosophy, biography](#)> (1548-1600) italian philosopher of the [Renaissance](#) and follower of [Nicolas of Cusa](#). An apostate Dominican, [Bruno](#) tried to incorporate both Copernican astronomy and [hermetic mysticism](#) into an atomistic physics. His evident inclination toward [pantheism](#) and explicit identification of infinite matter as the eternal substance of the [universe](#) in Dell' infinito, universo e mondi (On the Infinite Universe and Worlds) (1584), De Gli Eroi Furori (The Heroic Frenzies) (1585) and De immense et innumerabilibus (1591) earned him the condemnation of the church, which expressed its displeasure by burning him at the stake in Rome.

Recommended Reading:

J. Lewis McIntyre, Giordano Bruno (Kessinger, 1997);

Frances A. Yates, Giordano Bruno and the Hermetic Tradition (Chicago, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

09-10-2001

brute force

<[PI](#)> A primitive programming style in which the programmer relies on the computer' s processing power instead of using his own intelligence to simplify the problem, often ignoring problems of scale and applying naive methods suited to small problems directly to large ones. The term can also be used in reference to programming style: brute-force programs are written in a heavy-handed, tedious way, full of repetition and devoid of any elegance or useful abstraction (see also brute force and ignorance).

The canonical example of a brute-force algorithm is associated with the "[travelling salesman problem](#)" (TSP), a classical NP-hard problem:

Suppose a person is in, say, Boston, and wishes to drive to N other cities. In what order should the cities be visited in order to minimise the distance travelled?

The brute-force method is to simply generate all possible routes and compare the distances; while guaranteed to work and simple to implement, this algorithm is clearly very stupid in that it considers even obviously absurd routes (like going from Boston to Houston via San Francisco and New York, in that order). For very small N it works well, but it rapidly becomes absurdly inefficient when N increases (for N = 15, there are already 1,307,674,368,000 possible routes to consider, and for N = 1000 - well, see [bignum](#)). Sometimes, unfortunately, there is no better general solution than brute force. See also NP-complete.

A more simple-minded example of brute-force programming is finding the smallest number in a large list by first using an existing program to sort the list in ascending order, and then picking the first number off the front.

Whether brute-force programming should actually be considered stupid or not depends on the context; if the problem is not terribly big, the extra CPU time spent on a brute-force solution may cost less than the programmer time it would take to develop a more "intelligent" algorithm. Additionally, a more intelligent algorithm may imply more long-term complexity cost and bug-chasing than are justified by the speed improvement.

When applied to cryptography, it is usually known as [brute force attack](#). Ken Thompson, co-inventor of Unix, is reported to have uttered the epigram "When in doubt, use brute force". He probably intended this as a ha ha only serious, but the original Unix [kernel](#)'s preference for simple, robust and portable algorithms over brittle "smart" ones does seem to have been a significant factor in the success of that operating system. Like so many other tradeoffs in software design, the choice between brute force and complex, finely-tuned cleverness is often a difficult one that requires both engineering savvy and delicate aesthetic judgment.

[[Jargon File](#)]

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16-03-2001

brute force attack

<[cryptography](#)> A method of breaking a cipher (that is, to decrypt a specific encrypted text) by trying every possible [key](#). The quicker the brute force attack, the weaker the cipher. Feasibility of brute force attack depends on the key length of the cipher, and on the amount of computational power available to the attacker. Brute force attack is impossible against the ciphers with variable-size key, such as a one-time pad cipher.

Breaking ciphers with many workstations (<http://www.distributed.net/projects.html.en>).

[[FOLDOC](#)]

16-03-2001

Buber Martin

<[history of philosophy](#), [biography](#), [psychology](#)> austrian-Jewish theologian (1878-1965). In Ich und Du (I and Thou) (1922) [Buber](#) suggested that genuinely religious experiences must involve reciprocal intersubjective relations between persons rather than a merely objective apprehension of abstract reality. After emigrating to Israel [Buber](#) served as first President of the Academy of Science and Humanities.

Recommended Reading:

Dan Avnon, Martin Buber: The Hidden Dialogue (Rowman-Littlefield, 1998);

Martin Buber and the Human Sciences, ed. by Maurice Friedman and Pat Boni (SUNY, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

09-10-2001

Buddhism

<[religion](#), [philosophy](#)> individualistic religious and philosophical tradition that originated with the historical Buddha (c. 563-483 BC) in India and spread throughout the Orient. In this century, it has also spread to America, in the form of [Zen](#) Buddhism. Zen is the Japanese name for the form of Buddhism that was most successful in China, Ch'an, which represented [syncretism](#) of Indian Mahayana Buddhism and traditional Chinese beliefs like [Confucianism](#) and [Taoism](#). Buddhism, in fact, is quite similar to Taoism: both stress the belief that we cannot trust in the world of appearances and that there is an underlying unity to the universe (see [holism](#)); both emphasize a certain level of detachment from worldly affairs (sometimes bordering on [asceticism](#)) and the development of a disposition that enables one to enjoy and understand the world. Buddhism transcendentalism puts a great value on ultimate detachment and eternal enlightenment, known as Nirvana. (References from [holism](#), [humanism](#), [individualism](#), Neo-Confucianism, and [Taoism](#).)

Based on [[The Ism Book](#)]

Edited by Giovanni Benzi

24-03-2001

bundle theory

<[history of philosophy](#), [gnoseology](#), [psychology](#)> [belief](#) that an [object](#) comprises only the features or [properties](#) it exhibits, without requiring the unifying presence of any underlying [substance](#). Most notably, [Hume](#) supposed that the human self or [mind](#) is nothing more than a bundle of perceptions linked to each other only by contingent associations.

Recommended Reading:

James Bricke Hume' s Philosophy of Mind (Princeton, 1980).

[\[A Dictionary of Philosophical Terms and Names\]](#)

09-10-2001

Buridan Jean

<[history of philosophy](#), [biography](#)> french [logician](#) and philosopher who first developed a theory of inertial motion (1295-1356). His commentaries on [Aristotle](#)' s theory of action made famous the predicament involved in choosing (as must "Buridan' s ass") between two equally attractive alternatives. Although he defended [nominalism](#) as a solution to the problem of [universals](#), [Buridan](#) rejected the extreme version developed by his teacher, [Ockham](#).

Recommended Reading:

Jean Buridan' s Logic: The Treatise on Supposition, the Treatise on Consequences, ed. by Peter King (Reide 1986);

The Metaphysics and Natural Philosophy of John Buridan, ed. by J. M. M. H. Thijssen and Jack Zupko (Brill, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

09-10-2001

Burke Edmund

<[history of philosophy](#), [biography](#)> irish [politician](#) and [philosopher](#) (1729-1797). In the early A Philosophical Enquiry into the Origin of our Ideas of the Sublime and Beautiful (1757) [Burke](#) offered an analysis of aesthetic judgment that greatly influenced the work of [Kant](#). [Burke](#)' s Reflections on the Revolution in France (1790) includes an explicit criticism of the [social contract theory](#), an extended appeal for the preservation of established social and political institutions, and the defence of a society ruled by respect for the rights and privileges revealed in traditional value-systems, including established [religion](#).

Recommended Reading:

The Portable Edmund Burke, ed. by Isaac Kramnick (Penguin, 1999);

The Enduring Edmund Burke: Bicentennial Essays, ed. by Conor C. O' Brien, Bruce Frohnen, Peter J. Stanlis and Peter Tann (Intercollegiate, 1997);

Edmund Burke: A Genius Reconsidered, ed. by Roger Scruton (Intercollegiate, 1997).

[\[A Dictionary of Philosophical Terms and Names\]](#)

09-10-2001

Busy Beaver

<[logic](#)> (BB) One of a series of sets of [Turing Machine](#) programs. The BBs in the Nth set are programs of N states that produce a larger finite number of ones on an initially blank tape than any other program of N states. There is no program that, given input N, can deduce the productivity (number of ones output) of the BB of size N.

The productivity of the BB of size 1 is 1. Some work has been done to figure out productivities of bigger Busy Beavers – the 7th is in the thousands.

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16-03-2001

Butler Joseph

<[history of philosophy, biography](#)> english clergyman and philosopher (1692-1752). [Butler](#)' s Fifteen Sermon upon Human Nature (1726) attempted to establish human morality in the moderation of self-love by the authority of a divinely-provided conscience, and his The Analogy of Religion, Natural and Revealed, to the Constitution and Course of Nature (1736) defended revealed religion in the face of deistic challenges.

Recommended Reading:
Terence Penelhum, Butler (Routledge, 1986).

[[A Dictionary of Philosophical Terms and Names](#)]

09-10-2001

byte

<[unit](#)> /bi:t/ (B) A component in the machine [data hierarchy](#) usually larger than a [bit](#) and smaller than a word; now most often eight bits and the smallest addressable unit of storage. A byte typically holds one character. A byte may be 9 bits on 36-bit computers. Some older architectures used "byte" for quantities of 6 or 7 bits, and the PDP-10 and IBM 7030 supported "bytes" that were actually bit-fields of 1 to 36 (or 64) bits! These usages are now obsolete, and even 9-bit bytes have become rare in the general trend toward power-of-2 word sizes.

The term was coined by Werner Buchholz in 1956 during the early design phase for the IBM Stretch computer. It was a mutation of the word "bite" intended to avoid confusion with "bit". In 1962 he described it as "a group of bits used to encode a character, or the number of bits transmitted in parallel to and from input-output units". The move to an 8-bit byte happened in late 1956, and this size was later adopted and promulgated as a standard by the System/360 operating system (announced April 1964).

James S. Jones adds: I am sure I read in some historical brochure by IBM some 15-20 years ago that BYTE was an acronym that stood for "Bit asYnchronous Transmission E__?__" which related to width of the bus between the Stretch CPU and its CRT-memory (prior to Core).

Terry Carr says:
In the early days IBM taught that a series of bits transferred together (like so many yoked oxen) formed a Binary Yoked Transfer Element (BYTE).

[True origin? First 8-bit byte architecture?]

See also nibble, octet.

[[Jargon File](#)]

[[FOLDOP](#)]

16-03-2001

c

<[logic](#)>
Lower-case "c", often in Gothic type. The symbol for the cardinality of the continuum; $c = 2^{\aleph_1}$, or (assuming the continuum hypothesis) \aleph_2 .

See [continuum hypothesis](#)

[Glossary of First-Order Logic]

16-03-2001

Caird Edward

<[history of philosophy, biography](#)> Scottish [Hegelian philosopher](#). [Caird](#) (1835-1908) was one of the first generation of ' British idealists,' whose philosophical work was largely in reaction to the then dominant [empiricist](#) and associationist views of Alexander Bain (1818-1903) and J.S. [Mill](#). Best known for his studies of [Kant](#) - A Critical Account of the Philosophy of Kant (1877) and The Critical Philosophy of Immanuel Kant (1889) - and Hegel - Hegel (1883), [Caird](#) also exercised a strong influence on later [idealists](#) such as John [Watson](#) and Bernard [Bosanquet](#), particularly concerning the development of an '[evolutionary](#)' account of religion; see his two series of Gifford lectures, The Evolution of Religion (1893), and The Evolution of Theology in the Greek Philosophers (1904). (Contributed by Will Sweet.)

Recommended Reading:
The Collected Works of Edward Caird, ed. by Colin Tyler (Thoemmes, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

11-10-2001

calculus

<[ethics](#)> a calculus is simply a means of [computing](#) something, and a moral calculus is just a means of calculating what the right moral decision is in a particular case.

See also [practical reasoning](#)

[\[Ethics Glossary\]](#)

26-03-2001

Cambridge Platonists

<[history of philosophy](#)> an influential group of seventeenth-century English [philosophers](#) and latitudinarian [theologians](#) who rejected the tenets of (Oxford-taught) [scholasticism](#) in favor of an eclectic rationalism that employed a neoplatonic metaphysics and placed great emphasis on the role of [innate ideas](#) in the acquisition of worthwhile [knowledge](#) of [reality](#), while opposing the mechanism of the new [science](#) and the [atheism](#) to which they feared it might lead. Prominent members of the group included [Cudworth](#), [Cumberland](#), Glanvill, [More](#), [Conway](#) and [Norris](#).

Recommended Reading:

The Cambridge Platonists in Philosophical Context: Politics, Metaphysics, and Religion, ed. by G. A. J. Rogers, J. M. Vienne, and Y. C. Zarka (Kluwer, 1997);
Frederick James Powicke, Cambridge Platonists (Greenwood, 1955).

[\[A Dictionary of Philosophical Terms and Names\]](#)

11-10-2001

Camenes

<[logic](#), [philosophy of science](#)> name given by medieval logicians to a [categorical syllogism](#) whose standard form is AEE-4.

Example: All first-degree murders are premeditated homicides, but no premeditated homicides are actions performed in self-defence, so it follows that no actions performed in self-defence are first-degree murders. This is one of the fifteen forms in which syllogisms are [always valid](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

11-10-2001

Camestres

<[logic](#), [philosophy of science](#)> name given by medieval logicians to any [categorical syllogism](#) whose standard form may be designated as AEE-2. Example: All terriers are dogs, while no cats are dogs, so no cats are terriers. This is another of the fifteen forms of valid syllogism.

[\[A Dictionary of Philosophical Terms and Names\]](#)

11-10-2001

Camus Albert

<[literature](#), [history of philosophy](#), [biography](#)> french-Algerian journalist and novelist (1913-1960). [Camus](#) explored the practical consequences of existentialist philosophy in his novels, L' Étranger (The Stranger) (1942), La Peste (The Plague) (1947), L' Homme Révolté (The Rebel) (1951), and La Chute (The Fall) (1956). His essay Le Mythe de Sisyphe (Essai sur l' absurde) (The Myth of Sisyphus) (1943) describes the inherent absurdity of human life, a profound meaninglessness that can be mitigated only by moral integrity and social solidarity. Camus was awarded the Nobel Prize in 1957 and died in an automobile accident three years later.

Recommended Reading:

Olivier Todd and Benjamin Ivry, Albert Camus: A Life (Carroll, 2000);
Joseph McBride, Albert Camus: Philosopher and Litterateur (St. Martins, 1992);
Harold Bloom and William Golding, Albert Camus (Chelsea House, 1989).

[[A Dictionary of Philosophical Terms and Names](#)]

11-10-2001

canonical

(Historically, "according to religious law")

1. <[mathematics](#)> A standard way of writing a formula. Two formulas such as $9 + x$ and $x + 9$ are said to be equivalent because they mean the same thing, but the second one is in "canonical form" because it is written in the usual way, with the highest power of x first. Usually there are fixed rules you can use to decide whether something is in canonical form. Things in canonical form are easier to compare.

2. <[jargon](#)> The usual or standard state or manner of something. The term acquired this meaning in computer-science culture largely through its prominence in Alonzo Church' s work in computation theory and [mathematical logic](#) (see Knights of the Lambda-Calculus).

Compare [vanilla](#).

This word has an interesting history. Non-technical academics do not use the adjective "canonical" in any of the senses defined above with any regularity; they do however use the nouns "canon" and "canonicity" (not "canonicalness" or "canonicity"). The "canon" of a given author is the complete body of authentic works by that author (this usage is familiar to Sherlock Holmes fans as well as to literary scholars). "The canon" is the body of works in a given field (e.g. works of literature, or of art, or of music) deemed worthwhile for students to study and for scholars to investigate.

The word "canon" derives ultimately from the Greek "kanon" (akin to the English "cane") referring to a reed. Reeds were used for measurement, and in Latin and later Greek the word "canon" meant a rule or a standard. The establishment of a canon of scriptures within Christianity was meant to define a standard or a rule for the religion. The above non-technical academic usages stem from this instance of a defined and accepted body of work. Alongside this usage was the promulgation of "canons" ("rules") for the government of the Catholic Church. The usages relating to religious law derive from this use of the Latin "canon".

Hackers invest this term with a playfulness that makes an ironic contrast with its historical meaning. A true story: One Bob Sjoberg, new at the MIT AI Lab, expressed some annoyance at the incessant use of jargon. Over his loud objections, GLS and [RMS](#) made a point of using as much of it as possible in his presence, and eventually it began to sink in. Finally, in one conversation, he used the word "canonical" in jargon-like fashion without thinking. Steele: "Aha! We' ve finally got you talking jargon too!" Stallman: "What did he say?" Steele "Bob just used "canonical" in the canonical way."

Of course, canonicity depends on context, but it is implicitly defined as the way *hackers* normally expect things to be. Thus, a hacker may claim with a straight face that "according to religious law" is *not* the canonical meaning of "canonical".

[[FOLDOP](#)]

16-03-2001

canonicity

<[theory](#), [jargon](#)> The extent to which something is [canonical](#).

[[FOLDOP](#)]

16-03-2001

Cantor Georg Ferdinand Ludwig Philipp

<[mathematics](#), [history of philosophy](#), [biography](#)> german [mathematician](#). [Cantor](#) (1845-1918) developed modern [set theory](#) as the foundation for all of [mathematics](#) and used the "diagonal proof" to demonstrate that lines, planes, and spaces must all contain a non-denumerable [infinity](#) of points; that is, they cannot be counted in a one-to-one correspondence with the rational [numbers](#). The [reality](#) of trans-finite quantities within the [set](#) of real numbers leads, in turn to "Cantor' s paradox"- that every [set](#) has more subsets than members, so that there can be no set of all sets.

Recommended Reading:

Georg Cantor, Contributions to the Founding of the Theory of Transfinite Numbers, tr. by Philip E. Jourdain (Dover, 1955);
Keith Simmons, Universality and the Liar: An Essay on Truth and the Diagonal Argument (Cambridge, 1993)
Joseph Warren Dauben, Georg Cantor (Princeton, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

11-10-2001

Cantorian set theory

[set theory](#) Cantor' s theorem [logic](#)> The power set of a given set has a greater cardinality than the given set.

[Glossary of First-Order Logic]

16-03-2001

capacitor

<[electronics](#)> An electronic device that can store electrical charge. The charge stored Q in Coulombs is related to the capacitance C in Farads and the voltage V across the capacitor in Volts by $Q = CV$.

The basis of a dynamic RAM cell is a capacitor. They are also used for power-supply smoothing (or "decoupling"). This is especially important in digital circuits where a digital device switching between states causes a sudden demand for current. Without sufficient local power supply decoupling, this current "spike" cannot be supplied directly from the power supply due to the inductance of the connectors and so will cause a sharp drop in the power supply voltage near the switching device. This can cause other devices to malfunction resulting in hard to trace glitches.

[[FOLDOP](#)]

16-03-2001

capitalism

<[political philosophy](#)> economic system in which the principal means of production, distribution, and exchange are in private (individual or corporate) hands and competitively operated for profit. A mixed economy combines the private enterprise of capitalism and a degree of state monopoly, as in nationalized industries and welfare services. Most capitalist economies are actually mixed economies, but some (such as the US and Japanese) have a greater share of the economy devoted to free enterprise.

The reputation of capitalism, which was quite bad for a while, has recently been on the rise. This is no doubt due mainly to the universal failure of socialism and [communism](#), but credit must also be given to those scholars who have emphasized that what has been traditionally lampooned as evil "capitalism" is in fact the idea of minimal government, which is better described as classical [liberalism](#) or [libertarianism](#), which is much more "human" than the twentieth-century [authoritarianism](#) and [totalitarianism](#) that supplanted capitalism historically. However, some economists insist that capitalism is not a doctrine or theory in political philosophy in the way that Marxism is, because the free market is not an ideology but simply the economic phenomenon that occurs naturally in the absence of political control.

References from [dialectical materialism](#) and [social Darwinism](#).

Based on [[The Ism Book](#)]

Edited by Giovanni Benzi

16-03-2001

cardinal number

The [cardinality](#) of some set.

[[FOLDOC](#)]

16-03-2001

cardinality

<[mathematics](#)> The number of elements in a set; intuitively, the set' s "size" or "magnitude".

Notation: a double bar over the symbol denoting the set; also " $|S|$ " and "card S" when S is the symbol denoting the set. If two sets have the same number of elements (i.e. there is a [bijection](#) between them) then they have the same cardinality. A cardinality is thus an [isomorphism class](#) in the [category](#) of sets.

[aleph 0](#) is defined as the cardinality of the first [infinite ordinal](#), [omega](#) (the number of [natural numbers](#)).

[[FOLDOC](#)] and [Glossary of First-Order Logic]

16-03-2001

cardinality of an interpretation

[interpretation](#)

00-00-0000

Carnap Rudolf

<[history of philosophy](#), [biography](#)> german-American [philosopher](#). A leading logical positivist, [Carnap](#) (1891-1970) proposed in *Der logische Aufbau der Welt* (The Logical Structure of the World) (1929) and *Logische Syntax der Sprache* (The Logical Syntax of Language) (1934) that all meaningful assertions in a description of reality must be derived from basic statements of experience. [Carnap](#)' s influential articles "Pseudo-Problems in Philosophy" (1928) and "The Elimination of Metaphysics through Logical Analysis of Language" (1932) propose that many traditional [philosophical](#) disputes amount to little more than differences in poetic rhetoric. His "Empiricism, Semantics, and Ontology" (1950) considers the degree of ontological commitment entailed by linguistic reference to abstract entities.

In *Meaning and Necessity: A Study in Semantics and Modal Logic* (1947) and *Logical Foundations of Probability* (1950), [Carnap](#) tried to devise a purely formal representation of the degree of confirmation to which scientific hypotheses are susceptible. [Carnap](#)' s notions about the formation of scientific theories are expressed in *Philosophical Foundations of Physics* (1966).

Recommended Reading:

Alan W. Richardson, *Carnap' s Construction of the World: The Aufbau and the Emergence of Logical Empiricism* (Cambridge, 1997);

Bryan G. Norton, *Linguistic Frameworks and Ontology: A Re-Examination of Carnap' s Metaphilosophy* (Dordrecht, 1977);

Philosophy of Rudolph Carnap, ed. by Paul A. Schilpp (Open Court, 1974).

[[A Dictionary of Philosophical Terms and Names](#)]

12-10-2001

Carneades

<[history of philosophy](#), [biography](#)> greek [philosopher](#) (214-129 B.C.). As leader of the Academy, [Carneades](#) advocated a moderate skepticism, which permitted the qualified assertion of probable judgments.

In his own time, [Carneades](#) was famous for the ability to develop convincing arguments on both sides of any philosophical dispute.

Recommended Reading:

Edwyn Bevan, *Stoics and Skeptics* (Ares, 1980).

[[A Dictionary of Philosophical Terms and Names](#)]

11-10-2001

Carroll Lewis

<[history of philosophy](#), [biography](#)> english logician, mathematician, and author. Charles Lutwidge Dodgson (1832-1898). [Carroll](#)' s fascination with logical and philosophical puzzles is apparent in the popular books Alice' Adventures in Wonderland (1865) and Through the Looking Glass (1876) as well as in the more technical Games of Logic (1887) and Symbolic Logic (1893). The philosophical paper on "What the Tortoise said to Achilles" (1895) raised a significant issue about the legitimacy of reiterated demands for epistemological justification.

[[A Dictionary of Philosophical Terms and Names](#)]

11-10-2001

Cartesian coordinates

<[mathematics](#), [graphics](#)> (After René Descartes, French philosopher and mathematician) A pair of numbers, (x, y), defining the position of a point in a two-dimensional space by its perpendicular projection onto two axes which are at right angles to each other. x and y are also known as the abscissa and [ordinate](#).

The idea can be generalised to any number of independent axes.

Compare [polar coordinates](#).

[[FOLDOC](#)]

16-03-2001

Cartesian doubt

<[epistemology](#)> in his Meditations, [Descartes](#) (1596-1650) proposed discarding any kind of [belief](#) that could be doubted, that might be false. Initially, he was inclined to doubt all the evidences of his [senses](#) (pointing out that it seemed impossible to tell for sure whether he was at any point awake or asleep). The doubt that [Descartes](#) introduced into philosophy has been a characteristic feature as many philosophers since have supposed that we have no secure rational basis for believing in the existence of a world external to our sense experience, etc.

Compare private language argument, the

[[A Philosophical Glossary](#)]

25-04-2001

Cartesian interactionist dualism

<[philosophy of mind](#), [ontology](#)> the view that

1) ontological independence is the criterion for the identification of substance, that is $x = \text{substance}$ iff, for any y different from x, x exists independently of y

2) following (1), strictly speaking, there is only one substance, that is God = substance

3) if x is ontologically dependent only on God, then $x = \text{substance}$ in a weak sense

4) the mental and the material are two weak-substances and;

5) both can have causal effects on the other.

Luciano Floridi

16-03-2001

Cartesian product

<[mathematics](#)> (After Renee Descartes, French philosopher and mathematician) The Cartesian product of two sets A and B is the set

$A \times B = \{ (a, b) \mid a \text{ in } A, b \text{ in } B \}$.

I.e. the product set contains all possible combinations of one element from each set. The idea can be extended to products of any number of sets.

If we consider the elements in sets A and B as points along perpendicular axes in a two-dimensional space then the elements of the product are the "[Cartesian coordinates](#)" of points in that space.

See also [tuple](#).

[FOLDOC]

16-03-2001

Cartesian scepticism

<epistemology>

1. sceptical views against the absolute [reliability](#) of [empirical](#) and mathematical [knowledge](#).
2. any of a class of sceptical views against [empirical knowledge](#) based on the [argument](#) that claims to empirical knowledge are defeated by the possibility that we might be deceived insofar as we might be, for example, dreaming, hallucinating, deceived by demons, or brains in vats.

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)]
Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

Cartesianism

<[metaphysics](#), [epistemology](#), [philosophical school](#), [dualism](#), [innatism](#)> Cartesianism is the name applied in philosophy to the doctrines of [Descartes](#), and to the tradition of modern philosophy that arose out of his thought. In a way, much modern philosophy is just a footnote to, or working out of, Descartes. Some signature ideas and ideals of Cartesianism are [dualism](#) and [rationalism](#), a combination of [idealism](#) in the spiritual realm and of [mechanism](#) in the physical realm.

(References from [automatism](#) and [mechanism](#).)

Based on [[The Ism Book](#)]

Edited by Giovanni Benzi

23-03-2001

Cassirer Ernst

<[history of philosophy](#), [biography](#)> german neo-Kantian [philosopher](#) (1874-1945) who supposed that the fundamental categories of human thought are genuinely [a priori](#), yet develop historically. In his massive *Die Philosophie der symbolischen Formen* (The Philosophy of Symbolic Forms) (1929) (vol. 1-4), [Cassirer](#) suggested that these basic concepts are most clearly revealed in the cultural symbols of [language](#), [science](#), and mythology.

Recommended Reading:

Ernst Cassirer, *The Philosophy of the Enlightenment*, tr. by J. Pettegrove and F. Koelin (Princeton, 1968);
Ernst Cassirer: *A 'Repetition' of Modernity*, ed. by Steve G. Lofts and Michael Krois (SUNY, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

11-10-2001

casuistry

<[ethics](#), [metaphilosophy](#)> approach to [ethics](#) that begins by examining a series of concrete cases rather than by trying to deduce the consequences of a moral rule. Although [Pascal](#) criticized this method for the excessive, misleading, or harmful cleverness with which it was practiced in his day, it remains a common tool for applied ethics in a theological vein.

Recommended Reading:

The Context of Casuistry, ed. by James F. Keenan, Thomas A. Shannon, and Albert R. Jonsen (Georgetown, 1995);
Richard B. Miller, *Casuistry and Modern Ethics: A Poetics of Practical Reasoning* (Chicago, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

14-10-2001

categorical imperative

<[kantian ethics](#)> an [absolute](#) unconditional [command](#), allowing no exceptions. The commands of [morality](#), according to Kant, are all of this type and are all derivable from a single root [imperative](#) – the Categorical Imperative -- akin to the Biblical golden rule ("Do unto others as you would have them do unto you"). Kant gives at least two seemingly different formulations of this basic Categorical Imperative. The first formulation says, "Act only on that [maxim](#) through which you can at the same time will that it should become universal law" (see [maxim](#)).

This first formulation speaks more directly to justice, disallowing self-interested favoritism: it deems only those maxims you' d be willing for everyone (not just yourself) to act on to be morally acceptable; those you would b willing to universalize.

The second formulation says, "Act in such a way that you always treat humanity, whether in your own person or in the person of any other, never simply as a [means](#), but always at the same time as an [end](#)." In this second formulation the appeal seems to be more directly to rights, specifically a [right](#) of autonomy or self-determination. What it forbids is using others without their informed consent to achieve one' s owns purposes. Whether these two formulations are really [equivalent](#) -- just saying the same [thing](#) in other words -- as Kant maintains, is controversial.

Contrast: [hypothetical imperative](#).

[\[Philosophical Glossary\]](#)

28-07-2001

categorical logic

<[history of philosophy](#), [philosophy of science](#), [logic](#)> the traditional interpretation of the logic of classes developed by [Aristotle](#) and the medieval logicians.

Recommended Reading:

Aristotle, Prior Analytics, ed. by Robin Smith (Hackett, 1989);

Jan Lukasiewicz, Aristotle' s Syllogistic from the Standpoint of Modern Formal Logic (Clarendon, 1957).

[\[A Dictionary of Philosophical Terms and Names\]](#)

14-10-2001

categorical proposition

<[history of philosophy](#), [philosophy of science](#), [logic](#)> a [statement](#) of the relationship between two classes, each of which is designated by a [categorical term](#). Within each [proposition](#), the [subject](#) term occurs before the [copula](#) and the [predicate](#) term after. There are only four forms of [categorical proposition](#), distinguished by their quantity and quality.

[\[A Dictionary of Philosophical Terms and Names\]](#)

14-10-2001

categorical syllogism

<[history of philosophy](#), [philosophy of science](#), [logic](#)> a [logical argument](#) consisting of exactly three [categorical propositions](#), two [premises](#) and the [conclusion](#), with a total of exactly three [categorical terms](#), each used in only two of the [propositions](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

14-10-2001

categorical term

<[history of philosophy](#), [philosophy of science](#), [logic](#)> a word or phrase that designates a [class](#). Each [categorical term](#) divides the world into two parts: the original [class](#) and its [complement](#); the things to which the term applies and those to which it does not.

[\[A Dictionary of Philosophical Terms and Names\]](#)

14-10-2001

categoricity of systems

<[logic](#)>

1. A formal system in general is categorical [iff](#) all its models are isomorphic.
2. A first-order theory with identity is categorical [iff](#) All its normal models are isomorphic.

See [isomorphism of models](#), model, normal.

[Glossary of First-Order Logic]

16-03-2001

category

<[history of philosophy](#), [gnoseology](#), [philosophy of science](#)> [predicate](#); hence, a fundamental class of things in our conceptual framework. In [Aristotle](#)' [logic](#) specifically, the categories are the ten general modes of being ([substance](#), [quantity](#), [quality](#), [relation](#), [place](#), [time](#), [position](#), possession, doing, and undergoing) by reference to which any individual thing may be described. Following the lead of stoic thought, medieval logicians commonly employed only the first four of these ten, but allowed for additional, syncategorematic terms that belonged to none of them.

[Kant](#) employed a schematized table of a dozen [categories](#) as the basis for our understanding of the phenomenal realm. Gilbert [Ryle](#) used the term much more broadly, warning of the category mistakes that occur when we fail to respect the unique features of kinds of things.

Recommended Reading:

F. E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967);
Aristotle, Categories, ed. by Hugh Tredennick (Harvard, 1938).

[[A Dictionary of Philosophical Terms and Names](#)]

14-10-2001

category mistake

<[history of philosophy](#), [gnoseology](#), [philosophy of science](#)> confusion in the attribution of properties or the classification of things. Thus, to suppose that sleep is furious or that a city is nothing more than its buildings is to commit a [category mistake](#). [Ryle](#) maintained that [Cartesian dualism](#) arises from the implicit occurrence of just such an error, the supposition that the origins of human behavior must reside in an immaterial substance.

Recommended Reading:

Gilbert Ryle, The Concept of Mind (Chicago, 1984).

[[A Dictionary of Philosophical Terms and Names](#)]

14-10-2001

catharsis

<[history of philosophy](#), [aesthetics](#)> cleansing from guilt or defilement; hence, in [Aristotle](#), the elimination of destructive emotions through appreciation of an aesthetic experience. The notion here is that vicariously experiencing strong feelings renders us less likely to be overcome by them in our own lives.

Recommended Reading:

F. E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967);
Aristotle, Poetics, tr. by Malcolm Heath (Penguin, 1997);
Adnan K. Abdulla, Catharsis in Literature (Indiana, 1985).

[[A Dictionary of Philosophical Terms and Names](#)]

14-10-2001

Cauchy sequence

<[mathematics](#)> A sequence of elements from some [vector space](#) that converge and stay arbitrarily close to each other (using the [norm](#) defined for the space).

[[FOLDOP](#)]

16-03-2001

causal functionalism

<[philosophy of mind](#)> the view that a physical [system](#) realizes a mental state not in virtue of the particular stuff it is made of, but instead in virtue of the causal relations that parts of that [system](#) bear to each other.

See [functionalism](#)

Pete Mandik

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)]
Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

causation

00-00-0000

cause

<[causality](#), [substance](#), [ontology](#), [stoicism](#), [neo-platonism](#)> <[occasionalism](#), [logic](#), [epistemology](#), [philosophy of science](#)> <[neo-positivism](#), [determinism](#), [scientific law](#)> whatever is responsible for changes (including the creation and destruction) of things. According to Aristotle causes fall into four types: [material cause](#), the [substance](#) a [thing](#) is made of; [formal cause](#), the [structure](#) or design of the thing; [efficient cause](#), the [maker](#) or instigator of the change; and [final cause](#), the purpose or [function](#) of it (see [teleology](#)). Modern would-be-scientific conceptions of causality generally eschew [final causation](#) or teleology Hume argued that all [knowledge](#) of [causation](#) comes from our actual experience of observed regularities and includes no real knowledge of any [objectively necessary connection](#).

See [determinism](#), [scientific law](#).

[[Philosophical Glossary](#)]

22-06-2001

cause - effect

<[history of philosophy](#), [gnoseology](#), [philosophy of science](#), [epistemology](#)> distinction between the [events](#) involved in a [causal relationship](#), where the occurrence of one (the [cause](#)) is supposed to bring about or produce an occurrence of the other (the [effect](#)). Although the correct analysis of [causation](#) is a matter of great dispute, [Hume](#) offered a significant criticism of our inclination to infer a necessary connection from mere regularity, and [Mill](#) proposed a set of methods for recognizing the presence of causal relationships. Contemporary [philosophers](#) often suppose that a [causal relationship](#) is best expressed in the counterfactual statement that if the [cause](#) had not occurred, then the [effect](#) would not have occurred either.

Recommended Reading:

Judea Pearl, Causality: Models, Reasoning, and Inference (Cambridge, 2000);
Wesley C. Salmon, Causality and Explanation (Oxford, 1997);
Evan Fales, Causation and Universals (Routledge, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

14-10-2001

causes the four

<[history of philosophy](#), [philosophy of nature](#), [science](#)> Aristotle' s distinction in the Physics among four answer to the question of why something is:

- (1) the [material cause](#) is the stuff from which the thing is made;
- (2) the [formal cause](#) is the pattern or structure it has;
- (3) the [efficient cause](#) is the [agent](#) that imposed this [form](#) on that [matter](#); and
- (4) the [final cause](#) is the purpose for the thing.

Thus, for example, the [material cause](#) of this chair is the wood out of which it is made, the [formal cause](#) is the shape into which it was fashioned, the [efficient cause](#) was the carpenter by whom the chair was made, and the [final cause](#) is the sitting for the sake of which it was designed. In the case of living beings, [Aristotle](#) supposed, the [soul](#) is the [formal](#), [efficient](#), and [final cause](#); the [body](#) is only the [material cause](#).

Recommended Reading:

Aristotle, The Physics: Books I-IV, tr. by Philip H. Wicksteed and Francis M. Cornford (Harvard, 1986); Aristotle' s Physics: A Collection of Essays, ed. by Lindsay Judson (Clarendon, 1995).

[\[A Dictionary of Philosophical Terms and Names\]](#)

23-10-2003

Cavendish Margaret

<[history of philosophy](#), [biography](#)> english [philosopher](#) and playwright (1623-1673). [Cavendish](#) criticized the natural philosophy of both [Hobbes](#) and [Descartes](#) in Philosophical Letters (1664), and that of [Boyle](#) in Observations upon Experimental Philosophy (1666). Her own view, developed fully in The Grounds of Natural Philosophy (1668), was materialist but not mechanistic, supposing that all [matter](#) is imbued with [soul](#). In A True Relation of my Birth, Breeding, and Life (1656) [Cavendish](#) commented upon the place of women in seventeenth-century society.

Recommended Reading:

Margaret Cavendish, The Blazing World and Other Writings, ed. by Kate Lilley (Penguin, 1994); Anna Battigelli, Margaret Cavendish and the Exiles of the Mind (Kentucky, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

23-10-2003

Celarent

<[logic](#), [philosophy of science](#)> name given by medieval logicians to any categorical syllogism whose standard form may be designated as EAE-1. Example: No cold-blooded animals are furry pets, even though all reptiles are cold-blooded animals; therefore, no reptiles are furry pets. This is one of only fifteen [forms of syllogism](#) that are [always valid](#).

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23-10-2003

cellular automata

[cellular automaton](#)

00-00-0000

cellular automaton

<[algorithm](#), [parallel](#)> (CA, plural "- automata") A regular spatial lattice of "cells", each of which can have any one of a finite number of states. The state of all cells in the lattice are updated simultaneously and the state of the entire lattice advances in discrete time steps. The state of each cell in the lattice is updated according to a local rule which may depend on the state of the cell and its neighbours at the previous time step.

Each cell in a cellular automaton could be considered to be a [finite state machine](#) which takes its neighbours' states as input and outputs its own state.

The best known example is J.H. Conway' s game of [Life](#).

FAQ (<http://alife.santafe.edu/alife/topics/cas/ca-faq/ca-faq.html>).

[Usenet](#) newsgroups: news:comp.theory.cell-automata, news:comp.theory.self-org-sys.

[FOLDOC]

16-03-2001

censorship

<[ethics](#), [political theory](#)> legal or [social](#) practices aiming to bar the creation or dissemination (e.g., the publication or [public display](#)) of disapproved [forms](#) of [artistic expression](#).

[[Philosophical Glossary](#)]

23-10-2003

Cesare

<[logic](#), [philosophy of science](#)> name given by medieval [logicians](#) to a [categorical syllogism](#) whose standard form is EAE-2. Example: Since no truly peaceful nations are places where basic human rights are inadequately defended, while all countries torn by ethnic strife are places where basic human rights are inadequately defended, it follows that no countries torn by ethnic strife are truly peaceful nations. This is one of the fifteen forms of valid [syllogism](#).

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23-10-2003

chain of being

<[history of philosophy](#), [metaphysics](#), [biology](#)> belief that existing things can be hierarchically ordered, from least to greatest, in an unbroken series from inanimate particles of [matter](#) to the [deity](#). A. O. [Lovejoy](#) traced this concrete application of the principle of plenitude from ancient Greek thought through [neoplatonism](#) to its influence on early twentieth-century [idealism](#).

Recommended Reading:

Arthur Oncken Lovejoy, The Great Chain of Being: A Study of the History of an Idea (Harvard, 1970).

[[A Dictionary of Philosophical Terms and Names](#)]

23-10-2003

chaos

A property of some non-linear dynamic systems which exhibit sensitive dependence on initial conditions. This means that there are initial states which evolve within some finite time to states whose separation in one or more dimensions of state space depends, in an average sense, exponentially on their initial separation. Such systems may still be completely [deterministic](#) in that any future state of the system depends only on the initial conditions and the equations describing the change of the system with time. It may, however, require arbitrarily high precision to actually calculate a future state to within some finite precision.

["On defining chaos", R. Glynn Holt

D. Lynn Holt .

(ftp://mrcnext.cso.uiuc.edu/pub/etext/ippe/preprints/Phil_of_Science/Holt_and_Holt.On_Defining_Chaos)]

Fixed precision floating-point arithmetic, as used by most computers, may actually introduce chaotic dependence on initial conditions due to the accumulation of rounding errors (which constitutes a non-linear system).

[FOLDOC]

23-10-2003

Charron Pierre

<[history of philosophy](#), [biography](#)> french theologian (1541-1603).

Although De la Sagesse (Of Wisdom) (1601) expressed many themes from the [Stoic](#) tradition, [Charron](#) shared with [Montaigne](#) a profound [skepticism](#) about general [knowledge](#) of [god](#) and the world.

[[A Dictionary of Philosophical Terms and Names](#)]

23-10-2003

Chinese room

<[artificial intelligence](#), [philosophy of mind](#), [philosophy of AI](#), [PI](#)> an [argument](#) forwarded by John Searle intended to show that the [mind](#) is not a [computer](#) and how the [Turing Test](#) is inadequate.

Searle first formulated this problem in his paper "Minds, brains and programs" published in 1980. Ever since, it has been a mainstay of debate over the possibility of what Searle called "strong AI". Supporters of strong AI believe that a correctly programmed [computer](#) is not simply a [simulation](#) or [model](#) of a [mind](#), it actually would count as a [mind](#). That is, it understands, has [cognitive](#) states, and can think. Searle' [sargument](#) (or more precisely, [thought experiment](#)) against this position, the Chinese room argument, goes as follows:

Suppose that a [computer](#) which behaves as if it understands Chinese. In other words, the [computer](#) takes Chinese [symbols](#) as [input](#), consults a large look-up table (as all [computers](#) can be described as doing), and then produces other Chinese [symbols](#) as output. Suppose that this [computer](#) performs this task so convincingly that it easily passes the [Turing Test](#).

In other words, it convinces a human Chinese speaker that it is a Chinese speaker. All the questions the human asks are responded to appropriately, such that the Chinese speaker is convinced that he or she is talking to another Chinese speaker. The conclusion proponents of strong AI would like to draw is that the [computer](#) understands Chinese, just as the person does. Now, Searle asks us to suppose that he is sitting inside the [computer](#). In other words, he is in a small room in which he receives Chinese [symbols](#), looks them up on look-up table, and returns the Chinese [symbols](#) that are indicated by the table. Searle notes, of course, that he doesn' t understand a word of Chinese. Furthermore, his lack of understanding goes to show, h argues, that [computers](#) don' t understand Chinese either, because they are in the same situation as he is. The are mindless manipulators of [symbols](#), just as he is - and they don' t understand what they' re "saying", just he doesn' t.

The two most popular replies to this [argument](#) (both of which Searle (1980) considers) are the "[systems](#) reply" and the '[robot](#) reply' .

Briefly, the [systems](#) reply is simply that though Searle himself doesn' t understand Chinese in the [thought experiment](#), it is perfectly correct to say that Searle plus look-up table understand Chinese. In other words, the entire [computer](#) would understand Chinese, though perhaps the central processor or any other part might not. It is the entire [system](#) that matters for attributing understanding. In response, Searle claims that if we simply imagine the person in the Chinese room to memorize the look-up table, we have produced a counter example to this reply.

The [robot](#) reply is similar in spirit. The [robot](#) reply notes that the reason we don' t want to attribut understanding to the room, or a [computer](#) as described by Searle is that the [system](#) doesn' t interact properl with the [environment](#). This is also a reason to think the [Turing Test](#) is not adequate for attributing thinking or understanding. If, however, we fixed this problem - i.e. we put the [computer](#) in a [robot](#) body that could interact with the [environment](#), perceive things, move around, etc. - we would then be in a position to attribute understanding properly. In reply, Searle notes that proponents of this reply have partially given up the tenet of [AI](#) that [cognition](#) is [symbol](#) manipulation. More seriously, he proposes that he could be in a Chinese robot, just as easily as a Chinese room, and that he still wouldn' t understand Chinese.

Recommended Reading:

Harnad (1995). Minds, Machines and Searle (gopher://gopher.liv.ac.uk/00/phil/philos-l-files/searle.harnad)

Searle, 1995. Power in the Chinese Room (http://tkiwww.kub.nl_2080/tki/Docs/Think/2-1/searle.html)

Chinese Room Biblio (<http://ling.ucsc.edu/~chalmers/biblio4.html#4.1c>)

Introduction to the Chinese Room (<http://www.cas.ilstu.edu/PT/chinroom.htm>)

Searle, J. R. (1980). Minds, brains, and programs. Behavioral and Brain Sciences, 1: 417-24.

Also in J. Haugeland (ed) (1997). Mind Design II. MIT Press: Cambridge, MA.

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)]

Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

23-10-2003

chip[integrated circuit](#)

Chisholm Roderick M.

<[history of philosophy](#), [biography](#)> american [philosopher](#) (1916-1999) who applied the phenomenological methods of [Brentano](#) and [Meinong](#) to the central issues of [epistemology](#) in the analytic tradition in such books as *Perceiving: A Philosophical Study* (1957), *Realism and the Background of Phenomenology* (1960), *Person and Object: A Metaphysical Study* (1976), and *Brentano and Intrinsic Value* (1986).

Recommended Reading:

Roderick M. Chisholm, *A Realistic Theory of Categories: An Essay on Ontology* (Cambridge, 1996);
The Philosophy of Roderick M. Chisholm, ed. by Lewis Edwin Hahn (Open Court, 1997);
Analysis and Metaphysics: Essays in Honor of R. M. Chisholm, ed. by Keith Lehrer (Kluwer, 1975).

[\[A Dictionary of Philosophical Terms and Names\]](#)

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Chomsky Noam Avram

<[history of philosophy](#), [biography](#)> american linguist and [philosopher](#) (1928-), author of *Syntactic Structure* (1957), *Cartesian Linguistics* (A chapter in the history of rationalist thought) (1966), *Language and Mind* (1968), and *Knowledge of Language* (1986). In opposition to prevalent behaviorism, [Chomsky](#)'s psycholinguistic approach holds that competence in the use of [language](#) reveals innate possession of universal generative grammatical structures that cannot be acquired simply by empirical evidence. [Chomsky](#) has also been an outspoken and thoughtful critic of American foreign policy since the 1960s in such books as *American Power and the New Mandarins* (1969), *Necessary Illusions* (1989), and *Deterring Democracy* (1992).

Recommended Reading:

The Chomsky Reader, ed. by James Peck (Pantheon, 1987).

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23-10-2003

Christianity

<[religion](#)> name given to the religion and, later, theology that arose out of the teachings of Jesus, known to believers as "the anointed one", the Christ. The development of Christian doctrine owes much to the Neo-Platonism that was accepted by [Augustine](#). In the late Middle Ages, Thomas [Aquinas](#) turned Christian theology more towards [Aristotelianism](#).

(References from [Buddhism](#), [dualism](#), [pessimism](#), [polytheism](#), and [Thomism](#))

Based on [\[The Ism Book\]](#)

Edited by Giovanni Benzi

23-10-2003

Chrysippus

<[history of philosophy](#), [biography](#)> primary author of the [stoic](#) philosophy (280-207 B.C.). Although none of his many writings survived antiquity, [Chrysippus](#) reportedly made significant contributions to the development of [logic](#) and [ethics](#). He is generally credited with invention of the [propositional calculus](#) and eloquent expression of the doctrine of [eternal return](#).

Recommended Reading:

J. B. Gould, *The Philosophy of Chrysippus* (Brill, 1997);
 Brad Inwood, *Ethics and Human Action in Early Stoicism* (Oxford, 1992);
Stoic Studies (Cambridge, 1996) A. A. Long.

[\[A Dictionary of Philosophical Terms and Names\]](#)

23-10-2003

Church Alonzo

<[history of philosophy, biography](#)> american logician and mathematician (1903-); author of Introduction to Mathematical Logic (1956). Building on the work of G-del, [Church](#) showed that there can be no systematic decision procedure for the theorems of sophisticated formal systems like [arithmetic](#), since such [systems](#) characteristically involve non-recursive formulae for which there is no [computable algorithm](#).

Recommended Reading:

Alonzo Church, A Bibliography of Symbolic Logic (1666-1935)
(Association of Symbolic Logic, 1985).

[[A Dictionary of Philosophical Terms and Names](#)]

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Church-Rosser Theorem

<[logic](#)> This property of a [reduction](#) system states that if an expression can be reduced by zero or more reduction steps to either expression M or expression N then there exists some other expression to which both M and N can be reduced. This implies that there is a unique [normal form](#) for any expression since M and N cannot be different normal forms because the theorem says they can be reduced to some other expression and normal forms are irreducible by definition. It does not imply that a normal form is reachable, only that if reduction terminates it will reach a unique normal form.

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16-03-2001

Cicero Marcus Tullius

<[history of philosophy, biography](#)> (106-43 B.C.) roman politician whose philosophical writings primarily translated the work of Greek philosophers into his own polished Latin. Thus, De re publica and De legibus (Of the State and Of the Laws) owe much to dialogues of [Plato](#) on political structure. [Cicero](#) also relied heavily upon the [Stoics](#) for much of his philosophy of nature and [ethics](#), exemplified nicely in Tusculanae disputationes (Disputations at Tusculum) and "The Dream of Scipio." The influence of [Aristotle](#) is evident in De officiis (On Duties) and Laelius, sive de Amicitia (Essay on Friendship) (44 B.C.).

Recommended Reading:

Marcus Tullius Cicero, Selected Works, tr. by Michael Grant (Viking, 1960);
Cicero the Philosopher: Twelve Papers, ed. by Jonathan Powell (Oxford, 1999);
and Neal Wood, Cicero' s Social and Political Thought: An Introduction (California, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

23-10-2003

circuit

1. <[communications](#)> A communications path in a [circuit switching](#) network.
2. <[electronics](#)> A complete path through which an electric current can flow.

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16-03-2001

circularity

<[logic, philosophy of science](#)> [reasoning](#) that improperly assumes the [truth](#) of what is at issue. A [circular argument](#) implicitly employs its own [conclusion](#) as a [premise](#). A circular definition defines an expression in terms of itself. The problem is that circular reasoning - however accurate - is bound to be uninformative.

[[A Dictionary of Philosophical Terms and Names](#)]

23-10-2003

Cixous Hélène

<[history of philosophy](#), [biography](#)> algerian-French [philosopher](#) and literary critic (1937-). Employing [Derrida](#)'s methods of deconstruction in Entré l'Écriture (Coming to Writing) (1986) and Le Jeune Née (The Newly Born Woman) (1975), [Cixous](#) proposed the creation of literary works by Écriture féminine, "writing the body" in order to undermine the influence of masculine language. Since the feminine is always regarded as other and inferior in the dichotomies fostered by logocentric patriarchy, [Cixous](#) maintains that women can elude male domination only by rejecting the binary oppositions inherent in [symbolic](#) language. By celebrating historically-repressed differences, she believes, victims of repression forge the new identities upon which a genuinely post-colonial and post-patriarchal society might be founded.

Recommended Reading:

The Hélène Cixous Reader, ed. by Susan Sellers and Jacques Derrida (Routledge, 1994);
Verena Andermatt Conley, Hélène Cixous: Writing the Feminine (Nebraska, 1991);
The Body and the Text: Hélène Cixous, Reading and Teaching, ed. by Helen Wilcox, Keith McWatters, Ann Thompson, and Linda R. Williams (St. Martin' s, 1991);
Hélène Cixous (Toronto, 1992).

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23-10-2003

Clarke Samuel

<[history of philosophy](#), [biography](#)> english theologian and [philosopher](#) (1675-1729). In an extended correspondence with [Leibniz](#), [Clarke](#) defended [Newtonian](#) concepts of [space](#) and [time](#) against [Leibniz](#)'s relational notions. [Clarke](#)'s published Discourses Concerning the Unchangeable Obligations of Natural Religion and the Truth and Certainty of Christian Revelation (1705) and Demonstration of the Being and Attributes of God (1711) employed [Locke](#)'s methods of demonstration against the deists, to prove the existence and nature of [god](#), the human obligation to worship, and the fundamental rules of morality. This view, shared by the [Cambridge Platonists](#), became a target of [Hume](#)'s criticism of natural religion.

Recommended Reading:

Leibniz and Clarke: Correspondence, ed. by Roger Ariew (Hackett, 2000).

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class

1. <[PI](#)> The prototype for an [object](#) in an object-oriented language; analogous to a derived type in a [procedural language](#). A class may also be considered to be a set of objects which share a common structure and behaviour. The structure of a class is determined by the class variables which represent the [state](#) of an object of that class and the behaviour is given by a set of [methods](#) associated with the class.

Classes are related in a [class hierarchy](#). One class may be a specialisation (a "[subclass](#)") of another (one of its "superclasses") or it may be composed of other classes or it may use other classes in a client-server relationship. A class may be an [abstract class](#) or a [concrete class](#).

See also [signature](#).

2. <[programming](#)> See [type class](#).

3. <[networking](#)> One of three types of Internet addresses distinguished by their most significant bits.

3. <[language](#)> A language developed by the Andrew Project. It was one of the first attempts to add object-oriented features to [C](#).

[[FOLDOP](#)]

23-10-2003

class hierarchy

<PI> A set of [classes](#) and their interrelationships.

One class may be a specialisation (a "[subclass](#)" or "derived class") of another which is one of its "superclasses" or "base classes".

When a [method](#) is invoked on an [object](#) it is first looked for in the object' s class, then the superclass of that class, and so on up the hierarchy until it is found. Thus a class need only define those methods which are specific to it, and inherits methods from all its superclasses.

See also: multiple inheritance.

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class library

<PI> A library of reusable [classes](#) for use with an object-oriented programming system.

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class method

<PI> A kind of [method](#), available in some object-oriented programming languages, that operates on the class as a whole, as opposed to an "object method" that operates on an object that is an instance of the class.

A typical example of a class method would be one that keeps a count of the number of objects of that class that have been created.

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16-03-2001

classical logic

<logic> Non-[intuitionistic logic](#).

16-03-2001

classicism

<[aesthetics](#)>
the word classicism is usually used to describe an emphasis or over-emphasis on past practice, examples, and rules, especially in the making of art. In [aesthetics](#), classicism is usually contrasted historically and philosophically with [romanticism](#). (References from [formalism](#) and [romanticism](#)).

[[The Ism Book](#)]

Edited by Giovanni Benzi

23-03-2001

clear and distinct

<[gnoseology](#), [philosophy of science](#), [logic](#)> features of [ideas](#) considered as mental entities, without regard for their external relation to objects they are supposed to represent. An [idea](#) is [clear](#) if its [content](#) is precise and detailed; otherwise, it is obscure. An [idea](#) is [distinct](#) if it can be distinguished from any other [idea](#), confused if it cannot. (Although the two notions are formally distinct, they are commonly supposed to coincide, on the grounds that clarity is a necessary and sufficient condition for distinctness.) [Descartes](#) held that the clarity and distinctness of our [ideas](#) is a criterion for the [truth](#) of what we believe.

[[A Dictionary of Philosophical Terms and Names](#)]

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Clifford William Kingdon

<[history of philosophy](#), [biography](#)> english mathematician and philosopher (1845-1879). Arguing that belief in uncertain propositions is a [public act](#) with moral consequences, [Clifford](#) endorsed a wide-ranging agnosticism, asserting in "The Ethics of Belief" (1879) that "It is wrong always, everywhere, and for anyone, to believe anything on insufficient [evidence](#)."

[[A Dictionary of Philosophical Terms and Names](#)]

23-10-2003

clone

<[jargon](#)> 1. An exact copy of a product, made legally or illegally, from documentation or by reverse engineering, and usually cheaper.

E.g. "PC clone": a PC-BUS/[ISA](#), [EISA](#), [VESA](#), or [PI](#) compatible x86-based micro[computer](#) (this use is sometimes misspelled "klone" or "PClone"). These invariably have much more bang per buck than the IB PCM they resemble.

E.g. "Unix clone": An operating system designed to deliver a Unix-like environment without Unix licence fees or with additional "mission-critical" features such as support for real-time programming.

2. <[chat](#)> A clonebot.

[[Jargon File](#)] and [[FOLDOC](#)]

23-10-2003

closed set

<[mathematics](#)> A set S is closed under an operator * if $x*y$ is in S for all x, y in S.

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16-03-2001

closed term

<logic> A term with no [free variables](#).

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closed-box testing

[functional testing](#)

16-03-2001

closure

1. <PI> In a reduction system, a closure is a data structure that holds an expression and an environment of variable bindings in which that expression is to be evaluated. The variables may be local or global. Closures are used to represent unevaluated expressions when implementing functional programming languages with lazy evaluation. In a real implementation, both expression and environment are represented by pointers.

A suspension is a closure which includes a flag to say whether or not it has been evaluated. The term "think" has come to be synonymous with "closure" but originated outside functional programming.

2. <theory> In [domain theory](#), given a partially ordered set, D and a subset, X of D , the upward closure of X in D is the union over all x in X of the sets of all d in D such that $x \leq d$. Thus the upward closure of X in D contains the elements of X and any greater element of D . A set is "upward closed" if it is the same as its upward closure, i.e. any d greater than an element is also an element. The downward closure (or "left closure") is similar but with $d \leq x$. A downward closed set is one for which any d less than an element is also an element.

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3. <logic>

a. closure of a system

A system with at least one closed term is closed [iff](#) $\vdash \text{At}/x$ implies $\vdash (\exists x)Ax$ for each closed term t and each 1-wff A . (A 1-wff is a [wff](#) with exactly one free variable.)

Informally, the system is closed if the fact

that A is a [theorem](#)

when its free variable is replaced with any closed term in the language implies

the universal generalization $(\forall x)A$. It follows

from closure that every member of the domain is named by some closed term; hence the domain is countable.

See omega-completeness, term, closed, open wff

b. closure of a wff

In [predicate](#) logic, the binding of all [free variables](#) from a [wff](#) by

placing them within the scope of suitable quantifiers. A closed

[wff](#) is considered its own closure. The closure of a closure of a [wff](#) A is considered a closure of A .

Notation: A^c (a closure of [wff](#) A).

Closed [wffs](#) are also called sentences.

See [bound variable](#), [generalization](#), [instantiateion](#)

[Glossary of First-Order Logic]

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closure conversion

<logic> The transformation of continuation passing style code so that the only [free variables](#) of [functions](#) are names of other functions.

See also Lambda lifting.

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co-option

<[phylosophy of history](#), [political philosophy](#)> being assimilated. Especially, for Herbert [Marcuse](#), the sociopoliticoeconomic assimilation of works of art -- and simultaneous subversion of their liberative tendencies -- for commercial and control purposes.

[\[Philosophical Glossary\]](#)

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coarse grain

[granularity](#)

16-03-2001

Cockburn Catherine Trotter

<[history of philosophy](#), [biography](#)> english [philosopher](#) and playwright (1679-1749). She endorsed the philosophical [methods](#) of [Locke](#) in *Defense of Mr. Locke' s Essay of Human Understanding* (1702). In *Remarks upon some Writers in the Controversy concerning the Foundation of Moral Virtue and Moral Obligation* (1743), Cockburn defended the demonstrably rational morality of [Clarke](#) against the promotion of individual self-interest emphasized by [Hobbes](#), [Shaftesbury](#), and [Hutcheson](#). Recommended Reading: *The Works of Mrs. Catharine Cockburn* (Thoemmes, 1998).

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codomain

<logic> The set of values or type containing all possible results of a function. The codomain of a function f of type $D \rightarrow C$ is C . A function' [smage](#) is a subset of its codomain.

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16-03-2001

cogito argument

<[cartesianism](#), [awarness](#), [idealism](#), [epistemology](#), [realism](#)>
 <[method of doubt](#), [dualism](#), [apperception](#)> this [argument](#) of Descartes gets its [name](#) from the concluding phrase of his first formulation of it (in his Discourse on Method) -- cogito ergo sum, "I think therefore I am." In his Meditations on First Philosophy Descartes concludes from the impossibility of [doubting](#) his own [existence](#) as thinking "that this [proposition](#): I am, I exist, is necessarily true each time I pronounce it, or that I mentally conceive it" (2nd Meditation); my existence as a thinker is thereby assured. This assurance, Descartes thinks, can provide a secure [foundation](#) for all scientific knowledge. See also: [method of doubt](#).

[[Philosophical Glossary](#)]

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cognition

<[gnoseology](#), [psychology](#), [cognitive science](#), [neurosciences](#), [pedagogy](#)> the portion of human experience comprising [thought](#), [knowledge](#), [belief](#), and [inference](#) (as opposed to [sensation](#), [volition](#), or feeling).

Recommended Reading: David Braddon-Mitchell and Frank Jackson, The Philosophy of Mind and Cognition (Blackwell, 1996) and Mind As Motion: Explorations in the Dynamics of Cognition, ed. by Robert F. Port and Timothy Van Gelder (MIT, 1998).

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cognitive architecture

<[architecture](#)> A computer architecture involving non-deterministic, multiple [inference](#) processes, as found in neural networks. Cognitive architectures model the human brain and contrast with single processor computers.

The term might also refer to software architectures, e.g. [fuzzy logic](#).

[Origin? Better definition? Reference?]

[[FOLDOP](#)]

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cognitive science

<[philosophy of mind](#), [philosophy of science](#), [epistemology](#)> the interdisciplinary study which attempts to further our understanding of the nature of [thought](#).

The major contributing disciplines to cognitive science include [philosophy](#), [psychology](#), [computer science](#), [linguistics](#), [neuroscience](#) and [anthropology](#).

There are two standard [computational](#) approaches to [modelling](#) cognitive [systems](#) in cognitive science. The first is classicism (or [symbolicism](#)) and deals with thought in terms of [symbolic](#) processing. The second is known as [connectionism](#) and understands [thought](#) processes as a set of connections between nodes in a distributed network.

One goal of cognitive science is to [design](#) a cognitive architecture on which to build intelligent [systems](#). According to Andy Clark, cognitive science, "sets out to explain the mechanisms implicated in events which are recognizably [psychological](#) in nature, such as [reasoning](#), [planning](#), and

object recognition." (Clark, 1993).

References

Clark, A. (1993). *Associative Engines: Connectionism, Concepts, and Representational Change*, Cambridge: M.I.T. Press.

Thagard, P. (1996). *Mind: Introduction to Cognitive Science*. Cambridge, MA. MIT Press.

William Willaford

Chris Eliasmith - [[Dictionary of Philosophy of Mind](http://arts.wustl.edu/~philos/MindDict/)] Homepage (<http://arts.wustl.edu/~philos/MindDict/>)

24-10-2003

cognize

<[philosophy of mind](#)>

to have access to [knowledge](#) that has the properties of [knowledge](#) in the ordinary sense, but is not necessarily accessible to [consciousness](#) or dependent on warrant or [justification](#).

Cognize is a technical term Chomsky introduces (1980, p. 69) to denote a [relation](#) a subject S has to S' [knowledge](#). Just as S can be said to know that p, S can be said to cognize that q, where p and q stand for propositions representing some state of affairs or another. As such, cognising is said to differ very little from knowing in the ordinary sense. But there are some important features of cognising that set it off from the standard conception of what it is to know something.

Perhaps the most salient feature of cognising is that it is a [relation](#) primarily -- though apparently not exclusively -- associated with [unconscious](#) or [tacit knowledge](#). As Chomsky describes it, cognising "has the structure and character of [knowledge](#)" in that it is a matter of knowing-that (see [knowledge that](#), which is to say it is [propositional](#) and may involve [belief](#) (1980, pp. 70; 93-94; 1986, p. 269). What distinguishes cognising [per se](#) from ordinary knowing is that in many cases, what is cognised is inaccessible to [consciousness](#) (1980, p. 70; 1986, p. 269). However, it would seem that cases of explicit or [conscious](#) knowing [entail](#) cognising as well. Chomsky states, for example, that when we know that p, we cognize that p (1986, p. 265). What he means is that specific facts that are explicitly known may derive from [rules](#) and [principles](#) that are (presumably) [unconsciously](#) cognised (1986, p. 265). As an example, Chomsky cites the case of a person who, having unconscious knowledge of the binding principles, through [deduction](#) (or a similar [process](#)) can determine whether or not a pronoun and common noun encountered in the same [sentence](#) are coreferring (1986, p. 270). Cognising would thus seem to undergird at least some instances of explicit "knowing that" in important ways.

Despite the apparent fact that what is implicitly cognised often issues in conscious knowledge, it is hypothesised that at least some of what is cognised is inaccessible to [consciousness](#) in principle. The prototypical example of [knowledge](#) that is both cognised and is claimed to be inaccessible to [consciousness](#) in principle is a native speaker' [knowledge](#) of [grammar](#). Chomsky is careful to point out that to the extent that cognised [knowledge](#) is tacit or implicit, it is not the equivalent of [knowledge](#) which is [conscious](#) but that the holder cannot articulate (1986, p. 271). But although cognising is largely, if not primarily, associated with [cognitive structures](#) inaccessible to [consciousness](#), the line between the cognised [cognitive unconscious](#) and [consciously](#) accessible [knowledge](#) is, according to Chomsky, not inviolable. Rather, what is cognised can produce [conscious knowledge](#), as is illustrated by the example of the binding principles' affording explicit knowledge of coreference, described just above. Cognised [knowledge](#) is thus not held to be inferentially insulated from ordinary, i.e., [conscious](#), [beliefs](#).

One feature of cognising that sets it apart from many ordinary [concepts](#) of [knowledge](#) is that what is cognised is held not to consist in warranted or justified belief. Instead, Chomsky holds that cognised knowledge counts as a case of caused belief (1980, pp. 93-95). What this means is that cognised knowledge is caused by triggering experiences, which in at least some instances interact with [innate](#) principles to produce specific instances of knowing that p, where p is a cognised content of some sort. A prime example of caused knowledge is of course knowledge of grammar, which Chomsky has long hypothesised to arise from the interaction of an innate [universal grammar](#) and the triggering experiences afforded by exposure to a particular language. In Chomsky' s example, a native English speaker, when exposed to evidence that the phrase "each other" is a reciprocal, will now that this is the case by virtue of the triggering effect such evidence has on the innate principle of opacity (1980, p. 94). but such knowledge does not, on Chomsky' s account, stand as justified or warranted; as he puts it, "[e]ven where there is a triggering experience, this does not supply "good reasons" in any useful sense of the term"; (1980, p. 96).

Although the term "cognize" was introduced to dispel certain ambiguities in Chomsky' s theory of the nature of human knowledge, some ambiguities seem to remain. It is not always clear, for example, exactly how or even whether cognising differs from [knowledge](#) as such. Matters are not helped by Chomsky' s statement, after the term is introduced, that he will simply use "know" to mean "cognize" (1980, p. 70), or by his other statements that appear to conflate the two terms.

Nevertheless, the concept does appear to have two main functions. The first is to de-link [knowledge](#) from any necessary dependence on [justification](#) or warrant, thus forestalling possible empiricist objections to a theory of knowledge grounded, as Chomsky' s is, in content nativism. The second is to provide a covering term encompassing two kinds of knowledge -- explicit and implicit -- that otherwise might be treated as highly dissimilar and possibly unrelated (or in the case of implicit knowledge, simply dismissed outright).

One plausible interpretation of "cognising" then, is that it denotes an epistemological relation that is

- a) neutral in regard to whether or not what is known (or "cognised") is known explicitly, and
- b) can be fixed independently of [justification](#) or warrant.

References

Chomsky, N. (1980). Rules and Representations. New York, Columbia University Press.

Chomsky, N. (1986). Knowledge of Language. New York, Praeger.

See also [tacit knowledge](#), [implicit memory](#), [rules](#).

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coherence

<[logic](#)>

also cohesiveness, a [semantic relation](#) among a number of [elements](#), such as [propositions](#) or [concepts](#), that fit together well.

Philosophers have offered coherence theories of [truth](#), [knowledge](#) and [ethics](#). For example, scientific theories can be justified on the basis of how well they cohere internally and externally, with [evidence](#) and other [beliefs](#).

Connectionist [algorithms](#) have been used to provide [computational models](#) of coherence-based [inferences](#), with applications to [abduction](#), impression formation,

and [analogy](#).

Coherence is a [semantic](#) concept (the meaning or truth of p is compared to the meaning or truth of q), [consistency](#) is a syntactical concept (p is compared to not-p).

See [practical reasoning](#), [connectionism](#)

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coherence theory of truth

[truth theories](#)

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collectivism

<[political philosophy](#), [ethics](#)>

doctrine in political, or ethical, philosophy which holds that the individual' s actions should benefit some kind of wider organized group to which the individual belongs, e.g. the members of a certain profession, the state, a community, etc., rather than (just) the individual himself.

Collectivism in political theory can depend on [altruism](#) in ethics. There are many forms of collectivism in political reality, such as tribalism, [communism](#), [socialism](#), certain forms of trade unionism, [authoritarianism](#), [totalitarianism](#), communalism, and so on. Collectivism is a rather technical term, and is not used very often in everyday language. (References from communalism, [communism](#), [Hegelianism](#), [holism](#), [individualism](#), [Platonism](#), [socialism](#), and [totalitarianism](#)).

Based on [[The Ism Book](#)]

Edited by Giovanni Benzi

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Collingwood Robin George

<[history of philosophy](#), [biography](#)> english [philosopher](#) (1889-1943).

Influenced by [Hegel](#), Cook [Wilson](#), and [Croce](#), [Collingwood](#) explored the implications of [idealism](#) for [aesthetics](#) and the [philosophy of history](#) in *Speculum Mentis* (1924), *Essay on Philosophical Method* (1933), *The Principles of Art* (1938), and *The Idea of History* (1946). [Collingwood](#) proposed that historical understanding be achieved through empathetic reconstruction of the [thoughts](#) that motivated the [actions](#) of historical figures.

Recommended Reading: Aaron Ridley, *Collingwood* (Routledge, 1999); *Philosophy, History and Civilization: Essays on R. G. Collingwood*, ed. by David Boucher (U of Wales, 1996); and William H. Dray, *History As Re-Enactment: R. G. Collingwood' s Idea of History* (Oxford, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

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colour perception theories of

<[philosophy of mind](#), [epistemology](#), [philosophy of science](#)>
theories of colour perception propose to explain how it is that colours are perceived as properties of physical objects. What proposal one makes depends in turn on what proposal one makes about the nature of colour.

By contrast with theories of colour see [colours theories of](#), which address the problem of the nature of colour, theories of colour [perception](#) address the problem: how is it that colours (whatever their nature) are perceived as properties of physical objects? However, the answer one gives to this question about colour perception does depend on one' s theory of colour. If one proposes that the colours we perceive physical objects as having are mental qualitative properties of visual states themselves (the proposal about the nature of colour called subjectivism), then one must explain how it is that mental qualitative properties are perceived as properties of mind-independent objects. The subjectivist' s options seem to be limited to sense datum theories (see [sense data](#)) and projectivist theories.

If one proposes that the colours we perceive physical objects as having are properties of physical objects (as is claimed by physicalist and dispositionalist proposals about the constituting nature of colour), then an explanation of how it is colours are perceived as properties of physical objects is relatively straightforward. However, the question remains whether this access is mediated by visual states with mental qualitative properties.

Intentionalist theories of perception claim that visual states of colour are representational states which have no qualitative properties apart from those that they represent. Thus, it holds that the qualitative aspects of colour experience aren' t determined by mental qualitative properties of experience itself. Most intentionalists hold physicalism about the nature of colour, which claims that the colours we attribute to physical objects in visual states are physical properties of physical objects. Also, most physicalists (including Smart, Armstrong, Hilbert, Byrne and Hilbert) are intentionalists.

Intentionalism is rejected by most dispositionalists about the nature of colour. According to dispositionalism, the colours we perceive physical objects as having are dispositions of physical objects to produce perceptual responses. The most common version of dispositionalism holds that perceptual responses are visual states of colour characterised in terms of mental qualitative properties, in particular, colour [qualia](#) (currently, Peacocke and McDowell; formerly, McGinn and Johnston).

However, even though most dispositionalists reject intentionalism, these theorists do not thereby claim that the colours we perceive physical objects as having are colour [qualia](#) themselves. (If they were to claim this, they would have to explain how [qualia](#) are perceived as properties of mind- independent objects--the options would be some version of sense datum theory or projectivism). Rather, Peacocke, for example, claims that the colours we perceive physical objects as having are dispositional properties of physical objects. Colour [qualia](#) determine what it' s like to experience physical properties of physical objects as colours.

Thompson' s answer to the problem of colour perception cannot be easily categorised as intentionalist or nonintentionalist. He addresses the problem from the standpoint of the evolution of colour perception in different species. His answer takes an ecological approach to characterising colour perception.

According to sense datum theories, perceptual states are relations between perceivers and sense data, mental objects that have mental colours and mental shapes. According to Jackson' s sense datum theory (which Jackson has by now rejected--see Jackson and Pargetter), physical objects seem to be coloured because coloured sense data are caused by physical objects and the spatial properties of sense data vary as a function of the spatial properties of physical objects. Sense datum theories face difficulties in explaining how sense data, as mental objects, are related to the physical states and in particular

the neural states of perceivers. Furthermore, according to Jackson' s theory, sense data, which are mental objects, are located in three-dimensional physical space. Jackson' s theory faces difficulties in explaining the relation between perceivers and sense data located outside of their bodies in physical space. By contrast with sense datum theories, adverbialist theories claim that perceptual states are relations between perceivers and (actual or nonactual) physical objects rather than sense data, and that perceptual states themselves have mental properties such as mental colours. Mental colours are then held to be identified with, or supervenient on, properties of neural states of perceivers. Most current theories of colour perception which claim that perceptual states have mental colours assume an adverbialist theory of perceptual states of colour.

According to projectivist theories, in colour perception mental colours, characterised as properties of perceptual states rather than sense data, are experienced as properties of mind-independent objects. There are two versions of projectivism, which provide different explanations for how it is that mental colours are experienced as properties of mind-independent objects. According to one, proposed by Boghossian and Velleman, mental colours are experienced as properties of physical objects. But since mental colours are properties of visual states, experiencing mental colours as properties of physical objects involves experiencing properties of mental states as properties of physical objects. Since states are fundamentally different sorts of things than objects, it' s not clear that it even makes sense to hold that we experience properties of mental states as properties of physical objects. According to the other version of projectivism, proposed by McGilvray, we are not aware of physical objects or any of their properties in perception. McGilvray doesn' t deny that there are physical objects. Rather, he claims that the spatial properties as well as the colours we' re aware of in visual perception are mental qualitative properties of visual states themselves. Thus what we' re aware of in visual perception are mind-dependent patches with mental colours and mental shapes. (Although this claim suggests a sense datum theory, McGilvray explicitly accepts an adverbialist theory of perceptual states.) McGilvray claims that projective representation of colour involves experiencing such mind-dependent colour patches as external to our minds. But if the locations we' re aware of in visual experience are never physical locations, the problem now is that it' s difficult to characterize these mental locations that McGilvray claims we are aware of. He holds that we can describe mental locations as external to our minds by way of describing them as points in a three-dimensional visual field. However, McGilvray provides no explanation of the relation between perceivers, located in physical space, and the three-dimensional visual field comprised of mental locations, rendering mental locations mysterious.

Intentionalist theories of perception claim that visual states of colour are representational states which have no qualitative properties apart from those that they represent. Any proposal about colour perception that claims that visual states of colour have mental qualitative properties, for example, colour qualia, rejects intentionalism. An objection to intentionalist theories asserts that such theories cannot account for the colours of afterimages. In a recent formulation of this objection, Boghossian and Velleman claim that when we represent an afterimage as an afterimage, and not a physical object, what' s represented as coloured can' t be a physical object, but rather must be a part of the visual field itself. (Although this claim suggests a sense datum theory, Boghossian and Velleman state that their claim is consistent with adverbialism.) Boghossian and Velleman assume that when we represent an afterimage as coloured, then something is represented as coloured. However, it isn' t clear that their assumption is correct. We may make the inference that if we represent an afterimage as coloured, then we represent something as coloured. But we can' t make the inference that there is something that is represented as coloured, namely, the visual field. Rather, intentionalists would argue that when we represent an afterimage as coloured, we attribute a physical qualitative property to a merely intentional--not an actual--object.

What intentional objects are and how physical qualitative properties relate to them is indicated by a theory of intentionality. However, those who accept that visual experiences have mental colours, for example, qualia, may claim that afterimage colours are mental colours. And this may seem to be a more plausible way of accounting for afterimage colours.

Thompson addresses the question of how colours are perceived as properties of physical objects from the standpoint of the evolution of colour perception in different species. On the basis of comparative studies of the visual systems of different species, Thompson claims that different species' colour vision has evolved to perform biological functions which must be described in ecological terms. But how we are to characterize the biological function of colour vision is controversial. (The notion of biological function used in this context is Wright' s notion, or some variation on it.). Hilbert addresses the problem of colour perception from the standpoint of computational colour vision, according to which vision involves the processing of information contained in representations that encode physical properties of objects in the world. A focus of research in computational colour vision is the problem of how a visual **system** achieves what' s called colour constancy. colour constancy is a visual effect in which the colour a physical object looks remains fairly constant despite changes in the light illuminating the object. As it turns out, the constant colours that we perceive physical surfaces as having are correlated with surface reflectance. (Surface reflectance is the ratio of reflected to incident light for a surface, where light is measured by its wavelength composition and its intensity at each wavelength.) Hilbert argues that colour constancy shows that the biological function of colour vision is to detect physical object surfaces by way of surface reflectance, and thus characterizes the biological function of colour vision in physical terms. By contrast, Thompson offers an alternative characterisation of the biological function of colour vision in ecological terms. Thompson appeals to Mollon' s proposal that the biological function of primate colour vision includes promoting the detection of objects in contexts described in ecological terms, for example, the detection of fruit against a background of foliage, or the detection of objects against backgrounds which may include things without surfaces, such as volumes of water or the sky. According to Thompson, comparative colour vision indicates that there are nonhuman species with colour vision, and that for these species the biological function of colour vision cannot be described merely in terms of detecting object surfaces by way of surface reflectances. Hatfield provides further considerations in favour of characterising the biological function of colour vision in ecological terms. Psychophysics indicates that objects with different surface reflectances can produce perceptions of the same determinate colour (such as teal). Such physically distinct objects are called metamers. If we describe the biological function of colour vision as the detection of object surfaces by way of reflectance properties, then metamerism marks a failure of the visual system. Hatfield points out that if the biological function of colour vision isn' t best described as the detection of object surfaces by way of surface reflectance, but rather as, for example, the detection of objects against backgrounds, then it doesn' t follow that metamerism marks a failure--the task of detecting fruit against a background of foliage isn' t hampered by metamerism. In fact, the detection of objects against backgrounds is better served by a relatively small number of broad colour categories which include starkly contrasting pairs, such as red and green, and yellow and blue. Thompson argues that if the biological function of colour vision is to be described in ecological terms, then colours are relations between perceivers and objects. Thompson supports this claim by citing studies that indicate that species which have evolved in different ecological niches have different categories by which colours are classified as qualitatively identical or similar. But it may be that whereas the colour categories of a species are best explained in terms of ecological relations between members of the species and objects in their environments (over the course of evolution), the colours themselves are nonrelational properties of objects.

References (Note: "*" indicates more central reference)

Armstrong, D. M. (1987). "Smart and the Secondary Qualities" in *Metaphysics and Morality: Essays in Honour of J. J. C. Smart*, eds. Philip Pettit, Richard Sylvan, and Jean Norman. Oxford: Basil Blackwell, 1-15.

*Boghossian, Paul A. and J. David Velleman (1989). "Colour as a Secondary Quality" *Mind*, Vol. 98, No. 389 (January 1989): 81-103.

*Byrne, Alex and David R. Hilbert (1997). "colours and Reflectances" in *Readings on colour*, Vol. 1, *The Philosophy of colour*, eds. Alex Byrne and David R. Hilbert. Cambridge, Mass.: The MIT Press.

*Hatfield, Gary (1992). "colour Perception and Neural Encoding: Does Metameric Matching Entail a Loss of Information?" in *Proceedings of the 1992 Biennial Meeting of the Philosophy of Science Association*, Vol. 1, *Contributed Papers*, eds. David Hull, Micky Forbes, and Kathleen Okruhlik, 492-504.

*Hilbert, David R. (1992). "What Is colour Vision?", *Philosophical Studies*, Vol. 68, No. 3 (December 1992): 351-370.

*Jackson, Frank (1977). *Perception: A Representative Theory*. Cambridge: Cambridge University Press.

Jackson, Frank and Robert Pargetter (1987). "An Objectivist's Guide to Subjectivism about Colour", *Revue Internationale de Philosophie*, Vol. 41. No. 160 (fascicule 1/1987): 127-141.

Johnston, Mark (1992). "How to Speak of the colours" *Philosophical Studies*, Vol. 68, No. 3 (December 1992): 221- 263.

McDowell, John (1985). "Values and Secondary Qualities" in *Morality and Objectivity: A Tribute to J. L. Mackie*, ed. Ted Honderich. London: Routledge & Kegan Paul, 110-129.

*McGilvray, James A. (1994). "Constant colours in the Head" *Synthese*, Vol. 100, No. 2 (August 1994): 197-239.

McGinn, Colin (1983). *The Subjective View: Secondary Qualities and Indexical Thoughts*. Oxford: Clarendon Press.

Mollon, J. D. (1989). "'Tho" She Kneel' d in That Place Where They Grew . . ." *The Uses and Origins of Primate Colour Vision* *Journal of Experimental Biology*, Vol. 146 (September 1989): 21-38.

*Peacocke, Christopher (1984). "colour Concepts and colour Experiences" *Synthese*, Vol. 58, No. 3 (March 1984): 365- 381.

*Smart, J. J. C. (1975). "On Some Criticisms of a Physicalist Theory of colours" in *Philosophical Aspects of the Mind-Body Problem*, ed. Chung-ying Cheng. Honolulu: University of Hawaii Press, 54-63.

*Thompson, Evan (1995). *Colour Vision: A Study in Cognitive Science and the Philosophy of Perception*. London: Routledge.

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colour theories of

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theories of colour make proposals about the nature of the colours that we attribute to physical objects in visual perception. The most common proposals are that these colours are mental properties of perceptual states (subjectivism), they are physical properties of physical objects (physicalism), or they are **dispositions** of physical objects to produce perceptual states of colour (dispositionalism).

The problem of the constituting nature of colour is typically put in terms of the following question about the intentional content

of visual states of colour: what sorts of properties are the colours that we attribute to physical objects in virtue of our visual states of colour? Are attributed colours, for example, physical properties of physical objects? Or are they other sorts of properties, such as mental properties of visual states themselves, or dispositions of physical objects to produce visual states of colour?

The problem of the constituting nature of colour has been largely motivated by concerns about how colour fits into a scientific description of the world. In the seventeenth century, Galileo and Newton undertook a comprehensive description of nature in terms of mathematical physics. Physics requires that if colours are properties of physical objects, then they are describable in physical terms.

However, due to problems with understanding how colours can be describable in physical terms, many philosophers and scientists since the time of Galileo have come to reject the claim that colours are physical properties of physical objects. Most theorists assume that if we reject this claim, then the nature of colours must be characterised--at least in part--in terms of our mental nature.

In addressing the problem of the nature of the colour we attribute to physical objects in visual states we must consider the following question: how do we characterize the nature of these visual states (also commonly called visual experiences). Some theorists claim visual experiences of colour have both intentional properties and mental qualitative properties which I'll call mental colours; other theorists claim they have intentional properties but don't have mental colours. Those who claim that colour experiences have both intentional properties and mental colours include some physicalists (Lewis, Shoemaker), most dispositionalists (currently, Peacocke and McDowell; formerly, McGinn and Johnston), and all subjectivists. Those who claim that visual experiences of colour have intentional properties but do not have mental colours include some dispositionalists (Smart [1961]) and most physicalists (Smart [1975], Armstrong, Hilbert [1987 and 1992], and Byrne and Hilbert).

Mental colours are mental qualitative properties of colour experiences. Amongst those who characterize colour experiences as having mental colours, there's a controversy as to how to describe mental colours. The main divide is between those who claim that mental colours are what it's like for a perceiver to be conscious of colour (Peacocke, McGinn, Shoemaker, Block), and those who describe mental colours in terms of causal relations, for example, in terms of functionally described processes of our visual systems (Hardin, Clark, McGilvray, Lewis).

Proponents of the claim that mental colours are what it's like for a perceiver to be conscious of colour hold that mental colours cannot be described in terms of causal relations. Mental colours described as what it's like to be conscious of colour are typically called [qualia](#).

According to subjectivism, the colours that we attribute to physical objects in colour experiences are mental colours, which are mental qualitative properties of visual states themselves. Thus subjectivism claims that physical objects are colourless. (Because subjectivism denies the existence of coloured physical objects, it is sometimes called colour eliminativism.) Two kinds of [argument](#) are offered in support of subjectivism. One kind stresses [epistemological](#) and [phenomenological](#) considerations; the other is founded on evidence from colour science, in particular, psychophysics and neurophysiology. Boghossian and Velleman provide [arguments](#) of the first kind. In their 1991, they claim against physicalism that qualitative similarity relations among colours, such as that orange is more similar to red than it is to blue, specify essential features of determinate colours. Furthermore, they assert, ordinary experience provides access to these essential features. However, if physicalism were correct, these essential features would be relations among physical properties. They conclude that physicalism is false because ordinary experience doesn't provide access to relations among the relevant physical properties (namely, relations among surface reflectances). Furthermore, in their 1989 they claim against dispositionalism that colours cannot be dispositions to produce visual states of colour, for colours don't look like dispositions in our ordinary experience. However, disputable

epistemological assumptions underlie both of these arguments.

Against dispositionalism, they assume the very controversial claim that ordinary experience provides access to the constituting nature of colour, a claim that Johnston calls Revelation. Against physicalism, they assume a claim that physicalists deny, namely, that the qualitative similarity relations among colours specify essential features of determinate colours.

Hardin and McGilvray provide arguments for subjectivism founded on evidence from psychophysics and neurophysiology. Psychophysics indicates that objects with different surface reflectances can produce perceptions of the same determinate colour (such as teal); such physically distinct objects are called metamers. Metamerism is explained in terms of neurophysiology, and this neurophysiological explanation shows that for each determinate colour, indefinitely many different surface reflectances look that colour. Also, functionally described processes of our visual systems called opponent processes explain the qualitative similarity relations among perceived colours (such as that orange is qualitatively more similar to red than it is to blue) (see Hurvich). Furthermore, there is no range of physical properties of objects the members of which are related intrinsically in ways that correspond with the qualitative similarity relations. (Members of a range of properties are related intrinsically so long as these relations are don' t hold in virtue of relations between members of the range and members of a distinct range of properties.) Rather, physical properties of objects are related extrinsically in these ways, in virtue of relations between these physical properties and properties of the human visual system. Thus the qualitative identity and similarity relations among perceived colours are explained in terms of neurophysiology. Because Hardin and McGilvray assume that on any tenable proposal of the constituting nature of colour, this constituting nature must explain these qualitative relations, they conclude colour science shows that perceived colours aren' t physical properties of physical objects. Rather, Hardin and McGilvray claim colours are neural events of our visual systems. However, physicalists object to Hardin' s and McGilvray' s assumption. Physicalists propose that we distinguish between the neural properties that explain the qualitative relations among perceived colours and the perceived colours themselves, which are physical properties of objects.

Physicalism claims that colours we attribute to physical objects in colour experiences are physical properties of those objects, or as I' ll call them physical colours. There are several versions of physicalism. According to one type of physicalism held by Hilbert (1987 and 1992), physical colours are surface reflectances, and are individuated as finely as surface reflectances. However, objects with different surface reflectances can be perceived as the same determinate colour (such physically distinct objects are called metamers). Thus perceived colours are indeterminate with respect to physical colour. And because colour science shows that metamerism is explained in terms of the neurophysiology of the human visual system, Hilbert calls perceived colours anthropocentric colours. Nevertheless, Hilbert claims that perceived colours are objective, nonrelational properties of physical objects. On another type of physicalism held by Smart, Armstrong, and Lewis, no distinction is drawn between physical colours and perceived colours.

Physical colours just are the colours perceived by standard human colour perceivers in standard viewing conditions. Since the neurophysiological explanation of metamerism shows that for each determinate perceived colour indefinitely many different surface reflectances look that colour, physical colours are indefinitely large disjunctions of surface reflectances. Shoemaker proposes a third type of physicalism. He draws a distinction between the intentional contents and the qualitative contents of colour experiences. He claims that physical colours are included in intentional contents. But, he holds, these physical properties aren' t perceived colours—the colours included in qualitative contents. Rather, perceived colours are relations between physical colours and visual experiences with colour qualia (which are mental qualitative properties which determine qualitative contents). Of course, Shoemaker' s proposal depends on the controversial claim that visual states have qualia. Hilbert (1987 and 1992) argues for physicalism largely on the basis of the visual effect called colour constancy. Colour constancy is an effect in which the colour a

physical object looks remains fairly constant despite changes in the light illuminating the object. As it turns out, the constant colours that we perceive physical surfaces as having are correlated with surface reflectance. Hilbert (1992) argues that colour constancy shows that the biological function of colour vision is to detect physical object surfaces by way of surface reflectance, and that, therefore, the colours we attribute to physical objects in visual states of colour are surface reflectances.

However, some dispute Hilbert's characterisation of the biological function of colour vision in physical terms, and rather characterize this function in ecological terms. For example,

Thompson and Hatfield

object to Hilbert's physicalism from the standpoint of an ecological approach to colour perception, and claim that perceived colours are relations between objects and colour experiences. The

Smart/Armstrong/Lewis view holds that descriptions of relations between physical objects and colour experiences of standard perceivers in standard viewing conditions merely serve to fix the reference of colour terms (for a similar claim, see Kripke). However, the claim that perceived colours are disjunctions of physical properties is controversial. But crucial to a defence of this view is a distinction between properties and universals.

Whereas Armstrong denies that universals can be disjunctive, he allows that properties can be disjunctive, where disjunctive properties can be explained in terms of ranges of universals. And perceived colours can be explained in terms of psychophysical laws that quantify the relations between ranges of physical properties of objects and visual states of colour. Since visual science indicates that the qualitative identity and similarity relations among perceived colours are explained in terms of neurophysiology, independently of the physical colours themselves, physicalists claim that these qualitative relations don't specify essential features of determinate perceived colours. However, this claim is controversial (Boghossian and Velleman [1991], as well as Hardin and McGilvray assume that it's false; Johnston argues against it).

According to dispositionalism, the colours we attribute to physical objects in colour experiences are dispositions of physical objects to produce perceptual responses. Different versions of dispositionalism characterize perceptual responses differently. Smart (1961) characterizes perceptual responses nonqualitatively, namely, in terms of the discriminatory behaviour of perceivers. But the most common version of dispositionalism characterizes perceptual responses in terms of visual experiences with colour qualia, in particular such visual experiences of standard perceivers in standard viewing conditions (currently, Peacocke and McDowell; formerly, McGinn and Johnston). If the colours we attribute to objects are dispositions to produce visual experiences with colour qualia, then these colours are constituted by relations between some physical property or other of objects and visual experiences with colour qualia. According to current versions of this view, even though the colours we attribute to objects are in part constituted by colour qualia, the colours we attribute to objects aren't themselves colour qualia. Rather, colour qualia determine what it's like to experience physical properties of physical objects as colours, and colours we attribute to physical objects are dispositional properties of physical objects. Proponents of this version of dispositionalism argue that the colours we attribute to objects are in part constituted by colour qualia on epistemological grounds, in particular on the basis of the claim that ordinary experience provides access to essential features of colour. For example, Johnston claims that qualitative similarity relations among colour specify essential features of determinate colours to which ordinary experience provides access, and supports this claim with considerations about scepticism. However, physicalists reject this argument, and it remains controversial as to whether qualitative similarity relations specify essential features of determinate colours at all.

References (Note: "*" indicates more central reference)

A bibliography of colour and philosophy (<http://web.mit.edu/philos/www/colour-biblio.html>)

Stanford Encyclopedia entry on colour (<http://www.uic.edu/~hilbert/index.html>)

Hilbert's web page (<http://plato.stanford.edu/entries/colour/index.html>)

*Armstrong, D. M. (1987). "Smart and the Secondary Qualities" in *Metaphysics and Morality: Essays in Honour of J. J. C. Smart*, eds. Philip Pettit, Richard Sylvan, and Jean Norman. Oxford:

Basil Blackwell, 1-15.

Block, Ned (1990). "Inverted Earth" in *Philosophical Perspectives*, 4: Action Theory and Philosophy of Mind, ed. James E. Tomberlin. tascadero, Cal.: Ridgeview Publishing Company, 53-79.

*Boghossian, Paul A. and J. David Velleman (1989). "Colour as a Secondary Quality", *Mind*, Vol. 98, No. 389 (January 1989): 81-103.

Boghossian, Paul A. and J. David Velleman (1991). "Physicalist Theories of colour", *Philosophical Review*, Vol. 100, No. 1 (January 1991): 67-106.

*Byrne, Alex and David R. Hilbert (1997). "colours and Reflectances" in *Readings on colour*, Vol. 1, *The Philosophy of colour*, eds. Alex Byrne and David R. Hilbert. Cambridge, Mass.: The MIT Press.

*Clark, Austen (1993). *Sensory Qualities*. Oxford: Clarendon Press.

*Hardin, C. L. (1993). *colour for Philosophers: Unweaving the Rainbow*, Expanded Edition. Indianapolis: Hackett Publishing Company.

Hatfield, Gary (1992). "colour Perception and Neural Encoding: Does Metameric Matching Entail a Loss of Information?" in *Proceedings of the 1992 Biennial Meeting of the Philosophy of Science Association*, Vol. 1, *Contributed Papers*, eds. David Hull, Micky Forbes, and Kathleen Okruhlik, 492-504.

*Hilbert, David R. (1987). *colour and colour Perception: A Study in Anthropocentric Realism*. Stanford: Center for the Study of Language and Information.

Hilbert, David R. (1992). "What Is colour Vision?", *Philosophical Studies*, Vol. 68, No. 3 (December 1992): 351-370.

*Hurvich, Leo M. (1981). *colour Vision*. Sunderland, Mass.: Sinauer Associates Inc.

Hurvich, Leo M. (1981). *colour Vision*. Sunderland, Mass. Sinauer Associates Inc.

Kripke, Saul (1972). *Naming and Necessity*. Cambridge, Mass. Harvard University Press.

Lewis, David (1995). "Should a Materialist Believe in Qualia?", *Australasian Journal of Philosophy*, Vol. 73, No. 1 (March 1995): 140-144.

*Johnston, Mark (1992). "How to Speak of the colours", *Philosophical Studies*, Vol. 68, No. 3 (December 1992): 221- 263.

McDowell, John (1985). "Values and Secondary Qualities" in *Morality and Objectivity: A Tribute to J. L. Mackie*, ed. Ted Honderich. London: Routledge & Kegan Paul, 110-129.

McGilvray, James A. (1994). "Constant colours in the Head", *Synthese*, Vol. 100, No. 2 (August 1994): 197-239.

McGinn, Colin (1983). *The Subjective View: Secondary Qualities and Indexical Thoughts*. Oxford: Clarendon Press.

*Peacocke, Christopher (1984). "colour Concepts and colour Experiences", *Synthese*, Vol. 58, No. 3 (March 1984): 365- 381.

*Shoemaker, Sydney (1996). "colours, Subjective Relations, and Qualia" in *Philosophical Issues*, 7: Perception, ed. Enrique Villanueva. Atascadero, Cal.: Ridgeview Publishing Company, 55-66.

Smart, J. J. C. (1961). "Colours", *Philosophy*, Vol. 36, No. 137 (April and July 1961): 128-142.

*Smart, J. J. C. (1975). "On Some Criticisms of a Physicalist Theory of colours" in *Philosophical Aspects of the Mind-Body Problem*, ed. Chung-ying Cheng. Honolulu: University of Hawaii Press, 54-63.

Thompson, Evan (1995). *Colour Vision: A Study in Cognitive Science and the Philosophy of Perception*. London: Routledge.

See also [colour perception theories of](#)

Peter Ross

Chris Eliasmith - [[Dictionary of Philosophy of Mind](http://arts.wustl.edu/~philos/MindDict/)] Homepage (<http://arts.wustl.edu/~philos/MindDict/>)

25-10-2003

combination

1. <[mathematics](#)> A [set](#) containing a certain number of objects selected from another set.

The number of combinations of r objects chosen from a set of n is

$$n C r = n! / ((n-r)! r!)$$

where " $n C r$ " is normally with n and r as subscripts or as n above r in parentheses.

See also [permutation](#).

2. <[reduction](#)> In the theory of [combinators](#), a combination denotes an expression in which function application is the only operation.

[[FOLDOC](#)]

25-10-2003

combinator

<[logic](#)> A function with no [free variables](#).

A term is either a constant, a variable or of the form $A B$ denoting the application of term A (a function of one argument) to term B . Juxtaposition associates to the left in the absence of parentheses. All combinators can be defined from two basic combinators - S and K . These two and a third, I , are defined thus:

$$S f g x = f x (g x)$$

$$K x y = x$$

$$I x = x = S K K x$$

[Combinatory logic](#) is equivalent to the lambda-calculus but a lambda expression of size $O(n)$ is equivalent to a combinatorial expression of size $O(n^2)$.

Other combinators were added by David Turner in 1979 when he used combinators to implement SASL:

$$B f g x = f (g x)$$

$$C f g x = f x g$$

$$S' c f g x = c (f x) (g x)$$

$$B^* c f g x = c (f (g x))$$

$$C' c f g x = c (f x) g$$

See fixed point combinator, [curried function](#), supercombinators.

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25-10-2003

combinatory logic

<[logici](#)> A system for reducing the operational notation of [logic](#), mathematics or a functional language to a sequence of modifications to the input data structure. First introduced in the 1920' s by Schoenfinkel. Reintroduced independently by Haskell Curry in the late 1920' s (who quickly learned of Schoenfinkel' s work after he had the idea). Curry is really responsible for most of the development, at least up until work with Feys in 1958.

See [combinator](#).

[[FOLDOC](#)]

25-10-2003

communication system

<[communications](#)> A system or facility capable of providing information transfer between persons and equipment. The system usually consists of a collection of individual communication [networks](#), transmission systems, relay stations, tributary stations, and terminal equipment capable of interconnection and interoperation so as to form an integrated whole. These individual components must serve a common purpose, be technically compatible, employ common procedures, respond to some form of control, and generally operate in unison.

["Communications Standard Dictionary", 2nd Edition, Martin H. Weik].

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25-10-2003

communism

<[political philosophy](#), [marxism](#), [anarchism](#)>
 political theory according to which the individual' s actions should benefit the community or the state rather than the individual himself. It is the most radical kind of political [collectivism](#), and depends on an equally radical form of collectivism or [altruism](#) in ethics.
 In practice, communism has always been a form of [authoritarianism](#) or of [totalitarianism](#).
 When referring to actual political systems, communism is sometimes called Marxism-Leninism because of communism' s link with the revolutionary doctrines of Marxism and with countries inspired by the examples of Lenin' s revolution in Russia, and Mao' s in China. (References from [capitalism](#), [collectivism](#), [dialectical materialism](#), and [socialism](#)).

Based on [[The Ism Book](#)]

Edited by Giovanni Benzi

25-10-2003

compactness preserving

<[logic](#)>
 In [domain theory](#), a function f is compactness preserving if $f c$ is compact whenever c is.

[[FOLDOC](#)]

25-10-2003

compatibilism

<[ethics](#), [determinism](#), [political theory](#), [libertarianism](#)> also known as "soft [determinism](#)" and most famously championed by Hume, this [theory](#) holds that [free will](#) and [determinism](#) are [compatible](#). Properly understood, according to Hume, [freedom](#) is not an [absolute](#) ability to have chosen differently under exactly the same inner and outer circumstances. Rather it is a [hypothetical](#) ability to have chosen differently if one had been differently psychologically disposed by some different [beliefs](#) or [desires](#). Alternately, Hume maintains that free acts are not uncaused (or mysteriously self-caused as Kant would have it) but caused in the right way, i.e., by our choices as determined by our our beliefs and desires, by our characters. See [determinism](#). Contrast: hard determinism, [libertarianism](#).

[[Philosophical Glossary](#)]

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compatibility

[compatible](#)

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compatible

<[jargon](#)> Different systems (e.g., [programs](#), file formats, [protocols](#), even programming languages) that can work together or exchange data are said to be compatible.

See also backward compatible, forward compatible.

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complement

<[logic](#)>

1. The other value or values in the set of possible values.

See [logical complement](#), bitwise complement, set complement.

[[FOLDOC](#)]

2. complement of a set

<[logic](#)>

The [complement](#) of a set A is the set of elements that are not members of A.

Notation: A with a single bar over the top, or -A, or A' .

a. Absolute [complement](#) of a set

The set of all things whatsoever that are not members of the given set.

Standard set theory does not recognize absolute [complements](#). See Russell' s paradox

b. Relative [complement](#) of a set

The set of all things that are not members of the given set, A, but that are members of some particular "background" set, B.

This can be expressed through the notation for set difference: the relative [complement](#) of A in B or relative to B (A against the background of B) is the set $x : (x : B) \circ (x \notin A)$. The background set is sometimes called the universe or [universe of discourse](#). Notation: B-A, or BA.

[Glossary of First-Order Logic]

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complementary non-deterministic polynomial

<[complexity](#)> (Co-NP) The set (or property) of problems with a yes/no answer where the complementary no/yes problem is in the set [NP](#).

[Example?]

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complete

See [complete theory](#), [negation completeness](#), [omega-completeness](#), [semantic completeness](#), [syntactic completeness](#), [complete graph](#), [complete inference system](#), [complete lattice](#), [complete metric space](#), complete partial ordering

16-03-2001

complete graph

<[mathematics](#), [logic](#)> A [graph](#) which has a link between every pair of nodes. A complete bipartite graph can be partitioned into two subsets of nodes such that each node is joined to every node in the other subset.

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25-10-2003

complete inference system

<[logic](#)> An [inference](#) system A is complete with respect to another system B if A can reach every conclusion which is true in B. The [dual](#) to completeness is [soundness](#).

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complete lattice

<mathematics>. A [lattice](#) is a [partial ordering](#) of a set under a relation where all finite subsets have a [least upper bound](#) and a [greatest lower bound](#). A complete lattice also has these for infinite subsets. Every finite lattice is complete. Some authors drop the requirement for [greatest lower bounds](#).

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16-03-2001

complete metric space

<mathematics, logic>
A [metric space](#) in which every sequence that converges in itself has a limit. For example, the space of real numbers is complete by Dedekind' s axiom, whereas the space of [rational numbers](#) is not - e.g. the sequence $a[0]=1$; $a[n_{+1}]:=a[n]/2+1/a[n]$.

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complete partial ordering

<logic> (cpo) A [partial ordering](#) of a [set](#) under a [relation](#), where all [directed](#) subsets have a least upper bound. A cpo is usually defined to include a least element, [bottom](#) (David Schmidt calls this a pointed cpo). A cpo which is [algebraic](#) and [boundedly complete](#) is a (Scott) [domain](#).

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complete theory

<logic> An abstract logical [theory](#) in which all true statements have formal [proofs](#) within the theory.

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completeness

[complete theory](#), [negation completeness](#), [omega-completeness](#), [semantic completeness](#), [syntactic completeness](#), [complete graph](#), [complete inference system](#), [complete lattice](#), [complete metric space](#), complete partial ordering

a (logical) [language](#) is said to be complete [iff](#) all the formulas in the language that must be true (in any world in which the axioms of the [language](#) are true) can be proved from the axioms. [Goedel' s incompleteness theorem](#) shows that any [language](#) in which the truths of basic [arithmetic](#) can be formulated cannot be [complete](#) (unless the number of axioms is [infinite](#)).

[A Philosophical Glossary]

<2001-04-25, 2001-03-16>

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complex number

<[mathematics](#)> A number of the form $x+iy$ where i is the square root of -1 , and x and y are [real numbers](#), known as the "real" and "imaginary" part. Complex numbers can be plotted as points on a two-dimensional plane, known as an Argand diagram, where x and y are the [Cartesian coordinates](#).

An alternative, polar notation, expresses a complex number as $(r e^{it})$ where e is the base of natural logarithms, and r and t are real numbers, known as the magnitude and phase. The two forms are related:

$$\begin{aligned} r e^{it} &= r \cos(t) + i r \sin(t) \\ &= x + i y \\ \text{where} \\ x &= r \cos(t) \\ y &= r \sin(t) \end{aligned}$$

All solutions of any [polynomial equation](#) can be expressed as complex numbers. This is the so-called Fundamental Theorem of Algebra, first proved by Cauchy.

Complex numbers are useful in many fields of physics, such as electromagnetism because they are a useful way of representing a magnitude and phase as a single quantity.

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complex question

<[philosophy of science, logic](#)> the [informal fallacy](#) of framing an issue as if it involved genuine alternatives while implicitly assuming the truth of the desired [conclusion](#). Example: "Do you expect Peter to speak for thirty minutes or fifty? In either case, you acknowledge that he will be long-winded." Denying the presumption that lies behind both alternatives (in this case, that Peter will speak for at least thirty minutes) would eliminate the supposed [evidence](#) that the [conclusion](#) is true.

[[A Dictionary of Philosophical Terms and Names](#)]

25-10-2003

complexity

<[algorithm](#)> The level in difficulty in solving mathematically posed problems as measured by the time, number of steps or arithmetic operations, or memory space required (called time complexity, computational complexity, and space complexity, respectively).

The interesting aspect is usually how complexity scales with the size of the input (the "[scalability](#)"), where the size of the input is described by some number N . Thus an [algorithm](#) may have computational complexity $O(N^2)$ (of the order of the square of the size of the input), in which case if the input doubles in size, the computation will take four times as many steps. The ideal is a constant time algorithm ($O(1)$) or failing that, $O(N)$.

See also NP-complete.

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complexity class

<algorithm> A collection of [algorithms](#) or computable functions with the same [complexity](#).

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complexity measure

<algorithm> A quantity describing the [complexity](#) of a computation.

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component

<logic>

a proposition that is part of a compound proposition. A component may itself be compound. For example, p is a component in $p \Rightarrow q$, and $p \Rightarrow q$ is a component in $(p \Rightarrow q) \vee r$.

[Glossary of First-Order Logic]

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composite

[aggregate](#)

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composition

1. <logic>

One of the simple [function](#)-building operations of recursive function theory.

Given the one-place [functions](#) $f(x)$ and $g(x)$, composition allows

us

to create [function](#) h

thus: $h(x) = f(g(x))$. More generally, if

f is an

m -place, $f(x_1 \dots x_m)$, and there is a series of n -place

[functions](#) $g, g(x_1 \dots x_n)$, then we can create the

n -place [function](#) h by composition: $h(x_1 \dots x_n) =$

$f(g(x_1 \dots x_n), \dots, g_m(x_1 \dots x_n))$.

Also called substitution.

2. typesetting.

25-10-2003

composition fallacy of

<[philosophy of science, logic](#)> the [informal fallacy](#) of attributing some feature of the members of a collection to the collection itself, or reasoning from [part](#) to whole. Example: "Each of the elements in this compound (NaCl) is poisonous to human beings; therefore, this compound is itself poisonous to [human beings](#)."

[[A Dictionary of Philosophical Terms and Names](#)]

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compositionality

<[philosophy of mind](#)>
[representations](#) may be said to be compositional insofar as they retain the same meaning across diverse contexts. Thus, "kick" means the same thing in the context of "...the ball", "... a rock", "... a dog", although it changes meaning in the context of "... the bucket". One might say that according to the principle of the compositionality of representations atomic representations make the same [semantic](#) contribution in every context in which they occur.

The term "compositionality of representations" is also used to refer to a putative psychological regularity that is supposed to support the view that there exists a syntactically and semantically combinatorial language of thought. The locus classicus for this [argument](#) is Fodor and Pylyshyn, 1988.

According to Fodor and Pylyshyn, in normal cognitive agents, there exist intrinsic connections between some thoughts and others. Thoughts come in clumps. This putative fact is the [systematicity](#) of cognitive representations. The compositionality of representations says something about the nature of the thoughts that are intrinsically connected. It says something about the nature of the clumps of mental thoughts: the thoughts in the clumps are [semantically](#) related. The thoughts in the clumps have common terms and predicates, for example. Thus, the thoughts "John loves Mary" and "Mary loves John" are compositional sets of representations since they both represent John, loving, and Mary.

According to Fodor and Pylyshyn, the reason that cognitive representations are compositional, as well as systematic is that there exists a syntactically and semantically combinatorial language of thought that respects the principle of compositionality, that atomic representations mean the same thing in all contexts in which they occur. The existence of a syntactically and semantically combinatorial language of thought respecting the principle of compositionality explains the compositionality of representations.

A theory that admits mental representations, but rejects combinatorial structure, lacks a genuine explanation of the compositionality of representations. Even if a normal cognitive agent has thoughts that are intrinsically connected to each other, there is no principled reason why it should be the case that these thoughts should be semantically related. Suppose that one thought involves the mental representation that is intrinsically connected to the mental representation . Even if it means John loves Mary, why should mean Mary loves John, rather than say, Alfred likes pizza? There seems to be no principled answer to this question.

References

Fodor, J., and Pylyshyn, Z. (1988). "Connectionism and cognitive architecture: A critique." *Cognition*, 28, 3-71.

See [systematicity](#), [productivity](#), [symbolicism](#).

Ken Aizawa

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25-10-2003

compound proposition<[logic](#)>

A proposition made up of two or more simple propositions (components) joined by a connective. A compound proposition has just one truth-value for a given interpretation. Also called "molecules" (by writers who call simple propositions "atoms").

[Glossary of First-Order Logic]

16-03-2001

computability theory<[mathematics](#)> The area of theoretical computer science concerning what problems can be solved by any computer.

A function is computable if an [algorithm](#) can be implemented which will give the correct output for any valid input.

Since computer programs are [countable](#) but [real numbers](#) are not, it follows that there must exist real numbers that cannot be calculated by any program. Unfortunately, by definition, there isn't an easy way of describing any of them!

In fact, there are many tasks (not just calculating real numbers) that computers cannot perform. The most well-known is the [halting problem](#), the [busy beaver](#) problem is less famous but just as fascinating.

["Computability", N.J. Cutland. (A well written undergraduate-level introduction to the subject)].

["The Turing Omnibus", A.K. Dewdney].

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computablesee [computability theory](#), [computable function](#)

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computable function<[logic](#)>

A [total function](#) for which there is an [effective method](#) for determining the [value](#) (output, member of the range), given the [arguments](#) (inputs, members of the domain).

Incomputable [function](#)

A [function](#) for which there is no such effective method.

[Glossary of First-Order Logic]

16-03-2001

computation

<[philosophy of mind](#), [PI](#), [philosophy of science](#)>

a series of [rule](#)-governed state transitions whose [rules](#) can be altered.

There are numerous competing definitions of computation. Along with the initial definition provided here, the following three definitions are often encountered:

- 1) [rule](#)-governed state transitions
- 2) discrete [rule](#)-governed state transitions
- 3) [rule](#)-governed state transitions between interpretable states.

The difficulties with these definitions can be summarised as follows:

- (1) admits all physical systems into the class of computational systems, making the definition somewhat vacuous.
- (2) excludes all forms of analog computation, perhaps including the sorts of processing taking place in the brain.
- (3) necessitates accepting all computational systems as representational systems. In other words, there is no computation without representation on this definition.

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Computational Adequacy Theorem

<[PI](#)> This states that for any program (a non-function typed term in the typed lambda-calculus with constants) normal order reduction (outermost first) fails to terminate if and only if the [standard semantics](#) of the term is [bottom](#). Moreover, if the reduction of program e1 terminates with some head normal form e2 then the standard semantics of e1 and e2 will be equal. This theorem is significant because it relates the operational notion of a reduction sequence and the [denotational semantics](#) of the input and output of a reduction sequence.

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computational architecture

<[philosophy of mind](#), [PI](#), [philosophy of science](#)>

the [structure](#) and organisation of a given computing device (the way in which it handles memory, the organisation of data, the set of primitive instructions it executes, and the ordering of instruction application or execution) define a device' s computational architecture. Computational architecture involves only the structure and organisation relevant to [computation](#); [implementational](#) details to not constitute computational architecture.

In actual practice, the notion of computational architecture inherits some ambiguity/vagueness from the ambiguity/vagueness in one' s notion of computation. For example, computation might refer exclusively to forms of [effective computation](#) i.e. Turing-machine-equivalent computation, or it might also include weaker computational devices (e.g. finite state automata and push-down automata) or analog computational devices. On the hypothesis that cognition is computation, one research goal is the determination of the computational architecture that constitutes the structure and organisation of cognition. In

other words, if the brain is a type of computing device, one wishes to know exactly what type of computing device. Even on the hypothesis that cognition is a form of effective computation (Turing-machine-equivalent computation), one still wishes to know exactly which of the computationally equivalent forms of computation constitutes the hypothetical computational architecture of cognition. Even if diverse forms of computation are equivalent in the sense of computing the same functions, one wishes to know exactly what mechanisms the brain uses to compute those functions.

See also [functionalism](#), [Turing machine](#)

Ken Aizawa

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computational complexity

<[algorithm](#)> The number of steps or arithmetic operations required to solve a computational problem. One of the three kinds of [complexity](#).

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computational model

[computational models](#)

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computational models

<[philosophy of mind](#), [PI](#), [philosophy of science](#)>
[models](#) based on the overarching hypothesis that the [mind](#) is a type of [computer](#) which can be described in [algorithmic](#) terms.

The two major types of computational model are symbolic ([symbolicism](#) and connectionist ([connectionism](#)). Recently there has been a third, dynamicist approach ([dynamical systems theory](#)) which has been postulated as an alternative to either symbolism or connectionism. However, it is not yet clear if dynamicism offers a true alternative or whether it can be considered a special class of connectionist models.

References

Churchland, P. S. and T. Sejnowski (1992).
The computational brain. Cambridge, MA, MIT Press.

Newell, A. (1990). Unified theories of cognition.
Cambridge, MA, Harvard University Press.

Thelen, E. and L. B. Smith (1994). A dynamic systems approach
to the development of cognition and action. Cambridge,
MIT Press.

Chris Eliasmith - [\[Dictionary of Philosophy of Mind\]](#) Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

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computer

<computer> A machine that can be programmed to manipulate symbols. Computers can perform complex and repetitive procedures quickly, precisely and reliably and can quickly store and retrieve large amounts of data.

The physical components from which a computer is constructed (electronic circuits and input/output devices) are known as "hardware". Most computers have four types of hardware component: CPU, input, output and memory. The CPU (central processing unit) executes programs ("[software](#)") which tell the computer what to do. Input and output (I/O) devices allow the computer to communicate with the user and the outside world. There are several kinds of memory - fast, expensive, short term memory (e.g. [RAM](#)) to hold intermediate results, and slower, cheaper, long-term memory (e.g. magnetic disk and magnetic tape) to hold programs and data between jobs.

See also [analogue computer](#).

[[FOLDDOC](#)]

25-10-2003

computer crime

<legal> Breaking the criminal law by use of a computer.

See also [computer ethics](#), [software law](#).

[[FOLDDOC](#)]

16-03-2001

computer dictionary

Free On-line Dictionary of Computing (<http://www.foldoc.org>)

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computer ethics

<ethics> Ethics is the field of study that is concerned with questions of value, that is, judgments about what human behaviour is "good" or "bad". Ethical judgments are no different in the area of computing from those in any other area. Computers raise problems of privacy, ownership, theft, and power, to name but a few.

Computer ethics can be grounded in one of four basic world-views: Idealism, Realism, Pragmatism, or Existentialism. Idealists believe that reality is basically ideas and that ethics therefore involves conforming to ideals. Realists believe that reality is basically nature and that ethics therefore involves acting according to what is natural. Pragmatists believe that reality is not fixed but is in process and that ethics therefore is practical (that is, concerned with what will produce socially-desired results). Existentialists believe reality is self-defined and that ethics therefore is individual (that is, concerned only with one' s own conscience). Idealism and Realism can be considered ABSOLUTIST worldviews because they are based on something fixed (that is, ideas or nature, respectively). Pragmatism and Existentialism can be considered RELATIVIST worldviews because they are based on something relational (that is, society or the individual, respectively).

Thus ethical judgments will vary, depending on the judge' s world-view. Some examples:

First consider theft. Suppose a university' s computer is used

for sending an e-mail message to a friend or for conducting a full-blown private business (billing, payroll, inventory, etc.). The absolutist would say that both activities are unethical (while recognising a difference in the amount of wrong being done). A relativist might say that the latter activities were wrong because they tied up too much memory and slowed down the machine, but the e-mail message wasn't wrong because it had no significant effect on operations.

Next consider privacy. An instructor uses her account to acquire the cumulative grade point average of a student who is in a class which she instructs. She obtained the password for this restricted information from someone in the Records Office who erroneously thought that she was the student's advisor. The absolutist would probably say that the instructor acted wrongly, since the only person who is entitled to this information is the student and his or her advisor. The relativist would probably ask why the instructor wanted the information. If she replied that she wanted it to be sure that her grading of the student was consistent with the student's overall academic performance record, the relativist might agree that such use was acceptable.

Finally, consider power. At a particular university, if a professor wants a computer account, all she or he need do is request one but a student must obtain faculty sponsorship in order to receive an account. An absolutist (because of a proclivity for hierarchical thinking) might not have a problem with this divergence in procedure. A relativist, on the other hand, might question what makes the two situations essentially different (e.g. are faculty assumed to have more need for computers than students? Are students more likely to cause problems than faculty? Is this a hold-over from the days of "in loco parentis"?).

"Philosophical Bases of Computer Ethics", Professor Robert N. Barger (<http://www.nd.edu/~rbarger/metaethics.html>).

[Usenet](#) newsgroups: news:bit.listserv.ethics-l,
news:alt.soc.ethics.

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computer language

[programming language](#)

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computer law

<legal> Apart from [software law](#), other relevant laws include those concerning the sale of goods. Communication law is more relevant to the [Internet](#), it has to do with media issues in general, e.g. free speech.

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16-03-2001

Computer Mediated Communication

<[messaging](#)> (CMC) Communication that takes place through, or is facilitated by, computers. Examples include Usenet and e-mail, but CMC also covers real-time chat tools like lily (<http://www.lily.org/>), [IRC](#), and even video conferencing.

[[FOLDOC](#)]

25-10-2003

computer program

[software](#)

01-06-2004

computing

[computer](#)

00-00-0000

computing dictionary

Free On-line Dictionary of Computing (<http://www.foldoc.org>)

00-00-0000

computron

/kom' pyoætron"/ 1. A notional unit of computing power combining instruction speed and storage capacity, dimensioned roughly in instructions-per-second times megabytes-of-main-store times megabytes-of-mass-storage. "That machine can' t run GNU Emacs, it doesn' t have enough computrons!" This usage is usually found in metaphors that treat computing power as a fungible commodity good, like a crop yield or diesel horsepower. See bitty box, (Get a real computer!), toy, crank.

2. A mythical subatomic particle that bears the unit quantity of computation or information, in much the same way that an electron bears one unit of electric charge (see also bogon). An elaborate pseudo-scientific theory of computrons has been developed based on the physical fact that the molecules in a solid object move more rapidly as it is heated. It is argued that an object melts because the molecules have lost their information about where they are supposed to be (that is, they have emitted computrons). This explains why computers get so hot and require air conditioning; they use up computrons. Conversely, it should be possible to cool down an object by placing it in the path of a computron beam. It is believed that this may also explain why machines that work at the factory fail in the computer room: the computrons there have been all used up by the other hardware. (This theory probably owes something to the "Warlock" stories by Larry Niven, the best known being "What Good is a Glass Dagger?", in which magic is fuelled by an exhaustible natural resource called "mana".)

[[Jargon File](#)] and [[FOLDOC](#)]

25-10-2003

Comte Auguste

<[History of philosophy, biography](#)> French philosopher. As an early exponent of [positivism](#), Comte was a founder of the discipline of sociology. In an early [letter to M. Valat](#) Comte identified a methodological culture of science. His "Cours de philosophie positive" Course in Positive Philosophy (1830-1842) traces the historical development of [philosophy](#) from its origins in the theological and metaphysical thought to its culmination in observational science, especially the discipline of sociology. Comte proposed in "Système de politique positive" ("System of Positive Polity") (1851) that political development should follow a similar path, resulting in a highly-organized communitarian state. "[Discours sur l'Ensemble du positivisme](#)" ("A General View of Positivism") (1848) offers a convenient summary of his views.

Recommended Reading: Auguste Comte, "Introduction to Positive Philosophy", ed. by Frederick Ferre (Hackett, 1988); "Auguste Comte and Positivism: The Essential Writings", ed. by Gertrude Lenzer (Transaction, 1998); "Comte: Early political Writings", ed. by H.S. Jones (Cambridge, 1998); and Mary Pickering, "Auguste Comte: An Intellectual Biography" (Cambridge, 1993). Also see [Emmanuel Lazinier](#), [noesis](#), [ELC](#), [BIO](#), and [Andy Blunden](#).

[[A Dictionary of Philosophical Terms and Names](#)]

17-09-2003

concept

<[philosophy of mind](#)> a [semantically](#) evaluable, redeployable constituent of [thought](#), invoked to explain properties of [intentional phenomena](#) such as [productivity](#) and [systematicity](#). Applied to an assortment of [phenomena](#) including mental representations, images, words, stereotypes, senses, properties, reasoning abilities, mathematical [functions](#), etc.

See [nonconceptual content](#)

Pete Mandik

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

25-10-2003

conceptual role semantics

[functional role semantics](#)

00-00-0000

conceptualisation

<[artificial intelligence](#)> The collection of objects, concepts and other entities that are assumed to exist in some area of interest and the relationships that hold among them. A conceptualisation is an [abstract](#), simplified view of the world that we wish to represent. For example, we may conceptualise a family as the set of names, sexes and the relationships of the family members. Choosing a conceptualisation is the first stage of knowledge representation.

Every [knowledge base](#), knowledge-based system, or knowledge-level agent is committed to some conceptualisation, explicitly or implicitly.

[[FOLDOP](#)]

25-10-2003

conceptualism

<epistemology, scholasticism, nominalism, realism, ockhamism, logic>
 the theory that [universals](#) are general ideas, such as the [idea](#) of man or of redness, which exist in [mind](#) and only in mind, but it is grounded on experience. This view is typically contrasted with -- and held as a kind of compromise between -- [nominalism](#) and [realism](#). In the history of philosophy Peter [Abelard](#) (1079-1142) is usually called a conceptualist. He was a logician who opposed both the [nominalism](#) and the [intrinsicism](#) of his age. Abelard sought a middle position between these two poles of thinking, and ended up with views in [epistemology](#) that were quite similar to those of [Aristotle](#) or the later Aristotelians namely, that conceptual knowledge consists in an objective relation between reality and the mind (see objectivism and [Aristotelianism](#)). (Reference from [nominalism](#)).

based on [[The Ism Book](#), [Philosophical Glossary](#)]

25-10-2003

conclusion

<logic>
 The result of an [argument](#) or [inference](#).
 The [wff](#) derived from or supported by [premises](#).

[Glossary of First-Order Logic]

16-03-2001

concomitant variation method of

<philosophy of science, epistemology, gnoseology> one of [Mill](#)' s Methods. If an antecedent circumstance is observed to change proportionally with the occurrence of a [phenomenon](#), it is probably the [cause](#) of that [phenomenon](#).
 Example: "The more coffee I drink, the more difficult it is to fall asleep at night. Therefore, drinking coffee may be a cause of my insomnia."
 Recommended Reading: John Stuart Mill, System of Logic (Classworks, 1986).

[[A Dictionary of Philosophical Terms and Names](#)]

27-10-2003

concrete class

<PI> In object-oriented programming, a [class](#) suitable to be instantiated, as opposed to an abstract class.

[[FOLDOP](#)]

16-03-2001

concrete syntax

<[language](#)> The concrete syntax of a language including all the features visible in the source program such as parentheses and delimiters. The concrete syntax is used when [parsing](#) the program or other input, during which it is usually converted into some kind of [abstract syntax tree](#).

Compare: [abstract syntax](#).

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27-10-2003

concretism

<[metaphysics](#)> the view according to which only concrete things actually exist, and there are no such things as actual universals. Both [Aristotle](#) and [Abelard](#) are, in this sense of the word, concretists. (References from [individualism](#) and [physicalism](#)).

[[The Ism Book](#)]

Edited by Giovanni Benzi

23-03-2001

concurrency

[multitasking](#)

00-00-0000

Condillac Etienne Bonnot de

<[history of philosophy, biography](#)> french [philosopher](#) and clergyman (1715-1780); author of Logique (Logic) (1741), Essai sur l' origine des connaissances humaines (Essay on the Origins of Human Knowledge) (1746), Traité des systèmes (Treatise on Systems) (1749), Traité des sensations (Treatise on Sense Perception) (1754), Traité des animaux (Treatise on Animals) (1755), and Langue des calculs (The Language of Numbers) (1777). As one of the [Encyclopedists](#), [Condillac](#) was the foremost French popularizer of the empiricist philosophy of [Locke](#). Recommended Reading: Philosophical Writings of Etienne Bonnot, Abbe De Condillac, ed. by Franklin Phillip (Erlbaum, 1987) and Jacques Derrida, The Archeology of the Frivolous: Reading Condillac, tr. by John P. Leavey (Nebraska, 1987).

[[A Dictionary of Philosophical Terms and Names](#)]

27-10-2003

conditional

<[philosophy of science, epistemology, logic](#)> any [statement](#) of the form: "If ([antecedent](#)), then ([consequent](#)).". Although conditionals may have several uses in ordinary language, all share at least the truth-functional structure of [material implication](#).

Recommended Reading: Anthony Appiah, Assertion and Conditionals (Cambridge, 1985); Nelson Goodman, Fact, Fiction, and Forecast (Harvard, 1983); Frank Jackson, Conditionals (Oxford, 1991); H. McLaughlin, On the Logic of Ordinary Conditionals (SUNY, 1990); and Michael Woods, Conditionals, ed. by David Wiggins and Dorothy Edgington (Clarendon, 1997).

See [implication](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

27-10-2003

confirmation

<[philosophy of science](#), [epistemology](#), [logic](#)> the relationship between empirical evidence and the scientific hypotheses it is used to support. Although abductive reasoning can provide only partial or incomplete support for such hypotheses, their falsification by contradictory evidence can be [absolute](#). [Hempel](#) pointed out a systematic [paradox](#) regarding the nature of confirming instances.

Recommended Reading: Karl R. Popper, *Logic of Scientific Discovery* (Routledge, 1992); Richard Swinburne, *An Introduction to Confirmation Theory* (Methuen, 1973); Lawrence Sklar, *Probability and Confirmation* (Garland, 1999); and *Induction, Probability, and Confirmation*, ed. by Maxwell Grover and Robert Anderson.

[\[A Dictionary of Philosophical Terms and Names\]](#)

27-10-2003

Confucianism<[religion](#)>

Confucianism derives its name from the great sage K' ung Fu Tzu or Confucius (550-480 BC), who was in many ways the Chinese equivalent of [Socrates](#) (470-399 BC). Confucianism is the main stream of Chinese philosophy, just as Western philosophy is mostly in the Socratic tradition. Although his views have been interpreted in various ways throughout history, no one denies that the philosophy of Confucius is a powerful variety of [humanism](#). Herbert Fingarette' s book on Confucius is subtitled "The Secular as Sacred". Confucius holds that the most important, indeed sacred, aspect of life is our dealings with other people, so that he puts a great emphasis on [virtues](#) like honesty, [justice](#), [integrity](#), and so on. He provides a great many insights about human relationships.

Sometimes, when

people talk about "Confucianism" they are referring not so much to Confucius' actual views as to the way his writings were used by later interpreters to justify reactionary political practices like a large bureaucracy and the stratification of society. (References from [Buddhism](#), [humanism](#), Neo-Confucianism, and [Taoism](#)).

Based on [\[The Ism Book\]](#)

Edited by Giovanni Benzi

23-03-2001

conjunction[AND](#)

00-00-0000

Conjunctive Normal Form

<[logic](#)> (CNF) A logical formula consisting of a [conjunction](#) of disjunctions of terms where no disjunction contains a conjunction. Such a formula might also be described as a product of sums. E.g. the CNF of

(A and B) or C
is
(A or C) and (B or C).

Contrast Disjunctive Normal Form.

[[FOLDOC](#)]

28-10-2003

connected graph

<[mathematics](#)> A [graph](#) such that there is a path between any pair of nodes (via zero or more other nodes).

Thus if we start from any node and visit all nodes connected to it by a single edge, then all nodes connected to any of them, and so on, then we will eventually have visited every node in the connected graph.

[[FOLDOC](#)]

16-03-2001

connected subgraph

<[mathematics](#)> A [connected graph](#) consisting of a [subset](#) of the [nodes](#) and edges of some other graph.

[[FOLDOC](#)]

28-10-2003

connectionism

<[philosophy of mind](#)>
a computational approach to modelling the brain which relies on the interconnection of many simple units to produce complex behaviour.

Connectionism has a number of important considerations for the [philosophy of mind](#). By positing connectionist [models](#) as the best way to model human [cognition](#), philosophers have begun to see high level mental properties as "[emergent](#) properties... that depend on lower-level phenomena in some systematic way" (Churchland and Sejnowski, 1992, p.2). These commitments have redefined for many the best way to understand the nature of [representation](#) and [computation](#) in the human [mind](#). In his well known paper "On the proper treatment of connectionism", Paul Smolensky forwards a connectionist (or subsymbolic) hypothesis in order to capture these new ideas:

"The intuitive processor is a subconceptual connectionist dynamical [system](#) that does not admit a complete, formal, and precise conceptual-level description."

This commitment to a "subconceptual" level of description of cognitive processes is a direct rejection of the symbolist (see [symbolicism](#)) or [GOFAI](#) approach to human cognition.

Connectionist models can be classified by [representational](#) commitments in two categories; distributed and localist. [Distributed representations](#) are [vectors](#) in a representational

state space, and are processed simultaneously by many [nodes](#) in a connectionist [network](#). Localist models use individual nodes to represent one entire [concept](#) such as "dog". In general, distributed representations are more neurologically realistic than localist representations. However, distributed models are often far more complex and difficult to analyse than localist models.

Critiques of connectionism have been forwarded by [dynamic systems](#) theorists ([dynamism](#)), symbolists ([symbolicism](#)), and neuroscientists.

In particular, dynamic systems theorists claim that connectionist models are unrealistically wedded to ideas of representation and computation. Neuroscientists often note the lack of neurological realism in connectionist networks. These networks often have too little recursion, far too much inhibition, unrealistic learning algorithms, simplistic transfer functions, and no analog to the large number of neurotransmitters and hormones which affect human cognition.

Symbolists have taken a number of lines of [argument](#). Fodor and Pylyshyn (1988) have criticised connectionism as not being able to support the [systematic](#) and productive natures of human thought. As well, it is thought that the only role for connectionist work is to provide a method for implementing a symbolist [system](#) in a manner similar to the brain. Thus, the best level of description of human cognition remains at the symbolic level. In recent years, however, a number of connectionist models have been produced which shows these criticisms to be questionable.

References

Connectionist Philosophy Biblio (<http://ling.ucsc.edu/~chalmers/biblio4.html#4.3>)

Neural Net Biblio (http://glimpse.cs.arizona.edu_1994/bib/Neural/index.html)

Neural Parallel Archive (<http://alumni.caltech.edu/~ingber/index.html>)

Jordan Pollack (<http://www.cs.brandeis.edu/~pollack/index.html>)

Computer Science Technical Reports Archive (<http://www.rdt.monash.edu.au/tr/siteslist.html>)

Churchland, P. S. and T. Sejnowski (1992).
The computational brain. Cambridge, MA, MIT Press.

Fodor, J. and Z. Pylyshyn (1988). "Connectionism and cognitive architecture: A critical analysis" *Cognition* 28: 3-71.

Rumelhart, D. E. and J. L. McClelland, Ed. (1986).
Parallel distributed processing: Explorations in the microstructure of cognition. Cambridge MA, MIT Press/Bradford Books.

See also [connectionism history of](#)

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28-10-2003

connectionism history of

<[philosophy of mind](#)>

construed broadly, [connectionism](#) maintains that [cognitive](#) processes are (implemented in) processes taking place in [networks](#) of nerve cells. Thus construed, the history of connectionism spans a wide range of research in numerous disciplines over the course of centuries.

A central concern for connectionists is the idea that we must "take the brain seriously" in our psychological theorising. This idea, of course, dates to ancient Greek speculations concerning the [action](#) of animal spirits in the nervous system. Later, notable speculations may be found in Rene Descartes' "Treatise of Man" (composed circa 1633, first published posthumously in 1662) and David Hartley' s Observations on Man (1749).

During the 19th Century, histologists developed staining

and fixing techniques that enabled them to study the microscopic structure of the brain. With this information, the idea of taking the brain seriously took the form of relating psychological processes to neuronal processes. The existence of the nerve cell came to be widely accepted over the course of the 1890' s. At this time, it was widely believed that psychological processes were associative processes. A long tradition of associationism was thus linked to theories of neural networks by the supposition that the biological correlate of the psychological process of association was the formation or strengthening of synaptic connections between neurons. Versions of late 19th Century neural network theorising may be found in Herbert Spencer' s Principles of Psychology, 3rd edition (1872), Theodore Meynert' s Psychiatry (1884), William James' Principles of Psychology (1890), and Sigmund Freud' s Project for a Scientific Psychology (composed 1895). Neural network theories with an associationist flavour were quite common around the turn of the century, up into the 1930' s.

Beginning in the 1910' s, Karl Spencer Lashley began a series of animal experiments aimed at determining the effects of brain lesions. Lashley supposed that lesions would selectively remove the neurons dedicated to specific tasks, hence destroy an animal' s ability to perform those tasks. Rather than complete, selective loss of abilities, Lashley found that degradation of task performance was proportional to the amount of tissue removed. (See, for example, Lashley, 1929.) These results led to a decline in the popularity of neural network theories.

During the 1930' s, Nicolas Rashevsky proposed to use differential equations and physical concepts, such as energy minimisation, to describe how the behaviour of nerves and networks of nerves that might be related to psychological processes, such as Pavlovian conditioning. (See, for example, Rashevsky, 1931a, 1931b, 1935). Rashevsky' s work was part of a larger project of developing a mathematical biophysics that would mirror the methods of mathematical physics. Rashevsky was instrumental in bringing together Warren S. McCulloch and Walter Pitts, who in 1943 published a seminal contribution to many fields, "A Logical Calculus of Ideas Immanent in Nervous Activity". This work described how networks of binary threshold neurons might be described in terms of sentences of first-order logic. Although popularly remembered for having contributed the idea that networks might carry out logical inferences, McCulloch and Pitts were themselves more interested in the description of networks containing closed loops. This interest stemmed in part from McCulloch' s work in tracing neural pathways using strychnine neuronography. Neuroscientific findings by Rafael Lorente de No also increased the interest in closed neural circuits.

In 1949, Donald Olding Hebb, a student of Lashley' s, proposed a cell assembly theory of cognition.

This version of connectionism was meant to circumvent Lashley' s problematic lesion results by supposing that the brain contains numerous redundant neural pathways spatially distributed over relatively broad regions of the brain. In roughly the same years, there was considerable neuroscientific investigation of so-called "post-tetanic potentiation" . It had been found that a large tetanic stimulation of a nerve innervating a muscle would lead to an enhanced effect of the nerve on the muscle. This provided a kind of confirmation of the hypothesis that learning at the psychological level might be realised by facilitation at the biological level. Sir John Eccles, among others, pursued this line of research for over two decades. This research is in some respects a precursor of the current immense interest in so-called "long-term potentiation" and "long-term depression". (See, for example, Baudry & Davis, 1994).

During the 1950' s and 60' s, Frank Rosenblatt investigated the properties of mathematically described neural networks with modifiable connections, discovering the so-called "perceptron convergence procedure" that could train a two-layer network to compute any two-layer-network-computable function. In 1969, Marvin Minsky and Seymour Papert published Perceptrons, a critique of this sort of neural network model. This work showed that two-layer networks were limited in the functions they could compute, thereby providing a major cause for a

decline in neural network research during the 1970' s.

During the late 1970' s, Geoffrey Hinton, James McClelland, David Rumelhart, Paul Smolensky, and other members of the "Parallel Distributed Processing Research Group" became interested in neural network theories of cognition. Their landmark *Parallel Distributed Processing: Explorations in the Microstructure of Cognition*, (1986), marks the return of connectionism as a significant theory of [cognition](#). Where previous strains of connectionism were more or less explicitly linked with [associationism](#) or logical inference, the new connectionism in PDP guise has been more cognitively eclectic, suggesting that cognitive processes might be [constraint](#) satisfaction processes, energy minimisation processes, or pattern recognition processes. It has also been, in large measure, defined, both by its supporters and opponents, in relation to a [computational](#) theory of cognition. In this regard, contemporary advocates of connectionism often endorse a "subsymbolic paradigm" in contrast to the "symbolic paradigm" of the computational theory of cognition.

References

Baudry, M., Davis, J. L. (1994) (Eds.). *Long-Term Potentiation*, vol. 2. Cambridge, MA: MIT Press.

Descartes, R. (1972, composed 1633). *Treatise of man*. Cambridge, MA: Harvard University Press.

Freud, S. (1895). *Project for a scientific psychology*. First published in Strachey, J. (ed.). *The standard edition of the complete psychological works of Sigmund Freud*. London: The Hogarth Press and the Institute of Psycho-Analysis.

Hartley, David. (1749). *Observations on man, his frame, his duty, and his expectations*. London: S. Richardson.

Hebb, D. O. (1949). *The organisation of behavior: A neuropsychological approach*. New York: John Wiley & Sons.

James, W. (1890). *Principles of psychology*. New York, NY: Holt.

Lashley, K. S. (1929). *Brain mechanisms and intelligence: A quantitative study of injuries to the brain*. New York: Dover Publications, Inc.

McCulloch, W. S., and Pitts, W. "A Logical Calculus of Ideas immanent in Nervous Activity. *Bulletin of mathematical biophysics*", 5, 115-133. Reprinted in McCulloch, W. S., *Embodiments of mind*. Cambridge, MA: MIT Press.

Meynert, Theodore (1884). *Psychiatry*. trans. B. Sachs. New York: G.P. Putnam' s Sons.

Minsky, M., and Papert, S. (1988). *Perceptrons: An introduction to computational geometry*, expanded edition. Cambridge, MA: MIT Press.

Rashevsky, N. (1931a). "Learning as a Property of Physical Systems" *Journal of general psychology*, 5, 207-229.

Rashevsky, N. (1931b). "Possible brain mechanisms and their physical models" *Journal of General Psychology*, 5, 368-406.

Rashevsky, N. (1935). "Outline of a physico-mathematical theory of the brain" *Journal of General Psychology*, 13, 82-112.

Rosenblatt, F. (1962). *Principles of neurodynamics: Perceptrons and the theory of brain mechanisms*. Washington, D.C.: Spartan Books.

Rumelhart, D., McClelland, J. L., and the PDP Research Group (1986). *Parallel distributed processing: Explorations in the microstructure of cognition*. vols. 1 & 2. Cambridge, MA: MIT Press.

Spencer, Herbert. (1872). *Principles of psychology*, 3rd ed. London: Longman, Brown, Green, and Longmans.

Ken Aizawa

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28-10-2003

connective

<[logic](#)>

A symbol that [functions](#) to join two or more propositions into a compound proposition. Sometimes applied to symbols (like "~" for [negation](#)) which apply only to one proposition at a time. Sometimes applied to the [function](#) denoted by the symbol, rather than the symbol itself. A truth-functional connective is a truth-function; its components are its [arguments](#) and the truth-value of the compound it forms is its value. Truth-functional connectives that apply to only one proposition at a time are monadic; those that join two propositions are dyadic; those that join three are triadic, and so on. Monadic connectives are also called operators.

See truth-functional compound proposition

[Glossary of First-Order Logic]

16-03-2001

connotation

<[philosophy of science, linguistic](#)> the associative meaning of a term, including especially those features in virtue of which the term is properly applied; see [denotation](#) / [connotation](#). Recommended Reading: Beatriz Garza-Cuaron, Connotation & Meaning (De Gruyter, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

28-10-2003

conscience

<[philosophy, psychology](#)> inner awareness of the difference between right and wrong in one' s own actions, usually understood as a divinely-inspired [moral sense](#). Although [Aquinas](#) noted that an individual conscience may err, [Butler](#) held that it is the fundamental motive for good conduct. Recommended Reading: Joseph Butler, Fifteen Sermons on Human Nature (Classworks, 1986) and James Q. Wilson, The Moral Sense (Simon & Schuster, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

28-10-2003

consciousness

<[philosophy of mind](#)>

self-awareness. Subjective experience. The way things seem to us. Immediate phenomenological properties.

See also [phenomenal consciousness](#), [access consciousness](#)

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

consciousness objection

<[epistemology](#), [materialism](#), [philosophy of science](#)>
 <[artificial intelligence](#)> an [objection to materialism](#) that maintains that, since mentality is fundamentally [conscious](#) and [consciousness](#) cannot be materialistically explained or reduced, mentality is something (a [property](#) or [substance](#) that is fundamentally immaterial. Also, an objection to [artificial intelligence](#) that maintains that, since [consciousness](#) cannot be mechanically (or computationally) generated, that [machines](#) (or [computers](#)) cannot think.

[[Philosophical Glossary](#)]

28-10-2003

consequence

[semantic consequence](#), [syntactic consequence](#)

00-00-0000

consequent

<[logic](#), [philosophy of science](#)> the element of a conditional statement that states its outcome or result. For example, "You' ll see me tomorrow" is the [consequent](#) of both: "If you come by the office, then you' ll see me tomorrow." and "You' ll see me tomorrow, unless I see you first."

[[A Dictionary of Philosophical Terms and Names](#)]

See [implication](#)

28-10-2003

consequentialism

<[ethics](#)>
 any position in ethics which claims that the moral rightness or wrongness of actions depends on their [consequences](#) and therefore that moral decisions should be made on the basis of the expected outcome or consequences of the actions involved. [pragmatism](#) and [utilitarianism](#) are common forms of consequentialism. Consequentialist theories in ethics tend to be varieties of [altruism](#), although [hedonism](#) can be represented as a coherent form of consequentialism. The term has some connotations of [subjectivism](#), of deciding according to what the individual merely thinks is expedient. "Consequentialism" is a technical term in philosophy and is not used in popular discourse, where pragmatism and utilitarianism are more common. (References from [altruism](#), [pragmatism](#), and [utilitarianism](#).)

Based on [[The Ism Book](#)] and [[Ethics Glossary](#)]

28-10-2003

consistency

<logic>

<philosophy of science, logic> feature of any formal system from whose axioms no direct contradiction follows. The customary proof of consistency is to show that there is at least one interpretation of the system upon which all of its axioms are true.

Recommended Reading: Richard C. Jeffrey, Formal Logic: Its Scope and Limits (McGraw-Hill, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

See [absolute consistency](#), m-consistency, omega-consistency, proof-theoretic consistency, [relative consistency proof](#), [simple consistency](#)

28-10-2003

consistently complete

[boundedly complete](#)

00-00-0000

constant

<logic>

A symbol whose referent has been fixed.

An abbreviation or name, as opposed to a place-holder (a variable).

Individual constant

A symbol standing for an individual object from the domain of a system.

Predicate constant

A symbol standing for an [attribute](#) or relation.

Propositional constant

A symbol standing for a proposition.

[Glossary of First-Order Logic]

16-03-2001

constraint

<PI, mathematics> A [Boolean](#) relation, often an equality or inequality relation, between the values of one or more variables (often two). E.g. $x > 3$ is a constraint on x . [constraint satisfaction](#) is the process of assigning values to variables so that all constraints are true.

[Usenet](#) newsgroup: [news:comp.constraints](#). FAQ (<http://web.cs.city.ac.uk/archive/constraints/constraints.html>).

[[FOLDOP](#)]

28-10-2003

constraint satisfaction

<[application](#)> The process of assigning values to variables while meeting certain requirements or "[constraints](#)". For example, in [graph](#) colouring, a node is a variable, the colour assigned to it is its value and a link between two nodes represents the constraint that those two nodes must not be assigned the same colour. In scheduling, constraints apply to such variables as the starting and ending times for tasks.

The Simplex method is one well known technique for solving numerical constraints.

The search difficulty of constraint satisfaction problems can be determined on average from knowledge of easily computed structural properties of the problems. In fact, hard instances of NP-complete problems are concentrated near an abrupt transition between under- and over-constrained problems. This transition is analogous to phase transitions in physical systems and offers a way to estimate the likely difficulty of a constraint problem before attempting to solve it with search.

Phase transitions in search
(<ftp://parcftp.xerox.com/pub/dynamics/constraints.html>) (Tad Hogg, [XEROX PARC](#)).

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28-10-2003

constructed type

A type formed by applying some type constructor function to one or more other types. The usual constructions are functions: $t_1 \rightarrow t_2$, products: (t_1, t_2) , sums: $t_1 + t_2$ and lifting: $\text{lift}(t_1)$.

See also [algebraic data type](#), primitive type

[[FOLDOC](#)]

28-10-2003

constructive

<[mathematics](#)> A proof that something exists is "constructive" if it provides a method for actually constructing it.

[Cantor](#)'s proof that the [real numbers](#) are [uncountable](#) can be thought of as a *non-constructive* proof that irrational numbers exist. (There are easy constructive proofs, too; but there are existence theorems with no known constructive proof).

Obviously, all else being equal, constructive proofs are better than non-constructive proofs. A few mathematicians actually reject *all* non-constructive arguments as invalid; this means, for instance, that the law of the excluded middle (either P or not-P must hold, whatever P is) has to go; this makes proof by contradiction invalid. See [intuitionistic logic](#) for more information on this.

Most mathematicians are perfectly happy with non-constructive proofs; however, the constructive approach is popular in theoretical computer science, both because computer scientists are less given to abstraction than mathematicians and because [intuitionistic logic](#) turns out to be the right theory for a theoretical treatment of the foundations of computer science.

[[FOLDOC](#)]

16-03-2001

constructive proof

<logic>

A proof that actually produces an example of that which it proves to exist (which might be a number, [wff](#), [function](#), proof, etc. with certain properties).

See [existence proof constructive](#)

[Glossary of First-Order Logic]

16-03-2001

constructor

<PI> 1. In functional programming and type theory, one of the symbols used to create an object with an [algebraic data type](#).

2. A function provided by a [class](#) in C++ and some other object-oriented languages to [instantiate](#) an object, i.e. to name it and initialise it. The constructor function has the same name as the class. A class may also have a destructor function to destroy objects of that class.

[FOLDOC]

28-10-2003

container class

A [class](#) whose instances are collections of other objects. Examples include stacks, [queues](#), [lists](#) and arrays.

[FOLDOC]

28-10-2003

context

That which surrounds, and gives meaning to, something else.

<grammar> In a [grammar](#) it refers to the symbols before and after the symbol under consideration. If the syntax of a symbol is independent of its context, the grammar is said to be context-free.

[FOLDOC]

16-03-2001

context clash

<grammar> When a [parser](#) cannot tell which alternative [production](#) of a [syntax](#) applies by looking at the next input [token](#) ("lexeme").

E.g. given syntax

C -> A | b c

A -> d | b e

If you're parsing nonterminal C and the next token is ' b' , you don't know whether it's the first or second alternative of C since they both can start with b.

To discover whether a grammar has a context clash:

For each non-terminal, N, with multiple alternatives, look at the first symbol of each alternative's right-hand side, call it s. If s is the empty string, then find the set FOLLOWER(N) otherwise find the set FIRST*(s). If any of the sets for N's alternatives intersect then there will be a context clash when parsing N. If the next input symbol is one of those in the intersection of two sets then you won't know which of the alternatives applies.

FIRST(s) is the set of symbols with which s can start, including s itself. If s is a non-terminal then FIRST(s) also includes the first symbol of each alternative right-hand side of s. The '*' in FIRST*(s) means the "transitive closure" of FIRST which means keep applying FIRST to each element of the result until the result doesn't change. I.e. start with just the set $R = s$, then for each non-terminal x in R, add FIRST(x) to R. Keep doing this until nothing new is added. (We are really only interested in the terminals in FIRST*(s) but some definitions include the non-terminals).

FOLLOWER(N) is the set of symbols which can come after N in a sentence. Find each occurrence of N on the right-hand side of a rule, e.g.

$M \rightarrow \dots | \dots N \dots | \dots$

If there is a symbol s immediately following N then add FIRST*(s) to the result (again, we're only interested in the terminal symbols in FIRST*(s)) if there is no symbol after N in the alternative then add FOLLOWER(M) to the result (i.e. if N can be the last symbol in an M then anything that can follow M can also follow N).

If a grammar can generate the same sentence in multiple different ways (with different parse trees) then it is ambiguous. An ambiguity must start with a context clash (but not all context clashes imply ambiguity). The context clash occurs when trying to parse the first token of the phrase with multiple parses - you will not be able to tell which alternative to take. To see if a context clash is also a case of ambiguity you would need to follow the alternatives involved in each context clash to see if they can generate the same complete sequence of tokens.

[[FOLDOP](#)]

16-03-2001

context-free

Said of a [grammar](#) where the syntax of each constituent is independent of the symbols occurring before and after it in a sentence. [Parsers](#) for such grammars are simpler than those for context-dependent grammars because the parser need only know the current symbol.

[[FOLDOP](#)]

16-03-2001

continence - incontinence

<[philosophy](#), [ethics](#)> distinction between modes of human action in the [ethics](#) of [Aristotle](#). A continent agent is able to carry out actions that conform to the demands of [reason](#), while an incontinent agent is overcome by [desire](#) and said to suffer from weakness of the will.

Recommended Reading: Nichomachean Ethics, tr. by Terence Irwin (Hackett, 1985); Robert Dunn, The Possibility of Weakness of Will (Hackett, 1987); and Anthony Kenny, Aristotle's Theory of the Will (Yale, 1979).

[[A Dictionary of Philosophical Terms and Names](#)]

28-10-2003

contingency

<logic>

In truth-functional propositional logic, any proposition that is neither a tautology nor a contradiction, hence any proposition that is sometimes true, sometimes false, depending on the row of its truth table column or the interpretation.

[Glossary of First-Order Logic]

16-03-2001

contingent

<logic, ontology>

a [sentence proposition](#), [thought](#) or [judgement](#) is contingent if it is true of this actual world, though it is not true in all [possible worlds](#). Some philosophers claim that [contingent](#) a posteriori, and [synthetic](#) are equivalent, holding that the notion of [synthetic](#) explains the other two. [necessary](#)

[A Philosophical Glossary]

28-10-2003

continuous function

<logic, mathematics> A function $f : D \rightarrow E$, where D and E are cpos, is continuous if it is [monotonic](#) and

$$f(\text{lub } Z) = \text{lub } \{f z \mid z \in Z\}$$

for all [directed sets](#) Z in D. In other words, the image of the lub is the lub of any directed image.

All [additive](#) functions (functions which preserve all lubs) are continuous. A continuous function has a least fixed point if its [domain](#) has a least element, [bottom](#) (i.e. it is a cpo or a "pointed cpo" depending on your definition of a cpo). The [least fixed point](#) is

$$\text{fix } f = \text{lub } \{f^n \text{ bottom} \mid n = 0..infinity\}$$

28-10-2003

continuum

<logic>

The numerical continuum is the series of real numbers; the linear continuum is the series of points on a geometrical line.

[Glossary of First-Order Logic]

16-03-2001

continuum hypothesis

<logic>

There is no cardinal, a , such that $\aleph_0 < a < c$, where c is the cardinality of the continuum. Proving or disproving the continuum hypothesis was the first problem on Hilbert's famous list of problems in 1900. Goedel (1938) and Cohen (1963) have proved that it is neither provable nor disprovable from standard set theory. Usually abbreviated to CH.

Generalized continuum hypothesis

For every transfinite cardinal, a , there is no cardinal b such that $a < b^{2^a}$. Usually abbreviated to GCH.

[Glossary of First-Order Logic]

16-03-2001

contraction

reduction

00-00-0000

contradiction

<logic>

1. The conjunction of any proposition and its negation.
2. In truth-functional propositional logic, the negation of any tautology, hence any proposition that is false in every row of its truth table or in every interpretation.

See contingency

[Glossary of First-Order Logic]

16-03-2001

contradictories

<philosophy of science, logic> a pair of categorical propositions, each of which is true if and only if iff the other is false. In the traditional square of opposition, an A proposition and its corresponding O proposition are contradictories, as are an E proposition and its corresponding I proposition. Thus, for example: "All dogs are mammals and Some dogs are not mammals" are contradictories, as are "No fish are tuna and Some fish are tuna."

[A Dictionary of Philosophical Terms and Names]

28-10-2003

contraposition

<[philosophy of science](#), [logic](#)> the reciprocal relationship between two categorical propositions of the same [form](#) such that the subject term of each is the [complement](#) of the [predicate](#) term of the other. [Contraposition](#) is a [valid immediate inference](#) for both [A](#) and [O propositions](#). Thus, for example: "All voters are citizens and All non-citizens are non-voters", "Some ants are not biters and Some non-biters are not non-ants" are legitimate cases of contraposition.

[[A Dictionary of Philosophical Terms and Names](#)]

28-10-2003

contraries

<[philosophy of science](#), [logic](#)> a pair of categorical propositions which (provided that we assume existential import) cannot both be true, but can both be false. In the traditional square of opposition, an [A proposition](#) and its corresponding [E proposition](#) are contraries. Thus, for example: "All cars are green and No cars are green are contraries."

[[A Dictionary of Philosophical Terms and Names](#)]

28-10-2003

control flow

<[PL](#)> (Or "flow of control") The sequence of execution of instructions in a program. This is determined at run-time by the input data and by the control structures (e.g. "if" statements) used in the program.

Not to be confused with "flow control".

[[FOLDOP](#)]

28-10-2003

conventionalism

<[ethics](#), [epistemology](#)>
 technical term for a form of [subjectivism](#) (or [relativism](#)) which holds that [truth](#), good, and [beauty](#) are merely a matter of social convention. Conventionalism is a social kind of subjectivistic theory (the usual understanding is that the word "[convention](#)" does not refer to the beliefs or values of individuals, only of groups). In popular meaning, however, conventionalism refers to a person' s tendency to adhere to or have regard for what is customary (in thought or action). (References from [logical positivism](#), [nominalism](#), and [subjectivism](#).)

[[The Ism Book](#)]

Edited by Giovanni Benzi

23-03-2001

converse

<[logic](#)> the truth of a [proposition](#) of the form $A \Rightarrow B$ and its converse $B \Rightarrow A$ are shown in the following truth table:

A	B		A \Rightarrow B	B \Rightarrow A
f	f		t	t
f	t		f	f
t	f		f	t
t	t		t	t

[[FOLDOC](#)]

16-03-2001

converse accident

<[philosophy of science, logic](#)> the [informal fallacy](#) of using exceptional specific cases as the basis for a general [rule](#), omitting reference to their qualifying features. Example: "It rained on my birthday this year and it rained on my birthday last year. Therefore, it always rains on my birthday." (a dictum secundum quid ad dictum simpliciter).

[[A Dictionary of Philosophical Terms and Names](#)]

28-10-2003

conversion

<[philosophy of science, logic](#)> the reciprocal relationship between two categorical propositions of the same [form](#) such that the subject term of each is the [predicate](#) term of the other. [Conversion](#) is a [valid immediate inference](#) for both E and I propositions. Thus, for example: "No snakes are mammals and No mammals are snakes", like "Some carnivores are birds and Some birds are carnivores" are each the converse of the other.

[[A Dictionary of Philosophical Terms and Names](#)]

28-10-2003

Conway Anne Finch

<[history of philosophy, biography](#)> english [philosopher](#) (1631-1679); author of Principia philosophiae antiquissimae et recentissimae de Deo, Christo & Creatura (The Principles of the Most Ancient and Modern Philosophy) (1690). A student of Henry [More](#), she engaged in a lengthy correspondence with [Leibniz](#), who borrowed her use of the term, "[monad](#)." [Conway](#) developed and defended a monistic system in which all beings are modes of God, the one and only spiritual substance.

Recommended Reading: The Conway Letters: The Correspondence of Anne, Viscountess Conway, Henry More, and Their Friends, 1642-1684, ed. by Marjorie Hope Nicolson (Clarendon, 1992) and Women Philosophers of the Early Modern Period, ed. by Margaret Atherton (Hackett, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

28-10-2003

coordinate

<[mathematics](#)> One member of a [tuple](#) of numbers which defines the position of a point in some space. Commonly used coordinate systems have as many coordinates as their are dimensions in the space, e.g. a pair for two dimensions. The most common coordinate system is [Cartesian coordinates](#), probably followed by polar coordinates.

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28-10-2003

Copernicus Nicolas

<[history of philosophy, biography](#)> (1473-1543)
polish astronomer whose De Revolutionibus Orbium Caelestium (About the Revolutions of the Heavenly Spheres) (1543) proposed a heliocentric view of the [universe](#). [Copernicus](#) argued that geocentric astronomies, with their complex appeals to epicyclic motion in the planets, should not be regarded as [scientific](#). His own [explanation](#), in terms of circular motion about the sun, was a much more simple (if somewhat less accurate) way of accounting for the observed facts.

Recommended Reading: Alexandre Koyre, Astronomical Revolution: Copernicus-Kepler-Borelli (Dover, 1992) and Thomas S. Kuhn, The Copernican Revolution: Planetary Astronomy in the Development of Western Thought (Harvard, 1957).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2003

copyright

<[computer ethics](#)> The exclusive rights of the owner of the copyright on a work to make and distribute copies, prepare derivative works, and perform and display the work in public (these last two mainly apply to plays, films, dances and the like, but could also apply to software).

A work, including a piece of software, is under copyright by default in most countries, whether or not it displays a copyright notice. However, a copyright notice may make it easier to assert ownership. The copyright owner is the person or company whose name appears in the copyright notice on the box, or the disk or the screen or wherever.

A copyright notice has three parts. The first can be either a c with a circle around it ([LaTeX](#) copyright), or the word Copyright or the abbreviation Copr. A "c" in parentheses: "(c)" has no legal meaning. This is followed by the name of the copyright holder and the year of first publication.

Countries around the world have agreed to recognise and uphold each others' copyrights, but this worldwide protection requires the use of the c in a circle.

Originally, most of the computer industry assumed that only the program' s underlying instructions were protected under copyright law but, beginning in the early 1980s, a series of lawsuits involving the video screens of game programs extended protections to the appearance of programs.

Use of copyright to restrict redistribution is actually immoral, unethical, and illegitimate. It is a result of brainwashing by monopolists and corporate interests and it violates everyone' s rights. Copyrights and patents hamper technological progress by making a naturally abundant resource scarce. Many, from communists to right wing libertarians, are trying to abolish intellectual property myths.

See also [public domain](#), copyleft, [software law](#).

US Copyright Office Circular 61 - Copyright Registration for Computer Programs
(gopher://marvel.loc.gov:70/0/copyright/circs/circ61).

The US Department of Education' s "How Does Copyright Law Apply to Computer Software"
(gopher://eric.syr.edu:70/0/FAQ/CopyrightSoftware).

[Usenet](#) newsgroup: news:misc.legal.computing.

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29-10-2003

Cordemoy

<[history of philosophy, biography](#)> french [philosopher](#) and early follower of [Descartes](#) (1622-1684). In his efforts to resolve [Cartesian](#) difficulties with the unobservable interaction of mind and body in his *Le discernment du corps et de l' ame* (The Mind-Body Distinction) (1666), [Cordemoy](#) noted how commonly the two elements of any human being fail to correspond with each other.

Recommended Reading: GÉraud de Cordemoy, *A Philosophical Discourse Concerning Speech* (Scholars' Facsimilies, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2003

corpuscularianism

<[history of philosophy, natural philosophy](#)> seventeenth century physical theory that supposed all [matter](#) to be composed of minute particles. Corpuscularians included [Gassendi](#), [Boyle](#), and [Locke](#).

Recommended Reading: Peter Alexander, *Ideas, Qualities and Corpuscles: Locke and Boyle on the External World* (Cambridge, 1983); Robert Boyle on Natural Philosophy, ed. by Marie Boas Hall (Greenwood, 1980); and *The Concept of Matter in Modern Philosophy*, ed. by Ernan McMullan (Notre Dame, 1969).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2003

correspondence theory of truth

<[logic, epistemology, truth theories](#)>

a correspondence theory of truth includes the assertion that a [sentence](#) (or [proposition](#)) is true if and only if that which the sentence expresses corresponds to the "[facts](#)" or to "[reality](#)".

The correspondence theory may be analysed into three components (following, e.g., Devitt (1984)).

Sentences of a type x are true or false in virtue of:

- (i) their [structure](#)
- (ii) the referential relations between parts of the sentences and some reality, and
- (iii) the nature of this reality.

The analysis is restricted to sentences of type x so as to allow the correspondence theory to hold of some sentences (e.g., of the type "physics") while not of others (e.g., of the type "ethics"). (ii) concerns the nature of the referential relation, and various theories have been proposed, e.g. causal accounts (Dretske, Stampe, Putnam, Kripke), teleofunctional accounts (Millikan), and descriptive accounts. (iii)

concerns the nature of the reality to which the parts of the sentences correspond. A realist will hold that this reality is objective and mind-independent. An idealist may hold that it is objective yet not mind-independent. Obviously, many flavours are available.

References

Devitt, Michael (1984). Realism and Truth. Princeton, NJ: Princeton University Press.

Whit Schonbein

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

corresponding argument or derivation

<[logic](#)>

Every conditional statement, $A \Rightarrow B$, can be re-expressed as a derivation, $A \vdash B$, called the corresponding [argument](#) or derivation of the conditional.

[Glossary of First-Order Logic]

16-03-2001

corresponding conditional

<[logic](#)>

Every derivation, A_1, A_2, \dots, A_n therefore B, can be re-expressed as a conditional statement, $(A_1 \text{ o } A_2 \text{ o } \dots \text{ o } A_n) \Rightarrow B$, called the corresponding conditional of the [argument](#).

[Glossary of First-Order Logic]

16-03-2001

cosmological arguments

<[metaphysics](#), [scholasticism](#), [possible](#), [necessary](#)>
<a [posteriori](#), [existence of God](#)> [arguments](#) purporting to prove the existence of God [a posteriori](#) from the [fact](#) of the [existence](#) of the [universe](#) or of certain properties of the universe and things. Aquinas' "five ways" include arguments from the existence of, the efficient causal order of, and the motion of the universe, to the existence of a first cause thereof, which he identifies with [God](#).

[[Philosophical Glossary](#)]

29-10-2003

countable

<[mathematics](#)> A term describing a [set](#) which is [isomorphic](#) to a subset of the [natural numbers](#). A countable set has "countably many" elements. If the isomorphism is stated explicitly then the set is called "a counted set" or "an [enumeration](#)".

Examples of countable sets are any [finite](#) set, the natural numbers, [integers](#), and [rational numbers](#). The real numbers and complex numbers are not.

See also [uncountable set](#)

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29-10-2003

countably many

[countable](#)

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counted

<[mathematics](#)> A term describing a [set](#) with an explicit [isomorphism](#) to the [natural numbers](#).

See [countable](#).

[FOLDOC]

16-03-2001

counter-example

<[logic](#)>

an example which undermines or refutes the principle or theory against which it is advanced. Note that examples can illustrate, explain and support a theory but not prove it, whereas counter-examples can refute it.

16-03-2001

counterfactual

<[philosophy of science](#), [logic](#)> a conditional statement whose [antecedent](#) is known (or, at least, believed) to be contrary to [fact](#). Thus, for example, "If George Bush had been born in Idaho, then he would never have become President." Unlike material implications, [counterfactuals](#) are not made true by the falsity of their [antecedents](#). Although they are not truth-functional statements, [counterfactuals](#) may be significant for the analysis of scientific hypotheses. Recommended Reading: Igal Kvat, A Theory of Counterfactuals (Ridgeview, 1986) and David K. Lewis, Counterfactuals (Blackwell, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2003

coupling

<[PI](#), [hardware](#)> The degree to which components depend on one another. There are two types of coupling, "tight" and "loose". Loose coupling is desirable for good software engineering but tight coupling may be necessary for maximum performance. Coupling is increased when the data exchanged between components becomes larger or more complex.

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16-03-2001

courage

<[philosophy](#), [ethics](#)> willingness to take reasonable risks in pursuit of a worthwhile goal. According to [Plato](#), [courage](#) is vital for both social and personal embodiments of [virtue](#).
Recommended Reading: Walter T. Schmid, On Manly Courage: A Study of Plato' s Laches (Southern Illinois, 1992).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2003

creativity

<[philosophy of mind](#), [philosophy of AI](#)> creativity is an acid test for [artificial intelligence](#) and [cognitive science](#). If [computers](#) cannot be creative, then (a) they cannot be intelligent, and (b) people are not machines. However, the standard [arguments](#) against machine intelligence are not convincing.

Issues in computers and creativity include: Can computers be creative? Can they help us understand human creativity? How can they best enhance human creativity? What would the implications be for AI and cognitive science if computers could not be creative? This entry limits itself to two initial questions: Why is creativity important for AI and cognitive science? and How convincing are the standard [arguments](#) against machine creativity?

Recommended Reading:

Haugeland, J. (1985). Artificial Intelligence: The Very Idea, MIT/Bradford Books, Cambridge. Mass;
Dartnall, T. (ed.) (1994). Artificial Intelligence and Creativity: an Interdisciplinary Approach, Kluwer, Dordrecht.
Boden, M. (1990). The Creative Mind: Myths and Mechanisms, Weidenfeld & Nicolson, London. Revised edition, 1992, Cardinal, London. (Precis, with peer reviews, in Behavioural and Brain Sciences, 17.3, 1994.)
Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

Crescas Hasdai ben Abraham

<[history of philosophy](#), [biography](#)> jewish poet and [philosopher](#) (1340-1412). An outspoken opponent of the Aristotelian philosophy of [Maimonides](#) and [Gersonides](#), [Crescas](#) argued in Or Adonai (The Light of the Lord) (1410) that [happiness](#) is to be achieved in mystical union with [God](#) rather than through the application of human reason. His work was a significant influence on that of [Spinoza](#).

Recommended Reading:

Hasdai Crescas, The Refutation of the Christian Principles, tr. by Daniel J. Lasker (SUNY, 1992);
Harry Austryn Wolfson, Crescas' s Critique of Aristotle: Problems of Aristotle' s Physics in Jewish and Arat Philosophy (Cambridge, 1929);
Warren Zev Harvey, Physics and Metaphysics in Hasdai Crescas (Benjamin' s, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2003

criptography

<[spelling](#)> It' s spelled [criptography](#)".

16-03-2001

crisp

<[logic](#)> (Or "discrete") The opposite of "[fuzzy](#)".

[[FOLDOP](#)]

16-03-2001

criterion - criteria

<[philosophy of science](#), [logic](#)> a standard by means of which to judge the features of things. Possession of appropriate [criteria](#) necessarily constitutes adequate [evidence](#) for our attribution of the feature in question. Thus, as [Wittgenstein](#) noted, for example, observation of writhing and groaning are [criteria](#) for our [belief](#) that someone is in pain.

Recommended Reading:

Ludwig Wittgenstein, *Blue and Brown Books* (Harpercollins, 1986);
Ludwig Wittgenstein, *Philosophical Investigations*, tr. by G. E. M. Anscombe (Prentice Hall, 1999);
John V. Canfield, *Wittgenstein, Language and the World* (Massachusetts, 1981).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2003

critical theory

<[history of philosophy](#), [philosophy](#)> the theoretical approach of the [Frankfurt School](#) of social philosophers. Relying on the work of [Hegel](#) and [Marx](#), they tried to exhibit dialectically the contradictions imposed upon modern human beings by varieties of social organization that abuse formal rationality in order to deny power to classes of citizens. Rejecting the detached insularity of traditional efforts at [objectivity](#), critical theorists of any sort generally hope that their [explanation](#) of the [causes](#) of oppression will result in practical efforts to eliminate it.

Recommended Reading:

Max Horkheimer, *Critical Theory*, tr. by Mathew J. O' Connell (Continuum, 1975);
David Held, *Introduction to Critical Theory: Horkheimer to Habermas* (California, 1981);
Hauke Brunkhorst, *Adorno and Critical Theory* (U of Wales, 1999);
Ben Agger, *Critical Social Theory: An Introduction* (Westview, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2003

Croce Benedetto

<[history of philosophy](#), [biography](#)> (1866-1952) italian [philosopher](#) whose *Estetica come scienza dell' espressione e linguistica generale* (*The Aesthetic as the Science of Expression and of the Linguistic i General*) (1902) proposed a non-cognitivist account of [artistic](#) intuition as an expression of personal [creativity](#). In *Materialismo storico ed economia marxista* (*Historical Materialism and the Economics of Karl Marx*) (1914) and *Teoria e storia della storiografia* (*Theory and History of Historiography*) (1921), Croce defended an understanding of history akin to that of [Hegel](#). He was also an outspoken critic of the Fascist movement.

Recommended Reading:

Benedetto Croce, *My Philosophy, and Other Essays on the Moral and Political Problems of Our Time*, tr. and ed. by Raymond Klibansky and E. F. Carritt (AMS, 1977);
Thought, Action and Intuition: A Symposium on the Philosophy of Benedetto Croce (Lubrecht & Cramer, 1976).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2003

CRS

[conceptual role semantics](#)

00-00-0000

Cudworth Ralph

<[history of philosophy](#), [biography](#)> english [philosopher](#) (1617-1688). His True Intellectual System of the Universe (1678) and Eternal and Immutable Morality (1731) are excellent expositions of [Cambridge Platonism](#) in opposition to the mechanistic philosophy of [Hobbes](#). [Cudworth](#)' s daughter [Damaris Masham](#), also became an influential philosopher.

Recommended Reading:

Frederick James Powicke, Cambridge Platonists (Greenwood, 1955).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2003

cultural relativism

<[anthropology](#), [aesthetics](#), [ethics](#), [subjectivism](#), [relativism](#)> [moral theory](#) that holds that what' [good](#) or [bad](#) or [right](#) or wrong varies from society to society depending on what each society says to be, or believes to be, good or bad or right or wrong. See:[ethical relativism](#). Compare [subjectivism](#).

[[Philosophical Glossary](#)]

29-10-2003

Cumberland Richard

<[history of philosophy](#), [biography](#)> english [philosopher](#) (1631-1718). [Cumberland](#) opposed the ethical egoism of [Hobbes](#) in his De Legibus Naturae Disquisitio Philosophica (Treatise of the Laws of Nature) (1672), arguing that a universal benevolence motivates each human being to seek the [happiness](#) of all, leaving no room for the exercise of [free will](#).

Recommended Reading:

Jon Parkin, Science, Religion and Politics in Restoration England: Richard Cumberland' s De Legibus Naturae (Royal Historical Society, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2003

curried function

<[mathematics](#), [programming](#)> A [function](#) of N [arguments](#) can be considered as a function of one argument which returns another function of N-1 arguments. E.g. in Haskell we can define:

```
average :: Int -> (Int -> Int)
```

(The parentheses are optional). A partial application of average, e.g. (average 4), is a function of type (Int -> Int) which averages its argument with 4. In uncurried languages a function must always be applied to all its arguments but a partial application can be represented using a [lambda abstraction](#):

```
x -> average(4,x)
```

Currying is necessary if full laziness is to be applied to functional sub-expressions.

It was named after the logician Haskell Curry but the 19th-century formalist [Frege](#) was the first to propose it and it was first referred to in ["Ueber die Bausteine der mathematischen Logik", M. Schoenfinkel, Mathematische Annalen. Vol 92 (1924)].

David Turner said he got the term from Christopher Strachey who invented the term "currying" and used it in his lecture notes on programming languages written circa 1967. Strachey also remarked that it ought really to be called "Schoenfinkeling".

Stefan Kahrs reported hearing somebody in Germany trying to introduce "scho"nen" for currying and "finkeln" for "uncurrying". The verb "scho"nen" means "to beautify"; "finkeln" isn' t a German word, but it suggests "t fiddle".

["Some philosophical aspects of combinatory logic", H. B. Curry, The Kleene Symposium, Eds. J. Barwise, J. Keisler, K. Kunen, North Holland, 1980, pp. 85-101]

[[FOLDOP](#)]

29-10-2003

currying

Turning an uncurried function into a [curried function](#).

[[FOLDOC](#)]

16-03-2001

Cusa Nicolas of

<[history of philosophy, biography](#)> german theologian (1400-1464); author of De docta ingnorantia (Of Learned Ignorance) (1440) and De visione dei (Of the Vision of God) (1554). [Cusa](#)' s late exposition of neoplatoni philosophy, according to which all [contradictions](#) are unified in the infinite divine nature, was greatly influential on major figures of the [Renaissance](#).

Recommended Reading:

Jasper Hopkins, A Concise Introduction to the Philosophy of Nicholas of Cusa (Banning, 1986);
Karl Jaspers and Hannah Arendt, Anselm and Nicholas of Cusa, tr. by Ralph Manheim (Harcourt Brace, 1974);
and Jasper Hopkins, Nicholas of Cusa' s Metaphysic of Contraction (Banning, 1983).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2003

cybernetics

<[robotics](#)> The comparative study of the internal workings of organic and machine processes in order to understand their similarities and differences. Cybernetics often refers to machines that imitate human behaviour.

See [artificial intelligence](#), [robot](#).

[[FOLDOC](#)]

16-03-2001

cyberpunk

/si:' beɪpʌŋk/ (Originally coined by SF writer Bruce Bethke and/or editor Gardner Dozois) A subgenre of SF launched in 1982 by William Gibson' s epochmaking novel "Neuromancer" (though its roots go back through Vernor Vinge' s "True Names" to John Brunner' s 1975 novel "The Shockwave Rider"). Gibson' s ~~total~~ ^{total} ignorance of computers and the present-day hacker culture enabled him to speculate about the role of computers and hackers in the future in ways hackers have since found both irritatingly naive and tremendously stimulating. Gibson' s work was widely imitated, in particular by the shortlived but innovative "Max Headroom" TV series. See [cyberspace](#), [ice](#), [jack in](#), [go flatline](#).

Since 1990 or so, popular culture has included a movement or fashion trend that calls itself "cyberpunk", associated especially with the rave/techno subculture. Hackers have mixed feelings about this. On the one hand, self-described cyberpunks too often seem to be shallow trendoids in black leather who have substituted enthusiastic blathering about technology for actually learning and *doing* it. Attitude is no substitute for competence. On the other hand, at least cyberpunks are excited about the right things and properly respectful of hacking talent in those who have it. The general consensus is to tolerate them politely in hopes that they' attract people who grow into being true hackers.

[[Jargon File](#)]

[[FOLDOC](#)]

29-10-2003

cybersex

<[networking](#)> Sex performed in real time via a digital medium.

[[FOLDOC](#)]

29-10-2003

cyberspace

<[jargon](#)> /si:' beɪspays/

1. (Coined by William Gibson) Notional "information-space" loaded with visual cues and navigable with brain-computer interfaces called "cyberspace decks"; a characteristic prop of [cyberpunk](#) SF. In 1991 serious efforts to construct [virtual reality](#) interfaces modelled explicitly on Gibsonian cyberspace were already under way, using more conventional devices such as glove sensors and binocular TV headsets. Few hackers are prepared to deny outright the possibility of a cyberspace someday evolving out of the network (see [network](#)).

2. Occasionally, the metaphoric location of the mind of a person in hack mode. Some hackers report experiencing strong eidetic imagery when in hack mode; interestingly, independent reports from multiple sources suggest that there are common features to the experience. In particular, the dominant colours of this subjective "cyberspace" are often grey and silver, and the imagery often involves constellations of marching dots, elaborate shifting patterns of lines and angles, or moire patterns.

[[Jargon File](#)]

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29-10-2003

cycle

<[unit](#)> A basic unit of computation, one period of a computer clock.

Each instruction takes a number of clock cycles. Often the computer can access its memory once on every clock cycle, and so one speaks also of "memory cycles".

Every [hacker](#) wants more cycles (noted hacker Bill Gosper describes himself as a "cycle junkie"). There are only so many cycles per second, and when you are sharing a computer the cycles get divided up among the users. The more cycles the computer spends working on your program rather than someone else's, the faster your program will run. That's why every hacker wants more cycles: so he can spend less time waiting for the computer to respond.

The use of the term "cycle" for a computer clock period can probably be traced back to the rotation of a generator generating alternating current though computers generally use a clock signal which is more like a square wave.

Interestingly, the earliest mechanical calculators, e.g. Babbage's [Difference Engine](#), really did have parts which rotated in true cycles.

[[Jargon File](#)] and [[FOLDOC](#)]

29-10-2003

cynicism

<[ethics](#)> the word comes from a group of thinkers in ancient Greece who were called Cynics, from the Greek word for "dog". The Cynics held that pure [virtue](#) is the only good, and they cultivated an [asceticism](#) more rigorous than that of [Epicureanism](#) or [stoicism](#). Because of their independence from worldly concerns, they were critical of the rest of society and of conventional morality, somewhat akin to exponents of the [skepticism](#) that was arising around the same time.

The most famous Cynic was [Diogenes](#) (412-323 B.C.), who so faithfully put his ideas into practice that, according to legend, he took to living in a bathtub. It is often reported that, when Alexander the Great came to visit him in search of wisdom, and inquired if there was anything the great leader could do for him, Diogenes replied that, yes, there was: Alexander could move aside and stop blocking his sunshine. It is often forgotten that Alexander replied that, had he not been Alexander, he would have liked to be Diogenes.

In common usage, cynicism often denotes a combination of [skepticism](#) and [pessimism](#).

[[The Ism Book](#)]

Edited by Giovanni Benzi

29-10-2003

dagger function

<[logic](#) > The dyadic connective or truth [function](#) "neither/nor". One of only two dyadic connectives capable of expressing all truth [functions](#) by itself.

Notation: $p \mid/ q$. Also called joint denial.

See also [stroke function](#)

[Glossary of First-Order Logic]

16-03-2001

Daly Mary

<[history of philosophy, biography](#)> american [philosopher](#) and theologian (1928-).

Author of Pure Lust: Elemental Feminist Philosophy (1984) and the autobiographical Outcourse: The Be-Dazzling Voyage: Containing Recollections from My Logbook of a Radical Feminist Philosopher (being an account of my time/space travels and ideas - then, again, now, and how) (1992). Reacting against her early training in neo-Thomist theology, [Daly](#)'s early work, in The Church and the Second Sex (1968) and Beyond God the Father: Toward a Philosophy of Women' s Liberation (1973), noted that the Christian tradition helps t support patriarchal society and explicitly rejected its conception of a supreme male deity. [Daly](#) went on to develop an [ethical](#) position that regards woman-centered self-creation as the primary means of escaping male domination, and in Gyn/Ecology: The Metaethics of Radical Feminism (1978) she proposed that the life forces embodied in women can achieve their full effect only in a separate women' s culture. In an effort to escape th linguistic embodiment of [patriarchy](#), [Daly](#) often expresses herself by using inventive neologisms that are playful in tone but serious in purpose; Webster' s First New Intergalactic Wickedary of the English Language (1987 offers a delightful glimpse of the advantages of a "gynomorphic" language.

Recommended Reading: Mary Daly, Quintessence... Realizing the Archaic Future: A Radical Elemental Feminist Manifesto (Beacon, 1999);
Feminist Interpretations of Mary Daly, ed. by Sarah Lucia Hoagland and Marilyn Frye (Penn. State, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

11-11-2001

darii

<[logic, philosophy of science](#)> name given by medieval logicians to any [categorical syllogism](#) whose standard form may be designated as All-1. Example: All logicians are philosophers, and some serious scholars are logicians, so some serious scholars are philosophers. This is one of the fifteen forms in which syllogisms are always valid.

[[A Dictionary of Philosophical Terms and Names](#)]

12-11-2001

Darwin Charles

<[history of biology, biography, history of philosophy](#)> english biologist (1809-1882) who recorded his notes from the field in The Voyage of the Beagle (1848). [Darwin](#)' s Origin of Species by Means of Natural Selectio (1859) and The Descent of Man (1871) revolutionized modern science by proposing a non-teleological explanation for the survival of otherwise random variations in animal species. Despite opposition from biblical literalists, a Darwinian version of the theory of evolution became widely accepted within a few decades.

Recommended Reading:

The Portable Darwin, ed. by Duncan M. Porter and Peter W. Graham (Penguin, 1993);
Daniel C. Dennett, Darwin' s Dangerous Idea: Evolution and the Meanings of Life (Touchstone, 1996);
Janet Radcliffe Richards, Human Nature After Darwin: A Philosophical Introduction (Routledge, 2001);
The Book of Life: An Illustrated History of the Evolution of Life on Earth, ed. by Stephen Jay Gould and Peter Andrews (Norton, 2001);
Gertrude Himmelfarb, Darwin and the Darwinian Revolution (Dee, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

12-11-2001

dasein

<[ontology, history of philosophy](#)> [Heidegger](#)' s German term for "Beingthere," the kind of [existence](#) that self-conscious human beings uniquely possess.

Recommended Reading:

Being and Time: A Translation of Sein and Zeit, tr. by Joan Stambaugh (SUNY, 1997)

Hubert L. Dreyfus, Being-In-The-World: A Commentary on Heidegger' s Being and Time, Division I (MIT, 1991)

[[A Dictionary of Philosophical Terms and Names](#)]

12-11-2001

data

<[data](#), [data processing, jargon](#)> /day' t*/ (Or "raw data") Numbers, characters, images, or other method c recording, in a form which can be assessed by a human or (especially) input into a [computer](#), stored and processed there, or transmitted on some digital channel. Computers nearly always represent data in [binary](#).

Data on its own has no meaning, only when interpreted by some kind of data processing system does it take on meaning and become [information](#).

People or computers can find patterns in data to perceive information, and information can be used to enhance [knowledge](#). Since knowledge is prerequisite to wisdom, we always want more data and information. But, as modern societies verge on information overload, we especially need better ways to find patterns.

1234567.89 is data.

"Your bank balance has jumped 8087% to \$1234567.89" is information.

"Nobody owes me that much money" is knowledge.

"I' d better talk to the bank before I spend it, because of what has happened to other people" is wisdom.

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16-03-2001

data abstraction

[abstract data type](#)

17-02-2004

data dictionary

A data structure that stores meta-data, i.e. data about [data](#). The term "data dictionary" has several uses.

Most generally it is a set of data descriptions that can be shared by several applications.

Usually it means a [table](#) in a [database](#) that stores the names, [field types](#), length, and other characteristics of the fields in the database tables.

An active data dictionary is automatically updated as changes occur in the database. A passive data dictionary must be manually updated.

In a DBMS, this functionality is performed by the system catalog. The data dictionary is a more general software utility used by designers, users, and administrators for information resource management.

The data dictionary may maintain information on system hardware, software, documentation, users, and other aspects.

Data dictionaries are also used to document the database design process itself and can accumulate meta-data ready to feed into the system catalog.

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16-03-2001

data dictionary file

<database> (DDF) A set of files describing the structure of a [database](#) file. DDFs define database tables and include information about file locations, field layouts and indexes. DDFs are the standard method for defining field and index characteristics for Btrieve files.

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16-03-2001

data flow

<database> A data flow architecture or language performs a computation when all the operands are available. Data flow is one kind of data driven architecture, the other is demand driven. It is a technique for specifying parallel computation at a fine-grain level, usually in the form of two-dimensional graphs in which instructions that are available for concurrent execution are written alongside each other while those that must be executed in sequence are written one under the other. Data dependencies between instructions are indicated by directed arcs. Instructions do not reference memory since the data dependence arcs allow data to be transmitted directly from the producing instruction to the consuming one.

Data flow schemes differ chiefly in the way that they handle re-entrant code. Static schemes disallow it, dynamic schemes use either "code copying" or "tagging" at every point of re-entry.

An example of a data flow architecture is MIT' s VAL machine.

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16-03-2001

data flow analysis

<PI> A process to discover the dependencies between different data items manipulated by a program. The order of execution in a data driven language is determined solely by the data dependencies. For example, given the equations

1. $X = A + B$
2. $B = 2 + 2$
3. $A = 3 + 4$

a data-flow analysis would find that 2 and 3 must be evaluated before 1. Since there are no data dependencies between 2 and 3, they may be evaluated in any order, including in parallel.

This technique is implemented in hardware in some pipelined processors with multiple functional units. It allows instructions to be executed as soon as their inputs are available, independent of the original program order.

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16-03-2001

Data Flow Diagram

<data> A graphical notation used to describe how data flows between processes in a system. An important tool of most [structured analysis](#) techniques.

[[FOLDOC](#)]

16-03-2001

data glove

<[hardware](#),[virtual reality](#)> An input device for [virtual reality](#) in the form of a glove which measures the movements of the wearer's fingers and transmits them to the computer. Sophisticated data gloves also measure movement of the wrist and elbow. A data glove may also contain control buttons or act as an output device, e.g. vibrating under control of the computer. The user usually sees a virtual image of the data glove and can point or grip and push objects.

Examples are Fifth Dimension Technologies (5DT)' s[5th Glove](#), and Virtual Technologies' CyberGlove. A cheaper alternative is InWorld VR' s CyberWand.

["Full freedom plus input", PC Magazine, Mar 14 1995, pp. 168-190].

[Inventor?]

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16-03-2001

data hierarchy

<[data](#)> The system of data objects which provide the [methods](#) for [information](#) storage and retrieval. Broadly, a data hierarchy may be considered to be either natural, which arises from the alphabet or syntax of the language in which the information is expressed, or machine, which reflects the facilities of the computer, both hardware and software.

A natural data hierarchy might consist of bits, characters, words, phrases, sentences, paragraphs, and chapters. One might use components bound to an application, such as field, record, and file, and these would ordinarily be further specified by having data descriptors such as name field, address field, etc. On the other hand, a machine or software system might use [bit](#), [byte](#), word, block, [partition](#), channel, and [port](#).

Programming languages often provide [types](#) or objects which can create data hierarchies of arbitrary complexity, thus allowing software system designers to model language structures described by the linguist to greater or lesser degree.

The distinction between the natural form of data and the facilities provided by the machine may be obscure, because users force their needs into the molds provided, and programmers change machine designs. As an example, the natural data type "character" and the machine type "byte" are often used interchangeably, because the latter has evolved to meet the need of representing the former.

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16-03-2001

data mining

<[database](#)> Analysis of data in a [database](#) using tools which look for trends or anomalies without knowledge of the meaning of the data. Data mining was invented by IBM who hold some related patents.

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16-03-2001

data model

<[database](#)> The product of the [database](#) design process which aims to identify and organize the required data logically and physically.

A data model says what information is to be contained in a database, how the information will be used, and how the items in the database will be related to each other.

For example, a data model might specify that a customer is represented by a customer name and credit card number and a product as a product code and price, and that there is a one-to-many relation between a customer and a product.

It can be difficult to change a database layout once code has been written and data inserted. A well thought-out data model reduces the need for such changes. Data modelling enhances application maintainability and future systems may re-use parts of existing models, which should lower development costs.

A data modelling language is a mathematical formalism with a notation for describing data structures and a set of operations used to manipulate and validate that data.

One of the most widely used methods for developing data models is the entity-relationship model. The relational model is the most widely used type of data model. Another example is NIAM.

["Principles of Database and Knowledge-Base Systems", J.D. Ullman, Volume I, Computer Science Press, 1988, p. 32].

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16-03-2001

data modeling

<spelling> US spelling of "[data modelling](#)".

17-02-2004

data modelling

[data model](#)

17-02-2004

data processing

[application](#) The input, verification, organisation, storage, retrieval, transformation, and extraction of [information](#) from [data](#). The term is normally associated with commercial applications such as stock control or payroll.

[FOLDOC]

16-03-2001

data rate

<communications> The amount of [data](#) transferred per second by a communications channel or a computing or storage device. Typically measured in units of bits per second (bps), bytes per second (Bps) or baud.

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16-03-2001

data striping

<storage> Segmentation of logically [sequential](#) data, such as a single file, so that segments can be written to multiple physical devices (usually disk drives) in a round-robin fashion. This technique is useful if the processor is capable of reading or writing data faster than a single disk can supply or accept it. While data is being transferred from the first disk, the second disk can locate the next segment.

Data striping is used in some modern [database](#) s, such as Sybase, and in certain RAID devices under hardware control, such as IBM' s RAMAC array subsystem (9304/9395).

Data striping is different from, and may be used in conjunction with, mirroring.

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16-03-2001

data type[type](#)

17-02-2004

data warehouse<[database](#)>

1. A generic term for a system for storing, retrieving and managing large amounts of any type of data. Data warehouse software often includes sophisticated compression and hashing techniques for fast searches, as well as advanced filtering.

2. A [database](#), often remote, containing recent snapshots of corporate data. Planners and researchers can use this database freely without worrying about slowing down day-to-day operations of the production database.

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16-03-2001

data warehousing[data warehouse](#)[[FOLDOC](#)]

17-02-2004

database

1. One or more large structured sets of persistent data, usually associated with software to update and [query](#) the data. A simple database might be a single file containing many records, each of which contains the same set of fields where each field is a certain fixed width.

A database is one component of a [database management system](#).

See also ANSI/SPARC Architecture, atomic, blob, [data definition language](#), deductive database, [distributed database](#), [fourth generation language](#), [functional database](#), object-oriented database, relational database.

(http://www.bus.orst.edu/faculty/brownc/lectures/db_tutor/db_tutor.htm).

2. A collection of nodes managed and stored in one place and all accessible via the same server. Links outside this are "external", and those inside are "internal".

On the World-Wide Web this is called a web site.

3. All the facts and rules comprising a [logic programming](#) program.

16-03-2001

database normalisation

<[database](#)> A series of steps followed to obtain a [database](#) design that allows for efficient access and [storage](#) of data in a relational database. These steps reduce data redundancy and the chances of data becoming inconsistent.

A [table](#) in a relational database is said to be in normal form if it satisfies certain constraints. Codd' s original work defined three such forms but there are now five generally accepted steps of normalisation. The output of the first step is called First Normal Form (1NF), the output of the second step is Second Normal Form (2NF), etc.

First Normal Form eliminates repeating groups by putting each into a separate table and connecting them with a one-to-many relationship.

Second Normal Form eliminates functional dependencies on a partial key by putting the fields in a separate table from those that are dependent on the whole [key](#).

Third Normal Form eliminates functional dependencies on non-key fields by putting them in a separate table. At

this stage, all non-key fields are dependent on the key, the whole key and nothing but the key.

Fourth Normal Form separates independent multi-valued facts stored in one table into separate tables.

Fifth Normal Form breaks out data redundancy that is not covered by any of the previous normal forms.

(<http://home.earthlink.net/~billkent/Doc/simple5.htm>).

[What about non-relational databases?]

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16-03-2001

datagram

<[data](#)> A self-contained, independent entity of data carrying sufficient information to be routed from the source to the destination computer without reliance on earlier exchanges between this source and destination computer and the transporting [network](#).

See also connectionless, frame, packet.

16-03-2001

datisi

<[logic](#), [philosophy of science](#)> name given by medieval logicians to a [categorical syllogism](#) with the standard form All-3.

Example: Since all bookstores are places that sell popular novels and some bookstores are coffee shops, it follows that some coffee shops are places that sell popular novels. This is one of only fifteen forms of syllogism that are always valid.

[[A Dictionary of Philosophical Terms and Names](#)]

12-11-2001

Davidson Donald

<[history of philosophy](#), [biography](#)> american [philosopher](#) (1917-) who, like [Quine](#), applies the methods of logical and linguistic analysis to the study of human nature. On [Davidson](#)'s view, interpretation of a language should always be governed by a "principle of charity" that maximizes its true statements. Although he regards mental events as irreducibly [intentional](#) and denies the possibility of psycho-physical laws, [Davidson](#) defends a sophisticated [identity theory](#) ("[anomalous monism](#)") under which every mental event supervenes upon some physical event, subject to the usual physical laws of nature, even though it cannot be fully described in purely physical terms. Many of [Davidson](#)'s most influential essays are collected in *Essays on Actions and Events* (1980) and *Inquiries into Truth and Interpretation* (1984).

Recommended Reading:

Simon Evnine, *Donald Davidson* (Stanford, 1991);

The Philosophy of Donald Davidson, ed. by Lewis Edwin Hahn (Open Court, 1999);

Donald Davidson: Truth, Meaning, and Knowledge, ed. by Urszula M. Zeglen (Routledge, 1999);

Interpretations and Causes: New Perspectives on Donald Davidson's Philosophy, ed. by Mario De Car (Kluwer, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

13-11-2001

Day Dorothy

<[history of philosophy](#), [biography](#)> American social activist (1897-1980). [Day](#) combined communist social concern with [Christian](#) convictions in the autobiographical *From Union Square to Rome* (1938). She founded *The Catholic Worker* magazine in 1933, established a "hospitality house" in New York City, and supported pacifistic resistance to several wars.

Recommended Reading:

Dorothy Day: Selected Writings, ed. by Robert Ellsberg (Orbis, 1992);
 The Long Loneliness: The Autobiography of Dorothy Day, ed. by Daniel Berrigan (Harper, 1997);
 Voices from the Catholic Worker, ed. by Rosalie Riegle Troester (Temple, 1993);
 June E. O' Connor, *The Moral Vision of Dorothy Day: A Feminist Perspective* (Crossroad, 1991).

[\[A Dictionary of Philosophical Terms and Names\]](#)

13-11-2001

de dicto - de re

<[gnoseology](#), [philosophy of science](#)> distinction between ways of understanding the logical necessity or [truth](#) of statements, either in terms "of what is said" ([de dicto](#)) or in terms "of the thing" ([de re](#)). Someone who does not know that the morning star is the planet Venus, for example, could believe the truth, [de dicto](#), of the proposition, "The morning star is larger than Venus," even though no one would believe [de re](#) that Venus is larger than itself.

Recommended Reading:

Alvin Plantinga, *The Nature of Necessity* (Clarendon, 1989)
 Saul A. Kripke, *Naming and Necessity* (Harvard, 1980).

[\[A Dictionary of Philosophical Terms and Names\]](#)

13-11-2001

de facto - de jure

<[philosophy of science](#), [epistemology](#)> distinction between the grounds for a condition that merely happens to obtain ([de facto](#)) and one that holds as a matter of right or law ([de jure](#)). The maximum speed at which an automobile may lawfully travel on the highway is 70 m.p.h. [de jure](#), but the [de facto](#) speed limit on a busy afternoon is only about 50 m.p.h.

[\[A Dictionary of Philosophical Terms and Names\]](#)

13-11-2001

de facto standard

A widespread consensus on a particular product or [protocol](#) which has not been ratified by any official [standards](#) body, such as ISO, but which nevertheless has a large market share.

The archetypal example of a [de facto](#) standard is the IBM PC which, despite its many glaring technical deficiencies, has gained such a large share of the personal computer market that it is now popular simply because it is popular and therefore enjoys fierce competition in pricing and software development.

[\[FOLDOP\]](#)

16-03-2001

de jure

<[philosophy of science](#), [epistemology](#)> as a matter of law, not merely as a matter of fact. See [de facto](#) / [de jure](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

13-11-2001

De Morgan Augustus

<[history of philosophy](#), [biography](#)> british mathematician (1806-1871) who recognized the need to expand the notion of [logical validity](#) beyond the narrow confines of Aristotelian syllogistic. His works include Essay on Probabilities (1838), Formal Logic (1847), and Budget of Paradoxes (1872). [De Morgan](#) developed the standard statement of De Morgan' s Theorems, a pair of logical relationships earlier noted by [Ockham](#) and [Geulincx](#).

Recommended Reading:

Robert Adamson, Short History of Logic (Irvington, 1961)

Daniel Davy Merrill, Augustus De Morgan and the Logic of Relations (Kluwer, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

14-11-2001

de re

<[gnoseology](#), [philosophy of science](#)> "Of the thing," not "of what is said" See [de dicto/de re](#).

[[A Dictionary of Philosophical Terms and Names](#)]

18-11-2001

decidability

<[mathematics](#), [logic](#)> A property of sets for which one can determine whether something is a member or not in a [finite](#) number of computational steps. See also [effective method](#), [recursive set](#), [undecidable set](#)

Decidability is an important concept in [computability theory](#). A set (e.g. "all numbers with a 5 in them") is said to be "decidable" if I can write a program (usually for a [Turing Machine](#)) to determine whether a number is in the set and the program will always terminate with an answer YES or NO after a finite number of steps.

Most sets you can describe easily are decidable, but there are infinitely many sets so most sets are undecidable, assuming any finite limit on the size (number of instructions or number of states) of our programs. I.e. how ever big you allow your program to be there will always be sets which need a bigger program to decide membership.

One example of an undecidable set comes from the [halting problem](#). It turns out that you can encode every program as a number: encode every symbol in the program as a number (001, 002, ...) and then string all the symbol codes together. Then you can create an undecidable set by defining it as the set of all numbers that represent a program that terminates in a finite number of steps.

A set can also be "semi-decidable" - there is an [algorithm](#) that is guaranteed to return YES if the number is in the set, but if the number is not in the set, it may either return NO or run for ever.

The [halting problem'](#) s set described above is semidecidable. You decode the given number and run the resulting program. If it terminates the answer is YES. If it never terminates, then neither will the decision algorithm.

[[FOLDOP](#)]

16-03-2001

decidable

[decidability](#)

17-02-2004

decidable system

<logic> A formal system in which there is an [effective method](#) for determining whether any given [wff](#) is a [theorem](#). A system in which the set of [theorems](#) is a decidable set. The question whether a system is decidable is often called the Entscheidungsproblem, or decision problem.

See [decidable set](#), [effective proof procedure](#)

[Glossary of First-Order Logic]

16-03-2001

decidable wff

<logic> A [wff](#) that is either a [theorem](#) or the [negation](#) of a [theorem](#).

Either the [wff](#) or its [negation](#) is a [theorem](#).

Jargon: if [wff](#) A is decidable in system S, we often say that "S decides A".

[Glossary of First-Order Logic]

16-03-2001

decidability

<logic, [decidable system](#), [decidable wff](#)> a (logical) [language](#) is said to be decidable [iff](#) all of its [theorems](#) (or logical truths) can be shown to be true through a finite mechanical procedure. Propositional logic is decidable; [predicate logic](#) is not.

[[A Philosophical Glossary](#)]

30-04-2001

decision problem

<logic> A problem with a yes/no answer. Determining whether some potential solution to a question is actually a solution or not.

E.g. "Is 43669" a [prime number](#)?". This is in contrast to a "[search problem](#)" which must find a solution from scratch, e.g. "What is the millionth prime number?".

See [decidability](#).

[[FOLDOP](#)]

16-03-2001

decision procedure

<logic, [philosophy of science](#), [information theory](#)> an [algorithm](#) by means of which to establish, in a finite number of steps, whether a [statement](#) form is tautologous or whether an argument form is [valid](#). Drawing [Venn diagrams](#) provides a [decision procedure](#) for a modern interpretation of [categorical logic](#), and truth-tables give a [decision procedure](#) for the [propositional calculus](#), but there is no [decision procedure](#) for [quantification theory](#).

[[A Dictionary of Philosophical Terms and Names](#)]

13-11-2001

decision theory

<[probability](#)> A branch of statistics concerning strategies for decision making in non-[deterministic](#) systems. Decision theory seeks to find strategies that maximise the expected value of a utility function measuring the desirability of possible outcomes.

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16-03-2001

deconstruction

<[analysis of texts](#), [linguistics](#), [philosophy](#)> interpretive method that denies the priority or privilege of any single reading of a [text](#) (even if guided by the intentions of its author) and tries to show that the [text](#) is incoherent because its own key terms can be understood only in relation to their suppressed opposites. Deconstructionists like [Derrida](#) seek to uncover the internal conflicts that tend to undermine (or at least to "decenter") the putative significance of any [text](#). In ordinary language, for example, someone who says, "If I may be perfectly candid for a moment, . . ." thereby betrays a reluctance - at least in the past and, probably, even in the present case - to do so, and this difference points toward a systematic ambiguity in the very notions of honesty and truth.

Recommended Reading:

Deconstruction in a Nutshell: A Conversation With Jacques Derrida, ed. by John D. Caputo (Fordham, 1997);
Deconstruction in Context: Literature and Philosophy, ed. by Mark C. Taylor (Chicago, 1986);
Penelope Deutscher, Yielding Gender: Feminism, Deconstruction, and the History of Philosophy (Routledge, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

13-11-2001

deduction

<[logic](#)> an [inference](#) in which (when valid) the conclusion contains no information that was not already present in the premises, or whose [corresponding conditional](#) is a [tautology](#).

See also [induction](#), [validity](#), [logic](#), [hypothetical deductive method](#)

[Glossary of First-Order Logic]

16-03-2001

deduction - induction

<[logic](#), [philosophy of science](#), [epistemology](#)> distinction in [logic](#) between types of reasoning, [arguments](#), or inferences. In a deductive argument, the [truth](#) of the [premises](#) is supposed to guarantee the [truth](#) of the [conclusion](#); in an inductive argument, the [truth](#) of the [premises](#) merely makes it probable that the [conclusion](#) is true.

Recommended Reading:

Patrick Suppes, Introduction to Logic (Dover, 1999) and Richard L. Wilson, Logic: Deductive, Inductive and Informal Reasoning (Kendall/Hunt, 1993).

[[A Dictionary of Philosophical Terms and Names](#)]

13-11-2001

deduction theorem

<logic> When G is a set of [wffs](#), and A and B are [wffs](#), then if $G, A \vdash B$, then $G \vdash (A \Rightarrow B)$.

Also called the rule of conditional proof.

[Glossary of First-Order Logic]

16-03-2001

deductive apparatus

<logic> The axioms and rules of [inference](#) of a formal system.

Formal systems may lack axioms or [rules of inference](#) but not both.

[Glossary of First-Order Logic]

16-03-2001

deductive tableau

<logic> A theorem proof system consisting of a table whose rows contain assertions or goals. Variables in assertions are implicitly universally quantified and variables in goals are implicitly existentially quantified. The declarative meaning of a tableau is that if every instance of every assertion is true then some instance of at least one of the goals is true.

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16-03-2001

definite clause

<logic> A [Horn clause](#) that has exactly one [positive literal](#).

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16-03-2001

definite description

<logic, [philosophy of science](#)> an [expression](#) that claims to refer to the single being that possesses some unique feature. [Russell](#) showed nearly a century ago that the proper analysis of such expressions, as the joint assertion of several distinct [propositions](#), resolves a number of otherwise troubling difficulties.

Recommended Reading:

Definite Descriptions: A Reader, ed. by Gary Ostertag (Bradford, 1998);

Stephen Neale, Descriptions (Bradford, 1993);

Jaakko Hintikka and Jack Kulas, Anaphora and Definite Descriptions: Two Applications of Game-Theoretical Semantics (Kluwer, 1985).

[[A Dictionary of Philosophical Terms and Names](#)]

13-11-2001

definite sentence

<logic> A collection of [definite clauses](#).

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16-03-2001

definition

<[logic](#), [epistemology](#), [philosophy of science](#), [science](#), [linguistics](#)> an [explanation](#) of the [meaning](#) of a word. The five major kinds of [definition](#) (distinguished by the functions they may be used to perform) include: [stipulative](#), [lexical](#), [precising](#), [theoretical](#), and [persuasive](#).

Recommended Reading: Essays on Definition, ed. by Juan C. Sager (Benjamins, 2000);
Richard Robinson, Definition (Clarendon, 1950);
Richard Robinson, Definitions and Definability: Philosophical Perspectives, ed. by James H. Fetzer, David Shatz, and George N. Schlesinger (Kluwer, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

13-11-2001

degrees of freedom

<[robotics](#)> The number of independent parameters required to specify the position and orientation of an object. Often used to classify [robot](#) arms. For example, an arm with six degrees of freedom could reach any position close enough and could orient it' s end effector (grip or tool etc.) at any angle about the three perpendicular axes.

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16-03-2001

deism

<[metaphysics](#), [philosophy of religion](#)> the idea that [God](#) created the universe but then left it alone to operate on its own principles - principles that human reason and science can discover. Thus, according to deism, God is not involved in the day-to-day workings of the universe, and there are no miracles. Deism was a creation of the rational, scientific spirit of the [Enlightenment](#), and continues to be held to this day by many people, especially those of a scientific bent. (For other views about the relationship between God and the universe, see [theism](#) and [pantheism](#).) (References from [naturalism](#) and [theism](#).)

[[The Ism Book](#)]

<[philosophy](#), [religion](#), [metaphysics](#)> belief in [god](#) based entirely on [reason](#), without any reference to [faith](#), revelation, or institutional religion. During the seventeenth and eighteenth centuries, advances in the natural sciences often fostered confidence that the regularity of nature reflects the benevolence of a divine providence. This confidence, together with a widespread distrust of the church, made [deism](#) a popular view in England and on the continent. Thus, in distinct ways, [Toland](#), Lord [Herbert](#), [Paine](#), [Rousseau](#), and [Voltaire](#) were all deists.

Recommended Reading:
John Toland' s Christianity Not Mysterious: Text, Associated Works and Critical Essays, ed. by Alan Harrisor Richard Kearney, and Philip McGuinness (Dufour, 1997);
Thomas Paine, Age of Reason (Lyle Stuart, 1989);
William Stephens, An Account of the Growth of Deism in England (AMS, 1995);
William Stephens, The Radical Rhetoric of the English Deists: The Discourse of Skepticism, 1680-1750, ed. by James A. Herrick and Thomas W. Benson (South Carolina, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

06-01-2002

Delaunay triangulation

<[mathematics](#), [graphics](#)> (After B. Delaunay) For a [set](#) S of points in the Euclidean plane, the unique [triangulation](#) DT(S) of S such that no point in S is inside the circumcircle of any triangle in DT(S). DT(S) is the [dual](#) of the [voronoi diagram](#) of S.

[[FOLDOC](#)]

16-03-2001

Deleuze Gilles

<[history of philosophy, biography](#)> french [philosopher](#) (1925-1995) who used critical interpretations of [Spinoza](#) (Spinoza et le probl me de l' expression / Expressionism in Philosophy: Spinoza, 1968) and [Nietzsche](#) (Nietzsche et la philosophie / Nietzsche and Philosophy, 1962) as the basis for a profound attack on modernist rationality. Like [Foucault](#), [Deleuze](#) was sharply critical of the neo-Freudian psychoanalytic theories of Jacques [Lacan](#). In collaboration with psychoanalyst F lix Guattari, [Deleuze](#) published L' Ant Oedipe (Anti-Oedipus: Capitalism and Schizophrenia) (1972), an extended critique of contemporary political structures, and Qu' este que la philosophie? (What is Philosophy?) (1981). [Deleuze](#) developed his own [theories](#) of meaning and interpretation in Diff rence et r p tition (Difference and Repetition) (1968) and Logique du sens (The Logic of Sense) (1969).

Recommended Reading:

Deleuze: A Critical Reader, ed. by Paul Patton (Blackwell, 1996);
Dorothea Olkowski, Gilles Deleuze and the Ruin of Representation (California, 1999);
Todd May, Reconsidering Difference: Nancy, Derrida, Levinas, and Deleuze (Penn. State, 1997);
Tamsin E. Lorraine, Irigaray & Deleuze: Experiments in Visceral Philosophy (Cornell, 1999);
John Rajchman, The Deleuze Connections (MIT, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

14-11-2001

delta reduction

<[logic](#)> In lambda-calculus extended with constants, delta reduction replaces a function applied to the required number of arguments (a redex) by a result. E.g. plus 2 3 --> 5. In contrast with [beta reduction](#) (the only kind of reduction in the pure lambda-calculus) the result is not formed simply by textual substitution of arguments into the body of a function. Instead, a delta redex is matched against the left hand side of all delta rules and is replaced by the right hand side of the (first) matching rule. There is notionally one delta rule for each possible combination of function and arguments. Where this implies an infinite number of rules, the result is usually defined by reference to some external system such as mathematical addition or the hardware operations of some computer. For other types, all rules can be given explicitly, for example [Boolean](#) negation:

not True = False
not False = True

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16-03-2001

democracy

<[political theory](#)> form of government in which the people rule, either by directly voting on issues ([direct democracy](#)), or indirectly through electing representatives to decide issues ([representative democracy](#)).

[\[Philosophical Glossary\]](#)

22-06-2001

Democritus

<[history of philosophy, biography](#)> [presocratic](#) Greek [philosopher](#) (460-370 BC). As the originator of classical atomism, [Democritus](#) maintained in opposition to the [Eleatics](#) that the universe comprises a plurality of distinct entities that really do move. The haphazard collisions of these individually indestructible atoms, he believed, account for the [formation](#) and dissolution of all observable things. Long before its appropriation by [Epicurus](#), this doctrine produced an attitude toward human life that earned [Democritus](#) a reputation as "the laughing philosopher."

Recommended Reading:

Paul Cartledge, Democritus (Routledge, 1999)
C. C. W. Taylor, The Atomists: Leucippus and Democritus (Toronto, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

14-11-2001

denotation - connotation

<[logic](#), [philosophy of science](#)> Mill' s distinction between the things to which a term refers (its [denotation](#)) and the [meaning](#) of the term (its [connotation](#)). In modern [logic](#), this distinction is often assimilated to the distinction between the [extension](#) and [intension](#) of an expression.

Recommended Reading:

Ermanno Bencivenga, *Logic, Bivalence, and Denotation* (Ridgeview, 1991).

[\[A Dictionary of Philosophical Terms and Names\]](#)

18-11-2001

denotational semantics

<[logic](#)> A technique for describing the meaning of programs in terms of mathematical functions on programs and program components. Programs are translated into functions about which properties can be proved using the standard mathematical theory of functions, and especially [domain theory](#).

Compare axiomatic semantics, [operational semantics](#), [standard semantics](#).

[\[FOLDOC\]](#)

16-03-2001

denumerable set

<[logic](#)> A set whose cardinality is exactly aleph0, for example the set of natural numbers.

[\[Glossary of First-Order Logic\]](#)

16-03-2001

denying the antecedent

<[logic](#), [philosophy of science](#)> a [formal fallacy](#) of the form:

$$\begin{array}{l} p \rightarrow q \\ \sim p \\ \hline \sim q \end{array}$$

Example: "If Rover is a cat, then Rover is a mammal. But Rover is not a cat. So, Rover is not a mammal." Notice the crucial difference between this pattern of reasoning and the valid [Modus Tollens](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

18-11-2001

deontologism

<[ethics](#)> any ethical position claiming that the rightness or wrongness of actions depends on whether they correspond to our [duty](#) or not. The word derives from the Greek word for duty, "deon".

More generally, any kind of ethical theory that puts its emphasis on universal imperatives like moral laws, duties, obligations, prohibitions, and so on (sometimes this is also called "imperativism"). Kantianism is the prime example of a deontological theory, and generally speaking such theories are varieties of [altruism](#). Some thinkers even go so far as to claim that deontology is the extent of ethics, and that any interest in personal happiness or fulfillment is mere [egoism](#) and therefore not a matter for ethical theory.

(References from [altruism](#), [formalism](#), [imperativism](#), and Kantianism.)

Based on [\[The Ism Book\]](#) and [\[Ethics Glossary\]](#)

Edited by Giovanni Benzi

16-03-2001

deontology

<[philosophy](#), [ethics](#), [morality](#), [justice](#)> study of moral necessity, [duty](#), or obligation. A deontological normative theory holds that moral worth is an intrinsic feature of human actions, determined by formal rules of conduct. Thus, deontologists like [Kant](#) suppose that moral obligation rests solely upon [duty](#), without requiring any reference to the practical consequences that dutiful actions may have.

Recommended Reading:

Immanuel Kant, *Grounding for the Metaphysics of Morals*, tr. by James W. Ellington (Hackett, 1993);
 Roger J. Sullivan, *An Introduction to Kant's Ethics* (Cambridge, 1994);
 Philip Stratton-Lake, *Kant, Duty, and Moral Worth* (Routledge, 2001).

See [deontologism](#).

[[A Dictionary of Philosophical Terms and Names](#)]

18-11-2001

derivation

<[logic](#)> A finite, non-empty sequence of [wffs](#) in which the last member is the [wff](#) derived, and each of the others (the premises) is either an axiom, a member of a set of accepted premises, or the result of applying a rule of [inference](#) to [wffs](#) preceding it in the sequence.

Notation: Gamma |- A (the [wff](#) A can be derived from the set of [wffs](#) G).

See [corresponding argument](#), [proof](#)

[Glossary of First-Order Logic]

16-03-2001

Derrida Jacques

<[history of philosophy](#), [biography](#)> french [philosopher](#) and leader of the deconstructionist movement (1930-). From the work of [Husserl](#) and [Heidegger](#), [Derrida](#) derives the view that [meaning](#) emerges only provisionally, from an endless process of re-interpretation based on the interaction between reader and [text](#). In *La Voix et le phÉnomÈne* (Speech and Phenomena) (1967), *L'écriture et la différence* (Writing and Difference) (1967), *De la Grammatologie* (Of Grammatology) (1967), and *La DissÉmination* (Dissemination) (1972), [Derrida](#) argues that all dichotomies between subject and object or appearance and reality are ultimately untenable.

Recommended Reading:

A Derrida Reader, ed. by Peggy Kamuf (Columbia, 1991);
Deconstruction in a Nutshell: A Conversation With Jacques Derrida, ed. by John D. Caputo (Fordham, 1997);
Deconstruction and Philosophy: The Texts of Jacques Derrida, ed. by John Sallis (Chicago, 1989);
 Geoffrey Bennington, *Interrupting Derrida* (Routledge, 2000);
 Todd May, *Reconsidering Difference: Nancy, Derrida, Levinas, and Deleuze* (Penn. State, 1997);
 Christopher Johnson, *Derrida* (Routledge, 1999);
Feminist Interpretations of Jacques Derrida, ed. by Nancy J. Holland (Penn. State, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

14-11-2001

Descartes Rene

<[history of philosophy, biography](#)> after receiving a sound education in mathematics, classics, and law at La Fleche and Poitiers, Rene [Descartes](#) (1596-1650) embarked on a brief career in military service with Prince Maurice in Holland and Bavaria. Unsatisfied with scholastic philosophy and troubled by [skepticism](#) of the sort expounded by [Montaigne](#), [Descartes](#) soon conceived a comprehensive plan for applying mathematical methods in order to achieve perfect certainty in human knowledge. During a twenty-year period of secluded life in Holland, he produced the body of work that secured his philosophical reputation. [Descartes](#) moved to Sweden in 1649, but did not survive his first winter there.

Although he wrote extensively, [Descartes](#) chose not to publish his earliest efforts at expressing the universal method and deriving its consequences. The *Regulae ad directionem ingenii* (Rules for the Direction of the Mind) (1628) contain his first full statement of the principles underlying the method and his confidence in the success of their application. In *Le Monde* (The World) (1634), [Descartes](#) clearly espoused a Copernican astronomy, but he withheld the book from the public upon learning of Galileo's condemnation. [Descartes](#) finally presented (in French) his rationalist vision of the progress of human knowledge in the *Discours de la mÈthode pour bien conduire sa Raison et chercher la Verite dans les Sciences* (Discourse on Method) (1637). In this expository essay, [Descartes](#) assessed the deficient outcomes of a traditional education, proposed a set of rules with which to make a new start, and described the original experience upon which his hope for unifying human knowledge was based. The final sections of the Discourse and the essays (on dioptric, meteors, and geometry) appended to it illustrate the consequences of employing this [method](#). A few years later, [Descartes](#) offered (in Latin) a more formal exposition of his central tenets in *Meditationes de Prima Philosophia* (Meditations on First Philosophy) (1641). After an expanded statement of the [method](#) of doubt, he argued that even the most dire [skepticism](#) is overcome by the certainty of one's own existence as a thinking thing. From this beginning, he believed it possible to use our clear and distinct ideas to demonstrate the existence of [god](#), to establish the reliability of our [reason](#) generally despite the possibility of error, to deduce the essence of body, and to prove that material things do exist. On these grounds, [Descartes](#) defended a strict [dualism](#), according to which the mind and body are wholly distinct, even though it seems evident that they interact. The *Meditations* were published together with an extensive set of objections (by [Hobbes](#), [Gassendi](#), [Arnauld](#), and others) and [Descartes'](#) s replies. [Descartes](#) later attempted a more systematic exposition of his views in the *Principia Philosophiae* (Principles of Philosophy) (1644) and an explanation of human emotion in *Les Passions de L' Ame* (The Passions of the Soul).

Recommended Reading:

Primary sources:

Oeuvres de Descartes, ed. by C. Adam and P. Tannery (Cerf, 1896-1913);
 The Philosophical Works of Descartes, tr. by E. S. Haldane and G. T. R. Ross. (Cambridge, 1968);
 The Philosophical Writings of Descartes: The Correspondence, ed. by John Cottingham, et. al. (Cambridge, 1991);
 Rene Descartes, Discourse on Method and Meditations on First Philosophy, tr. by Donald A. Cress (Hackett, 1999);
 The Philosophical Writings of Descartes, tr. by John Cottingham Robert Stoothoff, and Dugald Murdoch (Cambridge, 1985);
 René Descartes, Philosophical Essays and Correspondence, ed. by Roger Ariew (Hackett, 2000);
 René Descartes, The World and Other Writings, ed. by Stephen Gaukroger (Cambridge, 1998);
 Rene Descartes, Discourse De La Methode / Discourse on the Method (Bilingual Edition), ed. by George Heffernan (Notre Dame, 1994);
 Rene Descartes, Meditationes De Prima Philosophia / Meditations on First Philosophy (Bilingual Edition), ed. by George Heffernan (Notre Dame, 1990).

Secondary sources:

The Cambridge Companion to Descartes, ed. by John Cottingham (Cambridge, 1992);
 Marjorie Grene, Descartes (Hackett, 1998);
 Anthony Kenny, Descartes: A Study of His Philosophy (St. Augustine, 1993);
 Margaret Dauler Wilson, Ideas and Mechanism (Princeton, 1999);
 Feminist Interpretations of Rene Descartes, ed. by Susan Bordo (Penn. State, 1999);
 John Cottingham, Descartes (Routledge, 1999);
 George Dicker, Descartes: An Analytical and Historical Introduction (Oxford, 1993);
 Daniel Garber, Descartes Embodied: Reading Cartesian Philosophy Through Cartesian Science (Cambridge, 2001);
 Martial Gueroult, Descartes' Philosophy Interpreted according to the Order of Reasons, tr. by Roger Ariew (i two volumes) (Minnesota, 1984);
 E. M. Curley, Descartes Against the Skeptics (Iuniverse, 1999);
 Daniel Garber, Descartes' Metaphysical Physics (Chicago, 1992).

Additional on-line information about Descartes includes:

Detailed lessons on Descartes from Alistair Lyall and Seonaid Woodburn.
 John Cottingham's article in The Oxford Companion to Philosophy.

Also see: animal spirits, Cartesianism, certainty, cogito ergo sum, doubt, dualism, foundationalism, French philosophy, human nature, ideas, arguments from illusion, innate ideas, the malin genie, philosophy of mathematics, mechanism, mentality, metaphysics, philosophy of mind, the mind-body problem, modernism, the pineal gland, primary and secondary qualities, rationalism, the representative theory of perception, res cogitans, skepticism, and thinking.

Kurt Smith's article on Descartes' s life and works in The Stanford Encyclopedia of Philosophy.
 Lex Newman's article on Descartes' s epistemology in The Stanford Encyclopedia of Philosophy.
 A thorough article in The Internet Encyclopedia of Philosophy.
 The article in the Columbia Encyclopedia at Bartleby.com.

A section on Descartes from Alfred Weber' s history of philosophy.
 The thorough collection of resources at EpistemeLinks.com.
 Adriane Baillet' s La Vie de M. Descartes.
 Stephen H. Daniel' s discussion of Cartesian epistemology.
 Snippets from Descartes (French, Latin, and English) in The Oxford Dictionary of Quotations.
 Clodius Piat' s discussion in The Catholic Encyclopedia.
 A paper on Cartesian dualism by Zuraya Monroy-Nasr.
 Robert Tremblay' s discussion at Encephi (in French).
 A discussion of eternal truths from Floy E. Andrews.
 A paper by Juan Carlos Moreno Romo on the Cartesian Circle.
 Eric Weisstein' s discussion at Treasure Trove of Scientific Biography.
 Discussions of mathematical contributions at Mathematical MacTutor.
 An entry in The Oxford Dictionary of Scientists.
 The Bloomsbury Guide to Human Thought on The Cartesian Co-ordinate System.
 David Wilkins, Björn Christensson' s brief guide to Descartes.
 A brief entry in The Macmillan Encyclopedia 2001.

[\[A Dictionary of Philosophical Terms and Names\]](#)

14-11-2001

descent function

If a [recursive](#) function is of the form

$$f(x) = \dots f(d(x)) \dots$$

then d is known as the descent function.

[\[FOLDOC\]](#)

16-03-2001

descriptive ethics

<[philosophy](#), [ethics](#), [morality](#), [justice](#)> branch of [ethics](#) that non-judgmentally examines the moral tenets of a particular society or tradition, analyzing the logical relations among them and observing the extent of their application in practice.

Recommended Reading:

May M. Edel and Abraham Edel, Anthropology & Ethics: The Quest for Moral Understanding (Transaction, 2000);

Hunter Lewis, A Question of Values: Six Ways We Make the Personal Choices That Shape Our Lives (Axios, 2000);

The Book of Virtues: A Treasury of Great Moral Stories, ed. by William J. Bennett (Touchstone, 1996).

[\[A Dictionary of Philosophical Terms and Names\]](#)

18-11-2001

descriptivism

<[ethics](#)> the view that ethics is purely descriptive and should never prescribe actions or values. The most famous proponents of this view were David [Hume](#) and, in the political sphere, Machiavelli. The opposing view is called [prescriptivism](#).

[\[The Ism Book\]](#)

Edited by Giovanni Benzi

16-03-2001

design

<[process](#)> The approach that engineering (and some other) disciplines use to specify how to create or do something. A successful design must satisfies a (perhaps informal) [functional specification](#) (do what it was designed to do); conforms to the limitations of the target medium (it is possible to implement); meets implicit or explicit requirements on performance and resource usage (it is efficient enough).

A design may also have to satisfy restrictions on the design process itself, such as its length or cost, or the tools available for doing the design.

In the software life-cycle, design follows [requirements analysis](#) and is followed by implementation.

[["Object-Oriented Analysis and Design with Applications"](#), 2nd ed., Grady Booch].

[[FOLDOP](#)]

16-03-2001

design - argument from

<[teleology](#), [god](#), [metaphysics](#), [religion](#)> belief that the operation of the universe evidences its providential origin.

See [teleological argument](#).

[[A Dictionary of Philosophical Terms and Names](#)]

18-11-2001

determinable - determinate

<[logic](#), [philosophy of science](#)> relative terms for general predicates and particular instances that are not (like the species of a common genus) distinguishable by differentiae. Thus, for example, "red," "yellow," "orange," and "maroon" are all determinates of the determinable "color."

[[A Dictionary of Philosophical Terms and Names](#)]

18-11-2001

determinism

<[metaphysics](#), [epistemology](#), [philosophy of science](#), [epicureism](#)> <[hard determinism](#), [compatibilism](#), [libertarianism](#), [ontology](#)> the position according to which all physical events and human actions are determined or settled (by external forces) before they happen. In other words, determinists deny the existence of freely chosen human activity, and the more consistent determinists even deny any personal responsibility for human actions. Determinists are usually, in fact almost exclusively, adherents of [materialism](#) although there are social or economic determinists also, especially those influenced by Marxism. Determinism means pretty much the same thing in practice as it does in philosophical theory, except that popularly it has connotations of [fatalism](#). In some technical discussions determinism is called [necessitarianism](#), the opposite of which is [libertarianism](#).

(References from [automatism](#), [fatalism](#), [historical determinism](#), [indeterminism](#), [libertarianism](#), [materialism](#), [necessitarianism](#), [physicalism](#), [reductionism](#), and [vitalism](#).)

Based on [[The Ism Book](#)]

Edited by Giovanni Benzi

16-03-2001

deterministic

1. <[probability](#)> Describes a system whose time evolution can be predicted exactly.

Contrast [probabilistic](#).

2. <[algorithm](#)> Describes an [algorithm](#) in which the correct next step depends only on the current state. This contrasts with an algorithm involving [backtracking](#) where at each point there may be several possible actions and no way to chose between them except by trying each one and backtracking if it fails.

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16-03-2001

deterministic automaton

<[logic](#)> A finite-state automaton in which the overall course of the computation is completely determined by the program, the starting state, and the initial inputs. The class of problems solvable by such automata is the class P (see polynomial-time algorithm).

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16-03-2001

Dewey John

<[history of philosophy, biography](#)> educated in his native Vermont and at Johns Hopkins University, John [Dewey](#) (1859-1952) enjoyed a lengthy career as an educator, psychologist, and [philosopher](#). He initiated the progressive laboratory school at the University of Chicago, where his reforms in methods of education could be put into practice. As a professor of [philosophy](#), [Dewey](#) taught at Michigan, Chicago, and Columbia University. He was instrumental in founding the American Association of University Professors as a professional organization for post-secondary educators.

Drawn from an idealist background by the pragmatist influence of [Peirce](#) and [James](#), [Dewey](#) became an outstanding exponent of philosophical naturalism. Human thought is understood as practical problem-solving, which proceeds by testing rival hypotheses against experience in order to achieve the "warranted assertability" that grounds coherent action. The tentative character of scientific inquiry makes [Dewey](#)' [sepistemology](#) thoroughly fallibilistic: he granted that the results of this process are always open to criticism and [revision](#), so that nothing is ever finally and absolutely true. This approach provides a significant opportunity for progress in [morality](#) and education, however. In "Logical Conditions of a Scientific Treatment of Morality" (1903), for example, [Dewey](#) tried to show how moral precepts develop and function as confirmable hypotheses. *Democracy and Education* (1916) describes in detail how an ability to respond creatively to continual changes in the natural order vitally provides for individual and community life. [Dewey](#)' s social theories shaped during hi long association with George Herbert [Mead](#).

Recommended Reading:

Primary sources:

John Dewey, Works (Southern Illinois, 1967-);

The Essential Dewey: Ethics, Logic, Psychology, ed. by Thomas M. Alexander and Larry A. Hickman (Indiana, 1998);

John Dewey, *Democracy and Education: An Introduction to the Philosophy of Education* (Simon & Schuster, 1997);

John Dewey, *Experience and Nature* (Dover, 1958); John Dewey, *How We Think* (Prometheus, 1991).

Secondary sources:

The Philosophy of John Dewey, ed. by John J. McDermott (Chicago, 1981);

Reading Dewey: Interpretations for a Postmodern Generation, ed. by Larry Hickman (Indiana, 1998);

Sidney Hook and Richard Rorty, *John Dewey: An Intellectual Portrait* (Prometheus, 1995);

Jennifer Welchman, *Dewey' s Ethical Thought* (Cornell, 1997).

Additional on-line information about Dewey includes:

Richard Field' s detailed article in The Internet Encyclopedia of Philosophy.

Karen Hanson' s article in The Oxford Companion to Philosophy.

Also see: American philosophy, philosophy of education, philosophy of mind, the pragmatic theory of truth, and pragmatism.

The thorough collection of resources at EpistemeLinks.com.

The article in the Columbia Encyclopedia at Bartleby.com.

Charles Lowney on Dewey' s pragmatism.

Suzanne Rice on educational implications of Dewey' s concept of virtue.

News from The Center for Dewey Studies.

A paper on Dewey' s individualism from S. Scott Zeman.
 A brief entry in The Macmillan Encyclopedia 2001.
 A short article in Oxford' s Who' s Who in the Twentieth Century.

[\[A Dictionary of Philosophical Terms and Names\]](#)

14-11-2001

dialectic

<[philosophy](#), [history of philosophy](#), [philosophical inquiry](#)> process of thinking by means of dialogue, discussion, debate, or [argument](#).

In ancient Greece, the term was used literally. [Parmenides](#) and the other [Eleatics](#) used such methods to defend paradoxical claims about the natural world. [Dialectic](#) is questioning and conversation for [Socrates](#), but [Plato](#) regarded it as a systematic method for studying the [Forms](#) of suprasensible reality. Although he frequently employed dialectical methods in his own writing, [Aristotle](#) maintained that it is inferior to the careful logical reasoning that aims at [theoretical knowledge](#) (Gk. epistḗmē).

German philosophers of the modern era applied the term "[dialectic](#)" only to more narrowly-defined patterns of thinking. Thus, [Kant](#)' s "Transcendental Dialectic" is an attempt to show the general futility of abstract metaphysical speculation, but [dialectic](#) is, for [Hegel](#), the fundamental process of development - in both [thought](#) and [reality](#) - from [thesis](#) to [antithesis](#) to [synthesis](#).

Recommended Reading:

F. E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967);
 Francisco J. Gonzalez, Dialectic and Dialogue: Plato' s Practice of Philosophical Inquiry (Northwestern, 1998);
 Hans-Georg Gadamer, Dialogue and Dialectic: Eight Hermeneutical Studies on Plato, tr. by P. Christopher Smith (Yale, 1983);
 Howard P. Kainz, Paradox, Dialectic, and System: A Contemporary Reconstruction of the Hegelian Problematic (Penn. State, 1988);
 Hans-Georg Gadamer, Hegel' s Dialectic, tr. by P. Christopher Smith (Yale, 1982);
 Richard Norman and Sean Sayers, Hegel, Marx and Dialectic: A Debate (Humanities, 1980).

[\[A Dictionary of Philosophical Terms and Names\]](#)

18-11-2001

dialectical materialism

<[metaphysics](#), [political philosophy](#), [philosophy of history](#)> the doctrine or theory of history espoused by Marxism. Literally (i.e., in ancient Greek), "[dialectic](#)" means dialogue or conversation, but the [Hegelian](#) understanding of dialectic posits the progression of history in determined stages. The materialist aspect of Marxism replaced Hegel' s collective [consciousness](#) (see [Hegelianism](#)) with the concept of economic classes. Thus dialectical materialism is the doctrine that history progresses in stages that are based solely on the supremacy of different economic classes: feudalism replaced aristocracy, [capitalism](#) replaced feudalism, and socialism or [communism](#) will replace capitalism - all according to inexorable, immutable laws (see [historical determinism](#)).

(References from [historical determinism](#) and [Marxism](#).)

Based on [\[The Ism Book\]](#)

Edited by Giovanni Benzi

16-03-2001

dianoia

<[gnoseology](#), [philosophy of science](#)> greek term used by [Plato](#) to signify [understanding](#) or intellectual activity as a discursive process, in contrast with the immediate apprehension characteristic of [noesis](#). In the taxonomy of [Aristotle](#), [dianoia](#) includes both the theoretical epistēmē and the more practical [technē](#).

Recommended Reading: F. E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967).

[\[A Dictionary of Philosophical Terms and Names\]](#)

18-11-2001

Dictionary of Philosophy of Mind

<source> [the Dictionary of Philosophy of Mind](#) edited by Chris Eliasmith, Philosophy Department, Washington University in St. Louis.

From the home page "This dictionary is intended as a free resource for all those interested in the [philosophy of mind](#). The dictionary has a policy of blind peer review for all submissions to the dictionary. Advisory, editorial and review boards have been established. For more information on copyright, editorial policy, or submission guidelines see the [submission information page](#)."

Many definitions in FOLDOP are from the version published in 2001-02-27. Whenever an entry was edited by a specific author, the name is indicated.

Chris Eliasmith - [the Dictionary of Philosophy of Mind](#)

16-03-2001

Diderot Denis

<history of philosophy, biography> french [philosopher](#) who edited the Encyclopédie. [Diderot](#) (1713-1784) promoted [Locke](#)' s thought in France through his *Pensées sur l' interprétation de la nature* (1746) and *Lettre sur le aveugles* (Essay on Blindness) (1749). In his later years, [Diderot](#) wrote essays and plays expressing favored Enlightenment themes, including [atheism](#) and [social contract theory](#).

Recommended Reading:

Denis Diderot, Selected Philosophical Writings (Greenwood, 1987);

Denis Diderot, Rameau' s Nephew, and Other Works, tr. by Jacques Barzun and Ralph H. Bowen (Hackett 2001);

Denis Diderot, Thoughts on the Interpretation of Nature and Other Philosophical Works (Clinamen, 2000);

Diderot' s Early Philosophical Works (Open Court, 1970).

[\[A Dictionary of Philosophical Terms and Names\]](#)

14-11-2001

Difference Engine

<computer, history> Charles Babbage' s design for the first automatic mechanical calculator. The Difference Engine was a special purpose device intended for the production of mathematical tables. Babbage started work on the Difference Engine in 1823 with funding from the British Government. Only one-seventh of the complete engine, about 2000 parts, was built in 1832 by Babbage' s engineer, Joseph Clement. This was demonstrated successfully by Babbage and still works perfectly. The engine was never completed and most of the 12,000 parts manufactured were later melted for scrap.

It was left to Georg and Edvard Schuetz to construct the first working devices to the same design which were successful in limited applications. The Difference Engine No. 2 was finally completed in 1991 at the Science Museum, London, UK and is on display there.

The engine used gears to compute cumulative sums in a series of registers: $r[i] := r[i] + r[i+1]$. However, the addition had the side effect of zeroing $r[i+1]$. Babbage overcame this by simultaneously copying $r[i+1]$ to a temporary register during the addition and then copying it back to $r[i+1]$ at the end of each cycle (each turn of a handle).

Difference Engine at the Science Museum

(<http://www.nmsi.ac.uk/on-line/treasure/plan/2ndcomp.htm#babbage>).

[\[FOLDOP\]](#)

16-03-2001

difference equation

<[mathematics](#)> A relation between consecutive elements of a sequence. The first difference is

$$D u(n) = u(n+1) - u(n)$$

where $u(n)$ is the n th element of sequence u . The second difference is

$$\begin{aligned} D^2 u(n) &= D (D u(n)) \\ &= (u(n+2) - u(n+1)) - (u(n+1) - u(n)) \\ &= u(n+2) - 2u(n+1) + u(n) \end{aligned}$$

And so on. A recurrence relation such as

$$u(n+2) + a u(n+1) + b u(n) = 0$$

can be converted to a difference equation (in this case, a second order linear difference equation):

$$D^2 u(n) + p D u(n) + q u(n) = 0$$

and vice versa. a, b, p, q are constants.

[[FOLDOC](#)]

16-03-2001

difference method of

<[logic](#), [philosophy of science](#)> one of [Mill](#)'s Methods for discovering causal relationships. If an antecedent circumstance is present only on those occasions when a [phenomenon](#) occurs, it may be inferred to be the [cause](#) of that [phenomenon](#).

Example: "Levi and Jarod lived in the same house and were both exposed to the same children at daycare, but only Levi, who also plays T-ball, caught the measles. So Levi probably caught the measles from one of his teammates."

Recommended Reading: John Stuart Mill, System of Logic (Classworks, 1986).

[[A Dictionary of Philosophical Terms and Names](#)]

18-11-2001

difference of sets

<[logic](#)> The difference of set B from set A is the set of all members of A that are not also members of B .

Notation: $A-B$, or AB .

$$A-B = \text{df } x : (x : A) \wedge (x \notin B)$$

[Glossary of First-Order Logic]

16-03-2001

digital

<[data](#)> A description of [data](#) which is stored or transmitted as a sequence of discrete symbols from a finite set, most commonly this means [binary](#) data represented using electronic or electromagnetic signals.

The opposite is [analogue](#).

[[FOLDOC](#)]

16-03-2001

dike

<[philosophy](#), [ethics](#), [justice](#)> greek term for legal compensation or justice; the corresponding human virtue of being just is dikaiosunē. According to [Plato](#), justice in this sense is best exemplified by harmonious relations in the ideal state.

[Aristotle](#), on the other hand, focussed primarily upon the equitable distribution of goods in a properly-run city.

Recommended Reading:

F. E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967);

Eric Alfred Havelock, The Greek Concept of Justice: From Its Shadow in Homer to Its Substance in Plato (Harvard, 1978);

Richard D. Parry, Plato's Craft of Justice (SUNY, 1996) .

[\[A Dictionary of Philosophical Terms and Names\]](#)

18-11-2001

dilemma

<[ethics](#), applied ethics, [logic](#)> a difficult choice between equally undesirable alternatives. In a disadvantageous rhetorical position, one is said to be impaled on the horns of a [dilemma](#), but logicians employ Constructive Dilemma as a rule of inference.

Recommended Reading:

Howard Kahane and Nancy Cavender, Logic and Contemporary Rhetoric (Wadsworth, 1997)

Douglas N. Walton, Informal Logic: A Handbook for Critical Argumentation (Cambridge, 1989).

[\[A Dictionary of Philosophical Terms and Names\]](#)

19-11-2001

Dilthey Wilhelm

<[history of philosophy](#), [biography](#)> german [philosopher](#) (1833-1911) who derived from the [thought](#) of [Kant](#) a conception of [philosophical](#) study as one of the social sciences in Einleitung in die Geisteswissenschaften (Introduction to the Human Sciences) (1883). Metaphysical speculation in particular, [Dilthey](#) held in Die Typen der Weltanschauung (1912), is an expression of the world-view of one's culture rather than a timeless expression of perfect rationality.

Recommended Reading:

Wilhelm Dilthey, ed. by Frithjof Rodi and Rudolf A. Makkreel (Princeton, 1996);

Rudolf A. Makkreel, Dilthey (Princeton, 1992);

Richard E. Palmer, Hermeneutics: Interpretation Theory in Schleiermacher, Dilthey, Heidegger and Gadamer (Northwestern, 1969).

[\[A Dictionary of Philosophical Terms and Names\]](#)

14-11-2001

dimaris

<[logic](#), [philosophy of science](#)> name given by medieval logicians to any [categorical syllogism](#) whose standard form is IAI-4.

Example: Some beloved household pets are golden retrievers, and since all golden retrievers are dogs, it must follow that some dogs are beloved household pets. This is one of only fifteen forms of syllogistic reasoning that are always [valid](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

19-11-2001

ding an sich

<[philosophy](#),[metaphysics](#), [ontology](#)> german phrase for thing in itself.

[[A Dictionary of Philosophical Terms and Names](#)]

19-11-2001

Diogenes

<[history of philosophy](#),[biography](#)> greek [philosopher](#) (400-325 BC). As one of the original Cynics, [Diogenes](#) both preached and practiced a life of complete self-sufficiency, utter simplicity, and total disregard for the conventional morality of what he took to be a corrupt human society. [Diogenes](#) was the teacher of [Zeno of Citium](#).

Recommended Reading:

The Cynics: The Cynic Movement in Antiquity and Its Legacy, ed. by R. Bracht Branham and Marie Odile Goulet-Caze (California, 2000)

D. R. Dudley, A History of Cynicism (Ares, 1980).

[[A Dictionary of Philosophical Terms and Names](#)]

19-11-2001

Diophantine equation

<[mathematics](#)> Equations with [integer](#) coefficients to which integer solutions are sought. Because the results are restricted to integers, different [algorithms](#) must be used from those which find [real](#) solutions.

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16-03-2001

direct realism

<[gnoseology](#), [perception](#), [philosophy of science](#), [epistemology](#)> theory of perception according which we perceive material objects directly, without the mediation of [ideas](#) or sensory representations. Although it is also called "naïve" [realism](#), this view often requires a sophisticated defence, especially in its attempts to account for the occurrence of hallucinations and perceptual error.

Recommended Reading:

Thomas Reid, An Inquiry into the Human Mind on the Principles of Common Sense, ed. by Derek Brookes (Penn. State, 2001);

H. H. Price, Perception (Greenwood, 1982);

Moltke S. Gram, Direct Realism: A Study of Perception (Nijhoff, 1983).

[[A Dictionary of Philosophical Terms and Names](#)]

19-11-2001

directed graph

(digraph) A graph with one-way edges.

See also directed acyclic graph.

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16-03-2001

directed set

<logic> A **set** X is directed under some **relation**, \leq (less than or equal), if it is non-empty and if for any two elements x and y there exists an element z such that $x \leq z$ and $y \leq z$. I.e. all pairs have an **upper bound**.

[[FOLDOP](#)]

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directive use of language

<philosophy, linguistics> communication that aims to bring about or to forestall the performance of some action.

Example: "Don' t forget to take out the trash."

[[A Dictionary of Philosophical Terms and Names](#)]

19-11-2001

disamis

<logic, philosophy of science> name given by medieval logicians to a **categorical syllogism** whose standard form may be designated as IAI-3.

Example: Some nutritious dinners are vegetarian delights, and all nutritious dinners are well-rounded meals, so some well-rounded meals are vegetarian delights. This is one of fifteen forms in which any **syllogism** is **valid**.

[[A Dictionary of Philosophical Terms and Names](#)]

19-11-2001

discriminated union

<logic> The discriminated union of two sets A and B is

$$A + B = (\text{in}A, a) \mid a \text{ in } A \cup (\text{in}B, b) \mid b \text{ in } B$$

where $\text{in}A$ and $\text{in}B$ are arbitrary tags which specify which summand an element originates from.

A **type** (especially an **algebraic data type**) might be described as a discriminated union if it is a sum type whose objects consist of a tag to say which part of the union they belong to and a value of the corresponding type.

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16-03-2001

disjoint sets

<logic> Two sets are disjoint **iff** they share no members, i.e. **iff** their intersection is the null set.

[Glossary of First-Order Logic]

16-03-2001

disjoint union

In **domain theory**, a union (or sum) which results in a domain without a least element.

16-03-2001

disjunct[disjunction](#)

29-02-2004

disjunction

<logic> A truth [function](#) that is true when one or the other of its components (called disjuncts) is true, and false otherwise. Also the connective denoting this [function](#); also the compound proposition built from this connective.

Exclusive disjunction

One or the other of the disjuncts is true, but not both.

Notation: no standard symbol, but the concept is accurately captured thus:

p
/=<=> q
(negation of material equivalence).

Inclusive disjunction

One or the other or both of the disjuncts is true.

Notation: p v q.

[\[Glossary of First-Order Logic\]](#)

disjunctive normal form (DNF)

<logic> The form of a of truth-functional compound when it is expressed as a series of disjuncts when each disjunct is either a simple proposition or the conjunction of simple propositions and the [negations](#) of simple propositions.

E.g. the DNF of (A or B) and C is (A and C) or (B and C).

[\[Glossary of First-Order Logic\]](#) and [\[FOLDOC\]](#)

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disjunctive syllogism<logic, [philosophy of science](#)> a rule of inference of the form:

p v q
~ p

q

Example: "Either Ellen brought him to the party or eith did. But Ellen didn' t. So, Keith brought him to the party. The validity of this pattern of reasoning is evident from a simple truth-table.

[\[A Dictionary of Philosophical Terms and Names\]](#)

19-11-2001

disposition

<[philosophy of science](#)> a tendency or propensity to respond in specific ways to particular circumstances. Things are commonly supposed to have dispositional features only in virtue of their possession of intrinsic or non-dispositional properties. Thus, for example, sugar is soluble in water (even when it is not in water) because of its chemical composition. [Ryle](#) maintained that mental states can be wholly analyzed as dispositions of human bodies.

Recommended Reading:

Gilbert Ryle, The Concept of Mind (Chicago, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

19-11-2001

distributed memory

<architecture> The kind of memory in a [parallel processor](#) where each processor has fast access to its own local memory and where to access another processor' s memory it must send a message via the inter processor network.

Opposite: shared memory.

[FOLDOC]

16-03-2001

distributed representation

<philosophy of mind> a distributed [representation](#) is one in which [meaning](#) is not captured by a single [symbolic](#) unit, but rather arises from the [interaction](#) of a [set](#) of units, normally in a [network](#) of some sort.

The concept of distributed representation is a product of joint developments in the neurosciences and in connectionist work on recognition tasks (Churchland and Sejnowski 1992). Fundamentally, a distributed representation is one in which meaning is not captured by a single symbolic unit, but rather arises from the interaction of a set of units, normally in a network of some sort. In the case of the brain, the concept of "grandmother" does not seem to be represented by a single "grandmother cell" but is rather distributed across a network of [neurons](#) (Churchland and Sejnowski 1992). This method of representation stands in direct opposition to the [symbolic representation](#) used by adherents of classical [artificial intelligence](#).

To introduce distributed representations concisely it is helpful to contrast them with the more familiar symbolic representations. Symbolic representations are the easiest for us, as language users, to understand and apply. A symbol, such as a word or a number, is an everyday occurrence for most of humankind. For instance, each word contained in this entry is a symbolic representation of a particular meaning associated with that word. These symbols are joined into propositions based on the [rules](#) of a grammar. Of course, symbols are not restricted to being words or numbers, but this is their most common application in classical [AI](#). From [computational](#), psychological, and neurological standpoints, there are a number of shortcomings in using purely symbolic representations in modelling human behaviour. I will briefly examine three of the more important limitations of symbolic representation that serve to distinguish them from distributed representations.

First, symbolic representations are strongly propositional. Thus, when this method of representation is used in non-language based applications such as image processing it becomes extremely difficult to explain many psychological findings. Similarly, taste, sound, touch, and smell are very awkward to handle with symbolic representations. In contrast, distributed representations are equally well suited to all modes of perception.

Second, symbolic representations are "all-or-none". This means that there is no such thing as the degradation of a symbolic representation, it is either there, or it is not there; this property is referred to as brittleness. The brittleness of symbolic representations is highly psychologically unrealistic. People often exhibit behaviour that indicates partial retrieval of representations, as in the "tip-of-the-brain" recall, prosopagnosia (loss of face recognition), and image completion. Furthermore, minor damage to a symbolic conceptual network causes loss of entire concepts, whereas a distributed network loses [accuracy](#), as people do, not entire concepts (Churchland and Sejnowski 1992).

Third, symbolic representations are not, in themselves, statistically sensitive. In other words, they are not constructed based on statistical regularities found in the environment. Therefore, symbolic representations are not amenable to modelling low-level perception. This sort of low-level perceptual learning seems to be common to all animals, and is an important part of human development. It is the case, however, that though symbolic representations are not statistically sensitive, they are superbly structurally sensitive. To many, this had seemed a reasonable trade-off in light of structurally insensitive alternatives. However, with the more recent development of distributed representations that exhibit both structural and statistical sensitivity, this trade-off is no longer as justifiable.

With these limitations in mind, many cognitive scientists have found distributed representations very appealing. Though distributed representations are a far less intuitive form of representation, the advantages they provide easily outweigh the difficulty in initially understanding them. In order to minimize a reliance on a technical description of distributed representations, I have constructed an [analogy](#) which will aid in explaining distributed representations in general. The [analogy](#) is this: imagine all of your concepts are mapped to the surface of a sphere - a conceptual golf ball, if you will. Each concept is nestled in a dimple on surface of the golf ball. The more similar two concepts are, the closer together they will be on the surface of the golf ball. Also, the distance from the centre of the golf ball to any particular dimple (i.e. concept) is approximately the same. The easiest way to identify the position of a concept on the surface of the ball is to provide its coordinates. These coordinates are in the units of "golf ball radii" and are continuous real values. Such a set of coordinates is commonly referred to as a vector. In order for us, as symbol users, to distinguish this vector from others, we assign it a tag e.g. "cherub". Thus, the vector (0.5, 0.5, 0.707) may be used to represent the position of the "cherub" dimple on the surface of the conceptual golf ball. Such a representation of "cherub" is a distributed representation, because the "cherub" dimple can only be located through knowing all three values. Thus, the concept of "cherub" is shared, or distributed, across the three dimensions of the golf ball' s coordinate system. Notably, a dimple on a golf ball is not a single point, rather it is a collection of points which are in proximity on the surface of the sphere. This makes the dimple particularly appealing as an analog for a concept for the following reasons:

1) A prototype for a concept could be considered to be the centre of the dimple.

2) Multiple vectors define the dimple/concept' s boundaries; thus it is a collection of examples. Typically, these "boundary" concepts would be specific examples which the cognizer had observed from its environment.

3) Because of 2, the prototype for a concept would not be defined by one particular example, but rather a superposition of all available examples of the concept.

However, as with any [analogy](#), there are a number of issues which may be obscured or inadequately addressed by the conceptual golf ball [analogy](#). For instance, when equating concepts to dimples, we must realize that it is misleading to think of concepts as being defined by a static circular boundary as a dimple is. Rather, conceptual boundaries may be dynamic, oddly shaped, "fuzzy", and possibly not even contiguous. Furthermore, such boundaries do not delineate two or three dimensional figures but rather some n-dimensional figures where n is possibly in the thousands or even millions. As we are equating a three dimensional golf ball to an n-dimensional hypersphere, it is important to bear in mind the limitations of such a simplification.

In the introduction to this discussion, I noted that much of the reason researchers were motivated to look for alternate forms of representation was due to the failings of symbolic representations. In particular we discussed the propositional, brittle, and statistical insensitivity nature of symbolic representations. Distributed representations do not fall prey to these short-comings. Rather, distributed representations:

1) Are the natural result of organisation of statistical input and thus provide a natural means to capturing semantic information (Smolensky 1995);

2) Have been successfully applied to visual, olfactory, auditory and tactile problems;

3) Have been proved to degrade gracefully with [noise](#) and are commonly tested with simulated lesions (i.e. a removal of part of the representation).

Furthermore, distributed representations have a number of properties which lend significant psychological and neurological plausibility to models employing them. In many instances distributed representations:

1) Represent concepts continuously;

2) Can be processed in parallel (see [parallel processing](#);

3) Can be learned using proven methods (Hinton 1986).

These powerful properties, coupled with the ability of distributed representations to overcome important short-comings of symbolic representation provide a solid foundation for realistic computational models of human cognition.

References

Connectionist Representation Biblio (<http://ling.ucsc.edu/~chalmers/biblio4.html#4.3b?>)

Churchland, P. S. and T. Sejnowski (1992). The computational brain. Cambridge, MA, MIT Press.

Hinton, G. E. (1986). Learning distributed representations of concepts. Eighth Conference of the Cognitive Science Society, Lawrence Erlbaum Associates.

Smolensky, P. (1995). Computational models of mind. A companion to the philosophy of mind. Cambridge, MA, Blackwell.

Chris Eliasmith - [\[Dictionary of Philosophy of Mind\]](#) Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

distributed system

<[logic](#)> A collection of (probably heterogeneous) automata whose distribution is transparent to the user so that the system appears as one local machine. This is in contrast to a network, where the user is aware that there are several machines, and their location, storage replication, load balancing and functionality is not transparent. Distributed systems usually use some kind of client-server organisation.

Distributed systems are considered by some to be the "next wave" of computing.

Distributed Computing Environment is the [Open Software Foundation](#)' s software architecture for distribute systems.

(http://www.dstc.edu.au/AU/research_news/dist-env.html)

[\[FOLDOP\]](#)

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distributed systems[distributed system](#)

29-02-2004

distribution of terms

<[logic](#), [philosophy of science](#)> a feature that categorical terms come to have by virtue of their use in a specific [categorical proposition](#). The term is [distributed](#) if the [proposition](#) refers to every member of the class it designates, undistributed if it does not. Thus, the subject term is distributed in all and only universal propositions; the predicate term is distributed in all and only negative propositions.

[\[A Dictionary of Philosophical Terms and Names\]](#)

19-11-2001

distributive lattice

<[logic](#)> A [lattice](#) for which the [least upper bound](#) (lub) and [greatest lower bound](#) (glb) operators distribute over one another so that

$$a \text{ lub } (b \text{ glb } c) == (a \text{ lub } c) \text{ glb } (a \text{ lub } b)$$

and vice versa.

[\[FOLDOC\]](#)

16-03-2001

diverge

<[logic](#)> If a series of approximations to some value get progressively further from it then the series is said to diverge.

The [reduction](#) of some term under some evaluation strategy diverges if it does not reach a [normal form](#) after a finite number of reductions.

[\[FOLDOC\]](#)

16-03-2001

divine command theory

<[ethics](#)> any ethical position claiming that the rightness or wrongness of actions depends on whether they correspond to [God'](#) [commands](#).

26-03-2001

division - fallacy of

<[logic](#), [philosophy of science](#)> the [informal fallacy](#) of attributing some feature of a [collection](#) to the members of that [collection](#) individually, or [reasoning](#) from whole to [part](#).

Example: "Today' s newspaper has a lot of grocery ads, so each page of today' s newspaper has a lot of groce ads."

[\[A Dictionary of Philosophical Terms and Names\]](#)

19-11-2001

divisor

<[mathematics](#)> A quantity that evenly divides another quantity.

Unless otherwise stated, use of this term implies that the quantities involved are integers. (For non-integers, the more general term [factor](#) may be more appropriate.)

Example: 3 is a divisor of 15.

Example: 3 is not a divisor of 14.

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16-03-2001

DNA computing

<[architecture](#)> The use of DNA molecules to encode computational problems. Standard operations of molecular biology can then be used to solve some NP-hard [search problems](#) in parallel using a very large number of molecules.

The exponential scaling of NP-hard problems still remains, so this method will require a huge amount of DNA to solve large problems.

[L. M. Adleman, "Molecular Computation of Solutions to Combinatorial Problems", Science 266:1021-1024, 1994].

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16-03-2001

DNF

disjunctive normal form

29-02-2004

doctrine of pre-established harmony

<[philosophy of mind](#), [ontology](#)> a view originated by G. W. Leibniz whereby:

- 1) the mental and the material comprise two different kinds of substance;
- 2) neither has any direct causal effect on the other and;
- 3) the coincidence between mental and material events is due to both substances being created to act in concert even though there is no post-creation interaction between the two.

See [dualism](#), [occasionalism](#), [parallelism](#)

Pete Mandik

Chris Eliasmith - [[Dictionary of philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

document

A term used on some systems (e.g. Intermedia) for a [hypertext node](#). It is sometimes used for a collection of nodes on related topics, possibly stored or distributed as one.

16-03-2001

dogmatism

<philosophy>

1. originally, the position of any philosopher who was not a skeptic.
2. authoritarian approach to ideas which emphasizes rigid adherence to doctrine over rational and enlightened inquiry. The opposite approach is probably best characterized as tolerant [humanism](#) or critical [rationalism](#) (in the sense of devotion to reason and independent thinking).

[\[The Ism Book\]](#)

Edited by Giovanni Benzi

16-03-2001

dolors<ethics> [utilitarian units](#) of pain or displeasure. See also hedons.

26-03-2001

domain

<logic>

1. Of a [function](#), the set of objects or sequences of objects that may serve as the [arguments](#) (inputs) of the [function](#). See [domain theory](#).
2. Of an interpretation of a [formal language](#) of [predicate](#) logic, the set of objects that may serve as the assigned referents of the constants of the language, the [arguments](#) of [functions](#), and the [arguments](#) of [predicates](#).

Cardinality of a domain: the cardinality of the set of objects comprising the domain.

[\[Glossary of First-Order Logic\]](#)

3. <[networking](#)> A group of computers whose hostnames share a common suffix, the "domain name". The last component of this is the top-level domain.

See administrative domain, Domain Name System, fully qualified domain name.

4. Distributed Operating Multi Access Interactive Network.
5. <[programming](#)> A specific phase of the [software life cycle](#) in which a developer works. Domains define developers' and users' areas of responsibility and the scope of possible relationships between products.
6. The subject or market in which a piece of software is designed to work.

[\[FOLDOC\]](#)

16-03-2001

Domain Analysis<[systems analysis](#)>

1. Determining the operations, data objects, properties and abstractions appropriate for designing solutions to problems in a given [domain](#).
2. The [domain engineering](#) activity in which domain knowledge is studied and formalised as a domain definition and a domain specification. A software reuse approach that involves combining software components, subsystems, etc., into a single application system.
3. The process of identifying, collecting organising, analysing and representing a [domain model](#) and software architecture from the study of existing systems, underlying theory, emerging technology and development histories within the domain of interest.
4. The analysis of systems within a domain to discover commonalities and differences among them.

[\[FOLDOC\]](#)

16-03-2001

domain architecture

<systems analysis> A generic, organisational structure or design for software systems in a [domain](#). The domain architecture contains the designs that are intended to satisfy requirements specified in the [domain model](#). A domain architecture can be adapted to create designs for software systems within a domain and also provides a framework for configuring assets within individual software systems.

[FOLDOC]

16-03-2001

domain engineering

<systems analysis> 1. The development and evolution of [domain](#) specific knowledge and artefacts to support the development and evolution of systems in the domain. Domain engineering includes engineering of [domain models](#), components, methods and tools and may also include [asset management](#).

2. The engineering process of analysing and modelling a domain, designing and modelling a generic solution architecture for a product line within that domain, implementing and using reusable components of that architecture and maintaining and evolving the domain, architecture and implementation models.

3. A reuse-based approach to defining the scope ([domain definition](#)), specifying the structure ([domain architecture](#)) and building the Assets (requirements, designs, software code, documentation) for a class of systems, subsystems or applications. Domain engineering can include domain definition, domain analysis, developing the domain architecture domain implementation.

16-03-2001

domain maturity

<systems analysis> The level of stability and depth of understanding that has been achieved in an area for which applications are developed.

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16-03-2001

domain model

<systems analysis>

1. A definition of the functions, objects, data, requirements, relationships and variations in a particular [domain](#).

2. A product of [domain analysis](#) which provides a representation of the requirements of the domain. The domain model identifies and describes the structure of data, flow of information, functions, constraints and controls within the Domain that are included in software systems in the domain. The Domain Model describes commonalities and variabilities among requirements for software systems in the domain.

[FOLDOC]

16-03-2001

domain selection

<systems analysis> The prioritisation and selection of one or more [domains](#) for which specific software reuse engineering projects are to be initiated.

[FOLDOC]

16-03-2001

domain theory

<[mathematics](#)> A branch of mathematics introduced by Dana Scott in 1970 as a mathematical theory of programming languages, and for nearly a quarter of a century developed almost exclusively in connection with [denotational semantics](#) in computer science.

In [denotational semantics](#) of programming languages, the meaning of a program is taken to be an element of a domain. A domain is a mathematical structure consisting of a set of values (or "points") and an ordering relation, \leq on those values. Domain theory is the study of such structures.

Different domains correspond to the different types of object with which a program deals. In a language containing functions, we might have a domain $X \rightarrow Y$ which is the set of functions from domain X to domain Y with the ordering $f \leq g$ iff for all x in X , $f x \leq g x$. In the pure lambda-calculus all objects are functions or applications of functions to other functions. To represent the meaning of such programs, we must solve the [recursive](#) equation over domains,

$$D = D \rightarrow D$$

which states that domain D is ([isomorphic](#) to) some [function space](#) from D to itself. I.e. it is a [fixed point](#) $D = F(D)$ for some operator F that takes a domain D to $D \rightarrow D$. The equivalent equation has no non-trivial solution in [set theory](#).

There are many definitions of domains, with different properties and suitable for different purposes. One commonly used definition is that of Scott domains, often simply called domains, which are omega-algebraic, [consistently complete](#) CPOs.

There are domain-theoretic computational models in other branches of mathematics including [dynamical systems](#), fractals, measure theory, integration theory, probability theory, and stochastic processes.

See also [abstract interpretation](#), [bottom](#), [pointed domain](#).

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16-03-2001

domain-specific language

<[language](#)> A machine-processable language whose terms are derived from a [domain model](#) and that is used for the definition of components or software architectures supporting that domain. A domain-specific language is often used as input to an application generator.

[[FOLDOC](#)]

16-03-2001

double aspect theory

<[gnoseology](#), [perception](#)> belief that mental properties and events on the one hand and physical properties and events on the other hand are irreducibly distinct features or aspects of one and the same thing that exhibits them both. [Spinoza](#), for example, maintained that [thought](#) and [extension](#) are distinct attributes of the one existing [substance](#) that is "[god](#) or [nature](#)."

Recommended Reading:

Keith Campbell, *Body and Mind* (Notre Dame, 1984);

Genevieve Lloyd, *Routledge Philosophy Guidebook to Spinoza and the Ethics* (Routledge, 1996);

Michael Della Rocca, *Representation and the Mind-Body Problem in Spinoza* (Oxford, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

19-11-2001

double negation

<[logic](#), [philosophy of science](#)> a rule of replacement of the form:

$$p = \sim \sim p$$

Example: "Alan is clever" is equivalent to "It is not the case that Alan is not clever." Although trivial in ordinary language, this [rule](#) is vital for the [completeness](#) of the [propositional calculus](#).

[[A Dictionary of Philosophical Terms and Names](#)]

19-11-2001

doubt - method of

<[history of philosophy](#), [metaphysics](#), [gnoseology](#), [epistemology](#)> the starting-point for [Descartes'](#) s philosophy. He used perceptual illusions, the dream problem, and the possibility of a deceiving [god](#) to show the uncertainty of many common beliefs. Only the [cogito](#) then survives as an indubitable foundation for [knowledge](#).

Recommended Reading:

RenÉ Descartes, Discourse on Method and Meditations on First Philosophy, tr. by Donald A. Cress (Hackett, 1999);

E. M. Curley, Descartes Against the Skeptics (Iuniverse, 1999);

The Cambridge Companion to Descartes, ed. by John Cottingham (Cambridge, 1992).

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19-11-2001

doxa

<[history of philosophy](#), [philosophical inquiry](#)> greek term for [opinion](#), [belief](#), or judgment, as opposed to systematic knowledge (Gk. epistḗmē). According to [Plato](#), this limited awareness of the sensible world encompasses the lower portion of the divided line. In [Aristotle'](#) s works [logic](#), the same terms are used to distinguish [contingent](#) from necessary truths about the world.

Recommended Reading:

F. E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967).

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19-11-2001

doxastic

<[philosophy of mind](#), [epistemology](#)> pertaining to [belief](#), from the Greek word "doxa", meaning "opinion", "belief". Alternatively, also pertaining to states sufficiently similar to beliefs, such as thoughts, judgments, opinions, desires, wishes, fears.

Often the distinction between doxastic and sub-doxastic states is a way of cashing out the distinction between personal and sub-personal states where instances of the latter include [information](#) bearing states not available to awareness (like the information processing going on in the cerebellum). Examples of non-doxastic contentful states would be the numbers of rings in a tree' s crosssection: they carry information about the age of the tree, but are neither beliefs (doxastic states), nor states of an entity that has beliefs (sub-doxastic states).

Pete Mandik

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16-03-2001

Du Bois William Edward Burghardt

<[history of philosophy](#), [biography](#)> american historian and sociologist (1868-1963). After completing his education with a Ph.D. from Harvard, [Du Bois](#) embarked on a long and distinguished career as a university professor and social activist. His *The Souls of Black Folk* (1903) was a penetrating analysis of the origins, practices, and consequences of racial discrimination in the United States. [Du Bois](#) also participated in efforts at social reform, founding the National Association for the Advancement of Colored People in 1910 and editing the influential journals *Crisis* and *Phylon*. Details of [Du Bois](#)' s life are to be found in his autobiography, *Dusk c Dawn* (1940).

Recommended Reading:

The Oxford W. E. B. Du Bois Reader, ed. by Eric J. Sundquist (Oxford, 1996);
 W. E. B. Du Bois, *The Souls of Black Folk: Authoritative Text, Contexts, Criticism*, ed. by Henry Louis Gates, Jr. and Terri Hume Oliver (Norton, 1999);
 W. E. B. Du Bois, *Writings: The Suppression of the African Slave-Trade: The Souls of Black Folk: Dusk of Dawn: Essays: Articles from the Crisis* (Library of America, 1996);
 W.E.B. Du Bois on Race and Culture: Philosophy, Politics, and Poetics, ed. by Bernard W. Bell, Emily Grosholz, and James B. Stewart (Routledge, 1996).

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14-11-2001

dual

<[mathematics](#), [logic](#)> Every field of mathematics has a different meaning of dual. Loosely, where there is some binary symmetry of a theory, the image of what you look at normally under this symmetry is referred to as the dual of your normal things.

In linear algebra for example, for any [vector space](#) V , over a [field](#), F , the vector space of linear maps from V to F is known as the dual of V . It can be shown that if V is finite-dimensional, V and its dual are [isomorphic](#) (though no isomorphism between them is any more natural than any other).

There is a natural [embedding](#) of any vector space in the dual of its dual:

$$V \rightarrow V'' : v \mapsto (v' : w \mapsto vw : F)$$

(x' is normally written as x with a horizontal bar above it). I.e. v' is the linear map, from V to F , which maps w to the scalar obtained by applying w to v . In short, this double-dual mapping simply exchanges the roles of function and argument.

It is conventional, when talking about vectors in V , to refer to the members of V' as covectors.

[[FOLDOP](#)]

16-03-2001

dual-aspect theory

<[philosophy of mind](#), [ontology](#)> a view forwarded by Spinoza (also called the dual-attribute theory) in which the unitary [substance](#) [God](#) is expressed in the distinct modes of the mental and the physical.

See [dualism](#)

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dualism

<[metaphysics](#), [philosophy of mind](#), [cartesianism](#)> in [metaphysics](#), the view that [reality](#) consists of two disparate parts or that there are only two fundamental things or [substances](#) or constituents of things in the world at large or in the human [soul](#). The first influential dualist theory in the West was [Platonism](#), which claimed that there are actually two different worlds: the physical world of appearances and the higher world of intelligible Forms or Ideas or Essences (thus note the common connection of dualism to transcendentalism and [idealism](#)), with a similar separation in the human person between mind and body. These ideas were picked up by [stoicism](#) and, later, by [Christianity](#). Thus the idea of dualism was current throughout the Christian era - but it received a renewed impetus from Descartes, who held that reality is made up exclusively of Spirit and Matter, and that these two substances can never meet or interact - except in the human soul (which gives rise to the mind-body dichotomy). [Aristotelianism](#), by contrast, holds that mind and body are not two distinct substances but two aspects of the same thing, of the same complete human person (cf. also [holism](#)). Even though dualism is a kind of [pluralism](#) and is opposed by [monism](#), practically speaking dualists often put their emphasis on the "higher", more spiritual reality that their theoretical separations construct, so that they are often construed as adherents of [idealism](#) or transcendentalism, even though this is not strictly the case.

Based on [[The Ism Book](#)]

Edited by Giovanni Benzi

2. In [philosophy of mind](#), the belief that the mental and physical are deeply different in kind: thus the mental is at least not identical with the physical.

See [occasionalism](#), doctrine of pre-established harmony [substance dualism](#), [property dualism](#), [Cartesian interactionist dualism](#), mind-body problem, [monism](#).

Introduction

Dualism is a time-honoured philosophical position which is exemplified by:

- 1) Pre-Socratics' appearance/reality distinction
- 2) Plato' s forms/world distinction
- 3) Hume' s fact/value distinction
- 4) Kant' s empirical phenomena/transcendental noumena distinction
- 5) Heidegger' s being/time distinction
- 6) Russell' s existence/subsistence distinction
- 7) Descartes' mind/matter distinction

It is, of course, the last of these which is of most immediate interest to philosophers of mind. There has been a recent revival of interest in the topic of Cartesian dualism amongst modern philosophers of mind and cognitive scientists. [Arguments](#) against dualism have been provided on the basis of both empirical evidence and on philosophical grounds, and clearly express the predominant view (e.g. Dennett, Damasio, Churchland). However, a number of modern philosophers of mind, though in the minority, have come to the defence of dualism (e.g. Hart). The question of dualism is not only of historical interest, it also has important implications for the scientific enterprise. If a convincing rejection of dualism can be formulated, the classic mind-body problem will be solved by its becoming a non-problem and the materialist approach of modern science will be vindicated. If, conversely, dualism can be convincingly maintained, it is by no means obvious that empirical evidence will suffice for a thorough understanding of the [mind](#) -- in other words, understanding the brain may not be enough for understanding the mind.

Descartes

Descartes' mind/matter distinction can be found in his *Meditations* and is a particular kind of [dualism Cartesian interactionist](#). Often, the term "Cartesian dualism" is used to refer to the general class of [substance](#) dualist theories. Substance dualists hold that mind and matter are different kinds of substances. Cartesian interactionist dualism is a particular kind of substance dualism in which these two different kinds of substance can causally interact. Thus, mind substance can cause matter substance (i.e. the body) to act and matter substance (i.e. the body) can cause mind substance to have certain "sensations", most often by itself being acted on by other material objects. For Descartes, the [essence](#) of [matter](#) is [extension](#) (i.e. having spatial dimensions and being located, [res extensa](#)) whereas that of mind is active thinking ([res cogitans](#)). Because Descartes thought these two sorts of substance are essentially different, he held that they are also independent. Thus, matter can exist without minds and minds can exist without matter.

Descartes' position raises an important question: How do mind and matter interact? It is one thing to claim that they do interact, it is another to explain convincingly how, particularly when mind and matter are conceived of so differently. It is this question that must be answered to solve the classic mind-body problem. The Cartesian solution to the problem is to insist that the mental representation, though caused by the physical, does not resemble the physical. However, this does not seem to explain, still, how the mental comes to represent the physical at all. It seems that Descartes' final position is to insist that God, as the only substance in the strong sense (i.e. as the only entity that can exist independently of anything else) is responsible for these interactions.

Solving the mind-body problem

Subsequent to Descartes, there were a number of attempts to provide dualistic solutions to the mind-body problem. These included:

Occasionalism. Espoused by Clauberg, de la Forge and Malebranche, occasionalism entails the contention that everything is devoid of causal efficacy and that God is the only truly causal agent. So, for example, placing your hand on a hot stove does not cause pain, but is rather an occasion for God to cause the mental state of pain. So, not only mind/body interactions, but all causal interactions become the work of God.

doctrine of pre-established harmony. This doctrine was formulated by Leibniz and is basically Cartesian interactionist dualism without the interaction. Thus, rather than causal interaction, God has provided setup in which the mental and physical are synchronised so as to provide this appearance. However, it should be noted that Leibniz himself was not a dualist: for him there were no physical substances, these were just appearances. Nevertheless, this position is often considered a possible dualistic solution to the mind-body problem.

Both occasionalism and the doctrine of pre-established harmony are considered instances of parallelism: the view that the mental and physical realms co-occur but are not causally connected.

Modern dualists

More recently, some philosophers have suggested that the interaction problem is not due to a problem with a dualist ontology, but a problem with our notion of causation (Hart). Indeed, this problem is just as evident in physics as in dualism: a conversion of, say, light to "psychic energy" seems no more a problem than a conversion of energy to matter. Both seem potentially able to contradict a standard notion of causation. Under this view, dualism is at least a viable possibility once we realize the difficulty may lie elsewhere than with a commitment to a dualist ontology.

Another approach to strengthening the dualist position has been to examine critically the claims that our mental lives can be adequately explained by reference to the physical brain. Philosophers of mind have, for the past ten years, begun to question seriously the possibility that science will be able to close the explanatory gap between the brain and our conscious experience, or **qualia** (termed the hard problem by Chalmers). Clearly, a reason this gap may be unbridgeable is because mind and matter are so different. Those holding this position have been called new mysterians because they insist that mind/consciousness is fundamentally mysterious and can not be explained by standard **reductionist** scientific means.

References

Dualism Biblio (<http://ling.ucsc.edu/~chalmers/biblio3.html#3.3d>)

Chalmers, D. (1996). *The conscious mind: In search of a fundamental theory*. Oxford, Oxford University Press.
 Churchland, P. M. (1996). *The engine of reason, the seat of the soul*. Cambridge, MA, MIT Press.
 Damasio, A. R. (1994). *Descartes' error: Emotion, reason, and the human brain*. New York, NY Grosset/Putnam.
 Descartes, R. (1989). *Discourse on Method and the Meditations*. Translated by John Veitch. Prometheus Books.
 Dennett, D. C. (1991). *Consciousness explained*. New York, Little, Brown and Company.
 Hart, W.D. (1988). *The engines of the soul*. Cambridge University Press.

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 Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

28-04-2001

Durkheim Emile

<[history of philosophy, biography](#)> french **philosopher** and sociologist (1858-1917). **Durkheim** argued that since society is something more than merely a collection of individual human beings, it follows that social events cannot be explained wholly in biological or psychological terms. This insight was a significant impetus for the independence of sociology as a science.

His major writings include *Éléments de sociologie* (1889), *Les Règles de la méthode sociologique* (Rules for Sociological Method) (1895), *De la division du travail social* (The Division of Labor in Society) (1893), and *Le Suicide* (Suicide: A Study in Sociology) (1897). **Durkheim** criticized pragmatism in *Pragmatism and Society* (1914).

Recommended Reading: Emile Durkheim, *On Morality and Society: Selected Writings*, ed. by Robert N. Bellah (Chicago, 1975);
 Gianfranco Poggi, *Durkheim* (Oxford, 2000);
 Steven Lukes, *Emile Durkheim, His Life and Work: A Historical and Critical Study* (Stanford, 1985).

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14-11-2001

duty

<[ethics](#), [stoicism](#), [metaphysics](#), [categorical imperative](#)> <[hypothetical imperative](#), [political philosophy](#), [psychology](#)> what an [individual](#) is obliged to, or ought to do. If an individual has a duty to do X it is not permissible for them not to do X; and if they have a duty not to do X then it is not permissible for them to do it. Kant believed the commands of morality, being [categorical](#), create perfect duties allowing no exceptions. Nonmoral imperatives, on the other hand, being [hypothetical](#), create imperfect duties which allow of exceptions. See [categorical imperative](#), [hypothetical imperative](#).

[[Philosophical Glossary](#)]

22-06-2001

Dworkin Ronald Myles

<[history of philosophy](#), [biography](#)> american political philosopher (1931-). In Taking Rights Seriously (1977) and Law' s Empire (1986) [Dworkin](#) defends a version of legal [positivism](#) that relies heavily upon the principled adjudication of disputes by the judiciary. His treatment of concrete legal issues concerning abortion and euthanasia is to be found in Life' s Dominion (1993). "Objectivity and Truth: You' d Better Believe It" argues th a moderate notion of objectivity secures the objectivity of moral claims.

Recommended Reading:

Ronald Dworkin, Freedom' s Law: The Moral Reading of the American Constitution (Harvard, 1997);

The Philosophy of Law, ed. by Ronald M. Dworkin (Oxford, 1977);

Stephen Guest, Ronald Dworkin (Stanford, 1992);

Ronald Dworkin and Contemporary Jurisprudence, ed. by Marshall Cohen (Rowman & Littlefield, 1984).

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dynamic systems theory

[dynamical systems theory](#)

06-03-2004

dynamical systems theory

<[philosophy of mind](#), [philosophy of science](#), [PI](#)> an area of mathematics used to describe the behaviour of complex systems by employing differential and difference equations. Recently, this approach has been advanced by some as the best way to describe human [cognition](#).

Proponents of the dynamical systems theory approach to cognition believe that systems of differential or difference equations are the most appropriate tool for modelling human behaviour. These equations are interpreted to represent an [agent](#)' s cognitive trajectory through a high dimensional state space. In other words cognition is explained as a multidimensional space of all possible thoughts and behaviours that is traversed by a path of thinking followed by an agent under certain environmental and internal pressures, all of which is captured by sets of differential equations. The terminology of dynamical systems theory is also adapted. Thus, cognition is spoken of in terms of state spaces; point, cyclic and chaotic attractors; trajectories; and deterministic chaos.

Dynamicists, including van Gelder, Port, Thelen and Smith, believe that they have a mandate to prove that this dynamicist conception of cognition is the correct one to the exclusion of [symbolicism](#) and [connectionism](#). Van Gelder has formulated this as the Dynamicist Hypothesis (van Gelder, 1995, p. 4):

"Natural cognitive systems are certain kinds of dynamical systems, and are best understood from the perspective of dynamics."

Those "certain kinds" of systems are identified as (van Gelder and Port, 1995, p. 5):

"state-determined systems whose behaviour is governed by differential equations... Dynamical systems in this strict sense always have variables that are evolving continuously and simultaneously and which at any point in time are mutually determining each other' s evolution."

In sum, van Gelder and Port assign the following criteria to dynamicist explanations of cognition. Dynamicist descriptions must be:

- [deterministic](#)

- generally complex (i.e. [nonlinear](#))

- described with respect to the independent variable of time
- of low dimensionality
- intimately linked (i.e. coupled)

There are also various claims made about the status of [computation](#) and [representation](#) in such systems. Often, it is claimed that dynamical systems are noncomputational and nonrepresentational.

Criticisms of dynamic systems theory are numerous. Some focus on the rejection of representation and computation. These either claim that the systems are indeed representational and computational or that dynamic systems theory will not be able to explain how cognitive systems are able to be both representational and computational. As well, the similarity between behaviourism and the dynamicist approach is often used to discredit dynamicism because of the numerous and debilitating difficulties faced by early behaviourists.

Another important criticism stems from the relation between dynamic systems theory and connectionist networks. Though many dynamicists feel that connectionism should be replaced by dynamicism, it is not clear why. Connectionist networks exhibit many of the features that behaviourist dynamicists note as being central to cognition and incompatible with classical, or symbolist [artificial intelligence](#). Though many connectionist networks do not live up to the expectations of dynamicists, there are a number which do, while not discarding the notions of computation and representation. Though a strong normative claim may be made concerning the importance of dynamical systems theory to connectionist models, it is far from clear that dynamicist cognitive approach will, or should, replace the connectionist approach.

References

Dynamic Systems Biblio (<http://ling.ucsc.edu/~chalmers/biblio4.html#4.4>)
 Eliasmith, C. (1996) (<http://ascc.artsci.wustl.edu/~celiasmi/index.html#publications>)
 The third contender: a critical examination of the dynamicist theory of cognition. *Philosophical Psychology*, 9 (4), 441-463.
 Van Gelder, T. (1995) "What might cognition be, if not computation?" *Journal of Philosophy*, 91, 345-381.
 Van Gelder, T. and Port, R. (1995). "It' s about time: an overview of the dynamical approach to cognition." i *Mind as motion: explorations in the dynamics of cognition*. Cambridge, MA: MIT Press.

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16-03-2001

dynamicism

[dynamical systems theory](#)

06-03-2004

dynamis

<[history of philosophy](#), [metaphysics](#)> greek term for power or [force](#), used by [presocratic philosophers](#) in reference to the [qualities](#) or features of material elements. [Aristotle](#) later used the term to signify [potentiality](#), or the capacity for undergoing change. The neoplatonic tradition, on the other hand, developed a conception of personified causal agents.

Recommended Reading:

F. E. Peters, *Greek Philosophical Terms: A Historical Lexicon* (NYU, 1967).

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19-11-2001

dynamism

<[metaphysics](#)> the idea that the universe is fundamentally made up of [force\(s\)](#); this idea is often augmented by the notion that much of the stability we perceive is illusory and that everything is constantly changing or in flux (sometimes called a Heraclitean view of the universe, after the ancient Greek philosopher [Heraclitus](#)). The most famous dynamists of recent times are probably [Whitehead](#) and [Bergson](#), who are also called "process philosophers".

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16-03-2001

E proposition

in the traditional notation for [categorical logic](#), a proposition that is both universal and negative. Example: "No reptiles are insects." This proposition affirms that the designated classes have no common members. Its contradictory is an "I" proposition with the same subject and predicate terms.

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29-10-2001

Eckhart Johannes

<[history of philosophy, biography](#)> known as Meister Eckhart (1260-1327). German Dominican theologian whose Von unsagbaren Dingen and other writings and sermons identified the [being](#) and [intellect](#) of a unified deity that could be apprehended only through mystical apprehension of the divine through an inner spark (scintilla animae) of the [soul](#). Condemned as pantheistic in his own time, Eckhart' s doctrines were a significant application of neoplatonic thought.

Recommended Reading:

Meister Eckhart, Selected Writings, ed. by Oliver Davies (Penguin, 1995);

Bernard McGinn, The Mystical Thought of Meister Eckhart: The Man from Whom God Hid Nothing (Crossroad, 2001);

Passion for Creation: Earth-honoring Spirituality of Meister Eckhart, ed. by Matthew Fox (Inner Traditions, 2000).

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29-10-2001

eclecticism

<[philosophy](#)> approach or way of doing philosophy that does not respect the boundaries of the current or traditional schools, but instead takes whatever seems true from each of them. Eclecticism is usually applied in a negative way, implying a lack of systematic or philosophical consistency, or even implying the presence of [subjectivism](#). (Reference from [syncretism](#).)

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16-03-2001

Eco Umberto

<[history of philosophy, biography](#)> Italian novelist, critic, and philosopher (1932-); author of Opera aperta (The Open Work) (1962), Trattato di semiotica generale (A Theory of Semiotics) (1976), and Semiotica e filosofia del linguaggio (Semiotics and the Philosophy of Language) (1984).

A serious scholar of [semiotics](#), Eco examines the use of signs, both in literary texts and - as in "Travels in Hyperreality" (1991)- in popular culture. His novels, Il Nome della Rosa (The Name of the Rose) (1980), Foucault' s Pendulum (1988), and The Island of the Day Before (1994) offer the kind of postmodern entertainment, deliberately open to re-interpretation at many different levels, that he had proposed in Apocalittici e integrati (Apocalyptic Postponed) (1964).

Recommended Reading:

Umberto Eco, *The Limits of Interpretation* (Indiana, 1994); Umberto Eco, *Misreadings* (McClelland & Stewart, 1994);
 Umberto Eco, *Six Walks in the Fictional Woods* (Belknap, 1995);
 Reading Eco: An Anthology, ed. by Rocco Capozzi (Indiana, 1997);
 Michael Caesar, *Umberto Eco: Philosophy, Semiotics and the Work of Fiction* (Blackwell, 1999);
 Out of Chaos: Semiotics: A Festschrift in Honor of Umberto Eco, ed. by William E. Tanner, Anne Gervasi, and Kay Mizzel (Liberal Arts, 1992).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

ecofeminism

<[human rights](#), [ecology](#)> belief that human violation of the natural world is an extension of the prevalent patriarchy of Western culture. On this view, efforts to protect the environment at large are feminist in spirit, since they challenge systemic male domination of the other.

Recommended Reading:

Ecofeminism: Women, Culture, Nature, ed. by Karen Warren and Nisvan Erkal (Indiana, 1997);
 Carol J. Adams, *The Sexual Politics of Meat: A Feminist-Vegetarian Critical Theory* (Continuum, 1999);
 Ivone Gebara, *Longing for Running Water: Ecofeminism and Liberation*, tr. by David Molineaux (Fortress, 1999);
 Ecofeminism: Women, Animals, Nature, ed. by Greta Claire Gaard (Temple, 1993);
 Beneath the Surface: Critical Essays in the Philosophy of Deep Ecology, ed. by Eric Katz, Andrew Light, and David Rothenberg (MIT, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

effect

<[ontology](#)> an [event](#) that is taken to result from or to be produced by another [event](#), with which it stands in a causal relationship.

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

effective computable

<[logic](#)> A term describing a [function](#) for which there is an effective algorithm that correctly calculates the function. The algorithm must consist of a [finite](#) sequence of instructions.

[\[FOLDOP\]](#)

22-03-2001

effective computation

[effective computable](#)

09-11-2003

effective enumeration

[enumerable set](#)

09-11-2003

effective method

<[logic](#)> An effective method for a class C of problems is a method for solving problems in C when the method (1) is logically bound as opposed to physically bound (2) to give some answer, as opposed to no answer, (3) that is correct, as opposed to incorrect, (4) in a finite number of steps, as opposed to an infinite number, (5) every time, or for all inputs, or for all problems in the class, as opposed to selectively, (6) if the method is followed carefully, as opposed to carelessly, (7) as far as necessary, as opposed to only as far as our resources permit, (8) when each step in the process is "dumb" or "mechanical". The eighth requirement introduces an irreducibly intuitive element into the definition. Some add (9) when given a problem from outside the class for which the method is effective, the method may halt or loop forever without halting, but must not return a value as if it were the answer to the problem. (The wording of this definition was influenced by Geoffrey Hunter.) Also called algorithm; decision procedure.

See also Church' s Thesis

[Glossary of First-Order Logic]

16-03-2001

effective proof procedure

<[logic](#)> An effective method for generating the proof of any [theorem](#) in a formal system. A system for which there exists an effective proof procedure is decidable; but not all [decidable systems](#) have effective proof procedures.

[Glossary of First-Order Logic]

16-03-2001

efficient cause

<[ontology](#)> the [agent](#) or [event](#) that produces some change in the accidental features of a thing; one of Aristotle' s [four causes](#).

Recommended Reading:

Aristotle, Physics, tr. by Robin Waterfield and David Bostock (Oxford, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

egalitarianism

<[ethics, political philosophy](#)> the view that [equality](#) is a very high, or even the most important, ethical and societal [value](#) (sometimes also called equalitarianism). Egalitarians usually focus on equality of results, rather than equality of opportunity or equality before the [law](#), which are ideas associated with classical [liberalism](#) or [libertarianism](#). In practical terms, egalitarian policies in political reality usually focus on the equal re-distribution of wealth, often verging on socialism. (Reference from [liberalism](#).)

[[The Ism Book](#)]

Edited by Giovanni Benzi

16-03-2001

egoism

<[ethics](#)> belief that human conduct is governed by self-interest. Psychological egoism holds that all human beings are, as a matter of fact, motivated to act only in pursuit of their own (at least apparent) advantage, never for the sake of others. Ethical egoism is the normative theory that right conduct can be defined in terms of (an enlightened notion of) one' s own welfare. Though often held jointly, the distinction between fact and value clearly renders the two views distinct: some might argue that human beings ought to act on their own behalf even though they don' t always do so, while others could suppose that they invariably do act selfishly even though they ought not.

Recommended Reading:

Robert William Shaver, Rational Egoism: A Selective and Critical History (Cambridge, 1998)

Kim-Chong Chong, Moral Agoraphobia: The Challenge of Egoism (Peter Lang, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

eidos

<[ontology](#)> Greek term for what is seen-figure, shape, or [form](#). In the philosophy of Plato, the eidos is the immutable genuine nature of a thing, one of the eternal, transcendent Forms apprehended by human reason. Aristotle rejected the notion of independently existing Forms and understood them instead as abstract [universals](#). By extension, Husserl used the term "eidetic" for the phenomenological apprehension of essences generally.

Recommended Reading:

F. E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

eigenvalue

<[mathematics](#)> The factor by which a [linear transformation](#) multiplies one of its [eigenvectors](#).

[\[FOLDOP\]](#)

16-03-2001

eigenvector

<[mathematics](#)> A [vector](#) which, when acted on by a particular [linear transformation](#), produces a scalar multiple of the original vector. The scalar in question is called the [eigenvalue](#) corresponding to this eigenvector.

It should be noted that "vector" here means "element of a vector space" which can include many mathematical entities. Ordinary vectors are elements of a vector space, and multiplication by a matrix is a [linear transformation](#) on them; smooth functions "are vectors", and many partial differential operators are linear transformations on the space of such functions; quantum-mechanical states "are vectors", and observables are linear transformations on the state space.

An important theorem says, roughly, that certain linear transformations have enough eigenvectors that they form a [basis](#) of the whole vector states. This is why [Fourier analysis](#) works, and why in quantum mechanics every state is a superposition of eigenstates of observables.

An eigenvector is a (representative member of a) [fixed point](#) of the map on the [projective plane](#) induced by a [linear map](#).

[\[FOLDOP\]](#)

16-03-2001

eikasia

<[epistemology](#)> Greek term used by Plato, to signify human [imagination](#), which is focussed exclusively on a temporal appearance or image.

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

Einstein Albert

<[history of philosophy](#), [biography](#)> german physicist (1879-1955). Einstein' s combination of simple thought experiments with complex mathematical formulae transformed twentieth-century conceptions of [matter](#), [space](#), and [time](#) and earned him the Nobel Prize for physics in 1921. His special (1905) and general (1915) theories of relativity emphasized the role of the observer in determining the content of our observations of the natural world. Although he assisted the careers of several of the logical positivists, his own philosophical reflections emphasized the independence of theory-formation from empirical evidence.

Recommended Reading:

Albert Einstein, *Relativity: The Special and the General Theory* (Crown, 1995);

Albert Einstein, *Out of My Later Years: The Scientist, Philosopher and Man Portrayed Through His Own Words* (Outlet, 1993);

Richard Feynman, *Six Not-So-Easy Pieces: Einstein' s Relativity, Symmetry, and SpaceTime* (Perseus, 1998);

Albrecht Folsing, *Albert Einstein: A Biography* (Penguin, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

Eleatics

< [history of philosophy](#), [school](#)> presocratic philosophers, including [Parmenides](#) and [Zeno](#), who used dialectical methods to argue that [reality](#) is a unified whole within which no motion or change is possible.

Recommended Reading:

The Cambridge Companion to Early Greek Philosophy, ed. by A. A. Long (Cambridge, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

elegant

(From Mathematics) Combining simplicity, power, and a certain ineffable grace of design. Higher praise than "clever", "winning" or even cuspy.

The French aviator, adventurer, and author Antoine de Saint-Exup' ery, probably best known for his children' s book "The Little Prince", was also an aircraft designer. He gave us perhaps the best definition of engineering elegance when he said "A designer knows he has achieved perfection not when there is nothing left to add, but when there is nothing left to take away."

[\[Jargon File\]](#) and [\[FOLDOC\]](#)

16-03-2001

eliminativism

<[philosophy of mind](#)> belief that language should be purged of all reference to the (none-existent) things of a certain kind; the most extreme variety of reductionism. Thus, while a reductive materialist may hold that pains are really just activities of the central nervous system, an eliminative materialist proposes that we speak only of brain-states.

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

ELIZA

<[artificial intelligence](#)> A famous program by [Joseph Weizenbaum](#), which simulated a Rogerian psychoanalyst by rephrasing many of the patient' s statements as questions and posing them to the patient. It worked by simple [pattern recognition](#) and substitution of key words into canned phrases. It was so convincing, however, that there are many anecdotes about people becoming very emotionally caught up in dealing with ELIZA. All this was due to people' s tendency to attach to words meanings which the computer never put there.

See also [ELIZA effect](#).

[\[FOLDOC\]](#)

16-03-2001

ELIZA effect

<[jargon](#)> /e-li: z* -fekt' / (From [ELIZA](#)) The tendency of humans to attach associations to terms from prior experience. For example, there is nothing magic about the symbol "+" that makes it well-suited to indicate addition; it' s just that people associate it with addition. Using "+" or "plus" to mean addition in a compute language is taking advantage of the ELIZA effect.

The ELIZA effect is a Good Thing when writing a programming language, but it can blind you to serious shortcomings when analysing an [Artificial Intelligence](#) system.

Compare ad-hockery; see also AI-complete.

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

Elizabeth of Bohemia

<[history of philosophy, biography](#)> German princess (Elisabeth von der Pfalz) (1618-1680). In he extensive correspondence with Descartes, Elizabeth deftly identified the impossibility of genuine interaction between [mental](#) and [physical substances](#) as the central difficulty with mind-body dualism.

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

emanation

<[ontology, Plotinus](#)> that which inevitably flows outward from the transcendental central principle of reality ("the One") in the neoplatonic philosophy of [Plotinus](#). Individual things, including human beings, are therefore presumed to be nothing more than the faint ripples left by a primordial big splash. The timeless reality of a central intelligence, [Plotinus](#) held, inexorably results in the formation of both soul as an active principle of organization and, eventually, inert matter.

Recommended Reading:

Plotinus, The Enneads, ed. by John Dillon and Stephen MacKenna (Penguin, 1991)
The Cambridge Companion to Plotinus, ed. by Lloyd P. Gerson (Cambridge, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

emanationism

<[metaphysics](#)> a doctrine in both gnosticism and especially the Neo-Platonism of [Plotinus](#), who posited that the physical world emanated from a "world soul", which in turn emanated from a divine presence, which in turn emanated from a higher divinity, and so on - the whole process having started with an emanation from the divine [God](#) or "One".

[[The Ism Book](#)]

Edited by Giovanni Benzi

16-03-2001

embedding

1. <[mathematics](#)> One instance of some mathematical object contained with in another instance, e.g. a group which is a subgroup.

2. <[theory](#)> ([domain theory](#)) A [complete partial order](#) F in [X -> Y] is an embedding if (1) For all x1, x2 in X, x1 <= x2 <=> F x1 <= F x2 and (2) For all y in Y, x | F x <= y is [directed](#).

[[FOLDOC](#)]

16-03-2001

emergence

<PI, philosophy of mind, ontology> properties of a complex physical system are emergent just in case they are neither (i) properties had by any parts of the system taken in isolation nor (ii) resultant of a mere summation of properties of parts of the system.

A system exhibits emergent properties when those properties are more than the sum of its parts" properties. Emergence is a notion cherished by those philosophers of mind who are mental realists, and physicalists who nonetheless reject the reducibility of the mental to the physical. Mental emergentists, then, posit that mental properties emerge from certain complex sets of physical properties, for instance, physical properties of human brains. Thus they hold that mental events are not identical to any brain events but instead emerge from them.

Ernest Nagel (1961) and Brain McLaughlin (1992) cite Mill' s ' Of the Composition of Causes" chapter System of Logic (1843) as the locus classicus on the notion of emergence. For Mill, the key to the distinction between emergent and non-emergent properties centres on a distinction regarding two different ways in which conjoint causes can produce an effect: Non-emergent properties are effects that are mere summations of the effects of each of the causal conjuncts, whereas emergent properties are effects that are not sums of the effects of each causal conjunct. These respective notions might be best conveyed by the following examples.

A paradigmatic example of an effect best construed as non-emergent is the way that multiple force vectors sum to propel a body in a given direction. Mill writes:

"If a body is propelled in two directions by two forces, one tending to drive it to the north and the other to the east, it is caused to move in a given time exactly as far in both directions as the two forces would separately have carried it; and is left precisely where it would have arrived if it had been acted upon first by one of the two forces, and afterwards by the other. This law of nature is called, in dynamics, the principle of the Composition of Forces: and in imitation of that well-chosen expression, I shall give the name of the Composition of Causes to the principle which is exemplified in all cases in which the joint effect of several causes is identical with the sum of their separate effects. (1843, p. 428)"

A key determinant of whether a behaviour is emergent on this view is whether removing any of the causal conjuncts prevents the remaining conjuncts from contributing their effects to the remaining system. If not, then the behaviour of the system in question is non-emergent. If so, then it is emergent. Mill offers as examples of emergent effects chemical reactions. Consider the following chemical process: $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$ (Methane + oxygen produces carbon dioxide + water). For Mill, the products of such chemical reactions are not, in any sense, the sum of the effects of each reactant (McLaughlin, 1992, p.60).

While the mechanics underlying chemical reactions are understood well enough today to render Mill' s pair dubious, we can see why the above chemical reaction would impress Mill and his contemporaries as significantly different in kind from the Composition of Forces for moving bodies. In the case of the chemical reaction, the resulting compounds exhibit properties significantly different from those of the reactants. For instance, methane is violently combustible, whereas carbon dioxide and water are not. This contrasts sharply against the case of a north-westerly moving object being propelled by two forces--one towards the north, the other towards the west-- insofar as the subsequent motion is so obviously decomposable into the effects of the conjoint causes. A very live possibility to consider in connection with these examples is that an enhanced understanding of the processes that underlie some observed property of a system may show that system not to be an example of emergence. That is, an increase of knowledge about the way certain effects are obtained may reveal that certain effects are decomposable into the effects contributed by subcomponents of that system. Mill' s chemical examples fail as properly emergent for just this reason. With the development c quantum mechanical explanation, we have been able to see how chemical reactions are composed of additive properties of individual electrons (McLaughlin, 1992, p.89).

Pete Mandik

Objection

I disagree with the definition of emergent properties. This definition would automatically make the shape of a composite body an "emergent" property. Consider a brick in the shape of a cube. The parts of this object are, let' s say, molecules. Now (1) None of the molecules is cubical in shape, and (2) "cubical" is not the "sum" c the shapes of the molecules, nor the sum of anything else. (In fact, only quantities can be sums. Since "cubical" isn' t a quantity, it can' t be the sum of anything.) Thus, the existence of emergent properties would be trivial.

Instead, we should take Broad' s definition from The Mind and its Place in Nature. Roughly: a property, P, of a composite object, O, is emergent if it is not metaphysically necessary that an aggregate composed of parts having exactly the (intrinsic) properties that the parts of O in fact have and arranged in the way that the parts of O are in fact arranged, should have P.

(Broad says, if you were given all the intrinsic properties of the parts plus their arrangement, you could not predict the properties of the whole. I think this is what he means.)

Michael Huemer

Reply to the Objection

While I agree that any good definition of "emergence" should exclude the shapes of bricks from counting as emergent properties, I disagree that my definition fails to do so. Superimpose a coordinate system (such as Descartes') on a brick, and it becomes a simple exercise to see that the particular way that the brick occupies

space is a sum of the ways its parts occupy space. Given the techniques of analytic geometry, particular shapes can be converted into particular quantities and summed all day long.

As regards the definition attributed to Broad, the following problem arises. According to that definition, my mental properties would count as emergent if and only if it is metaphysically possible that my microphysical doppelganger lacks (qualitatively identical) mental properties. Thus, Broad's definition of "emergence" is inconsistent with many formulations of psychophysical [supervenience](#), which, I think, would strike many contemporary emergentists as an unhappy result.

Pete Mandik

Recommended Reading:

Emergence Biblio (<http://ling.ucsc.edu/~chalmers/biblio3.html#3.3c>)

Lewes, George Henry. (1875). Problems of Life and Mind. Vol 2. London: Kegan Paul, Trench, Turbner, Co.

McLaughlin, Brian P. (1992). The rise and fall of British Emergentism. Emergence or Reduction?: Essays on the Prospects of Nonreductive Physicalism. Berlin: Walter de Gruyter.

Mill, John Stuart. (1843). System of Logic. London: Longmans, Green, Reader, and Dyer. (Eight edition, 1872).

Nagel, Ernest. (1961). The Structure of Science. New York: Harcourt, Brace and Wilson.

Chris Eliasmith - [\[Dictionary of Philosophy of Mind\]](#) Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

emergent property

<[ontology](#)> an irreducible feature (now commonly called [supervenient](#)) of a complex whole that cannot be inferred directly from the features of its simpler parts. Thus, for example, the familiar taste of salt is an emergent property with respect to the sodium and chlorine of which it is composed.

Recommended Reading:

Jaegwon Kim, Mind in a Physical World: An Essay on the Mind-Body Problem and Mental Causation (Bradford, 2000);

William Hasker, The Emergent Self (Cornell, 1999);

Benjamin Pinkel, Consciousness, Matter, and Energy: The Emergence of Mind in Nature (DeVors, 1992).

see [emergence](#)

[\[A Dictionary of Philosophical Terms and Names\]](#)

06-12-2003

Emerson Ralph Waldo

<[history of philosophy](#), [biography](#)> American essayist and anti-slavery activist (1803-1882). Emerson's enthusiastic celebration of the individual person expressed a prominent element of nineteenth-century optimism in his Essays - First Series (1841) and Second Series (1844). Among his best-known philosophical works are "The American Scholar" (1837), a speech on American intellectual values, and the confidently humanistic essay, "Self-Reliance" (1841). Influenced by German Romanticism, Emerson helped to establish a lasting American taste for non-theistic spirituality.

Recommended Reading:

Ralph Waldo Emerson: Essays and Lectures, ed. by Joel Porte (Library of America, 1983);

The Essential Writings of Ralph Waldo Emerson, ed. by Brooks Atkinson and Mary Oliver (Modern Library, 2000);

The Portable Emerson, ed. by Malcolm Cowley (Viking, 1987);

The Cambridge Companion to Ralph Waldo Emerson, ed. by Joel Porte and Sandra Morris (Cambridge, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

emotion appeal

<[argument](#)> known also as to [argumentum ad populum](#). The informal fallacy of persuading someone to accept (or reject) a conclusion by arousing favorable (or unfavorable) emotions toward it or by emphasizing its widespread acceptance (or rejection) by others. Example: "Nobody with an ounce of common sense or a single shred of integrity believes that our President is truly an effective leader. Therefore, the President is not an effective leader."

Recommended Reading:

Douglas Walton, Appeal to Popular Opinion (Penn. State, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

emotionalism

<[ethics](#), [epistemology](#)> any theory of [knowledge](#) that considers [emotion](#) to be the basic valid means of knowledge (cf. [intuitionism](#)), or more commonly to an ethical theory that is based on emotion rather than [reason](#) (often having connotations of [nihilism](#) or irrationalism). In popular discourse, the word "emotionalist" tends to be used to characterize those who are hypersensitive, over-emotional, or even irrational.

(References from [hedonism](#), irrationalism, [romanticism](#), and [subjectivism](#).)

[[The Ism Book](#)]

Edited by Giovanni Benzi

16-03-2001

emotive meaning

<[language](#)> attitudes and feelings associated with the use of a word, phrase, or sentence, in contrast with its literal significance.

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

emotivism

<[ethics](#)> the meta-ethical theory according to which the meaning of moral language is exhausted by its expression, evocation, or endorsement of powerful human feelings. Thus, for example, saying "Stealing is wrong," is just an especially strong way of reporting that I disapprove of stealing, evoking a similar disapproval from others, and thereby attempting to influence future conduct-both mine and theirs. Although its origins lie in the non-cognitivist morality of Hume, emotivism reached its height early in the twentieth century, with the work of the logical positivists and Stevenson.

Recommended Reading:

Charles L. Stevenson, *Ethics and Language* (Yale, 1944);
J. O. Urmson, *The Emotive Theory of Ethics* (London, 1968);
Stephen Satris, *Ethical Emotivism* (Martinus Nijhoff, 1987).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

Empedocles

<[history of philosophy](#), [biography](#)> Greek presocratic philosopher (d. 433 B.C.) who supposed that the four [elements](#) are irreducible components of the world, joined to and separated from each other by competing principles. Love invariably strives to combine everything into a harmonious sphere, which Strife tries to shatter into distinct entities. Human beings corrupted by eating animal flesh, Empedocles, supposed, pursue philosophy in an effort to contribute positively to the cosmic cycle.

Recommended Reading:

Empedocles: *The Extant Fragments*, ed. by M. R. Wright (Hackett, 1995);
Empedocles, ed. by Brad Inwood (Toronto, 2001);
and Peter Kingsley, *Ancient Philosophy, Mystery, and Magic: Empedocles and Pythagorean Tradition* (Oxford, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

empirical

<epistemology, philosophy of science, metaphysics> <empiricism, neo-empiricism, kantian logic, a priori> <a posteriori> based on experience, or [observation](#) -- describing [knowledge](#) derived from or [warranted by sense perception](#). Compare: [a posteriori](#). Contrast: [a priori](#).

[[Philosophical Glossary](#)]

22-06-2001

empiricism

<epistemology, neo-empiricism, cartesianism, innatism> <rationalism, ockhamism, skepticism, metaphysics, test> the view that all [ideas](#), and all [knowledge](#) of the [world](#) derives solely from sensory experience or [perception](#); denying the [existence](#) of [innate ideas](#) in opposition to [rationalism](#).

[[Philosophical Glossary](#)]

22-06-2001

empiricist

<philosophical school> specifically, a British philosopher of the 17th and 18th century such as [Hobbes](#), tended to believe that knowledge derives from our sensory experience and its ramifications. [Berkeley](#) and [Hume](#), in particular, maintained (as [nominalists](#)) that the [mind](#) has no essentially abstract, rational [ideas](#) of the sort that were supposed to form the basis of science for the [rationalist](#). neo-empiricist, neo-rationalist

[[A Philosophical Glossary](#)]

30-04-2001

emulation

<logic> One system is said to emulate another when it performs in exactly the same way, though perhaps not at the same speed. A typical example would be emulation of one computer by (a program running on) another. You might use an emulation as a replacement for a system whereas you would use a simulation if you just wanted to analyse it and make predictions about it.

[[FOLDOC](#)]

16-03-2001

emulator

Hardware or [software](#) that performs [emulation](#).

[[FOLDOC](#)]

16-03-2001

encapsulation

<PI> 1. The technique used by layered protocols in which a layer adds header information to the protocol data unit (PDU) from the layer above. As an example, in Internet terminology, a packet would contain a header from the physical layer, followed by a header from the network layer (IP), followed by a header from the transport layer (TCP), followed by the application protocol data.

2. The ability to provide users with a well-defined interface to a set of functions in a way which hides their internal workings. In object-oriented programming, the technique of keeping together data structures and the methods (procedures) which act on them.

[[FOLDOC](#)]

16-03-2001

encode

1. <[algorithm](#), [hardware](#)> Any program, circuit or [algorithm](#) which [encodes](#).

Example usages: "MPEG encoder", "NTSC encoder", "[RealAudio](#) encoder".

2. <[hardware](#)> A sensor or transducer for converting rotary motion or position to a series of electronic pulses.

[[FOLDOC](#)]

16-03-2001

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[[FOLDOC](#)]

16-03-2001

encryption

<[algorithm](#), [cryptography](#)> Any procedure used in [cryptography](#) to convert plaintext into ciphertext in order to prevent any but the intended recipient from reading that data. There are many types of data encryption, and they are the basis of network security. Common types include [Data Encryption Standard](#) and public-key encryption. The Unix command [crypt](#) performs encryption.

(<http://eff.org/>)

[[FOLDOC](#)]

16-03-2001

Encyclopedists

<[history of philosophy](#), [school](#)> a group of French philosophers, including [Condillac](#), d' Alembert, d' Holbac [Diderot](#), [Helvetius](#), [Montesquieu](#), [Rousseau](#), Turgot, and [Voltaire](#), who expressed their anti-institutional views on morality, politics, and religion in the seventeen-volume Encyclopédie ou dictionnaire raisonné des sciences, des arts, et des métiers (Encyclopedia, or a Descriptive Dictionary of the Sciences, Arts, and Trades) (1751-1772), a generative text of the French Enlightenment

Recommended Reading:

Jean Le Rond D' Alembert, Preliminary Discourse to the Encyclopedia of Diderot, tr. by Richard N. Schwa (Chicago, 1995);

Encyclopedie (French & European, 1997): Vol. I, Vol. II, Vol. III, and Vol. IV.

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

end

<[ethics](#), [metaphysics](#), [philosophy of history](#), [finalism](#)> <[causality](#), [stoicism](#),> that which is sought, or the [object](#) of pursuit. Aristotle maintains that all our pursuits aim ultimately at ends that are sought or desired intrinsically, i.e. for their own sakes, and that the greatest of these intrinsic goods is [happiness](#). Things sought not for their own sake but for the sake of something else are desired extrinsically or instrumentally, as [means](#).

[[Philosophical Glossary](#)]

22-06-2001

energeia

<ontology>

Greek term for the operation or activity of anything. More technically, in the philosophy of [Aristotle](#), energeia is the actuality characteristic of every individual [substance](#) toward some end, in contrast with its [potentiality](#) or capacity to change.

Recommended Reading:

George A. Blair, *Energeia and Entelecheia: Act in Aristotle* (Ottawa, 1992);
F. E. Peters, *Greek Philosophical Terms: A Historical Lexicon* (NYU, 1967).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

Engels Friedrich

<history of philosophy ,biography> German political activist and philosopher (1820-1895). Engels collaborated with Karl [Marx](#) on the Manifest der kommunistischen Partei (Communist Manifesto) (1848) and other political works. His own philosophical writing, including *Lage der arbeitenden Klasse in England* (The Condition of the Working Class in England) (1845), *Socialism, Utopian and Scientific* (1880), and *Ludwig Feuerbach and the Outcome of Classical German Philosophy* (1888), provided an excellent exposition of [dialectical materialism](#) and significantly influenced the development of the ideology of modern [communism](#).

His analysis of bourgeois family life in *The Origin of the Family, Private Property, and the State* (1884) offers an interesting anticipation of feminist concern with the place of women in society by noting the role of patriarchal oppression in preserving the capitalist order and by urging the elimination of private domestic labor for women.

Recommended Reading:

Terrell Carver, *Friedrich Engels: His Life and Thought* (St. Martins, 1993);
Introduction to Marx and Engels: A Critical Reconstruction, ed. by Richard Schmitt, Keith Lehrer, and Norman Daniels (Westview, 1997);
and *Engels After Marx*, ed. by Manfred B. Steger and Terrell Carver (Penn. State, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

Enlightenment

<history of philosophy, school> an eighteenth-century movement that placed great emphasis on the use of [reason](#) in the development of philosophical, social, political, and scientific knowledge. Enlightenment philosophers include [Bayle](#), [Hume](#), [Wollstonecraft](#), [Kant](#), and many lesser figures.

Recommended Reading:

The Portable Enlightenment Reader, ed. by Issac Kramnick (Penguin, 1995);
Ernst Cassirer, *The Philosophy of the Enlightenment*, tr. by J. Pettegrove and F. Koelin (Princeton, 1968);
Peter Gay, *The Enlightenment (The Rise of Modern Paganism)* (Norton, 1995) and *The Science of Freedom* (Norton, 1996);
Age of Enlightenment: The Eighteenth Century Philosophers, ed. by Isaiah Berlin (Plume, 1993).

[\[A Dictionary of Philosophical Terms and Names\]](#)

06-12-2003

entailment

<logic> relation between propositions such that one of them is strictly implied by the other(s); that is, its falsity is logically impossible, given the truth of what entails it. Thus, the premises of a valid deductive argument entail its conclusion.

Recommended Reading:

Charles F. Kielkopf, *Formal Sentential Entailment* (U. Press of America, 1986)
and *Entailment*, ed. by Alan Ross Anderson, Nuel D. Belnap, and J. Michael Dunn (Princeton, 1992).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

entelecheia

<[ontology](#)> [Aristotle](#)' s Greek term for the complete reality or perfection of a thing, as the [soul](#) is of the human body. For [Leibniz](#), then, an "entelechy" is the active force resident in every [monad](#).

Recommended Reading:

George A. Blair, *Energeia and Entelecheia: Act in Aristotle* (Ottawa, 1992);
F. E. Peters, *Greek Philosophical Terms: A Historical Lexicon* (NYU, 1967);
and *The Cambridge Companion to Leibniz*, ed. by Nicholas Jolley (Cambridge, 1994).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

enthusiasm

<[emotion](#), [anthropology](#)> an exaggerated state of religious fervor or reliance on divine inspiration. [Enlightenment](#) philosophers such as [Locke](#) and [Leibniz](#) decried manifestations of enthusiasm as incompatible with the proper employment of rational faculties.

Recommended Reading:

Michael Heyd, ' Be Sober and Reasonable' : *The Critique of Enthusiasm in the Seventeenth and Eighteenth Centuries* (Brill, 1995);
and Josef Pieper, *Enthusiasm and Divine Madness: On the Platonic Dialogue Phaedrus*, tr. by Richard and Clara Winston (St. Augustine, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

enthymeme

<[logic](#)> a deductive argument (especially a [categorical syllogism](#)) from whose ordinary-language expression one or more propositions have been omitted or left unstated. Example: "Since some finches are cardinals, it follows that some birds are cardinals."

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

entropy

<[PI](#), [mathematics](#), [logic](#)> A measure of the disorder of a system. Systems tend to go from a state of order (low entropy) to a state of maximum disorder (high entropy).

The entropy of a system is related to the amount of [information](#) it contains. A highly ordered system can be described using fewer [bits](#) of information than a disordered one. For example, a string containing one million "0"s can be described using run-length encoding as [{"0", 1000000}] whereas a string of random symbols (e.g. bits, or characters) will be much harder, if not impossible, to compress in this way.

Shannon' s formula gives the entropy $H(M)$ of a message M in bits:

$$H(M) = -\log_2 p(M)$$

Where $p(M)$ is the probability of message M .

[\[FOLDOP\]](#)

16-03-2001

enumerable set

<logic> Roughly, a set that can be translated into a sequence. More precisely, a set such that every one of its members has at least one counterpart in a certain sequence (though they may have more than one counterpart), and every term in the sequence has a counterpart in the set. The resulting sequence is called an enumeration of the set. The set a, b, c is enumerated by the sequence <a, b, c>, but also by the sequence <a, a, c, b>; it is not enumerated by the sequence <a, a, c, c>.

Effectively enumerable set

An enumerable set for which there is an effective method for ascertaining the nth term of the sequence for every positive integer n.

Recursively enumerable set

A set that is effectively enumerable by some [recursive function](#). Under Church' s thesis, a set is recursively enumerable [iff](#) it is effectively enumerable.

[Glossary of First-Order Logic]

16-03-2001

enumerated type

<programming> (Or "enumeration") A [type](#) which includes in its definition an exhaustive list of possible values for variables of that type. Common examples include [Boolean](#), which takes values from the list [true, false], and day-of-week which takes values [Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday]. Enumerated types are a feature of strongly typed languages, including [C](#) and Ada.

Characters, (fixed-size) integers and even floating-point types could be (but are not usually) considered to be (large) enumerated types.

[FOLDOP]

16-03-2001

enumeration

1. <mathematics> A [bijection](#) with the [natural numbers](#); a counted set.

Compare well-ordered.

2. <programming> [enumerated type](#).

[FOLDOP]

16-03-2001

environment

[environment variable](#)

22-11-2003

environment variable

<PI, operating system> A [variable](#) that is bound in the current environment. When evaluating an expression in some environment, the evaluation of a variable consists of looking up its name in the environment and substituting its value.

Most programming languages have some concept of an environment but in Unix shell scripts it has a specific meaning slightly different from other contexts. In shell scripts, environment variables are one kind of shell variable. They differ from local variables and command line arguments in that they are inherited by a child process. Examples are the PATH variable that tells the shell the file system paths to search to find command executables and the TZ variable which contains the local time zone. The variable called "SHELL" specifies the type of shell being used.

These variables are used by commands or shell scripts to discover things about the environment they are operating in. Environment variables can be changed or created by the user or a program.

To see a list of environment variables type "setenv" at the csh or tcsh prompt or "set" at the sh, bash, jsh or ksh prompt.

In other programming languages, e.g. functional programming languages, the environment is extended with new bindings when a [function](#)'s parameters are bound to its [actual arguments](#) or when new variables are declared. In a block-structured [procedural](#) language, the environment usually consists of a linked list of activation records.

[[FOLDOC](#)]

16-03-2001

Epictetus

<[history of philosophy](#), [biography](#)> even though he was born a slave in Hierapolis and endured a permanent physical disability, Epictetus (55-135) held that all human beings are perfectly free to control their lives and to live in harmony with nature. After intense study of the traditional Stoic curriculum (established by [Zeno of Citium](#) and [Chrysippus](#)) of [logic](#), [physics](#), and [ethics](#), Epictetus spent his entire career teaching philosophy and promoting a daily regime of rigorous self-examination. He eventually gained his freedom, but was exiled from Rome by Domitian in 89. Epictetus' s pupil Arrianus later collected lecture notes from the master and published them as the Discourses.

The more epigrammatic Encheiridion, or Manual represents an even later distillation of the same material. From a fundamental distinction between our ability to think or feel freely and our lack of control over external events or circumstances, Epictetus derived the description of a calm and disciplined life. We can never fail to be happy, he argued, if we learn to desire that things should be exactly as they are. That the same approach to human life may work for others as well as for a slave is suggested by the persuasive oratory of the Roman statesman Seneca. The Meditations of Roman emperor Marcus Aurelius illustrate the practical value of a Stoic approach even in the best of circumstances.

Recommended Reading:

Primary sources:

Epictetus, Enchiridion, tr. by George Long (Prometheus, 1955).

Secondary sources:

Malcolm Schofield, The Stoic Idea of the City (Chicago, 1999);

Adolf Friedrich Bonhoeffer, The Ethics of the Stoic Epictetus, tr. by William O. Stephens (Peter Lang, 2000);

A. A. Long, Hellenistic Philosophy: Stoics, Epicureans, Sceptics (California, 1986).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

Epicureanism

<[ethics](#)> school in ancient [ethics](#) founded by the Greek philosopher [Epicurus](#) (341-271 BC). This school began in the generation after the death of [Aristotle](#) and lasted over 500 years. Although Epicurus was an avowed advocate of [hedonism](#), he did not advocate the wanton pursuit of pleasure. In fact, his doctrine was quite strict and was far removed from our sense of the word "hedonism", since he held that the greatest pleasure a person can achieve lies in the absence of all pains and disturbances, and that the pleasures and pains of the mind are of greater importance than those of the body. While Epicureanism was much more individualistic than [stoicism](#), its view of happiness was less "activist" than that of [Aristotelianism](#) and one could even draw comparisons between Epicureanism and Eastern views like [Taoism](#). (References from [cynicism](#), [hedonism](#), [pessimism](#), [stoicism](#), and [Taoism](#).)

[[The Ism Book](#)]

Edited by Giovanni Benzi

16-03-2001

Epicurus

<[history of philosophy](#), [biography](#)> Epicurus (341-270 B.C.) was born in the Greek colony on Samos, but spent most of his active life in Athens, where he founded yet another school of philosophy. At "the Garden," Epicurus and his friends lived out their ideals for human life, talking about philosophical issues but deliberately detaching themselves from active involvement in social affairs. Epicurus whole-heartedly adopted the [atomism](#) of [Leucippus](#) and [Democritus](#), maintaining that all objects and events-including human lives-are in reality nothing more than physical interactions among minute indestructible particles. As they fall toward the center of the earth, [atoms](#) swerve from their paths to collide with each other and form temporary compound beings. There is no necessity about any of this, of course; everything happens purely by chance.

In his Letter to Menoeceus and Principle Doctrines, Epicurus discussed the consequences of this view for the human attempt to achieve [happiness](#). Since death is a total annihilation that cannot be experienced, in our present lives we need only live a simple [life](#) and seek always to avoid physical pain. It is pleasure, understood in this negative sense, that is the highest good for Epicurus. Freedom from mental disturbance is the very most for which one can hope.

Recommended Reading:

Primary sources:

The Essential Epicurus: Letters, Principal Doctrines, Vatican Sayings, and Fragments, tr. by Eugene Michael O' Connor (Prometheus, 1993).

Secondary sources:

Howard Jones, The Epicurean Tradition (Routledge, 1992);

A. A. Long, Hellenistic Philosophy: Stoics, Epicureans, Sceptics (California, 1986).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

Epimenides paradox

[liar paradox](#)

22-11-2003

epiphenomenalism

<[anthropology](#), [philosophy of mind](#)> belief that [consciousness](#) is an incidental side-effect ("epiphenomenon") or by-product of physical or mechanical reality. On this view, although mental events are in some sense real they have no causal efficacy in the material realm.

Recommended Reading:

D. M. Armstrong, The Mind-Body Problem: An Opinionated Introduction (Westview, 1999);

and Jaegwon Kim, Mind in a Physical World: An Essay on the Mind-Body Problem and Mental Causation (Bradford, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

epistemology

<[epistemology](#)> one of the major branches of philosophy, also known as philosophy of [knowledge](#). It concerns the forms, nature, preconditions, sources, types and limits of [knowledge](#).

Most of contemporary Anglo-American epistemology concentrates on:

1. the analysis of propositional knowledge (knowing that) as opposed to, e.g., procedural knowledge (knowing how) and knowledge by acquaintance (knowing who);
2. the nature, sources, and justification of its major types, e.g. [a priori](#) and [empirical](#);
3. the tripartite analysis of knowledge as justified true belief (see [Gettier problem](#));
4. supplying a theory of the justification of empirical knowledge (foundationalism, coherentism, or other).
5. the analysis of sceptical [arguments](#).

Luciano Floridi

16-03-2001

epoché

<[epistemology](#), [skepticism](#), [phenomenology](#)> Greek term for cessation or stoppage; hence, in the philosophy of the skeptics, the suspension of [judgment](#). Only by refusing either to affirm or to deny the [truth](#) of what we cannot know, they supposed, can we achieve the [ataraxia](#) of a peaceful mind.

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

equals

<[character](#)> "=", ASCII character 61.

Common names: ITU-T: equals; gets; takes. Rare: quadrathorpe; INTERCAL: half-mesh.

Equals is used in many languages as the [assignment](#) operator though earlier languages used "!=" ("becomes equal to") to avoid upsetting mathematicians with statements such as "x = x+1". It is also used in compounds such as "<=", ">=", "==", "/=", "!=" for various comparison operators and in [C](#)'s "+=", "*=" etc. which mimic the [primitive](#) operations of two-address code.

[[FOLDOC](#)]

16-03-2001

equational logic

<[logic](#)> First-order equational logic consists of [quantifier](#)-free terms of ordinary first-order logic, with equality as the only [predicate](#) symbol. The [model theory](#) of this logic was developed into [Universal algebra](#) by Birkhoff et al. [Birkhoff, Gratzner, Cohn]. It was later made into a branch of category theory by Lawvere ("algebraic theories").

[[FOLDOC](#)]

16-03-2001

equivalence

<[logic](#)> A truth [function](#) that returns truth when its two [arguments](#) have the same truth-value, and false otherwise. Also the connective denoting this [function](#); also the compound proposition built from this connective. Syntactically: the two propositions imply one another. Semantically: they have the same models. Also called a biconditional, or biconditional statement.

Logical equivalence

A tautologous statement of material equivalence (next).

Material equivalence

A truth [function](#) that is true when its two [arguments](#) have the same truth-value (not necessarily the same meaning). Notation: $p \Leftrightarrow q$, or $p \text{ iff } q$.

See also [equivalence thesis](#) [partial equivalence relation](#).

[Glossary of First-Order Logic]

16-03-2001

equivalence class

<[mathematics](#), [logic](#)> An equivalence class is a subset whose elements are related to each other by an [equivalence relation](#). The equivalence classes of a set under some relation form a [partition](#) of that set (i.e. any two are either equal or [disjoint](#) and every element of the set is in some class).

[[FOLDOC](#)]

16-03-2001

equivalence class partitioning

<[programming](#)> A software testing technique that involves identifying a small set of representative input values that invoke as many different input conditions as possible.

[[FOLDOC](#)]

16-03-2001

equivalence relation

<[mathematics](#), [logic](#)> A relation R on a set including elements a, b, c, which is reflexive ($a R a$), symmetric ($a R b \Rightarrow b R a$) and transitive ($a R b \wedge b R c \Rightarrow a R c$). An equivalence relation defines an [equivalence class](#).

See also [equivalence partial equivalence relation](#).

[[FOLDOC](#)]

16-03-2001

equivalence thesis

<[logic](#)> the equivalence thesis states that, for any proposed notion of truth, each instance of the schema "S is true if and only if P" resulting from the substitution of a translation of the sentence designated by S for P, is true. This thesis is often taken to be a minimal requirement on any notion of truth.

Note that the equivalence thesis does not presuppose a correspondence notion of truth. For example, deflationary notions of truth, such as the Quinian "disquotational" notion, satisfy the equivalence thesis.

Recommended Reading:

Dummett, Michael (1978). Truth and Other Enigmas. Cambridge, MA: Harvard University Press.

Devitt, Michael (1984). Realism and Truth. Princeton, NJ: Princeton University Press.

Whit Schonbein

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

equivalent sets

<[logic](#)> Two sets are equivalent [iff](#) they have the same cardinality, that is, if they can be put into one-to-one correspondence. Also called equinumerous sets. Notation: $A \approx B$; sometimes $A \sim B$.

[Glossary of First-Order Logic]

16-03-2001

equivocal

having more than one [meaning](#).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

equivocation

the informal fallacy that can result when an ambiguous word or phrase is used in different senses within a single argument. Example: "Odd things arouse human suspicion. But seventeen is an odd number. Therefore, seventeen arouses human suspicion."

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

ER

Entity-Relationship

22-11-2003

Erasmus Desiderius

<[history of philosophy](#), [biography](#)> Dutch humanist (1466-1536). Erasmus produced editions of classical texts far superior to those of the medieval period and, in *Diatribae de libero arbitrio* (Discourse on Free Will) (1524) defended the moral freedom of individual human beings. The *Ecomium moriae id est Laus stultitiae* (Praise of Folly) (1509) satirized the political and religious institutions of his time, and many of his *Colloquia* (1518) are stinging condemnations of ecclesiastical fraud.

Recommended Reading:

Christian Humanism and the Reformation: Selected Writings of Erasmus, ed. by John C. Olin (Fordham, 1987); Erasmus: His Life, Works and Influence, tr. by J. C. Grayson (Toronto, 1996)

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

Eratosthenes

<[history of philosophy](#), [biography](#)> African mathematician (276-197 B.C.) who discovered a method for identifying prime numbers and calculated the circumference of the earth. Eratosthenes served for several decades as head of the famous Greek library at Alexandria.

Recommended Reading:

P. M. Fraser, *Eratosthenes of Cyrene* (Oxford, 1972).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

Erigena John Scotus

<[history of philosophy](#), [biography](#)> Irish philosopher (812-877). In *De Divisione Naturae* (On the Distribution of Nature) (863), Erigena notoriously combined Greek and neoplatonic elements into a highly rationalized scheme in which everything both emanates from and later is reabsorbed by **god**. Although the divine is incomprehensible for Erigena, god may be known indirectly, as manifested in the created order. The views on human **freedom** he defended in *De praedestinatione* (On Predestination) (851) earned for Erigena the official condemnation of the church.

Recommended Reading:

Deirdre Carabine, *John Scottus Eriugena* (Oxford, 2000)

Henry Bett, *Johannes Scotus Erigena: A Study in Medieval Philosophy* (Hyperion, 1979).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

eros

<[anthropology](#), [affective life](#)> Greek personification of love; hence, sexual desire or love generally. [Plato](#)'s Symposium offers a set of speeches on the nature of love in human life.

Recommended Reading:

F. E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967);
 Louis A. Ruprecht, Jr., Symposia: Plato, the Erotic, and Moral Value (SUNY, 1999);
 Jamey Hecht, Plato's Symposium: Eros and the Human Predicament (Twayne, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

error

1. A discrepancy between a computed, observed, or measured value or condition and the true, specified, or theoretically correct value or condition.
2. <[programming](#)> A mental mistake made by a programmer that may result in a program [fault](#).
3. (verb) What a program does when it stops as result of a programming error.

[\[FOLDOC\]](#)

16-03-2001

error detection and correction

<[algorithm](#), [storage](#)> (EDAC, or "error checking and correction", ECC) A collection of methods to detect errors in transmitted or stored data and to correct them. This is done in many ways, all of them involving some form of coding. The simplest form of error detection is a single added [parity bit](#) or a cyclic redundancy check. Multiple parity bits can not only detect that an error has occurred, but also which bits have been inverted, and should therefore be re-inverted to restore the original data. The more extra bits are added, the greater the chance that multiple errors will be detectable and correctable.

Several codes can perform Single Error Correction, Double Error Detection (SECDEC). One of the most commonly used is the Hamming code.

At the other technological extreme, cuniform texts from about 1500 B.C. which recorded the dates when Venus was visible, were examined on the basis of contained redundancies (the dates of appearance and disappearance were supplemented by the length of time of visibility) and "the worst data set ever seen" by [Huber, Zurich] was corrected.

RAM which includes EDAC circuits is known as [error correcting memory](#) (ECM).

[Wakerly, "Error Detecting Codes", North Holland 1978].

[Hamming, "Coding and Information Theory", 2nd Ed, Prentice Hall 1986].

[\[FOLDOC\]](#)

16-03-2001

esse est percipi

Latin phrase meaning "to be is to be perceived." According to [Berkeley](#), this is the most basic feature of all sensible objects; for spirits, on the other hand, esse est percipere ("to be is to perceive"). Granting this to be the most fundamental principle of idealistic philosophy, [Moore](#) argued that it is indefensible.

Recommended Reading:

George Berkeley, Principles of Human Knowledge / Three Dialogues Between Hylas and Philonous, ed. by Roger Woolhouse (Penguin, 1988);
 Kenneth P. Winkler, Berkeley: An Interpretation (Clarendon, 1994).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

essence

<[ontology](#), [metaphysics](#), [accident](#), [existentialism](#)> that without which a specific [thing](#) or [substance](#) would not be one and the same (type of) [individual](#) it is, those features of an object that make it the kind of object it is as opposed to its [accidents](#) (e.g. a person' s ability to reason is an essential human feature, while hair color would be an [accident](#)) - [Essentialism](#) is the view that the essence - accident distinction is not arbitrary but rooted in the nature of reality.

based on [[A Philosophical Glossary](#), [Philosophical Glossary](#)]

28-07-2001

essence - accident

<[ontology](#), [metaphysics](#), [accident](#), [existentialism](#)> distinction among the [attributes](#), properties, or [qualities](#) of [substances](#). A thing' s possession of its essential properties is necessary either for its individual existence or, at least, for its membership in a specific kind. [Accidental features](#), by contrast, are those which the thing merely happens to have, even though it need not. Thus, for example, rationality may be part of the essence of any human being, but being able to calculate square roots accurately in one' s head is (surely) an accident. The legitimacy of the distinction itself is called into question by philosophers ("anti-essentialists") who doubt whether any features are genuinely essential to the things that have them.

Recommended Reading:

Charlotte Witt, Substance and Essence in Aristotle: An Interpretation of Metaphysics vii-ix (Cornell, 1994);

Saul A. Kripke, Naming and Necessity (Harvard, 1982);

Garth L. Hallett, Essentialism: A Wittgensteinian Critique (SUNY, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

essentialism

<[metaphysics](#), [epistemology](#)>

1) [Platonic idealism](#)

2) the view that all things have essential properties which can be discerned by reason (sometimes attributed to [Aristotelianism](#)).

See [substantialism](#)

[[The Ism Book](#)]

Edited by Giovanni Benzi

16-03-2001

estrangement

withdrawal from things or people; see [alienation](#).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

eternal return

belief that everything that happens has happened before and will happen again, since the universe (or time itself) is fundamentally cyclical. A standard feature of Pythagorean and Stoic thought, this view was more recently adopted as a basis for practical hope by [Nietzsche](#).

Recommended Reading:

Joan Stambaugh, Nietzsche' s Thought of Eternal Return (Taylor & Francis, 1988)

Mircea Eliade, Myth of the Eternal Return, tr. by Willard R. Trask (Princeton, 1971).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

ethical relativism

<[ethics](#), [anthropology](#), [cultural relativism](#), [subjectivism](#)> the view that what is morally permissible, obligatory, and forbidden differs among individuals or between cultures. According to ethical relativism nothing is absolutely [good](#) or [bad](#) or [right](#) or wrong: rather, relativists hold, what is right or wrong is so for a given [individual](#) or within a given culture or society: the underlying [idea](#) is that the individual or society' s judging thing right or wrong or good or [evil](#) makes them so for that individual or society. See [cultural relativism](#), [subjectivism](#).

[\[Philosophical Glossary\]](#)

22-06-2001

ethics

<[ethics](#)> branch of philosophy concerned with the evaluation of human conduct. Philosophers commonly distinguish: [descriptive ethics](#), the factual study of the ethical standards or principles of a group or tradition; [normative ethics](#), the development of theories that tematically denominate right and wrong actions; [applied ethics](#), the use of these theories to form judgments regarding practical cases; and meta-ethics, careful analysis of the meaning and justification of ethical claims.

Recommended Reading:

Lawrence M. Hinman, *Ethics: A Pluralistic Approach To Moral Theory* (Harcourt, 1997);
A Companion to Ethics, ed. by Peter Singer (Blackwell, 1993);
 D. D. Raphael, *Moral Philosophy* (Oxford, 1994);
 James Rachels, *The Elements of Moral Philosophy* (McGraw-Hill, 2000);
 The Blackwell Guide to Ethical Theory, ed. by Hugh LaFollette (Blackwell, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

Ethics Glossary

<[source](#)> the Ethics Glossary (<http://ethics.acusd.edu/Glossary.html>) edited by Lawrence M. Hinman, Professor of Philosophy and Director of the Values Institute at the University of San Diego. It is part of the service "Ethics Updates".

From the home page "Ethics Updates is" designed primarily to be used by ethics instructors and their students. It is intended to provide updates on current literature, both popular and professional, that relates to ethics.

Some definitions in FOLDOP are from the version published in 2001-03-27.

27-03-2001

ethnicity

<[ethics](#)> a person' s ethnicity refers to that individual' s affiliation with a particular cultural tradition that may national (French) or regional (Sicilian) in character. Ethnicity differs from race in that ethnicity is a sociological concept whereas race is a biological phenomenon.

26-03-2001

ethos

<[morality](#)> Greek word for custom or habit, the characteristic conduct of an individual human life. Hence, beginning with Aristotle, ethics is the study of human conduct, and the Stoics held that all behavior - for good or evil - arises from the eqos of the individual.

Recommended Reading:

F. E. Peters, *Greek Philosophical Terms: A Historical Lexicon* (NYU, 1967).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

Euclid

<[history of philosophy](#), [biography](#)> Greek mathematician (365-300 B.C.) whose *Elementae* (*Elements*) offered an axiomatic system for geometry based only on a few "common notions" and five basic postulates: (1) Any two points can be joined by a unique straight line. (2) A straight line can be extended indefinitely in either direction. (3) From a center point, a circle can be drawn with any radius. (4) All right angles are equal to each other. (5) If two straight lines crossing a third form angles less than two right angles on one of its sides, then indefinite extensions of these lines eventually meet. Although rejection of the fifth postulate eventually led to the development of alternative geometries by [Lobachevsky](#) and [Riemann](#), Euclid's emphasis on axiomatic structure remained significant for mathematicians like [Peano](#) and [Hilbert](#) and served as a significant model for such philosophers as [Hobbes](#) and [Spinoza](#).

Recommended Reading:

Thomas L. Heath, *History of Greek Mathematics: From Thales to Euclid* (Dover, 1981).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

Euclidean Algorithm

Euclid's Algorithm Euclid's Algorithm [algorithm](#) (Or "Euclidean Algorithm") An [algorithm](#) for finding the [greatest common divisor](#) (GCD) of two numbers.

It relies on the identity $\gcd(a, b) = \gcd(a-b, b)$

To find the GCD of two numbers by this algorithm, repeatedly replace the larger by subtracting the smaller from it until the two numbers are equal. E.g. 132, 168 -> 132, 36 -> 96, 36 -> 60, 36 -> 24, 36 -> 24, 12 -> 12, 12 so the GCD of 132 and 168 is 12.

This algorithm requires only subtraction and comparison operations but can take a number of steps proportional to the difference between the initial numbers (e.g. $\gcd(1, 1001)$ will take 1000 steps).

[[FOLDOP](#)]

16-03-2001

eudaimonia

<[ethics](#)> this is the word that Aristotle uses for "happiness" or "flourishing." It comes from the Greek "eu," which means "happy" or "well" or "harmonious," and "daimon," which refers to the individual's spirit. It is a crucial term in [virtue ethics](#). See also [eudaimonism](#).

28-04-2001

eudaimonism

<[ethics](#)> the word eudaimonism comes from the Greek word for happiness (eudaimonia), and refers to any conception of [ethics](#) that puts human happiness and the complete life of the individual at the center of ethical concern. This is solely a technical term and has no popular equivalent, though sometimes [humanism](#) comes close. [Aristotle](#) is the founder of eudaimonism. By contrast, note that [existentialism](#) rejects happiness as a bourgeois fantasy, and that even [stoicism](#) and [Epicureanism](#) may turn their backs on eudaimonism since they don't advocate individual fulfillment but only the lack of emotion or pain. (References from [altruism](#), [Aristotelianism](#), [existentialism](#), [individualism](#), [optimism](#), and [pessimism](#).)

Based on [[The Ism Book](#)]

Edited by Giovanni Benzi

16-03-2001

eudaimonistic

[eudaimonia](#)

23-11-2003

Euler Leonhard

<[history of philosophy](#), [biography](#)> Swiss mathematician and physicist (1707-1783); author of *Introductio in analysin infinitorum* (Introduction to infinite analyses) (1748) and many other mathematical treatises. Euler made significant contributions to the development of number theory, introduced the use of many now-familiar mathematical symbols, and devised (a century before [Venn](#)) a convenient set of topographical diagrams for representing the logical relationships expressed in categorical propositions and syllogisms. Euler's chief accomplishments are expressed in non-technical language in the *Lettres à une princesse d'Allemagne* (Letters for a German Princess) (1772).

Recommended Reading:

Leonhard Euler, *Foundations of Differential Calculus*, tr. by John D. Blanton (Springer Verlag, 2000);
 Morris Kline, *Mathematical Thought from Ancient to Modern Times* (Oxford, 1990);
 William Dunham, *Euler: The Master of Us All* (Math. Assn. of Amer., 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

06-12-2003

event

1. <[software](#)> An occurrence or happening of significance to a task or program, such as the completion of an asynchronous input/output operation. A task may wait for an event or any of a set of events or it may (request to) receive asynchronous notification (a [signal](#) or interrupt) that the event has occurred.

See also event-driven.

2. <[data](#)> A transaction or other activity that affects the records in a file.

[[FOLDOC](#)]

16-03-2001

event-driven

<[PI](#)> A kind of program, such as a [graphical user interface](#), with a main loop which just waits for [events](#) to occur. Each event has an associated handler which is passed the details of the event, e.g. mouse button 3 pressed at position (355, 990).

For example, X window system and most Visual Basic application programs are event-driven.

See also callback.

[[FOLDOC](#)]

16-03-2001

evidence

support for the [truth](#) of a [proposition](#), especially that derived from empirical observation or [experience](#).

Recommended Reading:

Karl R. Popper, *Logic of Scientific Discovery* (Routledge, 1992).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

evil problem of

<[ontology](#), [ethics](#)> bad things sometimes happen. Whether they are taken to flow from the operation of the world ("natural evil"), to result from deliberate human cruelty ("moral evil"), or simply to correlate poorly with what seems to be deserved ("non-karmic evil"), such events give rise to basic questions about whether or not life is fair. The presence of [evil](#) in the world poses a special difficulty for traditional theists, as both [Epicurus](#) and [Hume](#) pointed out. Since an omniscient [god](#) must be aware of [evil](#), an omnipotent [god](#) could prevent [evil](#), and a benevolent [god](#) would not tolerate [evil](#), it should follow that there is no [evil](#). Yet there is [evil](#), from which atheists conclude that there is no omniscient, omnipotent, and benevolent [god](#).

The most common theistic defense against the problem, propounded (in different forms) by both [Augustine](#) and [Leibniz](#), is to deny the reality of evil by claiming that apparent cases of evil are merely parts of a larger whole

that embodies greater good. More recently, some have questioned whether the traditional notions of omnipotence and omniscience are coherent.

Recommended Reading:

The Problem of Evil: A Reader, ed. by Mark Larrimore (Blackwell, 2000);
The Problem of Evil, ed. by Marilyn McCord Adams and Robert M. Adams (Clarendon, 1991);
Richard Swinburne, Providence and the Problem of Evil (Oxford, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

evolution strategy

(ES) A kind of [evolutionary algorithm](#) where individuals (potential solutions) are encoded by a set of real-valued "object variables" (the individual's "genome"). For each object variable an individual also has a "strategy variable" which determines the degree of mutation to be applied to the corresponding object variable. The strategy variables also mutate, allowing the rate of mutation of the object variables to vary.

An ES is characterised by the population size, the number of offspring produced in each generation and whether the new population is selected from parents and offspring or only from the offspring.

ES were invented in 1963 by Ingo Rechenberg, Hans-Paul Schwefel at the Technical University of Berlin (TUB) while searching for the optimal shapes of bodies in a flow.

[\[FOLDOC\]](#)

16-03-2001

evolutionary algorithm

<[algorithm](#)> (EA) An [algorithm](#) which incorporates aspects of natural selection or survival of the fittest. An evolutionary algorithm maintains a population of structures (usually randomly generated initially), that evolves according to rules of selection, recombination, mutation and survival, referred to as genetic operators. A shared "environment" determines the fitness or performance of each individual in the population. The fittest individuals are more likely to be selected for reproduction (retention or duplication), while recombination and mutation modify those individuals, yielding potentially superior ones.

EAs are one kind of [evolutionary computation](#) and differ from [genetic algorithms](#). A GA generates each individual from some encoded form known as a "chromosome" and it is these which are combined or mutated to breed new individuals.

EAs are useful for optimisation when other techniques such as gradient descent or direct, analytical discovery are not possible. Combinatoric and real-valued function optimisation in which the optimisation surface or fitness landscape is "rugged", possessing many locally optimal solutions, are well suited for evolutionary algorithms.

[\[FOLDOC\]](#)

16-03-2001

evolutionary computation

Computer-based problem solving systems that use computational models of evolutionary processes as the key elements in design and implementation.

A number of evolutionary computational models have been proposed, including [evolutionary algorithms](#), [genetic algorithms](#), the [evolution strategy](#), [evolutionary programming](#), and [artificial life](#).

The Hitchhiker's Guide to Evolutionary Computation (<http://www.cis.ohio-state.edu/hypertext/faq/bngusenet/comp/ai/genetic/top.html>).

Recommended Reading:

(<http://iinwww.ira.uka.de/bibliography/Ai/EC-ref.html>).

Usenet newsgroup: news:comp.ai.genetic.

[\[FOLDOC\]](#)

16-03-2001

evolutionary programming

(EP) A [stochastic](#) optimisation strategy originally conceived by Lawrence J. Fogel in 1960. An initially random population of individuals (trial solutions) is created. Mutations are then applied to each individual to create new individuals. Mutations vary in the severity of their effect on the behaviour of the individual. The new individuals are then compared in a "tournament" to select which should survive to form the new population.

EP is similar to a [genetic algorithm](#), but models only the behavioural linkage between parents and their offspring, rather than seeking to emulate specific genetic operators from nature such as the encoding of behaviour in a genome and recombination by genetic crossover.

EP is also similar to an [evolution strategy](#) (ES) although the two approaches developed independently. In EP, selection is by comparison with a randomly chosen set of other individuals whereas ES typically uses [deterministic](#) selection in which the worst individuals are purged from the population.

[[FOLDOC](#)]

16-03-2001

exclusive disjunction

[disjunction](#)

30-12-2003

exclusive premises

the formal [fallacy](#) committed in a categorical [syllogism](#) that is [invalid](#) because both of its [premises](#) are [negative](#). Example: "Since no mammals are fish and some fish are not whales, it follows that some whales are not mammals."

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

existence

<[ontology](#)> instantiation in reality, or actual being. [Kant](#) pointed out that existence is not a predicate, and [Frege](#) proposed that it is a second-order property of those first-order properties that happen to be instantiated. The metaphysical question of what kinds of things exist is the subject of [ontology](#), as is the even more general question of why there is something rather than nothing.

Recommended Reading:

Colin McGinn, Logical Properties: Identity, Existence, Predication, Necessity, Truth (Clarendon, 2001);
Jean-Paul Sartre, Truth and Existence, tr. by Adrian Van Den Hoven and Ronald Aronson (Chicago, 1995);
Emmanuel Levinas, Existence and Existents, tr. by Robert Bernaconi (Duquesne, 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

existence proof

<[logic](#)> A proof that something exists (e.g. a number, [wff](#), proof, etc. with certain properties) but that does not produce an example.

[constructive proof](#)

[Glossary of First-Order Logic]

16-03-2001

existential fallacy

<logic> the [formal fallacy](#) committed in a [categorical syllogism](#) that is [invalid](#) because it has two universal premises and a particular conclusion. Example: "All inhabitants of another planet are friendly people, and all Martians are inhabitants of another planet. Therefore, some Martians are friendly people."

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

existential import

<logic> Quantified statements have existential import [iff](#) (in the standard interpretation) they are taken to assert the existence of their subjects. Aristotle held that all quantified propositions have existential import.

The modern view, due to George Boole, is that existentially quantified statements do and that universally quantified statements do not.

Hence in the modern view, $(x)(Ax \Rightarrow Bx)$ ("All A' s are B' s") is noncommittal on the existence of any A' s; it may be true even for an interpretation whose domain contains no objects to instantiate x, or none that happen to be A' s. By contrast, $(\exists x)(Ax \wedge Bx)$ ("Some A' s are B' s") asserts the existence of at least one A, and it would be false for any interpretation whose domain contained no such values for x.

See [predicate logic](#), [quantifier](#)

[Glossary of First-Order Logic]

16-03-2001

existential instantiation

[instantiation](#)

30-12-2003

existential quantifier

[quantifier](#)

30-12-2003

existentialism

<[ethics](#), [subjectivism](#)> a (mostly) twentieth-century approach that emphasizes the primacy of individual existence over any presumed natural essence for human beings. Although they differ on many details, existentialists generally suppose that the fact of my existence as a human being entails both my unqualified [freedom](#) to make of myself whatever I will and the awesome responsibility of employing that freedom appropriately, without being driven by anxiety toward escaping into the inauthenticity or self-deception of any conventional set of rules for behavior, even though the entire project may turn out to be absurd. Prominent existentialists include Kierkegaard, [Heidegger](#), [Jaspers](#), [Beauvoir](#), [Sartre](#), and [Camus](#).

Recommended Reading:

Existentialism: From Dostoevsky to Sartre, ed. by Walter Kaufmann (Meridian, 1988);

L. Nathan Oaklander, Existentialist Philosophy: An Introduction (Prentice-Hall, 1995);

Robert C. Solomon, Existentialism (McGraw-Hill, 1974);

Robert Goodwin, An Introduction to Existentialism (Dover, 1962);

William Barrett, Irrational Man: A Study in Existential Philosophy (Anchor, 1962).

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

expected value

the net return it is reasonable to anticipate as the result of an action or investment. Expected value may be calculated as the sum of the products of each possible outcome and the relative likelihood that it will occur.

Recommended Reading:

James T. Fey, Elizabeth D. Phillips, and Catherine Anderson, What Do You Expect?: Probability & Expected Value (Seymour, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

<[2001-10-29](#)>

experientialism

[empiricism](#)

00-00-0000

experiment

<[epistemology](#), [philosophy of science](#),[hypothesis](#), [ockhamism](#)> <[empiricism](#), neo-empiricism> <[hypotetical deductive method](#)> a trial or [test](#) of a scientific hypothesis or [generalization](#) by manipulation of environmental factors to observe whether what results agrees, or disagrees, with what the [hypothesis](#) predicts.

See: [hypothesis](#).

[[Philosophical Glossary](#)]

22-06-2001

experimentalism

<[philosophy of science](#)> [empiricism](#), especially as applied to the methods of scientific inquiry.

[[The Ism Book](#)]

Edited by Giovanni Benzi

16-03-2001

expert system

<[artificial intelligence](#)> A computer program that contains a [knowledge base](#) and a set of [algorithms](#) or rules that infer new facts from knowledge and from incoming data.

An expert system is an [artificial intelligence](#) application that uses a knowledge base of human expertise to aid in solving problems. The degree of problem solving is based on the quality of the data and rules obtained from the human expert. Expert systems are designed to perform at a human expert level. In practice, they will perform both well below and well above that of an individual expert.

The expert system derives its answers by running the knowledge base through an [inference engine](#), a software program that interacts with the user and processes the results from the rules and data in the knowledge base.

Expert systems are used in applications such as medical diagnosis, equipment repair, investment analysis, financial, estate and insurance planning, route scheduling for delivery vehicles, contract bidding, counselling for self-service customers, production control and training.

[Difference from "knowledge-based system"?)

[[FOLDOP](#)]

16-03-2001

explanandum

"that which needs to be explained", plural = explananda

16-03-2001

explanation

<[philosophy of science, logic](#)> a structure, act, or process that provides understanding.

Providing explanations is one of the most important activities in high level [cognition](#). The nature of explanation and its role in thinking have been addressed by philosophers, psychologists, and [artificial intelligence](#) researchers; [inference to the best explanation](#) can be understood in terms of maximising [coherence](#) among competing hypotheses and evidence.

Recommended Reading:

Chi, M. T. H., Bassok, M., Lewis, M. W., Reimann, P., Glaser, R. (1989).

Self-explanations: How students study and use examples in learning to solve problems. *Cognitive Science*, 13, 145-182.

Harman, G. (1986). *Change in view: Principles of reasoning*. Cambridge, MA: MIT Press/Bradford Books.

Kitcher, P., Salmon, W. (1989). *Scientific explanation*. Minneapolis: University of Minnesota Press.

Leake, D. B. (1992). *Evaluating explanations: A content theory*. Hillsdale, NJ: Erlbaum.

Mitchell, T., Keller, R., Kedar-Cabelli, S. (1986). Explanation-based generalisation: A unifying view.

Machine Learning, 1, 47-80.

Schank, R. C. (1986). *Explanation patterns: Understanding mechanically and creatively*. Hillsdale, NJ: Erlbaum.

Thagard, P. (1992). *Conceptual revolutions*. Princeton: Princeton University Press.

Paul Thagard

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

explicit memory

<[philosophy of mind](#)> those memories which a subject is able to cite as being a [memory](#) of a particular event.

See also [implicit memory](#)

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

exponential

1. <[mathematics](#)> A function which raises some given constant (the "base") to the power of its argument. I.e.

$$f x = b^x$$

If no base is specified, [e](#), the base of [natural logarithms](#), is assumed.

2. <[complexity](#)> exponential-time algorithm.

[[FOLDOP](#)]

16-03-2001

exponential-time

<[complexity](#)> The set or property of problems which can be solved by an exponential-time algorithm but for which no polynomial-time algorithm is known.

[[FOLDOP](#)]

16-03-2001

exponential-time algorithm

<complexity> An [algorithm](#) (or [Turing Machine](#)) that is guaranteed to terminate within a number of steps which is a [exponential](#) function of the size of the problem.

For example, if you have to check every number of n digits to find a solution, the [complexity](#) is $O(10^n)$, and if you add an extra digit, you must check ten times as many numbers.

Even if such an algorithm is practical for some given value of n , it is likely to become impractical for larger values. This is in contrast to a polynomial-time algorithm which grows more slowly.

See also [computational complexity](#), polynomial-time, NP-complete.

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16-03-2001

expression tree

<mathematics, grammar> The [syntax tree](#) of an [expression](#).

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16-03-2001

expressionism

<aesthetics, ethics> 1. [aesthetics](#) a kind of [modernism](#) which holds that the essential function of art is to provide a vehicle for the [subjective](#), emotional expressions of the artist (at its most extreme and anti-representational, this doctrine takes the form of abstract expressionism).

2.in [ethics](#), "expressionism" refers to the view that [value judgments](#) are mere expressions of [emotion](#), although this is more commonly called [emotivism](#).

(References from [abstractionism](#) and [modernism](#).)

[The Ism Book]

Edited by Giovanni Benzi

16-03-2001

expressive use of language

communication that gives vent to feelings, attitudes, or [emotions](#). Example: "Yeow-hot, hot, hot!".

[A Dictionary of Philosophical Terms and Names]

<2001-10-29>

06-12-2003

extension

<logic>

1. extension of a system

A system S' is an extension of S iff every [theorem](#) of S is a [theorem](#) of S' . It follows that every model of S' is model of S .

2. finite extension of a system

System S' is a finite extension of S iff S' has all of the axioms of S , and differs from S only by adding a finite number of additional axioms that are [wffs](#) but not axioms of S .

[Glossary of First-Order Logic]

16-03-2001

extension - intension

<[philosophy of language](#)> distinction between ways in which the [meaning](#) of a term may be regarded: its [extension](#), or [denotation](#), is the collection of things to which the term applies; its [intension](#), or [connotation](#), is the set of features those things are presumed to have in common.

Recommended Reading:

D. Alan Cruse, *Meaning in Language: An Introduction to Semantics and Pragmatics* (Oxford, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

extensional

<[logic](#), [semantics](#)> having, or presupposing, a use of terms that is wholly determined by what falls under them (in this actual world). The meaning of a term in the extensional sense is given just by listing, or somehow indicating what things are referred to by the term. The extensional meaning of "Evening Star," "morning Star," and "Venus" is the same because they all refer to one and the same planet, though the sense, or intension, might be different. Some philosophers ([nominalists](#)) have hoped that we could describe the world in wholly extensional terms. [intension](#)

[\[A Philosophical Glossary\]](#)

30-04-2001

extensional equality

(Or extensionality). Functions, f and g are extensionally equal if and only if $f x = g x$ for all x .

where "=" means both expressions fail to terminate (under some given reduction strategy) or they both terminate with the same basic value.

Two functions may be extensionally equal but not inter-convertible (neither is reducible to the other). E.g. $x \cdot x + x$ and $x \cdot 2 * x$. See also [observational equivalence](#), referential transparency.

16-03-2001

extensionality

the feature of a [formal system](#) in which the meaning of every non-logical term is wholly determined by its [extension](#); this ensures that compound statements of the system will be truth-functional. [extensional equality](#)

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-10-2001

externalism

<[philosophy of mind](#)> externalists hold that there are mental events that do not supervene merely on physical events internal to the agent' s body, but supervene on environmental events as well. Also known as anti individualism.

For some externalists, mental events, namely those in which [concepts](#) are involved, can be seen to be partially constituted by the entities that those concepts are concepts of. This intuition gets pumped by the famous [Twin Earth](#) thought experiments of Putnam (1975) and Burge (1979), which I assume are familiar enough to not require recounting. Suffice it to mention that the upshot of the experiments is that the Earthling Pete and his molecule for molecule Twin Earth counterpart Twin Pete have divergent mental characteristics solely in virtue of their divergent environments: Pete' s "water" thoughts are about H2O whereas Twin Pete' s "water" thought are about XYZ.

Externalism does not apply solely to natural kind concepts like "water". Externalist [arguments](#), using Twin Earth style [thought experiments](#), have been advanced for all sorts of concepts. Further, externalist [arguments](#) have also been advanced for non-conceptual mental states, so externalism can apply to any contentful mental state. Some have advanced [arguments](#) for the externalist individuation of [qualia](#) on the grounds that they are representational in character (Dretske 1995; Tye 1995).

It is important to note that Burge, in formulating his externalist [arguments](#), considered them as [arguments](#)

explicitly against, among other things, [functionalism](#) (Burge 1979). However, the [functionalism](#) Burge had in mind was a strictly internalist functionalism--he left as an open issue whether a functionalism that quantified over environmental as well as bodily states of cognizers could be viable. In fact, the dominant reaction in the literature to Burge' [sarguments](#) has been to retain functionalism, but allow that events in one' s environment ar part of the causal [topology](#) that constitutes mental states.

Recommended Reading:

Dretske, F. (1995). Naturalizing the Mind. Cambridge, MA, MIT Press.

Putnam, H. (1975). Mind, language, and reality. Cambridge, Cambridge University Press.

Burge, T. (1979). Individualism and the mental. Midwest Studies in Philosophy IV: Studies in Metaphysics. P. French, et al. Minneapolis, University of Minnesota Press.

Tye, M. (1995). Ten problems of consciousness: A representational theory of the phenomenal mind. Cambridge, MA, MIT Press.

See [supervenience](#), [internalism](#)

Pete Mandik

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16-03-2001

extrinsic

bearing some relation to something else. See intrinsic - extrinsic.

[[A Dictionary of Philosophical Terms and Names](#)]

29-10-2001

fact

<[artificial intelligence](#), [PI](#)> The kind of [clause](#) used in [logic programming](#) which has no subgoals and so is always true (always succeeds).

E.g.

wet(water).

ale(denis).

This is in contrast to a [rule](#) which only succeeds if all its subgoals do. Rules usually contain logic variables, facts rarely do, except for oddities like "equal(X,X)".

[[FOLDOP](#)]

04-11-2003

fact - value

<[truths of reason](#), [truths of facts](#), [empiricism](#), [Hume](#)>, <[experience](#), [Kant](#), [positivism](#), [phenomenology](#), [Sachverhalt](#)>, <[moral philosophy](#)> Distinction between assertions about how things really are (fact) and how things ought to be (value). Drawn by [Hume](#), but also defended by [Stevenson](#), [Hare](#), and other ethical noncognitivists, the distinction is usually taken to entail that claims about moral obligation can never be validly inferred from the truth of factual premises alone. It follows that people who agree completely on the simple description of a state of affairs may nevertheless differ with respect to the appropriate action to take in response to it.

Recommended Reading:

David Hume, An Enquiry Concerning the Principles of Morals (Oxford, 1996)

Charles L. Stevenson, Ethics and Language (Yale, 1944).

[[A Dictionary of Philosophical Terms and Names](#)]

04-11-2003

facticity

<[fact](#), [Husserl](#), [existensialism](#), [Sartre](#), [casuality](#)>, <[contingent](#), [Heidegger](#), [effectivity](#), [hermeneutics](#), [ontology](#)>
 The contingent conditions of an individual human life. In the existentialism of Heidegger and Sartre, facticity includes all of the concrete details-time and place of birth, for example, along with the prospect of death-against the background of which human freedom is to be exercised.

Recommended Reading:

Martin Heidegger, *Ontology: The Hermeneutics of Facticity*, tr. by John Van Buren (Indiana, 1999)

Alterity and Facticity: New Perspectives on Husserl, ed. by Natalie Depraz and Dan Zahavi (Kluwer, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-11-2001

factor

A quantity which is multiplied by another quantity.

See coefficient of X. See also [divisor](#).

04-11-2003

failure

The inability of a system or system component to perform a required function within specified limits. A failure may be produced when a [fault](#) is encountered.

[\[FOLDOP\]](#)

16-03-2001

fallacy

<[logic](#), [syllogism](#), [rethoric](#), [argument](#)>, <[antinomy](#), [dialectic](#), [deduction](#)>, <[induction](#), [demonstration](#), [persuasion](#), [reason](#)>, A mistake in reasoning; an argument that fails to provide adequate logical support for the truth of its conclusion, yet appears convincing or persuasive in some other way. Common examples include both formal fallacies (structural errors in deductive logic) and informal fallacies (efforts to persuade by non-rational appeals).

Recommended Reading:

Nicholas Capaldi, *The Art of Deception: An Introduction to Critical Thinking* (Prometheus, 1987);

T. Edward Damer, *Attacking Faulty Reasoning: A Practical Guide to Fallacy-Free Arguments* (Wadsworth, 2000);

Douglas Walton, *A Pragmatic Theory of Fallacy* (Alabama, 1995).

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29-11-2001

fallibilism

<[epistemology](#), [knowledge](#), [Peirce](#), [pragmatism](#), [mistake](#)>, <[verificationism](#), [Popper](#), [conjecture](#), [refutation](#), [Quine](#)>, Belief that some or all claims to knowledge could be mistaken. Although Peirce limited the application of fallibilism to the empirical statements of natural science, Quine extended it by challenging the notion that any proposition can be genuinely analytic. Unlike a skeptic, the fallibilist may not demand suspension of belief in the absence of certainty.

Recommended Reading:

Charles S. Peirce: *Selected Writings*, ed. by Philip P. Wiener (Dover, 1980);

Charles S. Peirce and the Philosophy of Science, ed. by Edward C. Moore (Alabama, 1993);

Roger F. Gibson, *Enlightened Empiricism: An Examination of W.V. Quine's Theory of Knowledge* (Florida 1988);

Arthur Franklin Stewart, *Elements of Knowledge: Pragmatism, Logic, and Inquiry* (Vanderbilt, 1997).

See also [probabilism](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-11-2001

false cause

<[informal fallacy](#), [causality](#), [theory of fallacy](#), [logic](#)>, <[syllogism](#), [rhetoric](#), [method](#), [argument](#), [antinomy](#), [demonstration](#), [reason](#), [knowledge](#)> the informal fallacy of affirming the presence of a causal relationship on anything less than adequate grounds. Post hoc, ergo propter hoc is a common variety of this fallacy.

Example: "After drinking milk for twenty years, Melanie became addicted to cocaine. Therefore, drinking milk caused her cocaine addiction".

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-11-2001

falsifiability

<[epistemology](#), [empirical method](#), [philosophy of science](#)>, <[Popper](#), [scientific hypothesis](#), [deduction](#), [verification](#)>, <[experience](#), [induction](#)> A property of any proposition for which it is possible to specify a set of circumstances the occurrence of which would demonstrate that the proposition is false. According to Karl Popper, falsifiability is the crucial feature of scientific hypotheses: beliefs that can never be tested against the empirical evidence are dogmatic.

Recommended Reading:

Karl R. Popper, *Logic of Scientific Discovery* (Routledge, 1992)

Karl R. Popper, *Conjectures and Refutations: The Growth of Scientific Knowledge* (Routledge, 1992).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-11-2001

FAQ

[frequently asked question](#)

13-03-2004

FAQL

[frequently asked question](#)

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Farabi al - Abu Nasr

<[aristotelianism](#), [mathematics](#), [astronomy](#)>, <[medicine](#), [neoplatonism](#), [islamic philosophy](#), [logic](#)>, <[theology](#), [existence of god](#)> Persian Islamic neoplatonist (872-950) who employed Aristotelian logic in support of his arguments for the existence of god and used Plato' s Republic as the model for his own description of civ society in Principles of Citizens of the Virtuous City.

Recommended Reading:

Alfarabi: ' Philosophy of Plato and Aristotle' , tr. by Muhin Mahdi, Charles E. Butterworth, and Thomas L. Pang (Cornell, 2001)

Ian Richard Netton, *Al-Farabi and His School* (Curzon, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-11-2001

fatalism

<[ethics](#), [stoicism](#), [destiny](#), [islamic philosophy](#), [philosophy of religion](#), [Spinoza](#), [fate](#), [Wolff](#), [Kant](#), [moral philosophy](#), [causal determinism](#), [action](#), [causality](#)> Belief that every event is bound to happen as it does no matter what we do about it. Fatalism is the most extreme form of causal determinism, since it denies that human actions have any causal efficacy. Any determinist holds that indigestion is the direct consequence of natural causes, but the fatalist believes that it is bound occur whether or not I eat spicy foods.

Recommended Reading:

Jordan Howard Sobel, Puzzles for the Will: Fatalism, Newcomb and Samarra, Determinism and Omniscience (Toronto, 1998)

Ted Honderich, Consequences of Determinism: A Theory of Determinism (Clarendon, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

29-11-2001

fault

1. <[PI](#)> A manifestation of an [error](#) in [software](#). A fault, if encountered, may cause a [failure](#).

2. <[architecture](#)> page fault.

[[FOLDOC](#)]

04-11-2003

fault tolerance

<[architecture](#)>

1. The ability of a system or component to continue normal operation despite the presence of hardware or software faults. This often involves some degree of [redundancy](#).

2. The number of faults a system or component can withstand before normal operation is impaired.

[[FOLDOC](#)]

16-03-2001

fault tolerant

[fault tolerance](#)

13-03-2001

feature

<[jargon](#)>

1. A good property or behaviour (as of a program). Whether it was intended or not is immaterial.

2. An intended property or behaviour (as of a program). Whether it is good or not is immaterial (but if bad, it is also a misfeature).

3. A surprising property or behaviour; in particular, one that is purposely inconsistent because it works better that way - such an inconsistency is therefore a [feature](#) and not a bug. This kind of feature is sometimes called a miswart.

4. A property or behaviour that is gratuitous or unnecessary, though perhaps also impressive or cute. For example, one feature of Common LISP' s "format" function is the ability to print numbers in two differer Roman-numeral formats (see bells, whistles, and gongs).

5. A property or behaviour that was put in to help someone else but that happens to be in your way.

6. A bug that has been documented. To call something a feature sometimes means the author of the program did not consider the particular case, and that the program responded in a way that was unexpected but not strictly incorrect. A standard joke is that a bug can be turned into a [feature](#) simply by documenting it (then

theoretically no one can complain about it because it' s in the manual), or even by simply declaring it to be good. "That' s not a bug, that' s a feature!" is a common catchphrase. Apparently there is a Volkswagen Beetle in San Francisco whose license plate reads "FEATURE".

See also feetch feetch, creeping featurism, wart, green lightning.

The relationship among bugs, features, misfeatures, warts and miswarts might be clarified by the following hypothetical exchange between two hackers on an airliner:

A: "This seat doesn' t recline."

B: "That' s not a bug, that' s a feature. There is an emergency exit door built around the window behind you, a the route has to be kept clear."

A: "Oh. Then it' s a misfeature; they should have increased the spacing between rows here."

B: "Yes. But if they' d increased spacing in only one section it would have been a wart they would' ve had to make nonstandard-length ceiling panels to fit over the displaced seats."

A: "A miswart, actually. If they increased spacing throughout they' d lose several rows and a chunk out of the profit margin. So unequal spacing would actually be the Right Thing."

B: "Indeed."

"Undocumented feature" is a common euphemism for a bug.

7. An attribute or function of a [class](#) in Eiffel.

[\[Jargon File\]](#) and [\[FOLDOC\]](#)

04-11-2003

feed-forward

A multi-layer perceptron network in which the outputs from all neurons (see McCulloch-Pitts) go to following but not preceding layers, so there are no feedback loops.

05-11-2003

feedback

<[electronics](#)> Part of a system output presented at its input. Feedback may be unintended. When used as a design feature, the output is usually transformed by passive components which attenuate it in some manner; the result is then presented at the system input.

Feedback is positive or negative, depending on the sign with which a positive change in the original input reappears after transformation. Negative feedback was invented by Black to stabilise vacuum tube amplifiers. The behaviour becomes largely a function of the feedback transformation and only minimally a function of factors such as transistor gain which are imperfectly known.

Positive feedback can lead to instability; it finds wide application in the construction of oscillators.

Feedback can be used to control a system, as in [feedback control](#).

[\[FOLDOC\]](#)

05-11-2003

feedback control

<[electronics](#)> A control system which monitors its effect on the system it is controlling and modifies its output accordingly. For example, a thermostat has two inputs: the desired temperature and the current temperature (the latter is the feedback). The output of the thermostat changes so as to try to equalise the two inputs.

Computer disk drives use feedback control to position the read/write heads accurately on a recording track. Complex systems such as the human body contain many feedback systems that interact with each other; the homeostasis mechanisms that control body temperature and acidity are good examples.

[\[FOLDOC\]](#)

05-11-2003

Feigl Herbert

<[neo-positivism](#), [the Vienna Circle](#), [logical positivism](#)>, <[epistemology](#), [empiricism](#), [philosophy of mind](#)>
Austrian-American philosopher (1902-1988). A member of the Vienna Circle of logical positivists, Feigl later taught at the University of Minnesota. He defended a materialist account of the human mind in *The "Mental" and the "Physical"* (1958).

Recommended Reading:

Herbert Feigl: *Inquiries & Provocations, Selected Writings 1929 to 1974*, ed. by Robert S. Cohen (Kluwer, 1980)

Wilfrid Sellars, *Empiricism and the Philosophy of Mind*, ed. by Robert Brandom (Harvard, 1997).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-11-2001

feminism

<[sociology](#), [theory of politics](#), [philosophy of women](#)>, <[anthropology](#), [dualism](#), [Cartesian dualism](#), [tradition](#), [power](#)>
Commitment to the abolition of male domination in human society. Feminists differ widely in their accounts of the origins of patriarchy, their analyses of its most common consequences, and their concrete proposals for overcoming it, but all share in the recognition that the subordination of women to men in our culture is indefensible and eliminable. Many feminist philosophers oppose Cartesian dualism, scientific objectivity, and traditional theories of moral obligation as instances of masculine over-reliance on reason. Serious attention to the experiences of women would offer a more adequate account of human life.

Recommended Reading:

The Cambridge Companion to Feminism in Philosophy, ed. by Miranda Fricker and Jennifer Hornsby (Cambridge, 2000);

The Second Wave: A Reader in Feminist Theory, ed. by Linda Nicholson (Routledge, 1997);

A Companion to Feminist Philosophy, ed. by Alison M. Jaggar and Iris Marion Young (Blackwell, 1999);

Seyla Benhabib, Judith Butler, Drucilla Cornell, Nancy Fraser, and Linda J. Nicholson, *Feminist Contentions: A Philosophical Exchange* (Routledge, 1995);

Sandra Harding, *Whose Science? Whose Knowledge?: Thinking from Women's Lives* (Cornell, 1991);

Eva Feder Kittay, *Love's Labor: Essays on Women, Equality, and Dependency* (Routledge, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-11-2001

Ferio

<[scholasticism](#), [logic](#), [syllogism](#), [medieval philosophy](#)> Name given by medieval logicians to any categorical syllogism whose standard form may be designated as EIO-1.

Example: No mendicant friars are wealthy patrons of the arts, but some medieval philosophers are mendicant friars, so some medieval philosophers are not wealthy patrons of the arts. This is one of the fifteen forms of valid syllogism.

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-11-2001

Ferison

<[scholasticism](#), [logic](#), [syllogism](#), [medieval philosophy](#)> Name given by medieval logicians to any categorical syllogism whose standard form is EIO-3.

Example: Since no people who admire Marx are political conservatives and some people who admire Marx are South Carolinians, it follows that some South Carolinians are not political conservatives. This is another of the fifteen forms in which syllogisms are always valid.

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-11-2001

Fermat Pierre de

<[mathematics](#), [epistemology](#), [philosophy of science](#), [Descartes](#), [Pascal](#), [theory of probability](#), [last theorem](#)>
 French jurist and amateur mathematician (1601-1665). Although he engaged in a lengthy and bitter dispute with [Descartes](#), Fermat worked together with [Pascal](#) on the development of the modern theory of probability. The famous "Last Theorem" Fermat proposed in a marginal notation-that for any n greater than 2, there are no integers that satisfy the equation $x^n + y^n = z^n$ -was proven only in 1994.

Recommended Reading:

Michael Sean Mahoney, The Mathematical Career of Pierre de Fermat, 1601-1665 (Princeton, 1994);
 Simon Singh and John Lynch, Fermat' s Enigma: The Epic Quest to Solve the World' s Greatest Mathematic Problem (Bantam, 1998);
 Morris Kline, Mathematical Thought from Ancient to Modern Times (Oxford, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

05-11-2003

Fermat prime

<[mathematics](#)> A [prime number](#) of the form $2^{2^n} + 1$. Any prime number of the form $2^{2^n} + 1$ must be a Fermat prime. [Fermat](#) conjectured in a letter to someone or other that all numbers $2^{2^n} + 1$ are prime, having noticed that this is true for $n=0,1,2,3,4$.

[Euler](#) proved that 641 is a factor of $2^{2^5} + 1$. Of course nowadays we would just ask a computer, but at the time it was an impressive achievement (and his proof is very elegant).

No further Fermat primes are known; several have been factorised, and several more have been proved composite without finding explicit factorisations.

[Gauss](#) proved that a regular N -sided polygon can be constructed with ruler and compasses if and only if N is a power of 2 times a product of distinct Fermat primes.

[[FOLDOP](#)]

05-11-2003

Festino

<[scholasticism](#), [logic](#), [syllogism](#), [medieval philosophy](#)> Name given by medieval logicians to a categorical syllogism with the standard form EIO-2.

Example: No people deserving of our admiration and praise are inveterate liars, but some wealthy industrialists are inveterate liars; therefore, some wealthy industrialists are not people deserving of our admiration and praise. This is one of the fifteen forms in which syllogisms are always valid.

[[A Dictionary of Philosophical Terms and Names](#)]

29-11-2001

Feuerbach Ludwig Andreas

<[Kant](#), [idealism](#), [Hegel](#), [Hegelian school](#), [marxism](#), [ethics](#)>, <[philosophy of religion](#), [Absolute](#), [metaphysics](#)>
 German philosopher (1804-1872). As a follower of Kant and critic of idealism, Feuerbach supposed that Hegel had mistakenly inverted the relationship between individuals and the Absolute. In Das Wesen des Christentums (The Essence of Christianity) (1841) he argued that religion is a projection of human values onto the concept of the divine. Eliminating the vestiges of theological dependence, Feuerbach maintained in Grundsätze der Philosophie der Zukunft (Principles of the Philosophy of the Future) (1843), will make it possible to avoid alienation and enjoy a thoroughly humanistic life.

Recommended Reading:

Van A. Harvey, Feuerbach and the Interpretation of Religion (Cambridge, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

05-11-2003

Feyerabend Paul

<[epistemology](#), [philosophy of science](#), [Popper](#), [scientific method](#), [cultural pluralism](#), [scientific anarchism](#)>
Austrian-American philosopher (1924-1994). An outspoken opponent of Popper's philosophy of science Feyerabend argued in *Against Method* (1975) that there is no privileged method for the confirmation of scientific theories. Thus, Feyerabend defended cultural pluralism and "scientific anarchism" in *Science in a Free Society* (1978), *Farewell to Reason* (1987), and *Three Dialogues on Knowledge* (1991).

Recommended Reading:

Killing Time: The Autobiography of Paul Feyerabend (Chicago, 1996);
John Preston, *Feyerabend: Philosophy, Science and Society* (Polity, 1997);
The Worst Enemy of Science: Essays in Memory of Paul Feyerabend, ed. by John Preston and Gonzalo Munevar (Oxford, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-11-2001

Feynman Richard Phillips

<[physics](#), [quantum mechanics](#), [philosophy of science](#), [space](#)>, <[time](#), [sub-atomic physics](#), [Einstein](#), [superfluidity](#)>
American physicist (1918-1988), who contributed significantly to the development of modern quantum mechanics, the phenomena of superfluidity, and the nature of weak subatomic particle interactions. Feynman shared the Nobel Prize for physics in 1965. His colorful career and criticism of NASA are detailed in the autobiographical *Surely You're Joking, Mr. Feynman* (1984).

Recommended Reading:

Richard Feynman, *Six Easy Pieces: Essentials of Physics Explained by Its Most Brilliant Teacher*, ed. by Paul Davies and Robert B. Leighton (Perseus, 1996);
Richard Feynman, *Six Not-So-Easy Pieces: Einstein's Relativity, Symmetry, and SpaceTime*, ed. by Gerry Neugebauer and Roger Penrose (Perseus, 1998),
Richard Feynman, *The Character of Physical Law* (MIT, 1967);
James Gleick, *Genius: The Life and Science of Richard Feynman* (Vintage, 1993).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-11-2001

Fibonacci

<[mathematics](#), [medieval logic](#), [Fibonacci series](#)>, <[philosophy of science](#), [Arabian philosophy](#), [Arabian science](#)>
Leonardo Pisano (1170-1250) Italian mathematician. After travelling in North Africa, Fibonacci wrote *Liber Abaci* (1202), introducing the use of Arabic numerals for the decimal system into European arithmetic. His *Liber quadratorum* (*Book of Square Numbers*) (1225) introduced the "Fibonacci series" of natural numbers: 0, 1, 1, 2, 3, 5, 8, 13, . . . , each element of which is the sum of the preceding two.

Recommended Reading:

Morris Kline, *Mathematical Thought from Ancient to Modern Times* (Oxford, 1990)
Paul Chika Emekwulu, *Fibonacci Numbers For Research Mathematicians & AI Applications* (Novelty, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-11-2001

Fibonacci series

<[mathematics](#)> The [infinite](#) sequence of numbers beginning

1, 1, 2, 3, 5, 8, 13, ...

in which each term is the sum of the two terms preceding it.

The ratio of successive Fibonacci terms tends to the golden ratio, namely $(1 + \sqrt{5})/2$.

[\[FOLDOC\]](#)

16-03-2001

Fichte Johann Gottlieb

<[idealism](#), [romanticism](#), [ethics](#), [moral philosophy](#)>, <[metaphysics](#), [Kant](#), [reality](#), [noumenal self](#), [epistemology](#)>, <[Schelling](#), [philosophy of religion](#), [nationalism](#)> German philosopher (1762-1814). In Versuch einer Kritik aller Offenbarung (Critique of all Revelation) (1792) Fichte turned the critical philosophy of [Kant](#) into full-fledged idealism by emphasizing the metaphysical reality of the noumenal self as well as its moral autonomy. His amplification of this theme in Grundlage der gesamten Wissenschaftslehre (Foundations of the Science of Knowledge) (1794-95) and Darstellung der Wissenschaftslehre (Outlines of the Doctrine of Knowledge) (1810) greatly influenced [Schelling](#) and [Hegel](#). Die Bestimmung des Menschen (The Vocation of Man) (1800) is Fichte' s effort to defend himself against the charge of atheism. Fichte encouraged the development of German nationalism in opposition to Napoleonic threats in Der geschlossene Handelsstaat (The Closed Commercial State) (1800) and Reden an die deutsche Nation (Speeches to the German Nation) (1808).

Recommended Reading:

Fichtes Werke, ed. by Immanuel H. Fichte (de Gruyter, 1971);
George J. Seidel, Fichte' s Wissenschaftslehre of 1794: A Commentary on Part I (Purdue, 1993);
Gunter Zoller, Fichte' s Transcendental Philosophy: The Original Duplicity of Intelligence and Will (Cambridge 1998);
Frederick Neuhouser, Fichte' s Theory of Subjectivity (Cambridge, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

05-11-2003

Ficino Marsilio

<[neoplatonism](#), [Plotinus](#), [philosophy of Renaissance](#), [magic](#)>, <[myth](#), [love](#), [philosophy of nature](#), [philosophy of science](#)>, Christian thought, ethics> Italian philosopher (1433-1499), whose translations into Latin made the works of Plato and Plotinus accessible during the Renaissance. Despite his fascination with myth and magic, Ficino endorsed a synthesis of neoplatonic thought with the doctrines of Christianity.

Recommended Reading:

Marsilio Ficino, Commentary on Plato' s Symposium on Love (Spring, 2000);
Marsilio Ficino, Three Books on Life, ed. by Carol V. Kaske, John R. Clark (Medieval & Renaissance, 1989);
Renaissance Philosophy of Man, ed. by Ernst Cassirer, Paul Oskar Kristeller, and John H. Randall (Chicago, 1956).

[[A Dictionary of Philosophical Terms and Names](#)]

29-11-2001

fideism

<[theology](#), [individual reason](#), [common reason](#), [intuition](#)>, <[philosophy of religion](#), [metaphysics](#), [scepticism](#)>
Belief that religious doctrines rest exclusively on faith (Lat. Fides), instead of on reason. In various forms, fideism was maintained by philosophers as diverse as [Pascal](#), [Bayle](#), and [Kierkegaard](#).

Recommended Reading:

Delbert J. Hanson, Fideism and Hume' s Philosophy: Knowledge, Religion and Metaphysics (Peter Lang, 1993);
Terence Penelhum, God and Skepticism: A Study in Skepticism and Fideism (Reidel, 1983).

[[A Dictionary of Philosophical Terms and Names](#)]

05-11-2003

field

<[data](#), [database](#)> An area of a [database record](#), or graphical user interface [form](#), into which a particular item of data is entered.

Example usage: "The telephone number field is not really a numerical field", "Why do we need a four-digit field for the year?".

A [database](#) column is the set of all instances of a given field from all records in a [table](#).

[[FOLDDOC](#)]

05-11-2003

fifth generation language

<[language](#), [artificial intelligence](#)> A myth the Japanese spent a lot of money on. In about 1982, [MITI](#) decided it would spend ten years and a lot of money applying [artificial intelligence](#) to programming, thus solving the [software crisis](#). The project spent its money and its ten years and in 1992 closed down with a whimper.

[[FOLDOC](#)]

16-03-2001

figure

<[syllogism](#), [mode](#), [rhetoric](#), [middle term](#), [Aristotle](#), [scholasticism](#), [logic](#), [Gestalt](#), [Hegel](#), [phenomenology](#)>
A systematic way of indicating the position of the middle term in a categorical syllogism.

[[A Dictionary of Philosophical Terms and Names](#)]

29-11-2001

Filmer Robert

<[political thought](#), [philosophy of politics](#), [power](#), [Locke](#)> English political philosopher (1588-1653). Filmer' posthumously-published defense of a divinely-ordained hereditary monarchy in Patriarcha, or the Natural Power of Kings (1680) was attacked at length in the first of [Locke](#)' s Two Treatises of Civil Government.

[[A Dictionary of Philosophical Terms and Names](#)]

05-11-2003

final cause

<[metaphysics](#), [Aristotle](#), [theology](#), [ethics](#), [physics](#)>, <[causality](#), [telos](#), [teleology](#), [Ficino](#), [philosophy of history](#)>
the ultimate purpose, end, or goal of a thing; one of [Aristotle](#)' s four causes. Explanations of how a thing is the rely on reference to its end (Gk. *télos*) are often called "teleological;" their use fell into disfavor during the Renaissance.

Recommended Reading:

Aristotle, Physics, tr. by Robin Waterfield and David Bostock (Oxford, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

00-00-0000

finitary formal system

<[logic](#)>

A formal system in which (1) there are countably many symbols in the [formal language](#), (2) [wffs](#) are finite in length, and (3) every rule of [inference](#) takes only a finite number of premises.

[Glossary of First-Order Logic]

16-03-2001

Finite Automata

[Finite State Machine](#)

21-03-2004

Finite Automaton[Finite State Machine](#)

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finite differencing[strength reduction](#)

21-03-2004

Finite State Automata[Finite State Machine](#)

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Finite State Automaton[Finite State Machine](#)

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Finite State Machine

<[mathematics](#), [algorithm](#), [theory](#)> (FSM or "Finite State Automaton", "transducer") An [abstract machine](#) consisting of a set of [states](#) (including the initial state), a set of input events, a set of output events and a state transition function. The function takes the current state and an input event and returns the new set of output events and the next state. Some states may be designated as "terminal states". The state machine can also be viewed as a function which maps an ordered sequence of input events into a corresponding sequence of (sets of) output events.

A [deterministic](#) FSM is one where the next state is uniquely determined by a single input event. The next state of a non-deterministic FSM (NFA) depends not only on the current input event, but also on an arbitrary number of subsequent input events. Until these subsequent events occur it is not possible to determine which state the machine is in.

It is possible to automatically translate some (but not all) non-deterministic FSMs into deterministic ones which will produce the same output given the same input. [Is this true?]

In a probabilistic FSM [proper name?], there is a predetermined [probability](#) of each next state given the current state and input (compare [Markov chain](#)).

The terms "acceptor" and "transducer" are used particularly in language theory where automata are often considered as [abstract machines](#) capable of recognising a language (certain sequences of input events). An acceptor has a single [Boolean](#) output and accepts or rejects the input sequence by outputting true or false respectively, whereas a transducer translates the input into a sequence of output events.

FSMs are used in [computability theory](#) and in some practical applications such as regular expressions and digital logic design.

See also [state transition diagram](#), [Turing Machine](#).

[J.H. Conway, "regular algebra and finite machines", 1971, Eds Chapman & Hall].

[S.C. Kleene, "Representation of events in nerve nets and finite automata", 1956, Automata Studies. Princeton].

[Hopcroft & Ullman, 1979, "Introduction to automata theory, languages and computations", Addison-Wesley].

[M. Crochemore "tranducters and repetitions", Theoretical. Comp. Sc. 46, 1986].

[\[FOLDOP\]](#)

05-11-2003

first-order

Not higher-order.

21-03-2004

first-order logic

<[language, logic](#)> The language describing the truth of mathematical [formulas](#). Formulas describe properties of terms and have a truth value. The following are atomic formulas:

True

False

$p(t_1, \dots, t_n)$ where t_1, \dots, t_n are terms and p is a predicate.

If F_1 , F_2 and F_3 are formulas and v is a variable then the following are compound formulas:

$F_1 \wedge F_2$ conjunction - true if both F_1 and F_2 are true,

$F_1 \vee F_2$ disjunction - true if either or both are true,

$F_1 \Rightarrow F_2$ implication - true if F_1 is false or F_2 is true, F_1 is the antecedent, F_2 is the consequent (sometimes written with a thin arrow),

$F_1 \Leftarrow F_2$ true if F_1 is true or F_2 is false,

$F_1 \Leftrightarrow F_2$ true if F_1 and F_2 are both true or both false (normally written with a three line equivalence symbol)

$\sim F_1$ negation - true if f_1 is false (normally written as a dash '-' with a shorter vertical line hanging from its right hand end).

For all v . F universal quantification - true if F is true for all values of v (normally written with an inverted A).

Exists v . F existential quantification - true if there exists some value of v for which F is true. (Normally written with a reversed E).

The operators $\wedge \vee \Rightarrow \Leftarrow \Leftrightarrow \sim$ are called connectives. "For all" and "Exists" are [quantifiers](#) whose scope is F . A term is a mathematical expression involving numbers, operators, functions and variables.

The "order" of a logic specifies what entities "For all" and "Exists" may quantify over. First-order logic can only quantify over sets of atomic [propositions](#).

(E.g. For all p . $p \Rightarrow p$).

Second-order logic can quantify over functions on propositions, and higher-order logic can quantify over any type of entity. The sets over which quantifiers operate are usually implicit but can be deduced from well-formedness constraints.

In first-order logic quantifiers always range over ALL the elements of the domain of discourse. By contrast, second-order logic allows one to quantify over subsets of M .

["The Realm of First-Order Logic", Jon Barwise, Handbook of Mathematical Logic (Barwise, ed., North Holland, NYC, 1977)].

See also [predicate logic](#)

[[FOLDOP](#)]

05-11-2003

first-order predicate logic

[predicate logic](#)

21-03-2004

first-order theory

<logic>

A formal system of first-order [predicate](#) logic in which (1) there may be countably many new individual constants in the [formal language](#), provided they are effectively enumerable, and (2) there may be countably many [proper axioms](#) to supplement the logical axioms.

[Glossary of First-Order Logic]

16-03-2001

first-order theory with identity

<logic>

A first-order theory with $(x)(x=x)$ as an axiom, and the following axiom schema,

$$[(x=y) \Rightarrow (A \Rightarrow A')]^c,$$

when B^c is an arbitrary closure of B , and when A' differs from A only in that y may replace any free occurrence of x in A so long as y is free wherever it replaces x (y need not replace every occurrence of x in A).

See [identity](#), [predicate logic with identity](#)

[Glossary of First-Order Logic]

16-03-2001

five ways

<[theology](#), [metaphysics](#), [medieval philosophy](#), [Aquinas](#)>, <[existence of god](#), [cosmological argument](#), [moral philosophy](#)>, <[teleology](#), [teleological argument](#), [final cause](#)> the attempts to prove the existence of god included in Thomas Aquinas' s Summa Theologica I, 2, 3. They include three versions of the cosmologic argument, an argument from moral perfection, and the teleological argument.

Recommended Reading:

Thomas Aquinas, Selected Philosophical Writings, tr. by Timothy McDermott (Oxford, 1998);

Basic Writings of Saint Thomas Aquinas: God and the Order of Creation, ed. by Anton Charles Pegis (Hackett, 1997);

Anthony Kenny, The Five Ways: Saint Thomas Aquinas' Proofs of God' s Existence (Routledge, 1991).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-11-2001

fix

1. <[mathematics](#)> The [fixed point combinator](#). Called Y in [combinatory logic](#). Fix is a higher-order function which returns a fixed point of its argument (which is a function).

$$\text{fix} :: (a \rightarrow a) \rightarrow a$$

$$\text{fix } f = f (\text{fix } f)$$

Which satisfies the equation

$$\text{fix } f = x \text{ such that } f x = x.$$
Somewhat surprisingly, fix can be defined as the non-recursive [lambda abstraction](#):
$$\text{fix} = h . (\lambda x . h (x x)) (\lambda x . h (x x))$$
Since this involves self-application, it has an [infinite type](#). A function defined by
$$f x_1 \dots x_N = E$$

can be expressed as

$$f = \text{fix} (\lambda f . \lambda x_1 \dots x_N . E) = (\lambda f . \lambda x_1 \dots x_N . E)$$

$$(\text{fix} (\lambda f . \lambda x_1 \dots x_N . E)) = \text{let } f = (\lambda f . \lambda x_1 \dots x_N . E)$$

$$\text{in } x_1 \dots x_N . E$$
If f does not occur [free](#) in E (i.e. it is not [recursive](#)) then this reduces to simply
$$f = x_1 \dots x_N . E$$

In the case where $N = 0$ and f is free in E , this defines an infinite data object, e.g.

$\text{ones} = \text{fix} (\text{ones} . 1 : \text{ones}) = (\text{ones} . 1 : \text{ones}) (\text{fix} (\text{ones} . 1 : \text{ones})) = 1 : (\text{fix} (\text{ones} . 1 : \text{ones})) = 1 : 1 : \dots$

Fix f is also sometimes written as μf where μ is the Greek letter or alternatively, if $f = x . E$, written as $\mu x . E$.

Compare [Quine](#).

[\[Jargon File\]](#)

2. [bug fix](#).

[\[FOLDOC\]](#)

05-11-2003

flourishing

[eudaimonia](#)

Flynn' s taxonomy A classification of computer architectures based on the number of streams of instruction and data:

Single instruction/single data stream (SISD) - a sequential computer.

Multiple instruction/single data stream (MISD) - unusual.

Single instruction/multiple data streams (SIMD) - e.g. an array processor.

Multiple instruction/multiple data streams (MIMD) - multiple autonomous processors simultaneously executing different instructions on different data.

[["A Survey of Parallel Computer Architectures"](#), Duncan, Ralph, IEEE Computer. February 1990, pp. 5-16].

[Flynn' s original paper?]

05-11-2003

FOLDOC

[<source>](#)

[The Free On-Line Dictionary of Computing](#) edited by Denis Howe.

FOLDOC is a searchable dictionary of acronyms, jargon, programming languages, tools, architecture, operating systems, networking, theory, conventions, standards, mathematics, telecoms, electronics, institutions, companies, projects, products, history, in fact anything to do with computing.

FOLDOP begun as a project based on FOLDOC and many definitions in this dictionary are from the version published in 2000-07-18, which contained 13220 entries.

16-03-2001

folk psychology

[<philosophy of mind>](#) the common-sense conceptual framework that we, as human beings, employ to understand, predict, and explain the behaviour of other humans and higher animals.

References

Folk Psychology Biblio <http://ling.ucsc.edu/~chalmers/biblio2.html#2.1e>)

Horgan, T. & Woodward, J. 1985. Folk psychology is here to stay. *Philosophical Review* 94:197-225. Reprinted in (W. Lycan, ed) *Mind and Cognition* (Blackwell, 1990).

Jackson, F. Pettit, P. 1990. In defense of folk psychology. *Philosophical Studies* 59:31-54.

Chris Eliasmith - [\[Dictionary of Philosophy of Mind\]](#) Homepage <http://artsci.wustl.edu/~philos/MindDict/>)

05-11-2003

force - appeal to

<[dialectic](#), [logic](#), [rhetoric](#), [method](#), [argument](#)>, <[demonstration](#), [proof](#), [persuasion](#)>, (argumentum ad baculum) the informal fallacy of securing agreement by threatening adverse consequences in case of disagreement.

Example: "Anyone who believes that the government has exceeded its proper authority under the constitution will be subjected to severe harassment by the provincial police. Therefore, the government has not exceeded its authority."

Recommended Reading:

Douglas Walton, Scare Tactics: Arguments That Appeal to Fear and Threats (Kluwer, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

29-11-2001

formal cause

<[metaphysics](#), [ontology](#), [causality](#), [Aristotle](#), [physics](#)>, <[aristotelianism](#), [Nicholas of Cusa](#), [medieval philosophy](#)> structural features or attributes of a thing; one of the four causes.

Recommended Reading:

Aristotle, Physics, tr. by Robin Waterfield and David Bostock (Oxford, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

29-11-2001

formal fallacy

<[logic](#), [syllogism](#), [rhetoric](#), [method](#), [argument](#)>, <[antinomy](#), [mathematics](#), [dialectic](#), [epistemology](#), [deduction](#)>, <[induction](#), [demonstration](#), [proof](#), [reason](#), [knowledge](#), [aristotelianism](#), [Aquinas](#), [scholasticism](#), [proposition](#), [logic of Portroyal](#), [semantics](#)> Invalid arguments that may appear convincing at first glance because they closely resemble legitimate patterns of reasoning.

Commonly occurring formal fallacies include: (1) four terms (quaeternio terminorum), (2) undistributed middle, (3) illicit major, (4) illicit minor, (5) exclusive premises, (6) affirmative conclusion from negative premises, (7) existential, (8) affirming the consequent, (9) denying the antecedent, (10) converting the conditional, (11) negating the antecedent and the consequent, and affirming the alternative.

[[A Dictionary of Philosophical Terms and Names](#)]

05-11-2003

formal language

<[logic](#)> an alphabet and grammar.

The alphabet is a set of uninterpreted symbols.

The grammar is a set of rules that determine which strings of symbols from the alphabet will be acceptable (grammatically correct or well-formed) in that language. The grammar may also be conceived as a set of [functions](#) taking strings of symbols as input and returning either "yes" or "no" as output. The rules of the grammar are also called formation rules.

See [decidable system](#), [finitary formal system](#), [wff](#)

[Glossary of First-Order Logic]

16-03-2001

formal methods

<[mathematics](#), [specification](#)> Mathematically based techniques for the [specification](#), development and verification of software and hardware systems.

Referentially transparent languages are amenable to symbolic manipulation allowing program transformation (e.g. changing a clear inefficient specification into an obscure but efficient program) and proof of correctness.

Oxford FM archive (<http://www.comlab.ox.ac.uk/archive/formal-methods.html>)

[[FOLDOP](#)]

00-11-2003

formal system

<[logic](#)> a [formal language](#) (alphabet and grammar) and a deductive apparatus (axioms and rules of [inference](#)).

See [categoricity of systems](#), [closure of a system](#), [decidable system](#), [formal language](#), [deductive apparatus](#)

[Glossary of First-Order Logic]

05-11-2003

formalism

<[ethics](#), [aesthetics](#)> the term usually refers to an over-emphasis in ethics or aesthetics on form over content. In this sense, both [deontologism](#) in ethics and [classicism](#) in aesthetics might be described as varieties of formalism. More recently, formalism has been used to describe a twentieth-century view in aesthetics, art history, and literary criticism that values artistic form over artistic content and that is therefore opposed both to [representationalism](#) and [realism](#) in the arts.

[[The Ism Book](#)]

Edited by Giovanni Benzi

16-03-2001

formation rules

[formal language](#)

25-03-2004

forms

<[metaphysics](#), [scholasticism](#), [essence](#), [epistemology](#), [ideas](#)> <[cartesianism](#), [form](#), [aesthetics](#), [idealism](#), [innatism](#), [mimesis](#)> for Plato, the ideal Archetypes or patterns according to which all things are constructed. These are grasped by [rational](#) insight -- which Plato held to be a kind of recollection -- and not by sensory perception. The Forms, according to Plato, intelligible realities which are [transcend](#) the material world of sensible objects which somehow resemble or participate in them: they are ideals which [material](#) or sensible things imitate or aspire to.

For Aristotle forms or essences are [immanent](#) aspirations -- teleological principles of development -- in the things themselves.

[[Philosophical Glossary](#)]

05-11-2003

formula

1. In logic, a string or sequence of symbols from the alphabet of a [formal language](#). It may or may not conform to the grammar of the [formal language](#); if it does it is also called a well-formed formula or [wff](#).

2. [<language, music>](#) FORTH Music Language. An extension of FORTH with concurrent note-playing processes. Runs on Macintosh and Atari ST with MIDI output.

["Formula: A Programming Language for Expressive Computer Music", D.P. Anderson et al Computer 24(7):12 (Jul 1991)].

3. Preprocessor language for the Acorn Archimedes, allowing inline high-level statements to be entered in an assembly program. Written in nawk.

[\[FOLDOC\]](#) and [\[Glossary of First-Order Logic\]](#)

05-11-2003

forward analysis

an analysis which determines properties of the output of a program from properties of the inputs.

16-03-2001

forward chaining

a data-driven technique used in constructing goals or reaching [inferences](#) derived from a set of [facts](#). Forward chaining is the basis of [production systems](#). Oppose [backward chaining](#).

[\[FOLDOC\]](#)

05-11-2003

Foucault Michel

[<French philosophy, semantics, psychology>](#), [<structuralism, hermeneutics, freedom, philosophy of language>](#)
 French philosopher (1926-1984). As he explained in *Folie et deraison* (Madness and Civilization) (1961), *Le Mots et les choses* (The Order of Things) (1966), and *L' Archeologie du savoir* (The Archaeology of Knowledge) (1969), Foucault used historical investigations as a method of exposing how the structure of contemporary thought is shaped by conventional social institutions and practices, including especially the forceful marginalization of deviant behavior by discursive rationality. *Surveiller et Punir* (Discipline and Punish) (1975) and the unfinished *Histoire de la sexualite* (History of Sexuality: Introduction, Care of the Self, and The Use of Pleasure) (1976, 1984) focus on the use of social power to circumscribe and control subjective human experience. Genuine freedom, Foucault maintained, can be achieved only through detachment from what is expected of us as "normal."

Recommended Reading:

The Foucault Reader, ed. by Paul Rabinow (Random House, 1984);
 Michel Foucault, *The Birth of the Clinic: An Archaeology of Medical Perception* (Vintage, 1994);
 James Miller, *The Passion of Michel Foucault* (Harvard, 2000);
 Barry Smart, *Michel Foucault* (Routledge, 1993);
 The Cambridge Companion to Foucault, ed. by Gary Gutting (Cambridge, 1994);
 Hubert L. Dreyfus, *Michel Foucault: Beyond Structuralism and Hermeneutics* (Chicago, 1983);
 Feminist Interpretations of Michel Foucault, ed. by Susan J. Hekman (Penn. State, 1996);
 Gary Gutting, *Michel Foucault' s Archaeology of Scientific Reason* (Cambridge, 1989).

[\[A Dictionary of Philosophical Terms and Names\]](#)

29-11-2001

Foucher Simon

<[Descartes](#), [Cartesianism](#), [Malebranche](#), [Leibniz](#), [skepticism](#)>, <[epistemology](#), [dialectic](#), [truth](#), [Bayle](#), [Berkeley](#)>
 french philosopher (1644-1696), who offered trenchant criticisms of [Cartesianism](#), [Malebranche](#) , and [Leibniz](#) .
 The skeptical arguments of Foucher' s Dissertation sur la recherche de la verite (On the Search for Truth (1673) influenced the rejection of the primary / secondary quality distinction by [Bayle](#) and [Berkeley](#).

Recommended Reading:

Richard A. Watson and Marjorie Grene, Malebranche' s First and Last Critics: Simon Foucher and Dortous D Mairan (Southern Illinois, 1995).

[[A Dictionary of Philosophical Terms and Names](#)]

05-11-2003

foundation

the [axiom](#) of foundation states that the membership relation is well founded, i.e. that any non-empty collection Y of [sets](#) has a member y which is disjoint from Y. This rules out sets which contain themselves (directly or indirectly).

05-11-2003

four colour map theorem

<[mathematics](#), [application](#)> (Or "four colour theorem") The theorem stating that if the plane is divided into connected regions which are to be coloured so that no two adjacent regions have the same colour (as when colouring countries on a map of the world), it is never necessary to use more than four colours.

The proof, due to Appel and Haken, attained notoriety by using a computer to check tens of thousands of cases and is thus not humanly checkable, even in principle. Some thought that this brought the philosophical status of the proof into doubt.

There are now rumours of a simpler proof, not requiring the use of a computer.

See also [chromatic number](#)

[[FOLDOC](#)]

16-03-2001

four colour theorem

[four colour map theorem](#)

25-03-2004

four terms - fallacy of

<[fallacia](#), [syllogism](#), [logic](#), [rhetoric](#)>, <[argument](#), [antinomy](#), [mathematics](#), [dialectic](#)>, <[epistemology](#), [deduction](#), [induction](#), [demonstration](#), [proof](#)>, <[persuasion](#), [reason](#), [knowledge](#), [aristotelianism](#), [Aquinas](#)>, <[scholasticism](#)> ([quaternio terminorum](#)) - the formal [fallacy](#) committed in a categorical [syllogism](#) that is invalid because it employs more than three distinct categorical terms.

Example: "All managers are politicians, and all sybarites are administrators, so all sybarites are politicians."

[[A Dictionary of Philosophical Terms and Names](#)]

29-11-2001

Fourier Jean - Baptiste Joseph

<[mathematics](#), [philosophy of science](#), [physics](#)>, <[mathematical function](#), [analysis](#), [series of Fourier](#)> French Egyptologist and mathematician (1768-1830). In his *Theorie analytique de la chaleur* (The Analytical Theory of Heat) (1822) Fourier demonstrated the use of infinite series for calculation of the conduction of heat. Accompanying Napoleon's army into Egypt, he devoted his later years to archaeological research and occasional essays.

Recommended Reading:

John Herivel, *Joseph Fourier: The Man and the Physicist* (Clarendon, 1984);
 Who Is Fourier?: A Mathematical Adventure, tr. by Alan Gleason (Blackwell, 1995);
 Morris Kline, *Mathematical Thought from Ancient to Modern Times* (Oxford, 1990);
 M. J. Lighthill, *An introduction to Fourier analysis and generalized functions* (Cambridge, 1958).

[[A Dictionary of Philosophical Terms and Names](#)]

29-11-2001

Fourier transform

<[mathematics](#)> A technique for expressing a waveform as a weighted sum of sines and cosines.

Computers generally rely on the version known as [discrete Fourier transform](#).

Named after J. B. Joseph Fourier (1768 -- 1830).

See also wavelet, discrete cosine transform.

[[FOLDOC](#)]

05-11-2003

fractal

<[mathematics](#), [graphics](#)> A fractal is a rough or fragmented geometric shape that can be subdivided in parts, each of which is (at least approximately) a smaller copy of the whole. Fractals are generally self-similar (bits look like the whole) and independent of scale (they look similar, no matter how close you zoom in).

Many mathematical structures are fractals; e.g. [Sierpinski triangle](#), Koch snowflake, Peano curve, [Mandelbrot set](#) and [Lorenz attractor](#). Fractals also describe many real-world objects that do not have simple geometric shapes, such as clouds, mountains, turbulence, and coastlines.

Benoit [Mandelbrot](#), the discoverer of the [Mandelbrot set](#), coined the term "fractal" in 1975 from the Latin fractus or "to break". He defines a fractal as a set for which the Hausdorff Besicovich dimension strictly exceeds the topological dimension. However, he is not satisfied with this definition as it excludes sets one would consider fractals.

sci.fractals FAQ ([ftp://src.doc.ic.ac.uk/usenet/usenet-by-group/sci.fractals/](http://src.doc.ic.ac.uk/usenet/usenet-by-group/sci.fractals/)).

See also fractal compression, [fractal dimension](#), [Iterated Function System](#).

[Usenet](#) newsgroups: [news:sci.fractals](#), [news:alt.binaries.pictures.fractals](#), [news:comp.graphics](#).

["The Fractal Geometry of Nature", Benoit Mandelbrot].

[Are there non-self-similar fractals?]

[[FOLDOC](#)]

05-11-2003

fractal dimension

<[mathematics](#)> A common type of fractal dimension is the Hausdorff-Besicovich Dimension, but there are several different ways of computing fractal dimension. Fractal dimension can be calculated by taking the limit of the quotient of the log change in object size and the log change in measurement scale, as the measurement scale approaches zero. The differences come in what is exactly meant by "object size" and what is meant by "measurement scale" and how to get an average number out of many different parts of a geometrical object. Fractal dimensions quantify the static *geometry* of an object.

For example, consider a straight line. Now blow up the line by a factor of two. The line is now twice as long as before. $\log 2 / \log 2 = 1$, corresponding to dimension 1. Consider a square. Now blow up the square by a factor of two. The square is now 4 times as large as before (i.e. 4 original squares can be placed on the original square). $\log 4 / \log 2 = 2$, corresponding to dimension 2 for the square. Consider a snowflake curve formed by repeatedly replacing ___ with $_/_$, where each of the 4 new lines is $1/3$ the length of the old line. Blowing up the snowflake curve by a factor of 3 results in a snowflake curve 4 times as large (one of the old snowflake curves can be placed on each of the 4 segments $_/_$). $\log 4 / \log 3 = 1.261\dots$ Since the dimension 1.261 is larger than the dimension 1 of the lines making up the curve, the snowflake curve is a fractal. [sci.fractals FAQ].

16-03-2001

fragile

[brittle](#)

28-03-2004

Frankfurt school

<[sociology](#), [philosophy of history](#), [moral philosophy](#), [ethics](#)>, <[psychology](#), [Horkheimer](#), [Adorno](#), [Benjamin Marcuse](#), [Fromm](#)>, <[Habermas](#), [dialectic](#), [aesthetics](#), [philosophy of politics](#)> A community of German thinkers in the Institut fuer Sozialforschung (Institute for Social Research) who developed the methodology of critical theory. Prominent members include [Horkheimer](#), [Adorno](#), Benjamin, [Marcuse](#), Fromm, and [Habermas](#).

Recommended Reading:

The Essential Frankfurt School Reader, ed. by Andrew Arato and Eike Gebhardt (Continuum, 1982);

Martin Jay, The Dialectical Imagination: A History of the Frankfurt School and the Institute of Social Research 1923-1950 (California, 1996);

Rolf Wiggerhaus, The Frankfurt School: Its History, Theories, and Political Significance, tr. by Michael Robertson (MIT, 1995).

[[A Dictionary of Philosophical Terms and Names](#)]

28-03-2004

Free On-line Dictionary of Philosophy

FOLDOP is a searchable dictionary of technical words, concepts, acronyms, ideas, theories and some jokes in philosophy. As the name indicates, it is based on [FOLDOP](#) (<http://www.foldop.org>), the Free On-line Dictionary of Computing edited, by Denis Howe.

Without Denis' help and technical support FOLDOP would have never been possible.

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Cross-references to other entries look [like this](#). Note that not all cross-references actually lead anywhere yet, but if you find one that leads to something inappropriate, please let us know.

You can search the [latest version of the dictionary by WWW](#). If you find an entry that is wrong or inadequate please let us know by sending an email to floridi@ermine.ox.ac.uk, <mailto:gterrave@tin.it>.

16-03-2001

free variable

1. A variable referred to in a function, which is not an argument of the function. In lambda-calculus, x is a [bound variable](#) in the term $M = \lambda x. T$, and a free variable of T .

We say x is bound in M and free in T . If T contains a subterm $x. U$ then x is rebound in this term. This nested, inner binding of x is said to "shadow" the outer binding. Occurrences of x in U are free occurrences of the new x .

Variables bound at the top level of a program are technically free variables within the terms to which they are bound but are often treated specially because they can be compiled as fixed addresses. Similarly, an identifier bound to a recursive function is also technically a free variable within its own body but is treated specially.

A [closed term](#) is one containing no free variables.

See also [closure](#), [lambda lifting](#), [scope](#).

[[FOLDOC](#)]

2. In [predicate logic](#), an individual variable at least one of whose occurrences in a [wff](#) does not lie within the scope of a quantifier on the same letter. Because other occurrences may be bound, a variable may be both free and bound in the same [wff](#).

3. free occurrence of a variable

Any occurrence of an individual variable not within the scope of a quantifier on the same letter.

See [bound variable](#), [closure](#)

[Glossary of First-Order Logic]

05-11-2003

free will

<[ethics](#), [political philosophy](#), [psychology](#), [metaphysics](#)> <[libertarianism](#), [determinism](#), [causality](#), [compatibilism](#)> liberty of [choice](#) or self-determination. On the [absolute](#) or libertarian conception, [free will](#) is opposed absolutely to causal determination: given a situation, a person could simply have chosen and done otherwise than they did, unconditionally. Choices, on this conception, are uncaused or self-caused causings. On the compatibilist or hypothetical conception, free will is opposed to [constraint](#); a person is free if they could have done otherwise if they'd so chosen; though our choices, like everything else, are effects of antecedent causes. On this conception free acts are not uncaused, they're just caused in the right way, by our own preferences and desires. Acting freely on this "soft determinist" view is doing what you want (because you want to).

See also: [determinism](#).

[[Philosophical Glossary](#)]

05-11-2003

freedom

<[aesthetics](#), [ethics](#), [will](#), [action](#)>, <[political thought](#), [self-causality](#), [necessity](#), [possibility](#)>, <[metaphysics](#), [philosophy of nature](#)>, <[free will](#), [self-determination](#)>, <[necessity](#), [liberalism](#), [empiricism](#), [psychology](#), [Enlightenment](#)> (Lat. *libertas* Ger. *Freiheit*) - the human capacity to act (or not to act) as we choose or prefer, without any external compulsion or restraint. Freedom in this sense is usually regarded as a presupposition of moral responsibility: the actions for which I may be praised or blamed, rewarded or punished, are just those which I perform freely. The further question of whether choice-the volition or will to act-is itself free or subject to ordinary causality raises the issue of determinism in human conduct. But most modern philosophers have held that (internal) determination of the will by desire or impulse does not diminish the relevant sense of moral responsibility.

Recommended Reading:

Free Will, ed. by Gary Watson (Oxford, 1983);

Ilham Dilman, Free Will: An Historical and Philosophical Introduction (Routledge, 1999);

Robert Kane, The Significance of Free Will (Oxford, 1998);

Laura Waddell Ekstrom, Free Will: A Philosophical Study (Westview, 2000);

Graham McFee, Free Will (McGill, 2001); Daniel C. Dennett, Elbow Room (MIT, 1984).

[[A Dictionary of Philosophical Terms and Names](#)]

29-11-2001

Frege Gottlob

<[semantics](#), [philosophy of language](#), [metaphysics](#), [ethics](#)>, <[epistemology](#), [logic](#)> German mathematician and philosopher (1848-1925) who tried to develop effective ways of representing human thought in language and symbols. Frege was an early exponent of the view that arithmetical truth could be established on purely logical grounds. To that end, he developed a formal symbolic language for the expression of truth in Begriffsschrift (Concept-notation) (1879), which introduced quantifiers as logical operators, and employed this symbolic method in Die Grundlagen der Arithmetik (The Foundations of Arithmetic) (1884) and both volumes of Grundgesetze der Arithmetik (The Basic Laws of Arithmetic) (1893, 1903). In "Über Sinn und Bedeutung" ("On Sense and Reference") (1892), Frege proposed a strict distinction between the sense and the reference of terms as a way of avoiding difficult epistemological paradoxes about informative statements of identity.

Recommended Reading:

The Frege Reader, ed. by Michael Beaney (Blackwell, 1997);
 Joan Weiner, Frege (Oxford, 1999);
 Michael Dummett, The Interpretation of Frege' s Philosophy (Harvard, 1981);
 Michael Dummett, Frege and Other Philosophers (Oxford, 1996);
 Anthony Kenny, Frege: An Introduction to the Founder of Modern Analytic Philosophy (Blackwell, 2000); Hans D. Sluga, Gottlob Frege (Routledge, 1999); Wolfgang Carl, Frege' s Theory of Sense and Reference: Its Origin and Scope (Cambridge, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

29-11-2001

frequently asked question (FAQ)

<[convention](#)> (FAQ, or rarely FAQL, FAQ list) A document provided for many Usenet newsgroups (and, more recently, World-Wide Web services) which attempts to answer questions which new readers often ask. These are maintained by volunteers and posted regularly to the newsgroup. You should always consult the FAQ list for a group before posting to it in case your question or point is common knowledge.

The collection of all FAQ lists is one of the most precious and remarkable resources on the [Internet](#). It contains a huge wealth of up-to-date expert knowledge on many subjects of common interest. Accuracy of the information is greatly assisted by its frequent exposure to criticism by an interested, and occasionally well-informed, audience (the readers of the relevant newsgroup).

The main FTP archive for FAQs is on a computer called RTFM at MIT, where they can be accessed either by group (<ftp://rtfm.mit.edu/pub/usenet-by-group/comp.answers/>) or by hierarchy (<ftp://rtfm.mit.edu/pub/usenet-by-hierarchy/>).

There is another archive at Imperial College (<ftp://src.doc.ic.ac.uk/usenet/news-info/>), London, UK and a World-Wide Web archive in Ohio (<http://www.cis.ohio-state.edu/hypertext/faq/usenet/top.html>), USA.

The FAQs are also posted to Usenet newsgroups: [news:comp.answers](#), [news:news.answers](#) and [news:alt.answers](#).

[[FOLDOP](#)]

05-11-2003

Fresison

<[scholasticism](#), [logic](#), [syllogism](#), [medieval philosophy](#)> Name given by medieval logicians to any categorical syllogism whose standard form may be designated as EIO-4. Example: Since no fish are mammals while some animals that live in water are mammals, it follows that some animals that live in water are not fish. This is one of the fifteen forms in which syllogisms are always valid.

[[A Dictionary of Philosophical Terms and Names](#)]

29-11-2001

Freud Sigmund

<[psychology](#), [psychoanalysis](#), [subjectivity](#)> <[theory of dreams](#), [emotion](#), [passion](#), [repression](#)>, <[unconscious](#), [sublimation](#), [eros](#)> Austrian physician and psychoanalyst (1856-1939). Freud offered a series of extended accounts of the mechanism of repression, by means of which the motives of human behavior are unrecognizably disguised even from their agents. A series of lectures entitled *Vorlesungen zur Einfuehrung in die Psychoanalyse* (The Origin and Development of Psychoanalysis) (1917) offer a summary of his methods and results. In *Die Traumdeutung* (The Interpretation of Dreams) (1900), Freud proposed the analysis of dreams as a method of discovering the substantive content of the individual unconscious. In *Die Zukunft einer Illusion* (The Future of an Illusion), he offered a naturalistic account of religious belief.

Recommended Reading:

The Basic Writings of Sigmund Freud, ed. by A. A. Brill (Modern Library, 1995);
The Freud Reader, ed. by Peter Gay (Norton, 1995); The Cambridge Companion to Freud, ed. by Jerome Neu (Cambridge, 1992);
Paul Ricoeur, *Freud and Philosophy: An Essay on Interpretation*, tr. by Denis Savage (Yale, 1986); Anthony Storr, *Freud* (Oxford, 1989);
Donald Levy, *Freud Among the Philosophers: The Psychoanalytic Unconscious and Its Philosophical Critics* (Yale, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

29-11-2001

Freudianism

<[philosophy](#)> name for the ideas of Sigmund [Freud](#), and for the tradition of psychological thought (and psychoanalytic practice) spawned by his theories. The philosophical importance and influence of freudianism or psychoanalysis derives from its view of human nature, which emphasizes the importance of unconscious forces in determining the beliefs and actions of human beings.

[[The Ism Book](#)]

Edited by Giovanni Benzi

16-03-2001

Fuller Sarah Margaret

<[philosophy of women](#), [sociology](#), [political thought](#)> American journalist and social reformer (1810-1850). In *Woman in the Nineteenth Century* (1845), Fuller advocated political equality and intellectual opportunity for women. She died in a shipwreck off the coast of New York during her return from work as a newspaper correspondent in Italy. The posthumously-published *Life Without and Life Within* (1869) includes essays on several key intellectual figures of the nineteenth century.

Recommended Reading:

The Essential Margaret Fuller, ed. by Jeffrey Steele (Rutgers, 1992);
The Portable Margaret Fuller, ed. by Mary Kelley (Penguin, 1994);
Bell Gale Chevigny, *The Woman and the Myth: Margaret Fuller' s Life and Writings* (Northeastern, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

29-11-2001

function

1. <[mathematics](#)> (or "map", "mapping") Intuitively, a rule for associating a member or a sequence of members of one set (the domain) with a member of another set (the range). If D and C are sets (the domain and codomain) then a function f from D to C, normally written "f : D -> C" is a subset of D x C such that:

1. For each d in D there exists some c in C such that (d,c) is an element of f. I.e. the function is defined for every element of D.
2. For each d in D, c1 and c2 in C, if both (d,c1) and (d,c2) are elements of f then c1 = c2. I.e. the function is uniquely defined for every element of D.

See also [image](#), [inverse](#), [partial function composition](#), [computable function](#), definability of a function, [minimization](#), n-adic function, [partial function](#), [primitive recursion](#), [propositional function](#), [recursive function](#), recursive theory, [representation](#) of a function, [total function](#), [truth function](#)

2. <[programming](#)> Computing usage derives from the mathematical term but is much less strict. In programming (except in functional programming), a function may return different values each time it is called with the same argument values and may have side effects.

A [procedure](#) is a function which returns no value but has only side-effects. The [C](#) language, for example, has no procedures, only functions. ANSI C even defines a [type](#), void, for the result of a function that has no result.

[[FOLDOP](#)] and [Glossary of First-Order Logic]

05-11-2003

functional requirements

<[specification](#)> What a system should be able to do, the functions it should perform.

This term is used at both the user requirements analysis and software requirements specifications phases in the software life-cycle.

[When is a requirement not "functional"?)

[[FOLDOP](#)]

06-11-2003

functional role semantics

<[philosophy of mind](#)> also known as [conceptual role semantics](#) or CRS. The meaning of a [representation](#) is the role of that representation in the cognitive life of the agent. It is an extension of the well known [theory of meaning](#) as it supplements external use by including the role of a symbol inside a [computer](#) or a brain.

(The following discussion is published in The Routledge Encyclopedia of Philosophy)

According to Conceptual Role Semantics (CRS) [i.e. functional role semantics], the meaning of a representation is the role of that representation in the cognitive life of the agent, e.g. in perception, thought and decision-making. It is an extension of the well known [use theory of meaning](#), according to which the meaning of a word is its use in communication and more generally, in social interaction. CRS supplements external use by including the role of a symbol inside a [computer](#) or a brain. The uses appealed to are not just actual, but also counterfactual: not only what effects a thought does have, but what effects it would have had if stimuli or other states had differed.

The view has arisen separately in philosophy (where it is sometimes called "inferential," or "functional" role semantics) and in cognitive science (where it is sometimes called "procedural semantics"). The source of the view is Wittgenstein (1953) and Sellars, but the source in contemporary philosophy is a series of papers by Harman (see his 1987) and Field (1977). Other proponents in philosophy have included Block, Horwich, Loar, McGinn and Peacocke (1992). In cognitive science, they include Woods (1981) and Miller and Johnson-Laird (1976). (See references in Block, 1987.)

Further Discussion:

Linguistic and Metaphysical Semantics
(<http://www.nyu.edu/gsas/dept/philo/faculty/block/papers/ConceptualRoleSemantics.html#anchor695450>)

Motivations for Functional Role Semantics
(<http://www.nyu.edu/gsas/dept/philo/faculty/block/papers/ConceptualRoleSemantics.html#anchor695945>)

Two-factor Conceptual Role Semantics
(<http://www.nyu.edu/gsas/dept/philo/faculty/block/papers/ConceptualRoleSemantics.html#anchor696459>)

Criticisms of CRS
(<http://www.nyu.edu/gsas/dept/philo/faculty/block/papers/ConceptualRoleSemantics.html#anchor697027>)

Framework, Not Theory
(<http://www.nyu.edu/gsas/dept/philo/faculty/block/papers/ConceptualRoleSemantics.html#anchor735004>)

Ned Block

References

Block, N. (forthcoming) Conceptual Role Semantics
(<http://www.nyu.edu/gsas/dept/philo/faculty/block/papers/ConceptualRoleSemantics.html>)

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

functional specification

<PI, project> A description of what a system (e.g. a piece of [software](#)) does or should do (but not how it should do it). The functional specification is one of the inputs to the [design](#) process.

See IEEE/ANSI Std. 610.12-1990.

[FOLDOC]

06-11-2003

functional unit

A subsystem of the central processing unit of a computer. E.g. arithmetic and logic unit, memory address register, barrel shifter, register file.

[FOLDOC]

06-11-2003

functionalism 1

<philosophy of mind>

1. See [functionalism 1](#), the view that the physical realisation of a [functional](#) component is not, in some sense, its [essence](#). Rather, what makes a functional component the type it is, is characterised in terms of its role in relating [inputs](#) to [outputs](#) and its relations to other functional components.

See [multiple realisability](#), [Turing machine](#), [causal functionalism](#).

2. See [functionalism 2](#) an explanatory approach to behaviour and the constitution of cognitive states that regards particular [behaviours](#) and cognitive structures and capacities as playing functional roles in particular domains or contexts.

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

06-11-2003

functionalism 2

<philosophy of mind> see also [functionalism](#).

a. Introduction

functionalism (2) is an explanatory approach to behaviour and cognition that assumes the framework of evolutionary biology. Consequently, functionalism (2) regards specific behaviours and faculties or capacities as playing correspondingly specific and adaptive functional roles in the lives of the individuals and/or species that evidence them.

Functionalism (2) differs from the [functionalism 1](#), sometimes designated as "input-output functionalism", that often appears in the literature of cognitive science and philosophy of mind. This latter functionalism may be described as holding that the defining characteristic of a mental state is the set of causal relations it bears to inputs, other mental states, and outputs. Functionalism (2), by contrast, can be described as a quasi-teleological theory of adapted faculties and their functions.

b. Defining a Function

Functionalism (2) assumes a definition of function that, following Wright (1973/1995, p. 42), can be stated as: The function of X is Z means (a) X is there because it does Z, (b) Z is a consequence (or result) of X' s being there.

In other words, for an organism O, the function of faculty or organ X is that particular thing Z that X is good for and that explains why Os have Xs.

This conception of a function is meant to capture two central ideas: first, that Z is a function proper of X and not merely an accidental consequence or by-product of X, and second, that X is selected by virtue of its doing Z. This latter feature is what Wright calls "consequence-selection," or "selection by virtue of resultant advantage" (1973/1995, p. 43).

c. The Interaction and Isolation of Functions

Although under ordinary circumstances an organism' s various functions can be expected to interact, individual functions are hypothesised to have been shaped by the pressures of the specific domains in which the organism is active. It is in terms of such discrete domains that specific functions can be approached, or, as Reber puts, we can only understand a given behaviour or capacity by "recognising the role of the conditions under which it emerged and the functions that it has" (Reber 1995, p. 156). This has a practical consequence

in that attempts to study individual functions will be carried out within domains contrived as narrowly as possible, in order that the target function can be brought to the foreground to the greatest extent. One such attempt at the experimental isolation of a given function can be found in the artificial grammar learning experiments carried out by Reber and others. For these experiments the researchers designed situations meant to articulate effects that could be attributed to a single function, that is, the cognitive faculty hypothesised to afford acquisition of a grammar.

It should be emphasised, however, that the isolation of a function under experimental conditions is no more than a pragmatic expedient. A fuller, more natural account of the isolated function would have to locate it within the context of various interacting functions, the sum of which make up an organism' s complex repertoire c capacities and behaviours.

But functional isolation does buy us a measure of understanding in that it allows us to model the components making up an organism' s cognitive and behavioural resources.

Admittedly, the models resulting from functional isolation are necessarily idealisations of the actual processes and faculties under consideration. But as with all such idealisations, these models allow us to try to carve an organism' s various functions at the joints.

d. Functionalism and Adaptation

Like input-output [functionalism 1](#), functionalism (2) is subject to intentionalist criticism of the type found in Searle (1992). According to this critique, ascribing a function to a faculty or organ is always done against a background of the ascriber' s intentions (1992, p. 237).

The conclusion to be drawn is that the functional ascription is therefore not intrinsic to the faculty or organ, but rather to the teleology imposed on it from the outside by the observer. However, in the case of functionalism (2) it may be argued that consequence selection answers this concern. As Wright notes (1973/1995, p. 43), framing selection in terms of resulting advantage effectively separates selection from any necessary dependence on volition. For if the function is selected on the basis of the relative adaptive advantage it brings its possessor, we need only say that it is adaptive pressure of whatever sort that determines selection. If this is the case, then ascriptions of function can be taken as hypotheses about the intrinsic properties of a faculty or organ, which are in turn necessarily constrained by the best available theory of what counts as adaptive.

It is worth noting, however, that consequence selection can also accommodate functions that are in fact intentionally selected or designed. Consciously designed functions, no less than naturally selected functions, are functions "by virtue of their being the reason the thing with the function ' is there' " (Wright 1973/1995, p. 4). In sum, consequence selection allows intentional design to define functions without mandating it as a necessary condition of function definition.

e. Implications for Representational Theory and Content Ascription

Functionalism (2) carries important implications for content ascription and for representational theories generally. Specifically, functionalism (2) requires that given limits be placed on exactly what content states can be ascribed to a person. As Reber points out, content ascriptions made under functionalism (2) are constrained less by pure representational theory than by an understanding of what it is for a person to behave in an adaptive manner (Reber 1995, p. 58). While functionalist (2) content ascriptions still will be formulated in terms of what it is possible for a person to represent, the understanding of what "possible" means in any given situation will be characterised in terms of specifically adaptive possibilities. In sum, under functionalism (2), our attribution of a given representational content to a person will be constrained by what it is possible for that person to represent, given that his or her behaviour or cognitive state is an adaptive response to the domain or situation in question.

References

Reber, A. (1995). *Implicit Learning and Tacit Knowledge: An Essay on the Cognitive Unconscious*. New York, Oxford University Press.

Searle, J. (1992). *The Rediscovery of the Mind*. Cambridge, MA, MIT Press.

Sober, E. ed. (1995). *Conceptual Issues in Evolutionary Biology*. Cambridge, MA, MIT Press.

Wright, L. (1973/1995). Functions. In Sober (1995) pp. 27-48.

Daniel Barbiero

Chris Eliasmith - [\[Dictionary of Philosophy of Mind\]](http://artsci.wustl.edu/~philos/MindDict/) Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

functor

In category theory, a functor F is an operator on types. Fis also considered to be a [polymorphic](#) operator on functions with the type

$$F : (a \rightarrow b) \rightarrow (F a \rightarrow F b).$$

Functors are a generalisation of the function "[map](#)". The type operator in this case takes a type T and returns type "list of T". The map function takes a function and applies it to each element of a list.

[\[FOLDOP\]](#)

06-11-2003

fuzzy computing**fuzzy logic**

29-03-2004

fuzzy logic

A superset of [Boolean logic](#) dealing with the concept of partial truth -- truth values between "completely true" and "completely false". It was introduced by Dr. Lotfi Zadeh of UCB in the 1960' s as a means to model th uncertainty of [natural language](#).

Any specific theory may be generalised from a discrete (or "crisp") form to a continuous (fuzzy) form, e.g. "fuzzy calculus", "fuzzy differential equations" etc. Fuzzy logic replaces Boolean truth values with degrees of truth which are very similar to probabilities except that they need not sum to one. Instead of an assertion pred (X), meaning that X definitely has the property associated with [predicate](#) "pred", we have a truth function truth (pred(X)) which gives the degree of truth that X has that property. We can combine such values using the standard definitions of fuzzy logic:

truth(not x) = 1.0 - truth(x)
 truth(x and y) = minimum (truth(x), truth(y))
 truth(x or y) = maximum (truth(x), truth(y))

(There are other possible definitions for "and" and "or", e.g. using sum and product).

If truth values are restricted to 0 and 1 then these functions behave just like their Boolean counterparts. This is known as the "extension principle".

Just as a Boolean predicate asserts that its argument definitely belongs to some subset of all objects, a fuzzy predicate gives the degree of truth with which its argument belongs to a [fuzzy subset](#).

[Usenet](#) newsgroup: [news:comp.ai.fuzzy](#).

E-mail servers:

fuzzynet@aptronix.com
 rnalib@its.bldrdoc.gov
 fuzzy- server@til.com

(ftp://ftp.hiof.no/pub/Fuzzy), (ftp://ntia.its.bldrdoc.gov/pub/fuzzy).

FAQ (ftp://rtfm.mit.edu/pub/usenet-by-group/comp.answers/fuzzy-logic).

James Brule, "Fuzzy systems - a tutorial", 1985
 (http://life.anu.edu.au/complex_systems/fuzzy.html).

STB Software Catalog
 (<http://krakatoa.jsc.nasa.gov/stb/catalog.html>), includes a few fuzzy tools.

[H.J. Zimmerman, "Fuzzy Sets, Decision Making and Expert Systems", Kluwer, Dordrecht, 1987].

["Fuzzy Logic, State of the Art", Ed. R. Lowen, Marc Roubens, Theory and Decision Library, D: System theory, Knowledge Engineering and Problem Solving 12, Kluwer, Dordrecht, 1993, ISBN 0-7923-2324-6].

[[FOLDOP](#)]

06-11-2003

fuzzy subset

In [fuzzy logic](#), a fuzzy subset F of a set S is defined by a "membership function" which gives the degree of membership of each element of S belonging to F.

16-03-2001

Gadamer Hans-Georg

<[biography](#), [history of philosophy](#)> German philosopher; a student of [Nicolai Hartmann](#) (1900-2002). In *Wahrheit und Methode, Grundzuege einer philosophischen Hermeneutik (Truth and Method)* (1960), *Philosophical Hermeneutics* (1977) *Reason in the Age of Science* (1983), Gadamer develops a [hermeneutic](#) according to which the meaning of any text is a function of the historical situations of both author and interpreter. Since each reading is grounded in its own context, no one reading offers a definitive or final interpretation of the text; the virtual dialogue continues indefinitely.

Recommended Reading:

Hans-Georg Gadamer, *Praise of Theory: Speeches and Essays*, tr. by Chris Dawson (Yale, 1999);
 The Philosophy of Hans-Georg Gadamer, ed. by Lewis Edwin Hahn (Open Court, 1996);
 Brice R. Wachterhauser, *Beyond Being: Gadamer's PostPlatonic Hermeneutic Ontology* (Northwestern, 1999);
 James Risser, *Hermeneutics and the Voice of the Other: Re-Reading Gadamer's Philosophical Hermeneutic* (SUNY, 1997);
 Ingrid Scheibler, *Gadamer* (Rowman & Littlefield, 2000);
 Richard E. Palmer, *Hermeneutics: Interpretation Theory in Schleiermacher, Dilthey, Heidegger, and Gadamer* (Northwestern, 1969).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

Galilei Galileo

<[biography](#), [history of philosophy](#)> Italian mathematician and scientist (1564-1642) who developed modern scientific method and applied it to the study of astronomy and terrestrial motion. Author of *Il Saggiatore (The Assayer)* (1623), *Dialogo Sopra i due massimi sistemi del mondo (Dialogue on the Two Chief World Systems)* (1632), and *Discorsi e dimostrazioni matematiche intorno a due nuove scienze (Discourse on Two New Sciences)* (1638). Despite his careful delineation of scientific and religious concerns in *Considerations on the Copernican Opinion* (1615), Galileo's advocacy of Copernican astronomy earned him condemnation by the church. Artifacts from Galileo's career are displayed at the Museum of the History of Science in Florence, and his *Lettere (Letters)* are available on-line.

Recommended Reading:

Stillman Drake, *Galileo at Work: His Scientific Biography* (Dover, 1995);
 The Cambridge Companion to Galileo, ed. by Peter K. MacHamer (Cambridge, 1998);
 Stillman Drake, *Essays on Galileo and the History and Philosophy of Science* (Toronto, 2000);
 Dava Sobel, *Galileo's Daughter: A Historical Memoir of Science, Faith, and Love* (Penguin, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

Game of Life

[Life](#)

04-04-2004

game tree

<[games](#)> A [tree](#) representing contingencies in a game. Each [node](#) in a game tree represents a possible position (e.g., possible configuration of pieces on a chessboard) in the game, and each branching ("edge" in graph terms) represents a possible move.

[[FOLDOP](#)]

16-03-2001

Gandhi Mohandas Karamchand

<[biography](#), [history of philosophy](#)> Indian political leader (1869-1948), also called "Mahatma" (the Great-Souled). In opposition to racial discrimination against Indian nationals in South Africa and to British colonial rule of India itself, Gandhi urged the practice of Satyagraha in a practical effort to achieve peaceful resolution of political differences as head of the Indian National Congress. Constructive Programme: Its Meaning and Place (1941) includes a detailed description of the method he espoused. Active in efforts to reduce Hindu-Muslim ethnic conflict, Gandhi himself was assassinated by a Hindu fanatic.

Recommended Reading:

The Essential Gandhi: His Life, Work, and Ideas: An Anthology, ed. by Louis Fischer (Vintage, 1983);
Gandhi on Non-Violence, ed. by Thomas Merton (Norton, 1965);
An Autobiography: The Story of My Experiments With Truth, tr. by Mahadev Desai (Beacon, 1993);
Bhikhu Parekh, Gandhi (Oxford, 1997);
Glyn Richards, The Philosophy of Gandhi: A Study of His Basic Ideas (Curzon, 1992).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

Gassendi Pierre

<[biography](#), [history of philosophy](#)> French logician and philosopher (1592-1655). Gassendi revived interest in ancient [atomism](#) by defending a strictly mechanistic account of the physical world. Like Descartes, however, he exempted all thinking beings from this explanation. Gassendi proposed a limited empirical skepticism in Exercitationes Paradoxicae adversus Aristoteleos (Exercises against the Aristoteleans) (1624) and in the fifth set of Objections that were appended to the publication of Descartes' s Meditations in 1641. The Disquisiti Metaphysica (1644) and Syntagma Philosophiae Epicuri (1649) contain a clear defence of his adherence to an atomistic natural philosophy.

Recommended Reading:

Pierre Gassendi' s Institutio Logica: A Critical Edition With Translation and Introduction (Van Gorcum, 1981);
Pierre Gassendi, Selected Works;
Margaret J. Osler, Divine Will and the Mechanical Philosophy: Gassendi and Descartes on Contingency and Necessity in the Created World (Cambridge, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

Gauss Carl Friedrich

<[biography](#), [history of philosophy](#)> German physicist and mathematician (1777-1855). Gauss established the foundations of modern number theory with his work on primes in Disquisitiones arithmeticae (1801) and contributed significantly to the study of electromagnetic forces. Gauss was the teacher of Riemann and Dedekind.

Recommended Reading:

W. K. Bühler, Gauss: A Biographical Study (Springer Verlag, 1981)
Morris Kline, Mathematical Thought from Ancient to Modern Times (Oxford, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

Gaussian distribution

<[statistics](#)> [normal distribution](#).

04-04-2004

Gay John

<[biography](#), [history of philosophy](#)> English moral philosopher (1699-1745). Gay' s Dissertation concerning th Fundamental Principle of Virtue or Morality (1731) provided an early statement of the utilitarian theory. The greatest happiness principle, he supposed, represents a middle ground between the egoism of Hobbes and Hutcheson' s moral sense theory.

Recommended Reading:
D. D. Raphael, British Moralists (Hackett, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

Gemeinschaft - Gesellschaft

<[social philosophy](#), [community](#)> German distinction between [community](#), characterized by traditional practices and a personal sense of belonging, and the more individualistic, competitive, and impersonal organization of mere [society](#).

Recommended Reading:
Ferdinand Tonnies, Community and Society (Transaction, 1988)
Larry Lyon, The Community in Urban Society (Waveland, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

gender

<[sociology](#)> distinction between the socially-constructed expectations associated with masculinity and femininity and the biological categories of male and female. De Beauvoir, MacKinnon, and other feminists draw attention to the disparate power relationships established by gender differentiation in our culture.

Recommended Reading:
Martha Craven Nussbaum, Sex & Social Justice (Oxford, 2000);
Judith P. Butler, Bodies That Matter: On the Discursive Limits of Sex (Routledge, 1993);
Feminism / Postmodernism, ed. by Linda J. Nicholson (Routledge, 1989);
Gender / Body / Knowledge: Feminist Reconstructions of Being and Knowing, ed. by Alison M. Jaggar and Susan R. Bordo (Rutgers, 1989).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

General Recursion Theorem

<[mathematics](#)> [Cantor' s theorem](#), originally stated for [ordinals](#), which extends [inductive](#) proof to [recursive](#) construction. The proof is by pasting together "attempts" (partial solutions).

[Better explanation?]

[[FOLDOP](#)]

16-03-2001

general will

<[political philosophy](#), [collectivism](#)> collective desire for the [welfare](#) of a society as a whole. According to Jean Jacques Rousseau, the citizens of a properly-contracted civil society are infallibly guided by the general will, rather than by their conflicting individual self-interests.

Recommended Reading:
Jean-Jacques Rousseau, The Social Contract, tr. by Maurice Cranston (Penguin, 1987);
Robert Wokler, Rousseau (Oxford, 1995);
Patrick Riley, The General Will Before Rousseau (Princeton, 1991);
Andrew Levine, The General Will: Rousseau, Marx, Communism (Cambridge, 1993).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

generality constraint

<[philosophy of mind](#)> [constraint](#) on concept possession (and hence on the ability to entertain genuine thoughts) to the effect that a subject has the concept C only if the set of thoughts the subject is able to entertain is closed under recombination of C with all other semantically and categorically appropriate concepts that the subject possesses.

Pete Mandik

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://arts.wustl.edu/~philos/MindDict/>)

16-03-2001

generalization

<[logic](#)> To add a quantifier to a [wff](#) so that it either binds previously free variables, or binds new variables substituted for constants.

See [bound variables](#), [free variables](#), [instantiation](#), [quantifier](#)

Existential generalization

To generalize using the existential quantifier. For example to move from propositional [functions](#) like Px or propositions like Pa to (Ex)Px; from "x is purple" or "alabaster is purple" to "something is purple". Valid without restriction.

Universal generalization

To generalize using the universal quantifier. For example to move from propositional [functions](#) like Px or propositions like Pa to (x)Px; from "x is purple" or "alabaster is purple" to "everything is purple". Valid only under several restrictions.

[Glossary of First-Order Logic]

16-03-2001

generate

To produce something according to an [algorithm](#) or program or set of rules, or as a (possibly unintended) [side effect](#) of the execution of an algorithm or program.

The opposite of [parse](#).

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

genetic algorithm

(GA) An [evolutionary algorithm](#) which generates each individual from some encoded form known as a "chromosome" or "genome". Chromosomes are combined or mutated to breed new individuals. "Crossover", the kind of recombination of chromosomes found in sexual reproduction in nature, is often also used in GAs. Here, an offspring' s chromosome is created by joining segments chosen alternately from each of two parents' chromosomes which are of fixed length.

GAs are useful for multidimensional optimisation problems in which the chromosome can encode the values for the different variables being optimised.

Illinois Genetic Algorithms Laboratory (<http://GAL4.GE.UIUC.EDU/illigal.home.html>) (IlligAL).

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16-03-2001

genetic algorithms[genetic algorithm](#)

04-04-2004

genetic programming

<[programming](#)> (GP) A programming technique which extends the [genetic algorithm](#) to the domain of whole computer programs. In GP, populations of programs are genetically bred to solve problems. Genetic programming can solve problems of system identification, classification, control, robotics, optimisation, game playing, and [pattern recognition](#).

Starting with a primordial ooze of hundreds or thousands of randomly created programs composed of functions and terminals appropriate to the problem, the population is progressively evolved over a series of generations by applying the operations of Darwinian fitness proportionate reproduction and crossover (sexual recombination).

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16-03-2001

genus and differentia

<[logic](#), [definition](#)> latin terms used by medieval logicians in an effort to define a term by indicating the general kind (genus) of things to which it refers and then specifying the special feature (differentia) which sets them apart from other things of the same kind. This usage derives from Aristotle' s logic, where the highest kind t which an individual thing belongs is one of the basic categories of being.

[\[A Dictionary of Philosophical Terms and Names\]](#)

04-01-2002

Gersonides Levi ben Gershom

<[biography](#), [history of philosophy](#)> French Jewish mathematician and philosopher (1288-1344). Following the leads of Maimonides and Ibn Rushd, Gersonides maintained that truths of reason cannot conflict with revealed religion. He denied the possibility of creation ex nihilo, supposing instead that matter is eternal. On Gersonides view, however, genuine human freedom is possible because the omniscience of god extends only to knowledge of universals.

Recommended Reading:

Jacob J. Staub, The Creation of the World According to Gersonides (SBL, 1982)

Gersonides on Providence, Covenant, and the Chosen People: A Study in Medieval Jewish Philosophy and Biblical Commentary (SUNY, 1995).

[\[A Dictionary of Philosophical Terms and Names\]](#)

04-01-2002

Gettier Edmund

<[biography](#), [history of philosophy](#)> American philosopher (1927-) whose Is Justified True Belief Knowledge? (1963) offers counter-examples to show that even justified true belief may not be genuine knowledge in cases where that which justifies one' s belief happens not to be related directly to the truth of what one believes.

Recommended Reading:

Empirical Knowledge, ed. by Paul K. Moser (Rowman & Littlefield, 1996);

A Companion to Epistemology, ed. by Jonathan Dancy and Ernest Sosa (Blackwell, 1994);

Robert Audi, Epistemology: A Contemporary Introduction to the Theory of Knowledge (Routledge, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

04-01-2002

Gettier problem

<[epistemology](#)> a type of counterexample to the definition of [knowledge](#) as justified true belief. The first examples of the Gettier problem were published in 1963 by Edmund Gettier. In that paper, Gettier makes very clear that the tripartite definition concerns not knowledge per se, but a knowing subject' s epistemic state:

S knows that p *iff*

1) p is true

2) S believes that p

3) S is justified in believing that p

Sceptical [arguments](#) usually accept (2) and (3) and try to show that, no matter how one reinforces these two conditions, (1) does not necessarily follow. Gettier-type counterexamples concern (3) and are not to be confused with sceptical [arguments](#). They show that even if (1) and (2) are granted, one can always prove that S has merely guessed that p, since circumstances may be such that (3) only appears to apply, but actually does not, or is satisfied only in a sense too weak to be satisfactory. This shows that the tripartite definition is incorrect.

Suggestions on how to improve it have abounded.

Consider the following example, taken from Theory of Knowledge Course (<http://www-philosophy.ucdavis.edu/phi102/tkch1.htm>).

A teacher has two students, Mr. Nogot and Mr. Havit, in her class. Mr. Nogot seems to be the proud owner of a Ferrari (a rare and expensive car). He says he owns one, drives one around, and has papers which state that the car he drives is his. However, he does not actually own a Ferrari.

The teacher, on the basis of this evidence, concludes that someone in her class owns a Ferrari. This is true enough, but only because Mr. Havit, who shows no signs of Ferrari ownership, secretly owns one. So, it seems that the three conditions (truth, belief and justification) of knowledge have been met, but that there is no knowledge.

Another example of a Gettier case can be developed from an example concerning whether an executive' secretary is in his office. Suppose that she looked into the office and saw, sitting behind the desk, a figure who looked to her exactly like her secretary. We may suppose that she would be completely justified in accepting that her secretary is in his office. However, it may be that the person sitting at the desk is her secretary' identical twin brother. The real secretary is hiding behind the desk, waiting to leap up and surprise her. So it is true that the secretary is in the office, the executive accepts that it is true, and she is completely justified in so accepting that he is.

A third example, very simple, is provided by a broken watch. Suppose it is 3.15 pm and that my watch stopped working yesterday exactly at 3.15 pm. Suppose that checking the time on my watch has always been a very reliable and hence strongly justification-affording procedure in the past. I wish to know what the time is and I check my watch. Do I know that it is 3.15 pm? Of course not, I am just extremely lucky, although the procedure followed is reliable by hypothesis, and my belief that it is 3.15 pm is true.

Gettier counterexamples are easy to construct by maintaining but decoupling the justification of p from the truth of p. This can happen whenever p is, or refers to, an empirical (i.e. contingent) fact. In mathematical knowledge, where p is a theorem and its justification is a logical proof, not "Gettierisation" seems possible.

Luciano Floridi

16-03-2001

Geulincx Arnold

<[biography](#), [history of philosophy](#)> Belgian philosopher (1624-1669); author of Quaestiones quodlibeticæ (Miscellaneous Questions) (1653), Logica restituta (Restored Logic) (1662), and De virtute (On Virtue) (1665). As a devoted Cartesian, Geulincx sought to resolve the dualist' s problem of mind/body interaction by appealing to divine intervention as the genuine source of all causation, presaging the occasionalism of Malebranche. The coincidence of mental thoughts with bodily motions, he argued, is like the conformity between unconnected but synchronized clocks.

Recommended Reading:

Causation in Early Modern Philosophy: Cartesianism, Occasionalism, and Preestablished Harmony, ed. by Steven Nadler (Penn. State, 1993)

G. Nuchelmans, Geulincx Containment Theory of Logic (Royal Netherlands, 1988).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

Gilligan Carol

<[biography](#), [history of philosophy](#)> American psychologist (1936-). Gilligan' s In a Different Voice Psychological Theory and Women' s Development (1983) applies psychological research on femal adolescents to theories of moral development, discovering in women a greater inclination toward an "ethics of care," characterized by focus on responsibilities within particular human relationships, than toward the male "ethics of justice," with its emphasis on [rules](#) and [rights](#) conceived in general terms. In Mapping the Moral Domain (1988), Gilligan further examines the social significance of her psychological theories.

Recommended Reading:

Susan J. Hekman, Moral Voices, Moral Selves: Carol Gilligan and Feminist Moral Theory (Penn. State, 1995)
Caring Voices and Women' s Frames: Gilligan' s View, ed. by Bill Puka (Garland, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

Gilman Charlotte Perkins

<[biography](#), [history of philosophy](#)> American novelist and social philosopher who chronicled the abuses of androcentric culture (1860-1935). "The Yellow Wallpaper" (1892) describes the brutality suffered by married women under the guise of treatment of mental illness. Gilman' s utopian novel Herland (1915) provides a imaginative vision of a matriarchal society free from any taint of male domination. In Women and Economics: A Study of the Economic Relation between Men and Women as a Factor in Social Evolution (1898), Gilman maintained that securing the personal and political rights of women requires their achievement of genuine economic equality. His Religion and Hers: A Study of the Faith of Our Fathers and the Work of Our Mothers (1923) explored the patriarchal elements of traditional Christianity. Gilman described her personal resistance of gender models in the autobiographical The Living of Charlotte Perkins Gilman (1935).

Recommended Reading:

The Charlotte Perkins Gilman Reader, ed. by Ann J. Lane (Virginia, 1999);
Charlotte Perkins Gilman: A Nonfiction Reader, ed. by Larry Ceplair (Columbia, 1991);
Ann J. Lane, To Herland and Beyond: The Life and Work of Charlotte Perkins Gilman (Virginia, 1997);
The Captive Imagination: A Casebook on the Yellow Wallpaper, ed. by Catherine Golden (Feminist, 1992).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

Glanvil Joseph

<[biography](#), [history of philosophy](#)> English philosopher (1611-1680) whose Vanity of Dogmatizing (1661) used skeptical arguments to show the fallibility of empirical study of the natural world. Sharing the Cambridge Platonists' concern with the realm of [soul](#) and [spirit](#), however, Glanvill later argued that denying the reality of ghosts and witches would be the first step toward atheism.

Recommended Reading:

Robert M. Burns, The Great Debate on Miracles: From Joseph Glanvill to David Hume (Bucknell, 1981);
Sascha Talmor, Glanvill: The Uses and Abuses of Skepticism;
Joseph Glanvill, Saducismus Triumphatus: Or, Full and Plain Evidence Concerning Witches and Apparitions (Scholars' Facsimilies, 1966).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

globalisation

[internationalisation](#)

04-04-2004

Glossary of First-Order Logic

<[source](http://www.earlham.edu/~peters/courses/logsys/glossary.htm)> the Glossary of First-Order Logic (<http://www.earlham.edu/~peters/courses/logsys/glossary.htm>) edited by Peter Suber, Philosophy Department, Earlham College, USA "This glossary is limited to basic set theory, basic recursive function theory, two branches of logic (truth-functional propositional logic and first-order predicate logic) and their metatheory."
Many definitions in this dictionary are from the version published in 2001-02-05.

16-03-2001

God

<[God-proofs of the existence of](#)> <[metaphysics](#), [ontological argument](#), [teleological argument](#), > <[ethics](#), [existence](#), [tomism](#), [scholasticism](#), [evil](#), [stoicism](#)> [omnipotent](#) (all powerful), [omniscient](#) (all knowing), and [perfectly benevolent creator](#) of the [universe](#). Conceived of as [transcending](#) the created universe (as in the [Christian tradition](#)) God is thought to exist prior to and beyond the universe which he created from nothing or [ex nihilo](#). Conceived of as [immanent](#) (as on pantheistic and Stoic conceptions) God is in the universe (as its guiding [spirit](#) or [logos](#)) and [coextensive](#) with it, not beyond it or prior to it.

[[Philosophical Glossary](#)]

22-06-2001

God existence of

<[God-proofs of the existence of](#), [metaphysics](#)> attempts to demonstrate the existence of God have been a notable feature of Western philosophy. The most commonly employed theistic efforts include: the [cosmological argument](#), the [ontological argument](#), the [teleological argument](#), and the [moral argument](#). The most serious atheological argument is the problem of evil.

Recommended Reading:

The Existence of God, ed. by John Hick and Paul Edwards (Macmillan, 1964);
Alvin Plantinga, God and Other Minds: A Study of the Rational Justification of Belief in God (Cornell, 1990);
Richard M. Gale, On the Nature and Existence of God (Cambridge, 1993);
Richard. Swinburne, The Existence of God (Clarendon, 1991);
John L. Mackie, The Miracle of Theism: Arguments for and Against the Existence of God (Oxford, 1983).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

God-proofs of the existence of

<[metaphysics](#), [ontological argument](#), [unmoved mover](#), > <[watchmaker argument](#)>

04-04-2004

Godwin William

<[biography](#), [history of philosophy](#)> English social reformer (1756-1836) and husband of Mary Wollstonecraft. Godwin' s Enquiry Concerning Political Justice and its Influence on Modern Morals and Happiness (1793) an Thoughts on Man, his Nature, Productions, and Discoveries (1831) employed utilitarian principles to show the corrupting influence of government and to defend political anarchism. Godwin also wrote the novel The Adventures of Caleb Williams (1794).

Recommended Reading:

The Anarchist Writings of William Godwin, ed. by Peter Marshall (Freedom, 1986);
D. H. Monro, Godwin' s Moral Philosophy: An Interpretation of William Godwin (Greenwood, 1980);
George Woodcock, William Godwin: A Biographical Study (Black Rose, 1989).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

Goedel Kurt

<[biography](#), [history of philosophy](#)> Czech logician and mathematician (1906-1978). By applying an arithmetical method to the syntactical study of formalized logical languages, Goedel demonstrated in "Ueber formal unentscheidbare Saetze der Principia Mathematica und verwandter Systeme" ("On formally undecidable propositions of Principia Mathematica and related systems") (1931) that any consistent formal system powerful enough to contain arithmetic must contain at least one proposition whose truth or falsity cannot be proven within the system. It follows further that the consistency of a formal system cannot be evaluated from within the system itself. These discoveries brought an abrupt end to hopes for the purely-syntactical logicization of arithmetic. Goedel' s own reflections on the significance of his work may be found in "The modern developmer of the foundations of mathematics in the light of philosophy" (1961).

Recommended Reading:

G-del' s Proof (NYU, 1983); S. G. Shanker, Goedel' s Theorem in Focus (Routledge, 1988);

Raymond M. Smullyan, Forever Undecided: A Puzzle Guide to Goedel (Oxford, 1988);

Raymond M. Smullyan, Goedel' s Incompleteness Theorems (Oxford, 1992);

John L. Casti and Werner Depauli, Goedel: A Life of Logic, the Mind, and Mathematics (Perseus, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

Goedel numbering

<[logic](#)> A code in which distinct numerals are assigned to the expressions of a language such that we can tell from the numeral whether it is assigned to a symbol, a sequence of symbols (potential [wff](#)), or a sequence of [wffs](#) (potential proof). There must be an effective method for translating symbols, formulas, or sequences of formulas into their Goedel numbers, and vice versa.

See [arithmetisation](#)

[Glossary of First-Order Logic]

16-03-2001

GOFAI

Good Old-Fashioned Artificial Intelligence

04-04-2004

Goldman Emma

<[biography](#), [history of philosophy](#)> Lithuanian-American political activist (1869-1940); author of Anarchism and other Essays (1911). An outspoken advocate of free speech and social freedom, Goldman defended the rights of women to control their own economic and reproductive activities in The Traffic in Women (1909). Her views on religion are expressed in "The Philosophy of Atheism" (1916).

Goldman was influential in the development of the trade union movement, but was imprisoned for her anti-war activities and deported from the United States in 1919, continuing her involvement in world affairs from abroad. Living My Life (1931) details many of the events in her adventurous life.

Recommended Reading:

Red Emma Speaks: An Emma Goldman Reader, ed. by Alix Kates Shulman (Humanity, 1996);

Martin Gay and Kathlyn Gay, The Importance of Emma Goldman (Lucent, 1996);

Emma Goldman: American Individualist, ed. by John Chalberg and Oscar Handlin (Addison-Wesley, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

good

<[ethics](#), [ontology](#), [metaphysics](#)> the most general term of approval, both moral and non-moral, whether intrinsic or extrinsic.

Recommended Reading:

G. E. Moore, Principia Ethica (Prometheus, 1988);

R. M. Hare, The Language of Morals (Clarendon, 1991);

Being and Goodness: The Concept of the Good in Metaphysics and Philosophical Theology, ed. by Scott MacDonal (Cornell, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

Good Old-Fashioned Artificial Intelligence

see [symbolicism](#), [artificial intelligence](#)

04-04-2004

Goodman Nelson

<[biography](#), [history of philosophy](#)> American philosopher (1906-1998). In The Structure of Appearance (1951) and Ways of Worldmaking (1978), Goodman defended an extreme nominalism according to which things, qualities, and even similarities are entirely the products of our habits of speaking, without any ontological foundation in reality. The "new riddle of induction" introduced by Goodman in Fact, Fiction, and Forecast (1954) uses the color-predicate "grue" to raise significant doubts about our ability to project natural predicates into the future. Goodman' s Languages of Art (1969) proposes that arforms are properly understood as symbolic systems that establish inter-related networks of meaning without attempting to represent reality.

Recommended Reading:

Nelson Goodman and Catherine Z. Elgin, Reconceptions in Philosophy and Other Arts and Sciences (Hackett, 1990);

The Philosophy of Nelson Goodman: Selected Essays, ed. by Catherine Elgin (Garland, 1997);

How Classification Works: Nelson Goodman Among the Social Sciences, ed. by Mary Douglas and David Hull (Edinburgh, 1993).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

grammar

A formal definition of the syntactic structure of a language (see [syntax](#)), normally given in terms of [production rules](#) which specify the order of constituents and their sub-constituents in a [sentence](#) (a well-formed string in the language). Each rule has a left-hand side symbol naming a syntactic category (e.g. "noun-phrase" for a [natural language](#) grammar) and a right-hand side which is a sequence of zero or more symbols. Each symbol may be either a [terminal symbol](#) or a non-terminal symbol. A terminal symbol corresponds to one "[lexeme](#)" - a part of the sentence with no internal syntactic structure (e.g. an identifier or an operator in a computer language). A non-terminal symbol is the left-hand side of some rule.

One rule is normally designated as the top-level rule which gives the structure for a whole sentence.

A grammar can be used either to parse a sentence (see [parser](#)) or to generate one. Parsing assigns a terminal syntactic category to each input token and a non-terminal category to each appropriate group of tokens, up to the level of the whole sentence. Parsing is usually preceded by [lexical analysis](#). Generation starts from the top-level rule and chooses one alternative production wherever there is a choice.

See also [BNF](#), [yacc](#), [attribute grammar](#), [grammar analysis](#), [formal language](#)

16-03-2001

grammatical inference

Deducing a [grammar](#) from given examples. Also known as "inductive inference" and recently as "computational learning".

16-03-2001

Gramsci Antonio

<[biography](#), [history of philosophy](#)> Italian social philosopher (1891-1937) whose Quaderni del carcere (Prison Notebooks) (1929-1935) defended a humanistic version of the political philosophy of Marx as an alternative to Italian fascism. Like Croce, Gramsci deplored authoritarian government of every variety and argued that social classes are shaped as much by their characteristic patterns of thought as by their material circumstances.

Recommended Reading:

The Antonio Gramsci Reader: Selected Writings 1916-1935, ed. by David Forgacs and Eric J. Hobsbawm (NYU, 2000);

Antonio Gramsci: Pre-Prison Writings, ed. by Richard Bellamy and Virginia Cox (Cambridge, 1994);

Sue Golding, Gramsci' s Democratic Theory: Contributions to a PostLiberal Democracy (Toronto, 1992);

Gramsci, Historical Materialism and International Relations, ed. by Stephen Gill (Cambridge, 1993).

[\[A Dictionary of Philosophical Terms and Names\]](#)

04-01-2002

granularity

<[jargon](#), [parallel](#)> The size of the units of [code](#) under consideration in some context. The term generally refers to the level of detail at which code is considered, e.g. "You can specify the granularity for this profiling tool".

The most common computing use is in parallelism where "fine grain parallelism" means individual tasks are relatively small in terms of code size and execution time, "coarse grain" is the opposite. You talk about the "granularity" of the parallelism.

The smaller the granularity, the greater the potential for parallelism and hence speed-up but the greater the overheads of synchronisation and communication.

[\[FOLDOC\]](#)

16-03-2001

graph

1. <[mathematics](#)> A collection of [nodes](#) and [edges](#).

See also [connected graph](#), [degree](#), [directed graph](#), [Moore bound](#), [regular graph](#), [tree](#).

2. <[graphics](#)> A visual representation of algebraic equations or data.

[\[FOLDOC\]](#)

16-03-2001

greatest common divisor

<[mathematics](#)> (GCD) A function that returns the largest positive [integer](#) that both arguments are integer multiples of.

See also Euclid' s Algorithm. Compare [lowest common multiple](#).

[\[FOLDOC\]](#)

16-03-2001

greatest happiness principle

<[ethics](#), [utilitarianism](#)> the definition of moral value by utilitarians. As stated by Hutcheson, Bentham, and Mill, the principle is that actions are right only insofar as they tend to produce the greatest balance of pleasure over pain for the largest number of people.

Recommended Reading:

Francis Hutcheson, *Philosophical Writings*, ed. by R.S. Downie (Everyman, 1919);
 Jeremy Bentham, *An Introduction to the Principles of Morals and Legislation* (Prometheus, 1987);
 John Stuart Mill, *Utilitarianism and Other Essays*, ed. by Alan Ryan (Viking, 1987);
 Alan O. Ebenstein, *The Greatest Happiness Principle: An Examination of Utilitarianism* (Garland, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

04-01-2002

greatest lower bound

<[mathematics](#), [logic](#)> (glb, meet, infimum) The greatest lower bound of two elements, a and b is an element c such that $c \leq a$ and $c \leq b$ and if there is any other lower bound c' then $c' \leq c$.

The greatest lower bound of a set S is the greatest element b such that for all s in S, $b \leq s$. The glb of mutually comparable elements is their minimum but in the presence of incomparable elements, if the glb exists, it will be some other element less than all of them.

glb is the [dual](#) to [least upper bound](#).

[\[FOLDOC\]](#)

16-03-2001

Green Thomas Hill

<[biography](#), [history of philosophy](#)> English philosopher (1836-1882). Green' s defense of the idealism of Hegel found its best expression in the critical introduction to his editions of Hume' s *Treatise* and in his own *Prolegomena to Ethics* (1883), where he argued that all human knowledge and action derive from abstract thought. In *Lectures on the Principles of Political Obligation* (1885) Green applied Hegelian notions in opposition to laissez-faire liberal politics.

Recommended Reading:

T. H. Green, *The Theory of Free Will & the Compulsion of Human Actions* (Caribe, 1991);
 Geoffrey Thomas, *The Moral Philosophy of T. H. Green* (Oxford, 1987);
The Politics of Conscience: T. H. Green and His Age, ed. by Melvin Richter and Peter Johnson (St. Augustine, 1997);
 William D. Lamont, *Introduction to Green' s Moral Philosophy* (Sterling, 1980).

[\[A Dictionary of Philosophical Terms and Names\]](#)

04-01-2002

Grosseteste Robert

<[biography](#), [history of philosophy](#)> English philosopher (1170-1253). Grosseteste used Arabic and Jewish commentaries on the philosophy of Aristotle to develop his own scientific and religious theories, using practical experimentation to study the nature of light.

Recommended Reading:

James McEvoy, *Robert Grosseteste, Exegete and Philosopher* (Variorum, 1994);
 Robert Grosseteste - *On the Six Days of Creation: A Translation of the Hexaemeron*, tr. by C.F.J. Martin (British Academy, 1999);
 James McEvoy, *Robert Grosseteste* (Oxford, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

04-01-2002

Grotius Hugo

<[biography](#), [history of philosophy](#)> Dutch legal theorist (1583-1645). In *De Iure Belli ac Pacis Libri Tres* (Three Books on the Law of War and Peace) (1625) Grotius developed a natural law theory of relations between human beings who are both social and competitive that was influential on the work of Hobbes and Locke. Though he notoriously claimed that the principles of international cooperation did not depend upon the existence or benevolence of god, Grotius also wrote an extended defense of traditional theology, *De veritate religionis Christianae* (On the Truth of the Christian Religion) (1627). He died of pneumonia at the court of Queen Kristina.

Recommended Reading:

Edward Dumbauld, *The life and legal writings of Hugo Grotius* (Lyle Stuart, 1978);
 Hugo Grotius and International Relations, ed. by Hedley Bull, Benedict Kingsbury, and Adam Roberts (Oxford, 1992);
 Grotius, ed. by John Dunn and Ian Harris (Elgar, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

grue

<[philosophy of science](#)> a color-predicate used by Goodman to illustrate a significant problem with inductive predictions. With respect to a designated future time, an object is grue if it is seen to be green when first observed before that time or if it is seen to be blue when first observed after that time. The problem is that our present observations of green grass seem to provide equal support for hypotheses that grass is green and that grass is grue (or gred, for that matter). There is no simple and apparent way of forestalling this gruesome difficulty.

Recommended Reading:

Nelson Goodman, *Fact, Fiction, and Forecast* (Harvard, 1954)
 Grue!: *The New Riddle of Induction*, ed. by Douglas Stalker (Open Court, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

04-01-2002

Habermas Juergen

<[history of philosophy](#), [biography](#)> german philosopher (1929-). As a prominent member of the [Frankfurt school](#), [Habermas](#) engages in critical study of the historical origins of [human knowledge](#) in many disciplines. His *Theorie und Praxis: Sozial-Philosophische Studien* (Theory and Practice) (1963) and *Legitimationsprobleme im Spätkapitalismus* (Legitimation Crisis) (1973) examine the social conditions under which the uninhibited dialogue of an "[ethics of discourse](#)" is possible in the public literary sphere, serving the [basic human needs](#) to gain control over the natural world, to explore the character of interpersonal relationships, and to escape the domination of social power-structures. In *Erkenntnis und Interesse* (Knowledge and Human Interests) (1968) [Habermas](#) again emphasized the implications of social context for the development of [epistemology](#). [Habermas](#) is also the author of *Theorie des kommunikativen Handelns* (The Theory of Communicative Action) (1981) and *Der philosophische Diskurs der Moderne* (Philosophical Discourse on Modernity) (1985), where he criticizes the more radical views of [Foucault](#) and [Lyotard](#).

Recommended Reading:

Jurgen Habermas, *Postmetaphysical Thinking: Philosophical Essays*, tr. by William Mark Hohengarten (MIT, 1994);
 Jurgen Habermas, *Moral Consciousness and Communicative Action*, tr. by Shierry Weber Nicholsen and Christian Lenhardt (MIT, 1992);
 Habermas: A Critical Reader, ed. by Peter Dews (Blackwell, 1999);
 Perspectives on Habermas, ed. by Lewis Edwin Hahn (Open Court, 2000);
 The Cambridge Companion to Habermas, ed. by Stephen K. White (Cambridge, 1995);
 John B. Thompson, *Critical Hermeneutics: A Study in the Thought of Paul Ricoeur and Jurgen Habermas* (Cambridge, 1984);
 Habermas and the Unfinished Project of Modernity: Critical Essays on the Philosophical Discourse of Modernity, ed. by Maurizio P. D' Entrevas and Seyla Benhabib (MIT, 1997);
 Jane Braaten, *Habermas' s Critical Theory of Society* (SUNY, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

22-11-2001

hacker

<[person](#), [jargon](#)> (Originally, someone who makes furniture with an axe) 1. A person who enjoys exploring the details of programmable systems and how to stretch their capabilities, as opposed to most users, who prefer to learn only the minimum necessary.

2. One who programs enthusiastically (even obsessively) or who enjoys programming rather than just theorizing about programming.

3. A person capable of appreciating [hack value](#).

4. A person who is good at programming quickly.

5. An expert at a particular program, or one who frequently does work using it or on it; as in "a [Unix](#) hacker". (Definitions 1 through 5 are correlated, and people who fit them congregate.)

6. An expert or enthusiast of any kind. One might be an astronomy hacker, for example.

7. One who enjoys the intellectual challenge of creatively overcoming or circumventing limitations.

8. (Deprecated) A malicious meddler who tries to discover sensitive information by poking around. Hence "password hacker", "network hacker". The correct term is [cracker](#).

The term "hacker" also tends to connote membership in the global community defined by the net (see [The Network](#) and [Internet address](#)). It also implies that the person described is seen to subscribe to some version of the [hacker ethic](#).

It is better to be described as a hacker by others than to describe oneself that way. Hackers consider themselves something of an elite (a meritocracy based on ability), though one to which new members are gladly welcome. Thus while it is gratifying to be called a hacker, false claimants to the title are quickly labelled as "[bogus](#)" or a "[wannabee](#)".

9. (University of Maryland, rare) A programmer who does not understand proper programming techniques and principles and doesn't have a Computer Science degree. Someone who just bangs on the keyboard until something happens. For example, "This program is nothing but [spaghetti code](#). It must have been written by a hacker".

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

hacker ethic

<[ethics](#)> 1. The belief that information-sharing is a powerful positive good, and that it is an ethical duty of hackers to share their expertise by writing free software and facilitating access to information and to computing resources wherever possible.

2. The belief that system-cracking for fun and exploration is ethically OK as long as the cracker commits no theft, vandalism, or breach of confidentiality.

Both of these normative ethical principles are widely, but by no means universally, accepted among hackers. Most hackers subscribe to the hacker ethic in sense 1, and many act on it by writing and giving away free software. A few go further and assert that *all* information should be free and *any* proprietary control of it is bad; this is the philosophy behind the [GNU](#) project.

Sense 2 is more controversial: some people consider the act of cracking itself to be unethical, like breaking and entering. But the belief that "ethical" cracking excludes destruction at least moderates the behaviour of people who see themselves as "benign" crackers (see also [samurai](#)). On this view, it may be one of the highest forms of hackerly courtesy to (a) break into a system, and then (b) explain to the sysop, preferably by e-mail from a [superuser](#) account, exactly how it was done and how the hole can be plugged - acting as an unpaid (and unsolicited) [tiger team](#).

The most reliable manifestation of either version of the hacker ethic is that almost all hackers are actively willing to share technical tricks, software, and (where possible) computing resources with other hackers. Huge cooperative networks such as [Usenet](#), [FidoNet](#) and Internet (see [Internet address](#)) can function without central control because of this trait; they both rely on and reinforce a sense of community that may be hackerdom's most valuable intangible asset.

[[FOLDOC](#)]

16-03-2001

haecceity

<[history of philosophy](#), [ontology](#), [metaphysics](#)> [thisness](#); the property that uniquely distinguishes each individual thing from others of its kind. Introduced by [Duns Scotus](#) as a name for the individuating essence of any [particular](#), the term has been used more recently in connection with the view that rigidly designated individuals can exist in each of many possible worlds.

Recommended Reading:

John Duns Scotus, *Philosophical Writings: A Selection* (Hackett, 1987)

Gary S. Rosenkrantz, *Haecceity: An Ontological Essay* (Kluwer, 1993).

[[A Dictionary of Philosophical Terms and Names](#)]

22-11-2001

halting problem

The problem of determining in advance whether a particular program or [algorithm](#) will terminate or run forever. The halting problem is the [canonical](#) example of a [provably unsolvable](#) problem. Obviously any attempt to answer the question by actually executing the algorithm or simulating each step of its execution will only give an answer if the algorithm under consideration does terminate, otherwise the algorithm attempting to answer the question will itself run forever.

Some special cases of the halting problem are partially solvable given sufficient resources. For example, if it is possible to record the complete state of the execution of the algorithm at each step and the current state is ever identical to some previous state then the algorithm is in a loop. This might require an arbitrary amount of storage however.

Alternatively, if there are at most N possible different states then the algorithm can run for at most N steps without looping.

A program analysis called [termination analysis](#) attempts to answer this question for limited kinds of input algorithm.

[[FOLDOC](#)]

16-03-2001

Hamilton William

<[history of philosophy](#), [biography](#)> scottish philosopher (1788-1856); author of *Lectures on Metaphysics and Logic* (1860). [Hamilton](#) followed Reid in defending common sense against the [skepticism](#) of [empiricists](#) like [Hume](#) [Hamilton](#)' s thought was subjected, in turn, to sharp criticism by [Mill](#).

Recommended Reading:

James McCosh, *Scottish Philosophy: Biographical, Expository, and Critical* (AMS, 1980)

John Stuart Mill, *An Examination of Sir William Hamilton' s Philosophy and of the Principle Philosophic Questions Discussed in His Writings* (Classic, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

22-11-2001

Hamiltonian cycle

[Hamiltonian problem](#)

12-04-2004

Hamiltonian path

[Hamiltonian problem](#)

12-04-2004

Hamiltonian problem

<[computability](#)> (Or "Hamilton' s problem") A problem in [graph theory](#) posed by [William Hamilton](#): given a [graph](#), is there a path through the graph which visits each [vertex](#) precisely once (a "Hamiltonian path")? Is there a Hamiltonian path which ends up where it started (a "Hamiltonian cycle" or "Hamiltonian tour")?

Hamilton' s problem is NPcomplete. It has numerous applications, sometimes completely unexpected, in computing.

Home <http://www.ing.unlp.edu.ar/cetad/mos/Hamilton.html>).

[[FOLDOC](#)]

16-03-2001

Hamiltonian tour

[Hamiltonian problem](#) Hamilton' s problem

[Hamiltonian problem](#)

12-04-2004

Hampshire Stuart

<[history of philosophy, biography](#)> english philosopher (1914-) whose careful study of the philosophy of [Spinoza](#) in [Spinoza](#) (1951) prompted the development of a detailed description of the presuppositions necessary for [human behavior](#) in [Thought and Action](#) (1959) and [Morality and Conflict](#) (1983). [Hampshire](#) suggests that the nature of [human freedom](#) can best be understood by considering the difference between the declaration of what one intends to do and a [prediction](#) of what one is likely to do.

Recommended Reading:

Stuart Hampshire, [Innocence and Experience](#) (Harvard, 1991)
Stuart Hampshire, [Public and Private Morality](#) (Cambridge, 1978).

[[A Dictionary of Philosophical Terms and Names](#)]

22-11-2001

Happiness

<[philosophy, ethics, moral, justice, psychology](#)> general well-being in [human life](#), an important goal for many people and a significant issue for [theories](#) in [normative ethics](#). [Aristotle](#) disagreed with the identification of [happiness](#) with bodily pleasure defended by [Aristippus](#) and other [hedonists](#). Most [utilitarians](#) accept this identification, but emphasize the importance of considering the greatest [happiness](#) of everyone rather than merely one' s own.

Recommended Reading:

L. W. Sumner, [Welfare, Happiness, and Ethics](#) (Oxford, 1999);
[Aristotle, Kant, and the Stoics: Rethinking Happiness and Duty](#), ed. by Stephen Engstrom and Jennifer Whiting (Cambridge, 1998);
Victoria S. Wike, [Kant on Happiness in Ethics](#) (SUNY, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

22-11-2001

Haraway Donna Jeanne

<[history of philosophy, biography](#)> american feminist (1944-) [philosopher of science](#) who proposes a fundamental re-examination of the concepts of [human nature](#) and [political identity](#) in light of [postmodern](#) rejection of stark dualisms. Her "Manifesto for Cyborgs" (1965) suggests that the extent of our reliance on technology makes it difficult to understand ourselves independently of mechanical devices. Although we are all fabricated hybrids of [organism](#) and [machine](#), [Haraway](#) supposes that feminist cyborgs have the opportunity to escape the perils of [patriarchal capitalist technology](#).

Recommended Reading:

Donna J. Haraway, [Simians, Cyborgs, and Women: The Reinvention of Nature](#) (Routledge, 1991);
Donna J. Haraway, [Primate Visions: Gender, Race and Nature in the World of Modern Science](#) (Routledge, 1990);

The Cyborg Handbook, ed. by Chris Hables Gray, Heidi J. Figueroa-Sarriera, and Steven Mentor (Routledge, 1996).

[\[A Dictionary of Philosophical Terms and Names\]](#)

22-11-2001

Harding Sandra

<[history of philosophy](#), [biography](#)> american [philosopher of science](#) (1935-). In Discovering Reality: Feminist Perspectives on Epistemology, Methodology and Philosophy of Science (with Merrill [Hintikka](#)) (1983), The Science Question in Feminism (1986), and Whose Science? Whose Knowledge?:

Thinking from Women' s Lives (1991) [Harding](#) shows that it may be possible to eliminate such basic concepts of traditional [Western epistemology](#) as "objectivity," "universality," and "duality." Doing so would create the possibility of alternative ways of thinking, grounded in fundamentally different standpoints, including a [feminist perspective](#) borne of women' s experience of [reality](#).

Recommended Reading:

Sandra Harding, Is Science Multicultural? Postcolonialisms, Feminisms, and Epistemologies (Indiana, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

22-11-2001

Hare Richard Mervyn

<[history of philosophy](#), [biography](#)> english philosopher (1919-). In The Language of Morals (1952), Freedom and Reason (1963), and Moral Thinking (1981) Hare defended a [noncognitivist ethical theory](#) according to which [moral assertions](#) are [prescriptive commands](#) whose genuine universalizability makes them applicable to every [moral agent](#).

Recommended Reading:

R. M. Hare, Essays in Ethical Theory (Oxford, 1993);

R. M. Hare, Essays on Political Morality (Oxford, 1998);

R. M. Hare, Essays on Religion and Education (Oxford, 1998);

Hare and Critics: Essays on Moral Thinking, ed. by Douglas Seanor (Oxford, 1997).

[\[A Dictionary of Philosophical Terms and Names\]](#)

22-11-2001

Hart Herbert Lionel Adolphus

<[history of philosophy](#), [biography](#)> english [legal philosopher](#) (1907-1992) who applied the methods of [analytic philosophy](#) to the foundations of [jurisprudence](#) in The Concept of Law (1961), rejecting the rival claims of modern [legal positivism](#). [Hart](#)' s Law, Liberty, and Morality (1963) and The Morality of the Criminal Law (1965) offer a classic defence of the view that [private sexual conduct](#) ought not to be subjected to [public legislation](#). He is also the author of Punishment and Responsibility (1968) and Essays on Bentham (1982), both of which examine details of the [utilitarian moral theory](#).

Recommended Reading:

Michael Martin, The Legal Philosophy of H.L.A. Hart: A Critical Appraisal (Temple, 1991)

Eric J. Boos, Perspectives in Jurisprudence: An Analysis of H. L. A. Hart' s Legal Theory (Peter Lang, 1998)

N. MacCormick, H. L. A. Hart (Stanford, 1981)

Law, Morality, and Society: Essays in Honour of H. L. A. Hart (Oxford, 1996)

Michael D. Bayles, Hart' s Legal Philosophy: An Examination (Kluwer, 1992).

[\[A Dictionary of Philosophical Terms and Names\]](#)

22-11-2001

Hartley David

<[history of philosophy, biography](#)> english physician and philosopher (1705-1759). [Hartley](#)' s Observations o Man: his Frame, his Duty, and his Expectations (1749) offered a [physiological explanation](#) for the association of ideas in purely [mechanistic terms](#). His classification of various types of [pleasure](#) experienced by individual [human beings](#) was the basis for the later work of [Bentham](#).

Recommended Reading:

Richard C. Allen, David Hartley on Human Nature (SUNY, 1999)

Hartley' s Theory of the Human Mind: On the Principles of the Association of Ideas (AMS, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

22-11-2001

Hartmann Nicolai

<[history of philosophy, biography](#)> german philosopher (1882-1950) whose early writings, including Grundz• ge eine Methaphysik der Erkenntnis (Metaphysics of Knowledge) (1921) and Ethik (Ethics) (1926) used the philosophy of [Kant](#) as the starting point for [idealistic](#) accounts of [reality](#) and [human freedom](#). In such later works as M–glichkeit und Wirklichkeit (Possibility and Actuality) (1938), Der Aufbau der realen Welt (Construction of the Real World) (1940), and Neue Wege der ontologie (New Ways of Ontology) (1949), however, [Hartmann](#) employed [phenomenological methods](#) in defence of a vigorous [realism](#).

Recommended Reading:

Eva Huel Cadwallader, Searchlight on Values: Nicolai Hartmann' s TwentiethCentury Value Platonism (Univ. Press of America, 1985)

W. H. Werkmeister, Nicolai Hartmann' s New Ontology (Florida, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

22-11-2001

Hayek Friedrich August von

<[history of philosophy, biography](#)> austrian-British economist (1899-1992). In Economics and Knowledge (1936), The Road to Serfdom (1944), and Individualism and Economic Order (1949), [Hayek](#) agreed with [Popper](#), in opposition to [Keynes](#) that the limitations of [human knowledge](#) subvert rational attempts at social planning, leaving only "[free market](#)" forces as the foundations of economic life. [Hayek](#) won the Nobel Prize in 1974, and is also the author of The Constitution of Liberty (1960) and the three-part Law, Legislation, and Liberty (1978) - Rules and Order; The Mirage of Social Justice; and The Political Order of a Free People.

Recommended Reading:

John Gray, Hayek on Liberty (Routledge, 1998);

G. R. Steele, The Economics of Friedrich Hayek (Palgrave, 1997);

Hayek: Economist and Social Philosopher, ed. by Stephen F. Frowen (Palgrave, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

22-11-2001

Hebbian

Refers to the most common way for a neural network to learn, namely supervised learning. Using a training sample which should produce known responses, the connection weights are adjusted so as to minimise the differences between the desired and actual outputs for the training sample.

16-03-2001

hedon

<[ethics](#)> This is a term that utilitarians use to designate a unit of [pleasure](#). Its opposite is a [dolor](#), which is a unit of pain or displeasure. The term "hedon" comes from the Greek word for pleasure.

26-03-2001

hedonism

<[epicureism](#), [ethics](#)> the view according to which the fundamental standard of ethical judgment should be pleasure (see also [sensualism](#)). While nowadays hedonism has connotations of total pleasure-seeking and [emotionalism](#), it was not always so. For example, although [Epicureanism](#) was one of the original hedonistic theories in [ethics](#), it is quite strict as to what true pleasure really is (being a kind of [naturalism](#)), so that it is often described as a variety of "enlightened hedonism". While hedonism is usually a species of [individualism](#), this is not always the case; for instance, the ethical standard of [utilitarianism](#), which is a form of [altruism](#), is "the greatest pleasure for the greatest number" - which could be construed as a kind of universalized hedonism. (References from [Epicureanism](#) and [sensualism](#).)

Recommended Reading:

F. E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967);
 The Essential Epicurus, tr. by Eugene Michael O' Connor (Prometheus, 1993);
 Lionel Tiger, The Pursuit of Pleasure (Transaction, 2000);
 Fred Feldman, Utilitarianism, Hedonism, and Desert: Essays in Moral Philosophy (Cambridge, 1997);
 Rem B. Edwards, Pleasures and Pains: A Theory of Qualitative Hedonism (Cornell, 1987);
 Kate Soper, Troubled Pleasures: Writings on Politics, Gender, and Hedonism (Verso, 1991).

based on: [[A Dictionary of Philosophical Terms and Names](#)],
 [[The Ism Book](#)]

22-11-2001

Hegel Georg Wilhelm Friedrich

<[history of philosophy](#), [biography](#)> born in Stuttgart (1770-1831) and educated in Tuebingen, Georg Wilhelm Friedrich [Hegel](#) devoted his life wholly to academic pursuits, teaching at Jena, Nuremberg, Heidelberg, and Berlin. His Wissenschaft der Logik (Science of Logic) (1812-1816) attributes the unfolding of concepts of [reality](#) in terms of the pattern of [dialectical reasoning](#) ([thesis](#)---[antithesis](#)---[synthesis](#)) that [Hegel](#) believed to be the only method of progress in [human thought](#), and Die Encyclopaedie der philosophischen Wissenschaften im Grundrisse (Encyclopedia of the Philosophical Sciences) (1817) describes the application of this [dialectic](#) to all areas of [human knowledge](#), including [history](#). [Hegel](#)' s Naturrecht und Staatswissenschaft im Grundrisse an Grundlinien der Philosophie des Rechts (Philosophy of Right) (1820) provide an intellectual foundation for [modern nationalism](#). [Hegel](#)' [s absolute idealism](#) is evident even in the early Phaenomenologie des Geistes (Phenomenology of Mind) (1807). There [Hegel](#) criticized the traditional epistemological distinction of [objective](#) from [subjective](#) and offered his own dialectical account of the development of [consciousness](#) from individual sensation through social concern with [ethics](#) and [politics](#) to the pure [consciousness](#) of the World-Spirit in [art](#), [religion](#), and [philosophy](#).

Recommended Reading:

Primary sources:

Georg Wilhelm Friedrich Hegel, Gesammelte Werke (Meiner, 1968-);
 The Hegel Reader, ed. by Stephen Houlgate (Blackwell, 1998);
 Hegel' s Science of Logic, tr. by A. V. Miller (Humanity, 1998);
 Georg Wilhelm Friedrich Hegel, Phenomenology of Spirit, tr. by A. V. Miller and J. N. Findlay (Oxford, 1979);
 Georg Wilhelm Friedrich Hegel, Philosophy of History, tr. by J. Sibree (Dover, 1956);
 Georg Wilhelm Friedrich Hegel, Elements of the Philosophy of Right, tr. by A. Wood and H. Nisbet (Cambridge, 1991).

Secondary sources:

The Cambridge Companion to Hegel, ed. by Frederick C. Beiser (Cambridge, 1993);
 Walter Kaufmann, (Notre Dame, 1997);
 Peter Singer, Hegel (Oxford, 1983);
 Charles Taylor, Hegel and Modern Society (Cambridge, 1979);
 Feminist Interpretations of G.W.F. Hegel, ed. by Patricia J. Mills (Penn. State, 1996);
 Quentin Lauer, Hegel' s Idea of Philosophy (Fordham, 1983);
 Raymond Plant, Hegel (Routledge, 1999);
 Justus Hartnack, An Introduction to Hegel' s Logic (Hackett, 1998);
 Judith Butler, Subjects of Desire (Columbia, 1999);
 Jon Stewart, The Phenomenology of Spirit Reader: Critical and Interpretive Essays (SUNY, 1997);
 William Maker, Philosophy Without Foundations: Rethinking Hegel (SUNY, 1994);
 Allen W. Wood, Hegel' s Ethical Thought (Cambridge, 1990);
 Joseph McCarney, The Routledge Philosophy Guidebook to Hegel on History (Routledge, 2000);
 Herbert Marcuse, Reason and Revolution: Hegel and the Rise of Social Theory (Humanity, 1999);

Additional on-line information about Hegel includes:

Paul Redding' s thorough article in The Stanford Encyclopedia of Philosophy.
 Peter Singer' s article in The Oxford Companion to Philosophy.

Also see: the Absolute, concrete universals, German philosophy, Hegelianism, philosophy of history, idealism, master and slave, metaphysics, nationalism, the owl of Minerva, political philosophy, progress, philosophy of religion, philosophical romanticism, the State, Vorstellung, and world-soul.

The thorough collection of resources at EpistemeLinks.com.
 The article in the Columbia Encyclopedia at Bartleby.com.
 A glossary of Hegelian terminology from Carl Mückelesen.

Andy Blunden' s extensive Hegel by Hypertext site.
 A section on Hegel from Alfred Weber' s history of philosophy.
 Snippets from Hegel in The Oxford Dictionary of Quotations.
 Andrew Buchwalter on Hegel' s philosophy of law.
 An outline of the Encyclopedia by W. T. Stace.
 A summary discussion from G. J. Matthey.
 An analysis of Hegel' s system by Herbert Marcuse.
 A philosophical biography from Uwe Wiedemann.
 Antoinette M. Stafford' s feminist critique of Hegel.
 William Turner' s article in The Catholic Encyclopedia.
 The Bloomsbury Guide to Human Thought on Nationalism.
 A summary treatment from Robert Sarkissian.
 Bjoern Christensson' s brief guide to Hegel online.
 The Macmillan Encyclopedia 2001 on Hegel and Hegelianism.

[[A Dictionary of Philosophical Terms and Names](#)]

22-11-2001

Hegelianism

<[philosophical school](#)> Hegelianism is the name for the philosophical system of G.W.F. [Hegel](#) (1770-1831) and for the philosophical tradition he started. Hegel did not have strong positions of his own in ethics, since he was more interested in the great movements of history than in the individual - he probably even thought that individuals don' t have independent spiritual existence and that they are just part of the collectiv consciousness. Hegel' s [absolute idealism](#) is often contrasted with the subjective or [transcendental idealism](#) of [Kant](#) (1724-1804), on whose innovations - in addition to the [absolutism](#) of [Spinoza](#) (1632-1677) Hegel based much of his philosophy. In political theory, Hegel advocated what is called "the organic theory of the state", which is one of the most consistent kinds of [collectivism](#) to be found in philosophical literature ([Plato](#) is often said to have advocated such a theory, as well). Hegel was probably the first philosopher to think of history in terms of a [dialectic](#), which is what gave [Marx](#) (1818-1883) the inspiration for his doctrine of [dialectical materialism](#). Hegel, by contrast, was a fervent believer in [rationalism](#) and absolute [idealism](#), almost even to the point of [spiritualism](#). (References from [dialectical materialism](#) and [Marxism](#).)

[[The Ism Book](#)]

Edited by Giovanni Benzi

25-03-2001

Heidegger Martin

<[history of philosophy, biography](#)> after studying with [Husserl](#), Martin [Heidegger](#) (1889-1976) undertook an academic career in Germany, teaching at both Marburg and Freiburg. He became Rector of the University of Freiburg in 1933, where he continued to teach until 1944. Because of his public support for the Nazi regime, [Heidegger](#) was forbidden to teach after the end of World War II. [Heidegger](#)' s [Sein und Zeit](#) (Being and Time) (1927) applied the methods of [phenomenology](#) to [ontology](#), in an effort to comprehend the meaning of "[Being](#)" both in general and as it appears concretely. This led [Heidegger](#) to a conception of [human existence](#) as active participation in the world, "being-there" (Ger. [Dasein](#)), despite its inherent limitations and the threat of [inauthenticity](#). [Heidegger](#)' s most familiar themes are evident in The Basic Problems of Phenomenology (1927) and Einführung in die Metaphysik (Introduction to Metaphysics) (1953). "Hegel and the Greeks" is a sample of [Heidegger](#)' s reflections on the history of philosophy.

Recommended Reading:

Primary sources:

Martin Heidegger Gesamtausgabe (Klostermann, 1975-);
 Martin Heidegger, The Basic Problems of Phenomenology, tr. by Albert Hofstadter (Indiana, 1988);
 Martin Heidegger, Being and Time: A Translation of Sein and Zeit, tr. by Joan Stambaugh (SUNY 1997);
 Martin Heidegger, An Introduction to Metaphysics, tr. by Ralph Manheim (Yale, 1986);
 Martin Heidegger, The Metaphysical Foundations of Logic, tr. by Michael Heim (Indiana, 1992);
 Martin Heidegger, On the Way to Language (Harper San Francisco, 1982).

Secondary sources:

Joan Stambaugh, The Finitude of Being (SUNY, 1992);
 The Cambridge Companion to Heidegger, ed. by Charles B. Guignon (Cambridge, 1993).
 Steven Mulhall, Routledge Philosophy Guidebook to Heidegger and Being and Time (Routledge, 1996);
 George Pattison, Routledge Philosophy Guidebook to the Later Heidegger (Routledge, 2000);
 Michael Inwood, Heidegger (Oxford, 1997);
 John D. Caputo, The Mystical Element in Heidegger' s Thought (Fordham, 1986);
 Herman Philipse, Heidegger' s Philosophy of Being (Princeton, 1998);
 Jonathan Ree, Heidegger (Routledge, 1999).

Additional on-line information about Heidegger includes:

Robert Cavalier' s thorough lectures on Being and Time.
 M. J. Inwood' s article in The Oxford Companion to Philosophy.

Also see: abandonment, Angst, authenticity, Dasein, death, "existence precedes essence", existentialism, German philosophy, hermeneutics, metaphysics, nothingness, and phenomenology.

The thorough collection of resources at EpistemeLinks.com.

An interesting introduction by Christopher Scott Wyatt.

Lawrence Hatab' s discussion of Heidegger' s moral philosophy.

The article in the Columbia Encyclopedia at Bartleby.com.

A paper on Heidegger' s view of technology and communications by George Teschner.

A short article in Oxford' s Who' s Who in the Twentieth Century.

Bjoern Christensson' s brief guide.

An excellent collection of links at Ereignis.

A brief entry in The Macmillan Encyclopedia 2001.

[\[A Dictionary of Philosophical Terms and Names\]](#)

22-11-2001

Heisenberg Werner

<[history of science](#), [biography](#), [philosophy](#)> german physicist (1901-1976) who expressed the [uncertainty principle](#), according to which the [position](#) and [momentum](#) of a [subatomic particle](#) cannot both be determined precisely at the same time, as a crucial element of modern [quantum mechanics](#), described in his Physik und Philosophie (Physics and Philosophy) (1958). Heisenberg won the Nobel Prize for physics in 1932.

Recommended Reading:

Werner Heisenberg, Physical Principles of the Quantum Theory (Dover, 1930);

Werner Heisenberg, Philosophical Problems of Quantum Physics (Ox Bow, 1979);

David C. Cassidy, Uncertainty: The Life and Science of Werner Heisenberg (Freeman, 1993).

[\[A Dictionary of Philosophical Terms and Names\]](#)

22-11-2001

Held Virginia Potter

<[history of philosophy](#), [biography](#)> american philosopher (1929-); author of Rights and Goods: Justifying Social Action (1984), Feminist Morality: Transforming Culture, Society, and Politics (1993), and Liberalism and the Ethics of Care (1997). [Held](#) maintains that the experience of women in our culture promotes the development of [ethical practices](#) appropriate in a private rather than in a public sphere of influence.

Recommended Reading:

Justice and Care: Essential Readings in Feminist Ethics, ed. by Virginia Held (Westview, 1995)

Ethics in International Affairs, ed. by Andrew Valls and Virginia Held (Rowman & Littlefield, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

22-11-2001

Helvaetius Claude-Adrien

<[history of philosophy](#), [biography](#)> french philosopher (1715-1771), [Encyclopedist](#), and committed [hedonist](#). Both De l' esprit (Of Mind) (1758) and De l' homme (Of Man) (1773) use [empiricist methods](#) to defend a strictly [materialist](#) account of [human life](#), according to which [ethical egoism](#) is generated y the [natural desire](#) to maximize [pleasure](#).

Recommended Reading:

Claude-Adrien Helvetius, Philosophical Works (Thoemmes, 2000)

David W. Smith, Helvetius: A Study in Persecution (Greenwood, 1982).

[\[A Dictionary of Philosophical Terms and Names\]](#)

22-11-2001

Hempel Carl Gustav

<[history of philosophy, biography](#)> german-american [philosopher of science](#) (1905-1997). In *Fundamentals of Concept Formation in Empirical Science* (1952) and *Aspects of Scientific Explanation* (1965) [Hempel](#) pointed out that a [paradox](#) arises from the supposition that [confirming evidence](#) provides equal support for all [logically equivalent hypotheses](#): Since "All swans are white" is [logically equivalent](#) to "All non-white things are non-swans" (by [contraposition](#)), it follows that observing a brown dog should increase confidence in our belief that swans are white.

Recommended Reading:

Carl Gustav Hempel, *Selected Philosophical Essays*, ed. by Richard C. Jeffrey (Cambridge, 2000);

Carl Gustav Hempel, *Philosophy of Natural Science* (Prentice-Hall, 1966);

The Philosophy of Carl G. Hempel: Studies in Science, Explanation, and Rationality, ed. by James H. Fetzer (Oxford, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

22-11-2001

henotheism

<[metaphysics, religion, philosophy of religion](#)> term used to describe a belief in one [god](#) that at the same time does not deny the existence of other gods. This idea or practice is obviously opposed by [monotheism](#), which regards henotheism' s tolerance of other gods as patently ridiculous. (Reference from [polytheism](#).)

[[The Ism Book](#)]

Edited by Giovanni Benzi

25-03-2001

Heraclitus

<[history of philosophy, biography](#)> greek [presocratic philosopher](#) (540-475 BC) who used [paradox](#) and riddles to argue that the world is constantly changing in discussions preserved only in fragmetary reports. Although he identified fire as the [original stuff](#) (Gk. archē) of the universe, [Heraclitus](#) supposed that its changeable nature results in the formation of all of the [traditional opposites](#).

Recommended Reading:

Fragments: The Collected Wisdom of Heraclitus, tr. by Bruce Haxton and James Hillman (Penguin, 2001);

Henry W. Johnstone, Jr., *Heraclitus* (Bryn Mawr, 1989);

Richard G. Geldard, *Remembering Heraclitus* (Lindisfarne, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

22-11-2001

Herbert of Cherbury Baron

<[history of philosophy, biography](#)> english philosopher (1583-1648). His [rationalistic](#) defence of [theology](#) in *De Religione Laici* (*The Layman' s Religion*) (1645) and *De Religione Gentilium* (*On the Religion of the Gentiles*) (1663) was an early statement of the principles of seventeenth-century [deism](#). [Herbert'](#) s claim, in *De Veritat* (*On Truth*) (1624), that [human beings](#) are divinely endowed with "[common notions](#)" about god and [religion](#), however, was a primary target of [Locke'](#) s attack on innate ideas.

Recommended Reading:

John A. Butler, *Lord Herbert of Cherbury 1582-1648: An Intellectual Biography* (Edwin Mellen, 1990);

Eurgen D. Hill, *Edward, Lord Herbert of Cherbury* (Twayne, 1987);

R. D. Bedford, *The Defence of Truth: Herbert of Cherbury and the Seventeenth Century* (Princeton, 1987).

[[A Dictionary of Philosophical Terms and Names](#)]

22-11-2001

heredity

<logic> A property possessed by all the [wffs](#) in a set is logically hereditary [iff](#) the accepted rules of [inference](#) pass it on (transmit it) to all the conclusions derivable from that set by those rules.

[Glossary of First-Order Logic]

16-03-2001

hermeneutics

<philosophy, philosophical inquiry, history of philosophy> formal study of appropriate [methods of interpretation](#) (Gk. hermēneuma), first developed as a formal discipline of study by [Schleiermacher](#). Following the work of [Dilthey](#), [Gadamer](#), and [Ricoeur](#), the [hermeneutical process](#) is often regarded as involving a complex interaction between the [interpreting subject](#) and the [interpreted object](#). The task is complicated by the apparent [circularity](#) of understanding particular elements in light of the [text](#) as a whole, which can in turn be understood only by reference to them.

Recommended Reading:

John D. Caputo, *Radical Hermeneutics: Repetition, Deconstruction, and the Hermeneutic Project* (Indiana, 1987);

John D. Caputo, *More Radical Hermeneutics: On Not Knowing Who We Are* (Indiana, 2000);

Jean Grondin and Hans-Georg Gadamer, *Introduction to Philosophical Hermeneutics*, tr. by Joel Weinsheimer (Yale, 1997);

Paul Ricoeur, *Hermeneutics and Human Sciences: Essays on Language, Action, and Interpretation*, ed. by John B. Thompson (Cambridge, 1981);

Hans Georg Gadamer, *Philosophical Hermeneutics* (California, 1977);

Gianni Vattimo, *Beyond Interpretation: The Meaning of Hermeneutics for Philosophy*, tr. by David Webb (Stanford, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

22-11-2001

heterogeneous

Composed of unrelated parts, different in kind.

Often used in the context of [distributed systems](#) that may be running different [operating systems](#) or network [protocols](#) (a [heterogeneous network](#)).

For examples see: [interoperable database](#), [middleware](#).

Contrast [homogeneous](#).

[[FOLDOP](#)]

16-03-2001

heterological paradox

Grelling' s paradox

16-05-2004

heteronomy

<ethics> for Kant, heteronomy is the opposite of [autonomy](#). Whereas an autonomous person is one whose will is self-determined, a heteronomous person is one whose will is determined by something outside of the person, such as overwhelming emotions. Etymologically, heteronomy goes back to the Greek words for "other" and "law."

26-03-2001

heuristic

<[philosophy of science](#), [logic](#)> an informal [method](#) for [solving problems](#) in the absence of an [algorithm](#) for [formal proof](#). [Heuristics](#) typically have only restricted applicability and limited likelihood of success but, as George [Polya](#) showed, contribute significantly to our understanding of [mathematical truths](#).

Recommended Reading:

George Polya, How to Solve It (Princeton, 1971);

Gerd Gigerenzer and Peter M. Todd, Simple Heuristics That Make Us Smart (Oxford, 1999);

George Polya, Mathematics and Plausible Reasoning (Princeton, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

00-00-0000

hex

1. [hexadecimal](#).

2. A 6-pack of anything (compare [quad](#)). Neither usage has anything to do with [magic](#) or [black art](#), though the pun is appreciated and occasionally used by hackers. True story: As a joke, some hackers once offered some surplus ICs for sale to be worn as protective amulets against hostile magic. The chips were, of course, hex inverters.

3. <[character](#)> The [hash](#) character, used to introduce [hexadecimal](#) constants in some [assembly languages](#).

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

hexadecimal

<[mathematics](#)> (Or "hex") [Base](#) 16. A number representation using the digits 0-9, with their usual meaning, plus the letters A-F (or a-f) to represent hexadecimal digits with values of (decimal) 10 to 15. The right-most digit counts ones, the next counts multiples of 16, then $16^2 = 256$, etc.

For example, hexadecimal BEAD is decimal 48813:

digit weight value

B = 11 $16^3 = 4096$ $11 * 4096 = 45056$

E = 14 $16^2 = 256$ $14 * 256 = 3584$

A = 10 $16^1 = 16$ $10 * 16 = 160$

D = 13 $16^0 = 1$ $13 * 1 = 13$

BEAD = 48813

There are many conventions for distinguishing hexadecimal numbers from decimal or other bases in programs. In [C](#) for example, the prefix "0x" is used, e.g. 0x694A11.

Hexadecimal is more succinct than [binary](#) for representing bit-masks, machines addresses, and other low-level constants but it is still reasonably easy to split a hex number into different bit positions, e.g. the top 16 bits of a 32-bit word are the first four hex digits.

The term was coined in the early 1960s to replace earlier "sexadecimal", which was too racy and amusing for stuffy [IBM](#), and later adopted by the rest of the industry.

Actually, neither term is etymologically pure. If we take "binary" to be paradigmatic, the most etymologically correct term for base ten, for example, is "denary", which comes from "deni" (ten at a time, ten each), a Latin "distributive" number; the corresponding term for base sixteen would be something like "sendenary". "Decimal" is from an ordinal number; the corresponding prefix for six would imply something like "sextidecimal". The "sexa-" prefix is Latin but incorrect in this context, and "hexa-" is Greek. The word [octal](#) is similarly incorrect; a correct form would be "octaval" (to go with decimal), or "octonary" (to go with binary). If anyone ever implements a base three computer, computer scientists will be faced with the unprecedented dilemma of a choice between two *correct* forms; both "ternary" and "trinary" have a claim to this throne.

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

hierarchy

An organisation with few things, or one thing, at the top and with several things below each other thing. An inverted tree structure. Examples in computing include a directory hierarchy where each directory may contain files or other directories; a hierarchical [network](#) (see [hierarchical routing](#)), a [class hierarchy](#) in object-oriented programming.

[[FOLDOC](#)]

16-03-2001

high-level language

(HLL) A programming language which provides some level of abstraction above [assembly language](#). These normally use statements consisting of English-like keywords such as "FOR", "PRINT" or "GOTO", where each statement corresponds to several [machine language](#) instructions. It is much easier to program in a high-level language than in [assembly language](#) though the efficiency of execution depends on how good the [compiler](#) or [interpreter](#) is at optimising the program.

Rarely, the variants "[VHLL](#)" and "[MLL](#)" are found.

See also [languages of choice](#), [generation](#)

[[FOLDOC](#)]

16-03-2001

higher-order function

(HOF) A function that can take one or more functions as argument and/or return a function as its value. E.g. map in (map f l) which returns the list of results of applying function f to each of the elements of list l. See also [curried function](#).

16-03-2001

higher-order logic

[predicate logic](#)

15-05-2004

higher-order predicate logic

[predicate logic](#)

15-05-2004

Hilbert David

<[history of mathematics](#), [history of philosophy](#), [biography](#)> german mathematician (1862-1943) whose influential lecture at Paris, "Mathematical Problems" (1900), outlined the development of [classical mathematics](#) as the application of [Kant](#)'s notion of a regulative principle. [Hilbert](#)'s Grundlagen der Geometrie (Foundations of Geometry) (1899), "Axiomatisches Denken" ("Axiomatic Thinking") (1917), "Die Grundlagen der Mathematik" ("Foundations of Mathematics") (1926), and Principles of Mathematical Logic (1931) proposed the [axiomatic formalization](#) of [mathematics](#) in order to demonstrate consistency by [syntactical](#) or [metamathematical methods](#).

Recommended Reading:

Constance Reid, Hilbert (Copernicus, 1996);

Jeremy Gray and David Rowe, The Hilbert Problems: A Perspective on Twentieth Century Mathematics (Oxford, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

23-11-2001

Hippias

<[history of philosophy](#), [biography](#)> presocratic philosopher and mathematician (485-415 BC) who emphasized the use of [empirical methods](#) in pursuit of [knowledge](#). Although his efforts to [trisect the angle](#) geometrically failed, they led [Hippias](#) to the discovery of the [quadratrix](#), a curve satisfying the modern algebraic formula $y = x \tan(\pi/2a)$, whose construction would render [trisection of acute angles](#) unproblematic.

[[A Dictionary of Philosophical Terms and Names](#)]

23-11-2001

historical determinism

<[metaphysics](#), [political philosophy](#), [philosophy of history](#)> the view according to which the movement of [history](#) is determined by [material](#) or [spiritual](#) forces that are not open to human [volition](#) or change. [Hegel](#)'s spiritualize [dialectical](#) understanding of history is an example of this doctrine, as is the [dialectical materialism](#) that is part of [Marxism](#). (Reference from [dialectical materialism](#).)

[[The Ism Book](#)]

Edited by Giovanni Benzi

25-03-2001

historicism

<[history of philosophy](#), [historiography](#), [epistemology](#)> belief that [social structures](#), events, and [texts](#) are best to be understood in the context of their [historical development](#). Versions of this view were defended by [Dilthey](#), [Lukacs](#), and [Gramsci](#). More recently, [Popper](#) and [Hayek](#) criticized the extreme version of this view, according to which the historical outcomes are inevitably determined. In the milder form embraced by [Croce](#), [Kuhn](#), and [Gadamer](#), however, [historicism](#) is simply the notion that a purely [ahistorical perspective](#) on [human affairs](#) would be misleading.

Recommended Reading:

H. Aram Veeseer, *The New Historicism Reader* (Routledge, 1993);

Paul Hamilton, *Historicism: The New Critical Idiom* (Routledge, 1996);

Charles R. Bambach, *Heidegger, Dilthey, and the Crisis of Historicism: History and Metaphysics in Heidegger, Dilthey, and the Neo-Kantians* (Cornell, 1995);

Robert D' Amico, *Historicism and Knowledge* (Routledge, 1992);

Karl Popper, *The Poverty of Historicism* (Routledge, 1993).

[[A Dictionary of Philosophical Terms and Names](#)]

23-11-2001

Hoagland Sarah Lucia

<[history of philosophy](#), [biography](#)> american [moral philosopher](#) (1945-). In *Lesbian Ethics: Toward New Value* (1988) [Hoagland](#) attributes a host of individual and [social evils](#) to their origin in a [patriarchal](#) and [heterosexualist culture](#) and proposes a moral revolution based on the formation of [lesbian communities](#) purposefully separated from the society at large.

Recommended Reading:

For Lesbians Only: A Separatist Anthology, ed. by Sarah Lucia Hoagland and Julia Penelope (Onlywomen, 1992).

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23-11-2001

Hobbes Thomas

<[history of philosophy, biography](#)> decades after completing his traditional education as a classicist at Oxford and serving as tutor of William Cavendish, Thomas [Hobbes](#) (1588-1679) became convinced that the methods employed by [mathematicians](#) and scientists-geometry, in particular-hold the greatest promise for advances in [human knowledge](#). Voluntarily exiled to Holland during the years of Parliamentary Rule, the royalist [Hobbes](#) devoted much of his time to the development and expression of a comprehensive philosophical vision of the [mechanistic](#) operation of [nature](#). Although he returned to England with the restoration of Charles II, [Hobbes](#) was for the remainder of his life embroiled in bitter political and religious controversies.

They did not prevent the ninety-year-old [Hobbes](#) from completing his English translation of the works of [Homer](#). [Hobbes'](#) s first systematic statement of [political philosophy](#), Elements of Law, Natural and Politic (1640), relies heavily upon the conception of [natural law](#) that had dominated the tradition from [Aquinas](#) to [Grotius](#). But his views had begun to change by the time he reissued portions of his work in a Latin version known as De Cive (1642). The Leviathan (1651) is the most complete expression of [Hobbes'](#) philosophy. It begins with a clearly [materialistic](#) account of [human nature](#) and [knowledge](#), a rigidly [deterministic](#) account of [human volition](#), and a [pessimistic vision](#) of the consequently [natural state](#) of [human beings](#) in [perpetual struggle](#) against each other.

It is to escape this grim fate, [Hobbes](#) argued, that we form the [commonwealth](#), surrendering our individual powers to the authority of an [absolute sovereign](#). For [Hobbes](#), then, [individual obedience](#) to even an [arbitrary government](#) is necessary in order to forestall the greater [evil](#) of an [endless state of war](#).

Recommended Reading:

Primary sources:

The English works of Thomas Hobbes, ed. by Sir William Molesworth (Oxford, 1962);
Thomas Hobbes, Leviathan, ed. by J.C.A. Gaskin (Oxford, 1998);
Thomas Hobbes, On the Citizen, ed. by Richard Tuck and Michael Silverthorne (Cambridge, 1998);

Secondary sources:

The Cambridge Companion to Hobbes, ed. by Tom Sorell (Cambridge, 1996);
Richard Tuck, Hobbes (Oxford, 1989);
Quentin Skinner, Reason and Rhetoric in the Philosophy of Hobbes (Cambridge, 1997);
Samuel I. Mintz, The Hunting of Leviathan: Seventeenth-Century Reactions to the Materialism and Moral Philosophy of Thomas Hobbes (St. Augustine, 1997);
Aloysius P. Martinich, Thomas Hobbes (St. Martin' s, 1997).

Additional on-line information about Hobbes includes:

Bernard Gert' s article in The Oxford Companion to Philosophy.

Also see: conservatism, the social contract, English philosophy, the Leviathan, materialism, "nasty, brutish, and short", the people, the persecution of philosophers, political philosophy, and the state of nature.

An article in The Internet Encyclopedia of Philosophy.

The article in the Columbia Encyclopedia at Bartleby.com.

The thorough collection of resources at EpistemeLinks.com.

Hobbesiana from Nicola Caleffi.

G. J. Matthey' s summary discussion of Hobbes.

A section on Hobbes from Alfred Weber' s history of philosophy.

Steven Darwall' s lectures on Hobbes.

A summary treatment by Robert Sarkissian.

Snippets from Hobbes in The Oxford Dictionary of Quotations.

Rosalba Dur n Forero' s comparison of Hobbes with Spinoza on gender equality.

The Bloomsbury Guide to Human Thought on The State and Sovereignty.

A paper by Juhani Pietarinen on Hobbes and the Prisoner' s Dilemma.

Bj rn Christensson' s brief guide to online resources.

Discussion of Hobbes' s mathematical significance at Mathematical MacTutor.

A brief entry in The Macmillan Encyclopedia 2001.

[\[A Dictionary of Philosophical Terms and Names\]](#)

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Hofstadter Douglas

<[history of philosophy, biography](#)> american [computer scientist](#) and philosopher (1945-). In Goedel, Escher, Bach: an Eternal Golden Braid (1979), [Hofstadter](#) offers an insightful account of major developments in the [metamathematics](#) of [recursive functions](#), tracing its importance for [artificial intelligence](#) research and human self-understanding through metaphorical comparisons with art and music. [Hofstadter](#) is also author of Metamagical Themas (1985) and co-editor (with Dan Dennett) of The Mind' s I (1981).

Recommended Reading:

Douglas R. Hofstadter, Fluid Concepts & Creative Analogies: Computer Models of the Fundamental Mechanisms of Thought (Basic, 1996)

Douglas R. Hofstadter, Le Ton Beau De Marot: In Praise of the Music of Language (Basic, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

23-11-2001

holism

<[philosophy of mind, ontology](#)> the view that parts of a [system](#) have significance mostly in virtue of their interrelations with other parts.

(The following discussion is from The Routledge Encyclopedia of Philosophy)

Mental (or semantic) holism is the doctrine that the identity of a [belief](#) content (or the [meaning](#) of a sentence that expresses it) is determined by its place in the web of beliefs or sentences comprising a whole theory or group of theories. It can be contrasted with two other views: atomism and molecularism.

Molecularism characterizes meaning and content in terms of relatively small parts of the web in a way that allows many different theories to share those parts. For example, the meaning of "chase" might be said by a molecularist to be try to catch.

Atomism characterizes meaning and content in terms of none of the web; it says that sentences and beliefs have meaning or content independently of their relations to other sentences or beliefs.

One major motivation for holism has come from reflections on the natures of confirmation and learning. As Quine (1953) observed, claims about the world are confirmed not individually, but only in conjunction with theories of which they are a part. And typically, one cannot come to understand scientific claims without understanding a significant chunk of the theory of which they are a part. For example, in learning the Newtonian concepts of "force", "mass", "kinetic energy" and "momentum", one doesn't learn any definitions of these terms in terms that are understood beforehand, for there are no such definitions. Rather, these theoretical terms were all learned together in conjunction with procedures for solving problems.

The major problem with holism is that it threatens to make generalisation in psychology virtually impossible. If the content of any state depends on all others, it would be extremely unlikely that any two believers would ever share a state with the same content. Moreover, holism would appear to conflict with our ordinary conception of reasoning. What sentences one accepts influence what one infers. If I accept a sentence and then later reject it, I thereby change the inferential role of that sentence, so the meaning of what I accept wouldn't be the same as what I later reject. But then it would be difficult to understand on this view how one could rationally --or even irrationally!-- change one's mind. And agreement and translation are also problematic for much the same reason.

Holists have responded (1) by proposing that we should think not in terms of "same/different" meaning but in terms of a gradient of similarity of meaning, (2) by proposing "two factor" theories or (3) by simply accepting the consequence that there is no real difference between changing meanings and changing beliefs.

References

Ned Block Holism, Mental and Semantic
(<http://www.nyu.edu/gsas/dept/philo/faculty/block/papers/MentalSemanticHolism.html>)

Ned Block

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

homogeneous

(Or "homogenous") Of uniform nature, similar in kind.

1. In the context of [distributed systems, middleware](#) makes [heterogeneous](#) systems appear as a homogeneous entity. For example see: [interoperable network](#).

Contrast [heterogeneous](#).

2. <[mathematics](#)> (Of a [polynomial](#)) containing terms of the same degree with respect to all the variables, as in $x^2 + 2xy + y^2$.

3. <[mathematics](#)> (Of a [function](#)) containing a set of variables such that when each is multiplied by a constant, this constant can be eliminated without altering the value of the function, as in $\cos x/y + x/y$.

4. <[mathematics](#)> (of an equation) containing a homogeneous function made equal to 0.

[[FOLDOP](#)]

16-03-2001

homogenous[homogeneous](#)

15-05-2004

homological - heterological

<[philosophy of science, logic](#)> distinction between [concepts](#) or [words](#). A [homological term](#) applies to itself, a [heterological term](#) does not. Thus, for example: "short" and "having fewer than ten syllables" are [homological terms](#); "big" and "having more than ten syllables" are [heterological terms](#). Although "[homological](#)" is itself a [homological term](#), a self-referential [paradox](#) arises when we consider the word "[heterological](#)." If we suppose that it applies to itself (thus being [homological](#)), then it is not [heterological](#) and does not apply to itself. But if we suppose that it does not apply to itself (thus being [heterological](#)), then it does apply to itself and is [homological](#). What, then, are we to make of an expression such as, "The smallest integer not namable in fewer than twenty syllables?"

[\[A Dictionary of Philosophical Terms and Names\]](#)

23-11-2001

homomorphism

A map f between groups A and B is a homomorphism of A into B if $f(a_1 * a_2) = f(a_1) * f(a_2)$ for all a_1, a_2 in A .

where the $*$ s are the respective group operations.

16-03-2001

homonymous - synonymous - paronymous

<[philosophy, logic, linguistics](#)> [Aristotle](#)' s distinction among different uses of a term: they are said to be [homonymous](#) if the uses are entirely distinct, [synonymous](#) if they are the same, and [paronymous](#) if they are different but related. Thus, for example: In "Colleen is a cat," and "Garfield is a cat," "cat" is used [homonymously](#). In "Carter was president in 1978," and "Bush was president in 1990," "president" is used [synonymously](#). In "Jean was brave," and "What Jean did was brave," "brave" is used [paronymously](#).

Recommended Reading:

[Aristotle](#)' s Categories and De Interpretatione, tr. by J.L. Ackrill (Oxford, 1975).

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Hopfield model[Hopfield network](#)

15-05-2004

Hopfield network

<[artificial intelligence](#)> (Or "Hopfield model") A kind of [neural network](#) investigated by John Hopfield in the early 1980s. The Hopfield network has no special input or output neurons (see McCulloch-Pitts), but all are both input and output, and all are connected to all others in both directions (with equal weights in the two directions). Input is applied simultaneously to all neurons which then output to each other and the process continues until a stable state is reached, which represents the network output.

[\[FOLDOP\]](#)

16-03-2001

Hopper Grace

<[history of philosophy, biography](#)> american [mathematician](#) and [computer scientist](#) (1906-1992). During her service in the U.S. Navy (where she rose to the rank of Admiral) [Hopper](#) pioneered the development of [programming languages](#) (including [COBOL](#)) for [digital computers](#) and introduced use of the term "[bug](#)" to denote a [software flaw](#).

Recommended Reading:

Grace Murray Hopper and Steven L. Mandell, Understanding Computers (Wadsworth, 1990)
Nancy Whitelaw, Grace Hopper: Programming Pioneer.

[[A Dictionary of Philosophical Terms and Names](#)]

23-11-2001

Horkheimer Max

<[history of philosophy, biography](#)> german philosopher (1895-1973). Co-founder (with [Adorno](#) and [Marcuse](#)) of the [Frankfurt School](#), [Horkheimer](#) proposed unification of abstract [philosophy](#) with [social science](#) in the practice of critical theory in Dialektik der Aufkl"rung (Dialectic of Enlightenment) (1947). Zur Kritik der instrumentellen Vernunft (Critique of Instrumental Reason) (1967), Eclipse of Reason (1974), and other late writings express Horkheimer' s growing pessimism about the possibility of genuine progress.

Recommended Reading:

Max Horkheimer, Between Philosophy and Social Science: Selected Early Writings, tr. by G. Frederick Hunter, Matthew S. Kramer, and John Torpey (MIT, 1995);
Max Horkheimer, Critical Theory, tr. by Mathew J. O' Connell (Continuum, 1975);
Max Horkheimer: A Bibliography, ed. by Joan Nordquist (Ref. & Res. Serv., 1990).

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Horn clause

<[logic](#)> A set of [atomic literals](#) with at most one [positive literal](#). Usually written

$L \leftarrow L_1, \dots, L_n$

or

$\leftarrow L_1, \dots, L_n$

where $n \geq 0$. If L is false the clause is regarded as a goal.

Horn clauses can express a subset of statements of [first order logic](#).

The name "Horn Clause" comes from the logician Alfred Horn, who first pointed out the significance of such clauses in 1951, in the article "On sentences which are true of direct unions of algebras", Journal of Symbolic Logic, 16, 14-21.

A [definite clause](#) is a Horn clause that has exactly one positive literal.

[[FOLDOP](#)]

16-03-2001

Horney Karen

<[history of philosophy, biography](#)> german-american [psychoanalyst](#) (1885-1952) who emphasized the role of [social conditions](#) in the [formation of personality](#). In New Ways in Psychoanalysis (1939), [Horney](#) showed that [Freud](#)' s notion of ["denis envy"](#) is a misrepresentation of [female psychology](#), generated in fact by [phallocentric resentment](#) of women. [Horney](#) was also the author of Our Inner Conflicts: A Constructive Theory of Neurosis (1945), Self-Analysis (1947), and Neurosis and Human Growth: The Struggle Toward Self-Realization (1950).

Recommended Reading:

Karen Horney, The Neurotic Personality of Our Time (Norton, 1994);
Karen Horney, Feminine Psychology (Norton, 1993); The Unknown Karen Horney: Essays on Gender, Culture, and Psychoanalysis, tr. Bernard J. Paris (Yale, 2000);
Bernard J. Paris, Karen Horney: A Psychoanalyst' s Search for Self-Understanding (Yale, 1994).

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human rights[rights](#)

15-05-2004

Human-Computer Interaction

<[software](#), [hardware](#)> (HCI) The study of how humans interact with computers, and how to design computer systems that are easy, quick and productive for humans to use.

See also Human-Computer Interface.

HCI Sites (<http://www.acm.org/sigchi/hci-sites/>).

[\[FOLDOC\]](#)

16-03-2001

Human-Computer Interface

<[software](#), [hardware](#)> (HCI) Any [software](#) or [hardware](#) that allows a user to interact with a computer. Examples are [WIMP](#), [command line interpreter](#), or [virtual reality](#).

See also Human-Computer Interaction.

[\[FOLDOC\]](#)

16-03-2001

humanism

<[history of philosophy](#), [philosophy](#), [literature](#)> belief that [individual human beings](#) are the fundamental source of all [value](#) and have the ability to understand - and perhaps even to control - the [natural world](#) by careful application of their own [rational faculties](#). During the [Renaissance](#), [humanists](#) such as [Bruno](#), [Erasmus](#), [Valla](#), and [Pico della Mirandola](#) helped shift attention away from arcane [theological disputes](#) toward more productive avenues of [classical study](#) and [natural science](#).

Recommended Reading:

The Cambridge Companion to Renaissance Humanism, ed. by Jill Kraye (Cambridge, 1996); Impact of Humanism, ed. by Lucille Kekewich (Yale, 2000); Rebecca W. Bushnell, A Culture of Teaching: Early Modern Humanism in Theory and Practice (Cornell, 1996); John C. Olin, Erasmus, Utopia, and the Jesuits: Essays on the Outreach of Humanism (Fordham, 1994).

[\[A Dictionary of Philosophical Terms and Names\]](#)

23-11-2001

Hume David

<[history of philosophy](#), [biography](#)> soon after completing his studies at Edinburgh, Scottish philosopher David [Hume](#) (1711-1776) began writing his comprehensive statement of the views he believed would contribute to [philosophy](#) no less than [Newton](#)' s had [science](#). But the public reception for the three books of his magisterial Treatise of Human Nature (1739) was less than cordial, and [Hume](#) abandoned his hopes of a philosophical career in order to support his family as a librarian, historian, diplomat, and political essayist, a course of action he described in the autobiographical My Own Life (1776). Hume' s Essays Moral and Political (1741-1742) found some success, and the multi-volume History of England (1754-1762) finally secured the modest livelihood for which he had hoped. Although he spent most of his life trying to produce more effective statements of his philosophical views, he did not live to see the firm establishment of his reputation by the criticisms of [Kant](#) and much later appreciation of the [logical positivists](#). The central themes of Book I of the Treatise receive a somewhat more accessible treatment in An Enquiry concerning Human Understanding (1748), a more popular summary of Hume' s empiricism. According to [Hume](#), little [human knowledge](#) can be derived from the [deductively](#) certain relations of [ideas](#). Since the [causal interactions](#) of [physical objects](#) are known to us only as inherently uncertain [matters of fact](#), [Hume](#) argued, our belief that they exhibit any necessary connection (however explicable) can never be rationally justified, but must be acknowledged to rest only upon our acquired [habits](#). In similar fashion, [Hume](#) argued that we cannot justify our [natural beliefs](#) in the [reality](#) of the self or the existence of an [external world](#). From all of this, he concluded that a severe (if mitigated) [skepticism](#) is the only defensible view of the [world](#). [Hume](#) recast the [moral philosophy](#) of the Treatise' s Book I

in *An Enquiry concerning the Principles of Morals* (1751). In both texts [Hume](#) clearly maintained that [human agency](#) and [moral obligation](#) are best considered as [functions](#) of [human passions](#) rather than as the [dictates of reason](#). In the posthumously published *Dialogues concerning Natural Religion* (1780), Hume discussed the possibility of arriving at certain [knowledge](#) of [god](#) through the application of [reason](#) and considered defense of a fideistic alternative.

Recommended Reading:

Primary sources:

David Hume, *Philosophical Works*, ed. by T. H. Green and T. H. Grose (Longmans, Green, 1874-1875);
 David Hume, *A Treatise of Human Nature*, ed. by Ernest C. Mossner (Viking, 1986);
 David Hume, *An Enquiry Concerning Human Understanding*, ed. by Anthony Flew (0812690540);
 David Hume, *An Enquiry Concerning the Principles of Morals* (Free Press, 1966);
 David Hume, *Dialogues Concerning Natural Religion*, ed. by Martin Bell (Penguin, 1990).

Secondary sources:

The Cambridge Companion to Hume, ed. by David Fate Norton (Cambridge, 1993);
 Feminist Interpretations of David Hume, ed. by Anne Jaap Jacobson (Penn. State, 2000);
 Jonathan Bennett, *Locke, Berkeley, Hume: Central Themes* (Oxford, 1971);
 Anthony Quinton, *Hume* (Routledge, 1999);
 Donald W. Livingston, *Hume' s Philosophy of Common Life* (Chicago, 1984);
 Barry Stroud, *Hume* (Routledge, 1981);
 Terence Penelhum, *David Hume: An Introduction to His Philosophical System* (Purdue, 1992);
 George Dicker, *Hume' s Epistemology and Metaphysics: An Introduction* (Routledge, 1998);
 Harold W. Noonan, *Routledge Philosophy Guidebook to Hume on Knowledge* (Routledge, 1999);
 Hume' s Moral and Political Philosophy, ed. by Henry David Aiken (Free Press, 1975);
 James Baillie, *Routledge Philosophy Guidebook to Hume on Morality* (Routledge, 2000).

Additional on-line information about Hume includes:

The Hume Archives from James Fieser.
 Ty Lightner' s excellent David Hume Homepage.
 Justin Broackes' s article in *The Oxford Companion to Philosophy*.

Also see: backgammon, the bundle theory of the self, causality, the cement of the universe, empiricism, English philosophy, the external world, Hume' s fork, induction, ' is' and ' ought' , natural or scientific miracles, moral philosophy, moral sense, reason as slave of the passions, skepticism about religion, skepticism, Scottish philosophy, sentiments, suicide, sympathy, taste, utility, and virtues.

The thorough collection of resources at EpistemeLinks.com.

G. J. Matthey' s lectures on Hume.
 An article in *The Internet Encyclopedia of Philosophy*.
 The article in the *Columbia Encyclopedia* at Bartleby.com.
 A section on Hume from Alfred Weber' s history of philosophy.
 William Edward Morris' s article in *The Stanford Encyclopedia of Philosophy*.
 Snippets from Hume in *The Oxford Dictionary of Quotations*.
 Marcia L. Homiak' s discussion of Hume' s Ethics.
 A paper on Hume' s Construal of the Virtues by James Fieser.
 Bjoern Christensson' s brief guide to online resources.
 A brief entry in *The Macmillan Encyclopedia 2001*.

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23-11-2001

Husserl Edmund Gustav Albrech

<[history of philosophy](#), [biography](#)> german philosopher t (1859-1938). Student of [Brentano](#) and teacher of [Heidegger](#), [Husserl](#) pursued the development of [phenomenology](#) as a pure investigation into the nature and content of [consciousness](#) in *Logische Untersuchungen* (*Logical Investigations*) (1901-13) vol. 1 and vol. 2. This pursuit requires that we ' bracket' our [natural beliefs](#) in order to understand their structural sources. [Husserl](#) described his methods in *Pure Phenomenology, Its Method and Its Field of Investigation* (1917), his inaugural lecture at Freiburg. As [Husserl](#) made clear in *Meditations CartEsiennes* (*Cartesian Meditations*) (1931), only the [transcendental self](#) thus remains as both the [agent](#) and the [object](#) of [phenomenological study](#).

Recommended Reading:

The Essential Husserl: Basic Writings in Transcendental Phenomenology, ed. by Donn Welton (Indiana, 1999);
 Joseph J. Kockelmans, *Edmund Husserl' s Phenomenology* (Purdue, 1994);
 The Cambridge Companion to Husserl, ed. by Barry Smith and David Woodruff Smith (Cambridge, 1995); Paul S. MacDonald, *Descartes and Husserl: The Philosophical Project of Radical Beginnings* (SUNY, 1999);
 Victor Velarde, *On Husserl* (Wadsworth, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

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Hutcheson Francis

<[history of philosophy](#), [biography](#)> scottish philosopher (1694-1746). In his Inquiry into the Original of our Ideas of Beauty and Virue (1725), An Essay on the Nature and Conduct of the Passions and Affections with Illustrations on the Moral Sense (1728), and A System of Moral Philosophy (1755), [Hutcheson](#) introduced the notion of a "[moral sense](#)" by means of which we not only recognize the [rectitude](#) of [particular actions](#) but are also motivated to perform them, together with a formulation of the [greatest happiness principle](#). These conceptions, also developed (in different directions) by [Butler](#), [Hume](#), and [Bentham](#), became staples of British [moral philosophy](#) in the eighteenth and nineteenth centuries. His later work included a set of Remarks (1750) on Mandeville' s Fable of the Bees.

Recommended Reading:

Francis Hutcheson, Philosophical Writings, ed. by R. S. Downie (Everyman, 1994)

William R. Scott, Francis Hutcheson: His Life, Teaching and Position in the History of Philosophy (Thoemmes, 1998).

[[A Dictionary of Philosophical Terms and Names](#)]

23-11-2001

hyle

<[history of philosophy](#)> greek term for wood or forest; hence, in the [philosophy](#) of [Aristotle](#), the term is used for matter considered more generally. Among the four [causes](#), hylí is the [material cause](#) that underlies any sort of substantial change.

Recommended Reading:

F. E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967).

[[A Dictionary of Philosophical Terms and Names](#)]

23-11-2001

hylomorphic

<[history of philosophy](#), [metaphysics](#)> [Aristotle](#)' s theory that [natural objects](#) are irreducible composites of [matter](#) (Gk. [hyle](#)) and [form](#) (Gk. morphí).

Recommended Reading:

Aristotle, The Physics: Books I-IV, tr. by Philip H. Wicksteed and Francis M. Cornford (Harvard, 1986).

[[A Dictionary of Philosophical Terms and Names](#)]

23-11-2001

Hypatia

<[history of philosophy](#), [biography](#)> egyptian mathematician, astronomer, and philosopher (370-415). [Hypatia](#) was a popular teacher and head of the [neoplatonic](#) philosophical community at Alexandria until her torture and death at the hands of a clergy-led Christian mob. The Alexandrian intellectual community declined significantly after her death.

Recommended Reading:

Maria Dzielska, Hypatia of Alexandria (Harvard, 1996) Charles Kingsley, Hypatia (Dent, 1968).

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23-11-2001

hypercube

A cube of more than three dimensions. A single ($2^0 = 1$) point (or "node") can be considered as a zero dimensional cube, two (2^1) nodes joined by a line (or "edge") are a one dimensional cube, four (2^2) nodes arranged in a square are a two dimensional cube and eight (2^3) nodes are an ordinary three dimensional cube. Continuing this geometric progression, the first hypercube has $2^4 = 16$ nodes and is a four dimensional shape (a "four-cube") and an N dimensional cube has 2^N nodes (an "N-cube"). To make an N+1 dimensional cube, take two N dimensional cubes and join each node on one cube to the corresponding node on the other. A four-cube can be visualised as a three-cube with a smaller three-cube centred inside it with edges radiating diagonally out (in the fourth dimension) from each node on the inner cube to the corresponding node on the outer cube.

Each node in an N dimensional cube is directly connected to N other nodes. We can identify each node by a set of N [Cartesian coordinates](#) where each coordinate is either zero or one. Two nodes will be directly connected if they differ in only one coordinate.

The simple, regular geometrical structure and the close relationship between the coordinate system and binary numbers make the hypercube an appropriate topology for a parallel computer interconnection network. The fact that the number of directly connected, "nearest neighbour", nodes increases with the total size of the network is also highly desirable for a [parallel computer](#).

[[FOLDOP](#)]

16-03-2001

hypermedia

[hypertext](#)

15-05-2004

hypertext

<[hypertext](#)> A term coined by Ted Nelson around 1965 for a collection of documents (or "nodes") containing cross-references or "links" which, with the aid of an interactive [browser](#) program, allow the reader to move easily from one document to another.

The extension of hypertext to include other media - [sound](#), [graphics](#), and [video](#) - has been termed "[hypermedia](#)", but is usually just called "hypertext", especially since the advent of the World-Wide Web and [HTML](#).

[[FOLDOP](#)]

16-03-2001

hypostasization

<[philosophy](#), [philosophical inquiry](#), [metaphysics](#)> the variety of [reification](#) that results from supposing that whatever can be named or [conceived abstractly](#) must actually exist. When (in *Through the Looking Glass*) his Messenger declares "I'm sure nobody walks much faster than I do," the White King hypostasizes "Nobody" by responding that "He can't do that, or else he'd have been here first." Such philosophers as [Plato](#), [Hegel](#), and [Heidegger](#) are sometimes accused of similar flights of ontological whimsy.

[[A Dictionary of Philosophical Terms and Names](#)]

23-11-2001

hypothesis

<[epistemology](#), [philosophy of science](#), [hypothesis](#), [ockhamism](#)> <[empiricism](#), [neo-empiricism](#), [hypothetical deductive method](#)> in science, a [testable assertion](#) -- especially a [generalization](#) or [lawlike assertion](#), e.g., Newton's [law of universal gravitation](#) which states (in part) "All [bodies](#) attract each other with a [force inversely proportional](#) to their [distance](#)." Hypotheses that survive testing come to be confirmed, whereupon they are provisionally accepted as [scientific laws](#).

[[Philosophical Glossary](#)]

22-06-2001

hypothetical deductive method

<[epistemology](#), [philosophy of science](#), [hypothesis](#), [ockhamism](#)> <[empiricism](#), [neo-empiricism](#)> Heisenberg' uncertainty relations> <[hypotetical deductive method](#)> the [scientific method](#) of testing would-be [laws](#) (hypotheses) by making [predictions](#) of particular [observable events](#), then observing whether the [events](#) turn out as predicted. If so, the hypothesis is confirmed. If not, the hypothesis is disconfirmed, or (some would say) refuted.

[[Philosophical Glossary](#)]

22-06-2001

hypothetical imperative

<[kantian ethics](#), [categorical imperative](#), [metaphysics](#)> a [command](#) that applies, not unconditionally, but only under certain [conditions](#), or given certain [purposes](#). e.g., "If you want to see a good movie rent The Big Lebowski": the command, here, to rent The Big Lebowski applies only on the [condition](#) that you want to see a good movie. Similarly, the command to change your oil frequently applies only if you want your car to last; the command to look both ways before crossing only applies if you seek a safe crossing; etc. According to Kant, [nonmoral commandments](#) are all of this [hypothetical](#) sort. Compare: categorical imperative.

[[Philosophical Glossary](#)]

29-07-2001

hypothetical syllogism - HS

<[philosophy of science](#), [logic](#)> a [rule of inference](#) of the form:

$$\begin{array}{l} p \rightarrow q \\ q \rightarrow r \\ \hline p \rightarrow r \end{array}$$

Example: "If Debbie is promoted, then Gene will be, too. But if Gene is promoted, then Kim will be angry. Therefore, if Debbie is promoted, then Kim will be angry." A truth-table shows the [validity](#) of this [inference](#).

[[A Dictionary of Philosophical Terms and Names](#)]

23-11-2001

I proposition

<[philosophy of science](#), [logic](#)> in the traditional notation for [categorical logic](#), a [proposition](#) that is both [particular](#) and [affirmative](#). Example: "Some birds are Canada geese". Such a [proposition](#) affirms that there is at least one thing that belongs to both of the designated [classes](#). Its [contradictory](#) is an [E proposition](#) with the same [subject](#) and [predicate](#) terms.

[[A Dictionary of Philosophical Terms and Names](#)]

24-05-2004

Ibn Daud Abraham ben David Hallevi

<[history of philosophy](#), [biography](#)> jewish philosopher (1110-1180). [Ibn Daud](#) was the first Jewish [Aristotelean](#). His Sefer ha-Qabbalah (The Book of Tradition) (1161) and Emunah Ramah (The Exalted Faith) (1161) grounded [Jewish theology](#) on the [metaphysics](#) of [Ibn Sina](#), providing an important influence on the work of [Maimonides](#). [Ibn Daud](#) defended [free will](#) by proposing limitations on the extent of [divine omnipotence](#).

[[A Dictionary of Philosophical Terms and Names](#)]

01-09-2002

Ibn Gabirol Solomon

<[history of philosophy](#), [biography](#)> jewish philosopher and poet (1020-1057). Translated into Latin as Fons Vitae (The Source of Life), [Ibn Gabirol](#)' s philosophical work expressed a unique version of [neoplatonism](#). His distinction between the [essence](#) and the [will of god](#) had significant influence on the thought of [Duns Scotus](#).

Recommended Reading:

Solomon B. Ibn-Gabirol, Improvement of the Moral Qualities: An Ethical Treatise of the Eleventh Century (AMS, 1990);

Selected Poems of Solomon Ibn Gabirol, tr. by Peter Cole (Princeton, 2000);

Isaac Goldberg, Solomon Ibn Gabirol: A Bibliography (Word Works, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

01-09-2002

icon

<[graphics](#)> (From miniature religious statues) A small picture intended to represent something (a file, directory, or action) in a [graphical user interface](#). When an icon is clicked on, some action is performed such as opening a directory or aborting a file transfer. Icons are usually stored as [bitmap](#) images.

[\[FOLDOC\]](#)

16-03-2001

ICT

[Information and Communication Technology](#)

15-05-2004

idea

<[psychology](#), [gnoseology](#), [metaphysics](#)> the content of [conscious thought](#). [Plato](#) used the Greek word [idea](#) to designate the [universal Forms](#). For modern [representationalists](#) like [Descartes](#) and [Locke](#), however, [ideas](#) are the immediate objects of every [mental activity](#). [Ideas](#) in this sense are supposed to represent things - present or absent - before the [mind](#).

Recommended Reading:

Gail Fine, On Ideas: Aristotle' s Criticism of Plato' s Theory of Forms (Clarendon, 1995);

Margaret Daulet Wilson, Ideas and Mechanism (Princeton, 1999);

David Hausman and Alan Hausman, Descartes' s Legacy: Mind & Meaning in Early Modern Philosophy (Toronto, 1997);

John W. Yolton, Locke and the Way of Ideas (St. Augustine, 1993);

Richard A. Watson, Representational Ideas: From Plato to Patricia Churchland (Kluwer, 1995).

[\[A Dictionary of Philosophical Terms and Names\]](#)

14-01-2002

ideal

<[mathematics](#), [logic](#)> In [domain theory](#), a non-empty, [downward closed](#) subset which is also closed under binary [least upper bounds](#). I.e. anything less than an element is also an element and the least upper bound of any two elements is also an element.

[\[FOLDOC\]](#)

16-03-2001

idealism

<[metaphysics](#), [philosophical school](#)> in [metaphysics](#), idealism is a term used to describe the sort of theory which claims that something "ideal" or non-physical or non-material or non-extended is the primary reality. In this sense, [Plato](#), [Berkeley](#), [Leibniz](#) and [Hegel](#) are among the most significant of the idealists (Leibniz is perhaps the most inconsistent, since he said that all physical things are actually made up of little bundles of consciousness he called "monads", an idea that is close to panpsychism). Obviously, [spiritualism](#) is similar to idealism, but spiritualism tends to be used to refer more to religious, supernatural conceptions of reality, rather than to philosophical theories like those of Plato or Hegel. Plato can be considered the "Founding Father" of idealism in Western philosophy, since he claimed that what is fundamentally real are [ideas](#), of which physical objects are pale imitations. The opposite of idealism is [materialism](#). Just as materialism in metaphysics is often linked with [subjectivism](#) in [epistemology](#), idealism is often linked with [intrinsicism](#) in epistemology (though epistemological intrinsicism is sometimes also called, confusingly, idealism, since intrinsicism holds that we literally perceive universals or ideas). In popular usage, "idealism" is more of an ethical term, characterizing people who have a strong code of values or a great deal of integrity, though sometimes to an excessive degree (often contrasted with those who are merely or healthily pragmatic).

(References from [absolutism](#), [abstractionism](#), [Cartesianism](#), [dualism](#), [essentialism](#), [Hegelianism](#), [intrinsicism](#), [Kantianism](#), [Marxism](#), [materialism](#), [mentalism](#), [monism](#), Neo-Platonism, [Platonism](#), [realism](#), [spiritualism](#), and [transcendentalism](#).)

[[The Ism Book](#)]

<[history of philosophy](#), [gnoseology](#), [metaphysics](#)> belief that only [mental entities](#) are [real](#), so that [physical things](#) exist only in the sense that they are [perceived](#). [Berkeley](#) defended his "[immaterialism](#)" on purely [empiricist](#) grounds, while [Kant](#) and [Fichte](#) arrived at theirs by [transcendental arguments](#).

German, English, and (to a lesser degree) American [philosophy](#) during the nineteenth century was dominated by the [monistic absolute idealism](#) of [Hegel](#), [Bradley](#), and [Royce](#).

Recommended Reading:

David Berman, *George Berkeley: Idealism and the Man* (Oxford, 1996);
 German Idealist Philosophy, ed. by Rudiger Bubner (Penguin, 1997);
 The Cambridge Companion to German Idealism, ed. by Karl Ameriks (Cambridge, 2001);
 John Foster, *The Case for Idealism* (Routledge, 1982);
 Current Issues in Idealism, ed. by Paul Coates and Daniel D. Hutto (St. Augustine, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

14-01-2002

ideas

<[idealism](#), [ockhamism](#), [empiricism](#), [epistemology](#), [rationalism](#)> on Locke' s conception ideas are the [contents](#) with which [minds](#) are "furnished" (as he puts it). From "[simple ideas](#)" (e.g., or red, of round, of sweet) furnished by sense-perception the [mind constructs](#) "[complex ideas](#)" (e.g., of apple). Conception being nothing but this compounding of sense based ideas, and [reasoning](#) being nothing but transitions between ideas thus compounded, all [knowledge](#) -- Locke maintains -- derives ultimately from [sensory experience](#). See also: [empiricism](#), [impressions](#).

[[Philosophical Glossary](#)]

22-06-2001

idempotent

1. A function $f : D \rightarrow D$ is idempotent iff $(f x) = f x$ for all x in D .

I.e. repeated applications have the same effect as one. This can be extended to functions of more than one argument, e.g. Boolean & has $x \& x = x$. Any value in the [image](#) of an idempotent function is a [fixed point](#) of the function.

2. This term can be used to describe [C](#) header files, which contain common definitions and declarations to be included by several source files. If a header file is ever included twice during the same compilation (perhaps due to nested [#include](#) files), compilation errors can result unless the header file has protected itself against multiple inclusion; a header file so protected is said to be idempotent.

3. The term can also be used to describe an initialisation subroutine that is arranged to perform some critical action exactly once, even if the routine is called several times.

[[Jargon File](#)]

[[FOLDOP](#)]

16-03-2001

identity

<logic>A 2-adic [predicate](#), say Ixy , asserting that its two [arguments](#) are identical. Customarily immbolized by "=" and written in infix notation, " $x=y$ ". While all systems of polyadic [predicate](#) logic can express identity as easily as any other 2-adic relation, a system is said to be "with identity" [iff](#) it also contains axioms, axiom schemata, and/or rules of [inference](#) determining how "=" is to be used. Note that an axiom like " $(x)(x=x)$ " or " $(x)Ixx$ " is not logically valid because there are interpretations of "=" or "I" that do not take the meaning of identity.

See first-order theory with identity, [predicate logic with identity](#), interpretation, normal

[Glossary of First-Order Logic]

16-03-2001

identity theory

<philosophy of mind> the [identity](#) theory of mind is standardly understood to be the claim that every mental property is identical with some physical property.

1. Identity theories of mind (IT) and multiple realisation

The version of [physicalism](#) that gained ground in the middle of this century was in the first place committed to the identity thesis, namely, that every property (and thereby every mental property) is identical with some physical property.

IT: Every property is identical with some physical property.

Smart' s "Sensations and Brain Processes" (1959) provides the classic statement of this view. At that point, th primary concern of physicalists was to establish the point that two nonsynonymous terms could nonetheless pick out the same property.

Even though "pain" and, say, "C-fibers firing," are not synonymous, the property of being in pain could be identical with the property of having one' s Cfibers firing. Very soon, however, the predominant concern shifted to what is now famous as the problem of [multiple realisability](#) and its implications for identity theories.

It' s important to distinguish the problem of multiple realisability from the justification of multiple realisability. Th justification stems from [functionalism](#). According to functionalism, each mental property can be defined as a second-order property, the property of having some property or other that plays a certain functional role, defined in terms of other functional properties and physical causes and effects. As a result, it is likely that many different first-order physical properties can play the same functional role. There will (likely) be a very large set of different physical properties such that each can play the functional role, so that different instances of M may be correlated with various members of that set.

The way in which this constitutes a problem for identity theories is by implying a failure of coextension. Call this the Coextension [argument](#):

There exists at least one mental property M such that there is a set of distinct physical properties ($P_1, v P_2 v \dots P_n$), no one of which realizes M on every occasion, while each realizes it on some occasion.

1. If M is identical with any physical property, it is identical with one of ($P_1, v P_2 v \dots P_n$)
2. M can' t be identical with any of ($P_1, v P_2 v \dots P_n$) because there is no member of it with which it i coextensive
3. There is no physical property with which M is coextensive, and hence none with which it is identical.

Therefore, IT is false. A property M exists which is not identical to any physical property.

The identity theory IT can be saved in light of this argument by rejecting either premise 1 or premise 2. The [disjunction](#) option and elimination options discussed below correspond to those moves. If these prove unpalatable, the physicalist can still propose some theses that maintain the spirit, if not the letter, of IT; these are trope theories and second-order definition theories. I address each option in turn.

1.1. The disjunction option

One could deny 2 by finding some further physical property, unrelated to the realizers, which that is indeed in common to all the instances of M. But there is no reason to expect there to be any such property. The disjunction option instead locates the common property as the property defined by disjoining the members of ($P_1, v P_2 v \dots P_n$). The property M is identical with a physical property after all, namely, $P_1 v P_2 v \dots P_n$.

Advocates of the disjunction option face two important questions. First, is $P_1 v P_2 v \dots P_n$ a property? Second, is it in fact identical with M? Many philosophers are suspicious of such disjunctive properties as that allegedly named by " $P_1 v P_2 v \dots P_n$ " (Armstrong 1978; Lewis 1983). If one believes that every predicate corresponds to a property or a universal, then this problem cannot arise. But if you reject this presumption, then the question becomes pressing. (For debate, see Fodor 1974, Kim 1989, Kim 1992.)

Even if we decide that $P_1 \vee P_2 \vee \dots \vee P_n$ is a genuine physical property, the question remains whether it can be identified with M. The original problem multiple realizability posed for IT was a failure of coextension, and $P_1 \vee P_2 \vee \dots \vee P_n$ is supposed to be coextensive with M. But this is ambiguous: do we mean coextensive in the actual world, in all nomologically possible worlds, or all worlds whatsoever? If $P_1 \vee P_2 \vee \dots \vee P_n$ is to be identical with M then, trivially, we must mean that they are coextensive in all worlds whatsoever. But, in fact, if we are tempted to the disjunctive option because of functionalism, we cannot appeal to a purely physical disjunction for an identity claim. It's a familiar point that functionalism not only allows variable physical realisation; it also allows nonphysical realisation. In some worlds, nonphysical properties will realize the mental. Hence, if $P_1 \vee P_2 \vee \dots \vee P_n$ is to be coextensive with M in all possible worlds whatsoever, it must include some nonphysical properties as disjuncts. In that case, however, it is not a physical property with which we are identifying the physical property (Melnik 1996).

1.2. The eliminative option

If one is an eliminativist about the mental in general, one is of course unfazed by the Coextension [argument](#). However, one could adopt a mild sort of eliminativism by denying, not that any mental properties exist at all, but by denying the more limited claim that is the first premise of the Coextension [argument](#).

The strategy is simple. For each of the members of $(P_1 \vee P_2 \vee \dots \vee P_n)$ there is said to correspond a mental property, a species of M. If M is the property of pain, there will be many different kinds of pain, but no such thing as pain, period. Each of those kinds is then identified with its corresponding physical realizer, and IT is re-established.

Unlike a more thoroughgoing eliminativism, this view is not saddled with the implausible claim that people are not conscious, that they have no thoughts, etc. But it does face the charge that its invocation of these kinds of pain, and so on, is arbitrary and misleading. Why call it pain if doesn't have the features common to all pains? We cannot, on this view, say that it has those features, because there is no such thing as the property of pain, period, and hence no such thing as what is in common to each such instance.

Perhaps, again invoking the distinction between predicates that correspond to properties and those that don't the advocate of milder eliminativism could say that each such instance is picked out by the predicate "pain," and that is what they have in common; but this predicate fails to pick out any property (Kim 1992; Hooker 1981).

2. Identity theories and tropes

The remaining two responses to the Coextension [argument](#) admit that IT is, in fact, false; they propose closely related theses instead, however, that maintain the basic idea of IT.

The first of these switches from an identity theory about properties to one about tropes. A trope is the particular instance of a property, an abstract particular. The Coextension [argument](#) is powerless against this thesis:

IT1: Every actual trope is identical with a physical trope.

Even if there are properties -- universals -- that fail to be coextensive with physical properties, each instance of a nonphysical property could be identical with an instance of a physical property. If that were the case, physicalist intuitions would, it seems, be assuaged.

It's important to see that IT1 is more than a token identity thesis. It's not just that all particular events, or particular objects, are physical; it's that all particular property instances are physical (Robb 1997).

The primary difficulty with this approach is simply that the nature of tropes is obscure and, as a result, it is nearly impossible to evaluate the claim that we have in certain cases not two tropes but one. Property individuation is puzzling enough; trope individuation is worse yet.

3. The second-order option

Finally, if functionalism is adopted, one has already provided an identity theory of a sort. That is, one has already subscribed to the following thesis:

IT2: Every property is identical with a physical property or a second-order property defined in purely physical and logical terms.

IT2 is not, of course, an identity theory in the standard sense. It does not imply that every property is a physical property, unless every physically definable second order property thereby counts as a physical property.

One problem with IT2 is that it requires that one buy into functionalism for every property for which multiple realizability is a problem. This may seem innocuous enough if one is convinced of multiple realizability because of a commitment to functionalism in the first place, but IT2 highlights how contentious a thesis functionalism is in the first place. It is fair to call it a sort of "reductionism," since it claims that every property can be defined using only logical apparatus and physical terms. If IT2 is one's method of saving the spirit of the identity theory one certainly doesn't dilute its strength at all (Field 1992).

Increasingly, physicalists (see Papineau 1993; Melnyk 1996) have appealed to a related thesis:

IT3: Every property is identical with a physical property or is realised on every occasion by a physical property.

Depending on exactly how the notion of realisation is cashed out, this may turn out to be identical with IT2. The notion of realisation has, however, been neglected in the philosophical literature, even as its appeal has grown.

References (in order of importance)

- Smart, J. J. C. 1959. "Sensations and Brain Processes." *The Philosophical Review* 68: 141-156.
- Putnam, Hilary. 1967. "The Nature of Mental States." Originally appeared as "Psychological Predicates" in W. H. Capitan and D. D. Merrill, eds., *Art, Mind and Religion*. Pittsburgh: University of Pittsburgh Press. Reprinted (1975) in Putnam, *Mind, Language and Reality: Philosophical Papers, Volume 2*. Cambridge: Cambridge University Press, 429-40.
- Fodor, Jerry. 1974. "Special Sciences." *Synthese* 28: 97-115. Reprinted (1981) in Fodor, *Representations: Philosophical Essays on the Foundations of Cognitive Science*. Cambridge, Mass.: MIT Press, 127-146.
- Armstrong, David. 1978. *A Theory of Universals: Universals and Scientific Realism, Volume 2*. Cambridge: Cambridge University Press.
- Lewis, David. 1983. "New Work for a Theory of Universals." *Australasian Journal of Philosophy* 61: 343-377.
- Hooker, Clifford. 1981. "Towards a General Theory of Reduction." Parts 1 - 3. *Dialogue* 20: 38-59, 201-236, 496-529.
- Kim, Jaegwon. 1989. "The Myth of Nonreductive Materialism." *Proceedings and Addresses of the American Philosophical Association* 63: 31-47. Reprinted in Kim (1993)
- Kim, Jaegwon. 1992. "Multiple Realisation and the Metaphysics of Reduction." *Philosophy and Phenomenological Research* 52: 1-26. Reprinted in Kim (1993).
- Kim, Jaegwon. 1993. *Supervenience and Mind*. Cambridge: Cambridge University Press.
- Melnyk, Andrew. 1996. "Formulating Physicalism: Two Suggestions." *Synthese* 105, 381-407.
- Robb, David. 1997. "The Properties of Mental Causation." *The Philosophical Quarterly* 47: 178-194.
- Papineau, David. 1993. *Philosophical Naturalism*. Oxford: Blackwell.
- Field, Hartry. 1992. "Physicalism." In J. Earman, ed., *Inference, Explanation and other Frustrations. Essays in the Philosophy of Science*. Berkeley: University of California Press, 271-291.

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Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

iff

<[logic](#)> Abbreviation of "if and only if", which designates material [equivalence](#).

[Glossary of First-Order Logic]

16-03-2001

ignorance appeal to

<[logic](#), [philosophy of science](#)> known also as <[argumentum ad ignoratiam](#)>. The informal [fallacy](#) of supposing that a [proposition](#) must be [true](#) because there is no [proof](#) that it is [false](#). Example: "The F.B.I. investigation was never able to establish that Smith was not at the scene of the crime on the night of June 25th, so we may safely conclude that he was there".

Recommended Reading:

Douglas N. Walton, *Arguments from Ignorance* (Penn. State, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

14-01-2002

ignoratiam argumentum ad

<[logic](#), [philosophy of science](#)> see [appeal to ignorance](#).

[[A Dictionary of Philosophical Terms and Names](#)]

14-01-2002

ignoratio elenchi

<[logic](#), [philosophy of science](#)> latin phrase meaning, "misunderstanding of the [refutation](#)". See [irrelevant conclusion](#).

[[A Dictionary of Philosophical Terms and Names](#)]

14-01-2002

illicit major

<[logic](#), [philosophy of science](#)> the formal [fallacy](#) committed in a [categorical syllogism](#) that is [invalid](#) because its [major term](#) is [undistributed](#) in the [major premise](#) but [distributed](#) in the [conclusion](#). Example: "All dogs are mammals. No cats are dogs. Therefore, no cats are mammals."

[[A Dictionary of Philosophical Terms and Names](#)]

14-01-2002

illicit minor

<[logic](#), [philosophy of science](#)> the formal [fallacy](#) committed in a [categorical syllogism](#) that is [invalid](#) because its [minor term](#) is [undistributed](#) in the [minor premise](#) but [distributed](#) in the [conclusion](#). Example: "All poodles are mammals. All poodles are pets. Therefore, All pets are mammals".

[[A Dictionary of Philosophical Terms and Names](#)]

17-01-2002

illocutionary act

<[philosophy of language](#), [linguistics](#)> the [speech act](#) of doing something else-offering advice or taking a vow, for example - in the process of uttering meaningful language. Thus, for example, in saying "I will repay you this money next week," one typically performs the [illocutionary act](#) of making a promise.

Recommended Reading:

J. L. Austin, How to Do Things With Words (Harvard, 1975);

John R. Searle, Speech Acts (Cambridge, 1970);

William P. Alston, Illocutionary Acts and Sentence Meaning (Cornell, 2000);

Jerrold J. Katz, Propositional Structure and Illocutionary Force: A Study of the Contribution of Sentence Meaning to Speech Acts (Harvard, 1980).

[[A Dictionary of Philosophical Terms and Names](#)]

18-01-2002

image

1. <[data](#), [graphics](#)> Data representing a two-dimensional scene. A digital image is composed of [pixels](#) arranged in a rectangular array with a certain height and width. Each pixel may consist of one or more [bits](#) of information, representing the brightness of the image at that point and possibly including colour information encoded as [RGB](#) triples.

[Images](#) are usually taken from the real world via a [digital camera](#), [frame grabber](#), or [scanner](#); or they may be generated by computer, e.g. by [ray tracing](#) software.

See also [image formats](#), [image processing](#).

2. <[mathematics](#)> The image (or range) of a [function](#) is the set of values obtained by applying the function to all elements of its [domain](#). So, if $f : D \rightarrow C$ then the set $f(D) = \{f(d) \mid d \in D\}$ is the image of D under f . The image is a subset of C , the [codomain](#).

[[FOLDOP](#)]

16-03-2001

image recognition

<[graphics](#), [artificial intelligence](#)> The identification of objects in an [image](#). This process would probably start with [image processing](#) techniques such as [noise removal](#), followed by (low-level) [feature extraction](#) to locate lines, regions and possibly areas with certain textures.

The clever bit is to interpret collections of these shapes as single objects, e.g. cars on a road, boxes on a conveyor belt or cancerous cells on a microscope slide. One reason this is an [AI](#) problem is that an object can appear very different when viewed from different angles or under different lighting.

Another problem is deciding what features belong to what object and which are background or shadows etc. The human visual system performs these tasks mostly unconsciously but a computer requires skilful programming and lots of processing power to approach human performance.

[[FOLDOC](#)]

16-03-2001

imagination

<[philosophy of mind](#)> traditionally, the mental capacity for experiencing, constructing, or manipulating "mental imagery" (quasi-perceptual experience). Imagination is also regarded as responsible for fantasy, inventiveness, idiosyncrasy, and creative, original, and insightful thought in general, and, sometimes, for a much wider range of mental activities dealing with the non-actual, such as supposing, pretending, "seeing as", thinking of possibilities, and even being mistaken.

See [representation](#)

Nigel J.T. Thomas

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

immanent

<[kantian metaphysics](#), [ethics](#), [pantheism](#), [stoicism](#)> internal or indwelling as opposed to external or out dwelling: in particular, what is internal to the [material](#), [sensible world](#) as opposed to what is above or beyond it, or [transcendent](#). On pantheistic views (e.g., those of the [Stoics](#) or Spinoza) [God](#) is held to be an immanent guiding [spirit](#) in and of the [sensible material world](#), not existing apart or beyond it. [Orthodox Christian](#) views, by contrast hold God be [transcendent](#). Similarly, Plato asserts the [transcendence](#) while Aristotle maintains the [immanence](#) of the [Forms](#) or [essences](#) of [things](#).

[[Philosophical Glossary](#)]

29-07-2001

immediate inference

<[logic](#), [philosophy of science](#)> the relationship between two [propositions](#) that are [logically equivalent](#). In [categorical logic](#), the traditional immediate inferences include: [conversion](#), [obversion](#), and [contraposition](#).

[[A Dictionary of Philosophical Terms and Names](#)]

18-01-2002

immoralism

<[ethics](#)> intellectual stance that involves an outright rejection of conventional morality, of systematic approaches to [ethics](#), or even of ethics as such. Friedrich [Nietzsche](#) is famous for having called himself an immoralist. (References from [atheism](#) and [secularism](#).)

28-04-2001

immortalism

<[metaphysics](#), [philosophy of religion](#)> the view according to which human beings, or their [souls](#) at least, survive after death. This idea is sometimes called [athanatism](#) (from the Greek word for immortal), the opposite of which is [thanatism](#).

[[The Ism Book](#)]

Edited by Giovanni Benzi

25-03-2001

impartiality

<[ethics](#), [justice](#)> the absence of any [bias](#) toward or away from a particular person or opinion. Enlightenment philosophers often upheld the use of [human reason](#) as an impartial tool, but [postmodern thinkers](#) raise significant doubts about the possibility and [value](#) of such [objectivity](#). Although [moral impartiality](#) has traditionally been regarded as a [virtue](#), in strict practice it would require callous disregard for every special relationship with another person. In [public life](#), however, [impartiality](#) is a crucial component of [justice](#).

Recommended Reading:

Stephen L. Darwall, *Impartial Reason* (Cornell, 1995);

Shane O' Neill, *Impartiality in Context: Grounding Justice in a Pluralist World* (SUNY, 1997);

Paul Kelly, *Impartiality, Neutrality and Justice* (Columbia, 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

18-01-2002

imperative

<[ethics](#)> a command. Philosophers often distinguish between [hypothetical imperatives](#) and [categorical imperatives](#).

26-03-2001

imperativism

[deontologism](#)

15-05-2004

implementation

1. execution (the process of carrying out a course of action)
2. effectuation (providing a practical means for accomplishing something)
3. realisation (e.g. of a model or blueprint)
4. the outcome of 1-3

16-03-2001

implicans

[implication](#)

16-05-2004

implicateimplication

05-05-2004

implication

<logic> A statement of the form, "if A, then B," when A and B stand for wffs or propositions. The wff in the if-clause is called the antecedent (also the implicans and protasis). The wff in the then-clause is called the consequent (also the implicate and apodosis). As a truth function, see material implication. Also called a conditional, or a conditional statement.

See corresponding conditional

Logical implication

A tautologous statement of material implication (next)

Material implication

A truth function that is false when its antecedent is true and its consequent false, and true otherwise. Also the connective that denotes this function; also the compound proposition built from this connective.

Notation: $p \Rightarrow q$ (or a thin right arrow).

$A \Rightarrow B$ is true unless A is true and B is false.

The truth table is

A B | A \rightarrow B

F F | T

F T | T

T F | F

T T | T

It is surprising at first that $A \Rightarrow B$ is always true if A is false, but if $X \Rightarrow Y$ then we would expect that $(X \& Z) \Rightarrow Y$ for any Z. This truth function is rarely what implication or "if...then" means in English, but it captures the logical core of that usage and is truth-functional.

Paradoxes of material implication

Two consequences of the formal definition of material implication that violate informal intuitions about implication: (1) that a material implication is true whenever its antecedent is false, and (2) that a material implication is true whenever its consequent is true. These so-called paradoxes do not create contradictions.

[Glossary of First-Order Logic] and [FOLDOP]

16-03-2001

implicit memory

<philosophy of mind>

implicit memory is evident when the performance of a subject on a task is improved despite the inability of the subject to consciously recollect memories which facilitate to the task.

See also explicit memory

Chris Eliasmith - [Dictionary of Philosophy of Mind] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

impossible

<logic, epistemology> what cannot be the case, under any circumstances, is impossible. What is logically impossible is self contradictory; inconsistent with the basic principles of logic itself (to be both human and nonhuman, e.g., is logically impossible). It is convenient for many purposes to recognize types of impossibility weaker than strict logical impossibility. Natural or nomological impossibility is the next strongest generally recognized type: what is nomologically impossible, while it may be logically consistent, is inconsistent with the laws of nature: e.g., it' s nomologically impossible (current physics tells us) for anything to travel faster than the speed of light. Practical impossibility is a weaker variety yet: what is practically impossible may be consistent with the laws of nature, but is inconsistent given the circumstances; e.g., it' s nomologically possible for human being to run a four minute mile but it' s not practically possible for most of us (given our ages, physiques and physical conditions) to do so.

Contrast: [possible](#). See also: [necessary](#), [contingent](#), [actual](#).

[[Philosophical Glossary](#)]

22-06-2001

impressions

<[epistemology](#), [empiricism](#), [idealism](#)> Hume terms the direct [experiential deliverances](#) of [sensation impressions](#); [simple ideas](#), for Hume are faint [copies](#) (in [memory](#)) of these [sensory impressions](#), and [complex ideas](#) (all the rest) are compounded from these simple ideas, much as they are for Locke. See also: [empiricism](#), [ideas](#).

[[Philosophical Glossary](#)]

22-06-2001

inclination

<[ethics](#)> this is the word that Kant used (actually, he used the German word Neigung) to refer to our sensuous [feelings](#), [emotions](#), and [desires](#). Kant contrasts inclination with [reason](#). Whereas inclination was seen as physical, causally-determined, and [irrational](#), reason was portrayed as non-physical, free, and obviously [rational](#).

26-03-2001

inclusive

<[mathematics](#), [logic](#)> In [domain theory](#), a [predicate](#) $P : D \rightarrow \text{Bool}$ is inclusive iff For any [chain](#) C , a subset of D , and for all c in C , $P(c) \Rightarrow P(\text{lub } C)$

In other words, if the predicate holds for all elements of an increasing sequence then it holds for their [least upper bound](#).

[[FOLDOP](#)]

16-03-2001

inclusive disjunction

[disjunction](#)

30-05-2004

inclusive predicate logic

[predicate logic](#)

30-05-2004

inclusive quantification theory

[predicate logic](#)

30-05-2004

incommensurability

<[logic](#), [philosophy of science](#)> incapable of being measured against a common standard. The presumed [incommensurability](#) of individual [human pleasures](#) is sometimes raised as an objection against [hedonistic](#) versions of [utilitarianism](#).

[Feyerabend](#) and [Kuhn](#) suppose that [rival scientific theories](#) are [incommensurable](#) if neither can be fully stated in the vocabulary of the other.

Recommended Reading:

Nola J. Heidlebaugh, Judgement, Rhetoric, and the Problem of Incommensurability (South Carolina, 2001);

Howard Sankey, The Incommensurability Thesis (Avebury, 1994);

Incommensurability, Incomparability, and Practical Reason, ed. by Ruth Chang (Harvard, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

18-01-2002

incomparable

<[mathematics](#)> Two elements a, b of a set are incomparable under some relation \leq if neither $a \leq b$, nor $b \leq a$.

[[FOLDOC](#)]

16-03-2001

incontinence

<[ethics](#), [justice](#)> inability [to act reasonably](#) because of [weakness of will](#); lack of self-control.

Recommended Reading:

Alfred R. Mele, Irrationality: An Essay on Akrasia, Self-Deception, and Self-Control (Oxford, 1992)

Robert Dunn, The Possibility of Weakness of Will (Hackett, 1987).

[[A Dictionary of Philosophical Terms and Names](#)]

28-01-2002

incorrigible

<[logic](#), [philosophy of science](#), [epistemology](#)> incapable of [being corrected](#); hence, a putative criterion of certainty. An [incorrigible proposition](#) is one about which it is impossible to be mistaken, such as (perhaps) "I am now in pain." Whether any [human knowledge](#) is actually [incorrigible](#) is one of the central questions of [epistemology](#).

Recommended Reading:

Ludwig Wittgenstein, On Certainty (Harpercollins, 1986);

Certainty, ed. by Jonathan Westphal (Hackett, 1995);

William P. Alston, Epistemic Justification: Essays in the Theory of Knowledge (Cornell, 1993).

[[A Dictionary of Philosophical Terms and names](#)]

18-01-2002

incremental analysis

<[testing](#)> Partial analysis of an incomplete product to allow early feedback on its development.

[[FOLDOC](#)]

16-03-2001

independence of an axiom

<logic> If "S-A" denotes system S minus axiom A, then for many logicians an axiom A is independent of system S iff neither A nor $\sim A$ are theorems of S-A.

For some, A is independent iff A is not a theorem of S-A, even if $\sim A$ is a theorem of S-A. The former concept is equivalent to the undecidability of wff A in S.

[Glossary of First-Order Logic]

16-03-2001

indeterminism

<metaphysics> view, similar to accidentalism, according to which at least some events or human actions are not determined by outside causes; obviously this idea is opposed to determinism. Epicurus' idea of the "atomic swerve" is an example of an indeterminist doctrine.

[The Ism Book]

Edited by Giovanni Benzi

25-03-2001

indexical

<logic, philosophy of science> an expression whose meaning depends upon the context in which it is employed. Thus, for example, in the sentence, "I came back from there an hour ago," the words "I" and "there," along with the phrase "an hour ago," are all indexicals - the person, place, and time to which they refer is different on each occasion of their use.

Recommended Reading:

Philosophical Logic, ed. by T. J. Smiley (Oxford, 1999);

Lawrence D. Roberts, How Reference Works: Explanatory Models for Indexicals, Descriptions, and Opacity (SUNY, 1993);

John Perry, The Problem of the Essential Indexical (CSLI, 2001);

Ingar Brinck, The Indexical ' I ' : The First Person in Thought and Language (Kluwer, 1997).

[A Dictionary of Philosophical Terms and Names]

18-01-2002

indirect proof

<logic, philosophy of science> demonstration of the truth of a proposition from the impossible consequences of its contradictory; see reductio ad absurdum.

[A Dictionary of Philosophical Terms and Names]

18-01-2002

individual constant

<logic, philosophy of science> a symbol (usually lowercase letters such as a, b, c, etc.) used to represent a specific thing in quantification theory.

[A Dictionary of Philosophical Terms and Names]

18-02-2002

individual variable

<[logic](#), [philosophy of science](#)> a [symbol](#) (usually lowercase letters such as x, y, z, etc.) used to represent any individual generally in [quantification theory](#).

[[A Dictionary of Philosophical Terms and Names](#)]

18-01-2002

individualism

<[ethics](#), [metaphysics](#)>

1. while the word individualism usually pertains to [ethics](#), we can also speak of metaphysical individualism (that only particular, individual things exist - see [concretism](#) and [nominalism](#)), epistemological individualism (that only individual [minds](#) can come to have [knowledge](#)), political individualism (respect for individual [rights](#)), and methodological individualism (as in Austrian economics). In ethics, individualism refers to the principle that it is the unique, unrepeatable person who should be the beneficiary of action, not any sort of collective entity (thus individualism is essentially the same as [egoism](#) and is opposed to ethical [collectivism](#)). Most varieties of ethical individualism are brands of [eudaimonism](#), but this is not true of, for example, [existentialism](#) or [stoicism](#). In popular usage, the connotations of "individualism" can be positive or negative, depending on who is using the term. Though it is a positive word for many people, the term can imply a kind of atomism that necessarily puts a low or even negative value on relations with other people. (References from [altruism](#), [Aristotelianism](#), [Buddhism](#), [egoism](#), [gnosticism](#), [hedonism](#), [humanism](#), [naturalism](#), [stoicism](#), [transcendentalism](#), and [utilitarianism](#).)

2. see [internalism](#)

Based on [[The Ism Book](#)]

Edited by Giovanni Benzi

25-03-2001

indubitable

<[philosophy of science](#), [gnoseology](#)> the characteristic of a proposition whose [truth](#) cannot be doubted, such as "My father is older than I am," even though (given bizarre suppositions about time and/or human conception) it might be [false](#).

[Descartes](#) and other modern philosophers supposed that only such propositions would provide a suitable [foundation](#) for [human knowledge](#).

Recommended Reading:

Michael Williams, Unnatural Doubts (Princeton, 1995);

David Owens, Reason Without Freedom: The Problem of Epistemic Normativity (Routledge, 2000); Nicholas Nathan, The Price of Doubt (Routledge, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

18-02-2002

induction

<[logic](#)> an [inference](#) in which the conclusion contains information that was not contained in the premises. Or, also, a form of reasoning in which one moves from one or more [premisses](#) to a [conclusion](#) in such a way that while the [conclusion](#) seems to have been given some justification, it is logically possible for the [premisses](#) to be true and the [conclusion](#) false. [deduction](#), [mathematical induction](#)

Based on [[A Philosophical Glossary](#), Glossary of First-Order Logic]

05-06-2001

induction hypothesis

[mathematical induction](#)

30-05-2004

induction step[mathematical induction](#)

30-05-2004

inductive inference[grammatical inference](#)

30-05-2004

inductive relation

A relation R between [domains](#) D and E is inductive if for all [chains](#) $d_1 \dots d_n$ in D and $e_1 \dots e_n$ in E,

16-03-2001

ineffable

<[metaphysics](#), [gnoseology](#), [philosophy of science](#)> incapable of being expressed in [language](#), as the [experience](#) of [qualia](#) generally and [mystical insight](#) in particular are sometimes held to be.

Recommended Reading:

Ludwig Wittgenstein, Tractatus Logico-Philosophicus (Routledge, 1995)

Ben-Ami Scharfstein, Ineffability: The Failure of Words in Philosophy and Religion (SUNY, 1993).

[[A Dictionary of Philosophical Terms and Names](#)]

18-02-2002

inference

<[logic](#)> 1. The logical process by which new facts are derived from known facts by the application of [inference rules](#).

See also [symbolic inference](#), [type inference](#).

[[FOLDOP](#)]

2. A series of [wffs](#) or propositions in which some (called premises) support another (called the conclusion); also the act of concluding the [conclusion](#) from the [premises](#).

See [deduction](#), [derivation](#), [induction](#), [proof](#)

[Glossary of First-Order Logic]

<[logic](#), [philosophy of science](#)> the [relationship](#) that holds between the [premises](#) and the [conclusion](#) of a [logical argument](#), or the process of drawing a [conclusion](#) from [premises](#) that support it [deductively](#) or [inductively](#).

Recommended Reading:

Henry E. Kyburg, Jr., Epistemology and Inference (Minnesota, 1982);

D. S. Clarke, Jr., Practical Inferences (Routledge, 1985);

Robert B. Brandom, Articulating Reasons: An Introduction to Inferentialism (Harvard, 2000);

K.I. Manktelow, Inference and Understanding: A Philosophical and Psychological Perspective (Routledge, 1990);

Inference, Explanation, and Other Frustrations: Essays in the Philosophy of Science, ed. by John Earman (California, 1992).

[[A Dictionary of Philosophical Terms and Names](#)]

18-02-2002

inference engine

A program that infers new [facts](#) from known facts using [inference rules](#). Commonly found as part of a [Prolog interpreter](#), [expert system](#) or [knowledge based system](#).

[[FOLDOC](#)]

16-03-2001

inference rule

A procedure which combines known facts to produce ("infer") new facts. For example, given that

1. Socrates is a man and that
2. all men are mortal,

we can infer that Socrates is mortal. This uses the rule known as "modus ponens" which can be written in [Boolean algebra](#) as

$(A \& A \rightarrow B) \rightarrow B$

(if proposition A is true, and A implies B, then B is true).

Or given that,

1. Either Denis is programming or Denis is sad and
2. Denis is not sad,

we can infer that Denis is programming. This rule can be written

$((A \text{ OR } B) \& \text{not } B) \rightarrow A$

(If either A is true or B is true (or both), and B is false, then A must be true).

[[FOLDOC](#)]

16-03-2001

inference to the best explanation

[abduction](#)

30-05-2004

infimum

[greatest lower bound](#)

30-05-2004

infinite

<[mathematics](#)> 1. Bigger than any [natural number](#). There are various formal set definitions in [set theory](#): a set X is infinite if

- (i) There is a bijection between X and a proper subset of X.
- (ii) There is an injection from the set N of natural numbers to X.
- (iii) There is an injection from each natural number n to X.

These definitions are not necessarily equivalent unless we accept the [Axiom of Choice](#).

2. The length of a line extended indefinitely.

See also [infinite loop](#), [infinite set](#).

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

infinite loop

<PI> (Or "endless loop") Where a piece of program is executed repeatedly with no hope of stopping. This is nearly always because of a [bug](#), e.g. if the condition for exiting the loop is wrong, though it may be intentional if the program is controlling an [embedded system](#) which is supposed to run continuously until it is turned off. The programmer may also intend the program to run until interrupted by the user. An endless loop may also be used as a last-resort error handler when no other action is appropriate. This is used in some [operating system](#) kernels following a [panic](#).

A program executing an infinite loop is said to [spin](#) or [buzz](#) forever and goes [catatonic](#). The program is "wound around the axle".

A standard joke has been made about each generation' s exemplar of the ultrafast machine: "The Cray-3 is so fast it can execute an infinite loop in under 2 seconds!"

See also [black hole](#), [recursion](#), [infinite loop](#).

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

infinite regress

<logic, philosophy of science> a [definitional](#), [explanatory](#), or [justificatory](#) procedure that entails its own reapplication without any limit. Thus, for example, the claim that everything in the world has only [extrinsic value](#) would lead to an [infinite regress](#). Since the lack of any intrinsically worthwhile starting-point would render all value open to question, the procedure seems to be self-defeating.

Recommended Reading:

John Passmore, Philosophical Reasoning (Basic, 1969).

[[A Dictionary of Philosophical Terms and Names](#)]

18-02-2002

infinite set

<mathematics> A set with an infinite number of elements. There are several possible definitions, e.g.

(i) ("Dedekind infinite") A set X is infinite if there exists a [bijection](#) (one-to-one mapping) between X and some proper subset of X.

(ii) A set X is infinite if there exists an [injection](#) from N (the set of [natural numbers](#)) to X.

In the presence of the [Axiom of Choice](#) all such definitions are equivalent.

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16-03-2001

Infinite-Monkey Theorem

<humour> "If you put an [infinite](#) number of monkeys at typewriters, eventually one will bash out the script for Hamlet." (One may also hypothesise a small number of monkeys and a very long period of time.) This theorem asserts nothing about the intelligence of the one [random](#) monkey that eventually comes up with the script (and note that the mob will also type out all the possible "incorrect" versions of Hamlet). It may be referred to semi-seriously when justifying a [brute force](#) method; the implication is that, with enough resources thrown at it, any technical challenge becomes a one-banana problem.

This theorem was first popularised by the astronomer Sir Arthur Eddington. It became part of the idiom through the classic short story "Inflexible Logic" by Russell Maloney, and many younger hackers know it through a reference in Douglas Adams' s "Hitchhiker' s Guide to the Galaxy".

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

infinity

1. <[mathematics](#)> The size of something [infinite](#).

Using the word in the context of sets is sloppy, since different [infinite sets](#) aren' t necessarily the same size [cardinality](#) as each other.

See also [aleph 0](#)

2. <[programming](#)> The largest value that can be represented in a particular type of variable ([register](#), memory location, data type, whatever).

See also [minus infinity](#).

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

infix notation

<[language](#)> One of the possible orderings of [functions](#) and [operands](#): in infix notation the functions are placed between their operands, such as "1+2". Although infix notation is limited to binary functions most languages mix infix notation with [prefix](#) or [postfix](#) notation, as a form of [syntactic sugar](#).

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16-03-2001

infix syntax

[infix notation](#)

30-05-2004

informal fallacy

<[logic](#), [philosophy of science](#)> an attempt to persuade that obviously fails to demonstrate the [truth](#) of its [conclusion](#), deriving its only [plausibility](#) from a misuse of [ordinary language](#). The [informal fallacies](#) include: (1) [fallacies of relevance](#): [appeal to ignorance](#), [appeal to authority](#), [ad hominem argument](#), and [appeal to emotion](#), [appeal to force](#), [irrelevant conclusion](#), and [appeal to pity](#); (2) [fallacies of presumption](#): [accident](#), [converse accident](#), [false cause](#), [begging the question](#), and [complex question](#); (3) [fallacies of ambiguity](#): [equivocation](#), [amphiboly](#), [accent](#), [composition](#), and [division](#).

Recommended Reading:

Nicholas Capaldi, The Art of Deception: An Introduction to Critical Thinking (Prometheus, 1987);

S. Morris Engel and Rudolf Steiner, With Good Reason: An Introduction to Informal Fallacies (Bedford, 1994);

Douglas N. Walton, Informal Fallacies: Towards a Theory of Argument Criticisms (Benjamins, 1987).

[[A Dictionary of Philosophical Terms and Names](#)]

18-01-2002

Information and Communication Technology

<[education](#)> (ICT) The study of the technology used to handle information and aid communication. The phrase was coined by [?] Stevenson in his 1997 report to the UK government and promoted by the new National Curriculum documents for the UK in 2000.

(<http://rubble.ultralab.anglia.ac.uk/stevenson/ICTUKIndex.html>).

See also [IT](#)

[[FOLDOC](#)]

16-03-2001

information technology

<[business](#), [jargon](#)> (IT) Applied computer systems - both [hardware](#) and [software](#), and often including [networking](#) and [telecommunications](#), usually in the context of a business or other enterprise. Often the name of the part of an enterprise that deals with all things electronic.

The term "[computer science](#)" is usually reserved for the more theoretical, academic aspects of computing, while the vaguer terms "information systems" (IS) or "information services" may include more of the human activities and non-computerised business processes like [knowledge management](#).

[[FOLDOC](#)]

16-03-2001

informative use of language

<[logic](#), [philosophy of science](#)> communication employed for the purpose of [asserting propositions](#) or [presenting arguments](#).

[[A Dictionary of Philosophical Terms and Names](#)]

18-02-2002

infrared

<[electronics](#)> (IR) Electromagnetic waves in the frequency range just below visible light corresponding to radiated heat. IR waves can be generated by a kind of [LED](#) and are often used for remote controls for televisions etc. and in some [docking stations](#).

[[FOLDOC](#)]

16-03-2001

Ingarden Roman

<[history of philosophy](#), [biography](#)> polish philosopher (1893-1970) who developed a comprehensive [aesthetic theory](#) in Das literarische Kunstwerk (The Literary Work of Art: An Investigation on the Borderlines of Ontology, Logic, and Theory of Literature) (1931). [Ingarden](#)' s Vom formalen Aufbau des individuellen Gegenstandes (Th Structure of Individual Objects) (1935) proposed using the [phenomenalist methods](#) of [Husserl](#) to defend [perceptual realism](#).

Recommended Reading:

Bohdan Dziemidok, On the Aesthetics of Roman Ingarden: Interpretations and Assessments, ed. by Peter McCormick (Kluwer, 1989).

[[A Dictionary of Philosophical Terms and Names](#)]

12-01-2002

ingenium

<[gnoseology](#), [philosophy of science](#)> latin term for [natural capacity](#) or [understanding](#).

[[A Dictionary of Philosophical Terms and Names](#)]

18-02-2002

inherence

<[metaphysics](#), [essence](#), [attribute](#), [logic](#)> the [relation](#) between individuals or [particulars](#) and their attributes or [universals](#): when an [individual](#) has an [attribute](#), the attribute is said to "inhere" in the the [thing](#).

[[Philosophical Glossary](#)]

22-06-2001

inheritance

<PI, [object-oriented](#)> In object-oriented programming, the ability to derive new [classes](#) from existing classes. A derived class ("subclass") inherits the [instance variables](#) and [methods](#) of the "base class" ("superclass"), and may add new instance variables and methods. New methods may be defined with the same names as those in the base class, in which case they override the original one.

For example, bytes might belong to the class of integers for which an add method might be defined. The byte class would inherit the add method from the integer class.

See also [multiple inheritance](#).

[[FOLDOC](#)]

16-03-2001

initialise

<PI> To give a [variable](#) its first value. This may be done automatically by some languages or it may require explicit code by the programmer. Some languages allow initialisation to be combined with variable definition, e.g. in C:

```
int i = 0;
```

Failing to initialise a variable before using it is a common programming error, but one which compilers and automatic checkers like [lint](#) can easily detect.

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16-03-2001

injection

1. <[mathematics](#)> A [function](#), $f : A \rightarrow B$, is injective or one-one, or is an injection, if and only if for all a, b in A , $f(a) = f(b) \Rightarrow a = b$. I.e. no two different inputs give the same output (contrast many-to-one). This is sometimes called an embedding. Only injective functions have left inverses f' where $f'(f(x)) = x$, since if f were not injection, there would be elements of B for which the value of f' was not unique. If an injective function is also [surjection](#) then it is a [bijection](#).

2. <[reduction](#)> An injection function is one which takes objects of type T and returns objects of type $C(T)$ where C is some [type constructor](#). An example is $f x = (x, 0)$.

The opposite of an injection function is a [projection](#) function which extracts a component of a constructed object, e.g. $\text{fst}(x, y) = x$.

We say that f injects its argument into the data type and fst projects it out.

[[FOLDOC](#)]

16-03-2001

innate ideas

<[cartesianism](#), [innatism](#), [idealism](#), [epistemology](#), [monism](#)> <[rationalism](#), [empiricism](#), [neo-empiricism](#)> [ideas](#) that are inborn rather than acquired through [sensory experience](#). Socrates and Plato taught that such ideas were acquired by direct acquaintance (prior to birth) with the [archetypes or Forms](#) or according to which all things are constructed. Descartes, as well as other [rationalists](#) (in agreement with Plato) believe such "clear and distinct" innate ideas are the source of all [real knowledge](#). Belief in innate ideas is the distinguishing feature of [rationalism](#).

[[Philosophical Glossary](#)]

22-06-2001

inner product

<mathematics> In [linear algebra](#), any linear map from a [vector space](#) to its [dual](#) defines a product on the vector space: for u, v in V and linear $g: V \rightarrow V'$ we have gu in V' so $(gu)(v)$ is a scalar, known as the inner product of u and v under g . If the value of this scalar is unchanged under interchange of u and v (i.e. $(gu)(v) = (gv)(u)$), we say the inner product, g , is symmetric. Attention is seldom paid to any other kind of inner product.

An inner product, $g: V \rightarrow V'$, is said to be positive definite iff, for all non-zero v in V , $(gv)v > 0$; likewise negative definite iff all such $(gv)v < 0$; positive semi-definite or non-negative definite iff all such $(gv)v \geq 0$; negative semi-definite or non-positive definite iff all such $(gv)v \leq 0$. Outside relativity, attention is seldom paid to any but positive definite inner products.

Where only one inner product enters into discussion, it is generally elided in favour of some piece of syntactic sugar, like a big dot between the two vectors, and practitioners don't take much effort to distinguish between vectors and their duals.

16-03-2001

input

<architecture> [data](#) transferred from the outside world into a computer system via some kind of [input device](#).

Opposite [output](#).

[FOLDOC]

16-03-2001

insertion sort

<algorithm> A sorting [algorithm](#) that inserts each item in the proper place into an initially empty list by comparing it with each item in the list until it finds the new element's successor or the end of the list.

Compare [bubble sort](#).

[FOLDOC]

16-03-2001

instance

<PI> An individual [object](#) of a certain [class](#). While a class is just the type definition, an actual usage of a class is called "instance". Each instance of a class can have different values for its [instance variables](#), i.e. its [state](#).

[FOLDOC]

16-03-2001

instance variable

<PI> In object-oriented programming, one of the variables of a [class template](#) which may have a different value for each [object](#) of that [class](#). Instance variables hold the [state](#) of an object.

[FOLDOC]

16-03-2001

instantiate

[instantiation](#)

30-05-2004

instantiation

<[logic](#)> 1. In [predicate](#) logic, to remove a quantifier from a [wff](#) and either leave the previously bound variables free or replace them with constants.

See [generalization](#), [quantifier](#)

Existential instantiation

Instantiation from the existential quantifier. For example, to move from statements like $(\exists x)Px$ to Px or Pa ; from "something is purple" to "x is purple" or "alabaster is purple". Valid only under several restrictions.

Universal instantiation

Instantiation from the existential quantifier. For example, to move from statements like $(x)Px$ to Px or Pa ; from "everything is purple" to "x is purple" or "alabaster is purple". Valid without restriction.

[Glossary of First-Order Logic]

<[programming](#)>

2. Producing a more defined version of some object by replacing variables with values (or other variables).

3. In object-oriented programming, producing a particular [object](#) from its [class template](#). This involves allocation of a structure with the types specified by the template, and initialisation of [instance variables](#) with either default values or those provided by the class' [constructor](#) function.

4. In [unification](#), (as used in [logic programming](#), [type checking](#) and [type inference](#)), binding a [logic variable](#) ([type variable](#)) to some value (type).

[[FOLDOC](#)]

16-03-2001

instrumental

<[ethics](#), [instrumentalism](#), [hedonism](#)> a feature of values or valued things which is [extrinsic](#): had by things insofar as they are not desirable or commendable in and of themselves but rather for the [sake](#) of, or as a [means](#) to, something else. Money (which gets its [value](#) from enabling us to purchase good) and medical treatment (which is valuable for the health it maintains or restores) are classic examples of extrinsic or instrumental goods. Contrast: [intrinsic](#).

[[Philosophical Glossary](#)]

22-06-2001

integer

<[mathematics](#)> (Or "whole number") One of the finite numbers in the infinite set

..., -3, -2, -1, 0, 1, 2, 3, ...

An [inductive definition](#) of an integer is a number which is either zero or an integer plus or minus one. An integer is a number with no fractional part. If written in as a fixed-point number, the part after the decimal (or other base) point will be zero.

A [natural number](#) is a non-negative integer.

[[FOLDOC](#)]

16-03-2001

integers

[integer](#)

30-05-2004

integrated circuit

<electronics> (IC, or "chip") A microelectronic [semiconductor](#) device consisting of many interconnected transistors and other components. ICs are constructed ("fabricated") on a small rectangle (a "die") cut from a Silicon (or for special applications, Sapphire) wafer. This is known as the "substrate". Different areas of the substrate are "doped" with other elements to make them either "p-type" or "n-type" and polysilicon or aluminium tracks are etched in one to three layers deposited over the surface. The die is then connected into a package using gold wires which are welded to "pads", usually found around the edge of the die.

Integrated circuits can be classified into analogue, digital and hybrid (both analogue and digital on the same chip).

Digital integrated circuits can contain anything from one to millions of [logic gates](#) - [inverters](#), [AND](#), [OR](#), [NAND](#) and [NOR](#) gates, flip-flops, [multiplexors](#) etc. on a few square millimetres. The small size of these circuits allows high speed, low power dissipation, and reduced manufacturing cost compared with board-level integration.

The first integrated circuits contained only a few [transistors](#). Small Scale Integration ([SSI](#)) brought circuits containing transistors numbered in the tens. Later, Medium Scale Integration ([MSI](#)) contained hundreds of transistors. Further development lead to Large Scale Integration ([LSI](#)) (thousands), and VLSI (hundreds of thousands and beyond). In 1986 the first one [megabyte RAM](#) was introduced which contained more than one million transistors.

LSI circuits began to be produced in large quantities around 1970 for computer main memories and pocket calculators. For the first time it became possible to fabricate a [CPU](#) or even an entire [microprocessor](#) on a single integrated circuit. The most extreme technique is wafer-scale integration which uses whole uncut wafers as components.

[Where and when was the term "chip" introduced?]

[FOLDOC]

16-03-2001

integrationist

<ethics> any position which attempts to reconcile apparently conflicting tendencies or [values](#) into a single framework. Integrationist positions are contrasted with separatist positions, which advocate keeping groups (usually defined by race, ethnicity, or gender) separate from one another.

26-03-2001

integrity constraint

<database> A [constraint](#) (rule) that must remain true for a [database](#) to preserve [integrity](#). Integrity constraints are specified at database creation time and enforced by the [database management system](#).

Examples from a genealogical database would be that every individual must be their parent' s child or that the can have no more than two natural parents.

[FOLDOC]

16-03-2001

intellectual property

<legal> (IP) the ownership of ideas and control over the tangible or virtual representation of those ideas. Use of another person' s intellectual property may or may not involve royalty payments or permission, but shoul always include proper credit to the source.

[FOLDOC]

16-03-2001

intellectualism

<[ethics](#), [philosophy](#)> the first historical figure who is usually called an intellectualist is [Socrates](#) (470-399 BC), since he enunciated the principle that "knowledge is sufficient for excellence" - in other words, that one will do what is right or best just as soon as one truly understands what is right or best. As an approach to philosophy and to values, the word intellectualism often has the same meaning as philosophical or psychological [rationalism](#) and commonly has the same negative connotations of over-reliance on theoretical models to the detriment of practical living.

(References from [Platonism](#) and [Socraticism](#).)

[[The Ism Book](#)]

Edited by Giovanni Benzi

25-03-2001

intensional

<[logic](#)> having, or presupposing, a use of terms that relates not to the [extension](#) (that is, the individual things that actually happen to fall under these terms in this world) but determines what could or could not fall under the term (in for example any [possible world](#)).

E.g. the extension of "having a heart" and "having a kidney" is the same in this world because in fact all creatures that have one have the other. But the intension is not the same because a creature with one feature might not have the other. [extension](#)

[[A Philosophical Glossary](#)]

05-06-2001

intention-in-action

<[philosophy of mind](#)> the intentional or mental component of an [action](#). The intention in [action](#) causes, and is contemporaneous with, the [agent'](#)s bodily movement or state that is its condition of [satisfaction](#). Introduced by Searle in 1983.

See also [intentionality](#), [prior intention](#), [Background](#), [phenomenological critique of representationalism](#), [will](#)

Daniel Barbiero

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

intentional phenomena

[intentionality](#)

30-05-2004

intentional phenomenon

[intentionality](#)

30-05-2004

intentional state

[intentionality](#)

30-05-2004

intentional states[intentionality](#)

30-05-2004

intentionalism

<[metaphysics](#), [philosophy of mind](#)> the principle that consciousness is always consciousness of something, that is, of some aspect of reality. This idea is common to most varieties of epistemological [realism](#). A different formulation defines "intentionalism" as the thesis that all mental states are [representational](#) states. Specifically, raw feels and [qualia](#), are said to have representational content.

Based on [[Dictionary of Philosophy of Mind](#)] and [[The Ism Book](#)]

Edited by Giovanni Benzi

25-04-2001

intentionality

<[gnoseology](#), [moral philosophy](#)> the characteristic feature of [cognitive states](#) - that they invariably represent or are about something beyond themselves. The [intentions](#) of a [moral agent](#) are, therefore, the [states of mind](#) that accompany its actions.

Recommended Reading:

Daniel C. Dennett, *The Intentional Stance* (MIT, 1989); William Lyons, *Approaches to Intentionality* (Oxford, 1998);

John R. Searle, *Intentionality* (Cambridge, 1983); Robert C. Stalnaker, *Context and Content: Essays on Intentionality in Speech and Thought* (Oxford, 1999); Hubert L. Dreyfus, *Husserl, Intentionality and Cognitive Science* (Bradford, 1990);

Edward N. Zalta, *Intentional Logic and the Metaphysics of Intentionality* (MIT, 1988);

Michael Bratman, *Faces of Intention: Selected Essays on Intention and Agency* (Cambridge, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

18-02-2004

intentionality derived

<[philosophy of mind](#)> the power of a [system](#) (e.g. the mind) to be "about" something if that power is derived from that system' s connection to another, already intentional system.

Language' [sntentionality](#) is said to be derived from that of the mind.

Alan J. Laser

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

interactionism

<[history of philosophy](#), [metaphysics](#)> the supposition, defended by [Descartes](#) and others, that the [minds](#) and [bodies](#) of [human beings](#) exert direct causal influence on each other, even though they are distinct [substances](#) of different kinds.

Recommended Reading:

The Incorporated Self, ed. by Michael O' DonovanAnderson (Rowman & Littlefield, 1996);

Karl Popper, *Knowledge and the Body-Mind Problem: In Defence of Interaction* (Routledge, 1996);

Matthew Buncombe, *The Substance of Consciousness: An Argument for Interactionism* (Avebury, 1995).

[[A Dictionary of Philosophical Terms and Names](#)]

18-02-2002

interactive

<PI> A term describing a program whose input and output are interleaved, like a conversation, allowing the user' s input to depend on earlier output from the same run.

The interaction with the user is usually conducted through either a text-based interface or a [graphical user interface](#). Other kinds of interface, e.g. using [speech recognition](#) and/or [speech synthesis](#), are also possible.

This is in contrast to [batch](#) processing where all the input is prepared before the program runs and so cannot depend on the program' s output.

[FOLDOC]

16-03-2001

interface

<jargon> A boundary across which two systems communicate. An interface might be a hardware connector used to link to other devices, or it might be a convention used to allow communication between two software systems. Often there is some intermediate component between the two systems which connects their interfaces together. For example, two EIA-232 interfaces connected via a serial cable.

See also [graphical user interface](#), [Application Program Interface](#).

[FOLDOC]

16-03-2001

internalism

<philosophy of mind> internalists hold that mental events supervene only on physical events internal to the body of the subject of those mental events. Also known as individualism.

See also [supervenience](#), [externalism](#).

P. Mandik

Chris Eliasmith - [\[Dictionary of Philosophy of Mind\]](#) Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

Internet

<networking>

1. (Note: not capitalised)

Any set of networks interconnected with [routers](#). The [Internet](#) is the biggest example of an internet.

2. (Note: capital "I").

The Internet is the largest [internet](#) (with a small "i") in the world. It is a three level [hierarchy](#) composed of [backbone networks](#) (e.g. [ARPAnet](#), [NSFNet](#), [MILNET](#)), mid-level networks, and [stub networks](#). These include commercial (.com or .co), university (.ac or .edu) and other research networks (.org, .net) and military (.mil) networks and span many different physical networks around the world with various [protocols](#), chiefly the [Internet Protocol](#).

Until the advent of the World-Wide Web in 1990, the Internet was almost entirely unknown outside universities and corporate research departments and was accessed mostly via [command line](#) interfaces such as [telnet](#) and [FTP](#). Since then it has grown to become an almost-ubiquitous aspect of modern information systems, becoming highly commercial and a widely accepted medium for all sort of customer relations such as advertising, brand building, and online sales and services. Its original spirit of cooperation and freedom have, to a great extent, survived this explosive transformation with the result that the vast majority of information available on the Internet is free of charge.

While the web (primarily in the form of [HTML](#) and [HTTP](#)) is the best known aspect of the Internet, there are many other [protocols](#) in use, supporting applications such as [electronic mail](#), [Usenet](#), [chat](#), [remote login](#), and [file transfer](#).

There were 20,242 unique commercial domains registered with [InterNIC](#) in September 1994, 10% more than in August 1994. In 1996 there were over 100 [Internet access providers](#) in the US and a few in the UK (e.g. the [BBC Networking Club](#), [Demon](#), [PIPEX](#)).

There are several bodies associated with the running of the Internet, including the [Internet Architecture Board](#),

the [Internet Assigned Numbers Authority](#), the [Internet Engineering and Planning Group](#), [Internet Engineering Steering Group](#), and the [Internet Society](#).

See also [NYsernet](#), [EUNet](#).

The Internet Index <http://www.openmarket.com/intindex> - statistics about the Internet.

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16-03-2001

interpolation

<[mathematics](#), [algorithm](#)> A mathematical procedure which estimates values of a [function](#) at positions between listed or given values. Interpolation works by fitting a "curve" (i.e. a function) to two or more given points and then applying this function to the required input. Example uses are calculating [trigonometric functions](#) from tables and audio waveform synthesis.

The simplest form of interpolation is where a function, $f(x)$, is estimated by drawing a straight line ("linear interpolation") between the nearest given points on either side of the required input value:

$$f(x) \sim f(x_1) + (f(x_2) - f(x_1))(x - x_1)/(x_2 - x_1)$$

There are many variations using more than two points or higher degree [polynomial](#) functions. The technique can also be extended to functions of more than one input.

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16-03-2001

interpolation theorem

<[logic](#)> If $\models (A \Rightarrow B)$, and if A and B share at least one propositional symbol, then there is a [wff](#) C all of whose propositional symbols occur in A and B such that $\models (A \Rightarrow C)$ and $\models (C \Rightarrow B)$.

A syntactic version of the [theorem](#) replaces " \models " with " \vdash ".

[Glossary of First-Order Logic]

16-03-2001

interpretation

<[logic](#)> The assignment of objects from the domain to the constants of a formal language, truth-values to the proposition symbols, truth-functions to the connectives, other [functions](#) to the [function](#) symbols, and extensions to the [predicates](#) (when these extensions consist of subsets of the domain).

These assignments are made by the human logician and are not native to the symbols of the [formal language](#). These assignments can be captured by a [function](#) f so that (for example) for a constant, $f(c) =$ object d from domain D ; for a proposition, $f(p) =$ true; for a truth-function, $f(\Rightarrow) =$ material implication; for a [function](#), $f(g) =$ squaring the successor; or for a [predicate](#), $f(P) =$ the set of purple things. In propositional logic, an interpretation is just such a [function](#); in [predicate](#) logic, it is some set (the domain) together with such a [function](#) defined for members of that domain.

Cardinality of an interpretation

The cardinality of the domain of the interpretation.

See [domain](#), [model](#), [model theory](#)

Normal interpretation

An interpretation for systems with identity in which the relation of identity is assigned to the symbol "=" or some other 2-adic [predicate](#).

See first-order theory with identity, model, normal, [predicate logic with identity](#)

[Glossary of First-Order Logic]

16-03-2001

intersection of sets

<[logic](#)> The intersection of two sets, A and B, is the set of elements that are members of both A and B. Notation: $A \cap B$, or sometimes, AB . Also called the product of A and B. $A \cap B = \{x : (x \in A) \wedge (x \in B)\}$

[Glossary of First-Order Logic]

16-03-2001

intertextuality

<[linguistics](#), [philosophy](#), [semantic theory](#)> the complex mosaic of relationships by means of which [signifiers](#) have [meaning](#) in the [semantic theories](#) of [Lyotard](#) and [Kristeva](#).

Recommended Reading:

Graham Allen, *Intertextuality* (Routledge, 2000); *Criticism, History, and Intertextuality*, ed. by Richard Fleming and Michael Payne (Bucknell, 1987);

Michael Worton and Judith Still, *Intertextuality: Theories and Practices* (Manchester, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

18-02-2002

intrinsic - extrinsic

<[philosophy of science](#), [epistemology](#), [ethics](#)> distinction between the [features](#) of things. The [intrinsic features](#) of a thing are those which it has in and of itself; while its [extrinsic features](#) are those which it has only in its relation to something else. Thus, for example, I am intrinsically a human being, but only extrinsically a father. It might reasonably be disputed whether my being male is an intrinsic biological feature or an extrinsic cultural construction. In [epistemology](#), the distinction between [primary and secondary qualities](#) points out the difference between the [intrinsic and the extrinsic properties](#) of [material objects](#), and in [normative ethics](#), [deontologists](#) and [consequentialists](#) disagree about whether the [moral value](#) of [human actions](#) resides in their [intrinsic](#) or their [extrinsic features](#).

Recommended Reading:

Noah M. Lemos, *Intrinsic Value: Concept and Warrant* (Cambridge, 1994)

Michael J. Zimmerman, *The Nature of Intrinsic Value* (Rowman & Littlefield, 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

18-02-2002

intrinsicism

<[epistemology](#), [ethics](#)> intrinsicism in [epistemology](#) claims that our evaluations of things as true or valuable are not affected by our nature as human beings, but that truth and values exist out there in reality, divorced from human interests and concerns. A classic example is the intrinsic theory of value in the economic thought of the Middle Ages, which held that there is one natural, intrinsically-correct price for each product in the world. This example shows the principle that intrinsicism is frequently the flip side of [subjectivism](#), since the "natural price" was the price that the authorities or the guilds set up for themselves according to their own interests. Forms of [objectivism](#) attempt to offer workable alternatives to the false dichotomy of intrinsicism vs. subjectivism. (References from [conceptualism](#), [idealism](#), [intuitionism](#), [Kantianism](#), [objectivism](#), [perspectivism](#), [Platonism](#), [realism](#), and [subjectivism](#).)

[[The Ism Book](#)]

Edited by Giovanni Benzi

25-03-2001

intuitionism

<[logic](#), [philosophy of science](#), [moral philosophy](#)> reliance on unmediated [awareness](#) as a criterion of [truth](#). In [logic](#) and [mathematics](#), [intuitionism](#) denies the [independent reality](#) of [mathematical objects](#) and the principle of [excluded middle](#). In [moral philosophy](#), [intuitionism](#) is the [metaethical theory](#) that [moral judgments](#) are made by reference to a direct, non-inferential [awareness](#) of [moral value](#). [Ethical intuitionists](#) usually hold that we recognize our duties in the specific features of particular [moral decisions](#).

Recommended Reading:

Gisele Fischer Servi, *Intuitionism and Models of Cognition* (Giro, 1996);
 Michael Dummett, *Elements of Intuitionism* (Oxford, 2000);
 Grant C. Sterling, *Ethical Intuitionism and Its Critics* (Peter Lang, 1994);
 James Q. Wilson, *Moral Intuitions* (Transaction, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

22-10-2003

intuitionism (b)

<[ethics](#), [philosophy of mathematics](#)>

1. in [ethics](#) the term refers to the doctrine (popular in Britain around the turn of the century) that all of our moral judgments are made through an appeal to our moral intuitions or "moral sense". This ethical doctrine is derived from a more general idea in [epistemology](#) dating back to [Plato](#): namely, a radical [intrinsicism](#) which holds that all of our [knowledge](#) is gained through [intuition](#), immediate insight, or spiritual vision of a transcendent higher reality. In addition, the movement of ethical intuitionism picked up on the ideas of the earlier "moral sense theorists" such as David [Hume](#) (1711-1776) and Adam [Smith](#) (1723-1790). Even though intuitionism is a form of intrinsicism, it ends up being a kind of [subjectivism](#), in which the justification for ethical [values](#) is the fact that a certain person or philosopher thinks they are true. Historically, intuitionism has tended to be a kind of [deontologism](#), although the cause may have been simply the beliefs of the intuitionists themselves and not anything about intuitionism in general.

(References from [emotionalism](#) and [mysticism](#).)

[[The Ism Book](#)]

2. in [philosophy of mathematics](#) see [intuitionistic logic](#)

Edited by Giovanni Benzi

28-04-2001

intuitionistic logic

<[logic](#), [mathematics](#)> Brouwer' s foundational theory of mathematics which says that you should not count proof of (There exists x such that P(x)) valid unless the proof actually gives a method of constructing such an x. Similarly, a proof of (A or B) is valid only if it actually exhibits either a proof of A or a proof of B.

In intuitionism, you cannot in general assert the statement (A or not-A) (the principle of the [excluded middle](#)); (A or not-A) is not proven unless you have a proof of A or a proof of not-A. If A happens to be [undecidable](#) in your system (some things certainly will be), then there will be no proof of (A or not-A). This is pretty annoying; some kinds of perfectly healthy-looking proofs by contradiction just stop working. Of course, excluded middle is a theorem of [classical logic](#) (i.e. non-intuitionistic logic).

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16-03-2001

invariant

<[P](#)> A rule, such as the [ordering](#) of an ordered list or [heap](#), that applies throughout the life of a data structure or procedure. Each change to the data structure must maintain the correctness of the invariant.

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16-03-2001

inverse

<[mathematics](#)> Given a [function](#), $f : D \rightarrow C$, a function $g : C \rightarrow D$ is called a left inverse for f if for all d in D , $g(f(d)) = d$ and a right inverse if, for all c in C , $f(g(c)) = c$ and an inverse if both conditions hold. Only an [injection](#) has a left inverse, only a [surjection](#) has a right inverse and only a [bijection](#) has inverses. The inverse of f is often written as f^{-1} .

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16-03-2001

Irigaray Luce

<[history of philosophy](#), [biography](#)> french psycholinguist and philosopher (1932-), author of *Passions Elementaires* (Elemental Passions) (1982), *Ethique de la Difference Sexuelle* (An Ethics of Sexual Difference) (1984), *Je, Tu, Nous: Pour une Culture de la Difference* (Je, Tu, Nous: Toward a Culture of Difference) (1990). Irigaray examines the systematic suppression of feminine and maternal concerns from the history of [Western philosophy](#) in *Ce sexe qui en est pas un* (This sex which is not one) (1977), arguing that valorization of the masculine is destructive to the fluid multiplicity of feminine sexuality. Her essays often try to convey the significance of subjectivity by modifying the conventions of putatively 'objective' speech. In *Speculum de l' a femme* (Speculum of the Other Woman) (1974), Irigaray argues that women can de-center the "master discourse" of linguistic communication by affirming their [biological duality](#). Recent translations of Irigaray's work include *Sexes and Genealogies* (1993), *To Be Two* (2001), *Speech is Never Neuter* (2001), and *Democracy Begins Between Two* (2001).

Recommended Reading:

The Irigaray Reader, tr. and ed. by Margaret Whitford and David Macey (Blackwell, 1991);
Joan Nordquist, *French Feminist Theory: Luce Irigaray and Helene Cixous: A Bibliography* (Ref. & Res., 1991);
Margaret Whitford, *Luce Irigaray: Philosophy in the Feminine* (Routledge, 1991);
Engaging with Irigaray, ed. by Carolyn Burke, Naomi Schor, and Margaret Whitford (Columbia, 1994);
Tina Chanter, *Ethics of Eros: Irigaray's Rewriting of the Philosophers* (Routledge, 1995);
Tamsin E. Lorraine, *Irigaray & Deleuze: Experiments in Visceral Philosophy* (Cornell, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

12-01-2002

irony

<[philosophy](#), [psychology](#), [linguistics](#)> use of language to convey something entirely different from its [literal meaning](#). Thus, [Socrates](#) professed an ignorance that was the mark of [true wisdom](#), and [Kierkegaard](#) often tried to provoke his readers by writing exactly the opposite of what he intended for them to believe.

Recommended Reading:

Soren Kierkegaard, *The Concept of Irony*, tr. by Howard V. Hong (Princeton, 1992);
Alexander Nehamas, *The Art of Living: Socratic Reflections from Plato to Foucault* (California, 2000); David
Wisdo, *The Life of Irony and the Ethics of Belief* (SUNY, 1992);
Richard Rorty, *Contingency, Irony and Solidarity* (Cambridge, 1989).

[[A Dictionary of Philosophical Terms and Names](#)]

18-02-2002

irrational number

<[mathematics](#)> A [real number](#) which is not a [rational number](#), i.e. it is not the ratio of two [integers](#). In decimal notation, they are the fractions represented by infinite, non-repeating decimal expansions. Examples of irrational numbers are [pi](#), [e](#) and the square root of two.

16-03-2001

irrefutable

The opposite of [refutable](#).

30-05-2004

irrelevant conclusion

<[logic](#), [philosophy of science](#), [ignoratio elenchi](#)> reasoning that misses the point. The [informal fallacy](#) of defending the [truth](#) of a proposition by appeal to an [argument](#) that is actually concerned with something else. Example: "Parents with large incomes can buy lots of things for their children. Therefore, the children of wealthy parents are happy".

[[A Dictionary of Philosophical Terms and Names](#)]

18-01-2002

isochronous

<[communications](#)> /i:-sok' rrf's/ A form of data transmission that guarantees to provide a certain minimum [data rate](#), as required for time-dependent data such as [video](#) or [audio](#).

Isochronous transmission transmits asynchronous data over a synchronous data link so that individual characters are only separated by a whole number of bit-length intervals. This is in contrast to [asynchronous](#) transmission, in which the characters may be separated by arbitrary intervals, and with [synchronous](#) transmission [which does what?].

[Asynchronous Transfer Mode](#) and [High Performance Serial Bus](#) can provide isochronous service.

Compare: [plesiochronous](#).

[ANIXTER, LAN Magazine 7.93]

[Better explanation?]

[[FOLDOC](#)]

16-03-2001

isochronous transfer

[isochronous](#)

30-05-2004

isometry

<[mathematics](#)> A [mapping](#) of a [metric space](#) onto another or onto itself so that the distance between any two points in the original space is the same as the distance between their images in the second space. For example, any combination of rotation and translation is an isometry of the plane.

[[FOLDOC](#)]

16-03-2001

isomorphic

<[mathematics](#)> Two mathematical objects are isomorphic if they have the same structure, i.e. if there is an [isomorphism](#) between them. For every component of one there is a corresponding component of the other.

[[FOLDOC](#)]

16-03-2001

isomorphism

<mathematics> A [bijjective map](#) between two objects which preserves, in both directions, any structure under consideration. Thus a 'group isomorphism' preserves group structure; an order isomorphism (between [posets](#)) preserves the order relation, and so on. Usually it is clear from context what sort of isomorphism is intended.

[FOLDOC]

16-03-2001

isomorphism class

<mathematics> A collection of all the objects [isomorphic](#) to a given object. Talking about the isomorphism class (of a [poset](#), say) ensures that we will only consider its properties as a poset, and will not consider other incidental properties it happens to have.

[FOLDOC]

16-03-2001

isomorphism of models

<logic> Roughly, when models are identical in form and differ (if at all) only in content. Or when their domains map onto one another in the sense that their elements can be put into one-to-one correspondence and they stand in the same relations. To define isomorphism more precisely, let us say that D and D' are the domains of the two models under comparison, that for every member d of D there is a counterpart d' of D' and vice versa that every [function](#) f defined for D has a counterpart [function](#) f' defined for D' and vice versa, and that every [predicate](#) P defined for D has a counterpart [predicate](#) P' defined for D' and vice versa. Now the two models are isomorphic iff these three conditions are met: (1) D and D' can be put into one-to-one correspondence, (2) for all [functions](#) f and f' , $f(d_1 \dots d_n) = d_{n+1}$ iff $f'(d'_1 \dots d'_n) = d_{n+1}$ and (3) for [predicates](#) P and P' , $P d_1 \dots d_n$ iff $P' d'_1 \dots d'_n$.

See [categoricity of systems](#), Löwenheim-Skolem theorem

[Glossary of First-Order Logic]

16-03-2001

IT

1. <PI> [information technology](#).
2. <language, mathematics, history> [Internal Translator](#).

[FOLDOC]

16-03-2001

iteration

<PI> Repetition of a sequence of instructions. A fundamental part of many [algorithms](#). Iteration is characterised by a set of initial conditions, an iterative step and a termination condition.

A well known example of iteration in mathematics is Newton-Raphson iteration.

Iteration in programs is expressed using [loops](#), e.g. in C:

```
new_x = n/2;
```

```
do x = new_x; new_x = 0.5 * (x + n/x); while (abs(new_x-x) > epsilon);
```

Iteration can be expressed in functional languages using recursion:

```
solve x n = if abs(new_x-x) > epsilon
```

```
then solve new_x n
```

```
else new_x
```

```
where new_x = 0.5 * (x + n/x) solve n/2 n
```

[FOLDOC]

16-03-2001

James, William

James, William (1842-1909)

William James was raised in a highly intellectual household: his father Henry, Sr. was a Swedenborgian theologian, his sister Alice wrote lengthy, literary diaries, and his brother Henry, Jr. became a renowned novelist. William himself studied art and geology before receiving a professional medical degree from Harvard university, where he taught for thirty-five years. Despite an energetic constitution, James struggled throughout life with such severe bouts of hypochondria, melancholy, and depression that he regarded himself as persisting only by means of a deliberate effort of will. Upon his death, however, a friend expressed great respect for James' s wisdom, integrity, and equanimity.

Work in psychology with Hugo Munsterburg at Harvard resulted in publication of James' s Principles of Psychology (1890), the classic exposition of a discipline in transition from reliance upon anecdotal introspection toward its experimental foundations as a natural science. James himself emphasized the notion of the individual self or person as a continuous "stream of consciousness" capable of exercising free will.

In **Pragmatism: A New Name for some Old Ways of Thinking** (1907) James offered significant expansions of C.S. Peirce' s philosophy of pragmatism. He not only accepted Peirce' s method of using pragmatic meaning to resolve dispute, but also spelled out a pragmatic theory of truth as whatever is "expedient in the way of our thinking." During the same period, James wrote the mature expression of his epistemological principles that was published posthumously in *Essays in Radical Empiricism* (1912). There, his application of empirical principles results in neutral monism as a foundation for a phenomenalist analysis of human experience. Since for James it was the consequences of believing that matter, he argued in "The Will to Believe" (1897) that belief must remain an individual process and that we may rationally choose to believe some crucial propositions even though they lie beyond the reach of reason and evidence. This position has important implications for religious convictions in particular, which James explored in detail in *The Varieties of Religious Experience* (1902). A frequent commentator on public affairs, James proposed a system of national voluntary service in *The Moral Equivalent of War* (1906).

Recommended Reading:

Primary sources:

William James, *Works*, ed. by Frederick Burkhardt (Harvard, 1975-);
 William James, *Pragmatism and Other Writings* (Penguin, 2000);
 William James, *Essays in Radical Empiricism*, ed. by Ellen Kappy Suckiel (Nebraska, 1996);
 William James, *The Meaning of Truth* (Prometheus, 1997);
 William James, *Principles of Psychology* (Dover, 1955), Vol 1, 2;
 William James, *The Will to Believe and Human Immortality* (Dover, 1985);
 William James, *The Varieties of Religious Experience* (Random House, 1999).

Secondary sources:

Howard M. Feinstein, *Becoming William James* (Cornell, 2000);
The Cambridge Companion to William James, ed. by Ruth Anna Putnam (Cambridge, 1997);
 Charlene Haddock Seigfried, *Pragmatism and Feminism: Reweaving the Social Fabric* (Chicago, 1996);
 Ralph Barton Perry, *The Thought and Character of William James*, ed. by Charlene Haddock Seigfried (Vanderbilt, 1996).

Additional on-line information about James includes:

The comprehensive James Site from Frank Pajares.
 T. L. S. Sprigge' s article in *The Oxford Companion to Philosophy*.

Also see: American philosophy, emotion and feeling, empiricism, Harvard philosophy, philosophy of mind, the pragmatic theory of truth, pragmatism, the stream of consciousness, tender- and tough-minded, and the will to believe.

The thorough collection of resources at EpistemeLinks.com.
 Russell Goodman' s article in *The Stanford Encyclopedia of Philosophy*.
 Owen Thomas' s collection of links to online material on James.
 The article in the *Columbia Encyclopedia* at Bartleby.com.
 R. H. Albright' s lofty assessment of the work of James.
 Snippets from James in *The Oxford Dictionary of Quotations*.
 An article by Tadeusz Zawidzki in *The Dictionary of the Philosophy of Mind*.
 Excellent on-line resources on James (en Español) from Gustavo Parra.
 A brief entry (with his brother) in *The Macmillan Encyclopedia* 2001.

24-10-2003

Jansenism

Theological belief that obedience to divine will is possible only for those on whom god has already chosen to bestow grace, leaving no room for the exercise of human freedom. This view was originated by Dutch bishop Cornelius Jansen (1585-1638) and defended against Jesuit attacks by members of the Port-Royal community, including Arnauld and Pascal.

Recommended Reading:

Leszek Kolakowski, *God Owes Us Nothing: A Brief Remark on Pascal's Religion and on the Spirit of Jansenism* (Chicago, 1998);
William Doyle, *Jansenism: Catholic Resistance to Authority from the Reformation to the French Revolution* (Palgrave, 2000).

24-10-2003

Jargon File

<[source](#)> The on-line hacker Jargon File. A large collection of (often amusing) definitions of computing terms.

Many definitions in this dictionary are from v3.0.0 of 1993-07-27.

Current version: 4.0.0 (1996-07-25), as of 1998-02-22, corresponds to the third paper edition entitled "The New Hacker's Dictionary", due out in September 1996.

The file is available through ftp at any of the GNU archives as jarg400.txt.

Home (<http://www.tuxedo.org/jargon/>).

See also Yellow Book, Jargon.

30-10-2003

Jaspers, Karl Theodor

(1883-1969) German physician, psychiatrist, and philosopher educated at Heidelberg and Göttingen. In *Philosophie* (1931), *Von der Wahrheit* (On Truth) (1947), and *Einführung in die Philosophie* (Way to Wisdom) (1950) Jaspers developed a version of [existentialism](#) in which the effort to understand our concrete existence leads from careful self-analysis to a personal quest for authenticity in relation to the transcendent "Encompassing." Jaspers also wrote on topics in the history of philosophy in *Vom Ursprung und Ziel der Geschichte* (On the Origin and Goal of History) (1949) and *Die großen Philosophen* (The Great Philosophers) (1957). He also commented on the national emotions associated with the aftermath of World War II in *Die Schuldfrage* (The Question of German Guilt) (1946). A basic statement of his philosophical development may be found in *On My Philosophy* (1941).

Recommended Reading:

Karl Jaspers: *Basic Philosophical Writings: Selections* (Humanity, 1994);
Karl Jaspers, *Philosophy of Existence*, tr. by Richard F. Grabau (Pennsylvania, 1971);
Karl Jaspers, *Reason and Existenz: Five Lectures* (Marquette, 1997);
Hannah Arendt / Karl Jaspers *Correspondence 1926-1969*, ed. by Lotte Kohler and Hans Saner (Harcourt Brace, 1993);
Philosophy of Karl Jaspers, ed. by Lewis Edwin Hahn (Open Court, 1981);
Richard Wisser, *Karl Jaspers: Philosoph unter Philosophen*, ed. by Leonard H. Ehrlich (Rodopi, 1993);
Karl Jaspers Today, ed. by Leonard H. Ehrlich and Richard Wisser (UPA, 1988).

24-10-2003

Jefferson, Thomas

(1743-1826) American political leader. Jefferson's draft for the Declaration of Independence (1776) and his *Autobiography* (1821) reflect thorough absorption of the philosophical and political views of John [Locke](#), many of which he shared with other American founders.

Recommended Reading:

Allen Jayne, *Jefferson's Declaration of Independence: Origins, Philosophy, and Theology* (Kentucky, 2000);
Garrett Ward Sheldon, *The Political Philosophy of Thomas Jefferson* (Johns Hopkins, 1993);
Daniel J. Boorstin, *The Lost World of Thomas Jefferson* (Chicago, 1993).

24-10-2003

join

1. <[database](#)> inner join (common) or outer join (less common).
2. <[theory](#)> [least upper bound](#).

[FOLDOC]

30-10-2003

Joint Method of Agreement and Difference

One of [Mill](#)' s Methods for the discovery of a causal relationship. If an antecedent circumstance is invariably present when, but only when, a phenomenon occurs, it may be inferred to be the [cause](#) of that phenomenon. Example: "The seventeen students who attended the review session earned grades of C or better on the final exam, while the eleven students who did not earned grades of D or F. Therefore, attending the review session was an effective way to prepare for the final exam."

Recommended Reading:

John Stuart Mill, System of Logic (Classworks, 1986).

24-10-2003

joint occurrence

The complex event comprising the occurrence of both of its constituent events. The probability of a joint occurrence is calculated by the formula:

$$P(A \cdot B) = P(A) \times P(B, \text{ if } A)$$

Thus, for example, the chances of getting "heads" both times on two tosses of a coin are equal to the chances of getting "heads" on the first toss (1/2) times the chances of getting "heads" on the second toss (1/2), or 1/4.

Recommended Reading:

Richard Lowry, The Architecture of Chance: An Introduction to the Logic and Arithmetic of Probability (Oxford, 1989);

Ian Hacking, An Introduction to Probability and Inductive Logic (Cambridge, 2001);

Donald Gillies, Philosophical Theories of Probability (Routledge, 2000).

24-10-2003

judgment

(Ger. Urteil)

The mental act of affirming a proposition or the capacity for distinguishing truth from falsity.

See also [Kant](#)

24-10-2003

Jung, Carl Gustav

(1875-1961) Swiss psychiatrist. Jung rejected [Freudian](#) accounts of infant sexuality as the source of the libido and emphasized a generalized will to live. In Wandlungen und Symbolen der Libido (The Psychology of the Unconscious) (1912), Jung developed a rich account of the unconscious, positing shared primordial "archetypes" as elements established innately in the collective unconscious of all human beings rather than as features of individual personality in The Archetypes and The Collective Unconscious (1926). Such underlying mental contents, Jung claimed in The Association Method (1910), can be observed most easily through the free association of words. A simple statement of his most basic principles may be found in chapter IX of Modern Man in Search of a Soul (1933).

Recommended Reading:

Carl Gustav Jung, Memories, Dreams, Reflections (Vintage, 1989);

The Essential Jung, ed. by Anthony Storr (Princeton, 1999);

The Portable Jung, ed. by Joseph Campbell and R. F. C. Hull (Viking, 1976);

The Cambridge Companion to Jung, ed. by Polly Young-Eisendrath and Terence Dawson (Cambridge, 1997);

Marilyn Nagy, Philosophical Issues in the Psychology of C.G. Jung (SUNY, 1991);

Thomas Mulvihill King, Jung' s Four and Some Philosophers: A Paradigm for Philosophy (Notre Dame, 1999).

24-10-2003

just war theory

The attempt to provide acceptable conditions for international conflict. As developed by [Augustine](#) and [Aquinas](#), just war theory typically distinguishes the conditions under which war may be initiated (*ius ad bellum*), including a legitimate authority exercising a right intention in pursuit of a just cause, from the rules under which war may be conducted (*ius in bello*), including concern with proportionality of the means and discrimination between combatants and non-combatants.

Recommended Reading:

Just War Theory, ed. by Jean Bethke Elshtain (NYU, 1991);
 Richard J. Regan, Just War: Principles and Cases (Catholic U. of A., 1996);
 Paul Christopher, The Ethics of War and Peace: An Introduction to Legal and Moral Issues (Prentice Hall, 1998);
 Paul Ramsey, Speak Up for Just War or Pacifism (Penn. State, 1988).

24-10-2003

Justice

(Gk. *díkê*; Lat. *iustitia*)

Equitable distribution of goods and evils, including reward and punishment. After surveying alternative notions of the virtue of justice (Gk. *dikaiôsunê*), [Plato](#) defined it as the harmonious function of diverse elements of society or of the distinct souls within an individual person. Most social philosophers of the Western tradition, however, have followed [Aristotle](#)'s conceptions of retributive and distributive justice. Contemporary discussion often focus on [Rawls](#)'s notion of "justice as fairness."

Recommended Reading:

Richard D. Parry, Plato's Craft of Justice (SUNY, 1996);
 John Rawls, A Theory of Justice (Belknap, 1999); Martha Craven Nussbaum, Sex & Social Justice (Oxford, 2000);
 Michael Walzer, Spheres of Justice: A Defense of Pluralism and Equality (Basic, 1984);
 Randy E. Barnett, The Structure of Liberty: Justice and the Rule of Law (Oxford, 2000).

24-10-2003

justification

What is offered as grounds for believing an assertion. Hence, also, an explanation of the [legitimacy](#) of each step in the formal proof of the validity of a deductive [argument](#).

Recommended Reading:

Empirical Knowledge, ed. by Paul K. Moser (Rowman & Littlefield, 1996);
 Robert Audi, The Structure of Justification (Cambridge, 1993);
 The Justification of Deduction (Oxford, 1974).

24-10-2003

k-validity

<logic> A [wff](#) is k-valid [iff](#) it is true for every interpretation with a domain of exactly k members.

See [logical validity](#), omega-completeness

[Glossary of First-Order Logic]

16-03-2001

Kant Immanuel

<[history of philosophy](#), [biography](#)> Immanuel [Kant](#) (1724-1804) was born in the East Prussian city of Königsberg, studied at its university, and worked there as a tutor and professor for more than forty years, never travelling more than fifty miles from home. Although his outward life was one of legendary calm and regularity [Kant](#)' s intellectual work easily justified his own claim to have effected a Copernican revolution in [philosophy](#). Beginning with his Inaugural Dissertation (1770) on the difference between right- and left-handed spatial orientations, [Kant](#) patiently worked out the most comprehensive and influential philosophical programme of the modern era. His central thesis-that the possibility of human [knowledge](#) presupposes the [active](#) participation of the human mind-is deceptively simple, but the details of its application are notoriously complex. The monumental Kritik der reinen Vernunft (Critique of Pure Reason) (1781, 1787) fully spells out the conditions for [mathematical](#), [scientific](#), and [metaphysical knowledge](#) in its "Transcendental Aesthetic" "Transcendental Analytic" and "Transcendental Dialectic" but [Kant](#) found it helpful to offer a less technical exposition of the same themes in the Prolegomena zu einer jeden künftigen Metaphysik die als Wissenschaft wird auftreten können (Prolegomena to any Future Metaphysics) (1783). Carefully distinguishing [judgments](#) as [analytic](#) or [synthetic](#) and as [a priori](#) or [a posteriori](#), [Kant](#) held that the most interesting and useful varieties of human [knowledge](#) rely upon [synthetic a priori judgments](#), which are, in turn, [possible](#) only when the [mind](#) determines the conditions of its own experience. Thus, it is we who impose the [forms](#) of [space](#) and [time](#) upon all possible [sensations](#) in [mathematics](#), and it is we who render all experience coherent as scientific [knowledge](#) governed by traditional notions of [substance](#) and [causality](#) by applying the pure concepts of the [understanding](#) to all [possible](#) experience. But regulative principles of this sort hold only for the [world](#) as we know it, and since [metaphysical propositions](#) seek a [truth](#) beyond all experience, they cannot be established within the bounds of reason.

Significant applications of these principles are expressed in Metaphysische Anfangsgründe der Naturwissenschaft (Metaphysical Foundations of the Science of Nature) (1786) and Beantwortung der Frage: Ist es eine Erfahrung, dass wir denken? (On Comprehension and Transcendental Consciousness) (1788-1791). [Kant](#)' s moral philosophy is developed in the Grundlegung zur Metaphysik der Sitten (Grounding for the Metaphysics of Morals) (1785). From his [analysis](#) of the [operation](#) of the human will, [Kant](#) derived the necessity of a perfectly universalizable moral law, expressed in a [categorical imperative](#) that must be regarded as binding upon every [agent](#). In the Third Section of the Grounding and in the Kritik der praktischen Vernunft (Critique of Practical Reason) (1788), [Kant](#) grounded this conception of moral autonomy upon our postulation of [god](#), [freedom](#), and immortality.

In later life, [Kant](#) drew [art](#) and [science](#) together under the concept of purpose in the Kritik der Urteilskraft (Critique of Judgment) (1790), considered the consequences of transcendental criticism for [theology](#) in Die Religion innerhalb die Grenzen der blossen Vernunft (Religion within the Limits of Reason Alone) (1793), stated the fundamental principles for civil discourse in Beantwortung der Frage: Was ist Aufklärung? ("What is Enlightenment?") (1784), and made an eloquent plea for international cooperation in Zum ewigen Frieden (Perpetual Peace) (1795).

Recommended Reading:

Primary sources:

Kants gessamelte Schriften, ed. by der Preussischen Akademie der Wissenschaften (de Gruyter, 1902-1956);
Immanuel Kant, Critique of Pure Reason, tr. by Werner S. Pluhar and Patricia Kitcher (Hackett, 1996);
Kant: Critique of Practical Reason, tr. by Lewis W. Beck (MacMillan, 1992);
Immanuel Kant, Critique of Judgment, ed. by Werner S. Pluhar (Hackett, 1987);
Immanuel Kant, Prolegomena to Any Future Metaphysics That Will Be Able to Come Forward As Science, tr. by Paul Carus (Hackett, 1977);
Immanuel Kant, Grounding for the Metaphysics of Morals, tr. by James W. Ellington (Hackett, 1993).

Secondary sources:

Ernst Cassirer, Stephan Korner, and James Haden, Kant' s Life and Thought (Yale, 1986);
Roger Scruton, Kant (Oxford, 1983);
The Cambridge Companion to Kant, ed. by Paul Guyer (Cambridge, 1992);
Ralph C.S. Walker, Kant (Routledge, 1999);
Sebastian Gardner, Routledge Philosophy Guidebook to Kant and the Critique of Pure Reason (Routledge, 1999);
Norman Kemp Smith, Commentary to Kant' s Critique of Pure Reason (Humanity, 1991);
Paul Guyer, Kant and the Claims of Knowledge (Cambridge, 1987);
Jonathan Bennett, Kant' s Analytic (Cambridge, 1966);
Karl Ameriks, Kant' s Theory of Mind: An Analysis of the Paralogisms of Pure Reason (Oxford, 2000);
Kant' s Critique of Pure Reason: Critical Essays, ed. by Patricia Kitcher (Rowman & Littlefield, 1998);
Henry E. Allison, Kant' s Transcendental Idealism: An Interpretation and Defense (Yale, 1986);
Rudolf A. Makkreel, Imagination and Interpretation in Kant: The Hermeneutical Import of the Critique of Judgment (Chicago, 1994);
Feminist Interpretations of Immanuel Kant, ed. by Robin May Schott (Penn. State, 1997);
Roger J. Sullivan, An Introduction to Kant' s Ethics (Cambridge, 1994);
Kant' s Groundwork of the Metaphysics of Morals: Critical Essays, ed. by Paul Guyer (Rowman & Littlefield, 1997);
Christine M. Korsgaard, Creating the Kingdom of Ends (Cambridge, 1996).

Additional on-line information about Kant includes:

Stephen Palmquist' s comprehensive Kant on the Web site.
The thorough collection of resources at EpistemeLinks.com.
The excellent Kant Glossary from Andrew Carpenter.
Richard Lee' s excellent collection of links on Kant.
Henry E. Allison' s article in The Oxford Companion to Philosophy.

Related OCP articles on: aesthetics, the antinomies, apperception, autonomy and heteronomy, the categorical

imperative, duty, ethical formalism, German philosophy, the golden rule, good will, idealism, ideas of reason, immortality, incongruent counterparts, inner sense, Kantian ethics, Kantianism, liberalism, the manifold of sense, philosophy of mathematics, metaphysics, modernism, moral law, moral philosophy, neo-Kantianism, obligation, phenomena and noumena, practical reason, rationality, realism and anti-realism, regulative principles, philosophy of religion, right action, sexual morality, sincerity, space, the sublime, synthetic a priori judgments, thing-in-itself, transcendental analytic, transcendental arguments, virtues, ethical voluntarism, Vorstellung, and will.

Immanuel Kant Information Online, from Das Marburger Kant-Archiv.

G.J. Matthey' s thoughtful summary of Kant' s philosophy.

A section on Kant from Alfred Weber' s history of philosophy.

William Turner' s thorough article in The Catholic Encyclopedia.

Ethics Updates discussion of Kant and Kantian ethics, by Lawrence Hinman.

The article in the Columbia Encyclopedia at Bartleby.com.

Snippets from Kant (German and English) in The Oxford Dictionary of Quotations.

The Bloomsbury Guide to Human Thought on Kantian

Ethics and The Sublime.

A discussion of Kant' s notion of freedom from K roly KÙkai.

A paper on Non-spatiotemporality and the Unknowability of Things in Themselves from JuanAdolfo Bonaccini.

Some Essential Points in Reading The Critique of Pure Reason from Eduardo Shore.

Robert Greenberg on Kant' s Categories.

A Kantian Interpretation of Demonstrative Reference by Wing-Chun Wong.

A philosophical biography from Uwe Wiedemann.

Bj-rn Christensson' s brief guide to Internet resources on Kant.

Robert Sarkissian' s brief summary of Kant' s philosophy.

A brief entry in The Macmillan Encyclopedia 2001.

[\[A Dictionary of Philosophical Terms and Names\]](#)

20-11-2003

Kelsen Hans

<[history of philosophy](#), [biography](#)> Austrian legal [philosopher](#) (1881-1973) who wrote the constitution adopted by the Austrian republic in 1920. [Kelsen](#) rejected both natural law theory and [legal positivism](#) in Allgemeine Staatslehre (General Theory of Law and State) (1925) and Reine Rechtslehre (Introduction to the Problems of Legal Theory) (1934). [Kelsen](#)' s own view, most fully developed in the posthumous Allgemeine Theorie de Normen (General Theory of Norms) (1975), traced the legitimacy of social legislation back to a fundamental "ground rule" (Ger. Grundnorm) whose [universal](#) status is independent of [morality](#).

Recommended Reading:

David Dyzenhaus, Legality and Legitimacy: Carl Schmitt, Hans Kelsen and Hermann Heller in Weimar (Oxford, 2000)

Essays in Honor of Hans Kelsen, ed. by California Law Review Staff (Rothman, 1971).

[\[A Dictionary of Philosophical Terms and Names\]](#)

03-11-2003

Kemerling Garth

<[history of philosophy](#), [biography](#)> American [philosopher](#) (1948-). Since completing a program in the [history](#) of modern philosophy at the University of Iowa in 1974, [Kemerling](#) has taught a variety of undergraduate courses in [philosophy](#), served on the editorial staff of Studies in Short Fiction, and written about [John Locke](#), ethical development, and the practice of teaching [philosophy](#). During the past several years, he has been occupied chiefly with the development of these on-line materials in support of philosophical learning.

For additional information, see the curriculum vitae elsewhere on this site.

[\[A Dictionary of Philosophical Terms and Names\]](#)

03-11-2003

Kepler Johannes

<[history of philosophy, biography](#)> German astronomer (1571-1630) who modified the heliocentric views of [Copernicus](#) by postulating that planets move in elliptical (not circular) orbits with the sun at one focus, each of them sweeping through arcs of equal area in equal times. Despite his penchant for neoplatonic explanations, [Kepler](#)' s achievement, published in Astronomia Nova (A New Astronomy based on Causes) (1609) an Harmonia Mundi (The Harmony of the World) (1618), provided an important step toward the comprehensive mathematical [theory](#) of celestial motion developed by [Newton](#).

Recommended Reading: Johannes Kepler, Epitome of Copernican Astronomy, tr. by Charles Glenn Wallis (Prometheus, 1995);
Max Caspar, Kepler, tr. by C. Doris Hellman (Dover, 1993);
Bruce Stephenson, Kepler' s Physical Astronomy (Princeton, 1994);
Charlotte Methuen, Kepler' s Tuebingen: Stimulus to a Theological Mathematics (Ashgate, 1998);
Alexandre Koyre, Astronomical Revolution: Copernicus - Kepler - Borelli (Dover, 1992).

[[A Dictionary of Philosophical Terms and Names](#)]

03-11-2003

kernel

(Note: NOT "kernal").

1. <[operating system](#)> The essential part of Unix or other operating systems, responsible for resource allocation, low-level hardware interfaces, security etc.

See also [microkernel](#).

2. <[language](#)> An essential subset of a programming language, in terms of which other constructs are (or could be) defined. Also known as a core language.

[[FOLDOP](#)]

03-11-2003

Keynes (John Maynard)

<[history of philosophy, biography](#)> English economist who developed economic theories that were widely accepted during the twentieth century. [Keynes](#) (1883-1946) was the author of The Economic Consequences of the Peace (1919), Treatise on Money (1930), and General Theory of Employment, Interest, and Money (1936). His A Treatise on Probability (1921) was an important contribution to the classical theory regarding the [logical probability](#) of [propositions](#).

Recommended Reading:
John Maynard Keynes, A Tract on Monetary Reform (Prometheus, 2000);
D. E. Moggridge, Keynes (Toronto, 1993);
John Bryan Davis, Keynes' s Philosophical Development (Cambridge, 1994);
Mark Blaug, John Maynard Keynes: Life, Ideas, Legacy (Palgrave, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

03-11-2003

KK-thesis

<[epistemology](#)> If S knows p, then S knows that S knows p.

16-03-2001

know how

[knowledge how](#)

31-05-2004

knowledge

1. see <[epistemology](#)>

2. <[artificial intelligence](#), [information science](#)> The objects, concepts and relationships that are assumed to exist in some area of interest. A collection of [knowledge](#), represented using some [knowledge representation](#) language is known as a [knowledge base](#) and a program for extending and/or querying a knowledge base is a knowledge-based system.

Knowledge differs from [data](#) or [information](#) in that new knowledge may be created from existing knowledge using logical [inference](#). If information is truthful data plus meaning then knowledge is information plus justification/explanation.

A common form of knowledge, e.g. in a Prolog program, is a collection of [facts](#) and [rules](#) about some subject.

For example, a [knowledge base](#) about a family might contain the facts that John is David' s son and Tom i John' s son and the [rule](#) that the son of someone' s son is their grandson. From this knowledge it could infer th new fact that Tom is David' s grandson.

See also [Knowledge Level Gettier problem](#), [know how](#), [knowledge tacit](#)

Luciano Floridi

03-11-2003

Knowledge Analysis and Design System

<[process](#)> (KADS) A structured way of developing knowledge-based systems (expert systems). KADS was developed as an alternative to an evolutionary approach and is now accepted as the European standard for knowledge based systems.

(<http://www.cse.unsw.edu.au/~timm/pub/slides/kltut/index.html>).

["Knowledge Based Systems Analysis and Design: A KADS Developers Handbook", Tansley and Hayball]

[[FOLDOC](#)]

03-11-2003

knowledge argument

<[philosophy of mind](#)> an [argument](#) from Frank Jackson (1982) purporting to show that [physicalism](#) is false on the ground that there exist facts that cannot be known solely in virtue of knowing all the physical facts.

See [dualism](#), [consciousness](#)

Adam Vinueza

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

knowledge base

<[artificial intelligence](#)> A collection of [knowledge](#) expressed using some formal [knowledge representation](#) language. A knowledge base forms part of a knowledge-based system (KBS).

[[FOLDOC](#)]

16-03-2001

knowledge by acquaintance

<[philosophical terminology](#), [knowledge by description](#)> Russell' s distinction between ways of knowing. Only th objects of [immediate](#) experience are known by [acquaintance](#), through our direct awareness of them.

Other things are known only by [description](#), through the mediation of our apprehension of true propositions about them. For example: "I have a headache now." may be known by [acquaintance](#), but "Aspirin will relieve a headache." can be known only by [description](#). Despite its apparently narrow extent, [knowledge by acquaintance](#) is supposed to provide the [foundation](#) for knowledge by description.

Recommended Reading:

Bertrand Russell, Human Knowledge: Its Scope and Limits (Routledge, 1994);

Bertrand Russell, The Problems of Philosophy (Oxford, 1998);

John G. Slater, Bertrand Russell (St. Augustine, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

03-11-2003

knowledge how

<[philosophy of mind](#), [epistemology](#)> epistemically praiseworthy, non-propositional procedural elements of a [cognitive system](#) thought to underlie abilities where performance of a task is consistently better than chance.

See [knowledge](#)

Charles Wallis

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

03-11-2003

knowledge level

<[artificial intelligence](#)> A level of description of the [knowledge](#) of an [agent](#) that is independent of the agent' internal symbol-level representation. Knowledge can be attributed to agents by observing their actions. An agent "knows" something if it acts as if it had the information and is acting rationally to achieve its goals. The "actions" of agents, including knowledge base servers and knowledge-based systems, can be seen through a "tell and ask" functional interface, where a client interacts with an agent by making logical assertions (tell), and posing queries (ask).

[[FOLDOP](#)]

03-11-2003

knowledge representation

The subfield of [artificial intelligence](#) concerned with designing and using systems for storing knowledge - [facts](#) and [rules](#) about some subject.

A body of formally represented knowledge is based on a [conceptualisation](#) - an [abstract](#) view of the world that we wish to represent. In order to manipulate this knowledge we must specify how the abstract conceptualisation is represented as a [concrete](#) data structure. An [ontology](#) is an explicit specification of a conceptualisation.

[[FOLDOP](#)]

16-03-2001

knowledge theoretical

<[philosophical terminology](#)> an organized body of learning, the ultimate aim of human study for many classical philosophers

[[A Dictionary of Philosophical Terms and Names](#)]

03-11-2003

knowledge under entailment

See [principle of closure of knowledge under entailment](#), [knowledge under known entailment principle of closure of](#)

16-03-2001

knowledge under known entailment principle of closure of

<[epistemology](#)> If S knows p, and S knows that p entails q, then S knows q.

See [Cartesian scepticism](#), [principle of closure of knowledge under entailment](#)

P. Mandik

Chris Eliasmith - [\[Dictionary of Philosophy of Mind\]](#) Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

knowledge-based system

<[artificial intelligence](#)> (KBS) A program for extending and/or querying a [knowledge base](#).

The related term [expert system](#) is normally used to refer to a highly domain-specific type of KBS used for a specialised purpose such as medical diagnosis.

The Cyc project is an example of a large KBS.

[\[FOLDOC\]](#)

03-11-2003

KQML

[Knowledge Query and Manipulation Language](#)

30-05-2004

KR

[knowledge representation](#)

31-05-2004

Kripke Saul Aaron

<[history of philosophy](#), [contemporary philosophy](#), [biography](#)> American logician and [philosopher](#) (1940-). His early work, "A Completeness Theorem in Modal Logic" (1959) and "Semantical Considerations on Modal Logic" (1963), focussed on technical issues in [modal logic](#). In Naming and Necessity (1972) Kripke proposed a causal theory of referential meaning, on which [proper names](#) and natural kinds are not merely definite [descriptions](#) but rather rigid designators, whose [reference](#) must obtain in all [possible worlds](#). On the basis of such [semantics](#), Kripke holds that the [necessary](#) / [contingent](#) and [a priori](#) / [a posteriori](#) distinctions do not coincide. This raises significant doubts about theories that try to establish the [contingent identity](#) of mental events and brains states.

Recommended Reading:

Saul A. Kripke, Wittgenstein on Rules and Private Language (Harvard, 1984);

The New Theory of Reference -Kripke, Marcus, and Its Origins, ed. by Paul W. Humphreys and James H. Fetzer (Kluwer, 1999);

Consuelo Preti, On Kripke (Wadsworth, 2001).

[\[A Dictionary of Philosophical Terms and Names\]](#)

03-11-2003

Kristeva Julia

<[history of philosophy](#), [contemporary philosophy](#), [biography](#)> Bulgarian-French literary critic and psychoanalyst (1941-) influenced by the deconstructive methods of [Derrida](#). In *La Révolution du langage poétique* (The Revolution in Poetic Language) (1974) and *Semiotiche: Recherches pour une Semaanalyse* (Desire in Language: A Semiotic Approach to Literature and Art) (1980), she distinguishes between the pre-linguistic (feminine) [semiotic](#) of [subjectivity](#) on the one hand and the (masculine) [symbolic representation](#) of [logic](#) and [language](#) on the other.

[Kristeva](#) describes ways in which literature (especially "feminine writing") can combine both in a joyful [symbolic representation](#) of the more fundamental [semiotic reality](#).

Powers of Horror (1981), *Histoires d' amour* (Tales of Love) (1983), and *Soleil Noir* (Black Sun) (1987) offer thorough analyses of horror, romantic love, melancholy, and depression. [Kristeva](#)'s application of her central themes to political thought may be found in *Etrangers à nous-mêmes* (Strangers to Ourselves) (1988).

Recommended Reading:

Catherine Clement and Julia Kristeva, *The Feminine and the Sacred* (Columbia, 2001);
 The Portable Kristeva, ed. by Kelly Oliver (Columbia, 1997);
 The Kristeva Reader, ed. by Toril Moi (Columbia, 1986);
 Kelly Oliver, *Reading Kristeva: Unraveling the Double-Bind* (Indiana, 1993);
 John Lechte, *Julia Kristeva* (Routledge, 1990);
 Martha J. Reineke, *Sacrificed Lives: Kristeva on Women and Violence* (Indiana, 1997);
 Michael Payne, *Reading Theory: An Introduction to Lacan, Derrida and Kristeva* (Blackwell, 1993).

[[A Dictionary of Philosophical Terms and Names](#)]

03-11-2003

Kristina Wasa

<[history of philosophy](#), [biography](#)> queen of Sweden (1626-1689, queen from 1632) who pursued wide-ranging intellectual interests and corresponded with many of the seventeenth century's leading thinkers. Both [Grotius](#) and [Descartes](#) (to their peril) visited her court, and she published her *Lettres de Descartes* (Correspondence with Descartes) (1663). [Kristina](#) greatly admired the [skepticism](#) of [Sextus Empiricus](#) and [Gassendi](#). After her refusal to marry led to a decision to abdicate the throne in 1654, [Kristina](#) first became an outspoken atheist and then converted to Catholicism.

Recommended Reading:

Susanna Akerman, *Queen Christina of Sweden and Her Circle: The Transformation of a Seventeenth-Century Philosophical Libertine* (Brill, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

03-11-2003

KRL

[Knowledge Representation](#) Language. A frame-based language.

["An Overview of KRL, a Knowledge Representation Language", D.G. Bobrow and T. Winograd, *Cognitive Sci* 1:1 (1977)].

03-11-2003

Kuhn Thomas Samuel

<[history of philosophy](#), [biography](#)> American [philosopher](#) of science (1922-1996). In *The Structure of Scientific Revolution* (1962, 1970) Kuhn emphasized the discontinuity of scientific progress, characterized by long periods of "normal research" (conducted entirely within the framework of a prevailing theoretical paradigm) that are punctuated by brief and largely inexplicable periods of [paradigm](#)-shifting scientific revolution. On this view, there can be no [rational](#) grounds for choosing between incommensurable paradigms, each of which solves its own set of problems. Such themes are illustrated and expanded in *The Essential Tension: Selected Studies in Scientific Tradition and Change* (1977) and *The Road Since Structure: Philosophical Essays, 1970-1993* (2000).

Recommended Reading:

Thomas S. Kuhn, *Black-Body Theory and the Quantum Discontinuity, 1894-1912* (Chicago, 1987);
World Changes: Thomas Kuhn and the Nature of Science, ed. by Paul Horwich (MIT, 1994);
 Howard Margolis, *Paradigms & Barriers: How Habits of Mind Govern Scientific Beliefs* (Chicago, 1993);
 Alexander Bird, *Thomas Kuhn* (Princeton, 2001);
 Steve Fuller, *Thomas Kuhn: A Philosophical History for Our Times* (Chicago, 2000);

Hanne Andersen, On Kuhn (Wadsworth, 2000).

[A Dictionary of Philosophical Terms and Names]

03-11-2003

La Mettrie Julien Offray de

<[history of philosophy, biography](#)> French [physician](#) and [philosopher](#) (1709-1751) who offered a [materialistic](#) account of [human nature](#). Rejecting [Cartesian dualism](#), [La Mettrie](#) explained mental activity by reference to [physiology](#) in *Histoire naturelle de l'âme* (Natural History of the Soul) (1745) and then explained [physiology](#) in purely [mechanistic](#) terms in his *L'homme machine* (Man a Machine) (1747). On this view, human conduct inevitably flows from [physical causes](#), leaving no grounds for [free will](#) or [moral responsibility](#). The [Cartesians](#) were correct when they regarded all animal [behavior](#) as emerging from soulless machines, [La Mettrie](#) maintained, but the same explanation will also account for human behavior.

Recommended Reading: Julien Offray de La Mettrie, *Machine Man and Other Writings*, ed. by Ann Thomson (Cambridge, 1996).

[A Dictionary of Philosophical Terms and Names]

19-01-2002

Lacan Jacques

<[history of philosophy, biography](#)> French [psychoanalyst](#) (1901-1981) whose *The Language of the Self: The Function of Language in Psychoanalysis* (1959) modified [Freudian psychology](#)'s analysis of human sexuality by proposing that the individual [unconscious](#) is represented most accurately in linguistic and rhetorical structures like [metonymy](#) and [metaphor](#), which disrupt the flow of ordinary communication and reveal a repressed message. Relying upon the [imaginary](#) and the [symbolic](#), [Lacan](#) supposed, each person endeavors to establish not only working relationships with other people but also some accommodation with the insatiable desires of the [Other](#), expressed in dreams. Lacan's analytic theory and practice, as expressed in *The Ethics of Psychoanalysis* (1960) and *The Four Fundamental Concepts of Psychoanalysis* (1964), were an influence (both positive and negative) on the philosophical work of [Foucault](#), [Derrida](#), and [Irigaray](#).
Recommended Reading: Jacques Lacan, *On Feminine Sexuality, the Limits of Love and Knowledge*, ed. by Jacques-Alain Miller (Norton, 1999); Joel Dor, *Introduction to the Reading of Lacan: The Unconscious Structured Like a Language* (Other Press, 1998); *Introducing Lacan*, ed. by Darian Leader, Judy Groves, and Richard Appignanesi (Totem, 2000); Elisabeth Roudinesco, *Jacques Lacan*, tr. by Barbara Bray (Columbia, 1999); and Dylan Evans, *An Introductory Dictionary of Lacanian Psychoanalysis* (Routledge, 1996).

[A Dictionary of Philosophical Terms and Names]

19-01-2002

laissez-faire

<[political philosophy](#)> French vocative phrase meaning "Allow to do!". Hence, in [political philosophy](#) and [economics](#), a presumption against the desirability of governmental interference with the [natural order of society](#) in general and with the conduct of [free trade](#) in particular.
Recommended Reading: Rajani Kannepalli Kanth, Political Economy and Laissez Faire: Economics and Ideology in the Ricardian Era (Rowman & Littlefield, 1986) and Gilbert Faccarello, Foundations of 'Laissez-Faire' (Routledge, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

19-01-2002

Lakatos Imre

<[history of philosophy, biography](#)> Hungarian-British [philosopher](#) of [science](#) (1922-1974). In Proofs and Refutations (1976) [Lakatos](#) applied [Popper](#)' s account of [scientific falsifiability](#) to mathematical reasoning as well. Sharing [Polya](#)' s emphasis on the role of [heuristic methods](#), [Lakatos](#) regarded [mathematical proof](#) as an invitation to [objection](#) and [criticism](#).
Recommended Reading: Imre Lakatos, For and Against Method, ed. by Matteo Motterlini (Chicago, 2000); Imre Lakatos, The Methodology of Scientific Research Programmes, ed. by J. Worrall and Gregory Currie (Cambridge, 1980); Imre Lakatos, Mathematics, Science and Epistemology, ed. by J. Worrall and Gregory Currie (Cambridge, 1988); John David Kadvany, Imre Lakatos and the Guises of Reason (Duke, 2001); and Brendan Larvor, Lakatos: An Introduction (Routledge, 1998).

[[A Dictionary of Philosophical Terms and Names](#)]

19-01-2002

Lamarck Jean Baptiste de Monet Chevalier

<[history of philosophy, biography](#)> French [biologist](#) (1744-1829); author of Flore franc.ais (French Flora) (1773) and Philosophie zoologique (Zoology) (1809). [Lamarck](#)' s study of invertebrates in Histoire des animaux sans vertèbres (Natural History of Invertebrate Animals) (1822) led to the conviction that [species](#) evolve through the [hereditary transmission](#) of [acquired traits](#), by means of which [species](#) perfect their [adaptation](#) to their [environment](#) in an optimal fashion.
Recommended Reading: Alpheus Packard, Lamarck: The Founder of Evolution (Ayer, 1980); L.J. Jordanova, Lamarck (Oxford, 1984); and Richard W. Burkhardt, The Spirit of System: Lamarck and Evolutionary Biology (Belknap, 1995).

[[A Dictionary of Philosophical Terms and Names](#)]

19-01-2002

LAMBDA

A version of typed lambda-calculus, used to describe semantic [domains](#).

["Outline of a Mathematical Theory of Computation", D.S. Scott, TM PRG-2, PRG, Oxford U, 1971].

16-03-2001

lambda abstraction

A term in lambda-calculus denoting a function. A lambda abstraction begins with a lower-case lambda (represented as "" in this document), followed by a variable name (the "bound variable"), a full stop and a [lambda expression](#) (the body). The body is taken to extend as far to the right as possible so, for example an expression,

$$x . y . x+y$$

is read as

$$x . (y . x+y).$$

A nested abstraction such as this is often abbreviated to:

$$x y . x + y$$

The lambda expression ($v . E$) denotes a function which takes an argument and returns the term E with all [free](#) occurrences of v replaced by the [actual argument](#). Application is represented by [juxtaposition](#) so

$$(x . x) 42$$

represents the identity function applied to the constant 42.

A [lambda abstraction](#) in [Lisp](#) is written as the symbol lambda, a list of zero or more variable names and a list of zero or more terms, e.g.

(lambda (x y) (plus x y))

Lambda expressions in [Haskell](#) are written as a backslash, "", one or more patterns (e.g. variable names), "->" and an expression, e.g. x -> x.

[\[FOLDOP\]](#)

16-03-2001

lambda expression

<[mathematics](#)> A term in the lambda-calculus denoting an unnamed function (a "[lambda abstraction](#)"), a variable or a constant. The pure lambda-calculus has only functions and no constants.

[\[FOLDOP\]](#)

16-03-2001

lambda lifting

A program transformation to remove free variables. An expression containing a free variable is replaced by a function applied to that variable. E.g.

$$f x = g 3 \text{ where } g y = y + x$$

x is a free variable of g so it is added as an extra argument:

$$f x = g 3 x \text{ where } g y x = y + x$$

Functions like this with no free variables are known as supercombinators and are traditionally given upper-case names beginning with "\$". This transformation tends to produce many supercombinators of the form $f x = g x$ which can be eliminated by [eta reduction](#) and substitution. Changing the order of the parameters may also allow more optimisations. References to global (top-level) constants and functions are not transformed to function parameters though they are technically free variables.

A closely related technique is closure conversion. See also Full laziness.

[FOLDOC]

16-03-2001

lambda-calculus

<[mathematics](#)> (Normally written with a Greek letter lambda). A branch of mathematical logic developed by [Alonzo Church](#) in the late 1930s and early 1940s, dealing with the application of [functions](#) to their arguments. The pure lambda-calculus contains no constants - neither numbers nor mathematical functions such as plus - and is untyped. It consists only of [lambda abstractions](#) (functions), variables and applications of one function to another. All entities must therefore be represented as functions. For example, the natural number N can be represented as the function which applies its first argument to its second N times ([Church integer](#) N).

Church invented lambda-calculus in order to set up a foundational project restricting mathematics to quantities with "[effective procedures](#)". Unfortunately, the resulting system admits Russell' s paradox in a particularly nasty way; Church couldn' t see any way to get rid of it, and gave the project up.

Most [functional programming](#) languages are equivalent to lambda-calculus extended with constants and types. [Lisp](#) uses a variant of lambda notation for defining functions but only its [purely functional](#) subset is really equivalent to lambda-calculus.

See [reduction](#)

[FOLDOC]

16-03-2001

Langer Susanne

<[history of philosophy, biography](#)> American [philosopher](#) (1895-1985), author of *Mind: An Essay on Human Feeling* (1967, 1972, 1982). Extrapolating from the methods of [Ernst Cassirer](#), [Langer](#) used [aesthetic analysis](#) of music as the starting point for her comprehensive account of human [emotions](#) that cannot be adequately expressed by [language](#), in *Philosophy in a New Key: A Study in the Symbolism of Reason, Rite, and Art* (1942) and *Feeling and Form* (1953).

[[A Dictionary of Philosophical Terms and Names](#)]

19-01-2002

language

1. <[PI](#)> [programming language](#)
2. <[logic](#)> [formal language](#)
2. <[human language](#)> [natural language](#).

16-03-2001

language of thought

<[philosophy of mind](#), [philosophy of language](#)>

a phrase coined by Fodor to voice the view that all mental [representations](#) are linguistic expressions within an "internal" language which significantly resembles spoken language.

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

Laplace Pierre Simon de

<[history of philosophy](#), [biography](#)> French [mathematician](#) and [philosopher](#) (1749-1827) noted for his defense of strict [determinism](#) in the [mechanical](#) operation of the [universe](#), independently of [divine](#) intervention in *Traites de la meccanique celeste* (On Celestial Mechanics) (1799-1826). Complete [knowledge](#) of the position and velocity of every particle in the [universe](#), together with straightforward application of [Newtonian mechanics](#) would permit perfect [prediction](#) of every future event. Since we lack such [knowledge](#), however, [Laplace](#) developed and applied relatively modern methods for the calculation of the [probability](#) of natural events in *Theorie analytique des probabilités* (Analytic Theory of Probabilities) (1812) and *Essai philosophique sur les probabilités* (Philosophical Essay on Probabilities) (1814).

Recommended Reading: Charles Coulston Gillispie, Ivor Grattan-Guinness, and Robert Fox, Pierre-Simon Laplace, 1749-1827 (Princeton, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

20-01-2002

latency

<[communications](#)> 1. The time it takes for a [packet](#) to cross a network connection, from sender to receiver.

2. The period of time that a frame is held by a network device before it is forwarded.

Two of the most important parameters of a communications channel are its latency, which should be low, and its [bandwidth](#), which should be high. Latency is particularly important for a [synchronous protocol](#) where each packet must be acknowledged before the next can be transmitted.

[[FOLDOP](#)]

16-03-2001

LaTeX

<[language](#), [text](#), [tool](#)> (Lamport TeX) Leslie Lamport' s document preparation system built on top of [TeX](#). LaTeX was developed at [SRI International](#)' s Computer Science Laboratory and was built to resemble [Scribe](#).

LaTeX adds commands to simplify typesetting and lets the user concentrate on the structure of the text rather than on formatting commands.

[BibTeX](#) is a LaTeX package for bibliographic citations.

Lamport' s LaTeX book has an exemplary index listing every symbol, concept and example in the book. The index in the, now obsolete, first edition includes (on page 221) the mysterious entry "Gilkerson, Ellen, 221". The second edition (1994) has an entry for "infinite loop" instead.

["LaTeX, A Document Preparation System", Leslie Lamport, A-W 1986, ISBN 0-201-15790-X (first edition, now obsolete)].

[[FOLDOC](#)]

16-03-2001

lattice

<[mathematics](#), [logic](#)>

A [partially ordered set](#) in which all finite subsets have a [least upper bound](#) and [greatest lower bound](#).

This definition has been standard at least since the 1930s and probably since Dedekind worked on lattice theory in the 19th century; though he may not have used that name.

See also [complete lattice](#), [domain theory](#).

[[FOLDOC](#)]

16-03-2001

Le Doeuff Michèle

<[history of philosophy](#), [biography](#)> French [philosopher](#) (1948-); translator of [Shakespeare](#). In *Recherches sur l' Imaginaire Philosophique* (The Philosophical Imaginary) (1980), she examines the use of [imagery](#) in the [philosophical](#) texts of [More](#), [Bacon](#), and [Descartes](#). Le Doeuff points out that [feminist criticism](#) of [gender categories](#) demonstrates the susceptibility of purportedly [objective philosophical](#) discourse to [social](#) and [political power](#) in *L' Étude et le rouet* (Hipparchia's Choice) (1991).

Recommended Reading: Michele Le Doeuff: *Operative Philosophy and Imaginary Practice*, ed. by Max Deutscher (Humanity, 2001) and Joan Nordquist, *French Feminist Theory II: Michele Le Doeuff*, Monique Wittig, Catherine Clement: A Bibliography (Reference & Research, 1993).

[[A Dictionary of Philosophical Terms and Names](#)]

20-01-2002

leaf

<[mathematics](#), [data](#)> (Or "terminal node") In a [tree](#), a node which has no [daughter](#).

[[FOLDOC](#)]

16-03-2001

least fixed point

A function f may have many [fixed points](#) (x such that $f x = x$). For example, any value is a fixed point of the identity function, $(x . x)$. If f is [recursive](#), we can represent it as

$$f = \text{fix } F$$

where F is some higher-order function and

$$\text{fix } F = F (\text{fix } F).$$

The standard [denotational semantics](#) of f is then given by the least fixed point of F . This is the [least upper bound](#) of the infinite sequence (the ascending Kleene chain)

obtained by repeatedly applying F to the totally undefined value, bottom. I.e.

fix F = LUB bottom, F bottom, F (F bottom),

The least fixed point is guaranteed to exist for a [continuous](#) function over a [cpo](#).

16-03-2001

least upper bound

<[mathematics](#), [logic](#)>

(lub or "join", "supremum") The least upper bound of two elements a and b is an upper bound c such that $a \leq c$ and $b \leq c$ and if there is any other upper bound c' then $c \leq c'$. The least upper bound of a set S is the smallest b such that for all s in S, $s \leq b$. The lub of mutually comparable elements is their maximum but in the presence of incomparable elements, if the lub exists, it will be some other element greater than all of them.

Lub is the [dual](#) to [greatest lower bound](#).

[[FOLDOC](#)]

16-03-2001

legal positivism

<[philosophical terminology](#)> [belief](#) that the laws of a [society](#) express nothing other than the [will](#) of the sovereign that legislates them. Thus, in opposition [natural law theory](#), [legal positivist John Austin](#) denied that the [law](#) is in grounded upon any higher [morality](#).
Recommended Reading: John Austin, The Province of Jurisprudence Determined (Prometheus, 2000); Anthony James Sebok, Legal Positivism in American Jurisprudence (Cambridge, 1998); and The Autonomy of Law: Essays on Legal Positivism, ed. by Robert P. George (Oxford, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

20-01-2002

Leibniz Gottfried Wilhelm

<[history of philosophy](#), [biography](#)> after completing his philosophical and legal education at Leipzig and Altdorf, [Gottfried Leibniz](#) (1646-1716) spent several years as a diplomat in France, England, and Holland, where he became acquainted with the leading intellectuals of the age. He then settled in Hanover, where he devoted most of his adult life to the development of a comprehensive scheme for human [knowledge](#), comprising [logic](#), [mathematics](#), [philosophy](#), [theology](#), [history](#), and [jurisprudence](#). Although his own [rationalism](#) was founded upon an advanced understanding of [logic](#), which [Leibniz](#) largely kept to himself, he did publish many less technical expositions of his results for the general public. These include a survey of the entire scheme in The New System of Nature (1695), a critical examination of [Locke's philosophy](#) in Nouveaux Essais sur l'entendement humain (New Essays on Human Understanding) (1704), and an attempt to resolve several [theological issues](#) in the Theodicee (Theodicy) (1710). La Monadologie (Monadology) (1714) is a highly condensed outline of [Leibniz's metaphysics](#). Complete individual [substances](#), or [monads](#), are dimensionless points which contain all of their [properties](#)-past, present, and future-and, indeed, the entire [world](#). The [true propositions](#) that express their natures follow inexorably from the principles of [contradiction](#) and [sufficient reason](#). The same themes are presented more popularly in the Discours de Metaphysique (Discourse on Metaphysics) (1686). There [Leibniz](#)

emphasized the role of a benevolent deity in creating this, [the best of all possible worlds](#), where everything exists in a perfect, pre-established harmony with everything else. Since [space](#) and [time](#) are merely relations, all of [science](#) is a study of [phenomenal objects](#). According to [Leibniz](#), human [knowledge](#) involves the discovery within our own minds of all that is a part of our [world](#), and although we cannot make it otherwise, we ought to be grateful for our own inclusion in it.

Recommended Reading:

Primary sources:

Gottfried Wilhelm Leibniz, *Saemtliche Schriften und Briefe* (Reichl, 1923-); Gottfried Wilhelm Leibniz, *Philosophical Texts*, ed. by Richard Francks and R. S. Woolhouse (Oxford, 1998); Gottfried Wilhelm Leibniz, *Discourse on Metaphysics and the Monadology*, tr. by R. Montgomery (Prometheus, 1992); Gottfried Wilhelm Leibniz, *New Essays on Human Understanding*, ed. by Peter Remnant and Jonathan Bennett (Cambridge, 1997); *Philosophical Papers and Letters*, ed. by Leroy Loemker, (Chicago: University Press, 1956). Leibniz and Clarke: *Correspondence*, ed. by Roger Ariew (Hackett, 2000).

Secondary sources:

Bertrand Russell, *A Critical Exposition of the Philosophy of Leibniz: With an Appendix of Leading Passages* (Routledge, 1993); *The Cambridge Companion to Leibniz*, ed. by Nicholas Jolley (Cambridge, 1994); *Leibniz: Critical and Interpretive Essays* ed. by Michael Hooker (Minnesota, 1982); Anthony Savile, *Routledge Philosophy Guidebook to Leibniz and the Monadology* (Routledge, 2000); Donald Rutherford, *Leibniz and the Rational Order of Nature* (Cambridge, 1997); Hide Ishiguro, *Leibniz' s Philosophy of Logic and Language* (Cambridge, 1991); Nicholas Jolley, *The Light of the Soul: Theories of Ideas in Leibniz, Malebranche, and Descartes* (Clarendon, 1998); Robert Merrihew Adams, *Leibniz: Determinist, Theist, Idealist* (Oxford, 1998).

Additional on-line information about Leibniz includes:

Greg Brown' s excellent [The Leibniz Page](#).

R. C. Sleight' s article in [The Oxford Companion to Philosophy](#).

Also see: [apperception](#), [German philosophy](#), [pre-established harmony](#), [the identity of indiscernibles](#), [infinitesimals](#), [metaphysics](#), [monadology](#), [pessimism and optimism](#), [the principle of plenitude](#), [possible worlds](#), [rationalism](#), [the nature of relations](#), [salva veritate](#), [the principle of sufficient reason](#), and [theodicy](#).

The thorough collection of resources at [EpistemeLinks.com](#).

An article on Leibniz' s philosophy of mind in the [Stanford Encyclopedia of Philosophy](#), by Mark Kulstad and Laurence Carlin.

An article on Leibniz and the problem of evil in the [Stanford Encyclopedia of Philosophy](#), by Michael J. Murray.

William Turner' s article in [The Catholic Encyclopedia](#).

The article in the [Columbia Encyclopedia](#) at [Bartleby.com](#).

G. J. Matthey' s lectures on Leibniz. Snippets from Leibniz (French and English) in [The Oxford Dictionary of Quotations](#).

GWL info from Znort! A section on Leibniz from Alfred Weber' s [history of philosophy](#). Eric Weisstein' s discussion at [Treasure Trove of Scientific Biography](#). A paper on natural and artificial machines in Leibniz by Paul Raymond.

Leibniz on Material Things by Arto Repo. Brandon Look' s paper on Leibniz' s explanation of unity and reality. A brief biographical note from [Oesterreich-Lexikon](#). A philosophical biography from Uwe Wiedemann.

Bjoern Christensson' s brief guide to Internet resources on Leibniz.

An entry in [The Oxford Dictionary of Scientists](#). Discussions of Leibniz as mathematician from [Mathematical MacTutor](#) and David Wilkins. A brief entry in [The Macmillan Encyclopedia 2001](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

20-01-2002

lemma

<logic>

A [theorem](#) (or metatheorem) proved only for the sake of another [theorem](#) (or metatheorem).

[Glossary of First-Order Logic]

16-03-2001

Lenin Vladimir Ilyich

<[history of philosophy, biography](#)> Russian [revolutionary](#) (1870-1924) who led the October Revolution of 1917 and became head of state. His State and Revolution (1917) discusses the practical application of [Marx'](#) s principles to the success of the [Bolshevik revolution](#). On [Lenin'](#) s view, the [dictatorship of the proletariat](#) is a temporary expedient that will inevitably lead to the creation of a truly [socialist government](#). In his Materialism and Empiro-Criticism (1909) and the Philosophical Notebooks (1929), [Lenin](#) sought to purge [Marxism](#) of any tendency toward [subjective idealism](#) by encouraging critical study of [Hegel](#). Recommended Reading: Vladimir Lenin, Essential Works of Lenin: ' What Is to Be Done?' and Other Writings, ed. by Henry M. Christman (Dover, 1987); Robert Service, Lenin: A Biography (Harvard, 2000); Louis Althusser, Lenin and Philosophy and Other Essays (Monthly Review, 2001); Georg Lukacs, Lenin: A Study in the Unity of His Thought (Verso, 1998); and Kevin Anderson, Lenin, Hegel, and Western Marxism: A Critical Study (Illinois, 1995).

[[A Dictionary of Philosophical Terms and Names](#)]

20-01-2002

Lessing Gotthold Ephraim

<[history of philosophy, biography](#)> German [philosopher](#) (1729-1781), [critic](#), and [playwright](#) who vigorously opposed [dogmatism](#) in any form and supported the ideals of the [Enlightenment](#). In Die Erziehung des Menschengeschlechts (The Education of the Human Race) (1780) he argued that both [revealed religion](#) and [philosophical rationality](#) represent stages of historical development rather than expressions of eternal truth. [Lessing'](#) s [aesthetic](#) writings, including the Laokoon (1766), helped to revive German interest in [Shakespeare](#) and [Spinoza](#). Recommended Reading: Gotthold Ephraim Lessing, Nathan the Wise, Minna Von Barnhelm, and Other Plays and Writings, ed. by Peter Demetz (Continuum, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

20-01-2002

Leucippus

<[history of philosophy, biography](#)> [Presocratic philosopher](#) (c 450 BC) and [atomist](#) who opposed the [Eleatics](#) and argued that everything that happens is strictly determined by [rational](#) laws. His views were more fully developed and expressed by [Democritus](#) and [Epicurus](#). Recommended Reading: George Sarton, Ancient Science Through the Golden Age of Greece (Dover, 1993) and C. C. W. Taylor, The Atomists: Leucippus and Democritus (Toronto, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

20-01-2002

Lewis Clarence Irving

<[history of philosophy, biography](#)> American [philosopher](#) and [logician](#) (1883-1964). [Lewis'](#) s Symbolic Logic (1932) contributed significantly to the development and refinement of modern [modal logic](#). His [empiricist epistemology](#), employing significant elements of [pragmatism](#), is developed in Mind and the World-Order (1929). An Analysis of Knowledge and Valuation (1946) defends a naturalistic account of human [morality](#).

Recommended Reading: E. Paul Colella, C.I. Lewis and the Social Theory of Conceptualistic Pragmatism: The Individual and the Good Social Order (Edwin Mellen, 1992) and The Philosophy of C. I. Lewis, ed. by Paul A. Schilpp (Open Court, 1981).

[[A Dictionary of Philosophical Terms and Names](#)]

20-01-2002

lex talionis

<[philosophical terminology](#)> Latin phrase meaning "law of retaliation". Hence, a strictly [retributive](#) notion of [punishment](#), according to which anyone who causes [injury](#) to another should suffer exactly the same [injury](#) in return.

Recommended Reading: Hugo Adam Bedau, Retribution and the Theory of Punishment (Rowman & Littlefield, 1981) and Charles K. B. Barton, Getting Even (Open Court, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

20-01-2002

lexeme

<[grammar](#)> A minimal lexical unit of a language. Lexical analysis converts strings in a language into a list of lexemes. For a programming language these word-like pieces would include [keywords](#), [identifiers](#), [literals](#) and punctuation. The lexemes are then passed to the [parser](#) for syntactic analysis.

[[FOLDOP](#)]

16-03-2001

lexical definition

<[philosophical terminology](#)> a faithful report of the way in which a [term](#) is used within a particular language-community.

<[A Dictionary of Philosophical Terms and Names](#)>

20-01-2002

liar paradox

<[philosophical terminology](#)> the sentence "I am now lying" would seem to be [true](#) (because I am lying) only in those cases when it is [false](#) (since what I say is the case) and [false](#) (because I am not lying) when it is [true](#) (since what I say is not the case). Less personally, the statement "This sentence is not true" generates a similar perplexity. These are particular instances of the self-referential semantic paradoxes that have troubled logicians since [Epimenides](#), the Cretan who is supposed to have said, "All Cretans are liars."

Recommended Reading: Paradox of the Liar, ed. by Robert L. Martin (Ridgeview, 1979); Recent Essays on Truth and the Liar Paradox,

ed. by Robert L. Martin (Oxford, 1997); Vann McGee, Truth, Vagueness, and Paradox: An Essay on the Logic of Truth (Hackett, 1990); Robert C. Koons, Paradoxes of Belief and Strategic Rationality (Cambridge, 1992); and Benson Mates, Skeptical Essays (Chicago, 1981).

[[A Dictionary of Philosophical Terms and Names](#)]

23-01-2002

liberalism

<[political philosophy](#)>

at least in the classical sense of the word, liberalism is a doctrine or principle in political philosophy that is very similar to modern [libertarianism](#) - namely, that what matters in political affairs is the absolute freedom and rights of the individual. Unfortunately, this word has lost its original meaning (at least in the United States), so that it now refers to something akin to [egalitarianism](#) or a watered-down version of [socialism](#). (References from [anarchism](#), [Aristotelianism](#), [capitalism](#), [egalitarianism](#), and [libertarianism](#).)

[[The Ism Book](#)]

Edited by Giovanni Benzi

25-03-2001

libertarianism

<[metaphysics](#), [political philosophy](#)>

1. in [metaphysics](#), the term libertarianism refers the idea that human beings have free will (opposed to [necessitarianism](#) and [determinism](#)).
2. in [political philosophy](#), libertarianism (sometimes also called classical [liberalism](#)) espouses the right of individuals to act in whatever way they please, so long as they do not initiate force or fraud against other people; sometimes libertarianism verges on [anarchism](#). (References from [accidentalism](#), [anarchism](#), [capitalism](#), [determinism](#), [egalitarianism](#), [liberalism](#), [necessitarianism](#), and [voluntarism](#).)

[[The Ism Book](#)]

Edited by Giovanni Benzi

25-03-2001

libertas

<[philosophical terminology](#)> Latin word for freedom. Recommended Reading: Chaim Wirszubski, Libertas As a Political Idea at Rome During Late Republic and Early Principate (Cambridge, 1950).

[[A Dictionary of Philosophical Terms and Names](#)]

23-01-2002

Life

<PI> aka Game of Life.

The first popular [cellular automata](#) based [artificial life](#) "game". Life was invented by British mathematician John Horton Conway in 1970 and was first introduced publicly in "Scientific American" later that year.

Conway first devised what he called "The Game of Life" and "ran" it using plates placed on floor tiles in his house. Because of he ran out of floor space and kept stepping on the plates, he later moved to doing it on paper or on a checkerboard, and then moved to running Life as a computer program on a PDP-7. That first implementation of Life as a computer program was written by M. J. T. Guy and [S. R. Bourne](#) (the author of [Unix](#)' [Bourne shell](#)).

Life uses a rectangular grid of binary (live or dead) cells each of which is updated at each step according to the previous state of its eight neighbours as follows: a live cell with less than two, or more than three, live neighbours dies. A dead cell with exactly three neighbours becomes alive. Other cells do not change.

While the rules are fairly simple, the patterns that can arise are of a complexity resembling that of organic systems -- hence the name "Life".

Many hackers pass through a stage of fascination with Life, and hackers at various places contributed heavily to the mathematical analysis of this game (most notably [Bill Gosper](#) at [MIT](#), who even implemented Life in [TECO!](#); see [Gosperism](#)). When a hacker mentions "life", he is more likely to mean this game than the magazine, the breakfast cereal, the 1950s-era board game or the human state of existence.

Yahoo!
(http://www.yahoo.com/Science/Artificial_Life/Conway_s_Game_of_Life/).

Demonstration
(<http://www.research.digital.com/nsl/projects/life/>).

["Scientific American" 223, October 1970, p120-123, 224; February 1971 p121-117, Martin Gardner].

["The Garden in The Machine: the Emerging Science of Artificial Life", Claus Emmeche, 1994].

["Winning Ways, For Your Mathematical Plays", Elwyn R. Berlekamp, John Horton Conway and Richard K. Guy, 1982].

["The Recursive Universe: Cosmic Complexity and the Limits of Scientific Knowledge", William Poundstone, 1985].

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

like this

You weren' t supposed to follow that link, it was just an example of what a link looks like.

16-03-2001

linear argument

<[mathematics](#), [logic](#)>

A function argument which is used exactly once by the function.

If the argument is used at most once then it is safe to [inline](#) the function and replace the single occurrence of the formal parameter with the actual argument expression. If the argument was used more than once this transformation would duplicate the argument expression, causing it to be evaluated more than once.

If the argument is sure to be used at least once then it is safe to evaluate it in advance (see [strictness analysis](#)) whereas if the argument was not used then this would waste work and might prevent the program from terminating.

[[FOLDOP](#)]

16-03-2001

linear function

A [recursive](#) function is linear if it is of the form

$f\ x = \text{if } p\ x \text{ then } q\ x \text{ else } h\ f\ x$

where h is a "linear functional" which means that

(1) for all functions, a , b c and some function ht

$h\ (\text{if } a \text{ then } b \text{ else } c) = \text{if } ht\ a \text{ then } h\ b \text{ else } h\ c$

Function ht is known as the "predicate transformer" of h .

(2) If for some x ,

$h\ (y \cdot \text{bottom})\ x \neq \text{bottom}$

then

for all g , $ht\ g\ x = \text{True}$.

I.e. if $h\ g\ x$ terminates despite $g\ x$ not terminating then $ht\ g\ x$ doesn't depend on g .

See also [linear argument](#).

[[FOLDOP](#)]

16-03-2001

linear logic

(<http://www.csl.sri.com/linear/sri-csl-ll.html>)

[Wadler, P., "Is there a use for linear logic", ACM/IFIP PEPM Conference, 1991].

[Summary?]

[[FOLDOP](#)]

16-03-2001

linear map

<[mathematics](#)> (Or "linear transformation") A [function](#) from a [vector space](#) to a vector space which respects the [additive](#) and [multiplicative](#) structures of the two: that is, for any two [vectors](#), u, v , in the source vector space and any scalar, k , in the [field](#) over which it is a vector space, a linear map f satisfies $f(u+kv) = f(u) + kf(v)$.

[FOLDOC]

16-03-2001

linear programming

<[application](#)> A procedure for finding the maximum or minimum of a [linear function](#) where the arguments are subject to linear [constraints](#). The [simplex method](#) is one well known [algorithm](#).

[FOLDOC]

16-03-2001

linear space

<[mathematics](#)> A [vector space](#) where all [linear combinations](#) of elements are also elements of the space. This is easy for spaces of numbers but not for a space of functions. Roughly, this is to say that multiplication by numbers, and addition of elements is defined in the space.

[FOLDOC]

16-03-2001

linear transformation[linear map](#)

00-00-0000

linear type

1. <[theory, PL](#)> An attribute of values which are used exactly once: they are neither duplicated nor destroyed. Such values require no [garbage collection](#), and can safely be updated in place, even if they form part of a data structure.

Linear types are related to the [linear logic](#) of J.-Y Girard. They extend Schmid' s notion of [single threading](#), provide an alternative to Hudak and Bloss' [update analysis](#), and offer a practical complement to Lafont and Holmstr"m' s elegant linear languages.

[' UseOnce' Variables and Linear Objects Storage Management, Reflection and Multi-Threading, Henry Baker. (<ftp://ftp.netcom.com/pub/hb/hbaker/Use1Var.html>)].

["Linear types can change the world!", Philip Wadler, "Programming Concepts and Methods", April 1990, eds. M. Broy, C. Jones, pub. North-Holland, IFIP TC2 Working Conference on Programming Concepts and Methods, Sea of Galilee, Israel].

[FOLDOC]

16-03-2001

list

<[data](#)> A data structure holding many values, possibly of different types, which is usually accessed sequentially, working from the head to the end of the tail - an "ordered list". This contrasts with a (one-dimensional) [array](#), any element of which can be accessed equally quickly.

Lists are often stored using a cell and pointer arrangement where each value is stored in a cell along with an associated pointer to the next cell. A special pointer, e.g. zero, marks the end of the list. This is known as a (singlely) "linked list". A doubly linked list has pointers from each cell to both next and previous cells.

An unordered list is a [set](#).

[[FOLDOC](#)]

16-03-2001

Lobachevsky Nikolai Ivanovich

<[history of philosophy, biography](#)> Russian [mathematician](#) who developed a non-Euclidean geometry (1792-1856), denying the [truth](#) of Euclid' s parallel postulate by supposing that there may be two or more such lines passing through a given point. Recommended Reading: H. S. Coxeter, Non-Euclidean Geometry (Math. Assn. of Amer., 1998); Marvin Jay Greenberg, Euclidean and Non-Euclidean Geometries: Development and History (Freeman, 1995); Non-Euclidean Geometry, ed. by Roberto Bonola and H. S. Carslaw (Dover, 1954); and Morris Kline, Mathematical Thought from Ancient to Modern Times (Oxford, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

23-01-2002

Locke John

<[history of philosophy, biography](#)> although he completed a philosophical education at [Oxford](#), [John Locke](#) (1632-1704) declined the offer of a permanent academic position in order to avoid committing himself to a religious order. Having also studied medicine, he served for many years as private physician and secretary to Anthony Ashley Cooper, the first Earl of Shaftesbury and one of the Lord Proprietors of the Carolina Colonies. [Locke](#)' s involvement with this controversial political figure led to a period of self-imposed exile in Holland during the 1680s, but after the [Glorious Revolution](#) of 1688 he held several minor governmental offices. A friend of [Isaac Newton](#) and [Robert Boyle](#), [Locke](#) was also an early member of the [Royal Society](#). He studied and wrote on philosophical, scientific, and political matters throughout his life, but the works for which he is best known were published in a single, sudden burst. The fundamental principles of [Locke](#)' s [philosophy](#) are presented in An Essay Concerning Human Understanding (1690), the culmination of twenty years of reflection on the origins of human [knowledge](#). According to [Locke](#), what we know is always properly understood as the [relation between ideas](#), and he devoted much of the Essay to an extended argument that all of our ideas-[simple](#) or [complex](#)-are ultimately derived from [experience](#). The consequence of this [empiricist](#) approach is that the [knowledge](#) of which we are capable is severely limited in its scope and certainty. Our [knowledge](#) of [material](#) substances, for example, depends heavily on the [secondary qualities](#) by [reference](#) to which we name them, while their [real](#) inner natures derive from the [primary qualities](#) of their insensible parts. Nevertheless, [Locke](#) held that we have no grounds for complaint about the limitations of our [knowledge](#), since a proper application of our [cognitive](#) capacities is enough to guide our [action](#) in the practical conduct of life. The Essay brought

great fame, and [Locke](#) spent much of the rest of his life responding to admirers and critics by making revisions in later editions of the book, including detailed accounts of human [volition](#) and [moral freedom](#), the [personal identity](#) on which our [responsibility](#) as [moral](#) agents depends, and the dangers of [religious](#) enthusiasm. One additional section that was never included in the Essay itself is Of the Conduct of the Understanding, a practical guide to the achievement of useful beliefs about the world. The bachelor [philosopher](#)'s notions about childrearing appeared in Some Thoughts concerning Education (1693). By contrast, [Locke](#) chose to avoid controversy by publishing his [political](#) writings anonymously. With the Two Treatises of Civil Government (1690) [Locke](#) established himself as a [political theorist](#) of the highest order. The First Treatise is a detailed refutation of the (now-forgotten) [monarchist](#) theories of [Robert Filmer](#), but the Second Treatise of Government offers a systematic account of the foundations of [political obligation](#). On [Locke](#)'s view, all rights begin in the [individual property](#) interest created by an investment of [labor](#). The [social structure](#) or [commonwealth](#), then, depends for its formation and maintenance on the express consent of those who are governed by its [political](#) powers. [Majority](#) rule thus becomes the cornerstone of all [political order](#), and dissatisfied citizens reserve a lasting [right](#) to [revolution](#). Similarly, [Locke](#)'s Letter Concerning Toleration (1689) argued for a broad (though not limitless) acceptance of alternative [religious](#) convictions.

Recommended Reading:

Primary sources:

John Locke, Works (Clarendon, 1975); John Locke, An Essay Concerning Human Understanding, ed. by Peter H. Nidditch (Clarendon, 1989); John Locke, Some Thoughts Concerning Education and of the Conduct of the Understanding, ed. by Ruth W. Grant and Nathan Tarcov (Hackett, 1996); John Locke, Two Treatises of Government, ed. by Peter Laslett (Cambridge, 1988); John Locke, A Letter Concerning Toleration (Prometheus Books, 1990).

Secondary sources:

Richard I. Aaron, John Locke (Clarendon, 1971); Nicholas Jolley, Locke: His Philosophical Thought (Oxford, 1999); John W. Yolton, Locke and the Way of Ideas (St. Augustine, 1993); The Cambridge Companion to Locke, ed. by Vere Chappell (Cambridge, 1994); Locke on Human Understanding, ed. by I. C. Tipton (Oxford, 1977); Locke's Philosophy: Content and Context, ed. by G. A. J. Rogers (Oxford, 1997); Michael Ayers, Locke: Epistemology and Ontology (Routledge, 1994); John L. Mackie, Problems from Locke (Oxford, 1976); Michael Ayers, Locke (Routledge, 1999); John Locke: An Essay Concerning Human Understanding in Focus, ed. by Gary Fuller, Robert Stecker, and John P. Wright (Routledge, 2000); E. J. Lowe, Routledge Philosophy Guidebook to Locke on Human Understanding (Routledge, 1995); David L. Thomas, Locke on Government (Routledge, 1995).

Additional on-line information about Locke includes:

The thorough collection of resources at EpistemeLinks.com.

A thorough article in The Internet Encyclopedia of Philosophy.

Roger Woolhouse's article in The Oxford Companion to Philosophy.

Also see: the social contract, empiricism, English philosophy, ideas, innate ideas, inner sense, natural kinds, philosophy of language, latitudinarianism, liberalism, mixture of labour, the Molyneux problem, the people, personal identity, pleasure, political philosophy, primary and secondary qualities, property, qualities, the representative theory of perception, revolution, the rule of law, political self-determination, the state of nature, tabula rasa, toleration, and trust.

G. J. Matthey's lectures on Locke.

The article in the Columbia Encyclopedia at Bartleby.com.

A section on Locke from Alfred Weber's history of philosophy.

Snippets from Locke in The Oxford Dictionary of Quotations.

The Bloomsbury Guide to Human Thought on The State and Revolution.

Discussion of Locke's critique of innatism by Syliane Charles.

Bjoern Christensson's brief guide to Internet resources.

A brief entry in The Macmillan Encyclopedia 2001.

[\[A Dictionary of Philosophical Terms and Names\]](#)

23-01-2002

locutionary act

<[philosophical terminology](#)> the simple [speech act](#) of generating sounds that are linked together by [grammatical conventions](#) so as to say something [meaningful](#). Among speakers of English, for example, "It is raining" performs the [locutionary act](#) of saying that it is raining, as "Grablistrod zetagflx dapu" would not. Recommended Reading: J. L. Austin, *How to Do Things With Words*, ed. by Marina Sbisa and J. O. Urmson (Harvard, 1975) and John R. Searle, *Speech Acts* (Cambridge, 1970).

[[A Dictionary of Philosophical Terms and Names](#)]

23-01-2002

Loebner Prize

<[artificial intelligence](#)> An annual competition in artificial intelligence started by Dr. Hugh Gene Loebner of New York City in 1991. A \$100,000 prize is offered to the author of the first computer program to pass an unrestricted [Turing test](#). Annual competitions are held each year with a \$2000 prize for the best program on a restricted [Turing test](#).

Sponsors of previous competitions include: [Apple Computer](#), [Computerland](#), Crown Industries, GDE Systems, [IBM](#) Personal Computer Company' [Center for Natural Computing](#), Greenwich Capital Markets, [Motorola](#), the National Science Foundation, The Alfred P. Sloan Foundation, and The Weingart Foundation.

The 1995 and 1996 events were unrestricted Turing Tests, requiring computer entries to converse indefinitely with no topic restrictions. So far, even the best programs give themselves away almost immediately, either by simple grammatical mistakes or by repetition.

Complete transcripts and [IBM compatible](#) diskettes that play the 1991, 1992, and 1993 conversations in real-time are available for purchase from the Cambridge Center for Behavioral Studies (telephone: +1 (617) 491 9020, Fax: 1072). Sponsorship opportunities are available.

Home (<http://info.acm.org/~loebner/loebner-prize.htmlx>).

Dr. Hugh G. Loebner
Prize Donor
Telephone: +1 (201) 672 2277 (fax 7536).

[[FOLDOP](#)]

16-03-2001

Loewenheim-Skolem theorem

<[logic](#)>
Every first-order theory with a model has a denumerable model. The [theorem](#) implies that consistent first-order theories, including those intended to capture the real numbers or other uncountable sets, will be non-categorical; hence it implies that there is no consistent, categorical description of the reals in a first-order theory.

See [categoricity of systems](#), [Skolem paradox](#)

Downward Loewenheim-Skolem [theorem](#)

If a first-order theory has a model of any infinite cardinality k , then it has a model of every infinite cardinality j , $j \leq k$.

Upward Loewenheim-Skolem [theorem](#)

If a first-order theory has a model of any infinite cardinality, then it has a model of any arbitrary infinite cardinality, and hence, models of every infinite cardinality. Variation for systems with identity: if a first-order theory has a normal model of any infinite cardinality, then it has a normal model of any arbitrary infinite cardinality.

[Glossary of First-Order Logic]

16-03-2001

logarithmus dualis

<[mathematics](#)> (ld) Latin for [logarithm](#) base two. More commonly written as "log" with a subscript "2".

Roughly the number of [bits](#) required to represent an [integer](#).

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16-03-2001

logic

<[discipline](#)>

1. <[logic](#), [mathematics](#)> A branch of philosophy and mathematics that deals with the formal principles, methods and criteria of validity of [inference](#), reasoning and [knowledge](#).

Logic is concerned with what is true and how we can know whether something is true. This involves the formalisation of logical arguments and [proofs](#) in terms of symbols representing [propositions](#) and [logical connectives](#). The meanings of these logical connectives are expressed by a set of rules which are assumed to be self-evident.

[Boolean algebra](#) deals with the basic operations of truth values: AND, OR, NOT and combinations thereof. Predicate logic extends this with existential and universal [quantifiers](#) and symbols standing for [predicates](#) which may depend on variables. The rules of [natural deduction](#) describe how we may proceed from valid premises to valid conclusions, where the premises and conclusions are expressions in [predicate logic](#).

Symbolic logic uses a meta-language concerned with truth, which may or may not have a corresponding expression in the world of objects called existence. In symbolic logic, arguments and [proofs](#) are made in terms of symbols representing [propositions](#) and [logical connectives](#). The meanings of these begin with a set of rules or [primitives](#) which are assumed to be self-evident. Fortunately, even from vague primitives, functions can be defined with precise meaning.

[Boolean logic](#) deals with the basic operations of truth values: AND, OR, NOT and combinations thereof. Predicate logic extends this with [existential quantifiers](#) and [universal quantifiers](#) which introduce [bound variables](#) ranging over [finite](#) sets; the [predicate](#) itself takes on only the values true and false. Deduction describes how we may proceed from valid [premises](#) to valid conclusions, where these are expressions in [predicate logic](#).

Carnap used the phrase "rational reconstruction" to describe the logical analysis of thought. Thus logic is less concerned with how thought does proceed, which is considered the realm of psychology, and more with how it should proceed to discover truth. It is the touchstone of the results of thinking, but

neither its regulator nor a motive for its practice.

See also [fuzzy logic](#), [logic programming](#), [arithmetic and logic unit](#), [first-order logic](#),

See also [Boolean logic](#), [fuzzy logic](#), [logic programming](#), [first-order logic](#), [logic bomb](#), [combinatory logic](#), [higher-order logic](#), [intuitionistic logic](#), [equational logic](#), [modal logic](#), [linear logic](#), [paradox](#).

2. <[electronics](#)> [Boolean](#) logic circuits.

See also [arithmetic and logic unit](#), [asynchronous logic](#), [TTL](#).

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16-03-2001

logic gate

An [integrated circuit](#) or other device whose inputs and outputs represent [Boolean](#) or binary values as voltages ([TTL](#) uses 0V for False or 0, +5V for True or 1). Different gates implement different Boolean functions: [AND](#), [OR](#), [NAND](#), [NOR](#) (these may take two or more inputs) [NOT](#) (one input), [XOR](#) (two inputs). NOT, NAND and NOR are often constructed from single [transistors](#) and the other gates made from combinations of these basic ones. These functions are all [combinatorial logic](#) functions, i.e. their outputs depend only on their inputs and there is no internal state. Gates with state, such as [latches](#) and flip-flops, are constructed by feeding some of their outputs back to their inputs.

[[FOLDOC](#)]

16-03-2001

logic programming

<[artificial intelligence](#), [PI](#), [language](#)> A [declarative](#), [relational](#) style of programming based on first-order logic. The original logic programming language was [Prolog](#). The concept is based on [Horn clauses](#).

The programmer writes a "database" of "[facts](#)", e.g.

wet(water).

("water is wet") and "[rules](#)", e.g.

mortal(X) :- human(X).

("X is mortal is implied by X is human"). Facts and rules are collectively known as "[clauses](#)".

The user supplies a "[goal](#)" which the system attempts to prove using "[resolution](#)" or "[backward chaining](#)". This involves matching the current goal against each fact or the left hand side of each rule using "[unification](#)". If the goal matches a fact, the goal succeeds; if it matches a rule then the process recurses, taking each sub-goal on the right hand side of the rule as the current goal. If all sub-goals succeed then the rule succeeds.

Each time a possible clause is chosen, a "[choice point](#)" is created on a [stack](#). If subsequent [resolution](#) fails then control eventually returns to the choice point and subsequent clauses are tried. This is known as "[backtracking](#)".

Clauses may contain [logic variables](#) which take on any value necessary to make the fact or the left hand side of the rule match a goal. Unification binds these variables to the corresponding subterms of the goal. Such bindings are associated with the [choice point](#) at which the clause was

chosen and are undone when backtracking reaches that choice point.

The user is informed of the success or failure of his first goal and if it succeeds and contains variables he is told what values of those variables caused it to succeed. He can then ask for alternative solutions.

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16-03-2001

logic variable

<PI> A variable in a [logic programming](#) language which is initially undefined ("unbound") but may get bound to a value or another logic variable during [unification](#) of the containing clause with the current [goal](#). The value to which it is bound may contain other variables which may themselves be bound or unbound.

For example, when unifying the clause

sad(X) :- computer(X, ibmpc).

with the goal

sad(billgates).

the variable X will become bound to the atom "billgates" yielding the new subgoal "computer(billgates, ibmpc)".

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16-03-2001

logical axiom

[axioms](#)

00-00-0000

logical complement

<logic> In [Boolean algebra](#), the logical complement or negation of a Boolean value is the opposite value, given by the following [truth table](#):

A		-A
---		---
T		F
F		T

-A is also written as A with a bar over it or with a small vertical line hanging from the right-hand end of the "-"

([LaTeX](#)

eg) or as A' . In the [C](#) programming language, it is !A and in digital circuit design, /A.

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16-03-2001

logical empiricist

<[philosophical school](#)>

a term for those 20th century philosophers who maintain that [empiricism](#) is right on purely [logical](#) (not psychological) grounds.

Empiricism becomes a theory about the meaning of [synthetic](#) propositions: namely, that their meaning can be given entirely in experiential, or phenomenal terms.

[[A Philosophical Glossary](#)]

30-04-2001

logical form

<[philosophical terminology](#)> the structure of a [proposition](#) or an [argument](#) from which all [content](#) has been removed. [Tautology](#) and [validity](#) are features that hold only in virtue of [logical form](#).

Recommended Reading: William G. Lycan, Logical Form in Natural Language (MIT, 1969) and Robert May, Logical Form (MIT, 1985).

[[A Dictionary of Philosophical Terms and Names](#)]

23-01-2002

logical implication

[implication](#)

00-00-0000

logical positivism

<[epistemology](#), [philosophical movement](#)>

Logical positivism is a movement in 20th century philosophy that originated as a reaction against nineteenth-century [idealism](#). The word logical in the name refers to the belief that logic is all-important for philosophy (thus this movement is a sort of [logicism](#)), while "positivism" here is really a certain form of [empiricism](#) which claims that empiricism is the whole of philosophy and that there is no validity to anything which could be called conceptual experience or conceptual insight. The movement is also a form of [conventionalism](#), since its adherents hold that things are true only by convention. Logical positivists denigrate or ignore ethics, and some have even gone so far as to say that all values are merely expressions of emotion (see [emotivism](#)). Thus the logical positivists, while holding a deep respect for reason in the limited context of logic and mathematics, have had such a limited view of what reason is (a process of contraction started by Kant) that they have ended up holding some extremely subjectivistic views, especially in ethics. (References from [logicism](#), [nominalism](#), [positivism](#), and [scholasticism](#).)

[[The Ism Book](#)]

<[philosophical terminology](#)> twentieth-century [philosophical movement](#) that used a strict principle of [verifiability](#) to reject as [meaningless](#) the non-empirical statements of [metaphysics](#), [theology](#), and [ethics](#). Under the influence of [Hume](#), [Russell](#), and the early [Wittgenstein](#), the [logical positivists](#) regarded as [meaningful](#) only statements reporting [empirical observations](#), taken together with the tautologies of [logic](#) and [mathematics](#). Prominent logical positivists included members of the [Vienna Circle](#) and [Ayer](#).

Recommended Reading: A. J. Ayer, Logical Positivism (Free Press, 1966); Michael Friedman, Reconsidering Logical Positivism (Cambridge, 1999); and Science and Philosophy in the Twentieth Century: Basic Works of Logical Empiricism, ed. by Sahotra Sarkar (Garland, 1996) - Vol. 1: The Emergence of Logical Empiricism: From 1900 to the Vienna Circle, Vol. 2: Logical Empiricism at Its

Peak: Schlick, Carnap, and Neurath, Vol. 3: Logic, Probability, and Epistemology: The Power of Semantics, Vol. 4: Logical Empiricism and the Special Sciences: Reichenbach, Feigl, and Nagel, Vol. 5: Decline and Obsolescence of Logical Empiricism: Carnap vs. Quine and the Critics, and Vol. 6: The Legacy of the Vienna Circle: Modern Appraisals.

[[A Dictionary of Philosophical Terms and Names](#)]

23-01-2002

logical relation

A [relation](#) R satisfying

$f R g \Leftrightarrow \text{For all } a, b, a R b \Rightarrow f a R g b$

This definition, by Plotkin, can be used to extend the definition of a relation on the types of a and b to a relation on functions.

16-03-2001

logical validity

<[logic](#)>

For a [wff](#), to be true for every interpretation of the [formal language](#); to have every interpretation be a model. "Every interpretation" here is understood to mean all, but only, those interpretations in which the connectives and/or quantifiers take their standard meanings. In truth-functional propositional logic, logically valid [wffs](#) are also called tautologies. In standard [predicate](#) logic, logical validity is limited to interpretations with non-empty domains. Logical validity is also called logical truth.

Notation:

$\models A$ (A is a logically valid [wff](#)).

See k-validity, [model](#), [predicate logic](#), [tautology](#), true for an interpretation

[Glossary of First-Order Logic]

16-03-2001

logicization of arithmetic

<[philosophical terminology](#)> the program - conceived by [Dedekind](#), [Peano](#), [Frege](#), and [Hilbert](#), but completed by [Russell](#) and [Whitehead](#) in Principia Mathematica (1913)- of showing that [arithmetical knowledge](#) can be demonstrated upon the basis of purely [logical](#) axioms and definitions. The project was effectively demolished by G-del' s proof that some [true formal propositions](#) must nevertheless remain [undecidable](#) within the [system](#).

Recommended Reading: Howard Whitley Eves, Foundations and Fundamental Concepts of Mathematics (Dover, 1997); Ivor Grattan-Guinness, The Search for Mathematical Roots, 1870-1940 (Princeton, 2001); and From Frege to Godel 1879-1931: A Source Book in Mathematical Logic, ed. by Jean Van Heijenoort (iUniverse, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

23-01-2002

logos - mythos

<[philosophical terminology](#)> Plato' s Greek distinction between two ways of explaining what happens: either by providing an explicit [rational](#) account ([logos](#)), which combines with belief to form accurate [knowledge](#) (Gk. episteme) of the [essence](#) of things; or merely by telling a story with [figurative significance](#) ([mythos](#)). The [Stoics](#) elevated [logos](#) into an active [principle](#) that generates the specific "[seminal reasons](#)" (Gk. logoi spermatikoi) from which individual things flow. [Philo Judaeus](#) fully personified this notion as the [divine agent](#) responsible for [creation](#) of the [world](#).
Recommended Reading: F.E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967).

[[A Dictionary of Philosophical Terms and Names](#)]

23-01-2002

Lombard Peter

<[history of philosophy, biography](#)> Italian [theologian](#) and [philosopher](#) (1095-1160)whose *Sententiae in quattuor libris distinctae* (Four Books of Sentences) (1158) compiled the assertions and arguments of ancient philosophers and [patristic](#) theologians, providing a traditional background upon which late medieval [scholasticism](#) frequently commented.
Recommended Reading: Marcia L. Colish, Peter Lombard (Brill, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

23-01-2002

long term memory

<[philosophy of mind](#)>
the permanent [memory](#) store accessed after a considerable gap between the presentation of a [stimulus](#) and its recall.

See also [short term memory](#), [memory](#).

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

loop

<[P](#)> A sequence of [instructions](#) that the [processor](#) repeats, either until some condition is met, or indefinitely.

In an [structured language](#) (e.g. [C](#), [Pascal](#), [BASIC](#), or [Fortran](#)), a loop is usually achieved with [for loop](#), while loop or [repeat loop](#) constructs.

In other languages these constructs may be synthesised with a [jump](#) ([assembly language](#)) or a [GOTO](#) (early Fortran or BASIC).

[[FOLDOP](#)]

16-03-2001

Lorenz attractor

<[mathematics](#)> (After [Edward Lorenz](#), its discoverer) A region in the [phase space](#) of the solution to certain systems of (non-linear) [differential equations](#). Under certain conditions, the motion of a particle described by such a system will neither converge to a steady state nor diverge to infinity, but will stay in a bounded but chaotically defined region. By [chaotic](#), we mean that the particle's location, while definitely in the attractor, might as well be randomly placed there. That is, the particle appears to move randomly, and yet obeys a deeper order, since it never leaves the attractor.

Lorenz modelled the location of a particle moving subject to atmospheric forces and obtained a certain system of ordinary differential equations. When he solved the system numerically, he found that his particle moved wildly and apparently randomly. After a while, though, he found that while the momentary behaviour of the particle was chaotic, the general pattern of an attractor appeared. In his case, the pattern was the butterfly shaped attractor now known as the [Lorenz attractor](#).

[FOLDOC]

16-03-2001

Lorenz Konrad

<[history of philosophy, biography](#)> Austrian [biologist](#) (1903-1989); author of *King Solomon's Ring* (1949) and *Man Meets Dog* (1950). [Lorenz's](#) comparative studies of animal [behavior](#) led to the development of the discipline of [ethology](#). He is best known for *On Aggression* (1966), an exploration of the [instinctual](#) foundations of [aggressive behavior](#) in animals, including [human beings](#). He shared the [Nobel Prize](#) for medicine in 1973. Recommended Reading: *Animal and Human Aggression*, ed. by Pierre Karli and S.M. Carmona and *The Foundations of Ethology* (Springer Verlag, 1981).

[[A Dictionary of Philosophical Terms and Names](#)]

23-01-2002

Lotze Rudolf Hermann

<[history of philosophy, biography](#)> German [philosopher](#) (1817-1881). As a committed [idealist](#), [Lotze](#) argued in *Mikrokosmos* (1856-1864) that the apparent success of [mechanistic](#) explanations of the [natural world](#) derives only from the organic unity of [consciousness](#) through laws of [nature](#) which express the [will](#) of the Absolute. This position was a significant influence on [Royce](#) and [Santayana](#). Recommended Reading: George Santayana, *Lotze's System of Philosophy*; Hermann Lotze, *Grundzuge der praktischen Philosophie* (Rodopi, 1969); and Hermann Lotze, *Outlines of Psychology* (Ayer, 1973).

[[A Dictionary of Philosophical Terms and Names](#)]

23-01-2002

Lovejoy Arthur Oncken

<[history of philosophy, biography](#)> American [philosopher](#) (1873-1962) whose Revolt against Dualism (1930) defended [perceptual realism](#) by arguing that [material](#) objects exist independently of our [perception](#) of them. The historical sweep of Lovejoy's The Great Chain of Being introduced an influential set of methods for the study of the [history of ideas](#) and used them to trace the recurrence of the [principle of plenitude](#) in [Western philosophy](#).

Recommended Reading: Arthur O. Lovejoy and George Boas, Primitivism and Related Ideas in Antiquity (Johns Hopkins, 1997) and The History of Ideas: Canon and Variations, ed. by Donald R. Kelley (Rochester, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

23-01-2002

lower set

<[mathematics](#)> A [finite](#) non-empty [downward closed](#) subset of a [partial order](#).

[[FOLDOC](#)]

16-03-2001

LTM

[long term memory](#)

00-00-0000

Lucretius Titus Lucretius Carus

<[history of philosophy, biography](#)> Roman [philosopher](#) (99-55 BC). [Lucretius'](#) [philosophical poem](#) De rerum natura (On the Nature of Things) (50 B.C.) expounded the [atomism](#) of [Leucippus](#), [Democritus](#), and [Epicurus](#). [Lucretius](#) denied the [immortality](#) of the [soul](#) and criticized the [superstitious](#) adherence to [religious belief](#).

Recommended Reading: G. D. Hadzsits, Lucretius and His Influence (Cooper Square, 1930) and K. A. Algra, M. H. Koenen, and P. H. Schrijvers, Lucretius and his Intellectual Background (Royal Netherlands Academy, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

23-01-2002

Lukacs Grygory

<[history of philosophy, biography](#)> Hungarian [philosopher](#) (1885-1971). In Geschichte und Klassen-bewußtsein (History and Class Consciousness) (1923) Lukacs offered an extended defense of European [communism](#) as a means of overcoming the harmful effects of [alienation](#). He also applied the [philosophy](#) of [Marx](#) to [literary theory](#) in Die Eigenart des Ästhetischen (The Specificity of the Aesthetic) (1963), articulating an influential conception of "[socialist realism](#)."

Recommended Reading: The Lukacs Reader, ed. by Arpad Kadarky (Blackwell, 1995); Mary Gluck, Georg Lukacs and His Generation, 1900-1918 (Harvard, 1991); Eugene Lunn, Marxism and Modernism: An Historical Study of Lukacs, Brecht, Benjamin, and Adorno (California, 1984); Agnes Heller, Lukacs Reappraised (Columbia, 1984); and Galin Tihanov, The Master and the Slave: Lukacs, Bakhtin, and the Ideas of the Time (Oxford, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

23-01-2002

Lukasiewicz Jan

<[history of philosophy, biography](#)> Polish [logician](#) (1878-1956) whose Aristotle' s Syllogistic from the Standpoint of Modern Formal Logic (1957) introduced a bracketless [logical notation](#) and developed an axiomatic treatment of [Aristotelean syllogistic](#). He also proposed the use of a three-valued logic for interpretation of [future contingent](#) propositions as neither [true](#) nor [false](#) but merely [possible](#), in order to vitiate the difficulties traditionally associated with the [principle of bivalence](#).

Recommended Reading: Aristotle & Lukasiewicz on the Principle of Contradiction, ed. by Frederick Seddon (Modern Logic, 1996) and Philosophical Logic in Poland, ed. by Jan Wolenski (Kluwer, 1994).

[\[A Dictionary of Philosophical Terms and Names\]](#)

23-01-2002

Lull Raimond

(1235-1315) was born in Palma de Mallorca. After a tumultuous youth, he joined the Franciscan order firmly convinced that his mission was to convert the infidels. To accomplish his purpose, he amalgamated Agostinism and Aristotelism . Since the only way to convert Muslims to the Catholic faith is to demonstrate the truths of faith by means of reason, Lull develops his Ars Magna, or Ars Generalis, in which he states a series of rigorous logical deductions starting from certain and evident supreme principles that also the Muslims can accept. His polemic targets were Averroè and Sigier of Brabant, whose doctrine of double truth he opposed. His thought found excellent reception in Paris, Valencia and Barcelona; successively, Leibniz salvaged the Lullian idea of a Mathesis Universalis as a rational project. Raimond Lull died in Tunisia during the umpteenth attempt to convert Muslims to Christianity.

Primary sources:

Raimondi Lulli Opera Latina cum cura et studio Instituti Raimundi Lulli in universitate friburgense brisivagorum ad fidem codicum manu scriptorum edita (Palma de Mallorca voll. I-V - Thurnholt vol. VI-XXIII). The remaining volumes are under publication.

Secondary sources:

J. A. Yates, The Art of Raimond Lull (1955);

Carlo Ottaviano, L'ars compendiosa de R. Lull avec un étude sur la bibliographie et le fond Ambrosien de Lull (1930);

Louis Sala-Molins, La philosophie de l'amour chez R. Lulle, ed. V. Jankélevitch, Revista de Estudios Lulianos (1974);

Web-bibliography: www.geocities.com/Athens/Forum/5284/estev.html

Sandro Borzoni

11-05-2004

Luxemburg Rosa

<[history of philosophy, biography](#)> Polish [political activist](#) (1871-1919), author of Sozialreform oder Revolution? (Social Reform or Revolution?) (1899) and Die Akkumulation des Kapitals: Ein Beitrag zur Okonomischen Erklarung des Imperialismus (The Accumulation of Capital: An Anti-Critique) (1913). After studying [law](#) and [economics](#) in Switzerland, [Luxemburg](#) helped to establish [socialist revolutionary movements](#) in both Poland and Germany. Although she supported the Russian [revolution](#), she disagreed with [Lenin](#) about the [totalitarian](#) structure of the [state](#). The War and the Workers (1916) was written during her imprisonment in Germany. She was assassinated in Berlin.

Recommended Reading: Rosa Luxemburg: Writings and Reflections, ed. by Paul Le Blanc (Humanity, 1999); Rosa Luxemburg and Emma

Goldman: A Bibliography, ed. by Joan Nordquist (Reference & Research Services, 1996); Rosa Luxemburg Speaks, ed. by Mary-Alice Waters (Pathfinder, 1979); Rosa Luxemburg: A Revolutionary for Our Times, ed. by Stephen Eric Bronner (Penn. State, 1997); and Raya Dunayevskaya, Rosa Luxemburg, Women' s Liberation, and Marx' s Philosophy of Revolution (Illinois, 1991).

[\[A Dictionary of Philosophical Terms and Names\]](#)

23-01-2002

Lyotard Jean-Francois

<[history of philosophy](#), [biography](#)> French [philosopher](#) and literary theorist (1924-1998).

[Lyotard](#) maintained in *Le Diffèrend* (The Differend) (1983) that human discourses occur in any number of [discrete](#) and [incommensurable](#) realms, none of which is privileged to pass [judgment](#) on the success or value of any of the others. Thus, in *Économie libidinale* (Libidinal Economy) (1974), *La Condition postmoderne: Rapport sur le savoir* (The Postmodern Condition: A Report on Knowledge) (1979), and *Au juste: Conversations* (Just Gaming) (1979), Lyotard attacked contemporary literary theories and encouraged experimental discourse unbounded by excessive concern for [truth](#).

Recommended Reading: Jean-Francois Lyotard, *Political Writings*, tr. by Kevin P. Geiman (Minnesota, 1993); Jean-Francois Lyotard, *The Inhuman: Reflections on Time*, tr. by Rachel Bowlby and Geoffrey Bennington (Stanford, 1992); *The Lyotard Reader*, ed. by Andrew Benjamin (Blackwell, 1989); Jean-Francois Lyotard, *Phenomenology*, tr. by Brian Beakley (SUNY, 1991); Jean-Francois Lyotard, *Postmodern Fables*, tr. by Georges Van Den Abbeele (Minnesota, 1999); James Williams, *Lyotard: Towards a Modern Philosophy* (Polity, 1998); David Carroll, *Paraesthetics: Foucault, Lyotard, Derrida* (Routledge, 1987); James Williams, *Lyotard and the Political* (Routledge, 2000); *Judging Lyotard*, ed. by Andrew Benjamin (Routledge, 1992); and Jean-Francois Lyotard: *Time and Judgment*, ed. by Robert Harvey and Lawrence R. Schehr (Yale, 2001).

[\[A Dictionary of Philosophical Terms and Names\]](#)

23-01-2002

m-consistency

<[logic](#)> (model-theoretic consistency)

The state of having a [model](#)
(see also proof-theoretic consistency)

Model-theoretic consistent [wff](#)

A [wff](#) that has a model

Model-theoretic consistent set of [wffs](#) (m-consistent set)

A set of [wffs](#) for which there is a model, I, in which each member of the set is true for I.

Model-theoretic inconsistency (m-inconsistency)

The state of not having a model; being true in no interpretations.

[Glossary of First-Order Logic]

16-03-2001

magnanimity

<[history of philosophy](#), [ethics](#), [philosophy of politics](#)>
[greatness of soul](#); one of [Aristotle](#)' s most
 important [virtues](#).

[[A Dictionary of Philosophical Terms and Names](#)]

15-02-2002

Maimonides Moses Moses ben Maimon or Rambam

<[biography](#), [history of philosophy](#)> jewish philosopher and
 theologian (1135-1204) whose
 Sefer ha-Mizvot (Book of Commandments)
[codified Talmudic law](#). In Moreh Nevukhim (Guide to the
 Perplexed) (1190), [Maimonides](#) offered for the benefit of
 the intellectually elite an effective synthesis of
[medieval Judaism](#) with the philosophy of [Aristotle](#). On
 this view, reason is the primary source for [human knowledge](#),
 but it remains acceptable to rely upon faith in cases beyond
 the reach of [rationality](#). [Maimonides](#)' s opposition to the
[neoplatonism](#) of al-Farabi and [Ibn Sina](#) was a significant
 influence on the work of [Aquinas](#) and [Spinoza](#).
 Recommended Reading: Ethical Writings of Maimonides, ed. by
 Charles E. Butterworth (Dover, 1983); Maimonides Reader, ed.
 by Isadore Twersky (Behrman House, 1989); Jose Faur, Homo
 Mysticus: A Guide to Maimonides' s Guide for the Perplexed
 (Syracuse, 1999); Marvin Fox, Interpreting Maimonides:
 Studies in Methodology, Metaphysics, and Moral Philosophy
 (Chicago, 1995); Idit Dobbs-Weinstein, Maimonides and St.
 Thomas on the Limits of Reason (SUNY, 1995); and Maimonides:
 A Collection of Critical Essays, ed. by Joseph A. Buijs
 (Notre Dame, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

15-02-2002

major premise

<[philosophy of science](#), [logic](#)> in a [categorical syllogism](#),
 the [premise](#) whose terms are the [syllogism](#)' s [major term](#)
 and [middle term](#).

[[A Dictionary of Philosophical Terms and Names](#)]

15-02-2002

major term

<[philosophy of science](#), [logic](#)> the [predicate term](#) of the
[conclusion](#) of a [categorical syllogism](#).

[[A Dictionary of Philosophical Terms and Names](#)]

15-02-2002

Malebranche Nicolas

<[biography](#), [history of philosophy](#)> french priest and
 philosopher (1638-1715). As a leading [Cartesian](#), [Malebranche](#)
 argued in De la Recherche de la Ve/rite/ (The Search after
 Truth) (1675) and Entretiens sur la mÉtaphysique et sur
 la religion (Dialogues on Metaphysics and on Religion) (1688)
 that our ideas provide no direct, certain knowledge of bodies,
 but that instead we "see all things in god." This divinely
 ordained [occasionalism](#) provided for the apparent regularity
 of the [natural world](#) without appealing to any genuine
[causal interaction](#) among things. [Malebranche](#)' s explanation

of the [imperfection](#) of a divinely-created universe in the *Traité de la nature et de la grace* (Treatise on Nature and Grace) (1680) and other theological writings influenced the [theodicy](#) of [Leibniz](#).

Recommended Reading: Nicolas Malebranche, *Oeuvres Completes* (French & European, 1978); Patricia Easton, Thomas M. Lennon, and Gregor Sebba, *Bibliographia Malebranchiana: A Critical Guide to the Malebranche Literature into 1989* (Southern Illinois, 1992); Nicholas Jolley, *The Light of the Soul: Theories of Ideas in Leibniz, Malebranche, and Descartes* (Clarendon, 1998); and *The Cambridge Companion to Malebranche*, ed. by Steven M. Nadler (Cambridge, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-02-2002

Malthus Thomas Robert

<[biography](#), [history of philosophy](#)> english economist (1766-1834). In his

Essay on the Principle of Population (1798) [Malthus](#) pointed out that since human populations tend to grow more rapidly than their supply of food, they are eventually reduced by war, disease, and famine. In opposition to the optimism of social reformers like [Godwin](#), [Malthus](#) urged the prohibition or postponement of marriage as a responsible social policy in *Principles of Political Economy* (1820).

Recommended Reading: William Petersen, *Malthus: Founder of Modern Demography* (Transaction, 1998); Thomas Robert Malthus: *Critical Assessments*, ed. by John Cunningham Wood (Routledge, 1986); *Malthus: Critical Responses*, ed. by Geoffrey Gilbert (Routledge, 1997); and *Beyond Malthus: Nineteen Dimensions of the Population Challenge*, ed. by Lester R. Brown, Gary Gardner, and Brian Halweil (Norton, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-02-2002

Mandelbrot Benoit

<[biography](#), [history of philosophy](#)> polish-american mathematician (1924-). [Mandelbrot](#)'s

The Fractal Geometry of Nature (1982) made significant contributions to the study of [fractal geometry](#) as a [method of understanding](#) the scale-symmetries of [natural objects](#) and artifacts.

Recommended Reading: *Fractal Geometry and Analysis*, ed. by C.J.G. Evertsz, H.-O. Peitgen, and R. F. Voss (World Scientific, 1996) and *Complex Dynamical Systems: The Mathematics Behind the Mandelbrot and Julia Sets*, ed. by Robert L. Devaney (Am. Math. Soc., 1995).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-02-2002

Mandelbrot set

<[mathematics](#), [graphics](#)> (After its discoverer, Benoit Mandelbrot) The set of all [complex numbers](#) c such that

$$|z[N]| < 2$$

for arbitrarily large values of N , where

$$z[0] = 0$$

$$z[n+1] = z[n]^2 + c$$

The Mandelbrot set is usually displayed as an Argand diagram, giving each point a colour which depends on the largest N for which $|z[N]| < 2$, up to some maximum N which

is used for the points in the set (for which N is infinite). These points are traditionally coloured black.

The Mandelbrot set is the best known example of a [fractal](#) - it includes smaller versions of itself which can be explored to arbitrary levels of detail.

The Fractal Microscope
(http://www.ncsa.uiuc.edu/Edu/Fractal/Fractal_Home.html/).

[[FOLDOC](#)]

16-03-2001

Mandeville Bernard

<[biography](#), [history of philosophy](#)> dutch physician and philosopher (1670-1733). [Mandeville](#)' s The Fable of the Bees; or, Private

Vices, Public Benefits (1723) offered an account of human society as a purely conventional construction, governed by economic and [moral principles](#) serving only to secure the rational self-interest of its individual citizens. The only motive for [altruistic conduct](#), [Mandeville](#) supposed, is the condescending self-satisfaction an agent feels when proudly acting for the benefit of others.

Recommended Reading: M. M. Goldsmith, Private Vices, Public Benefits: Bernard Mandeville' s Social and Political Thought (Cambridge, 1991); Jack Malcolm, The Social and Political Thought of Bernard Mandeville (Garland, 1991); and Paradox and Society: The Work of Bernard Mandeville, ed. by Louis Schneider and Jay Weinstein (Transaction, 1986).

[[A Dictionary of Philosophical Terms and Names](#)]

17-02-2002

manichaeism

<[religion](#), [ethics](#), [history of philosophy](#)> persian religion. Followers of [Manes](#) (216-277) adhered to a [radical dualism](#) between [good and evil](#), or [spirit and body](#), and recommended an [ascetic way of life](#).

[Augustine](#), who had been a [Manichaean](#) before his conversion to [Christianity](#), later wrote an extended refutation of this [heretical doctrine](#).

Recommended Reading: Augustine and Manichaeism in the Latin West, ed. by Johannes Van Oort, Otto Wermelinger, and Gregor Wurst (Brill, 2001); Emerging from Darkness: Studies in the Recovery of Manichaen Sources, ed. by Paul Allan Mirecki and Jason Beduhn (Brill, 1997); and Jason David Beduhn, The Manichaean Body: In Discipline and Ritual (Johns Hopkins, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

17-02-2002

Mao Zedong

<[biography](#), [politics](#), [history of philosophy](#)> chinese revolutionary leader and founder of the People' s Republic of China (1893-1976). While leading the [Chinese revolution](#), [Mao](#) wrote

extensively on the theoretical application of [Marx](#)' s philosophy to the traditional values of Chinese culture. Many of his comments are included in Quotations from Chairman Mao. Other significant articles include Analysis of the Classes in Chinese Society (1926) On Practice (1937), and On New Democracy (1940).

Recommended Reading: Zedong Mao, On Guerrilla Warfare, tr. by Samuel B. Griffith (Illinois, 2000); Jonathan D. Spence, Mao Zedong (Viking, 1999); and Critical Perspectives on Mao Zedong' s Thought, ed. by Arif Dirlik, Paul Michael Healy, and Nick Knight

(Promethean, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

17-02-2002

map

1. [<mathematics>](#) [function](#).
2. [<programming>](#) In [functional programming](#), the most common higher-order function over lists. Map applies its first argument to each element of its second argument (a list) and returns the list of results.

```
map :: (a -> b) -> [a] -> [b]
map f [] = []
map f (x:xs) = f x : map f xs
```

This can be generalised to types other than lists.

[[FOLDOC](#)]

16-03-2001

mapping

[function](#)

00-00-0000

Marcel Gabriel

[<biography, history of philosophy>](#) french philosopher (1889-1973) whose *Le Mystère de l' être* (The mystery of Being) (1950), *The Existentialist Background to Human Dignity* (1963), and *The Philosophy of Existentialism* (1967) are often considered classic statements of [theistic existentialism](#), in which despair and self-deception are overcome by hope and a [spirit of truth](#). **Marcel** also wrote plays exhibiting similar themes, including *Un Homme de Dieu* (A Man of God) (1925) and *La Dimension Florestan* (The Florestan Dimension) (1956). Recommended Reading: Joe McCown, *Gabriel Marcel and the Phenomenology of Human Openness* (Scholars' Press, 1978); Seymour Cain, *Gabriel Marcel's Theory of Religious Experience* (Peter Lang, 1995); *Reflections on Gabriel Marcel: A Collection of Essays*, ed. by William Cooney (Edwin Mellen, 1989); and *The Philosophy of Gabriel Marcel*, ed. by Paul Arthur Schilpp and Lewis Edwin Hahn (Open Court, 1984).

[[A Dictionary of Philosophical Terms and Names](#)]

17-02-2002

Marcus Aurelius

[<biography, history of philosophy>](#) roman emperor and philosopher (121-180 CE); author of an intensely personal statement of [stoic principles](#) in the aphorisms of the *Meditations*. Written during his frequent military campaigns, these sayings provided **Marcus** with reminders of his [ethical obligations](#). Recommended Reading: Pierre Hadot, *The Inner Citadel: The Meditations of Marcus Aurelius*, trans. by Michael Chase (Harvard, 1998) and Anthony R. Birley, *Marcus Aurelius* (Routledge, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

17-02-2002

Marcuse Herbert

<[biography](#), [history of philosophy](#)> german-american political philosopher associated with the [Frankfurt School](#) (1898-1979). Author of Eros and Civilization (1955) and One-Dimensional Man (1964). [Marcuse](#) combined [Marx'](#) s economic analysis with [Freudian psychology](#) in an effort to show that a fundamental [social transformation](#) could liberate individual [human beings](#) from the [alienation](#) and repression that characterize [patriarchal capitalist societies](#).

Recommended Reading: Herbert Marcuse, Towards a Critical Theory of Society, ed. by Douglas Kellner (Routledge, 2001); Joan Nordquist, Herbert Marcuse: A Bibliography (Ref. and Res. Serv., 2000); Douglas Kellner, Herbert Marcuse and the Crisis of Marxism (California, 1992); Marcuse, ed. by Robert Pippin, Andrew Feenberg, and Charles P. Webel (Greenwood, 1987); and Charles Reitz, Art, Alienation, and the Humanities: A Critical Engagement With Herbert Marcuse (SUNY, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

19-02-2002

Maritain Jacques

<[biography](#), [history of philosophy](#)> french philosopher (1882-1973). After

studying with [Bergson](#), [Maritain](#) became the leading exponent of neo-Thomistic thought. His works include: Art et scholastique (Art and Scholasticism) (1920), Distinguer pour unir, ou les degre/s du savoir (The Degrees of Knowledge) (1932), and Humanisme inte/gral (True Humanism) (1936), along with many commentaries on the philosophy of Aquinas. In Approaches de Dieu (Approaches to God) (1953), for example, [Maritain](#) defended the five ways of proving God' s existence. [Maritain](#) was also one of the authors of the Universal Declaration of Human Rights approved by the United Nations in 1948.

Recommended Reading: Jacques Maritain, Man and the State (Catholic Univ. of Amer., 1998); Jacques Maritain, An Essay on Christian Philosophy, ed. by Edward H. Flannery (Irvington, 1955); The Future of Thomism: The Maritain Sequence, ed. by Deal W. Hudson, Dennis William Moran, and Donald Arthur Gallagher (Notre Dame, 1992); Charles A. Fecheck, The Philosophy of Jacques Maritain (Greenwood, 1953); and James V. Schall, Jacques Maritain (Rowman & Littlefield, 1998).

[[A Dictionary of Philosophical Terms and Names](#)]

19-02-2002

Markov chain

<[probability](#)> (Named after [Andrei Markov](#)) A model of sequences of events where the probability of an event occurring depends upon the fact that a preceding event occurred.

A [Markov process](#) is governed by a Markov chain.

In [simulation](#), the principle of the Markov chain is applied to the selection of samples from a probability density function to be applied to the model. [Simscrip](#) II.5 uses this approach for some modelling functions.

[Better explanation?]

[[FOLDOP](#)]

16-03-2001

Markov model

<[probability, simulation](#)> A model or [simulation](#) based on [Markov chains](#).

[FOLDOC]

16-03-2001

Markov process

<[probability, simulation](#)> A process in which the sequence of events can be described by a [Markov chain](#).

[FOLDOC]

16-03-2001

Marsilius of Padua

<[biography, history of philosophy](#)> italian political theorist who taught in Paris and Nuremberg (1277-1342). His Defensor Pacis (Defender of Peace) (1324) refuted papal claims to political as well as [ecclesiastical power](#) and argued that the chief function of [republican government](#) is the resolution of conflicts among citizens. Recommended Reading: Marsilius of Padua, Writings on the Empire: Defensor Minor and De Translatione Imperii, ed. by Cary J. Nederman (Cambridge, 1993) and Alan Gewirth, Marsilius of Padua (Ayer, 1979).

[A Dictionary of Philosophical Terms and Names]

04-03-2002

Marx Karl

<[biography, history of philosophy](#)> [Karl Marx](#) (1818-1883) was born and educated in Prussia, where he fell under the influence of [Ludwig Feuerbach](#) and other radical [Hegelians](#). Although he shared [Hegel'](#) s belief in [dialectical structure](#) and [historical inevitability](#), [Marx](#) held that the foundations of [reality](#) lay in the [material base](#) of [economics](#) rather than in the [abstract thought](#) of [idealistic philosophy](#). He earned a doctorate at Jena in 1841, writing on the [materialism](#) and [atheism](#) of [Greek atomists](#). Although he attempted to earn a living as a journalist in K–In, Paris, and Brussels, [Marx'](#) s participation in unpopular political movements made it difficult to support his growing family. He finally settled in London in 1849, where he lived in poverty while studying and developing his economic and political theories. Above all else, [Marx](#) believed that philosophy ought to be employed in practice to change the world. The core of [Marx'](#) [economic analysis](#) found early expression in the +konomisch-philosophische Manuskripte aus dem Jahre 1844 (Economic and Political Manuscripts of 1844) (1844). There, [Marx](#) argued that the conditions of modern industrial societies invariably result in the [estrangement](#) (or [alienation](#)) of workers from their own labor. In his review of a [Bruno Baier](#) book, On the Jewish Question (1844), [Marx](#) decried the lingering influence of religion over politics and proposed a revolutionary re-structuring of European society. Much later, [Marx](#) undertook a systematic explanation of his economic theories in Das Capital (Capital) (1867-95) and Theorien Dber den Mehrwert (Theory of Surplus Value) (1862). [Marx](#) and his colleague [Friedrich Engels](#) issued the Manifest der kommunistischen Partei ([Communist Manifesto](#)) (1848) in the explicit hope of precipitating [social revolution](#). This work describes the [class struggle](#) between [proletariat](#) and

[bourgeoisie](#), distinguishes [communism](#) from other [socialist movements](#), proposes a list of specific social reforms, and urges all workers to unite in [revolution](#) against existing regimes. You may wish to compare this prophetic document with the later exposition of similar principles in [Lenin](#)' s State and Revolution (1919).

Recommended Reading:

Primary sources:

Karl Marx, Friedrich Engels, Gesamtausgabe, ed. by the Institut fuer Marxismus-Leninismus (Dietz, 1972-);

The Portable Karl Marx, ed. by Eugene Kamenka (Viking, 1983);

The Communist Manifesto, ed. by Frederic L. Bender (Norton, 1988);

Karl Marx, Early Writings, tr. by Rodney Livingstone (Penguin, 1992);

Karl Marx, Capital: A Critique of Political Economy, tr. by Ben Fowkes (Penguin, 1992).

Secondary sources:

The Cambridge Companion to Marx, ed. by Terrell Carver (Cambridge, 1992);

Terry Eagleton, Marx (Routledge, 1999);

Sidney Hook and Christopher Phelps, From Hegel to Marx: Studies in the Intellectual Development of Karl Marx (Columbia, 1994).

Additional on-line information about Marx includes:

Comprehensive coverage from The Marx/Engels Archive.

Allen Wood' s article in The Oxford Companion to Philosophy.

Also see: alienation, base and superstructure, bourgeoisie and proletariat, capitalism, class struggle, communism, dialectical materialism, the dictatorship of the proletariat, exploitation, false consciousness, German philosophy, historical materialism, ideology, Marxist philosophy, material contradiction, political philosophy, property, social constructionism, socialism, and Soviet philosophy.

The thorough collection of resources at EpistemeLinks.com.

The Bloomsbury Guide to Human Thought on Marxism, Capitalism,

The Labour Theory Of Value, The Bourgeoisie, Class, Ideology, and The Sociology Of Knowledge.

The article in the Columbia Encyclopedia at Bartleby.com.

Paul Warren' s paper on Marxist objections to exploitation.

A philosophical biography from Uwe Wiedemann.

Snippets from Marx and The Communist Manifesto in The Oxford Dictionary of Quotations.

A contemporary defense of Marxist aims from Bob Stone.

Bjoern Christensson' s brief guide to online resources.

The Macmillan Encyclopedia 2001 on Marx and Marxism.

[\[A Dictionary of Philosophical Terms and Names\]](#)

05-03-2002

Masham Damaris Cudworth

<[biography](#), [history of philosophy](#)> English philosopher (1659-1708).

The daughter of [Ralph Cudworth](#) and an intimate friend of [John Locke](#), [Masham](#) used religious arguments to encourage the education of women in Occasional Thoughts in Reference to a Christian Life (1694) and A Discourse concerning the Love of God (1696).

Recommended Reading: Women Philosophers of the Early Modern Period, ed. by Margaret Atherton (Hackett, 1994).

[\[A Dictionary of Philosophical Terms and Names\]](#)

05-03-2002

material cause

<[metaphysics](#), [history of philosophy](#)> basic stuff of which a thing is made; one of [Aristotle](#)' s [four causes](#).

Recommended Reading: Aristotle, The Physics: Books I-IV, tr. by Philip H. Wicksteed and Francis M. Cornford (Harvard, 1986) and Aristotle' s Physics: A Collection of Essays, ed. by Lindsay Judson (Clarendon, 1995).

[\[A Dictionary of Philosophical Terms and Names\]](#)

05-03-2002

material equivalence

<[logic](#), [philosophy of science](#)> the [logical relationship](#) between any two [propositions](#) that have the same truth-value. See [equivalence](#).

[[A Dictionary of Philosophical Terms and Names](#)]

05-03-2002

material implication

<[logic](#), [philosophy of science](#)> the [logical relationship](#) between any two [propositions](#) such that either the first is [false](#) or the second is [true](#). See [implication](#).

Recommended Reading: David H. Sanford, *If P, Then Q: Conditionals and the Foundations of Reasoning* (Routledge, 1992); W. L. Harper, R. Stalnaker, and G. Pearce, *Ifs: Conditionals, Belief, Decision, Chance, and Time* (Kluwer, 1980); and Michael Woods, *Conditionals*, ed. by David Wiggins and Dorothy Edgington (Clarendon, 1997). See [implication](#).

[[A Dictionary of Philosophical Terms and Names](#)]

05-03-2002

materialism

<[metaphysics](#), [philosophy of mind](#)>

the view according to which the only thing that really exists in the world is matter in its various states and movements (commonly atoms or other physical particles). Thus materialism is the opposite of [idealism](#). Note that many philosophers and scientists now use the terms "material" and "physical" interchangeably (for a version of physicalism distinct from materialism, see [physicalism](#)). Materialism considers any talk of, say, the soul to be complete nonsense and a throwback to the bad old days of [spiritualism](#) and [vitalism](#) in philosophy. Note that because matter can be completely known by means of physical laws and mathematical description (see [reductionism](#)), materialism tends to be used to lend heavy support to [determinism](#). (References from [behaviorism](#), [determinism](#), [idealism](#), [monism](#), [reductionism](#), and [vitalism](#).)

Recommended Reading: Julien Offray de La Mettrie, *Machine Man and Other Writings*, ed. by Ann Thomson (Cambridge, 1996); Richard C. Vitzthum, *Materialism: An Affirmative History and Definition* (Prometheus, 1995); *Materialism and the Mind-Body Problem*, ed. by David M. Rosenthal (Hackett, 2000); Jennifer Trusted, *The Mystery of Matter* (Palgrave, 1999); and *Physicalism and Its Discontents*, ed. by Carl Gillett and Barry Loewer (Cambridge, 2001).

Based on [[The Ism Book](#)] and the [[Dictionary of Philosophy of Mind](#)]
[[A Dictionary of Philosophical Terms and Names](#)]

06-03-2002

mathematical induction

<logic>

A powerful technique for proving that a [theorem](#) holds for all cases in a large or infinite well-ordered sets. The proof has two steps, the basis and induction step. Roughly, in the basis the [theorem](#) is proved to hold for the "ancestor" case, and in the induction step it is proved to hold for all "descendant" cases.

Example: if S is a well-ordered set with ordering "<", and we want to show that a property P holds for every element of S, it is sufficient to show that, for all s in S,

IF for all t in S, $t < s \Rightarrow P(t)$ THEN $P(s)$

i.e. if P holds for anything less than s then it holds for s. In this case we say P is proved by induction.

The most common instance of proof by induction is induction over the [natural numbers](#) where we prove that some property holds for $n=0$ and that if it holds for n, it holds for $n+1$.

(In fact it is sufficient for "<" to be a well-founded [partial order](#) on S, not necessarily a well-ordering of S.)

For a more precise definition, see sub-items below.

See [heredity](#), [induction](#)

Basis

Proof that the [theorem](#) in question holds for the minimal case. Induction hypothesis

Assumption that the [theorem](#) in question holds (in weak mathematical

induction) for an arbitrary case k, or that it holds (in strong mathematical induction) for all cases up to and including k. Induction step

Proof that if the induction hypothesis is true, then the [theorem](#) in question holds for case $k+1$.

Strong and weak mathematical induction

Two versions of the induction hypothesis (see above).

[Glossary of First-Order Logic] and [[FOLDOC](#)]

16-03-2001

Mathematical knowledge

Understanding of mathematical entities and [ideas](#) and ability to elaborate mathematical ideas into theories. Thinkers disagree on whether mathematical [knowledge](#) is 'knowledge that something is so' (propositional knowledge) or 'knowledge of something' (nonpropositional knowledge). A further distinction can be drawn according to whether mathematical knowledge is, entirely or in part, empirical ([a posteriori](#)) or non-empirical ([a priori](#)).

Giuseppina Ronzitti.

See :

- Stewart Shapiro, *Philosophy of Mathematics: Structure and Ontology*, Oxford University Press (1997).
- Philip Kitcher, *The Nature of Mathematical knowledge*, New York, Oxford University Press (1983).

28-01-2004

Mathematical object

An [abstract entity](#) that is thought to exist in a mathematical realm. [Numbers](#), [functions](#), [sets](#), points, lines and triangles are examples of mathematical objects. A main philosophical problem is whether the existence of mathematical objects is or is not dependent on human [mathematical knowledge](#) of them. A related problem is that of finding out whether mathematical objects come into existence by means of the achievements of such knowledge or are rather eternal by essence.

Giuseppina Ronzitti

See :

- Stewart Shapiro, *Philosophy of Mathematics: Structure and Ontology*, Oxford University Press (1997).
- Paul Benacerraff, "What Numbers could not be" in *Philosophical Review* 74:47-73 (1965); reprinted in Benacerraff and Putnam (1983).
- Paul Benacerraff and Hilary Putnam, *Philosophy of Mathematics, Selected Readings*. Cambridge: Cambridge University Press (1983).

28-01-2004

Mathematical structuralism

The claim that mathematics concerns mathematical structures, rather than isolated objects. In this view, for example, [arithmetics](#) is the study of the form of systems of natural numbers structured by a designated initial object and a successor function.

Giuseppina Ronzitti

See :

- Charles Parsons, *The Structuralist View of Mathematical Objects*, *Sinthese* 84:303-346 (1990)
- Stewart Shapiro, *Philosophy of Mathematics: Structure and Ontology*, Oxford University Press (1997).

28-01-2004

matrix

[FidoNet] 1. What the Opus BBS software and sysops call [FidoNet](#).

2. Fanciful term for a [cyberspace](#) expected to emerge from current networking experiments (see network, the).

3. The totality of present-day computer networks.

[[Jargon File](#)]

4. <[logic](#)>

In [wffs](#) of [predicate](#) logic in which all quantifiers are clustered together at the left side, the section to the right of the quantifiers.

See [prefix](#), [prenex normal form](#).

[Glossary of First-Order Logic]

16-03-2001

matter

<[metaphysics](#), [cosmology](#)> physical stuff-whatever has size and shape, is [solid](#) and [tangible](#), takes up [space](#), and can move. Hence, for many philosophers of the [Western tradition](#), [material objects](#) are [substances](#) that have the attribute of [extension](#). [Idealists](#) deny the [reality](#) of any such stuff, while [materialists](#) deny that there is anything else.

[[A Dictionary of Philosophical Terms and Names](#)]

06-03-2002

mauvaise foi

<[ethics](#), [moral philosophy](#)> Sartre' s French term for "bad faith," the culpable self-deception involved in declining to accept [responsibility](#) for one' s [choices](#). Recommended Reading: Jean-Paul Sartre, Being and Nothingness: A Phenomenological Essay on Ontology, tr. by Hazel E. Barnes (Washington Square, 1993); Joseph S. Catalano, A Commentary on Jean-Paul Sartre' s ' Being and Nothingness' (Chicago, 1985); and Ronald E. Santoni, Bad Faith, Good Faith, and Authenticity in Sartre' s Early Philosophy (Temple, 1995).

[[A Dictionary of Philosophical Terms and Names](#)]

06-03-2002

maxim

<[medieval logic](#), [ethics](#)> an [action](#) guiding [principle](#) or [policy](#), e.g., the carpenter' s maxim, "Measure twice, cut once." According to Kant, a maxim is the subjective rule that an individual uses in making a decision. For him, all human actions are undertaken under the color of maxims, and the [moral character](#) of the act -- whether it' s [right](#) or [wrong](#) -- depends on the [universalizability](#) or [nonuniversalizability](#) of the maxim under color of which it is undertaken. See categorical imperative.

based on [[Ethics Glossary](#), [Philosophical Glossary](#)]

06-03-2002

maximal proof-theoretic consistent set

<[logic](#)>

A set of [wffs](#) that cannot be enlarged without becoming p-inconsistent.

See proof-theoretic consistency

[[Glossary of First-Order Logic](#)]

16-03-2001

maximin principle

<[logic](#), [mathematics](#), [game-theory](#)> supposition that the preferable alternative is one whose worst outcome is least harmful, originally in mathematical and game-theoretical contexts. Thus, when success in any venture is uncertain, it is better to choose courses of action that risk the least, even if they don' t offer [a chance](#) at the most. [Rawls](#) argued that this maximization of the minimum gain to be achieved is a [rational guide](#) for social decision-making.

Recommended Reading: V. F. Dem' Yanov and V. N. Malozemov, Introduction to Minimax (Dover, 1990); Stephen Simons, Minimax and Monotonicity (Springer Verlag, 1999); Ronald Christensen, General Description of Entropy Minimax (Entropy, 1981); and John Rawls, A Theory of Justice (Belknap, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

06-03-2002

McCulloch-Pitts neuron

<[artificial intelligence](#)> The basic building block of [artificial neural networks](#). It receives one or more inputs and produces one or more identical outputs, each of which is a simple non-linear function of the sum of the inputs to the neuron. The non-linear function is typically a threshold or step function which is usually smoothed (i.e. a [sigmoid](#)) to facilitate [learning](#).

[[FOLDOC](#)]

16-03-2001

McTaggart John McTaggart Ellis

<[biography, history of philosophy](#)> british philosopher (1866-1925). In *Studies in the Hegelian Dialectic* (1896), *Studies in the Hegelian Cosmology* (1901), and *Commentary on Hegel's Logic* (1910) McTaggart criticized and modified [Hegel's](#) use of [dialectical methods](#). [McTaggart's](#) own effort to unfold the consequences of the supposition that something exists in *The Nature of Existence* (1921, 1927) notoriously resulted in an extreme version of [idealism](#), according to which space, time, and [material objects](#) have no genuine [reality](#). Only individual minds, related to each other by love, are real in the most fundamental sense.

Recommended Reading: J. McT. Ellis McTaggart, *Philosophical Studies*, ed. by S. V. Keeling and Gerald Rochelle (St. Augustine, 1996); Gerald Rochelle, *The Life and Philosophy of J. McT. E. McTaggart, 1866-1925* (Edwin Mellen, 1991); Gerald Rochelle, *Behind Time: The Incoherence of Time and McTaggart's Atemporal Replacement* (Ashgate, 1998); and C. D. Broad, *Examination of McTaggart's Philosophy* (Thoemmes, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

15-02-2002

Mead George Herbert

<[biography, history of philosophy](#)> american philosopher (1863-1931) who applied the principles of [pragmatism](#) to the development of the modern discipline of [sociology](#). In *The Social Self* (1913), [Mead](#) developed a notion of self-consciousness grounded in [social interaction](#) that would be more fully explained in *Mind, Self, and Society from the Standpoint of a Social Behaviorist* (1934).

Recommended Reading: George Herbert Mead, *Essays on Social Psychology*, ed. by Mary Jo Deegan (Transaction, 2001); *Philosophy, Social Theory, and the Thought of George Herbert Mead*, ed. by Mitchell Abouafia (SUNY, 1991); Hans Joas, G.H. Mead: A Contemporary Re-Examination of His Thought, tr. by Raymond Meyer (MIT, 1997); and Gary A. Cook, *George Herbert Mead: The Making of a Social Pragmatist* (Illinois, 1993).

[[A Dictionary of Philosophical Terms and Names](#)]

06-03-2002

mean

<[ethics, philosophy of politics](#)> the middle way between too much and too little of something. [Aristotle](#) held that [virtue](#) is always a mean between vicious extremes of excess and deficiency.

Recommended Reading: Aristotle, *The Nicomachean Ethics*, tr. by W. D. Ross, J. L. Ackrill, and J. O. Urmson (Oxford, 1998); Aristotle, *Virtue and the Mean*, ed. by Richard Bosley, Roger A. Shiner, and Janet D. Sisson (Academic Pr. & Pub., 1995); James S. Hans, *The Golden Mean* (SUNY, 1994); Sarah Broadie, *Ethics With Aristotle* (Oxford, 1995); and Amelie Rorty, *Essays*

on Aristotle' s Ethics (California, 1981).

[[A Dictionary of Philosophical Terms and Names](#)]

06-03-2002

meaning

<[logic](#), [philosophy of science](#), [linguistics](#)> the customary significance attached to the use of a word, phrase, or sentence, including both its [literal sense](#) and its [emotive associations](#); what is elucidated in a [definition](#). Philosophical theories of meaning endeavor to explain the conditions under which an expression comes to have [internal significance](#) and [external reference](#).

Recommended Reading: A. W. Moore, Meaning and Reference (Oxford, 1993); Paul Grice, Studies in the Way of Words (Harvard, 1991); The Meaning of Meaning: A Study of the Influence of Language upon Thought and of the Science of Symbolism, ed. by I. A. Richards and C. K. Ogden (Harvest, 1989); Truth and Meaning: Essays in Semantics, ed. by Gareth Evans and John McDowell (Oxford, 2000); and Gilles Fauconnier, Eve Sweetser, and George Lakoff, Mental Spaces: Aspects of Meaning Construction in Natural Language (Cambridge, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

07-03-2002

means

<[ethics](#)>

philosophers often contrast means and [ends](#). The ends we seek are the goals we try to achieve, while the means are the [actions](#) or things which we use in order to accomplish those ends. A hammer provides the means for pounding a nail in a piece of wood. Some philosophers, most notably Immanuel Kant, have argued that we should never treat human beings merely as means to an end.

26-03-2001

mechanicism

<[philosophy of complexity](#), [atomism](#), [finalism](#), [materialism](#)>
<[causalism](#), [physics](#), [biology](#), [psychology](#), [sociology](#)>
[philosophical theory](#) that denies "[action](#) at a distance" and holds, that [natural systems](#), including living organisms, are [complex machines](#). Descartes famously held this to be [true](#) of all nonhuman animals but not of [human minds](#) and their [freely willed actions](#).

[[Philosophical Glossary](#)]

29-07-2001

mechanism

<[metaphysics](#), [history of philosophy](#)> belief that science can explain all [natural phenomena](#) in terms of the [causal interactions](#) among [material particles](#), without any reference to [intelligent agency](#) or [purpose](#). As employed by [Descartes](#) and [Hobbes](#), [mechanism](#) offered an alternative to the [scholastic reliance](#) on explanatory appeals to [final causes](#).

Recommended Reading: Julien Offray de La Mettrie, Machine Man and Other Writings, ed. by Ann Thomson (Cambridge, 1996); Margaret Dauler Wilson, Ideas and Mechanism (Princeton, 1999); and Roger J. Faber, Clockwork Garden: On the Mechanistic Reduction of Living Things (Massachusetts, 1986).

[\[A Dictionary of Philosophical Terms and Names\]](#)

07-03-2002

megalopsychia

<[ethics](#), [moral philosophy](#)> Greek term for [magnanimity](#) or [greatness of soul](#), one of the greatest of the [moral virtues](#) in the [ethics](#) of [Aristotle](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

07-03-2002

Meinong Alexius Ritter von Handschuchsheim

<[biography](#), [history of philosophy](#)> Austrian philosopher (1853-1928). In *Untersuchungen zur Gegenstandstheorie und Psychologie* (On the Theory of Objects and Psychology) (1904), *Über Annahmen* (On Assumptions) (1907), and *Über Möglichkeit und Wahrscheinlichkeit* (On Possibility and Probability) (1915), [Meinong](#) drew a strict distinction between the content of a [mental act](#) and its object. Protesting what he called the "prejudice in favor of the actual" by traditional ontology, [Meinong](#) posited many levels of [reality](#), including not only existence but also being, subsistence, and "being-so." In [Meinong](#)'s fully developed theory of objects, it is possible not only to think about the golden mountain - even though it does not exist and may even be impossible - but also to know of it that it most certainly is made of gold. Recommended Reading: Reinhardt Grossmann, *Meinong* (Routledge, 1999); Roderick M. Chisholm, *Brentano And Meinong Studies* (Rodopi, 1982); Rudolf Haller, *Meinong Und Die Gegenstandstheorie* (Rodopi, 1996); Kenneth J. Perszyk, *Nonexistent Objects: Meinong and Contemporary Philosophy* (Kluwer, 1993); and Marie-Luise Schubert Kalsi, *Meinong's Theory of Knowledge* (Martinus Nijhoff, 1987).

[\[A Dictionary of Philosophical Terms and Names\]](#)

07-03-2002

meliorism

<[metaphysics](#)>
the view according to which the universe is getting better all the time - a belief in [progress](#) which we could call a kind of [optimism](#).

[\[The Ism Book\]](#)

Edited by Giovanni Benzi

25-03-2001

membership

<[logic](#)>
The relation of an element to the sets to which it belongs.
Notation: x
: S
(x is a member of set S).

[\[Glossary of First-Order Logic\]](#)

16-03-2001

meme

<[sociobiology](#), [philosophy of biology](#), [anthropology](#)> a self-replicating unit of cultural meaning. Transmitted socially among individuals of different generations, [memes](#) evolve through processes of [mutation](#) and [natural selection](#). Thus, for example, the jingles sung by children while skipping rope, the conventional standards for fashionable dress, and the notions comprising the "common-sense" view of the world are all passed on through time, gradually modifying without any deliberate guidance.

Recommended Reading: Richard Dawkins, *The Selfish Gene* (Oxford, 1990); Richard Brodie, *Virus of the Mind: The New Science of the Meme* (DeVors, 1995); Susan Blackmore and Richard Dawkins, *The Meme Machine* (Oxford, 2000); and Aaron Lynch, *Thought Contagion: How Belief Spreads Through Society* (Basic, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

07-03-2002

memetic algorithm

<[algorithm](#)> A [genetic algorithm](#) or [evolutionary algorithm](#) which includes a non-genetic local search to improve genotypes. The term comes from the Richard Dawkin' s term "[meme](#)".

One big difference between memes and genes is that memes are processed and possibly improved by the people that hold them - something that cannot happen to genes. It is this advantage that the memetic algorithm has over simple genetic or evolutionary algorithms.

These algorithms are useful in solving complex problems, such as the "[Travelling Salesman Problem](#)," which involves finding the shortest path through a large number of nodes, or in creating [artificial life](#) to test evolutionary theories.

Memetic algorithms are one kind of [metaheuristic](#).

UNLP memetic algorithms home page
(http://www.ing.unlp.edu.ar/cetad/mos/memetic_home.html).

[[FOLDOC](#)]

16-03-2001

Memex

<[hypertext](#)> [Vannevar Bush](#)' s original name fo [hypertext](#), which he invented in the 1930s.

Fantastic article
(<http://jefferson.village.virginia.edu/elab/hfl0051.html>).

[[FOLDOC](#)]

16-03-2001

memory

<[philosophy](#), [gnoseology](#), [psychology](#), [neurosciences](#)> the capacity to recall past [experience](#) or information in the present. The reliability of [memory](#) as a source of [knowledge](#) and the extent of its contribution to [personal identity](#) are matters of philosophical dispute.

Recommended Reading: Edward S. Casey, *Remembering: A Phenomenological Study* (Indiana, 2000); Charles E. Scott, *The Time of Memory* (SUNY, 1999); Edward S. Casey, *Spirit and Soul: Essays in Philosophical Psychology* (Spring, 1991); and Ian Hacking, *Rewriting the Soul* (Princeton, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

1. <[storage](#)> These days, usually used synonymously with Random Access Memory or Read-Only Memory, but in the general sense it can be any device that can hold [data](#) in machine-readable format.

[\[FOLDOC\]](#)

2. <[philosophy of mind](#)> See [LTM](#), [STM](#)

07-03-2002

Mendel Gregor

<[biography](#), [genetics](#), [history of philosophy](#)>

Austrian botanist (1822-1884)

whose observation of successive generations of garden peas, published in Experiments in Plant Hybridization (1865), suggested principles of heredity which helped give rise to the modern science of [genetics](#).

Recommended Reading: William Bateson, Mendel' s Principles of Heredity (Genetics Heritage, 1996); Robin Marantz Henig, The Monk in the Garden: The Lost and Found Genius of Gregor Mendel, the Father of Genetics (Mariner, 2001); and Edward Edelson, Gregor Mendel and the Roots of Genetics (Oxford, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

07-03-2002

Mendelssohn Moses

<[biography](#), [genetics](#), [history of philosophy](#)> German Jewish philosopher (1729-1786). [Mendelssohn](#)' s arguments for the existence of

[god](#) in Morgenstunden (Morning Hours) (1785) and defense of [human immortality](#) in his commentary on [Plato](#)' s [Phaedo](#) (1767) were greatly influential on his friends [Lessing](#) and [Kant](#). Relying upon [natural law](#) theory to argue for religious toleration in Jerusalem (1783),

[Mendelssohn](#) expressed high hopes for political progress, but his intellectual life was often disturbed by growing German discrimination against Jews. His grandson, the composer Felix Mendelssohn, was raised as a Christian.

Recommended Reading: Moses Mendelssohn, Philosophical Writings, tr. by Daniel O. Dahlstrom (Cambridge, 1997); Allan Arkush, Moses Mendelssohn and the Enlightenment (SUNY, 1994); Walter Hermann, Moses Mendelssohn, Critic and Philosopher (Ayer, 1973); and David Jan Sorkin, Moses Mendelssohn and the Religious Enlightenment (California, 1996).

[\[A Dictionary of Philosophical Terms and Names\]](#)

07-03-2002

mens

<[philosophical terminology](#)> latin term for [mind](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

07-03-2002

mental content<[philosophy of mind](#)>

as distinguished from vehicle, mental content is that aspect of mentality which, ideally, refers to an object, property or relation and specifies some properties of that item. [externalism](#), [internalism](#), [sense](#), [reference](#)

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

mentalism<[metaphysics](#), [psychology](#), [philosophy of mind](#)>

the view according to which only mind or spirit really exists, or that mind or spirit is the fundamental substance in the universe. Mentalism is sometimes called [immaterialism](#), and is usually held to be similar to or equivalent to [idealism](#).

[[The Ism Book](#)]

Edited by Giovanni Benzi

25-03-2001

mention

<[logic](#), [linguistics](#)> reference to an [expression](#) considered merely as a unit of language; see [use](#) / [mention](#).

[[A Dictionary of Philosophical Terms and Names](#)]

07-03-2002

mereology<[logic](#)>

branch of logic that studies part-whole formal relationships.

See [set theory](#)

Luciano Floridi

16-03-2001

Merleau-Ponty Maurice

<[biography](#), [history of philosophy](#)> French philosopher (1908-1961).

Applying

the methods of [Husserl](#)' [phenomenology](#) to the relation of [mind and body](#) in *La Phaenomenologie de la perception* (The Phenomenology of Perception) (1945) and *Le visible et l' invisible* (The Visible and the Invisible) (1964), Merleau-Ponty rejected [dualism](#) and diagnosed a pervasive ambiguity in the character of [human life](#). Attributing all [consciousness](#) to pre-reflective sensual awareness of the corporeal, Merleau-Ponty tried to overcome the traditional dichotomy between objective and subjective elements of human experience.

Recommended Reading: Maurice Merleau-Ponty, *Structure of Behavior* (Duquesne, 1983); *The Merleau-Ponty Aesthetics Reader: Philosophy and Painting*, ed. by Galen A. Johnson and Michael B. Smith (Northwestern, 1994); Gary Brent Madison, *The Phenomenology of Merleau-Ponty: A Search for the Limits of Consciousness* (Ohio, 1981); *Merleau-Ponty: Interiority and Exteriority, Psychic Life and the World*, ed. by Dorothea Olkowski and James Morley (SUNY, 1999); and M. C. Dillon, *Merleau-Ponty' s Ontology* (Northwestern, 1997).

[\[A Dictionary of Philosophical Terms and Names\]](#)

07-03-2002

Mersenne Marin

<[biography](#), [history of philosophy](#)> French priest (1588-1648). Through his own voluminous correspondence, [Mersenne](#) kept several early modern philosophers in touch with each other's development. He translated into French the philosophical works of [Galileo](#), [Herbert](#) of [Cherbury](#), and [Hobbes](#); he gathered the objections to which his friend [Descartes](#) replied in the original edition of the [Meditations](#); and he composed his own reply to the threats of [skepticism](#) and [atheism](#) in *La Ve/rite/ des sciences contre les sceptiques ou pyrrhoniens* (The Truth of Science against the Sceptics or Pyrrhonians) (1625). Recommended Reading: Peter Dear, *Mersenne and the Learning of the Schools* (Cornell, 1995) and Grotius to Gassendi, ed. by Vere Chappell (Garland, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

07-03-2002

mesos

<[ethics](#), [moral philosophy](#)> Greek term for [middle](#) or [mean](#). The [Pythagoreans](#) regarded a balance between extremes as part of the [harmonious life](#) proper for [human conduct](#). [Aristotle](#) argued more specifically that [virtue](#) in human life invariably emerges as the [mean](#) between [vicious](#) extremes. Recommended Reading: F. E. Peters, *Greek Philosophical Terms: A Historical Lexicon* (NYU, 1967); Aristotle, *The Nicomachean Ethics*, tr. by W. D. Ross, J. L. Ackrill, and J. O. Urmson (Oxford, 1998); Sarah Broadie, *Ethics With Aristotle* (Oxford, 1995); and Aristotle, *Virtue and the Mean*, ed. by Richard Bosley, Roger A. Shiner, and Janet D. Sisson (Academic Pr. & Pub., 1995).

[\[A Dictionary of Philosophical Terms and Names\]](#)

10-03-2002

message

<PI>
In object-oriented programming sending a message to an [object](#) (to invoke a [method](#)) is equivalent to calling a [procedure](#) in traditional programming languages, except that the actual code executed may only be selected at run-time depending on the [class](#) of the object. Thus, in response to the message "drawSelf", the method code invoked would be different if the target object were a circle or a square.

[\[FOLDOP\]](#)

16-03-2001

meta

<[logic](#)> /me' t*/ or /may' t*/ or (Commonwealth) /mee' t*/ A prefix meaning one level of description higher. If X is some concept then meta-X is data about, or processes operating on, X.

For example, a [metasyntax](#) is [syntax](#) for specifying syntax, [metalanguage](#) is a language used to discuss language, meta-data is data about data, and meta-reasoning is reasoning about reasoning.

[FOLDOC]

16-03-2001

meta-data

<data> /me' t'day` t*/, or combinations of /may/ or (Commonwealth) /mee'-/; /-dah` t*/ (Or "meta data") Data about [data](#). In [data processing](#), meta-data is definitional data that provides information about or documentation of other data managed within an application or environment.

For example, meta data would document data about data elements or [attributes](#), (name, size, data type, etc) and data about [records](#) or [data structures](#) (length, fields, columns, etc) and data about data (where it is located, how it is associated, ownership, etc.). Meta data may include descriptive information about the context, quality and condition, or characteristics of the data.

[FOLDOC]

16-03-2001

Metaclass

The class of a class. A metaclass is a class whose instances are themselves classes.

16-03-2001

metaethics

<[ethics](#), [moral philosophy](#)> branch of philosophical [ethics](#) concerned with the meaning of [moral propositions](#) and the grounds upon which [moral judgments](#) are to be justified. Meta-ethical theories typically offer an account of [moral language](#) and its uses together with an explanation of the [logical relations](#) between assertions of [fact](#) and [value](#).

Recommended Reading: Robin Attfield, Value, Obligation, And Meta-ethics (Rodopi, 1995); David O. Brink, Moral Realism and the Foundations of Ethics (Cambridge, 1989); Bernard Williams, Ethics and the Limits of Philosophy (Harvard, 1986); T. Tannsjo, The Relevance of Metaethics to Ethics (Coronet, 1976); and Andrew Minase, A Book of Metaethics (iUniverse, 2000).

[A Dictionary of Philosophical Terms and Names]

10-03-2002

metaheuristic

<[algorithm](#), [complexity](#), [computability](#)> A top-level general strategy which guides other [heuristics](#) to search for feasible solutions in domains where the task is hard.

Metaheuristics have been most generally applied to problems classified as NP-Hard or NP-Complete by the theory of [computational complexity](#). However, metaheuristics would also be applied to other [combinatorial optimisation](#) problems for which it is known that a polynomial-time solution exists but is not practical.

Examples of metaheuristics are [Tabu Search](#), simulated annealing, [genetic algorithms](#) and [memetic algorithms](#).

[FOLDOC]

16-03-2001

metalanguage

1. [theorem proving] A language in which proofs are manipulated and tactics are programmed, as opposed to the logic itself (the "[object language](#)"). The first [ML](#) was the metalanguage for the Edinburgh [LCF](#) proof assistant.

[[FOLDOP](#)]

2. [logic] The language in which we talk about a [formal language](#). The "target" of the metalanguage is called the [object language](#).

[Glossary of First-Order Logic]

16-03-2001

metalogic

<[logic](#)>

The study of formal systems, especially those intended to capture branches of logic, e.g. truth-functional propositional logic, resulting

in

[metatheorems](#) about those systems. Reasoning about reasoning.

See [metalanguage](#)

[Glossary of First-Order Logic]

16-03-2001

metanarrative

<[philosophy](#), [psychology](#), [sociology](#)> stories employed to legitimate the mechanisms of [social control](#). Thus, for example, when parents tell their children, "We only want to help you avoid our mistakes," they are constructing a [metanarrative](#) that justifies the imposition of rules of conduct they are unwilling to follow themselves. [Lyotard](#) supposed that the deliberate subversion of prominent [metanarratives](#) is a significant tool of [postmodernism](#). Recommended Reading: Jean-Francois Lyotard, Postmodern Fables, tr. by Georges Van Den Abbeele (Minnesota, 1999) and Jean-Francois Lyotard, The Postmodern Condition: A Report on Knowledge, tr. by Brian Massumi (Minnesota, 1985).

[[A Dictionary of Philosophical Terms and Names](#)]

10-03-2002

metaphilosophy

<[philosophy](#), [philosophical terminology](#)> branch of [philosophy](#) that tries to determine the proper [aims](#), [methods](#), and conditions for the discipline of [philosophy](#) itself.

Recommended Reading: Jerry H. Gill, Metaphilosophy: An Introduction (U. Press of Am., 1986); Nicholas Rescher, Philosophical Reasoning: A Study in the Methodology of Philosophizing (Blackwell, 2001); and Kai Nielsen, On Transforming Philosophy: A Metaphilosophical Inquiry (Westview, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

10-03-2002

metaphysics

<philosophy, philosophical terminology> branch of [philosophy](#) concerned with providing a comprehensive account of the most general features of [reality](#) as a whole; the study of [being as such](#). Questions about the existence and nature of [minds](#), [bodies](#), [god](#), [space](#), [time](#), [causality](#), [unity](#), [identity](#), and the [world](#) are all [metaphysical issues](#). From [Plato](#) onwards, many philosophers have tried to determine what kinds of things (and how many of each) exist. But [Kant](#) argued that this task is impossible; he proposed instead that we consider the general structure of our thought about the world. [Strawson](#) calls the former [activity revisionary metaphysics](#), and the latter [descriptive metaphysics](#).

Recommended Reading: A Companion to Metaphysics, ed. by Jaegwon Kim and Ernest Sosa (Blackwell Pub, 1996); Metaphysics: The Big Questions, ed. by Peter Van Inwagen and Dean W. Zimmerman (Blackwell, 1998); Metaphysics: An Anthology, ed. by Jaegwon Kim and Ernest Sosa (Blackwell, 1999); and D. M. Armstrong, A World of States of Affairs (Cambridge, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

10-03-2002

metasyntax

<grammar> [Syntax](#) used to describe [syntax](#). The best known example is [BNF](#) and its variants such as [EBNF](#).

A [metasyntactic variable](#) is a [variable](#) used in [metasyntax](#).

[[FOLDOC](#)]

16-03-2001

metatheorem

<logic>

A statement about a formal system (as opposed to a [wff](#) inside it) proved either informally or by appeal to axioms and rules from another system (as opposed to proved inside the system as a [theorem](#)).

[Glossary of First-Order Logic]

16-03-2001

method

<PI> The name given in [Smalltalk](#) and other object-oriented languages to a procedure or routine associated with one or more [classes](#). An [object](#) of a certain class knows how to perform actions, e.g. printing itself or creating a new instance of itself, rather than the function (e.g. printing) knowing how to handle different types of object.

Different classes may define methods with the same name (i.e. methods may be [polymorphic](#)). The term "method" is used both for a named operation, e.g. "PRINT" and also for the code which a specific class provides to perform that operation.

Most methods operate on objects that are instances of a certain class. Some object-oriented languages call these "object methods" to distinguish them from "[class methods](#)".

In [Smalltalk](#), a method is defined by giving its name, documentation, temporary local variables and a sequence of expressions separated by "."s.

[[FOLDOC](#)]

16-03-2001

method of doubt

<[cartesianism](#), [epistemology](#), [skepticism](#)> [method](#) of doubting everything conceivably doubtful, proposed by Descartes, with the aim of discovering what -- if anything -- can be known indubitably, with [absolute certainty](#). Descartes concludes that the "[Archimedian point](#)" of certainty he seeks can be found in his unshakable assurance of his own [existence](#) as a [thinker](#). See also: [cogito argument](#).

[[Philosophical Glossary](#)]

22-06-2001

methodology

1. <[PI](#)> An organised, documented set of procedures and guidelines for one or more phases of the software life cycle, such as analysis or design. Many methodologies include a diagramming notation for documenting the results of the procedure; a step-by-step "cookbook" approach for carrying out the procedure; and an objective (ideally quantified) set of criteria for determining whether the results of the procedure are of acceptable quality.

An example is The [Yourdon methodology](#).

2. A pretentious way of saying "method".

16-03-2001

methods of Mill

<[logic](#), [philosophy of science](#)> patterns of [inductive inference](#) elaborated by [John Stuart Mill](#) for the purpose of understanding the grounds upon which it is appropriate to make [judgments](#) about [causal relationships](#). The [five methods](#) include: the [Method of Agreement](#), the [Method of Difference](#), the [Joint Method of Agreement and Difference](#), the [Method of Residues](#), and the [Method of Concomitant Variation](#). Recommended Reading: John Stuart Mill, System of Logic (Classworks, 1986).

[[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

microcosm

<[metaphysics](#), [moral philosophy](#)> literally, a "little world." (Gk. mikros + kosmos) In the philosophy of the [Stoics](#), many [neoplatonists](#), and [Leibniz](#), individual [human beings](#) are taken to reflect the structure of the [universe](#) as a whole.

[[A Dictionary of Philosophical Terms and Names](#)]

10-03-2002

middle term

<[logic](#), [philosophy of science](#)> the term that occurs in both [premises](#) (but not in the [conclusion](#)) of a [categorical syllogism](#).

[[A Dictionary of Philosophical Terms and Names](#)]

10-03-2002

Midgley Mary

<[biography](#), [history of philosophy](#)> English philosopher (1919-), author of *Heart & Mind: The Varieties of Moral Experience* (1981), *Women' s Choices: Philosophical Problems Facing Feminism* (1983), and *Wickedness: A Philosophical Essay* (1984). In *Beast and Man: The Roots of Human Nature* (1978), *Animals and Why They Matter* (1983), and *The Ethical Primate: Humans, Freedom, and Morality* (1994), Midgley uses [ethological studies](#) of [animal behavior](#) to develop principles for morality that explicitly extend its concerns to include the welfare of non-human species. Recommended Reading: Mary Midgley, *Can' t We Make Moral Judgements?* (St. Martin' s, 1993); Mary Midgley, *Utopias, Dolphins and Computers: Problems of Philosophical Plumbing* (Routledge, 2000); and Mary Midgley, *Science and Poetry* (Routledge, 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

07-03-2002

milesians

<[history of philosophy](#)> [presocratic philosophers](#) at Miletus - including [Thales](#), [Anaximander](#), and [Anaximenes](#) - who speculated about the [fundamental principle](#) (Gk. *arché*) that unifies the composition of the [world](#). Recommended Reading: Jonathan Barnes, *The Presocratic Philosophers* (Routledge, 1982) and Richard D. McKirahan, *Philosophy Before Socrates: An Introduction With Text and Commentary* (Hackett, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

10-03-2002

Mill James

<[biography](#), [history of philosophy](#)> Scottish philosopher and economist (1773-1836). As a friend of [Jeremy Bentham](#) and the father of [John Stuart Mill](#), [James Mill](#) exerted an important influence on the development of [utilitarianism](#) by arguing that since each individual acts in self-interest, any collection of people must therefore act in the interest of the whole. In *An Analysis of the Phenomena of the Human Mind* (1829) [Mill](#) defended a strictly [associationist psychology](#). He also wrote *The Elements of Political Economy* (1844). Recommended Reading: *Collected Works of James Mill* (Routledge, 1992); *James Mill: Political Writings*, ed. by Terence Ball (Cambridge, 1992); Alexander Bain, *James Mill: A Biography*; and Bruce Mazlish, *James and John Stuart Mill: Father and Son in the Nineteenth Century* (Transaction, 1988).

[[A Dictionary of Philosophical Terms and Names](#)]

10-03-2002

Mill John Stuart

<[biography](#), [history of philosophy](#)> the son of [James Mill](#), a friend and follower of [Jeremy Bentham](#), [John Stuart Mill](#) (1806-1873) was subjected to a rigorous education at home: he mastered English and the classical languages as a child, studied logic and philosophy extensively, read the law for several years, and then embarked on a life-long career with the British East India Company at the age of seventeen. (He also suffered through a severe bout of depression before turning twenty-one.) Despite such a rich background, [Mill](#) credited the bulk of his intellectual and personal development to his long and intimate association with [Harriet Hardy Taylor](#). They were devoted friends for two decades before the death of her husband made it possible for them to marry in 1852; she died a few years later. [Mill](#) continued to write and to participate in political affairs, serving one term in Parliament (1865-68). The best source of information about [Mill](#)' s life is his own Autobiography (1873). Philosophically, [Mill](#) was a [radical empiricist](#) who held that all [human knowledge](#), including even [mathematics](#) and [logic](#), is derived by generalization from [sensory experience](#). In *A System of Logic, Ratiocinative and Inductive* (1843) he explained in great detail the canons for [reasoning inductively](#) to conclusions about the [causal connections](#) exhibited in the [natural world](#). [Mill](#)' s [moral philosophy](#) was a modified version of the [utilitarian theory](#) he had learned from his father and [Bentham](#). In the polemical *Utilitarianism* (1861) [Mill](#) developed a systematic statement of [utilitarian ethical theory](#). He modified and defended the general principle that [right actions](#) are those that tend to produce [the greatest happiness of the greatest number of people](#), being careful to include a distinction in the quality of the [pleasures](#) that constitute [happiness](#). There [Mill](#) also attempted a proof of the [principle of utility](#), explained its enforcement, and discussed its relation to a [principle of justice](#). [Mill](#)' s greatest contribution to [political theory](#) occurs in *On Liberty* (1859), where he defended the broadest possible [freedom of thought](#) and expression and argued that the state can justify interference with the conduct of individual citizens only when it is clear that doing so will prevent a greater harm to others. [Mill](#) also addressed matters of social concern in *Principles of Political Economy* (1848) and *Considerations on Representative Government* (1861) and eloquently supported the cause of women' s rights in *The Subjection of Women* (1869).

Recommended Reading:

Primary sources:

The Collected Works of John Stuart Mill (Toronto, 1963-);
 John Stuart Mill, Autobiography, ed. by John Robson (Penguin, 1990);
 John Stuart Mill, *Utilitarianism and Other Essays*, ed. by Alan Ryan (Viking, 1987);
 John Stuart Mill, *On Liberty and Utilitarianism* (Bantam, 1993);
 John Stuart Mill, *The Subjection of Women* (Prometheus, 1986);
 John Stuart Mill, *Principles of Political Economy: And Chapters on Socialism*, ed. by Jonathan Riley (Oxford, 1999).

Secondary sources:

[Mill](#)' s on Liberty: Critical Essays, ed. by Gerald Dworkin (Rowman & Littlefield, 1997);
 The Cambridge Companion to Mill, ed. by John Skorupski (Cambridge, 1997);
 Roger Crisp, *Routledge Philosophy Guidebook to Mill on Utilitarianism* (Routledge, 1997);
 Jonathan Riley, *Routledge Philosophy Guidebook to Mill on Liberty* (Routledge, 1998).

Additional on-line information about Mill includes:

A thorough article in The Internet Encyclopedia of Philosophy.
 John Skorupski' s article in The Oxford Companion to Philosophy.
 Also see: denotation and connotation, empiricism, the enforcement of morals, English philosophy, political freedom, the golden rule, the greatest happiness principle, happiness, moral and political individualism, liberalism, philosophy of mathematics, the method of agreement, the method of difference, the joint method, the method of concomitant variations, the method of residues, moral philosophy, political philosophy, pushpin and poetry, right action, the rule of law, self-regarding and other-regarding actions, the uniformity of nature, and utilitarianism.

Lawrence Hinman' s survey of utilitarianism at Ethics Updates.

The article in the Columbia Encyclopedia at Bartleby.com.
 The thorough collection of resources at EpistemeLinks.com.
 Lecture notes on utilitarianism by Donna Summerfield.
 Snippets from Mill in The Oxford Dictionary of Quotations.
 Bjørn Christensson' s brief guide to online resources.
 A brief entry (with his father) in The Macmillan Encyclopedia
 2001.

[\[A Dictionary of Philosophical Terms and Names\]](#)

10-03-2002

mimesis

<[philosophical terminology](#), [history of philosophy](#)> Greek term for [imitation](#) or [representation](#). Hence, for [Plato](#), mímísis is one of the ways in which sensible particulars copy the [eternal forms](#); thus he criticized the arts as doubly removed from [ultimate reality](#). Although [Aristotle](#) rejected the [theory of forms](#), he agreed with [Plato](#) that [aesthetic experience](#) is fundamentally [mimetic](#).

Recommended Reading: F. E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967); Theories of Mimesis, ed. by Arne Melberg, Donald Melcalf, and Nicos A. Nicola (Cambridge, 1995); Laurence R. Goldman, Child' s Play: Myth, Mimesis and Make-Believe (Berg, 1998); and Andrew Benjamin, Art, Mimesis and the Avant-Garde: Aspects of a Philosophy of Difference (Routledge, 1991).

[\[A Dictionary of Philosophical Terms and Names\]](#)

11-03-2002

mind

<[philosophy](#), [psychology](#), [neurosciences](#)> that which thinks, reasons, perceives, wills, and feels. [Philosophy of mind](#) is concerned with explaining the characteristic features of [mental events](#), the proper analysis of [conscious experience](#), the relation between [mind and body](#), and the moral status of [persons](#). For comprehensive treatment of technical terms employed in contemporary discussion of these and related issues, see Chris Eliasmith' s Dictionary of Philosophy of Mind and David J. Chalmers' s Contemporary Philosophy of Mind: An Annotated Bibliography.

Recommended Reading: A Companion to the Philosophy of Mind, ed. by Samuel Guttenplan (Blackwell, 1996); Jaegwon Kim, Philosophy of Mind (Westview, 1996); Fred Dretske, Naturalizing the Mind (Bradford, 1997); The Mind, ed. by Daniel N. Robinson (Oxford, 1999); Thomas Nagel, Other Minds: Critical Essays 1969-1994 (Oxford, 1999); Stephen P. Stich, Deconstructing the Mind (Oxford, 1998); and Michael Tye, Ten Problems of Consciousness: A Representational Theory of the Phenomenal Mind (Bradford, 1996).

[\[A Dictionary of Philosophical Terms and Names\]](#)

11-03-2002

mind-body dichotomy

<[philosophy of mind](#), [metaphysics](#)> [dualism](#) between mind (soul, spirit) and body (brain, matter), see the mind-body problem.

28-04-2001

mind-body problem

<[philosophy of mind](#)>

most generally, the problem of describing the relationship between the mind and body (or brain). First explicitly raised by Descartes, it is, perhaps, the best known problem in the [philosophy of mind](#).

See [dualism](#), [epiphenomenalism](#), [monism](#), and [materialism](#)

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

<[history of philosophy](#), [gnoseology](#), [psychology](#)> the difficulty of explaining how the [mental activities](#) of [human beings](#) relate to their living [physical organisms](#). Historically, the most commonly accepted solutions have included mind-body dualism ([Descartes](#)), [reductive materialism](#) ([Hobbes](#)) or [idealism](#) ([Berkeley](#)), and the [double aspect theory](#) ([Spinoza](#)).

Although many contemporary philosophers accept some form of [identity theory](#), they often rely on behavioral or functional methods of analyzing [mental events](#) and upon the achievements of [neuroscience](#).

Recommended Reading: History of the Mind-Body Problem, ed. by Tim Crane and Sarah Patterson (Routledge, 2001); Materialism and the Mind-Body Problem, ed. by David M. Rosenthal (Hackett, 2000); Jaegwon Kim, Mind in a Physical World: An Essay on the Mind-Body Problem and Mental Causation (Bradford, 2000); Paul M. Churchland, Matter and Consciousness: A Contemporary Introduction to the Philosophy of Mind (MIT, 1988); and Sergio Moravia, The Enigma of the Mind: The Mind-Body Problem in Contemporary Thought (Cambridge, 1995).

[[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

minimization

<[logic](#)>

One of the simple [function](#)-building operations of recursive function theory. Roughly, if we are given a computable [function](#) $f(x,y)$, then we posit another [function](#) g which computes the least value of y (a natural number) such that $f(x,y) = 0$. We say that g is created from f by minimization.

One way that g might work is to start from 0 and test every natural number in order, stopping at the first value which makes $f(x,y) = 0$. Also called ' μ ' (Greek letter mu).

Bounded minimization

To insure that g is a total [function](#), we create it from f by bounded minimization. We pick a bound z and try every value $0...z$ as the value of y ; the first one to make $f(x,y) = 0$ is returned as the value of g ; if none makes $f(x,y) = 0$, then g returns 0. Since g always returns a value, it is a total [function](#); since z is always finite, g is computable.

Unbounded minimization

If $f(x,y)$ never equals 0, then g is undefined; hence g is a partial, hence incomputable, [function](#). Think of g running on a computer; when it is unbounded, it will run forever with some inputs. It might test

the values
 0,
 1, 2... in search of a value for y which will make $f(x,y) = 0$.
 But if
 there
 is no such y, and if no bound is put on the search, then the search
 will
 never halt.

[Glossary of First-Order Logic]

16-03-2001

minor premise

<[logic](#), [philosophy of science](#)> in a [categorical syllogism](#), the [premise](#) whose terms are the [syllogism](#)' [minor term](#) and [middle term](#).

[[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

minor term

<[logic](#), [philosophy of science](#)> the [subject term](#) of the [conclusion](#) of a [categorical syllogism](#).

[[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

Minsky Marvin

<[biography](#), [history of philosophy](#)> american mathematician and cognitive scientist (1927-). A leader in research of semantic information processing and artificial intelligence, [Minsky](#) proposes in *The Society of Mind* (1985) a detailed explanation of [human thought](#), [memory](#), and [feeling](#) in terms of the interaction of multiple internal agents, none of which are themselves [conscious](#).

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

miserecordiam argumentum ad

<[ethics](#), [moral philosophy](#)> literally, an appeal to "distress of the heart;" see appeal to [pity](#).
 Recommended Reading: Douglas N. Walton, *Appeal to Pity: Argumentum Ad Miserecordiam* (SUNY, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

13-03-2002

modal logic

An extension of [propositional calculus](#) with operators that express various "modes" of truth. Examples of modes are: necessarily A, possibly A, probably A, it has always been true that A, it is permissible that A, it is believed that A.

"It is necessarily true that A" means that things being as they are, A must be true, e.g.

"It is necessarily true that $x=x$ " is TRUE

while

"It is necessarily true that $x=y$ " is FALSE

even though " $x=y$ " might be TRUE.

Adding modal operators [F] and [P], meaning, respectively, henceforth and hitherto leads to a "[temporal logic](#)".

Flavours of modal logics include: Propositional Dynamic Logic (PDL), [Propositional Linear Temporal Logic](#) (PLTL), [Linear Temporal Logic](#) (LTL), [Computational Tree Logic](#) (CTL), Hennessy-Milner Logic, S1-S5, T.

C.I. Lewis, "A Survey of Symbolic Logic", 1918, initiated the modern analysis of modality. He developed the logical systems

S1-S5. JCC McKinsey used algebraic methods (Boolean algebras with operators) to prove the decidability of Lewis' S2 and S4 in 1941. Saul Kripke developed the relational semantics for modal logics (1959, 1963). Vaughan Pratt introduced [dynamic logic](#) in 1976. Amir Pnuelli proposed the use of temporal logic to formalise the behaviour of continually operating [concurrent](#) programs in 1977.

[Robert Goldblatt, "Logics of Time and Computation", CSLI Lecture Notes No. 7, Centre for the Study of Language and Information, Stanford University, Second Edition, 1992, (distributed by University of Chicago Press)].

[Robert Goldblatt, "Mathematics of Modality", CSLI Lecture Notes No. 43, Centre for the Study of Language and Information, Stanford University, 1993, (distributed by University of Chicago Press)].

[G.E. Hughes and M.J. Cresswell, "An Introduction to Modal Logic", Methuen, 1968].

[E.J. Lemmon (with Dana Scott), "An Introduction to Modal Logic", American Philosophical Quarterly Monograph Series, no. 11 (ed. by Krister Segerberg), Basil Blackwell, Oxford, 1977].

[[FOLDOP](#)]

16-03-2001

mode

1. A general state, usually used with an adjective describing the state. Use of the word "mode" rather than "state" implies that the state is extended over time, and probably also that some activity characteristic of that state is being carried out. "No time to hack; I' m in thesis mode."

In its jargon sense, "mode" is most often attributed to people, though it is sometimes applied to programs and inanimate objects. In particular, see [hack mode](#), day mode, [night mode](#), [demo mode](#), [fireworks mode](#), and yoyo mode; also [chat](#).

2. More technically, a mode is a special state that certain user interfaces must pass into in order to perform certain functions. For example, in order to insert characters into a document in the Unix editor "vi", one must type the "i" key, which invokes the "Insert" command. The effect of this command is to put vi into "insert mode", in which typing the "i" key has a quite different effect (to wit, it inserts an "i" into the document). One must then hit another special key, "ESC", in order to leave "insert mode". Nowadays, modeful interfaces are generally considered [losing](#) but survive in quite a few widely used tools built in less enlightened times.

[[Jargon File](#)] and [[FOLDOP](#)]

16-03-2001

model

<[simulation](#)> <[logic](#)>

1. A description of observed behaviour, simplified by ignoring certain details. Models allow complex [systems](#) to be understood and their behaviour predicted within the scope of the model, but may give incorrect descriptions and predictions for situations outside the realm of their intended use. A model may be used as the basis for [simulation](#).

[FOLDOC]

2. An [interpretation](#) in which expressions of interest to us (e.g. a [wff](#), a set of [wffs](#), a system) come out true for that [interpretation](#). See [isomorphism of models](#), [true for an interpretation](#)

Cardinality of a model

The cardinality of the domain of the model.

Model of a wff or set of wffs

An interpretation, I, that makes those [wffs](#) true for I.

Model of a formal system

An interpretation, I, that makes its set of [theorems](#) true for I.

A

model

of a system is a model of its set of [theorems](#).

Non-standard model

Weakly, any non-standard interpretation that is a model.

Strongly, any

model that is not isomorphic with the intended (standard) model.

See [isomorphism of models](#)

Normal model

A normal interpretation that is a model. See interpretation, normal

[Glossary of First-Order Logic]

16-03-2001

model checking

<[theory](#), [algorithm](#), [testing](#)> To algorithmically check whether a program (the model) satisfies a specification.

The model is usually expressed as a [directed graph](#) consisting of [nodes](#) (or [vertices](#)) and [edges](#). A set of [atomic propositions](#) is associated with each node. The nodes represents states of a program, the edges represent possible executions which alters the state, while the atomic propositions represent the basic properties that hold at a point of execution.

A specification language, usually some kind of temporal logic, is used to express properties.

The problem can be expressed mathematically as: given a temporal logic formula p and a model M with initial state s, decide if M,s models p.

["Automatic verification of finite state concurrent systems using temporal logic", E.M. Clarke, E.A. Emerson, and A.P. Sista, ACM Trans. on Programming Languages and Systems 8(2), pp. 244--263, 1986].

[FOLDOC]

16-03-2001

model theory

<logic>

The study of the interpretations of [formal languages](#) of formal systems and associated questions of the truth and isomorphism of interpretations.

See [categoricity](#), [interpretation](#), [isomorphism of models](#), [L"wenheim-Skolem theory](#), [model](#), [proof theory](#)

[Glossary of First-Order Logic]

16-03-2001

modelling

[model](#)

00-00-0000

moderation

<[ethics](#), [moral philosophy](#)> self-control. According to [Plato](#), a person who has the [virtue](#) of [moderation](#) subordinates the desire for [pleasure](#) to the dictates of [reason](#). For [Aristotle](#), all [virtues](#) are to be understood as the mean between [vicious extremes](#).

Recommended Reading: James S. Hans, *The Golden Mean* (SUNY, 1994); Aristotle, *The Nicomachean Ethics*, tr. by W. D. Ross, J. L. Ackrill, and J. O. Urmson (Oxford, 1998); Sarah Broadie, *Ethics With Aristotle* (Oxford, 1995); and Charles Hartshorne, *Wisdom As Moderation: A Philosophy of the Middle Way* (SUNY, 1987).

[[A Dictionary of Philosophical Terms and Names](#)]

13-03-2002

modernism<[aesthetics](#)>

modernism (sometimes called [abstractionism](#)) is an aesthetic doctrine and movement of the 20th century that repudiates the traditional purpose of art to represent reality and/or address timeless human values; instead, modernism holds that the purpose of art is to enable the artist to express his or her emotions, often in an utterly non-representational manner (also called abstract [expressionism](#)). Modernism is usually an aesthetic variety of [subjectivism](#). (References from [abstractionism](#) and [expressionism](#).)

[[The Ism Book](#)]

Edited by Giovanni Benzi

25-03-2001

modus ponens

<[logic](#), [philosophy of science](#)> a [rule of inference](#) of the form:

$$\begin{array}{l} p \rightarrow q \\ p \\ \hline q \end{array}$$

Example: "If Tuesday is the 14th, then Friday must be the 17th. Tuesday is the 14th. Therefore, Friday is the 17th". A simple truth-table shows the validity of this pattern of reasoning.

[\[A Dictionary of Philosophical Terms and Names\]](#)

11-03-2002

modus tollens

<[logic](#), [philosophy of science](#)> a [rule of inference](#) of the form:

$$\begin{array}{l} p \rightarrow q \\ \sim q \\ \hline \sim p \end{array}$$

Example: "If it had rained this morning, then the grass would still be wet. But the grass is not wet. Therefore, it did not rain this morning." A simple truth-table shows that any argument of this form must be [valid](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

11-03-2002

molecule

<[logic](#)>

In propositional logic, a [compound proposition](#) as opposed to a simple proposition or [atom](#)

[Glossary of First-Order Logic]

16-03-2001

monad

<[metaphysics](#), [ontology](#), [monism](#), [dualism](#), [atomism](#), [idealism](#)>
<[spiritualism](#)> according to Leibniz, monads are the ultimate [indivisible units](#) or "[true atoms](#)" of all [existence](#).

Monads are not [material](#): each monad is a self-activating, unique, center of "[purpose](#)" and "[perception](#)." Monads cannot interact, but are in a "[preestablished harmony](#)" with each other, by the [grace of God](#).

Recommended Reading: Gottfried Wilhelm Leibniz, *Philosophical Texts*, ed. by Richard Francks and R. S. Woolhouse (Oxford, 1998); Anthony Savile, *Routledge Philosophy Guidebook to Leibniz and the Monadology* (Routledge, 2000); Bertrand Russell, *A Critical Exposition of the Philosophy of Leibniz* (Routledge, 1993); and Donald Rutherford, *Leibniz and the Rational Order of Nature* (Cambridge, 1997).

based on [\[A Dictionary of Philosophical Terms and Names\]](#)
[\[Philosophical Glossary\]](#)

13-03-2002

monadic predicate logic

[predicate logic](#)

00-00-0000

monism

belief that only things of a single kind exist. In its most extreme form, [monism](#) may lead to [Spinoza](#)' s conviction that only a single being is real or the [idealist](#)' s supposition that everything is comprised by the [Absolute](#). Contemporary philosophers more commonly suppose that many distinct things exist, each of them exhibiting both mental and physical properties.

Recommended Reading: Errol E. Harris, *Spinoza' s Philosophy: An Outline* (Humanity, 1992); *German Idealist Philosophy*, ed. by Rudiger Bubner (Penguin, 1997); and Mafizuddin Ahmed, *Bertrand Russell' s Neutral Monism*.

[\[A Dictionary of Philosophical Terms and Names\]](#)

<[metaphysics](#)> answer offered to philosophical [dualism](#) by adherents of [idealism](#) and of [materialism](#). Monism holds that reality is made up of only one type of [substance](#), historically either [spirit/mind](#) (according to idealists Berkeley) or [matter](#).

See also [materialism](#), [idealism](#), [neutral monism](#), [anomalous monism](#), [dualism](#)

13-03-2002

monoid

An operator * and a value x form a monoid if * is [associative](#) and x is its left and right [identity](#).

16-03-2001

monotheism

<[metaphysics](#), [philosophy of religion](#)>
the belief there is only one god, or that the gods of different religions are really just different manifestations of the one true god. Monotheism is opposed to both [henotheism](#) and [polytheism](#).

[\[The Ism Book\]](#)

Edited by Giovanni Benzi

25-03-2001

monotonic

In [domain theory](#), a function $f : D \rightarrow C$ is monotonic (or monotone) if

for all x, y in D , $x \leq y \Rightarrow f(x) \leq f(y)$.

[\[FOLDOP\]](#)

16-03-2001

monotonicity

<logic>

The property of a system by which new **wffs** can be added to any set of

wffs without invalidating previously valid derivations from that set. If A

is any **wff**, and

G and

D any sets

of **wffs**, a system is monotonic **iff**

G

|- A

=>

D ,

G

|- A. In

non-monotonic logics derivations can be invalidated when

the set of premises

is enlarged.

[Glossary of First-Order Logic]

16-03-2001

Montaigne Michel Eyquem de

<[biography](#), [history of philosophy](#)> french humanist (1533-1592)

whose motto

was "Que sais-je?" ("What do I know?"). **Montaigne'** s Essais

(Essays) (1580, 1588) drew attention to the vain pretensions of

human rationality and thereby revived modern interest in

classical skepticism, against which **Descartes** tried to argue.

Recommended Reading: Hugo Friedrich, Montaigne, tr. by Dawn Eng

(California, 1991); Craig B. Brush, From the Perspective of the

Self: Montaigne' s SelfPortrait (Fordham, 1994); Montaigne' s

Message and Method, ed. by Dikka Berven (Garland, 1995); and

Marcel Tetel, Montaigne (Twayne, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

Montesquieu Charles-Louis de Secondat

<[biography](#), [history of philosophy](#)> french political

philosopher (1689-1755)

who significantly influenced the founders of the American

republic. In the multi-volume L' esprit des lois (On the Spirit

of the Laws) (1748), **Montesquieu** considered the fundamental

principles of government, emphasizing respect for

individual liberty and (extrapolating from a suggestion of

Locke) urging a sharp separation of executive, legislative,

and judicial powers.

Recommended Reading: Montesquieu' s Science of Politics, ed.

by Michael A. Mosher, David W. Carrithers, and Paul A. Rahe

(Rowman & Littlefield, 2001); Thomas L. Pangle, Montesquieu' s

Philosophy of Liberalism: A Commentary on the Spirit of the

Laws (Chicago, 1989); and Peter V. Conroy, Montesquieu

Revisited (Twayne, 1992).

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

mood and figure

<[logic](#), [philosophy of science](#)> a unique description of the logical form of a [categorical syllogism](#). The [mood](#) lists the [forms](#) of its three [categorical propositions](#) (in standard form order), while the [figure](#) indicates the position of its [middle term](#).

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

Moore bound

An upper limit on the number of nodes in a [regular graph](#) of [degree](#) $d > 2$ and [diameter](#) k :

$$N(d,k) \leq d(d-1)^{k-1}$$

d-2

16-03-2001

Moore George Edward

<[biography](#), [history of philosophy](#)> during his long career at Cambridge University and as Editor of the premier British philosophical journal, *Mind*, G. E. [Moore](#) (1873-1958) made an enormous contribution to the development of twentieth-century Anglo-American thought. Although he had studied with [Bradley](#) and [McTaggart](#), [Moore](#) was an early leader in the revolt against [absolute idealism](#). Amazed by the peculiar character of philosophical controversy, [Moore](#) supposed that common-sense beliefs about the world are correct as they are. The purpose of philosophy is not to debate their [truth](#), but rather to seek an appropriate analysis of their significance. [Moore](#) was a significant influence on [Russell](#), [Wittgenstein](#), [Ryle](#). [Moore](#)'s departure from [idealistic philosophy](#) began with a criticism of internal relations in the careful analysis of [truth](#) and [falsity](#) in "The Nature of Judgment" (1899). In "The Refutation of Idealism" (1903) he also drew a sharp distinction between [consciousness](#) and its objects and argued explicitly against the idealistic belief that [esse est percipi](#). Continuing to develop his realistic convictions, [Moore](#) argued in "A Defence of Common Sense" (1925) that we all certainly know the [truth](#) of many propositions about ourselves, bodies, and other people, even though we may be uncertain about the correct analysis of these propositions. Both [idealists](#) and [skeptics](#), [Moore](#) argued, implausibly deny this simple, everyday knowledge. [Moore](#)'s preoccupation with these issues is evident even in *Some Main Problems of Philosophy* (1953). [Moore](#) applied similar methods of analysis to [moral philosophy](#) in *Principia Ethica* (1903) and *Ethics* (1912). There he used the open question argument to reject the "[naturalistic fallacy](#)" of identifying [good](#) with anything else. On [Moore](#)'s view [good](#) is a simple, non-natural, indefinable quality of certain things, including especially personal friendship and aesthetics appreciation. This conception of the possibilities for human life was a significant influence on [John Maynard Keynes](#) and other members of the [Bloomsbury group](#).

Recommended Reading:

Primary sources:

G. E. Moore, *Philosophical Studies* (Routledge, 1965);
G. E. Moore, *Principia Ethica* (Prometheus, 1988);
G. E. Moore, *Some Main Problems of Philosophy* (Collier, 1962).

Secondary sources:

E. D. Klemke, *A Defense of Realism: Reflections on the Metaphysics of G. E. Moore* (Humanity, 1999);
Philosophy of G. E. Moore, ed. by Paul A. Schlipp (Open Court, 1993).

Additional on-line information about Moore includes:

Geoffrey J. Warnock's article in *The Oxford Companion to Philosophy*.

Also see: analysis, analytic philosophy, Cambridge philosophy, English philosophy, linguistic philosophy, moral philosophy, the naturalistic fallacy, non-natural properties, the open question argument, and internal and external relations. The article in the Columbia Encyclopedia at Bartleby.com. The thorough collection of resources at EpistemeLinks.com. A short article in Oxford' s Who' s Who in the Twentieth Century. A brief entry in The Macmillan Encyclopedia 2001.

[\[A Dictionary of Philosophical Terms and Names\]](#)

10-03-2002

Moore graph

A [graph](#) which achieves the [Moore bound](#). These are [complete graphs](#), [polygon graphs](#) ([regular graphs](#) of [degree 2](#)) and three others: (nodes, degree, diameter) = (10,3,2), (50,7,2) and the possible but undiscovered (3250,57,2).

[\[FOLDOC\]](#)

16-03-2001

moral

<[ethics](#), [moral philosophy](#)> distinction between types of [value](#), [judgments](#), or [propositions](#). Although a precise line is difficult to draw, there seems to be a genuine difference between universalizable moral concerns that impinge upon other people and merely personal matters of taste. For example: "Murder is wrong." is a [moral assertion](#), but "This coffee is good." is a non-moral assertion.

Recommended Reading: R. M. Hare, *The Language of Morals* (Clarendon, 1991); *Fact and Value: Essays on Ethics and Metaphysics* for Judith Jarvis Thomson, ed. by Alex Byrne, Robert Stalnaker, and Ralph Wedgwood (MIT, 2001); and Gilbert Harman, *Explaining Value: And Other Essays in Moral Philosophy* (Clarendon, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

10-03-2002

moral argument

<[ethics](#), [moral philosophy](#)> an attempt to prove the [existence of god](#) by appeal to presence of [moral value](#) in the universe. The fourth of [Aquinas'](#) s five ways concludes that [god](#) must exist as the most perfect cause of all lesser goods. [Kant](#) argued that postulation of [god'](#) s existence is a necessary condition for our capacity to apply the [moral law](#). Recommended Reading: Thomas St. Aquinas, *Summa Contra Gentiles: God*, tr. by Anton C. Pegis (Notre Dame, 1997); Immanuel Kant, *The One Possible Basis for a Demonstration of the Existence of God*, tr. by Gordon Treash (Nebraska, 1994); Joseph Owens, *St. Thomas Aquinas on the Existence of God* (SUNY, 1980); and Gordon E. Michalson, *Kant and the Problem of God* (Blackwell, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

10-03-2002

moral ballpark

<ethics>

the domain of actions, motives, traits, etc. that are open to moral assessment, that is, can be said to be morally good or morally bad.

26-03-2001

moral isolationism

<ethics>

the view that we ought not to be morally concerned with, or involved with, people outside of our own immediate group. Moral isolationism is often a consequences of some versions of [moral relativism](#).

26-03-2001

moral luck

<ethics>

the phenomenon that the moral goodness or badness of some of our actions depends simply on [chance](#). For example, the drunk driver may safely reach home without injuring anyone at all, or might accidentally kill several children that run out into the street while the drunken person is driving home. How bad the action of driving while drunk is in that case depends in part on luck.

26-03-2001

moral rights[rights](#)

00-00-0000

moral sense

<ethics, [moral philosophy](#)> a putatively innate [human faculty](#) for distinguishing [right](#) from [wrong](#). In the [moral intuitionism](#) of [Shaftesbury](#) and [Hutcheson](#), the [moral sense](#) motivates proper conduct by enabling us to perceive the distinctive pleasure of [moral rectitude](#).

Recommended Reading: Adam Smith, *The Theory of Moral Sentiments* (Prometheus, 2000); Francis Hutcheson, *Philosophical Writings*, ed. by R.S. Downie (Everyman, 1994); and James Q. Wilson, *The Moral Sense* (Simon & Schuster, 1997).

[\[A Dictionary of Philosophical Terms and Names\]](#)

10-03-2002

morality

<ethics>

"morality" refers to the first-order beliefs and practices about good and [evil](#) by means of which we guide our behaviour. Contrast with [ethics](#), which is the second-order, reflective, critical and normative consideration of our moral beliefs and practices.

26-03-2001

More Henry

<[biography](#), [history of philosophy](#)> English theologian and philosopher (1614-1687); author of *The Immortality of the Soul* (1659) and *Divine Dialogues* (1668). A leading member of the [Cambridge Platonists](#), **More** claimed to demonstrate the [existence of god](#), the [immortality of the human soul](#), and the compatibility of [faith](#) and [reason](#).
 Recommended Reading: A. Rupert Hall, *Henry More: Magic, Religion and Experiment* (Blackwell, 1984); Henry More: *Tercentenary Studies*, ed. by Sarah Hutton (Kluwer, 1990); and A. Rupert Hall, *Henry More and the Scientific Revolution* (Cambridge, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

More Thomas

<[biography](#), [history of philosophy](#)> English humanist and politician (1478-1535). An advocate of classical learning, **More** imagined in *Utopia* (1516) an egalitarian Christian [hedonistic](#) society based on the philosophy of [Epicurus](#).
 Recommended Reading: John Guy, *Thomas More* (Edward Arnold, 2000); Richard Marius, *Thomas More: A Biography* (Harvard, 1999); Peter Ackroyd, *The Life of Thomas More* (Anchor, 1999); Louis L. Martz, *Thomas More: The Search for the Inner Man* (Yale, 1992); and Gerald B. Wegemer, *Thomas More on Statesmanship* (Catholic U. of Am., 1998).

[[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

morphe

<[philosophical terminology](#), [history of philosophy](#)> Greek word for the [shape](#) or [figure](#) of a thing. Hence, for [Aristotle](#), the [fundamental cause](#) which, in conjunction with [hyl ](#), constitutes a [natural object](#) as a [hylomorphic composite](#).

[[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

morphing

<[graphics](#)> The animated transformation of one image into another by gradually distorting the first image so as to move certain chosen points to the position of corresponding points in the second image.

Compare [tweening](#).

[[FOLDOP](#)]

16-03-2001

mother

[parent](#)

00-00-0000

multiple realisability

<[philosophy of mind](#)>

the thesis that a mental state is the type it is independent of the physical [realisation](#) of that mental state.

See [functionalism](#)

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

multitasking

<[computer, parallel](#)> (Or "multi-tasking", "multi-processing", "multiprogramming", "concurrency", "process scheduling") A technique used in an [operating system](#) for sharing a single processor between several independent jobs. The first multitasking operating systems were designed in the early 1960s.

Under "[cooperative multitasking](#)" the running task decides when to give up the CPU and under "pre-emptive multitasking" (probably more common) a system process called the "[scheduler](#)" suspends the currently running task after it has run for a fixed period known as a "time-slice". In both cases the scheduler is responsible for selecting the next task to run and (re)starting it.

The running task may relinquish control voluntarily even in a pre-emptive system if it is waiting for some external [event](#). In either system a task may be suspended prematurely if a hardware [interrupt](#) occurs, especially if a higher priority task was waiting for this event and has therefore become runnable.

The scheduling [algorithm](#) used by the scheduler determines which task will run next. Some common examples are round-robin scheduling, [priority scheduling](#), shortest job first and [guaranteed scheduling](#).

Multitasking introduces [overheads](#) because the processor spends some time in choosing the next job to run and in saving and restoring tasks' state, but it reduces the worst-case time from job submission to completion compared with a simple [batch](#) system where each job must finish before the next one starts. Multitasking also means that while one task is waiting for some external event, the [CPU](#) to do useful work on other tasks.

A multitasking operating system should provide some degree of protection of one task from another to prevent tasks from interacting in unexpected ways such as accidentally modifying the contents of each other' s memory areas.

The jobs in a multitasking system may belong to one or many users. This is distinct from [parallel processing](#) where one user runs several tasks on several processors. Time-sharing is almost synonymous but implies that there is more than one user.

[Multithreading](#) is a kind of multitasking with low [overheads](#) and no protection of tasks from each other, all threads share the same memory.

[[FOLDOP](#)]

16-03-2001

multithreaded[multithreading](#)*00-00-0000***multithreading**

<[parallel](#)> Sharing a single [CPU](#) between multiple tasks (or "threads") in a way designed to minimise the time required to switch threads. This is accomplished by sharing as much as possible of the program execution environment between the different threads so that very little state needs to be saved and restored when changing thread.

Multithreading differs from [multitasking](#) in that threads share more of their environment with each other than do tasks under multitasking. Threads may be distinguished only by the value of their [program counters](#) and [stack pointers](#) while sharing a single [address space](#) and set of global variables. There is thus very little protection of one thread from another, in contrast to multitasking.

Multithreading can thus be used for very fine-grain multitasking, at the level of a few instructions, and so can hide [latency](#) by keeping the processor busy after one thread issues a long-latency instruction on which subsequent instructions in that thread depend.

A light-weight process is somewhere between a thread and a full process.

[TLO](#) is an example of a threaded machine language. [Dataflow](#) computation (E.g. [ld](#) and [SISAL](#)) is an extreme form of multithreading.

[\[FOLDOP\]](#)*16-03-2001***mutual recursion**[recursion](#)*00-00-0000***mysticism**

<[metaphysics](#), [philosophical terminology](#)> belief in direct apprehension of divine or [eternal reality](#) by means of [spiritual contemplation](#) distinct from more ordinary avenues of [human knowledge](#).

Recommended Reading: Evelyn Underhill, *Mysticism: The Nature and Development of Spiritual Consciousness* (Oneworld, 1999); William James, *The Varieties of Religious Experience* (MacMillan, 1997); *Mysticism: A Study and an Anthology*, ed. by Frank C. Hoppold (Viking, 1991); and Gershom Scholem, *Major Trends in Jewish Mysticism* (Schocken, 1995).

[\[A Dictionary of Philosophical Terms and Names\]](#)*11-03-2002*

mythos

<[philosophical terminology](#), [history of philosophy](#)> Greek term for a speech, tale, or story, as opposed to a [rational explanation](#). See [logos](#) / [mythos](#). Although [Plato](#) typically derided [myth](#) as inferior to analysis, [Philo Judaeus](#) incorporated it as [allegorical interpretation](#) in order to synthesize [theology](#) and [philosophy](#).

Recommended Reading: F. E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967).

[[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

n-adic function or predicate

<[logic](#)> A [function](#) of [predicate](#) that takes n [arguments](#). Also called n-ary [functions](#) and [predicates](#).

[Glossary of First-Order Logic]

16-03-2001

n-formula

[wff](#), [open](#)

00-00-0000

n-tuple

<[logic](#)> A [sequence](#) of n terms.

[Glossary of First-Order Logic]

16-03-2001

n-valued logics

truth-value

00-00-0000

n-wff

[wff](#), [open](#)

00-00-0000

Nagel Ernest

<[history of philosophy](#), [biography](#)> American philosopher of science (1901-1985) who improved understanding of scientific explanation in his "Introduction to Logic and Scientific Method" (1934) and "Principles of the Theory of Probability" (1939). Nagel combined the pragmatic method of [Peirce](#) with the [logical positivism](#) of the [Vienna Circle](#). His "The Structure of Science" (1961) argues on behalf of the systematic [reduction](#) to [physical](#) science of social and behavioral sciences, despite their apparent reference to non-observable entities

and appeal to judgments of value.

Recommended Reading: Ernest Nagel and James R. Newman, "Goedel' s Proof" (NYU, 1983); Ernest Nagel, "Teleology Revisited" (Columbia, 1982); and "Logical Empiricism and the Special Sciences: Reichenbach, Feigl, and Nagel", ed. by Sahotra Sarkar (Garland, 1996).

<[A Dictionary of Philosophical Terms and Names](#)>

21-02-2002

Nagel Thomas

<[history of philosophy, biography](#)> American philosopher (1937-); author of "The Possibility of Altruism" (1970), Brain Bisection and the "Unity of Consciousness" (1971) and "What Is It Like to Be a Bat?" (1974). In "The View from Nowhere" (1989) Nagel tries to reconcile the [subjective](#) and personal elements of human life with the urge to achieve [objective](#) and impersonal truths about life and value. On-line papers by Nagel include "Justice and Nature" (1996), Conceiving the Impossible and the "Mind-Body Problem" (1998), and "Concealment and Exposure" (1998).

Recommended Reading: Thomas Nagel, "What Does It All Mean: A Very Short Introduction to Philosophy" (Oxford, 1987); Thomas Nagel, "Mortal Questions" (Cambridge, 1991); Thomas Nagel, "The Last Word" (Oxford, 1996); Thomas Nagel, "Other Minds: Critical Essays 1969-1994" (Oxford, 1999); and Thomas Nagel, "Equality and Partiality" (Oxford, 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

21-02-2002

NAND

Not AND. The [Boolean](#) function which is true unless both its arguments are true, the [logical complement](#) of [AND](#):

$A \text{ NAND } B = \text{NOT } (A \text{ AND } B) = (\text{NOT } A) \text{ OR } (\text{NOT } B)$

Its [truth table](#) is:

A	B	A NAND B
F	F	T
F	T	T
T	F	T
T	T	F

NAND, like [NOR](#), forms a complete set of [Boolean](#) functions on its own since it can be used to make NOT, AND, OR and any other Boolean function:

$\text{NOT } A = A \text{ NAND } A$

$A \text{ AND } B = \text{NOT } (A \text{ NAND } B)$

$A \text{ OR } B = (\text{NOT } A) \text{ NAND } (\text{NOT } B)$

[[FOLDOP](#)]

16-03-2001

narcissism

<ethics> an excessive preoccupation with oneself. In mythology, Narcissus was a beautiful young man who fell in love with his own image reflected in a pool of water.

26-03-2001

natural deduction

A set of rules expressing how valid **proofs** may be constructed in **predicate logic**.

A horizontal line separates premises (above) from conclusions (below). Vertical ellipsis (dots) stand for a series of applications of the rules. "T" is the constant "true" and "F" is the constant "false".

"^" is the AND (conjunction) operator, "v" is the inclusive OR (disjunction) operator and "/" is NOT (negation or **complement**).

P, Q, P1, P2, etc. stand for **propositions** such as "Socrates was a man". P[x] is a proposition possibly containing instances of the variable x, e.g. "x can fly".

A proof (a sequence of applications of the rules) may be enclosed in a box. A boxed proof produces conclusions that are only valid given the assumptions made inside the box, however, the proof demonstrates certain relationships which are valid outside the box. For example, the box below labelled "Implication introduction" starts by assuming P, which need not be a true **proposition** so long as it can be used to derive Q.

Truth introduction:

```
--
T
```

(Truth is free).

Binary AND introduction:

```
-----
| . | . |
| . | . |
| Q1 | Q2 |
-----
Q1 ^ Q2
```

(If we can derive both Q1 and Q2 then Q1^Q2 is true).

N-ary AND introduction:

```
-----
| . | .. | . |
| . | .. | . |
| Q1 | .. | Qn |
-----
Q1 ^ .. ^ Qi ^ .. ^ Qn
```

Other n-ary rules follow the binary versions similarly.

Quantified AND introduction:

```
-----
| x . |
| . |
| Q[x] |
-----
For all x . Q[x]
```

(If we can prove Q for arbitrary x then Q is true for all x).

Falsity elimination:

F

--

Q

(Falsity opens the floodgates).

OR elimination:

P1 v P2

```

-----
| P1 | P2 |
| . | . |
| . | . |
| Q | Q |
-----

```

Q

(Given P1 v P2, if Q follows from both then Q is true).

Exists elimination:

Exists x . P[x]

```

-----
| x P[x] |
| . |
| . |
| Q |
-----

```

Q

(If Q follows from P[x] for arbitrary x and such an x exists then Q is true).

OR introduction 1:

P1

P1 v P2

(If P1 is true then P1 OR anything is true).

OR introduction 2:

P2

P1 v P2

(If P2 is true then anything OR P2 is true). Similar symmetries apply to ^ rules.

Exists introduction:

P[a]

Exists x.P[x]

(If P is true for "a" then it is true for all x).

AND elimination 1:

P1 ^ P2

P1

(If P1 and P2 are true then P1 is true).

For all elimination:

For all x . P[x]

P[a]

(If P is true for all x then it is true for "a").

For all implication introduction:

```

-----
| x P[x] |
| . |
| . |

```

| Q[x] |

For all x . P[x] -> Q[x]

(If Q follows from P for arbitrary x then Q follows from P for all x).

Implication introduction:

| P |
| . |
| . |
| Q |

P -> Q

(If Q follows from P then P implies Q).

NOT introduction:

| P |
| . |
| . |
| F |

/ P

(If falsity follows from P then P is false).

NOT-NOT:

//P

P

(If it is not the case that P is not true then P is true).

For all implies exists:

P[a] For all x . P[x] -> Q[x]

Q[a]

(If P is true for given "a" and P implies Q for all x then Q is true for a).

Implication elimination, modus ponens:

P P -> Q

Q

(If P and P implies Q then Q).

NOT elimination, contradiction:

P /P

F

(If P is true and P is not true then false is true).

[[FOLDOC](#)]

16-03-2001

natural language

<[application](#)> A language spoken or written by humans, as opposed to a language use to program or communicate with computers. Natural language understanding is one of the hardest problems of [artificial intelligence](#) due to the complexity, irregularity and diversity of human language and the philosophical problems of meaning.

See also Pleuk grammar development system, [proof](#).

[An on-line demonstration](#)

[New York U.](#)

[[FOLDOC](#)]

16-03-2001

natural law

<[ethics](#)> in ethics, believers in natural law hold (a) that there is a natural order to the human world, (b) that this natural order is good, and (c) that people therefore ought not to violate that order.

26-03-2001

natural numbers

<[logic](#)> <[mathematics](#)> The set 0, 1, 2, 3..., that is any [integer](#) greater than or equal to zero. A natural number is an [isomorphism class](#) of a finite set. Negative numbers and fractions are not natural numbers. The cardinality of this set is aleph0 by definition.

16-03-2001

natural rights

[rights](#)

00-00-0000

natural theology

<[metaphysics](#), [ethics](#), [epistemology](#)> [knowledge](#) about [God](#) that can be obtained by natural means by the exercise of [reason](#) and [sense perception](#). Contrast: [revealed theology](#).

[[Philosophical Glossary](#)]

22-06-2001

naturalised semantics

<[philosophy of language](#)> the project of explaining [semantic](#) notions, such as "means", "refers", "denotes", in terms of non-semantic notions, such as correlation, causation, resemblance, structural isomorphism, or teleological function. Some leading efforts in this area include Dretske' s, Fodor' s, and Millikan' s works.

[Ken Aizawa](#) [Chris Eliasmith](#)

[[Dictionary of Philosophy of Mind](#)]

16-03-2001

naturalism

<[philosophy of mind](#), [metaphysics](#), [aesthetics](#), [ethics](#)>

1. in relation to mind, the view that mental phenomena can be explained as part of the natural order and are empirically accessible features of the world.

2. in [metaphysics](#), the view according to which reality operates according to natural laws, without spiritual intervention (opposed to [theism](#) and spiritualism, but compatible with deism).

3. in [aesthetics](#), the view according to which art (and especially literature) should present human experience "as is", without evaluating reality or projecting ethical ideals (historically, naturalism in literature developed in reaction to [romanticism](#)).

4. in [ethics](#), the view according to which at least some human values (though not necessarily all) are determined by, and hence can be derived from, the nature of the human organism and our situation on earth - values like food, water, shelter, safety, psychological closeness, actualization of human talent and potential, the attainment of knowledge, and so on. By way of illustration, [existentialism](#) could be considered a humanistic form of [individualism](#), but it differs from many other forms of [humanism](#) in denying ethical naturalism. Since, according to naturalism, moral [values](#) can be derived from facts about the world and human nature, the naturalist holds that "is" can imply "ought."

Based on [[Ethics Glossary](#)], [[The Ism Book](#)] and the [[Dictionary of Philosophy of Mind](#)]

29-04-2001

naturalistic fallacy

<[ethics](#)> according to G. E. [Moore](#), any [argument](#) which attempts to define the good in any terms whatsoever, including naturalistic terms. For [Moore](#), good is simple and indefinable. This is revealed, Moore thought, by the fact that, after listing any "natural" quality of something (pleasurable, for example), we can always raise the question "but is it good?". [prescriptivism](#)

Recommended Reading: G. E. Moore, "Principia Ethica" (Prometheus, 1988); Brian Hutchinson, "G. E. Moore' s Ethical Theory: A Reassessment" (Cambridge, 2001); Dennis Rohatyn, "The Reluctant Naturalist: A Study of G.E. Moore' s ' Principia Ethica' " (Univ. Pr. of Am., 1987); Tom Regan, "Bloomsbury' s Prophet: G. E. Moore and the Development of His Moral Philosophy" (Temple, 1986); and Peter

Simpson, "Goodness and Nature: A Defense of Ethical Naturalism" (Martinus Nijhoff, 1987).

Based on [[A Philosophical Glossary](#)], [[Ethics Glossary](#)], [[A Dictionary of Philosophical Terms and Names](#)]

21-02-2002

necessary

<[logic](#), [semantics](#)> a [sentence](#), [proposition](#), [thought](#), or judgement is necessary if it is true of any [possible world](#). Some philosophers (e.g. A.J. [Ayer](#)) maintain that the truths of logic and mathematics are necessary because they are [a priori](#), and [a priori](#) simply because they are [analytic](#); similarly maintaining that [contingent](#), [a posteriori](#), and [asynthetic](#) are equivalent.

[[A Philosophical Glossary](#)]

30-04-2001

necessary - contingent

<[philosophical terminology](#)> distinction between kinds of [truth](#). [Necessary truth](#) is a feature of any statement that it would be contradictory to deny. (Contradictions themselves are necessarily false.) [Contingent truth](#) (or falsehood) happens to be true (or false), but might have been otherwise. Thus, for example: "Squares have four sides." is [necessary](#). "Stop signs are hexagonal." is [contingent](#). "Pentagons are round." is contradictory. This distinction was traditionally associated (before [Kant](#) and [Kripke](#)) with the distinctions between [a priori](#) and [a posteriori knowledge](#) and the distinction between [analytic](#) and [synthetic judgment](#). Necessity may also be defined [de dicto](#) in terms of the formal logical property of [tautology](#).

Recommended Reading: Jules Vuillemin, "Necessity or Contingency?" (C S L I, 1995); Alvin Plantinga, "The Nature of Necessity" (Clarendon, 1989); and Margaret Dauler Wilson, "Leibniz' Doctrine of Necessary Truth" (Harvard, 1984).

[[A Dictionary of Philosophical Terms and Names](#)]

21-02-2002

necessary - sufficient

<[philosophical terminology](#)> distinction between logical or causal conditions. In [logic](#), one [proposition](#) is a necessary condition of another when the second cannot be true while the first is false, and one [proposition](#) is a [sufficient condition](#) for another when the first cannot be true while the second is false. Thus, for example: "I have a dog" is a necessary condition for "My dog has fleas," and "You scored ninety-five percent" is a [sufficient condition](#) for "You received an A." In causal relations, a necessary condition for the occurrence of an [event](#) is a [state](#) of affairs without which the [event](#) cannot happen, while a [sufficient condition](#) is a [state](#) of affairs that guarantees that it will happen. Thus, for example: the presence of oxygen is a necessary condition for combustion, and the flow of electrical current is a [sufficient condition](#) for the induction of a magnetic field.

Recommended Reading: Brian McLaughlin, "On the

Logic of Ordinary Conditionals" (SUNY, 1990); "Conditionals", ed. by Michael Woods, David Wiggins, and Dorothy Edgington (Clarendon, 1997); and David Lewis, "Counterfactuals" (Blackwell, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

21-02-2002

necessitarianism

<[metaphysics](#)> [determinism](#) applied to human beings: the doctrine that human beings do not have free will but are determined in their actions by antecedent, external causes. Necessitarianism is thus opposed to [libertarianism](#) regarding human action. (References from [determinism](#) and [libertarianism](#).)

[\[The Ism Book\]](#)

25-03-2001

negating the antecedent and the consequent

<[philosophical terminology](#)> a [fallacy](#) of the form:

$$\begin{array}{l} p \rightarrow q \\ \hline \sim p \rightarrow \sim q \end{array}$$

Example: "If my daughter is sixteen, then I am over thirty. Therefore, if my daughter is not sixteen, then I am not over thirty." This pattern of reasoning should be distinguished from legitimate cases of [transposition](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

21-02-2002

negation

<[logic](#)> A [truth function](#) that is true when its [argument](#) is false, and false when its [argument](#) is true (in 2-valued logics). Also the operator or connective denoting this [function](#); also the proposition built from this operator. Notation: $\sim p$, also \bar{p} , also, p with a bar on top. (By convention an unadorned propositional symbol, p, is the affirmation of proposition p.)

[\[Glossary of First-Order Logic\]](#)

16-03-2001

negation by failure

An extralogical feature of Prolog and other [logic programming](#) languages in which failure of unification is treated as establishing the negation of a [relation](#). For example, if Ronald Reagan is not in our [database](#) and we asked if he was an American, Prolog would answer "no".

[\[FOLDOC\]](#)

16-03-2001

negation completeness

<[logic](#)> A system is [negation](#)-complete when for every closed [wff](#) A of its language, either A or \sim A is a [theorem](#). That is, all closed [wffs](#) are [decidable](#).

[Glossary of First-Order Logic]

16-03-2001

negation incompleteness

A system is [negation](#)-incomplete when for at least one closed [wff](#) A neither A nor \sim A is a [theorem](#), or when there is at least one [undecidable](#) closed [wff](#).

[Glossary of First-Order Logic]

16-03-2001

negative proposition

<[philosophical terminology](#)> a [statement](#) whose propositional quality is determined by the [assertion](#) that some or all members of one [class](#) of things are excluded from membership in some other [class](#). Examples: "No fish are birds." and "Some birds are not geese." The first declares that the classes of fish and birds have no common members, while the second maintains that there is at least one member of the [class](#) of birds that is excluded from the [class](#) of geese.

[[A Dictionary of Philosophical Terms and Names](#)]

21-02-2002

negative rights

[rights](#)

00-00-0000

neikos

<[philosophical terminology](#)> Greek term for a quarrel, feud, or battle; hence, in the [philosophy](#) of [Empedocles](#), the spirit of discord or strife in constant struggle with the benevolent influence of [philia](#).

Recommended Reading: Empedocles: "The Extant Fragments", ed. by M. R. Wright (Hackett, 1995) and Peter Kingsley, "Ancient Philosophy, Mystery, and Magic: Empedocles and Pythagorean Tradition" (Oxford, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

21-02-2002

neo-Confucianism

<religion> variety of [Confucianism](#) that survived as a response to the introduction of [Buddhism](#) to China from India. While this is strictly a technical or scholarly term, it helps to be aware that philosophical development occurred in the East as in the West (the changes in [Confucianism](#) are similar to the changes in [Aristotelianism](#) and [Platonism](#) in the West), and that the modern understanding of [Confucianism](#) is not necessarily true to the original tenets held by Confucius himself.

[[The Ism Book](#)]

25-03-2001

neo-Thomism

<history of philosophy> a nineteenth- and twentieth-century movement (encouraged by Leo XIII' s Aeterni Patris in 1879) that attempts to defend the philosophical and theological doctrines of [Thomas Aquinas](#) in a contemporary context. Prominent neo-Thomists include Gilson, [Maritain](#), and Lonergan.

Recommended Reading: Gerald A. McCool, "The Neo-Thomists" (Marquette, 1996); "The Future of Thomism: The Maritain Sequence", ed. by Deal W. Hudson, Dennis William Moran, and Donald Arthur Gallagher (Notre Dame, 1992); "Conflict and Community: New Studies in Thomistic Thought", ed. by Michael B. Lukens (Peter Lang, 1993); W. Norris Clarke, "The One and the Many: A Contemporary Thomistic Metaphysics" (Notre Dame, 2001); and John F. X. Knasas, "The Preface to Thomistic Metaphysics: A Contribution to the Neo-Thomist Debate on the State of Metaphysics" (Peter Lang, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

21-02-2002

neoplatonism

<philosophical school> neplatonism refers specifically to the doctrines of [Plotinus](#) (205-270 CE) and his followers in the early centuries CE, and more generally to the tradition of such thought stretching through late antiquity into the Middle Ages and early Renaissance. Neo-Platonism was a revamped [Platonism](#) which put greater emphasis on [Plato](#)' s [dualism](#) and [idealism](#), even to the point of a spiritualism which early Christian theologians like [Augustine](#) found congenial despite the basic [pantheism](#) of Neo-Platonic ideas.

Recommended Reading: "Select Passages Illustrating Neoplatonism", tr. by E. R. Dodd (Ares, 1980); Baine Harris, "The Significance of Neoplatonism" (SUNY, 1976); R. T. Wallis, "Neoplatonism" (Hackett, 1995); and Sara Rappe, "Reading Neoplatonism: Non-Discursive Thinking in the Texts of Plotinus, Proclus, and Damascius" (Cambridge, 2000).

Based on [[A Dictionary of Philosophical Terms and Names](#)]

21-02-2002

neorationalist

<[philosophical school](#)> a term for those 20th century philosophers who wish to revive aspects of [rationalism](#). Specifically, maintaining [mentalism](#), as opposed to behaviourism, in psychology, possibly insisting on innateness in learning theory and on intensional structures in a scientific description of the world.

[[A Philosophical Glossary](#)]

30-04-2001

netiquette

<[convention, networking](#)> /net' eket/ or /net' -ket/ Network etiquette.

The conventions of politeness recognised on Usenet and in mailing lists, such as not (cross-)posting to inappropriate groups and refraining from commercial advertising outside the biz groups.

The most important rule of netiquette is "Think before you post". If what you intend to post will not make a positive contribution to the newsgroup and be of interest to several readers, don' t post it! Personal messages to one or two individuals should not be posted to newsgroups, use private e-mail instead.

When following up an article, quote the minimum necessary to give some context to your reply and be careful to attribute the quote to the right person. If the article you are responding to was posted to several groups, edit the distribution ("Newsgroups:") header to contain only those groups which are appropriate to your reply, especially if the original message was posted to one or more inappropriate groups in the first place.

Re-read and edit your posting carefully before you post. Check the spelling and grammar. Keep your lines to less than 70 characters. Don' t post test messages (except to test groups) - wait until you have something to say. When posting humorous or sarcastic comments, it is conventional to append a smiley, but don' t overuse them.

Before asking a question, read the messages already in the group and read the group' s [FAQ](#) if it has one. When you do post a question, follow it with "please reply by mail and I will post a summary if requested" and make sure you DO post a summary if requested, or if only a few people were interested, send them a summary by mail. This avoids umpteen people posting the same answer to the group and umpteen others posting "me too"s.

If you believe someone has violated netiquette, send them a message by private e-mail, DO NOT post a follow-up to the news. And be polite, they may not realise their mistake, they might be a beginner or may not even have been responsible for the "crime" - their account may have been used by someone else or their address forged.

Be proud of your postings but don' t post just to see your name in pixels. Remember: your future employer may be reading.

["net.acceptable"](#).

[[Jargon File](#)] and [[FOLDOP](#)]

16-03-2001

network

<[networking](#)> Hardware and software data communication systems.

The OSI seven layer model attempts to provide a way of partitioning any computer network into independent modules from the lowest (physical) layer to the highest (application) layer. Many different specifications exist at each of these layers.

Networks are often also classified according to their geographical extent: local area network (LAN), metropolitan area network (MAN), wide area network (WAN) and also according to the [protocols](#) used.

See BITNET, Ethernet, [Internet](#), Novell, PSTN, network, the.

[Tanenbaum, A., "Computer Networks; 2nd ed.", Prentice Hall, Englewood Cliffs, NJ, 1989.]

[[FOLDOC](#)]

16-03-2001

neural nets

[artificial neural network](#)

00-00-0000

neural network

[artificial neural network](#)

00-00-0000

Neurath Otto

<[history of philosophy, biography](#)> Austrian philosopher (1882-1945) who founded and edited the "International Encyclopedia of Unified Science". As a member of the [Vienna Circle](#), Neurath advanced the development of [logical positivism](#) by rejecting epistemological (as well as metaphysical) assertions as meaningless. In *Protocolls'tze* (Protocol Statements, 1932) urged abandonment of efforts to ground science in uninterpreted phenomenal contents. His defence of the practical political doctrines of [Marx](#) necessitated emigration from Nazi Germany to England.

Recommended Reading: Otto Neurath, "Philosophical Papers, 1913-1946" (Reidel, 1983); Otto Neurath: "Philosophy Between Science and Politics", ed. by Nancy Cartwright, Jordid Cat, and Thomas Uebel (Cambridge, 1996); "Encyclopedia and Utopia: The Life and Work of Otto Neurath", ed. by Elisabeth Nemeth and Friedrich Stadler (Kluwer, 1996); "Logical Empiricism at Its Peak: Schlick, Carnap, and Neurath", ed. by Sahotra Sarkar (Garland, 1996); and Thomas E. Uebel, "Overcoming Logical Positivism from Within: The Emergence of Neurath' s Naturalism in the Vienna Circle' s Protocol Sentence Debate" (Rodopi, 1992).

[[A Dictionary of Philosophical Terms and Names](#)]

21-02-2002

neuron[artificial neural network](#)

00-00-0000

neutral monism

<[philosophical terminology](#)> belief that both [mental](#) and [physical](#) properties are the features of substances of a single sort, which are themselves ultimately neither [mental](#) nor [physical](#). In distinct varieties, [neutral monism](#) was defended by [James](#) and [Russell](#).

Recommended Reading: William James: "Writings 1902-1910", ed. by Bruce Kuklick (Lib. of Am., 1988); "The Cambridge Companion to William James", ed. by Ruth Anna Putnam (Cambridge, 1997); Ray Monk, "Bertrand Russell and the Origins of Analytical Philosophy" (St. Augustine, 1997); and Mafizuddin Ahmed, "Bertrand Russell' s Neutral Monism".

[\[A Dictionary of Philosophical Terms and Names\]](#)

21-02-2002

Newton Isaac

<[history of philosophy, biography](#)> English mathematician and scientist (1642-1727). Newton made incomparable contributions to the development of optics and mechanics. He demonstrated the composite structure of light in "Opticks: Or a Treatise of the Reflections Inflections and Colours of Light" (1704). Newton' s "Philosophiae naturalis principia mathematica" ("The Mathematical Principles of Natural Philosophy") (1687) provided a comprehensive account of both celestial and terrestrial motion by reference to simple laws of motion and the notion of universal gravitation. Newton also served as Master of the Mint and President of the Royal Society.

Recommended Reading: Richard Westfall, "The Life of Isaac Newton" (Cambridge, 1994); Dana Densmore, "Newton' s Principia: The Central Argument" (Green Lion, 1996); and "Philosophical Perspectives on Newtonian Science", ed. by Phillip Bricker and R. I. G. Hughes (MIT, 1990.)

[\[A Dictionary of Philosophical Terms and Names\]](#)

21-02-2002

Nicole Pierre

<[history of philosophy, biography](#)> French philosopher (1625-1695). Nicole was a long-time associate of Antoine [Arnauld](#), with whom he co-wrote "La logique ou l' art de penser", also known as "The PorRoyal Logic" (1662). In the "Essais de Morale" ("Moral Essays") (1678) Nicole offered an enlightened defence of [egoism](#).

Recommended Reading: Edward Donald James, "Pierre Nicole, Jansenist and Humanist A study of his Thought" (Martinus Nijhoff, 1981).

[\[A Dictionary of Philosophical Terms and Names\]](#)

21-02-2002

Nietzsche Friedrich

<[history of philosophy](#), [biography](#)> born the son of a Lutheran pastor in Roecken, Saxony, Friedrich Nietzsche (1844-1900) quickly abandoned his own pursuit of [theology](#) in order to specialize in philology at Leipzig. His study of classical literature led to an academic appointment at Basel and the publication of "Die Geburt der Tragödie aus dem Geiste der Musik" ("The Birth of Tragedy") (1872), with its distinction between Apollonian and Dionysian cultures. When ill health forced an early end to his teaching career, Nietzsche began to produce the less scholarly, quasi-philosophical, and anti-religious works for which he is now known, including "Menschliches, allzumenschliches" ("Human, All Too Human") (1878), "Also Sprach Zarathustra" ("Thus Spoke Zarathustra") (1883), "Die Fröhliche Wissenschaft" ("The Gay Science") (1882), and "Jenseits von Gut und Böse" ("Beyond Good and Evil") (1886). Nietzsche never recovered from the mental collapse he suffered in 1889; his "Der Wille zur Macht" ("Will to Power") (1901) and the autobiographical "Ecce Homo" ("Ecce Homo") (1908) were published posthumously. Nietzsche sharply criticized the Greek tradition's overemphasis on reason in his "Die Götzenvermürung" ("Twilight of the Idols") (1889). Reliance on abstract concepts in a quest for absolute truth is merely a symptom of the degenerate personalities of philosophers like [Socrates](#). From this Nietzsche concluded that traditional philosophy and religion are both erroneous and harmful. [Progress](#) beyond the stultifying influence of [philosophy](#), then, requires a thorough «revaluation of values». In "Zur Genealogie der Moral" ("On the Genealogy of Morals") (1887) Nietzsche bitterly decried the slave morality enforced by social punishment and religious guilt. Only the noble one - the Übermensch - can rise above all moral distinctions to achieve a healthy life of truly human worth.

Recommended Reading:

Primary sources:

"Friedrich Wilhelm Nietzsche, Werke", ed. by Giorgio Colli and Mazzino Montinari (de Gruyter, 1967-); "Basic Writings of Nietzsche", ed. by Peter Gay (Modern Library, 2000); "A Nietzsche Reader", tr. by R. J. Hollingdale (Penguin, 1978); Friedrich Wilhelm Nietzsche, "Beyond Good and Evil", tr. by Helen Zimmern (Prometheus, 1989); Friedrich Wilhelm Nietzsche, "The Birth of Tragedy", ed. by Douglas Smith (Oxford, 2000); Friedrich Wilhelm Nietzsche, "Ecce Homo: How One Becomes What One Is", tr. by R. J. Hollingdale (Penguin, 1993); Friedrich Wilhelm Nietzsche, "The Genealogy of Morality and Other Writings", ed. by Keith Ansell-Pearson and Carol Diethe (Cambridge, 1994); Friedrich Wilhelm Nietzsche, "Thus Spoke Zarathustra", tr. by R.J. Hollingdale and Walter Kauffmann (Penguin, 1978); Friedrich Wilhelm Nietzsche, "Twilight of the Idols or How to Philosophize With a Hammer", ed. Duncan Large (Oxford, 1998); Friedrich Wilhelm Nietzsche, "The Will to Power", tr. by R. Hollingdale and Walter Kaufmann (Random House, 1987).

Secondary sources:

"The Cambridge Companion to Nietzsche" , ed. by Bernd Magnus and Kathleen Marie Higgins (Cambridge, 1996); Michael Tanner, "Nietzsche" (Oxford, 1995); R. J. Hollingdale, "Nietzsche: The Man and His Philosophy" (Cambridge, 1999); "Feminist Interpretations of Friedrich Nietzsche", ed. by Kelly Oliver and Marilyn Pearsall (Penn. State, 1998); Ronald Hayman, "Nietzsche" (Routledge, 1999);

Richard Schacht, "Nietzsche" (Routledge, 1985); "The New Nietzsche: Contemporary Styles of Interpretation", ed. by David B. Allison (MIT, 1985); Robert C. Solomon and Kathleen M. Higgins, "What Nietzsche Really Said" (Schocken, 2000); "Reading Nietzsche", ed. by Robert C. Solomon and Kathleen M. Higgins (Oxford, 1990); James I. Porter, "The Invention of Dionysus: An Essay on the Birth of Tragedy" (Stanford, 2000); Arthur Coleman Danto, "Nietzsche as Philosopher" (Columbia, 1965).

Additional on-line information about Nietzsche includes: Douglas Thomas' s outstanding Nietzsche page. Robert Wicks' s article in "The Stanford Encyclopedia of Philosophy". Richard Schacht' s article in "The Oxford Companion to Philosophy". Also see: «Dionysian and Apollinian», eternal recurrence, «God is dead», irrationalism, moral philosophy, nihilism, skepticism about religion, resentment, slave morality, superman, tragedy, the transvaluation of values, and the will to power. The thorough collection of resources at EpistemeLinks.com. Katharena Eiermann' s Nietzsche page. Gary Brent Madison on Nietzsche' s influence on postmodern thinkers. The article in the "Columbia Encyclopedia" at Bartleby.com. G. J. Matthey' s lecture on Nietzsche' s metaphysics. A comparison of Nietzsche and Kant by Scarlett Marton. Snippets from Nietzsche (German and English) in "The Oxford Dictionary of Quotations". An interesting page (in German) from Jens Suckow. Bjoern Christensson' s brief guide to Internet resources. A brief entry in The Macmillan Encyclopedia 2001.

[\[A Dictionary of Philosophical Terms and Names\]](#)

21-02-2002

nihil est in intellectu quod non prius fuerit in sensu

<[philosophical terminology](#)> Latin phrase meaning "Nothing is in the understanding that was not earlier in the senses". Hence, the central [doctrine](#) of the [empiricism](#) of [Gassendi](#), [Locke](#), and [Mill](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

21-02-2002

nihilism

<[ethics](#)> the belief that there is no [value](#) or [truth](#). Literally, a belief in nothing (nihil in Latin). Most contemporary discussions of nihilism arise out of a consideration of Friedrich Nietzsche' s remarks on nihilism, especially in "The Will to Power". Nihilism can also be described as an extreme form of [existentialism](#) or [pessimism](#) which holds that life has no meaning and that even if you try to achieve your goals, in the end your life must necessarily come to nothing - thus nihilism is similar to [fatalism](#). Sometimes, nihilism is worse than fatalism because nihilists don' t usually say that life comes to zero but to less than zero, since they hold that life really just consists of one thing: pain. Nihilism is popularly taken to refer to wanton destruction for its own sake, a sort of activist irrationalism.

Recommended Reading: Stanley Rosen, Nihilism: "A Philosophical Essay" (St. Augustine, 2000); Simon Critchley, "Very Little-Almost Nothing: Death, Philosophy, Literature" (Routledge, 1997); Karl Lowith, "Martin Heidegger and European Nihilism", ed. by Richard Wolin and Gary Steiner (Columbia, 1998); and David Levin, "The Body' s Recollection of Being: Phenomenological Psychology and the Deconstruction of Nihilism" (Routledge, 1990).

Based on [\[The Ism Book\]](#) and the [\[Ethics Glossary\]](#)
[\[A Dictionary of Philosophical Terms and Names\]](#)

21-02-2002

Noddings Nel

<[history of philosophy, biography](#)> American [philosopher](#) (1929-). In her *Caring: A Feminine Approach to Ethics and Moral Education* (1984) and *Women and Evil* (1989), Noddings emphasizes the importance of personal relationships as the foundation for ethical conduct. "Educating for Intelligent Belief or Unbelief" (1993) offers a general account of [epistemological](#) values. Her comments on "Excellence as a Guide to Educational Conversation" (1992) are available on line. In "Philosophy of Education" (1995) Noddings examines in detail the relevance of [philosophy](#)- both historical and contemporary - for educational theory and practice.

Recommended Reading: Nel Noddings, "The Challenge to Care in Schools: An Alternative Approach to Education" (Teachers' College, 1992) and Nel Noddings, "Starting at Home: Caring and Social Policy" (California, 2002).

[\[A Dictionary of Philosophical Terms and Names\]](#)

21-02-2002

node

1. A point or vertex in a [graph](#).
2. An addressable device attached to a computer [network](#). More often called a "host".
3. A [hypertext](#) document.

16-03-2001

noesis

<[philosophical terminology](#)> Greek word for [intuition](#) or [thinking](#); the operation of [nous](#) without benefit of the discursive reasoning that characterizes [dianoia](#). According to [Plato](#), such awareness represents the highest portion of human [knowledge](#). From this foundation, [Plotinus](#) developed a detailed theory about the operation of the human [soul](#) in relation to the world. [Husserl](#) later appropriated this Greek term in order to emphasize the characteristic [intentionality](#) of [mental](#) acts.

Recommended Reading: F. E. Peters, "Greek Philosophical Terms: A Historical Lexicon" (NYU, 1967).

[\[A Dictionary of Philosophical Terms and Names\]](#)

21-02-2002

nominalism

<[logic](#), [scholasticism](#), [universals](#), [nominalist](#)>
 <[ockhamism](#)> the view (held by Berkeley, among others) that general [terms](#), such as "table," do not express or refer to general [concepts](#), [abstract ideas](#), or any sort of really existing [universals](#); there are just individual words and the individual things they refer to.

[[Philosophical Glossary](#)]

22-06-2001

nominalist

<[philosophical school](#)>

1. in the middle ages, someone who maintained that there where no universals above and beyond particular individual things and words (marks on paper) in particular languages. [realist](#)

2. today, we tend to call someone a nominalist whose general account of the universe tries to get along without sanctioning things that are not realized completely in our experience. Goodman is often said to be a nominalist, and [Quine](#) may be said to have such tendencies (though [Quine](#) sanctions sets).

[[A Philosophical Glossary](#)]

30-04-2001

non parity

[parity](#)

00-00-0000

non sequitur

<[philosophical terminology](#)> Latin phrase meaning, "It does not follow." The characteristic feature of arguments that fail to provide adequate support for their conclusions, especially those that commit one of the fallacies of relevance.

[[A Dictionary of Philosophical Terms and Names](#)]

25-02-2002

non-algorithmic procedure

[heuristic](#)

00-00-0000

non-contradiction

<[logic](#), [metaphysics](#), [essence](#), [causality](#), [syllogism](#), [idealism](#)>
 <[mathematics](#), [intuitionism](#), [epistemology](#), [excluded middle](#)>
 a fundamental logical principle, first formulated by [Aristotle](#), which maintains that one and the same [proposition](#) (or [thought](#) or [statement](#)) cannot be both true and false or that a statement and its denial or contradictory cannot both be true. Compare: Excluded Middle.

[[Philosophical Glossary](#)]

28-07-2001

non-determinism

<[algorithm](#)> A property of a computation which may have more than one result.

One way to implement a non-deterministic [algorithm](#) is using [backtracking](#), another is to explore (all) possible solutions in parallel.

[[FOLDOC](#)]

16-03-2001

non-deterministic

Exhibiting non-determinism.

00-00-0000

non-deterministic automaton

<[theory](#)> (Or "probabilistic automaton") An [automaton](#) in which there are several possible actions (outputs and next states) at each state of the computation such that the overall course of the computation is not completely determined by the program, the starting state, and the initial inputs.

See also non-deterministic Turing Machine.

[[FOLDOC](#)]

16-03-2001

non-deterministic polynomial time

<[complexity](#)> (NP) A set or property of computational [decision problems](#) solvable by a non-deterministic Turing Machine in a number of steps that is a [polynomial](#) function of the size of the input. The word "non-deterministic" suggests a method of generating potential solutions using some form of non-determinism or "trial and error". This may take exponential time as long as a potential solution can be verified in polynomial time.

NP is obviously a superset of P (polynomial time problems solvable by a deterministic [Turing Machine](#) in polynomial time) since a deterministic algorithm can be considered as a degenerate form of non-deterministic algorithm. The question then arises: is NP equal to P? I.e. can every problem in NP actually be solved in polynomial time? Everyone's first guess is "no", but no one has managed to prove this; and some very clever people think the answer is "yes".

If a problem A is in NP and a polynomial time algorithm for A could also be used to solve problem B in polynomial time, then B is also in NP.

See also Co-NP, NP-complete.

[Examples?]

[FOLDOC]

16-03-2001

non-deterministic Turing Machine

<complexity> A normal (deterministic) [Turing Machine](#) that has a "guessing head" - a write-only head that writes a guess at a solution on the tape first, based on some arbitrary internal [algorithm](#). The regular [Turing Machine](#) then runs and returns "yes" or "no" to indicate whether the solution is correct.

A non-deterministic Turing Machine can solve non-deterministic polynomial time computational [decision problems](#) in a number of steps that is a [polynomial](#) function of the size of the input

[FOLDOC]

16-03-2001

non-polynomial

<complexity> The set or property of problems for which no polynomial-time algorithm is known.

This includes problems for which the only known [algorithms](#) require a number of steps which increases exponentially with the size of the problem, and those for which no [algorithm](#) at all is known. Within these two there are problems which are "[provably difficult](#)" and "[provably unsolvable](#)".

[FOLDOC]

16-03-2001

non-truth-functional

<logic> an operator (i.e. something which if added to one or more propositions makes a (molecular) proposition) is non-truth-functional [iff](#) the truth-value of a [proposition](#) in which it appears is not wholly determined by the truth-value of the subsidiary propositions on which it operates. E.g. the truth-value of "it is necessary that there are nine planets" and "it is believed that there are nine planets" is not determined by the truth value of "there are nine planets." Hence the operators "it is believed that" are non-truth-functional operators. truth-functional

[A Philosophical Glossary]

30-04-2001

non-volatile

non-volatile storage

00-00-0000

non-volatile memory

non-volatile storage

00-00-0000

Non-Volatile Random Access Memory

<storage> (NVRAM) Static [random](#) access memory which is made into non-volatile storage either by having a battery permanently connected or by saving its contents to EEPROM before turning the power off and reloading it when power is restored.

[[FOLDOC](#)]

16-03-2001

non-volatile storage

<storage> (NVS, persistent storage, memory) A term describing a storage device whose contents are preserved when its power is off. Storage using magnetic media (e.g. magnetic disks, magnetic tape or bubble memory) is normally non-volatile by nature whereas semiconductor memories (static RAM and especially dynamic RAM) are normally volatile but can be made into non-volatile storage by having a (rechargeable) battery permanently connected.

Dynamic RAM is particularly volatile since it loses its data, even if the power is still on, unless it is refreshed. An acoustic delay line is a (very old) example of a volatile storage device.

Other examples of non-volatile storage are EEPROM, CD-ROM, paper tape and punched cards.

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16-03-2001

noncognitivism

<[philosophical terminology](#)> a meta-ethical [theory](#) according to which [moral](#) issues are not subject to rational determination. Dealing with values, not facts, moral assertions are neither [true](#) nor [false](#), but merely express attitudes, feelings, desires, or demands.

Recommended Reading: "Hume' s Ethical Writings", ed. by Alasdair MacIntyre (Notre Dame, 1979); Routledge "Philosophy Guidebook to Hume on Morality", ed. by James Baillie (Routledge, 2000); and Charles L. Stevenson, Facts and Values (Greenwood, 1975).

[[A Dictionary of Philosophical Terms and Names](#)]

25-02-2002

nonconceptual content

<[philosophy of mind](#)> a [content](#), possibly of a non- or sub-[doxastic](#) state, whose [canonical](#) specification employs concepts which the subject need not possess in order to entertain the content, but rather might, for instance, be canonically specified in terms of abilities and skills the subject possesses, or in terms of significant though nonconceptualised experience.

[Rick Grush](#) and
[Pete Mandik](#)

[[Dictionary of Philosophy of Mind](#)]

16-03-2001

nonlinear

(Scientific computation) A property of a system whose output is not proportional to its input. For example, a transistor has a region of input voltages for which its output voltage is found by multiplying the input voltage by the gain of the transistor. Outside this region though, the transistor behaves non-linearly, meaning that it does not obey this simple equation. The behaviour of a system containing non-linear components is thus harder to model and to predict.

[[Jargon File](#)]

16-03-2001

NOR

<[logic](#)> Not OR.

The [Boolean](#) function which is true if none of its inputs are true and false otherwise, the [logical complement](#) of inclusive [OR](#). The binary (two-input) NOR function can be defined (written as an [infix](#) operator):

$A \text{ NOR } B = \text{NOT } (A \text{ OR } B) = (\text{NOT } A) \text{ AND } (\text{NOT } B)$

Its [truth table](#) is:

A	B	A NOR B
F	F	T
F	T	F
T	F	F
T	T	F

NOR, like [NAND](#), forms a complete set of [Boolean](#) functions on its own since it can be used to make NOT, AND, OR and any other Boolean function:

$\text{NOT } A = A \text{ NOR } A$

$A \text{ OR } B = \text{NOT } (A \text{ NOR } B)$

$A \text{ AND } B = (\text{NOT } A) \text{ NOR } (\text{NOT } B)$

[[FOLDOC](#)]

16-03-2001

norm

<[mathematics](#)> A real-valued function modelling the length of a [vector](#). The norm must be [homogeneous](#) and [symmetric](#) and fulfil the following condition: the shortest way to reach a point is to go straight towards it. Every convex symmetric closed surface surrounding point 0 introduces a norm by means of Minkowski functional; all vectors that end on the surface have the same norm then.

The most popular norm is the [Euclidean](#) norm; it is calculated by summing up squares of all coordinates and taking the square root; this is the essence of [Pythagoras'](#) s theorem. In the infinite dimensional case, the sum is infinite or is replaced with an integral when the number of dimensions is [uncountable](#).

[[FOLDOC](#)]

16-03-2001

normal distribution

<[statistics](#)> (Or "Gaussian distribution", "bell curve") The frequency distribution of many natural phenomena such as the height of people of a certain age and sex. The formula looks something like:

$$P(x) = e^{-((x-m)/s)^2}$$

where P(x) is the probability of a measurement x, m is the mean value of x and s is the standard deviation.

[[FOLDOC](#)]

16-03-2001

normal form

1. <[reduction](#)> In [reduction](#) systems, the state of a term which contains no reducible expressions. Variants include head normal form, weak head normal form.

2. <[database](#)> See [database normalisation](#).

16-03-2001

normal interpretation

[interpretation](#)

16-03-2001

normal order reduction

Under this evaluation strategy an expression is evaluated by reducing the leftmost outermost redex first. This method will terminate for any expression for which termination is possible, whereas applicative order reduction may not. This method is equivalent to passing arguments unevaluated because arguments are initially to the right of functions applied to them. See also [computational adequacy theorem](#).

16-03-2001

normalisation

1. [<data processing>](#) A transformation applied uniformly to each element in a set of data so that the set has some specific statistical property. For example, monthly measurements of the rainfall in London might be normalised by dividing each one by the total for the year to give a profile of rainfall throughout the year.

2. [<programming>](#) Representation of a floating-point number so that its mantissa's leftmost digit is non-zero. If the leftmost fraction digit are zeros, the number is said to be unnormalised. Unnormalised numbers are normalised by shifting the fraction left, one digit at a time, until the leftmost digit is nonzero and reducing the exponent by the number of shifts.

3. [<database>](#) [database normalisation](#).

[FOLDOC]

16-03-2001

normalised

[normalisation](#)

00-00-0000

normative ethics

[<philosophical terminology>](#) branch of philosophical [ethics](#) concerned with developing theories that determine which human actions are right and which are wrong. It is useful to distinguish normative theories according to the way in which they derive moral value from duties or [rights](#): deontological theories hold that actions are intrinsically right or wrong, while consequentialist theories evaluate actions by reference to their extrinsic outcomes. Virtue [ethics](#) theories locate the highest moral value in the development of persons.

Recommended Reading: William K. Frankena, "Ethics" (Prentice Hall, 1973); Stephen Darwall, "Philosophical Ethics" (Westview, 1998); "The Blackwell Guide to Ethical Theory", ed. by Hugh LaFollette (Blackwell, 2000); and "Normative Ethics", ed. by Shelly Kagan, Keith Lehrer, and Norman Daniels (Westview, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

25-02-2002

normed space

[<mathematics>](#) A [vector space](#) with a [function](#), $\|F\|$, such that

$$\begin{aligned} \|F\| &= 0 \text{ if and only if } F=0 \\ \|aF\| &= \text{abs}(a) * \|F\| \\ \|F+G\| &\leq \|F\| + \|G\| \end{aligned}$$

Roughly, a distance between two elements in the space is defined.

[FOLDOC]

16-03-2001

Norris John

<[history of philosophy](#), [biography](#)> English philosopher (1657-1711). In his Essay towards the Theory of an Ideal World, Norris defended the [philosophy](#) of [Malebranche](#) against the [empiricism](#) of [Locke](#).

Recommended Reading: John Norris, "Treatises upon Several Subjects" (Garland, 1993) and Richard Acworth, "The Philosophy of John Norris of Bemerton" (Lubrecht & Cramer, 1976).

[[A Dictionary of Philosophical Terms and Names](#)]

25-02-2002

NOT

<[logic](#)> The [Boolean](#) function which is true only if its input is false. Its [truth table](#) is:

A		NOT A
---	+	-----
F		T
T		F

See also [negation](#)

[[FOLDOC](#)]

16-03-2001

noumenal

<[ethics](#), [epistemology](#), [ontology](#)> a Kantian term that refers to the unknowable world as it is in itself. According to Kant, we can only know the world as it appears to us, as a [phenomenon](#). We can never know it as it is in itself, as a [noumenon](#). The adjectival forms of these two words are "phenomenal" and "noumenal," respectively.

26-03-2001

noumenon

<[kantian ontology](#), [epistemology](#)> for Kant noumena or "things-in-themselves" are realities transcending all possible thought and experience. Since the Categories of thought do not apply to things-in-themselves but only "things-for-us" or [phenomena](#), [knowledge](#) is possible only of these phenomena.

[[Philosophical Glossary](#)]

29-07-2001

noun numeral

[numeral](#)

00-00-0000

nous

<[philosophical terminology](#)> Greek term for [mind](#), [reason](#), or [intellect](#). Thus, in the [philosophy](#) of [Anaxagoras](#), nous is an organizing principle for the universe as a whole. [Plato](#) distinguished this cosmic [sense](#) from the more ordinary operation of the human [soul](#) in achieving higher [knowledge](#). [Aristotle](#) typically regarded nous as the distinctive faculty involved in the acquisition of general [knowledge](#). As always, [Plotinus](#) elevated this into a quasi-divine principle.

Recommended Reading: F. E. Peters, "Greek Philosophical Terms: A Historical Lexicon" (NYU, 1967).

[\[A Dictionary of Philosophical Terms and Names\]](#)

25-02-2002

Nozick Robert

<[history of philosophy, biography](#)> American philosopher (1938-2002); author of "Philosophical Explanations" (1981) and "The Examined Life" (1990). Although Nozick has dealt with a wide range of philosophical issues, he is best known for the [libertarian](#) political philosophy he defended in "Anarchy, State, and Utopia" (1974). According to Nozick, direct action by the state is rarely warranted, and [justice](#) is appropriately evaluated by reference to the means by which social policies are implemented, rather than their consequences.

Recommended Reading: Robert Nozick, "The Nature of Rationality" (Princeton, 1994); Robert Nozick, "Socratic Puzzles" (Harvard, 1999); Robert Nozick, "Invariances: The Structure of the Objective World" (Harvard, 2001); Simon A. Hailwood, Exploring Nozick: "Beyond ' Anarchy, State and Utopia' " (Avebury, 1996); and Reading Nozick: "Essays on ' Anarchy, State and Utopia' ", ed. by Jeffrey Paul (Rowman & Littlefield, 1981).

[\[A Dictionary of Philosophical Terms and Names\]](#)

25-02-2002

NP

<[complexity](#)> non-deterministic polynomial time.

[\[Jargon File\]](#)

16-03-2001

NP time

non-deterministic polynomial time

00-00-0000

NP-complete

<complexity> (NPC, non-deterministic Polynomial time complete) A set or property of computational [decision problems](#) which is a subset of [NP](#) (i.e. can be solved by a non-deterministic [Turing Machine](#) in [polynomial](#) time), with the additional property that it is also NP-hard. Thus a solution for one NP-complete problem would solve all problems in NP. Many (but not all) naturally arising problems in class NP are in fact NP-complete.

There is always a polynomial-time algorithm for transforming an instance of any NP-complete problem into an instance of any other NP-complete problem. So if you could solve one you could solve any other by transforming it to the solved one.

The first problem ever shown to be NP-complete was the [satisfiability problem](#). Another example is Hamilton' s problem.

See also [computational complexity](#), [halting problem](#), Co-NP, NP-hard.

[FOLDOC]

16-03-2001

NP-hard

<complexity> A set or property of computational [search problems](#). A problem is NP-hard if solving it in [polynomial time](#) would make it possible to solve all problems in class [NP](#) in polynomial time.

Some NP-hard problems are also in [NP](#) (these are called "NP-complete"), some are not. If you could reduce an [NP](#) problem to an NP-hard problem and then solve it in polynomial time, you could solve all NP problems.

See also [computational complexity](#).

[FOLDOC]

16-03-2001

null set

<logic>

The set with zero members. Notation: \emptyset , sometimes 0 or $\&$. Also called the empty set.

[Glossary of First-Order Logic]

16-03-2001

number crunching

<application, jargon> Computations of a numerical nature, especially those that make extensive use of floating-point numbers. The only thing Fortrash is good for.

This term is in widespread informal use outside hackerdom and even in mainstream slang, but has additional hackish connotations: namely, that the computations are mindless and involve massive use of [brute force](#). This is not always [evil](#), especially if it involves ray tracing or [fractals](#) or some other use that makes pretty pictures, especially if such pictures can be used as wallpaper.

[\[Jargon File\]](#) and [\[FOLDOC\]](#)

16-03-2001

numbers

(Scientific computation) Output from a computation that may not be significant but at least indicates that the program is running. Numbers may be used to placate management, grant sponsors, etc. "Making numbers" means running a program because output - any output, not necessarily meaningful output - is needed as a demonstration of progress.

See [integers](#), [irrational numbers](#), [natural numbers](#), [numeral](#), [rational numbers](#), [real numbers](#).

16-03-2001

numeral

<[logic](#)> A symbol or [wff](#) whose intended interpretation is a number. Notation: ("n" with a bar over it), also "n" (numeral for number n).

Adjectival numerals

Numerals that adjectivally modify nouns, as in "three bags full" and "two turtle doves". [Predicate logic](#) can express adjectival numerals unambiguously, but not noun numerals.

Noun numerals

Numerals that [function](#) as nouns or substantives in the propositions in which they occur, as "three is the successor of two".

[Glossary of First-Order Logic]

16-03-2001

Nussbaum Martha Craven

<[history of philosophy](#), [biography](#)> American philosopher (1947-). In "The Fragility of Goodness" (1986) and "The Therapy of Desire" (1994) Nussbaum argues for the continuing relevance of the [moral](#) philosophy of [Aristotle](#) and the schools of the Hellenistic era. An on-line example of her use of this [method](#) may be found in "Victims and Agents: What Greek tragedy can teach us about sympathy and responsibility". She employs more modern literary texts as significant sources of insight into human emotions and decision-making in "Love' s Knowledge" (1990).

Recommended Reading: Martha Craven Nussbaum, "Poetic Justice: The Literary Imagination and Public Life" (Beacon, 1997); Martha Craven Nussbaum, "Cultivating Humanity" (Harvard, 1998); Martha Craven Nussbaum, "Women and Human Development: The Capabilities Approach" (Cambridge, 2000); Martha Craven Nussbaum, "Sex & Social Justice" (Oxford, 2000); and Ronald L. Hall, "The Human Embrace: The Love of Philosophy and the Philosophy of Love: Kierkegaard, Cavell, Nussbaum" (Penn. State, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

25-02-2002

Nyquist Theorem

<[communications](#)> A theorem stating that when an [analogue](#) waveform is digitised, only the frequencies in the waveform below half the sampling frequency will be recorded. In order to reconstruct (interpolate) a signal from a sequence of samples, sufficient samples must be recorded to capture the peaks and troughs of the original waveform. If a waveform is sampled at less than twice its frequency the reconstructed waveform will effectively contribute only [noise](#). This phenomenon is called "aliasing" (the high frequencies are "under an alias").

This is why the best digital audio is sampled at 44,000 Hz - twice the average upper limit of human hearing.

The Nyquist Theorem is not specific to digitised signals (represented by discrete amplitude levels) but applies to any sampled signal (represented by discrete time values), not just sound.

[[FOLDOP](#)]

16-03-2001

O proposition

<[logic, philosophy of science](#)> in the traditional notation for [categorical logic](#), a [proposition](#) that is both [particular](#) and [negative](#). Example: "Some trees are not evergreens." Such a proposition affirms that there is at least one tree that is not also an evergreen. Its contradictory is an "A" proposition with the same [subject](#) and [predicate](#) terms.

[[A Dictionary of Philosophical Terms and Names](#)]

12-11-2001

Ob-

/ob/ prefix Obligatory. A piece of [netiquette](#) acknowledging that the author has been straying from the newsgroup' s charter topic. For example, if a posting in alt.sex is a response to a part of someone else' s posti that has nothing particularly to do with sex, the author may append "ObSex" (or "Obsex") and toss off a question or vignette about some unusual erotic act. It is considered a sign of great winnitude when one' s Ob are more interesting than other people' s whole postings.

[[Jargon File](#)]

16-03-2001

object

In object-oriented programming, a unique instance of a data structure defined according to the template provided by its [class](#). Each object has its own values for the variables belonging to its class and can respond to the messages ([methods](#)) defined by its class.

16-03-2001

object code

The machine code generated by a [source code](#) language processor such as an assembler or compiler. A file of object code may be immediately executable or it may require linking with other object code files, e.g. libraries, to produce a complete executable program.

[[FOLDOP](#)]

16-03-2001

object identifier

<[programming, PI](#)> (OID) Generally an implementation-specific [integer](#) or pointer that uniquely identifies an [object](#).

[FOLDOC]

16-03-2001

object language

<[logic](#)> The [formal language](#) of a system. The language used to talk about the object language is called the [metalanguage](#). Outside logic, an object language need not be formal; it is any referent language of any metalanguage.

[Glossary of First-Order Logic]

16-03-2001

object-orientation

object-oriented

12-11-2003

object-oriented

1. <[programming, PI](#)> (OO) See object-oriented programming, object-oriented analysis, object-oriented database, object-oriented design.

2. <[graphics](#)> [vector](#) graphics.

16-03-2001

object-oriented analysis

(OOA) See object-oriented design

16-03-2001

object-oriented database

<[database](#)> (OODB) A system offering DBMS facilities in an object-oriented programming environment. Data is stored as [objects](#) and can be interpreted only using the [methods](#) specified by its [class](#). The relationship between similar objects is preserved ([inheritance](#)) as are references between objects. Queries can be faster because [joins](#) are often not needed (as in a relational database). This is because an object can be retrieved directly without a search, by following its object id.

The same programming language can be used for both data definition and data manipulation. The full power of the database programming language' s type system can be used to model data structures and the relationship between the different data items.

Multimedia applications are facilitated because the [class methods](#) associated with the data are responsible for its correct interpretation.

OODBs typically provide better support for versioning. An object can be viewed as the set of all its versions. Also, object versions can be treated as full fledged objects. OODBs also provide systematic support for triggers and [constraints](#) which are the basis of active [databases](#). Most, if not all, object-oriented application programs that have database needs will benefit from using an OODB.

[Ode](#) is an example of an OODB built on C++.

[FOLDOC]

16-03-2001

object-oriented design

<[programming, Pl](#)> (OOD) A design method in which a system is modelled as a collection of cooperating [objects](#) and individual objects are treated as instances of a [class](#) within a [class hierarchy](#). Four stages can be identified: identify the classes and objects, identify their [semantics](#), identify their relationships and specify class and object interfaces and implementation. Object-oriented design is one of the stages of object-oriented programming.

["Object-oriented analysis and design with applications", Grady Booch, 2nd ed., pub. Benjamin/Cummings, Redwood CA, 1994].

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16-03-2001

object-oriented language

object-oriented programming

12-11-2003

object-oriented programming

<[programming, Pl](#)> (OOP) The use of a class of programming languages and techniques based on the concept of an "[object](#)" which is a data structure ([abstract data type](#)) encapsulated with a set of routines, called "[methods](#)", which operate on the data. Operations on the data can only be performed via these methods, which are common to all objects that are instances of a particular "[class](#)". Thus the interface to objects is well defined, and allows the code implementing the methods to be changed so long as the interface remains the same.

Each class is a separate module and has a position in a "[class hierarchy](#)". Methods or code in one class can be passed down the hierarchy to a [subclass](#) or inherited from a [superclass](#). This is called "[inheritance](#)".

A [procedure](#) call is described as invoking a method on an object (which effectively becomes the procedure's first [argument](#)), and may optionally include other arguments. The method name is looked up in the object's class to find out how to perform that operation on the given object. If the method is not defined for the object's class, it is looked for in its superclass and so on up the class hierarchy until it is found or there is no higher superclass.

OOP started with SIMULA-67 around 1970 and became all-pervasive with the advent of C++, and later Java. Another popular object-oriented programming languages (OOP) is Smalltalk, a seminal example from Xerox' Palo Alto Research Center (PARC). Others include [Ada](#), [Object Pascal](#), Objective C, DRAGOON, [BETA](#), Emerald, POOL, Eiffel, [Self](#), Oblog, [ESP](#), POLKA, and [Loops](#). Other languages, such as [Perl](#) and VB, permit, but do not enforce OOP.

FAQ (<http://iamwww.unibe.ch/~scg/OOinfo/FAQ/>).
(<http://zgdv.igd.fhg.de/papers/se/oop/>).
(<http://cuiwww.unige.ch/Chloe/OOinfo/>).

[Usenet](#) newsgroup: news:comp.object

[FOLDOC]

16-03-2001

objective

something is objective insofar as it is independent of either a particular human mind or minds altogether.

Pete Mandik and Luciano Floridi

16-03-2001

objective - subjective

<[gnoseology](#), [philosophy of science](#)> distinction between [propositions](#) or [judgments](#) about the way things are and those about how people think or feel about them. The [truth](#) of [objective](#) claims is presumed to be entirely independent of the merely personal concerns reflected in [subjective](#) expressions, even though is difficult to draw the distinction precisely. Thus, for example: "Spinach is green" is [objective](#), while "I like spinach" is [subjective](#). "Seventy-three percent of people in Houston don't like spinach," however, seems to be an [objective](#) claim about certain subjects. The legitimacy of this distinction is open to serious question, since it is unclear whether (and how) any knowing subject can achieve genuine [objectivity](#). Nevertheless, because [objective truth](#) is supposed to carry undeniable persuasive force, exaggerated claims of [objectivity](#) have often been used as tools of intellectual and social oppression.

Recommended Reading:

Richard Rorty, *Objectivity, Relativism, and Truth* (Cambridge, 1991);

Thomas Nagel, *The View from Nowhere* (Oxford, 1989); Richard J. Bernstein, *Beyond Objectivism and Relativism: Science, Hermeneutics, and Praxis* (Pennsylvania, 1983); and *The Authority of Reason*, ed. by Jean E. Hampton and Richard A. Healey (Cambridge, 1998).

[[A Dictionary of Philosophical Terms and Names](#)]

12-11-2001

objective truth

<[epistemology](#), [metaphysics](#), [logic](#), [empiricism](#), [idealism](#)>

<[stoicism](#), [epicureism](#), [ockhamism](#), [theology](#), [existentialism](#)> <[phenomenology](#), [pragmatism](#)> objective truths are true regardless of what anyone thinks. Example: The earth revolves around the sun. This was true, a believer in [objective](#) truth would say, long before anyone thought so (the earth being long uninhabited) and even despite everyone thinking otherwise for a long time (prior to Copernicus, for millennia, virtually everyone thought the sun revolved around the earth).

[[Philosophical Glossary](#)]

22-06-2001

objectivity

the property of being [objective](#).

16-03-2001

obscenity

<[aesthetics](#), [ethics](#)> artistic expression which appeals solely to prurient interests and is without redeeming artistic merit or [social](#) importance. (As defined under U. S. [law](#).)

[[Philosophical Glossary](#)]

22-06-2001

observational equivalence

Two terms M and N are observationally equivalent iff for all contexts C[] where C[M] is a valid term, C[N] is also a valid term with the same value.

16-03-2001

obversion

<[logic](#), [philosophy of language](#)> the reciprocal relationship between two [categorical propositions](#) of opposite quality such that the [predicate](#) term of each is the complement of the [predicate](#) term of the other. Obversion is a [valid immediate inference](#) for [categorical propositions](#) of every form. Thus, for example: All lizards are reptiles and No lizards are non-reptiles. No spiders are insects and All spiders are non-insects. Some fish are birds and Some fish are not non-birds. Some mammals are not dogs and Some mammals are non-dogs. They are all legitimate cases of obversion; either member of each pair can be substituted for the other.

[[A Dictionary of Philosophical Terms and Names](#)]

04-12-2001

occasionalism

<[philosophy of mind](#), [ontology](#)> a view popularised by Nicholas Malbranche whereby:

- 1) the mental and the material comprise two different kinds of substance;
- 2) neither has any direct causal effect on the other and;
- 3) all seeming interactions between the two are due to the continual intervention by God who brings about a change in one on the occasion of a change in the other.

See [dualism](#), doctrine of pre-established harmony, [parallelism](#)

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

Ockham William of

<[history of philosophy](#), [biography](#)> english [philosopher](#) (1285-1349) who defended the [logic](#), [physics](#), and [metaphysics](#) of [Aristotle](#) in Summa Logicae (The Whole of Logic) (1328) vol. 1 and vol. 2 and the Dialogus. An extreme [nominalist](#), Ockham held that general terms are signs that indefinitely signify discrete (though similar) particulars. Ockham is best known for his statement of the law of [parsimony](#) as the ontological principle often called Ockham' s Razor: "Frustra fit per plura quod potest fieri per pauciora" ("It is pointless to do with more what can be done with less"). Thus, according to Ockham, we ought never to postulate the [reality](#) of any [entity](#) unless it is logically [necessary](#) to do so.

Recommended Reading: William of Ockham, Opera Philosophica (Franciscan, 1975); William of Ockham, Philosophical Writings: A Selection, tr. by Philotheus Boehner (Hackett, 1990); The Cambridge Companion to Ockham, ed. by Paul Vincent Spade (Cambridge, 1999); Rega Wood, Ockham on the Virtues (Purdue, 1997); and Five Texts on the Mediaeval Problem of Universals: Porphyry, Boethius, Abelard, Duns Scotus, Ockham, ed. by Paul Vincent Spade (Hackett, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

12-11-2001

octal

<[mathematics](#)> Base 8. A number representation using the digits 0-7 only, with the right-most digit counting ones, the next counting multiples of 8, then $8^2 = 64$, etc. For example, octal 177 is digital 127:

digit weight value
 $1 \cdot 8^2 = 64$ $1 \cdot 64 = 64$
 $7 \cdot 8^1 = 8 \cdot 7 \cdot 8 = 56$
 $7 \cdot 8^0 = 1 \cdot 7 \cdot 1 = 7$

 127

Octal system used to be widespread back when many computers used 6-bit bytes, as a 6-bit byte can be conveniently written as a two-digit octal number. Since nowadays a byte is almost always 8-bit long the octal system lost most of its appeal to the [hexadecimal](#) system.

For a brief discussion on the word `octal' see [hexadecimal](#).

[[FOLDOP](#)]

16-03-2001

Omega-algebraic

In domain theory, a complete partial order is algebraic if every element is the lub of some chain of compact elements. If the set of compact elements is countable it is omega-algebraic. Usually written with a Greek letter omega.

[FOLDDOC]

16-03-2001

omega-completeness

<logic> A system is omega-complete iff there is no wff W with one free variable such that (1) W_n is a [theorem](#) for every natural number n , and (2) $(x)Wx$ is not a [theorem](#).

See [closure](#) of a system

[Glossary of First-Order Logic]

16-03-2001

omega-consistency

<logic> A system is omega-consistent iff there is no wff W with one free variable such that (1) W_n is a [theorem](#) for every natural number n , and (2) $\sim(x)Wx$ is also a [theorem](#).

[Glossary of First-Order Logic]

omega-inconsistency

There is a wff W with one free variable such that (1) W_n is a [theorem](#) for every natural number n , and (2) $\sim(x)Wx$ is also a [theorem](#).

[Glossary of First-Order Logic]

omega-incompleteness

There is a wff W with one free variable such that (1) W_n is a [theorem](#) for every natural number n , and (2) $(x)Wx$ is not a [theorem](#). Wx is true for every n by instantiation but not by generalization.

See k -validity

[Glossary of First-Order Logic]

16-03-2001

one-to-one correspondence

<logic> The pairing-off of the members of one set with the members of another set such that each member of the first has exactly one counterpart in the second and each member of the second has exactly one counterpart in the first. The method of pairing off need not be effective. Notation: $A \approx B$ (set A can be put into one-to-one correspondence with set B)

[Glossary of First-Order Logic]

16-03-2001

ones complement

A system used in some computers to represent negative numbers. To negate a number, each bit of the number is inverted (zeros are replaced with ones and vice versa). This has the consequence that there are two representations for zero, either all zeros or all ones.

...

000...00011 = +3

000...00010 = +2

000...00001 = +1

000...00000 = +0

111...11111 = -0

111...11110 = -1

111...11101 = -2

111...11100 = -3

...

Naive logic for ones complement addition might easily include that $-0 + 1 = +0$. The twos [complement](#) avoids this by using all ones to represent -1.

16-03-2001

ontological commitment

<[ontology](#)> commitment (of a theory) to an existence claim, usually concerning some individual entity. It is often implicit.

Luciano Floridi

16-03-2001

ontology

1. <[ontology](#), [metaphysics](#)> A systematic account of what there is, an inventory of what exists.
2. <[artificial intelligence](#)> An explicit formal specification of how to represent the objects, concepts and other entities that are assumed to exist in some area of interest and the relationships that hold among them.

For [AI](#) systems, what "exists" is that which can be represented. When the [knowledge](#) about a [domain](#) is represented in a declarative [language](#), the set of objects that can be represented is called the [universe of discourse](#). We can describe the ontology of a program by defining a set of representational terms. Definitions associate the names of entities in the [universe of discourse](#) (e.g. classes, relations, functions or other objects) with human-readable text describing what the names mean, and formal axioms that constrain the interpretation and well-formed use of these terms. Formally, an ontology is the statement of a [logical theory](#).

A set of [agents](#) that share the same ontology will be able to communicate about a domain of discourse without necessarily operating on a globally shared theory. We say that an agent commits to an ontology if its observable actions are consistent with the definitions in the ontology. The idea of ontological commitment is based on the [Knowledge-Level](#) perspective.

3. <[information science](#)> The hierarchical structuring of knowledge about things by subcategorising them according to their essential (or at least relevant and/or cognitive) qualities. See [subject index](#). This is an extension of the previous senses of "ontology" (see 2 above) which has become common in discussions about the difficulty of maintaining [subject indices](#).

Recommended Reading: Jean-Paul Sartre, Being and Nothingness: A Phenomenological Essay on Ontology, tr. by Hazel E. Barnes (Washington Square, 1993); Herman Philipse, Heidegger's Philosophy of Being (Princeton, 1998); Gustav Bergmann, New Foundations of Ontology, ed. by William Heald and Edwin B. Allaire (Wisconsin, 1992); W. V. O. Quine, Ontological Relativity (Columbia, 1977); and Roger F. Gibson, Jr., The Philosophy of W. V. Quine: An Expository Essay (Florida, 1986).

based on [[A Dictionary of Philosophical Terms and Names](#)]

04-12-2001

open

1. To prepare to read or write a file. This usually involves checking whether the file already exists and that the user has the necessary authorisation to read or write it. The result of a successful open is usually some kind of capability (e.g. a Unix file descriptor) - a token that the user passes back to the system in order to access the file without further checks and finally to close the file.
2. Abbreviation for "open (or left) parenthesis" - used when necessary to eliminate oral ambiguity. To read aloud the LISP form (DEFUN FOO (X) (PLUS X 1)) one might say: "Open defun foo, open eks close, open, plus eks one, close close."
3. Non-proprietary. An open [standard](#) is one which can be used without payment.

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

open source

<legal> A method and philosophy for software licensing and distribution designed to encourage use and improvement of software written by volunteers by ensuring that anyone can copy the [source code](#) and modify it freely.

The term "open source" is now more widely used than the earlier term "free software" (promoted by the [Free Software Foundation](#)) but has broadly the same meaning - free of distribution restrictions, not necessarily free of charge.

There are various [open source licenses](#) available. Programmers can choose an appropriate license to use when distributing their programs.

The [Open Source Initiative](#) promotes the [Open Source Definition](#).

The Cathedral and the Bazaar
(<http://www.tuxedo.org/~esr/writings/cathedral-bazaar/cathedral-bazaar.html>)
was a seminal paper describing the open source phenomenon.

Open Sources - O' Reilly book with full text online
(<http://www.oreilly.com/catalog/opensources/book/perens.html>).

Articles from ZDNet
(<http://www.zdnet.com/pcmag/features/opensource/>).

[[FOLDOC](#)]

16-03-2001

Open Source Definition

<standard> (OSD) Definition of distribution terms for [open source](#) software, promoted by the [Open Source Initiative](#).

Home (<http://www.opensource.org/osd.html>).

[[FOLDOC](#)]

16-03-2001

Open Source Initiative

<body> (OSI) An organisation dedicated to managing and promoting the [Open Source Definition](#) for the good of the community.

Home (<http://www.opensource.org/>).

[[FOLDOC](#)]

16-03-2001

Open source license

<legal> Any document that attempts to specify [open source](#) usage and distribution of software. These licenses are usually drafted by experts and are likely to be more legally sound than one a programmer could write. However, loopholes do exist.

Here is a non-exhaustive list of open source licenses:

1. [Public Domain](#) - No license.
2. BSD License - An early open source license
3. General Public License (GPL) - The copyleft license of the Free Software Foundation. Used for GNU software and much of Linux.
4. Artistic License
(<http://www.my-opensource.org/Artistic.txt>) Less restrictive than the GPL, permitted by [Perl](#) in addition to the GPL.
5. Mozilla Public Licenses (<http://www.mozilla.org/MPL/>) (MPL, MozPL) and Netscape Public License (NPL).

["Open Sources", pub. O' Reilly, full text

(<http://www.oreilly.com/catalog/opensources/book/perens.html>).

[[FOLDOC](#)]

16-03-2001

operational semantics

<[semantics](#)> A set of rules specifying how the state of an actual or hypothetical computer changes while executing a program. The overall state is typically divided into a number of components, e.g. stack, heap, registers etc. Each rule specifies certain preconditions on the contents of some components and their new contents after the application of the rule.

It is similar in spirit to the notion of a [Turing machine](#), in which actions are precisely described in a mathematical way.

Compare axiomatic semantics, [denotational semantics](#).

[[FOLDOC](#)]

16-03-2001

operator

<[programming, PI](#)>

1. A symbol used as a [function](#), with [infix syntax](#) if it has two arguments (e.g. "+") or [prefix syntax](#) if it has only one (e.g. [Boolean](#) NOT). Many languages use operators for built-in functions such as arithmetic and logic.

<[logic](#)>

2. see [connective](#)

16-03-2001

opinion

<[gnoseology, philosophy of knowledge and science](#)>

acceptance of a [proposition](#) despite a lack of the conclusive evidence that would result in certain [knowledge](#) of its [truth](#).

[[A Dictionary of Philosophical Terms and Names](#)]

04-12-2001

optimal

1. <[mathematics](#)> Describes a solution to a problem which minimises some cost [function](#). [Linear programming](#) is one technique used to discover the optimal solution to certain problems.

2. <[programming, PI](#)> Of code: best or most efficient in time, space or code size.

16-03-2001

optimise

To perform optimisation.

16-03-2001

optimism

<[metaphysics](#)> optimism is something of a "marginal" term in philosophy, in the sense that it is not really used in technical philosophy (when it is used, it refers to Leibniz' s belief that this is "the best of all possible worlds". The term is useful, however, since it describes a metaphysical affirmation of the possibility of knowledge and happiness in opposition to [pessimism](#). In this sense, for example, [eudaimonism](#) can be a form of optimism. The popular usage of optimism is related to the meaning described here, but it is not as fundamental or "metaphysical".

See also [meliorism](#)

Recommended Reading: Gottfried Wilhelm Leibniz, Theodicy: Essays on the Goodness of God, the Freedom of Man, and the Origin of Evil, ed. by Austin Marsden Farrer (Open Court, 1988) and The Cambridge Companion to Leibniz, ed. by Nicholas Jolley (Cambridge, 1994).

based on [[A Dictionary of Philosophical terms and Names](#)]

04-12-2001

OR

<[logic](#)> The [Boolean](#) function which is true if any of its arguments are true. Its [truth table](#) is:

A		B		A	OR	B
---	+	+	+	-----		
F		F		F		F
F		T		T		T
T		F		T		T
T		T		T		T

See also [disjunction](#)

[[FOLDOC](#)]

16-03-2001

order-embedding

A function $f : D \rightarrow C$ is order-embedding iff for all $x, y \in D$,

$f(x) \leq f(y) \Leftrightarrow x \leq y$.

I.e. arguments and results compare similarly. A function which is order-embedding is [monotonic](#) and one-to-one and an [injection](#).

[[FOLDOC](#)]

16-03-2001

ordering

A relation.

See [partial ordering](#), pre-order, [total ordering](#).

16-03-2001

ordinal

<[mathematics](#)> An [isomorphism class](#) of well-ordered sets.

[[FOLDOC](#)]

16-03-2001

ordinate

<[mathematics](#)> The y-coordinate on an (x,y) graph; the output of a function plotted against its input.

x is the "[abscissa](#)".

See [Cartesian coordinates](#).

[[FOLDOP](#)]

16-03-2001

organicism

<[metaphysics](#), [aesthetics](#)>

1. in [metaphysics](#) the view according to which the universe is or is like a living organism. The same basic idea is behind the Gaia hypothesis, which claims that the earth is a living thing. Sometimes this is what is meant by [holism](#), especially in popular usage, but holism simply says that all parts of reality are interconnected and does not claim that the earth or the universe is a living thing.

2. in [aesthetics](#), the word organicism is sometimes used in aesthetics to refer to the idea (which goes back at least to Aristotle) that a work of art should be an "organic whole" with all its parts or aspects serving one central purpose.

Based on [[The Ism Book](#)]

Edited by Giovanni Benzi

25-03-2001

Ortega y Gasset José

(1883-1955); a disciple of Hermann Cohen, Ortega y Gasset was professor of Metaphysics at the Central University of Madrid from 1911 to 1936. He studied in Germany under the guidance of Herman Cohen. After moving away from neo-Kantianism and the ideas of the Marburg school, of which he was adherent for a short time, he developed a doctrine which went against both idealism and realism and which he called "perspectivism". "I am: myself and my surrounding" (yo soy: yo y mi circunstancia). Man as a concrete reality here and now acquires knowledge through a series of impressions upon which he focuses, because he is first and foremost a living being. The cultural world follows the biological one but does not run counter to it. The development of this idea subsequently (from 1923 onwards) led him to "ratiovitalism". Philosophy is not a reflection on life, but its starting point should be that it is living reason. Man is not an abstract entity endowed with reason, but a reality that uses reason to live. There is a continuum between the world of culture (razón) and that of biology (vital) and therefore human life is not biology but biography; man does not have a nature but a history, according to Ortega.

Ortega y Gasset is also remembered for his influence in public life and his opposition towards any form of totalitarian regimes. Ortega also believed that intellectuals had a role to fulfil in society, which he understood in a twofold sense. In a positive sense it was an essential instrument for life (like the flexible skin of an organism) and in a negative sense it was oppressive and asphyxiating (like an orthopaedic apparatus).

Meditaciones del Quijote, El Espectador (1916-1934), España Invertebrada, Que es filosofía, Europa y la idea de Nación, Epistolario Unamuno-Ortega (1964).

Bibliography: Udo Rusker, Bibliografía de Ortega (1971), José Ferrater Mora, An Outline of his philosophy (1957), Paulino Garagorri, Ortega, una reforma de la filosofía (1958), Ciriaco Morón Arroyo, El sistema de Ortega y Gasset (1968), Domingo Hernández Sánchez, Índice de autores y conceptos de la obra de José Ortega y Gasset (2000).

Online Bibliography: www.ortegaygasset.edu

Sandro Borzoni

11-05-2004

orthogonal

Mutually independent; well separated; sometimes, irrelevant to. Used in a generalisation of its mathematical meaning to describe sets of primitives or capabilities that, like a vector basis in geometry, span the entire "capability space" of the system and are in some sense non-overlapping or mutually independent.

In logic, the set of operators "not" and "or" is orthogonal, but the set "nand", "or", and "not" is not (because any one of these can be expressed in terms of the others).

Also used in comments on human discourse: "This may be orthogonal to the discussion, but ..."

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

other minds problem

<[epistemology](#), [computer science](#), [AI](#), [consciousness objection](#)> the [problem](#) of how we know that there are minds other than our own on the [assumption](#) that [mental](#) life consists, essentially, of [private](#) conscious experiences directly accessible only to oneself.

[[Philosophical Glossary](#)]

22-06-2001

Otto Rudolf

<[history of philosophy](#), [biography](#)> german [philosopher](#) of religion (1869-1937).

Extrapolating from the [philosophy](#) of [Kant](#) in Naturalistische und religiöse Weltansich (Naturalism and Religion) (1904) and Das Heilige (The Idea of the Holy) (1917), Otto tried to identify, describe, and classify the variety of "numinous" feelings that give rise to the [cognitive](#) content of religious belief.

Recommended Reading:

Rudolf Otto, Autobiographical and Social Essays, ed. by Gregory D. Alles (De Gruyter, 1996);

Philip C. Almond, Rudolf Otto: An Introduction to His Philosophical Theology (North Carolina, 1992);

Melissa Raphael, Rudolf Otto and the Concept of Holiness (Clarendon, 1997); and Todd A. Gooch, The Numinous and Modernity: An Interpretation of Rudolf Otto's Philosophy of Religion (De Gruyter, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

06-12-2001

ousia

<[metaphysics](#), [ontology](#)> greek [term](#) for [being](#) or [substance](#). Thus, in the [philosophy](#) of [Aristotle](#), the most crucial of the categories by means of which to describe a [natural](#) object.

Recommended Reading:

F. E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967).

[[A Dictionary of Philosophical Terms and Names](#)]

06-12-2001

output

<[architecture](#)> [Data](#) transferred from a computer system to the outside world via some kind of output device.

Opposite: [input](#)

[[FOLDOC](#)]

16-03-2001

outsourcing

<[business](#)> Paying another company to provide services which a company might otherwise have employed its own staff to perform, e.g. software development.

16-03-2001

overriding

<[programming, PI](#)> Redefining in a child [class](#) a [method](#) or function member defined in a parent [class](#).

Not to be confused with "overloading".

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16-03-2001

overrun

1. A frequent consequence of data arriving faster than it can be consumed, especially in serial line communications. For example, at 9600 baud there is almost exactly one character per millisecond, so if a silo can hold only two characters and the machine takes longer than 2 milliseconds to get to service the interrupt, at least one character will be lost.

2. Also applied to non-serial-I/O communications. "I forgot to pay my electric bill due to mail overrun." "Sorry, I got four phone calls in 3 minutes last night and lost your message to overrun." When thrashing at tasks, the next person to make a request might be told "Overrun!" Compare firehose syndrome.

3. More loosely, may refer to a buffer overflow not necessarily related to processing time (as in overrun screw).

[[Jargon File](#)]

16-03-2001

pacifism

<[political philosophy](#)> the view according to which the highest political or social value is peace, which must be sought at all costs. Another meaning of pacifism - connected with the actions and views of reformers like Thoreau, Ghandi, and Martin Luther King - is the ideal of non-violence in human affairs (akin to the moral aspect of [anarchism](#)).

[[The Ism Book](#)]

<[philosophical terminology](#)> opposition to war, killing, and violence; support for peace (Lat. Pax). Pacifism may be defended deontologically as respect for the [value](#) of human life, on the consequentialist grounds that the consequences of violence are clearly harmful, or personally as a significant component of good character.

Recommended Reading:

Robert L. Holmes, Nonviolence in Theory and Practice (Waveland, 2001);

Lisa Sowle Cahill, Love Your Enemies: Discipleship, Pacifism, and Just War Theory (Fortress, 1997); and Catherine Clement, Gandhi: The Power of Pacifism, tr. by Ruth Sharman (Abrams, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

03-03-2002

Paine Thomas

<[history of philosophy, biography](#)> American patriot (1737-1809) whose Common Sense (1776) argued forcefully for the [independence](#) of American colonies. Paine' s activism continued after the success of th American revolution; in The Rights of Man (1792) - a response to [Burke](#) - he presented his radical political and economic theories in support of the French Revolution as well, and in The Age of Reason (1794) and Essays on Religion (1797) he defended [deism](#) as an alternative to traditional religion.

Recommended Reading:

The Thomas Paine Reader, ed. by Isaac Kramnick and Michael Foot (Penguin, 1987);

Thomas Paine: Collected Writings, ed. by Eric Foner (Lib. of Am., 1995);

Thomas Paine, Political Writings, ed. by Bruce Kuklick (Cambridge, 2000);

Jack Fruchtman, Thomas Paine: Apostle of Freedom (Four Walls, 1996); and Howard Fast, Citizen Tom Paine (Grove, 1983).

[[A Dictionary of Philosophical Terms and Names](#)]

03-03-2002

Paley William

<[history of philosophy, biography](#)> English [philosopher](#) and theologian (1743-1805). Paley' s Principles of Moral and Political Philosophy (1785) rejected the moral sense theory and defended a variety of [utilitarianism](#), claiming that human conduct is properly founded upon respect for the [divine will](#), as evidenced in the [natural](#) connection between [virtue](#) and [happiness](#). A View of the Evidences of Christianity (1794) upholds the reasonability of [belief](#) in miracles in contrast with [Hume](#)' s famous essay to the contrary. Paley' s analogy between the operation of [nature](#) and the movements of a well-designed watch in Natural Theology: Evidences of the Existence and Attributes of the Deity (1802) is often regarded as a classic statement of the [teleological argument](#) for [god' s existence](#).

Recommended Reading:

The Works of William Paley, ed. by Victor Nuovo (Thoemmes, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

03-03-2002

panpsychism

<[philosophical terminology](#)> [belief](#) that everything in the [world](#) has some [mental](#) aspect. This view attributes some degree of [consciousness](#)- however small - even to apparently inert bits of [matter](#). Varieties of panpsychism have been defended by the Pythagoreans, [Plotinus](#), [Leibniz](#), [Schopenhauer](#), and [Whitehead](#).

Recommended Reading:

Timothy Sprigge, The Vindication of Absolute Idealism (Edinburgh, 1984) and Ralph Abraham, Chaos, Gaia, Eros (Harper, 1994).

[\[A Dictionary of Philosophical Terms and Names\]](#)

03-03-2002

pantheism

<[metaphysics, stoicism, epistemology](#)> the [belief](#) that [God](#) and the [universe](#) are identical; among modern philosophers, Spinoza is considered to be a pantheist. Among the ancients the Stoics were the most notable exponents of pantheism. According to [Stoicism](#), the [material universe](#) is the [Body](#) of [God](#), and the [God](#)' s spirit or [soul](#) is the [Mind](#) (or [logos](#)) guiding and governing this universal body. In effect, universal Body and indwelling Mind together comprise the divine Person.

Recommended Reading:

Michael P. Levine, Pantheism: A Non-Theistic Concept of Deity (Routledge, 1994) and Paul Harrison, The Elements of Pantheism: Understanding the Divinity in Nature and the Universe (Thorsons, 1999).

based on [\[Philosophical Glossary\]](#),

[\[A Dictionary of Philosophical Terms and Names\]](#)

03-03-2002

Paracelsus Phillippus Aureolus Theophrastus Bombastus

<[history of philosophy, biography](#)> Swiss chemist and physician (1493-1541). Rejecting the ancient reliance on concern for bodily "humours", Paracelsus transformed the practice of medicine by employing careful [observation](#) and [experimentation](#). Although his chemical knowledge was rudimentary by modern standards, Paracelsus envisioned using pharmaceutical methods for treating disease and something like inoculation for preventing it.

Recommended Reading:

Four Treatises of Theophrastus Von Hohenheim, called Paracelsus, tr. by C. Lilian Temkin, George Rosen, and Gregory Zilboorg (Johns Hopkins, 1996);

Paracelsus, ed. by Jolande Jacobi and Norbert Guterman (Princeton, 1995);

Manly P. Hall, Paracelsus, His Mystical and Medical Philosophy (Phil. Res. Soc., 1990); and Andrew Weeks and David Appelbaum, Paracelsus: Speculative Theory and the Crisis of the Early Reformation (SUNY, 1997).

[\[A Dictionary of Philosophical Terms and Names\]](#)

03-03-2002

paradigm

<[philosophical terminology](#)> an exemplary [instance](#) or [model](#); hence, also, a set of background assumptions. Thus, a "paradigm case" [argument](#) shows that an adequate philosophical analysis must conform to the most ordinary applications of what it analyzes. According to [Kuhn](#), procedural paradigms control our study of the natural world during periods between scientific revolutions.

Recommended Reading:

John A. Passmore, *Philosophical Reasoning* (Basic, 1969);

Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago, 1996); and Paul Hoyningen-Huene, *Reconstructing Scientific Revolutions: Thomas S. Kuhn's Philosophy of Science*, tr. by Alexander J. Levin (Chicago, 1993).

[\[A Dictionary of Philosophical Terms and Names\]](#)

03-03-2002

paradox

<[logic](#)> Originally, any surprising, puzzling, or counter-intuitive claim, especially a counter-intuitive truth, or an apparently sound argument leading to a [contradiction](#). Most paradoxes stem from some kind of self-reference. In modern logic, a concept or proposition that is not only self-contradictory, but for which the obvious alternatives are either self-contradictory or very costly.

Recommended Reading:

Glenn W. Erickson and John A. Fossa, *Dictionary of Paradox* (U. Pr. of Am., 1998);

Nicholas Rescher, *Paradoxes: Their Roots, Range, and Resolution* (Open Court, 2001); and R. M. Sainsbury, *Paradoxes* (Cambridge, 1995).

See Grelling's paradox [Liar paradox](#), [implication](#), [Russell's paradox](#) [Skolem paradox](#)

based on [Glossary of First-Order Logic], [[FOLDOC](#)],
[\[A Dictionary of Philosophical Terms and Names\]](#)

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paradoxes of material implication

[implication](#)

12-11-2003

parallel computer

[parallel processor](#)

12-11-2003

parallel computing

[parallel processing](#)

12-11-2003

parallel distributed process

[parallel distributed processing](#)

12-11-2003

parallel distributed processing

also known as PDP. See [connectionism](#), [parallel processing](#) [parallelism](#), [artificial neural network](#).

16-03-2001

parallel processing

<parallel> The simultaneous use of more than one computer to solve a problem. There are many different kinds of parallel computer (or "parallel processor"). They are distinguished by the kind of interconnection between processors (known as "processing elements" or PEs) and between processors and memory. Flynn' taxonomy also classifies parallel (and serial) computers according to whether all processors execute the same instructions at the same time ("single instruction/multiple data" - SIMD) or each processor executes different instructions ("multiple instruction/multiple data" - MIMD).

The processors may either communicate in order to be able to cooperate in solving a problem or they may run completely independently, possibly under the control of another processor which distributes work to the others and collects results from them (a "processor farm"). The difficulty of cooperative problem solving is aptly demonstrated by the following dubious reasoning:

If it takes one man one minute to dig a post-hole then sixty men can dig it in one second.

Amdahl' s Law states this more formally.

Processors communicate via some kind of network or bus or a combination of both. Memory may be either shared memory (all processors have equal access to all memory) or private (each processor has its own memory - "[distributed memory](#)") or a combination of both.

A huge number of software systems have been designed for programming parallel computers, both at the operating system and programming language level. These systems must provide mechanisms for partitioning the overall problem into separate tasks and allocating tasks to processors. Such mechanisms may provide either implicit [parallelism](#) - the system (the compiler or some other program) partitions the problem and allocates tasks to processors automatically or explicit parallelism where the programmer must annotate his program to show how it is to be partitioned. It is also usual to provide synchronisation primitives such as semaphores and monitors to allow processes to share resources without conflict.

Load balancing attempts to keep all processors busy by moving tasks from heavily loaded processors to less loaded ones.

Communication between tasks may be either via shared memory or message passing. Either may be implemented in terms of the other and in fact, at the lowest level, shared memory uses message passing since the address and data signals which flow between processor and memory may be considered as messages.

See also [cellular automaton](#).

Usenet newsgroup: news:comp.parallel.

Institutions (http://www.ccsf.caltech.edu/other_sites.html)

Research groups (<http://www.cs.cmu.edu/~scandal/research-groups.html>).

[[FOLDOP](#)]

16-03-2001

parallel processor

<parallel> A computer with more than one [central processing unit](#), used for [parallel processing](#).

[[FOLDOP](#)]

16-03-2001

parallelism

1. <[philosophy of mind](#)> the view that mental and physical phenomena occur in parallel but that these simultaneities never involve causal interactions.

See [dualism](#), pre-established harmony, [occasionalism](#)

2. [parallel processing](#)

3. <[PI](#)> The maximum number of independent subtasks in a given task at a given point in its execution. E.g. in computing the expression $(a + b) * (c + d)$ the expressions a, b, c and d can all be calculated in parallel giving a degree of parallelism of (at least) four. Once they have been evaluated then the expressions $a + b$ and $c + d$

can be calculated as two independent parallel processes.

The [Bernstein condition](#) states that processes P and Q can be executed in parallel (or in either sequential order) only if:

- (i) there is no overlap between the inputs of P and the outputs of Q and vice versa and
- (ii) there is no overlap between the outputs of P, the outputs of Q and the inputs of any other task.

If process P outputs value v which process Q reads then P must be executed before Q. If both processes write to some variable then its final value will depend on their execution order so they cannot be executed in parallel if any other process depends on that variable' s value.

16-03-2001

param

[argument](#)

12-11-2003

parameter

[argument](#)

12-11-2003

parametric polymorphism

[polymorphism](#).

12-11-2003

parent

<[mathematics](#), [data](#)> (Or "mother", "predecessor") In a [tree](#), a node which points to at least one daughter node.

[[FOLDOC](#)]

16-03-2001

Pareto Vilfredo

<[history of philosophy](#), [biography](#)> Italian economist (1848-1923) who proposed a non-[utilitarian](#) method for assessing the [distribution](#) of goods in a society in New Theories of Economics (1897). A state of affairs is said to be "Pareto efficient" if and only if any change that would improve the situation for someone would at the same time make it worse for someone else. Pareto' s elitist social policies may be found in Trattato di sociologi generale (Mind and Society) (1916).

Recommended Reading:

Vilfredo Pareto, The Rise and Fall of Elites: An Application of Theoretical Sociology, tr. by Hans L. Zetterberg (Transaction, 1991);

Vilfredo Pareto, ed. by John Cunningham Wood and Michael McLure (Routledge, 1999);

Raymond Aron, Main Currents in Sociological Thought (Transaction, 1999);

R. Cirillo, Economics of Vilfredo Pareto (Frank Cass, 1979); and Michael McLure, Pareto, Economics and Society: The Mechanical Analogy (Routledge, 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

03-03-2002

Parmenides

<[history of philosophy](#), [biography](#)> [Presocratic](#) philosopher (510 BC) whose work is best known to us in fragmentary reports from other philosophers. Parmenides used sophisticated [logical language](#) in the epic poem Peri Fuseos (On Nature) to argue that all of [reality](#) is a [single](#), unchanging [substance](#). Everything is what it is - complete and immobile - and can never become what it is not. Followers of Parmenides included [Zeno of Elea](#) and other [Eleatics](#).

Recommended Reading:

Parmenides of Elea: Fragments, ed. by David Gallop (Toronto, 1991);

Patricia Curd, The Legacy of Parmenides (Princeton, 1997);

Martin Heidegger, Parmenides, tr. by Andre Schuwer and Richard Rojcewicz (Indiana, 1998); and Karl Popper, World of Parmenides, ed. by Arne F. Petersen and Jorgen Mejer (Routledge, 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

03-03-2002

paronymous

<[philosophical terminology](#)> related though different use of an [expression](#); see [homonymous](#) / [synonymous](#) / [paronymous](#).

[[A Dictionary of Philosophical Terms and Names](#)]

03-03-2002

parser

<[language](#)> An [algorithm](#) or program to determine the syntactic structure of a sentence or string of symbols in some language. A parser normally takes as input a sequence of tokens output by a [lexical](#) analyser. It may produce some kind of [abstract syntax tree](#) as output. One of the best known [parser generators](#) is yacc.

[[FOLDOP](#)]

16-03-2001

parser generator

A program which takes a formal description of a [grammar](#) (e.g. in BNF) and outputs source code for a parser which will recognise valid strings obeying that grammar and perform associated actions. Unix' s yacc is a well known example.

16-03-2001

parsimony law of

<[philosophical terminology](#)> [belief](#) that the simplest answer is most likely to be the correct one. As a methodological [principle](#), this may be no more than an initial bias in favor of uncomplicated solutions. Its [ontological](#) form - that we ought never to multiply entities without necessity - is also known as "[Ockham](#)' razor".

Recommended Reading:

Sharon M. Kaye and Robert M. Martin, On Ockham (Wadsworth, 2000);

The Cambridge Companion to Ockham, ed. by Paul Vincent Spade (Cambridge, 1999); and Elliott Sober, Reconstructing the Past: Parsimony, Evolution, and Inference (Bradford, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

03-03-2002

parsing

[parser](#)

12-11-2003

partial equivalence relation

(PER) A relation R on a set S where R is symmetric ($x R y \Rightarrow y R x$) and transitive ($x R y \wedge y R z \Rightarrow x R z$) and where there may exist elements in S for which the relation is not defined. A PER is an equivalence relation on the subset for which it is defined, i.e. it is also reflexive ($x R x$).

16-03-2001

partial function

A function which is not defined for all arguments of its input type. E.g.

$$f(x) = 1/x \text{ if } x \neq 0.$$

The opposite of a [total function](#). In [denotational semantics](#), a partial function

$$f : D \rightarrow C$$

may be represented as a total function

$$ft : D' \rightarrow \text{lift}(C)$$

where D' is a superset of D and

$$ft x = f x \text{ if } x \text{ in } D$$

$$ft x = \text{bottom} \text{ otherwise}$$

where $\text{lift}(C) = C \cup \text{bottom}$.

See [total function](#)

[FOLDOC]

16-03-2001

partial ordering

A [relation](#) R is a partial ordering if it is a pre-order (i.e. it is [reflexive](#) ($x R x$) and [transitive](#) ($x R y \wedge y R z \Rightarrow x R z$)) and it is also [antisymmetric](#) ($x R y \wedge y R x \Rightarrow x = y$). The ordering is partial, rather than total, because there may exist elements x and y for which neither $x R y$ nor $y R x$.

In [domain theory](#), if D is a set of values including the undefined value ([bottom](#)) then we can define a partial ordering relation \leq on D by

$$x \leq y \text{ if } x = \text{bottom} \text{ or } x = y.$$

The constructed set $D \times D$ contains the very undefined element, (bottom, bottom) and the not so undefined elements, (x, bottom) and (bottom, x). The partial ordering on $D \times D$ is then

$$(x_1, y_1) \leq (x_2, y_2) \text{ if } x_1 \leq x_2 \text{ and } y_1 \leq y_2.$$

The partial ordering on $D \rightarrow D$ is defined by

$$f \leq g \text{ if } f(x) \leq g(x) \text{ for all } x \text{ in } D.$$

(No f is more defined than g .)

A [lattice](#) is a partial ordering where all finite subsets have a [least upper bound](#) and a [greatest lower bound](#).

[FOLDOC]

16-03-2001

partially ordered set

A [set](#) with a [partial ordering](#).

16-03-2001

particular proposition

<[philosophical terminology](#)> a statement whose [propositional](#) quantity is determined by the [assertion](#) that at least one member of one class of things is either included or excluded as a member of some other class. Examples: "Some cows are Jerseys." and "Some school holidays are not postal holidays." are both [particular](#).

[[A Dictionary of Philosophical Terms and Names](#)]

03-03-2002

particularity

<[ethics](#)> In recent discussions, ethicists have contrasted particularity with [universality](#) and [impartiality](#) and asked how, if [morality](#) is necessarily universal and impartial, it can give adequate recognition to particularity. Particularity refers to specific attachments (friendships, loyalties, etc.) and desires (fundamental projects, personal hopes in life) that are usually seen as morally irrelevant to the rational moral self.

26-03-2001

particulars

<[logic](#)> [individual existents](#) (e.g., Ben Franklin): as to kinds (e.g., inventor) or [attributes](#) (e.g., inventiveness), which are [universals](#).

[[Philosophical Glossary](#)]

22-06-2001

partition

1. <[storage](#)> A [logical](#) section of a disk. Each partition normally has its own file system. Unix tends to treat partitions as though they were separate physical entities.

2. <[mathematics](#)> A division of a set into subsets so that each of its elements is in exactly one subset.

[[FOLDOP](#)]

16-03-2001

Pascal Blaise

<[history of philosophy](#), [biography](#)> French [mathematician](#) and [theologian](#) (1623-1662). A member of the community at Port-Royal, Pascal in the Lettres provinciales (Provincial Letters) (1657) defended his Jansenist friends against the persecution of the Jesuits. In Les Pense/es (Thoughts) (1665), Pascal defended a [fideistic](#) approach to religion, according to which "Le coeur a ses raisons que le raison ne connaît point." ("The heart has its reasons that reason does not know at all.")

Pascal' s work with [Fermat](#) on the nature of [probability](#) presaged the development of modern [decision theory](#), on the basis of which he argued that [belief](#) in [god](#), although not [rational](#), is a clever wager.

Recommended Reading:

Bernard Rogers, Pascal (Routledge, 1999);

Dawn M. Ludwin, Blaise Pascal' s Quest for the Ineffable (Peter Lang, 2001);

Leszek Kolakowski, God Owes Us Nothing: A Brief Remark on Pascal' s Religion and on the Spirit c Jansenism (Chicago, 1998); and Buford Norman, Portraits of Thought: Knowledge, Methods, and Styles in Pascal (Ohio State, 1989).

[[A Dictionary of Philosophical Terms and Names](#)]

03-03-2002

patriarchy

<[philosophical terminology](#)> literally, "rule by the father"; hence, any [social](#) or [political](#) system that grants privileged status to males and permits or encourages their [domination](#) of females. Most Western cultures have been, and continue to be, patriarchal in this sense.

Recommended Reading:

Sandra Lee Bartky, *Femininity and Domination: Studies in the Phenomenology of Oppression* (Routledge, 1991);

Gerda Lerner, *The Creation of Patriarchy* (Oxford, 1987);

Frances B. O' Connor and Becky S. Drury, *The Female Face in Patriarchy: Oppression As Culture* (Michigan State, 1998);

Carole Pateman, *The Disorder of Women: Democracy Feminism and Political Theory* (Stanford, 1990); and *After Patriarchy: Feminist Transformations of the World Religions*, ed. by William R. Eakin, Jay B. McDaniel, and Paula Cooley (Orbis, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

03-03-2002

pattern matching

1. A [function](#) is defined to take [arguments](#) of a particular type, form or value. When applying the function to its actual arguments it is necessary to match the type, form or value of the actual arguments against the formal arguments in some definition. For example, the function

length [] = 0

length (x:xs) = 1 + length xs

uses pattern matching in its argument to distinguish a null list from a non-null one.

There are well known [algorithm](#) for translating pattern matching into conditional expressions such as "if" or "case". E.g. the above function could be transformed to

length l = case l

of [] -> 0

x:xs -> 1 + length xs

Pattern matching is usually performed in textual order though there are languages which match more specific patterns before less specific ones.

2. Descriptive of a type of language or utility such as awk or Perl which is suited to searching for strings or patterns in input data, usually using some kind of regular expression.

[[FOLDOP](#)]

16-03-2001

pattern recognition

<[artificial intelligence](#), [data processing](#)> A branch of [artificial intelligence](#) concerned with the classification or description of observations.

Pattern recognition aims to classify [data](#) (patterns) based on either [a priori knowledge](#) or on [statistical information](#) extracted from the patterns. The patterns to be classified are usually groups of measurements or observations, defining points in an appropriate multidimensional space.

A complete pattern recognition system consists of a sensor that gathers the observations to be classified or described; a [feature](#) extraction mechanism that computes numeric or [symbolic](#) information from the observations; and a classification or description scheme that does the actual job of classifying or describing observations, relying on the extracted features.

The classification or description scheme is usually based on the availability of a set of patterns that have already been classified or described. This set of patterns is termed the training [set](#) and the resulting learning strategy is characterised as supervised. Learning can also be unsupervised, in the sense that the system is not given an a priori labelling of patterns, instead it establishes the classes itself based on the statistical regularities of the patterns.

The classification or description scheme usually uses one of the following approaches: statistical (or [decision theoretic](#)), [syntactic](#) (or [structural](#)), or [neural](#). Statistical pattern recognition is based on statistical characterisations of patterns, assuming that the patterns are generated by a [probabilistic](#) system. Structural pattern recognition is based on the structural interrelationships of features. Neural pattern recognition employs the neural computing paradigm that has emerged with [neural networks](#).

[[FOLDOP](#)]

16-03-2001

PDP[parallel distributed processing](#)

12-11-2003

Peano arithmetic

<[mathematics](#)> A system for representing [natural numbers](#) inductively using only two symbols, "0" (zero) and "S" (successor).

This could be expressed as a [recursive](#) data type with the following Haskell definition:

```
data Peano = Zero | Succ Peano
```

The number three, usually written "SSS0", would be Succ(Succ(Succ Zero)). Addition of Peano numbers can be expressed as a simple syntactic transformation:

```
plus Zero n = n
plus (Succ m) n = Succ (plus m n)
```

[\[FOLDOC\]](#)

16-03-2001

Peano Giuseppe

<[history of philosophy, biography](#)> Italian [mathematician](#) and [logician](#) (1858-1932) who formalized Dedekind's insight that the [arithmetic](#) of [natural numbers](#) could be constructed as an [axiomatic system](#). In Arithmetices principia nova methodo exposita (The principles of arithmetic, presented by a new method) (1889) [Peano](#) showed how to derive all of [arithmetic](#) from the principles of [logic](#), together with a set of nine postulates about numbers: 1 is a [number](#). Every number is equal to itself. Numerical [equality](#) is commutative. Numbers both equal to a third are equal to each other. Anything equal to a [number](#) is a [number](#). The successor of any [number](#) is a number. No two distinct numbers have the same successor. 1 is not the successor of any number. Any property that is: (a) true of 0, and (b) if [true](#) of any number is true of its successor, must be true of all numbers. This foundation for [mathematical induction](#) was an important step toward the twentieth-century [logicization of arithmetic](#).

Recommended Reading:

Selected works of Giuseppe Peano (Toronto, 1973);

Hubert Kennedy, Peano: Life and Work of Giuseppe Peano (Kluwer, 1980); and D. A. Gillies, Frege, Dedekind, and Peano on the Foundation of Arithmetic (Van Gorcum, 1988).

[\[A Dictionary of Philosophical Terms and Names\]](#)

04-03-2002

Peirce Charles Sanders

<[history of philosophy, biography](#)> Charles Sanders Peirce (1839-1914) studied [philosophy](#) and chemistry at Harvard, where his father, Benjamin Peirce, taught [mathematics](#) and astronomy. Although he showed early signs of great genius, an unstable personal life prevented Peirce from fulfilling his early promise. Although he wrote widely and delivered several series of significant lectures, he never completed the most ambitious of his philosophical projects. After a respectable scientific career, studying the effects of gravitation with the U.S. Coast and Geodetic Survey, Peirce taught briefly at John Hopkins before retiring to a life of isolation, poverty, and illness in Milford, Pennsylvania. Peirce's place as a founder of American [pragmatism](#) was secured by a pair of highly original essays that apply logical and scientific principles to philosophical [method](#). In The Fixation of Belief (1877) he described how human beings converge upon a true [opinion](#), each of us removing the irritation of [doubt](#) by forming beliefs from which successful habits of [action](#) may be derived. This [theory](#) was extended in How to Make Our Ideas Clear (1878) to the very meaning of concepts, which Peirce identified with the practical effects that would follow from our adoption of the concept. In his extensive logical studies, Peirce developed a theory of signification that anticipated many features of modern [semiotics](#), emphasizing the role of the [interpreting subject](#). To the [traditional logic](#) of [deduction](#) and [induction](#), Peirce added explicit acknowledgement of [abduction](#) as a preliminary stage in productive human inquiry. Using a [Kantian](#) system of [categories](#), Peirce proposed a descriptive [metaphysics](#) that emphasized the role of chance.

Recommended Reading:

Primary sources: Philosophical Writings of Peirce, ed. by Justus Buchler (Dover, 1986);

Charles S. Peirce: Selected Writings, ed. by Philip P. Wiener (Dover, 1980);

Peirce on Signs: Writings on Semiotic, ed. by James Hoopes (North Carolina, 1991);

Charles Sanders Peirce, Chance, Love, and Logic: Philosophical Essays, ed. by Morris R. Cohen (Nebraska, 1998).

Secondary sources: James K. Feibleman, An Introduction to the Philosophy of Charles S. Peirce (MIT, 1969);

Christopher Hookway, Peirce (Routledge, 1992);

Karl-Otto Apel, Charles Peirce: From Pragmatism to Pragmaticism (Prometheus, 1995);

Joseph Brent, Charles Sanders Peirce: A Life (Indiana, 1998);

Sandra B. Rosenthal, Charles Peirce' s Pragmatic Pluralism (SUNY, 1994);
 C. F. Delaney, Science, Knowledge, and Mind: A Study in the Philosophy of C.S. Peirce (Notre Dame, 1993);
 Floyd Merrell, Peirce, Signs, and Meaning (Toronto, 1997).
 Additional on-line information about Peirce includes:
 Joseph Ransdell' s excellent site on Peirce, Arisbe.
 A biography and bibliography from the Peirce Society.
 C. J. Hookway' s article in The Oxford Companion to Philosophy.
 Also see: abduction, American philosophy, Harvard philosophy, indexicals, pragmatism, the pragmatic theory of truth, pragmatism, semiotics, and sign and symbol.
 The Peirce Edition Project.
 The thorough collection of resources at EpistemeLinks.com.
 Eric M. Hammer' s article on Peirce' s logic in The Stanford Encyclopedia of Philosophy.
 The article in the Columbia Encyclopedia at Bartleby.com.
 Eric Weisstein' s discussion at Treasure Trove of Scientific Biography.
 A paper by Peter Skagestad on Peirce' s notion of Virtuality.
 Robert Tremblay' s essay on Peirce (in French) at EnÈphi.
 Brief entries on Peirce and ' symbol' in Oxford' s Concise Dictionary of Linguistics.
 A discussion of Peirce' s mathematical significance from Mathematical MacTutor.
 The Macmillan Encyclopedia 2001.

[\[A Dictionary of Philosophical Terms and Names\]](#)

04-03-2002

per se - per accidens

<[philosophical terminology](#)> Latin phrases meaning "through itself" and "by accident," used by medieval philosophers to distinguish [essential](#) and [accidental](#) features of substances.

[\[A Dictionary of Philosophical Terms and Names\]](#)

05-03-2002

perceive

<[epistemology](#), [psychology](#), [phenomenology](#)> to detect or become aware of via the outward [senses](#) of sight, hearing, touch, taste, and smell, and also (according to the usage of some) via "[reflection](#)" (Locke) or introspection.

[\[Philosophical Glossary\]](#)

22-06-2001

perception

<[philosophical terminology](#)> awareness of an [object](#) of [thought](#), especially that of apparently [external](#) objects through use of the senses. Since things don' t always turn out actually to be as they seem to us, there is ample reason to wonder about the [epistemological reliability](#) of [sense](#) perception, and theories of perception offer a variety of responses. The [skeptical](#) challenge to [direct realism](#) is often answered by [representative realism](#), [phenomenalism](#), or [idealism](#).

Recommended Reading:

Howard Robinson, Perception (Routledge, 2001);
 John Foster, The Nature of Perception (Oxford, 2000);
 R. J. Hirst, Problems of Perception (Prometheus, 1992);
 Fred I. Dretske, Perception, Knowledge and Belief (Cambridge, 2000); and Maurice Merleau-Ponty, Phenomenology of Perception (Routledge, 1992).

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04-03-2002

perceptron

1. A single McCulloch-Pitts neuron.
2. A network of [neurons](#) in which the output(s) of some neurons are connected through weighted connections to the input(s) of other neurons. A multilayer perceptron is a specific instance of this.

16-03-2001

perceptual illusion

<[philosophical terminology](#)> cases in which what we apprehend by [sensation](#) does not correspond with the way things really are. Thus, for example, the apparent discontinuity between the portions of a spoon in and out of a glass of water is a visual illusion caused by the different indices of refraction of water and air. [Representationalists](#) commonly try to account for such cases by appeal to the distinction between primary and secondary [qualities](#), but [skeptics](#) and [idealists](#) use perceptual illusion to raise more general doubts about the reliability of sensory [knowledge](#).

Recommended Reading:

John W. Yolton, Perception & Reality: A History from Descartes to Kant (Cornell, 1996);
William P. Alston, The Reliability of Sense Perception (Cornell, 1996); and Mark B. Fineman, The Nature of Visual Illusion (Dover, 1996).

[\[A Dictionary of Philosophical Terms and Names\]](#)

04-03-2002

perfectibility

<[philosophical terminology](#)> the enlightenment [belief](#) that proper employment of [reason](#) will result in the full achievement of human potential. To various degrees, this optimistic supposition was held by [Godwin](#), [Rousseau](#), Saint-Simon, [Kant](#), [Hegel](#), [Comte](#) and [Marx](#).

Recommended Reading:

John Arthur Passmore, The Perfectibility of Man (Liberty Fund, 2000) and Virginia L. Muller, The Idea of Perfectibility (Univ. Pr. of Am., 1986).

[\[A Dictionary of Philosophical Terms and Names\]](#)

04-03-2002

performative utterance

<[philosophical terminology](#)> a linguistic [expression](#) used to do something. When spoken by someone in an appropriate position: "I'm sorry." makes an apology; "Play ball!" begins a baseball game; and "I now declare you husband and wife." performs a marriage. Thus, [performatives](#) are important instances of what [Austin](#) later called [illocutionary acts](#).

Recommended Reading:

J. L. Austin, How to Do Things With Words, ed. by Marina Sbisa and J. O. Urmson (Harvard, 1975), and John R. Searle, Speech Acts (Cambridge, 1970).

[\[A Dictionary of Philosophical Terms and Names\]](#)

04-03-2002

performatives

<[logic](#), [pragmatics](#)> [sentences](#) (or performative [utterances](#)) that serve more to do (than describe) something. Typically, these sentences are in the first person present noncontinuous, with a main verb that indicates a speech action. e.g. "I promise to come to your party" as opposed to the non-performative (or descriptive) "he promises..." or "I kick him". Performatives are important because they make us realize that many declarative sentences are not so much true or false as they are actions which are well or badly done (orders, appointments, christenings, exorcisms, rulings, sentences, etc.).

[\[A Philosophical Glossary\]](#)

30-04-2001

peripatetics

<[philosophical terminology](#)> Greek philosophers who followed the principles of [Aristotle](#), so-named because they learned from the master while strolling about (Gk. peripate) in the covered walkways of the Lyceum.

[[A Dictionary of Philosophical Terms and Names](#)]

04-03-2002

perlocutionary act

<[philosophical language](#)> the [speech act](#) of having an [effect](#) on those who hear a [meaningful utterance](#). By telling a ghost story late at night, for example, one may accomplish the cruel perlocutionary act of frightening a child.

Recommended Reading:

J. L. Austin, *Philosophical Papers*, ed. by Geoffrey J. Warnock and J. O. Urmson (Oxford, 1990) and *A Companion to the Philosophy of Language*, ed. by Crispin Wright and Bob Hale (Blackwell, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

04-03-2002

permutation

<[mathematics](#)> An ordering of a certain number of elements of a given set. For instance, the permutations of (1,2,3) are (1,2,3) (2,3,1) (3,1,2) (3,2,1) (1,3,2) (2,1,3).

Permutations form one of the canonical examples of a "group" - they can be composed and that you can find an inverse permutation that reverses the action of any given permutation.

A permutation is a [bijection](#).

The number of permutations of r things taken from a set of n is

$n P r = n! / (n-r)!$

where "n P r" is usually written with n and r as subscripts and n! is the [factorial](#) of n.

What the football pools call a "permutation" is not a permutation but a [combination](#) - the order does not matter.

[[FOLDOP](#)]

16-03-2001

perplexity

The geometric [mean](#) of the number of words which may follow any given word for a certain lexicon and [grammar](#).

16-03-2001

Perry Ralph Barton

<[history of philosophy, biography](#)> American [philosopher](#) (1876-1957); author of a prize-winning biography of William [James](#), *The Thought and Character of William James*.

Perry participated in the early twentieth-century movement toward [perceptual](#) realism, arguing against the [idealistic identification](#) of [knower](#) and [known](#) in *The Ego-Centric Predicament* (1910) In *The General Theory of Value* (1926) and *Realms of Value* (1954) Perry defended a [naturalistic definition](#) of [value](#) in terms of [subjective](#) interest. *Puritanism and Democracy* (1944) is a popular exposition of American intellectual principles.

[[A Dictionary of Philosophical Terms and Names](#)]

04-03-2002

persistence

1. <[programming, PI](#)> A property of a programming language where created objects and variables continue to exist and retain their values between runs of the program.

2. <[hardware](#)> The length of time a phosphor dot on the screen of a cathode ray tube will remain illuminated after it has been energised by the electron beam. Long-persistence phosphors reduce flicker, but generate ghost-like images that linger on screen for a fraction of a second.

[FOLDOC]

16-03-2001

persistent

[persistence](#)

13-11-2003

perspective

<[games](#)> In computer games, the [virtual](#) position from which the human player views the playing area. There are three different perspectives: first person, second person, and third person.

First person perspective: Viewing the world through the eyes of the primary character in three dimensions. e.g. Doom, Quake.

Second person perspective: Viewing the game through a spectator' s eyes, in two or three dimensions. Depending on the game, the main character is always in view. e.g. Super Mario Bros., Tomb Raider.

Third person perspective: a point of view which is independent of where characters or playing units are. The gaming world is viewed much as a satellite would view a battlefield. E.g. Warcraft, Command & Conquer.

[FOLDOC]

16-03-2001

perspectivism

<[epistemology](#)> the view according to which judgments of [truth](#) and [value](#) depend on one' s "perspective". This view is similar to [contextualism](#) and can be a valuable tonic to [intrinsicism](#). However, some "radical" versions of perspectivism (for example some interpretations of Nietzsche' s thought) come close to making perspectivism form of [relativism](#).

Based on [[The Ism Book](#)]

Edited by Giovanni Benzi

27-03-2001

pessimism

<[philosophy, ethics](#)> the view according to which any belief in the possibility of knowledge and happiness is, to say the least, naive (see also [fatalism](#)). Pessimism has a long history in Western philosophy, beginning in a mild form with [stoicism](#) in Greece and Rome and continuing through to [existentialism](#) in the twentieth century (consider the rejection of [eudaimonism](#) in both of these philosophies). The arch-pessimist of all intellectual history, and the only major thinker whose philosophy is "officially" said to be one of pessimism, is [Schopenhauer](#) (1788-1860), whose ideas held sway over the young [Nietzsche](#) and who had a strong influence on the existentialists (and who is reputed to have been influenced by Indian philosophy). Schopenhauer believed that reality, human nature, existence as such are all positively evil. In contrast to the totalistic pessimism of Schopenhauer, other thinkers are often pessimistic only about this world, and can be quite optimistic about the possibility of happiness in an afterlife - for example, [Christianity](#) is, or can be seen as, this kind of pessimism. The popular meaning of pessimism is related to the philosophical one, though not as fundamental.

Based on [[The Ism Book](#)]

27-03-2001

Petri net

<[parallel](#), [simulation](#)> A [directed](#), bipartite [graph](#) in which nodes are either "places" (represented by circles) or "transitions" (represented by rectangles), invented by Carl Adam Petri. A Petri net is marked by placing "tokens" on places. When all the places with arcs to a transition (its input places) have a token, the transition "fires", removing a token from each input place and adding a token to each place pointed to by the transition (its output places).

Petri nets are used to model concurrent [systems](#), particularly [network protocols](#).

Variants on the basic idea include the coloured Petri Net, Time Petri Net, Timed Petri Net, Stochastic Petri Net, and Predicate Transition Net.

FAQ (<http://www.daimi.aau.dk/PetriNets/faq/answers.htm>).

[[FOLDOP](#)]

16-03-2001

phenomena

[phenomenon](#)

13-11-2003

phenomenal

[noumenal](#)

13-11-2003

phenomenal consciousness

<[philosophy of mind](#)> [phenomenal consciousness](#) [p-consciousness] is just experience thus, p-conscious states are experiential states. The totality of the experiential properties of a state are p-consciousness, i.e. "what it is like" to have it.

References:

Ned Block. On a confusion about a function of consciousness (<http://www.cogsci.soton.ac.uk/bbs/Archive/bbs.block.html>) in Behavioural and Brain sciences, 1995, 18:227-287

A. Khwaja: akhwaja@hudsonet.com

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

phenomenalism

<[philosophy of science](#), [epistemology](#), [ontology](#)> the [monistic](#) view that all empirical statements (such as the laws of physics) can be placed in a one to one [correspondence](#) with statements about only the phenomenal (i.e. mental appearances).

See [monism](#), [idealism](#), [neutral monism](#)

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16-03-2001

phenomenological

[phenomenology](#)

13-11-2003

phenomenological critique of representationalism

<[philosophy of mind](#)> rejection of the notion that [representational](#) states define and explain the most basic kind of human interaction with the environment.

See also [phenomenology](#), intention-in-action, [background](#),

Daniel Barbiero

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16-03-2001

phenomenology

<[discipline](#), [philosophical school](#)> a philosophic movement that originated around the turn of the century on the Continent (see [Husserl](#)' s Cartesian Meditations for example). This movement- like [Russell](#), G. E. [Moore](#), and the analytic movement generally -- insisted on divorcing philosophy from (empirical) psychology, thus avoiding something labeled [psychologism](#). The phenomenologists insisted that philosophers could directly study the pure phenomenon of thought (intensional objects) by a bracketing technique which avoided any commitments about empirical psychology.

[[A Philosophical Glossary](#)]

30-04-2001

phenomenon

<[metaphysics](#), [epistemology](#), [phenomenology](#)> for Kant, phenomena are "things for us" -- things as understood & experienced. Phenomena contrast with [noumena](#) -- the "[things](#) in themselves" -- which [transcend](#) our [understanding](#) and experience.

[[Philosophical Glossary](#)]

22-06-2001

phenominalism

<[ontology](#)> the view that immediate experience ([sensations](#), [thoughts](#), etc.) is all there might be to reality. B. [Russell](#) for example, often took the phenominalist view that talk about the external [world](#) of objects is more properly understood as talk about a series of experiences or potentialities of experience.

[[A Philosophical Glossary](#)]

30-04-2001

philia

<[philosophical terminology](#)> Greek term for friendship or amiability. In the [philosophy](#) of [Empedocles](#), the constructive principle counter-acting the destructive influence of [neikos](#). [Aristotle](#) regarded friendship as a crucial component of the good life.

Recommended Reading:

Eros, Agape and Philia: Readings in the Philosophy of Love, ed. by Alan Soble (Paragon, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

05-03-2002

Philo Judaeus Philo of Alexandria

<[history of philosophy, biography](#)> Alexandrian Jewish [philosopher](#) (20 BC - 50 CE) who tried to synthesize Greek [philosophy](#) with Judaism by means of an allegorical [interpretation](#) of scripture. According to Philo, the personal deity of scripture is identical with Form of the Good in [Plato](#), and the [logos](#) is its mediating creative force.

Recommended Reading:

The Works of Philo, ed. by David M. Scholer and C. D. Yonge (Hendrickson, 1993);

Kenneth S. Guthrie, Message of Philo Judaeus of Alexandria (Kessinger, 1997); and Robert M. Berchman, From Philo to Origen: Middle Platonism in Transition (Brown, 1985).

[[A Dictionary of Philosophical Terms and Names](#)]

05-03-2002

Philosophical Glossary

<[source](#)> Philosophical Glossary (<http://members.aol.com/lshauser2/lexicon.html>) edited by Larry Hauser homepage (<http://members.aol.com/lshauser/>).

Some definitions in this dictionary are based on the version published in 2001-04-13.

22-06-2001

philosophy

<[philosophical terminology](#)> literally, love of wisdom. Hence, careful [thought](#) about the fundamental [nature](#) of the [world](#), the grounds for human [knowledge](#), and the evaluation of human conduct. As an academic discipline, philosophy' s chief branches include [logic](#), [metaphysics](#), [epistemology](#), and [ethics](#), and the appropriate aims and methods of each are the concern of [metaphilosophy](#).

Recommended Reading:

Nigel Warburton, Philosophy: The Basics (Routledge, 1999);

Thomas Nagel, What Does It All Mean: A Very Short Introduction to Philosophy (Oxford, 1987);

Simon Blackburn, Think: A Compelling Introduction to Philosophy (Oxford, 1999);

The Great Philosophers: An Introduction to Western Philosophy, ed. by Bryan Magee (Oxford, 2000);

Martin Cohen, 101 Philosophy Problems (Routledge, 1999); and Antony Flew, Introduction to Western Philosophy: Ideas and Argument from Plato to Popper (Thames & Hudson, 1989).

[[A Dictionary of Philosophical Terms and Names](#)]

05-03-2002

Philosophy of mathematics

Philosophers have several reasons to be interested in mathematics. To begin with, mathematics offers the main example of exactness of thought and thus a model of that rationality whose inner principles philosophy strives to individuate. At the same time, mathematics poses some problems to philosophy, for example it raises the question of the existence of objects (numbers, triangles, etc.) that nobody can see or touch, while someone claims to know things about them with the highest degree of precision and certainty.

Philosophy of mathematics is, in this respect, the conceptual study of the subject matter of mathematics and its practice, aiming to account for the ultimate nature of its objects and for the possibility for us to know them. Ancient and long-standing philosophical frameworks for mathematics are [realism \(platonism\)](#) and [nominalism](#). More recent conceptual schemes are antirealism, naturalism and [structuralism](#). There are both metaphysical and

epistemological questions that philosophy of mathematics faces and to which it tries to offer answers. Some examples are the following: what does it mean for an [abstract entity](#) to exist ? what is a [mathematical object](#) ? what is the nature of [mathematical knowledge](#) ? which is the source of the certainty of mathematical knowledge ? etc. At the beginning of the 20th century, the discipline of mathematical [logic](#), then at its beginnings, started playing a major role both in mathematics and in philosophical investigations. Formalized languages and formalized proofs were recognized as powerful tools for the study of the foundations of mathematics and offered solutions that philosophy alone could not provide. The usefulness of the logical method seemed to particularly reside in its being independent of any particular mathematical field while permitting reasonings which are valid generally. Via logic one can detect [forms](#) in mathematical reasonings and frame them in logical schemes. Three foundational schools were formed, the first two leaning on logical methods and the third reacting to the spreading use of logic in mathematical and philosophical enquires: Logicism ([Frege Gottlob](#) and [Russell Bertrand](#)), Formalism ([Hilbert David](#)) and [Intuitionism](#) (L. E. J. Brouwer).

Mathematics has always been a source for philosophy, and philosophy also has fruitfully contributed to mathematical thinking, in the sense that mathematical research has sometimes been stimulated and directed by philosophical reflection. Nowadays the increasing specialization of both mathematics and philosophy makes it more difficult for researchers of each side to get real expertise in the other and the probability of mutual influence decreases consequently. Nevertheless, mathematically-minded philosophers and philosophically-minded mathematicians keep on lively discussing those undying themes that have always fascinated and

puzzled humanity.

Giuseppina Ronzitti

See :

- Paul Benacerraf and Hilary Putnam, *Philosophy of Mathematics, Selected Readings*. Cambridge: Cambridge University Press (1983).
- Philip Kitcher, *The Nature of Mathematical knowledge*, New York, Oxford University Press (1983).
- Charles Parsons, *Mathematics in Philosophy*, Ithaca, New York, Cornell University Press (1983).
- Bertrand Russell, *Introduction to Mathematical Philosophy*, New York: Simon and Schuster (1919).
- Stewart Shapiro, *Philosophy of Mathematics: Structure and Ontology*, Oxford University Press (1997).
- Jean Van Heijenoort, *From Frege to Gödel*, Cambridge, Harvard University Press (1967).
- Alexander George and Daniel J. Velleman, *Philosophies of Mathematics*, Blackwell (2002).

Keywords: [mathematical object](#), [existence](#), [infinite](#)

Web sites:

History of Mathematics: <http://www.archives.math.utk.edu/topics/history.html>;

Mathematical Logic around the world: <http://www.uni-bonn.de/logic/world.html>

Discussion list:

FOM (Foundations of Mathematics): <http://cs.nyu.edu/mailman/listinfo/fom>

28-01-2004

philosophy of mind

<[philosophy of mind](#)> the branch of philosophy that is concerned with the nature of mental phenomena in general and the role of [consciousness](#), [sensation](#), [perception](#), [concepts](#), [action](#), [reasoning](#), [intention](#), [belief](#), [memory](#), etc. in particular.

Standard problems include those of [free will](#), personal [identity](#), mind-body problem, [other minds](#), [computationalism](#).

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

philosophy of psychology

<[philosophy of mind](#)> the branch of the philosophy of science concerned specifically with psychology. It is concerned with the sorts of models, theories and explanations used in psychology to address psychological phenomena.

See also [philosophy of mind](#)

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

phronesis

<[philosophical terminology](#)> Greek term for practical wisdom or prudence, the application of good [judgment](#) to human conduct, in contrast with the more [theoretical](#) inquiry leading to [sophia](#), or wisdom generally.

Recommended Reading:

F. E. Peters, *Greek Philosophical Terms: A Historical Lexicon* (NYU, 1967);

Joseph Dunne, *Back to the Rough Ground: 'Phronesis' and 'Techne' in Modern Philosophy and in Aristotle* (Notre Dame, 1993).

[[A Dictionary of Philosophical Terms and Names](#)]

05-03-2002

physicalism

<[philosophy of mind](#), [metaphysics](#), [philosophy of science](#)> the view according to which everything that is real is, in some sense, physical. Since physical entities are the only real existents, mental phenomena like consciousness are illusory or reducible to physical phenomena. Physicalism makes a stronger claim about the specific nature of reality than [concretism](#) and in so doing strays from [metaphysics](#) or ontology into cosmology. The idea often appears in concert with [determinism](#), [reductionism](#), and [epiphenomenalism](#). See also [materialism](#), physicalism non-reductive, [idealism](#).

Recommended Reading:

Jeffrey Poland, *Physicalism: The Philosophical Foundation* (Clarendon, 1994);
 Physicalism and Its Discontents, ed. by Carl Gillett and Barry Loewer (Cambridge, 2001);
 Emergence or Reduction?: Essays on the Prospects of Nonreductive Physicalism, ed. by Ansgar Beckermann, Hans Flohr, and Jaegwon Kim (De Gruyter, 1992); and Joseph E. Corbi, *Minds, Causes and Mechanisms: A Case Against Physicalism* (Blackwell, 1999).

Based on [[The Ism Book](#)],
 [[Dictionary of Philosophy of Mind](#)],
 [[A Dictionary of Philosophical Terms and Names](#)]

05-03-2002

physicalism non-reductive

<[philosophy of mind](#), [ontology](#)> the claim that functional properties cannot be reduced to physical properties, but that nevertheless all causality is physical.

See [physicalism](#), [multiple realisability](#), [functionalism](#)

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Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://arts.wustl.edu/~philos/MindDict/>)

16-03-2001

physis

<[philosophical terminology](#)> Greek term for [nature](#), as opposed to [techne](#), or [art](#). Thus, for [Aristotle](#), the governing [principle](#) of all movement among inanimate things.

Recommended Reading:

F. E. Peters, *Greek Philosophical Terms: A Historical Lexicon* (NYU, 1967).

[[A Dictionary of Philosophical Terms and Names](#)]

05-03-2002

Pico della Mirandola Giovanni

<[history of philosophy](#), [biography](#)> Italian thinker (1463-1494) who studied in Florence with Marsilio [Ficino](#). Pico' s *De hominis dignitate* (Oration on the Dignity of Man) (1486) is an excellent statement of the principles of Renaissance [humanism](#). He supposed it possible for an [individual human](#) being, as a [microcosm](#) of [nature](#), to reconcile all [philosophical](#) positions in a single grand [system](#) of [thought](#).

Recommended Reading:

Pico Della Mirandola, *A Platonic Discourse on Love* (Holmes, 1994) and S. A. Farmer, *Syncretism in the West: Pico' s 900 Theses* (Medieval & Renaissance, 1998).

[[A Dictionary of Philosophical Terms and Names](#)]

05-03-2002

picture

[image](#)

19-11-2003

picture element

<[graphics](#)> (pixel) The smallest resolvable rectangular area of an [image](#), either on a screen or stored in memory. Each pixel in a monochrome image has its own brightness, from 0 for black to the maximum value (e.g. 255 for an eight-bit pixel) for white. In a colour image, each pixel has its own brightness and colour, usually represented as a triple of red, green and blue intensities.

[[FOLDDOC](#)]

16-03-2001

pipeline

<[architecture](#)> A sequence of [functional](#) units ("stages") which performs a task in several steps, like an assembly line in a factory. Each functional unit takes inputs and produces outputs which are stored in its output buffer. One stage' s output buffer is the next stage' s input buffer. This arrangement allows all the stages to work in parallel thus giving greater throughput than if each input had to pass through the whole pipeline before the next input could enter. The costs are greater latency and complexity due to the need to synchronise the stages in some way so that different inputs do not interfere. The pipeline will only work at full efficiency if it can be filled and emptied at the same rate that it can process.

Pipelines may be synchronous or asynchronous. A synchronous pipeline has a master clock and each stage must complete its work within one cycle. The minimum clock period is thus determined by the slowest stage. An asynchronous pipeline requires handshaking between stages so that a new output is not written to the interstage buffer before the previous one has been used.

Many CPUs are arranged as one or more pipelines, with different stages performing tasks such as fetch instruction, decode instruction, fetch arguments, arithmetic operations, store results. For maximum performance, these rely on a continuous stream of instructions fetched from sequential locations in memory. Pipelining is often combined with instruction prefetch in an attempt to keep the pipeline busy.

When a [branch](#) is taken, the contents of early stages will contain instructions from locations after the branch which should not be executed. The pipeline then has to be flushed and reloaded. This is known as a [pipeline break](#).

[[FOLDDOC](#)]

16-03-2001

pipeline break

<[architecture](#)> (Or "pipeline stall") The delay caused on a processor using [pipelines](#) when a transfer of control is taken. Normally when a control-transfer instruction (a branch, conditional branch, call or trap) is taken, any following instructions which have been loaded into the processor' s pipeline must be discarded or "flushed" and new instructions loaded from the branch destination. This introduces a delay before the processor can resume execution.

"Delayed control-transfer" is a technique used to reduce this effect.

[[FOLDDOC](#)]

16-03-2001

piracy

[software piracy](#)

19-11-2003

pirate

[software pirate](#)

19-11-2003

pistis

<[philosophical terminology](#)> most general Greek term for [belief](#) or [faith](#) as a [subjective](#) state. According to [Plato](#), this occupies a higher part of the lower portion of the divided line.

Recommended Reading:

F. E. Peters, *Greek Philosophical Terms: A Historical Lexicon* (NYU, 1967).

[[A Dictionary of Philosophical Terms and Names](#)]

05-03-2002

pity appeal to

<[philosophical terminology](#), [argumentum ad misericordiam](#)> the [informal fallacy](#) that tries to elicit feelings of mercy from an audience.

Recommended Reading:

Douglas N. Walton, *Appeal to Pity: Argumentum Ad Misericordiam* (SUNY, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

05-03-2002

plan

<[philosophy of mind](#)> a stable, often incomplete formulation of a program of [action](#).

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

Planck Max Karl Ernst Ludwig

<[history of philosophy](#), [biography](#)> German physicist (1858-1947) whose discovery of the constant rate at which energy can be radiated contributed significantly to [Einstein](#)' s formulation of a wave/particle theory of light and the development of [quantum mechanics](#). Planck won the Nobel Prize in 1918.

Recommended Reading:

Max Planck, *Eight Lectures on Theoretical Physics*, tr. by A. P. Wills (Dover, 1998);

Max Planck, *Treatise on Thermodynamics* (Dover, 1990); and J. L. Heilbron, *Dilemmas of an Upright Man: Max Planck and the Fortunes of German Science* (Harvard, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

05-03-2002

Plato

<[history of philosophy](#), [biography](#)> the son of wealthy and influential Athenian parents, Plato (427-347 BC) began his [philosophical](#) career as a student of [Socrates](#). When the master died, Plato travelled in Italy, studied with students of [Pythagoras](#), and spent several years advising the ruling family of Syracuse. He returned to Athens and established his own school of [philosophy](#), the Academy, in 387. For students enrolled there, Plato tried both to pass on the heritage of a [Socratic](#) style of thinking and to guide their progress through [mathematical](#) learning to the achievement of [abstract](#) philosophical [truth](#). The written dialogues on which his enduring reputation rests also serve both of these aims. In his earliest literary efforts, Plato tried to convey the spirit of [Socrates](#)' s teaching by presenting accurate reports of the master' s conversational interactions, in which these dialogues are our primary source of information. Early dialogues are typically devoted to investigation of a single issue, about which a conclusive result is rarely achieved. Thus, the Euthyphro raises a significant [doubt](#) about whether morally right [action](#) can be defined in terms of [divine](#) approval by pointing out a significant dilemma about any appeal to authority in defence of moral judgments. The Apology offers a description of the [philosophical](#) life as Socrates presented it in his own defense before the Athenian jury. The Crito uses the circumstances of Socrates' s imprisonment to ask whether an individual citizen is ever justified in refusing to obey the [state](#). Although they continue to use the talkative Socrates as a fictional character, the middle dialogues of Plato develop, express, and defend his own, more firmly established, conclusions about central [philosophical](#) issues. Beginning with the Meno, for example, Plato not only reports the [Socratic](#) notion that no one knowingly does wrong, but also introduces the [doctrine](#) of [recollection](#) in an attempt to discover whether or not [virtue](#) can be taught. The Phaedo continues development of [Platonic](#) notions by presenting the [doctrine](#) of the Forms in support of a series of arguments that claim to demonstrate the immortality of the human [soul](#).

The masterpiece among the middle dialogues is Plato' s Republic. It begins with a [Socratic](#) conversation about the [nature](#) of [justice](#) but proceeds directly to an extended discussion of the [virtue](#) (Gk. areté) of [justice](#) (Gk. dikaiosyne), [wisdom](#) (Gk. sophia), [courage](#) (Gk. andreia), and [moderation](#) (Gk. sophrosyne) as they appear

both in [individual](#) human beings and in society as a whole. This plan for the [ideal](#) society or person requires detailed accounts of human [knowledge](#) and of the kind of educational program by which it may be achieved by men and women alike, captured in a powerful image of the possibilities for human [life](#) in the allegory of the cave. The dialogue concludes with a review of various forms of government, an explicit description of the ideal state, in which only philosophers are fit to rule, and an attempt to show that [justice](#) is better than injustice. Among the other dialogues of this period are Plato' s treatments of human [emotion](#) in general and of love in particular in the Phaedrus and Symposium. Plato' s later writings often modify or completely abandon the form structure of dialogue. They include a critical examination of the theory of [forms](#) in Parmenides, an extended discussion of the problem of knowledge in Theaetetus, cosmological speculations in Timaeus, and an interminable treatment of government in the unfinished Laws.

Recommended Reading:

Primary sources:

Platonis opera, ed. by J. Burnet (Oxford, 1899-1906);
 Plato, Complete Works, ed. by John M. Cooper and D. S Hutchinson (Hackett, 1997);
 The Collected Dialogues of Plato, ed. by Edith Hamilton and Huntington Cairns. (Princeton, 1961);
 Great Dialogues of Plato, tr. by W. H. D. Rouse (Signet, 1999);
 Plato, The Republic, tr. by G. M. Grube (Hackett, 1992).

Secondary sources:

The Cambridge Companion to Plato, ed. by Richard Kraut (Cambridge, 1992);
 Bernard A. O. Williams, Plato (Routledge, 1999);
 R. M. Hare, Plato (Oxford, 1983); David Melling, Understanding Plato (Oxford, 1988);
 Feminist Interpretations of Plato, ed. by Nancy Tuana (Penn. State, 1994);
 Plato I: Metaphysics and Epistemology, ed. by Gregory Vlastos (Anchor, 1971);
 Plato II: Ethics, Politics, and Philosophy of Art, Religion, ed. by Gregory Vlastos (Anchor, 1971);
 John M. Cooper, Reason and Emotion (Princeton, 1998);
 Nickolas Pappas, Routledge Philosophy Guidebook to Plato and the Republic (Routledge, 1999);
 Daryl H. Rice, Guide to Plato' s Republic (Oxford, 1997);
 Plato' s Republic: Critical Essays, ed. by Richard Kraut (Rowman & Littlefield, 1997);
 Alexander Nehamas, Virtues of Authenticity (Princeton, 1998);
 Engendering Origins: Critical Feminist Readings in Plato and Aristotle, by Bat-Ami Bar On (SUNY, 1994).

Additional on-line information about Plato includes:

Exploring Plato' s Dialogues, the fine source from Anthony F. Beavers.
 Richard Hooker' s excellent treatment.
 A thorough explanation of Plato' s philosophy from Christopher S. Planeaux.
 David Bostock' s article in The Oxford Companion to Philosophy.

Also see: the Academy, anamnesis, ancient philosophy, appearance and reality, the allegory of the cave, the demiurge, philosophy of education, form and matter, Platonic Forms, human nature, immortality, innate ideas, philosophy of language, love, philosophy of mathematics, mimesis, moral philosophy, Neoplatonism, the noble lie, the one-over-many problem, the philosopher-king, Platonism, political philosophy, Speusippus, teaching philosophy, the third man argument, tragedy, universals, and virtues.

Bernard Suzanne' s alternative interpretation of Plato and his dialogues.

The article in the Columbia Encyclopedia at Bartleby.com.

William Turner' s article in The Catholic Encyclopedia.

The thorough collection of resources at EpistemeLinks.com.

MHBer on Plato, the Platonic Academy, and Renaissance Platonism.

Eric Weisstein' s discussion at Treasure Trove of Scientific Biography.

The Bloomsbury Guide to Human Thought on Platonism.

Bj-rn Christensson' s brief guide to online work on Plato.

A brief entry in Oxford' s Concise Dictionary of Linguistics.

A literary analysis of Plato' s work in The Perseus Encyclopedia.

The Bloomsbury Guide to Human Thought on Academe.

Snippets from Plato in The Oxford Dictionary of Quotations.

An entry in The Oxford Dictionary of Scientists.

Discussion of Plato' s mathematical thought at Mathematical MacTutor.

The Macmillan Encyclopedia 2001 on Plato and Platonism.

[\[A Dictionary of Philosophical Terms and Names\]](#)

11-03-2002

Platonic realism

<[idealism](#), [metaphysics](#), [epistemology](#), [conceptualism](#)> <[nominalism](#)> view that affirms the [existence](#) of [universals](#). Extreme or Platonic realism holds that universals ("forms" or "ideas") exist independently of both [particular](#) things and human [minds](#). Moderate or Aristotelian [realism](#) holds that universals only exist as inhering in, or being [instantiated](#) by, [particulars](#). Also see [conceptualism](#). Contrast: [nominalism](#).

[\[Philosophical Glossary\]](#)

22-06-2001

platonism

<[philosophy](#), [philosophical school](#)> The word platonism refers both to the doctrines of [Plato](#) (427-347 BC) and to the manner or tradition of philosophizing that he founded. While it can be difficult to pin down what Plato actually believed (he often tried things out as hypotheses and changed or criticized many of his earlier views late in life), the term refers centrally to Platonic [idealism](#) and [dualism](#) - though it also refers to the more debatable portions of his thought, such as his [collectivism](#) or [totalitarianism](#) (as revealed in his dialogue The Republic), his [rationalism](#) or [intellectualism](#), his distrust of art, and so on. Often, in philosophy, "Platonism" is virtually equivalent to [idealism](#) or [intrinsicism](#), since Plato was the first Western philosopher to claim that reality is fundamentally something ideal or abstract and that knowledge largely consists of insight into or perception of the ideal. In common usage, the adjective "Platonic" refers to Platonic love, the idea that the best form of love is non-sexual or non-physical (originally put forth in Plato' s dialogue The Symposium).

Based on [[The Ism Book](#)]

Edited by Giovanni Benzi

27-03-2001

plenitude principle of

<[philosophical terminology](#)> [belief](#) that everything that can be, is. [Leibniz](#) clearly maintained that every genuine [possibility](#) must be actualized in the [best of all possible worlds](#), and A. O. [Lovejoy](#) supposed adherence to this notion a significant source for the notion of the great [chain of being](#) envisioned by such philosophers as [Plato](#), [Plotinus](#), and the [Neoplatonics](#).

Recommended Reading:

Arthur Oncken Lovejoy, The Great Chain of Being: A Study of the History of an Idea (Harvard, 1970).

[[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

pleonasm

[redundancy](#) of expression, [tautology](#).

16-03-2001

Plotinus

<[history of philosophy](#), [biography](#)> Egyptian [philosopher](#) (205-270). In the Enneads (which were collected and published by his pupil [Porphyry](#)) Plotinus extrapolated from the writings of [Plato](#) a comprehensive view of [reality](#) in which everything flows in a series of emanations from the central unity outwards into ever less significant things. On this view, the chain of being extends from [nous](#) through psyché to [physis](#). Although human beings are typically caught up in the lowest element of [nature](#), Plotinus supposed each to be a [microcosm](#) of the [universe](#) as a whole, capable of contemplative awareness of the divine unity.

Recommended Reading:

Dominic J. O' Meara, Plotinus: An Introduction to the Enneads (Oxford, 1995), ed. by Lloyd P. Gerson (Cambridge, 1996);

John N. Deck, Nature, Contemplation, and the One: A Study in the Philosophy of Plotinus (Larson, 1991); and Lloyd P. Gerson, Plotinus (Routledge, 1998).

[[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

pluralism

<[metaphysics](#), [political philosophy](#), [ethics](#)>

1. in [ontology](#) the [theory](#) that [reality](#) is [composed](#) or can be explained in terms of two or more fundamental (types of) [substance](#), energy, or [force](#). In the modern era [Cartesian](#) dualism represents the most notable [pluralist](#) hypothesis. Among the ancients, the pluralism of Pythagorus and Democritus is usually contrasted to the [monism](#) of the Milesians (Thales, Anaximenes, Anaximander) and Eleatics (Parmenides, Miletus, Zeno).

2. in political philosophy the term pluralism is also used to refer to political systems that allow more than one political party (roughly equivalent to democracy as opposed to [totalitarianism](#)).

3. in [ethics](#), the belief that there are multiple perspectives on an issue, each of which contains part of the [truth](#) but none of which contain the whole truth. Moral pluralism is the belief that different moral theories each capture part of truth of the moral life, but none of those theories has the entire answer.

Recommended Reading:

Andrew L. Blais, *On the Plurality of Actual Worlds* (Massachusetts, 1997);
 John Kekes, *Pluralism in Philosophy: Changing the Subject* (Cornell, 2000);
 Michael P. Lynch, *Truth in Context: An Essay on Pluralism and Objectivity* (MIT, 1998);
 Nicholas Rescher, *Pluralism: Against the Demand for Consensus* (Clarendon, 1995);
 Michael Walzer, *Spheres of Justice: A Defense of Pluralism and Equality* (Basic, 1984); and *Philosophy and Pluralism*, ed. by David Archard (Cambridge, 1996).

based on [[The Ism Book](#), [Ethics Glossary](#), [Philosophical Glossary](#)], [[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

ply

<[mathematics](#), [data](#)>

1. Of a [node](#) in a [tree](#), the number of [branches](#) between that node and the root.
2. Of a tree, the maximum ply of any of its nodes.

[[FOLDOC](#)]

16-03-2001

pneuma

<[philosophical terminology](#)> Greek term for wind, breath, or spirit. [Aristotle](#) relied on the literal senses of the term, but the [Stoics](#) gave it a quasi-divine cosmological significance. Hence, pneumatology is the study of spiritual beings, the branch of [Christian theology](#) concerned with third person of the trinity.

Recommended Reading:

F. E. Peters, *Greek Philosophical Terms: A Historical Lexicon* (NYU, 1967) and *Language and Thought in Early Greek Philosophy*, ed. by Kevin Robb (Open Court, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

PNF

[prenex normal form](#)

21-11-2003

poiesis

<[philosophical terminology](#)> Greek term for creation or production that is aimed at some [end](#) ([telos](#)), unlike mere [action](#) ([praxis](#)) or doing. Excellence in poiesis is achieved by skill [techné](#).

[[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

Poincaré Jules Henri

<[history of Philosophy](#), [biography](#)> French mathematician and [philosopher](#) of [science](#) (1854-1912). Although he granted the necessity of testing scientific propositions against observed facts about the natural world in *La Science et l' hypothèse* (*Science and Hypothesis*) (1902), Poincaré emphasized that scientific theories are conventional claims best supported by appeal to their simplicity and [utility](#) rather than to their [truth](#). This philosophy of science provided a significant impetus for [logical positivism](#), but Poincaré himself criticized the [logicization](#) of arithmetics in *Dernières Pensées* (*Mathematics and Science: Last Essays*) (1912).

Recommended Reading:

The Value of Science: Essential Writings of Henri Poincare (Modern Library, 2001);
 Elie Zahar, *Poincare's Philosophy: From Conventionalism to Phenomenology* (Open Court, 2001); an
Mathematical Heritage of Henri Poincare, ed. by Felix E. Browder (Am. Math. Soc., 1983).

[[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

point

1. <[text unit](#)> (Sometimes abbreviated "pt") The unit of measurement for [text](#) characters. One point is 1/72 inches (approx 0.35mm) so 12 point text would be 1/6th inch (approx 4.2mm) high when printed.

2. <[hardware](#)> To move a pointing device so that the on-screen pointer is positioned over a certain object on the screen such as a button in a graphical user [interface](#). In most window systems it is then necessary to click a (physical) button on the pointing device to activate or select the object. In some systems, just pointing to an object is known as "mouse-over" [event](#) which may cause some help text (called a "tool tip" in Windows) to be displayed.

[\[FOLDOC\]](#)

16-03-2001

Polish notation

<[philosophical terminology](#)> an alternative representation for [symbolic logic](#), introduced by Jan [Lukasiewicz](#). Use of the basic [notation](#) is illustrated in the following table:

Np negation $\sim p$

Kpq conjunction $p \ \& \ q$

Apq disjunction $p \vee q$

Cpq material implication $p \rightarrow q$

Epq material equivalence $p = q$

PxFx universal quantifier $(x)Fx$

SxGx existential quantifier $(Ex)Gx$

Polish notation eliminates any need for parenthetical bracketing by relying upon a rigorous principle of order. Thus, for example,

$$((pvr) \ \& \ ((p \rightarrow \sim q) \ \& \ (r \rightarrow s))) \rightarrow (\sim q \vee s)$$

can be expressed in Polish notation as

CKAprKCpNqCrSAnqs.

Recommended Reading:

Philosophical Logic in Poland, ed. by Jan Wolenski (Kluwer, 1994) and Jan Lukasiewicz, Aristotle' s Syllogisti from the Standpoint of Modern Formal Logic (Clarendon, 1957).

[\[A Dictionary of Philosophical Terms and Names\]](#)

11-03-2002

politics

<[philosophical terminology](#)> what pertains to the life of the city (Gk. polis) or state. Hence, study of citizenship or the art of governance generally. Political philosophers, including [Plato](#), [Aristotle](#), Machiavelli, [Hobbes](#), [Locke](#), [Rousseau](#), [Mill](#), [Marx](#), and MacKinnon examine the origins, forms, and limits of political power as exercised in practical life.

Recommended Reading:

Political Philosophy, ed. by Anthony Quinton (Oxford, 1989);

Jene M. Porter and John Hallowell, Political Philosophy: The Search for Humanity and Order (Prentice Hall, 1997);

Classics of Moral and Political Theory, ed. by Michael L. Morgan (Hackett, 1997);

History of Political Philosophy, ed. by Leo Strauss and Joseph Cropsey (Chicago, 1987); and The Routledge Dictionary of Twentieth Century Political Thinkers, ed. by Robert Benewick and Philip Green (Routledge, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

11-03-2002

Polya George

<[history of philosophy](#), [biography](#)> Hungarian-American mathematician (1887-1985) whose books How to Solve It (1957) and Mathematical Discovery (1962) offered an interesting variety of [heuristics](#) for the solution of mathematical and logical problems and contributed significantly to a transformation in the [methods](#) for teaching [mathematics](#).

Recommended Reading:

George Polya, Mathematics and Plausible Reasoning (Princeton, 1990); and Gerald L. Alexanderson, The Random Walks of George Polya (Math. Assn. of Am., 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

polyadic predicate logic

[predicate logic](#)

21-11-2003

polymorphic

[polymorphism](#)

21-11-2003

polymorphic lambda-calculus

(Or "second order typed lambda-calculus"). An extension of typed lambda-calculus allowing functions which take types as parameters. E.g. the [polymorphic](#) function "twice" may be written:

$$\text{twice} = \lambda t. (\lambda f. (f :: t \rightarrow t) . (\lambda x :: t) . f (f x))$$

(where " λ " is an upper case Greek lambda and " $(v :: T)$ " is usually written as v with subscript T). The parameter t will be bound to the type to which twice is applied, e.g.:

twice Int

takes and returns a function of type $\text{Int} \rightarrow \text{Int}$. (Actual type arguments are often written in square brackets []). Function twice itself has a higher type:

$$\text{twice} :: \Delta t . (t \rightarrow t) \rightarrow (t \rightarrow t)$$

(where Δ is an upper case Greek delta). Thus λ introduces an object which is a function of a type and Δ introduces a type which is a function of a type. Polymorphic lambda-calculus was invented by Jean-Yves Girard in 1971 and independently by John C. Reynolds in 1974.

[[FOLDOP](#)]

16-03-2001

polymorphism

A concept first identified by Christopher Strachey (1967) and developed by Hindley and Milner, allowing types such as list of anything. E.g. in Haskell:

length :: [a] -> Int

is a function which operates on a list of objects of any type, a (a is a type variable). This is known as parametric polymorphism. Polymorphic typing allows strong type checking as well as generic functions. [ML](#) in 1976 was the first language with polymorphic typing.

Ad-hoc polymorphism (better described as overloading) is the ability to use the same syntax for objects of different types, e.g. "+" for addition of reals and integers or "-" for unary negation or dyadic subtraction. Parametric polymorphism allows the same object code for a function to handle arguments of many types but overloading only reuses syntax and requires different code to handle different types.

See also [variable](#).

In object-oriented programming, the term is used to describe variables which may refer at run-time to objects of different [classes](#).

16-03-2001

polynomial

1. [<mathematics>](#) An arithmetic expression composed by summing multiples of powers of some variable.

$$P(x) = \sum a_i x^i \text{ for } i = 0 \dots N$$

The multipliers, a_i , are known as "coefficients" and N, the highest power of x with a non-zero coefficient, is known as the "degree" of the polynomial. If N=0 then P(x) is constant, if N=1, P(x) is linear in x. N=2 gives a "quadratic" and N=3, a "cubic".

2. [<complexity>](#) polynomial-time.

16-03-2001

polynomial-time

[<complexity>](#) (P) The set or property of problems which can be solved by a known polynomial-time algorithm.

[FOLDOC]

16-03-2001

polynomial-time algorithm

[<complexity>](#) A known [algorithm](#) (or [Turing Machine](#)) that is guaranteed to terminate within a number of steps which is a [polynomial](#) function of the size of the problem.

See also [computational complexity](#), exponential time, non-deterministic polynomial-time (NP), NP-complete.

[FOLDOC]

16-03-2001

polytheism

[<metaphysics, philosophy of religion>](#) a kind of [theism](#) which holds that there is more than one god. It is compatible with [henotheism](#) but incompatible with [monotheism](#), by which it was supplanted in the history of Western religion. Polytheism was the dominant view of the supernatural among the ancients, for example in Greek and Roman religion. By contrast, both Judaism and [Christianity](#) are monotheistic world-views.

[The Ism Book]

Edited by Giovanni Benzi

27-03-2001

Popper Karl Raimund

[<history of philosophy, biography>](#) Austrian [philosopher](#) of [science](#) and political thinker (1902-1994). According to Popper in *Logik der Forschung* (The Logic of Scientific Discovery) (1935), [knowledge](#) of the natural world never advances by direct confirmation of scientific theories - which cannot occur - but only indirectly, through the systematic falsification of their alternatives by reference to our experience. He defended a realistic [epistemology](#) in *Objective Knowledge* (1966). Applying the same [methods](#) to [political science](#) in *The Open Society and its Enemies* (1945) vol. 1 and vol. 2, Popper argued that the unintended harmful consequences of social planning outweigh its benefits and that citizens, therefore, must always retain an absolute right to change their form of government.

Recommended Reading:

Karl Raimund Popper, *Poverty of Historicism* (Routledge, 1993);

Karl Raimund Popper, *Conjectures and Refutations: The Growth of Scientific Knowledge* (Routledge, 1992);

Roberta Corvi, *An Introduction to the Thought of Karl Popper*, tr. by Patrick Camiller (Routledge, 1996);

Bryan Magee, *Philosophy and the Real World: An Introduction to Karl Popper* (Open Court, 1985); and

Frederic Raphael, *Popper* (Routledge, 1999).

[A Dictionary of Philosophical Terms and Names]

11-03-2002

populum argumentum ad

<[philosophical terminology](#)> an attempt to persuade by reference to commonplace sentiments; see appeal to [emotion](#).

Recommended Reading:

Douglas Walton, Appeal to Popular Opinion (Penn. State, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

Porphyry

<[history of philosophy, biography](#)> Phoenecian [philosopher](#) (232-304). A disciple of [Plotinus](#), Porphyry defended the [neoplatonic](#) philosophy in Peri agalmaton (On Images) and several commentaries on the [logic](#) of [Aristotle](#), including an influential exposition of the Categories.

Recommended Reading:

Porphyry, Life of Plotinus (Holmes 1983) and Five Texts on the Mediaeval Problem of Universals, ed. by Paul Vincent Spade (Hackett, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

Port-Royal

<[history of philosophy](#)> monastery outside Paris that fostered [Jansenism](#) during the seventeenth century. During its heyday, Port-Royal hosted Antoine [Arnauld](#) (whose sister AngÉlique was its abbess), Pierre [Nicole](#), and Blaise [Pascal](#), along with Jean Racine.

Recommended Reading:

Antoine Arnauld and Pierre Nicole, Logic

or the Art of Thinking: Containing, Besides Common Rules, Several New Observations Appropriate for Forming Judgement, ed. by Jill V. Buroker (Cambridge, 1996);

Marc Escholier, Port-Royal: The Drama of the Jansenists (Hawthorn, 1968); and William Doyle, Jansenism: Catholic Resistance to Authority from the Reformation to the French Revolution (Palgrave, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

11-03-2002

portability

<[operating system, programming, PI](#)> The ease with which a piece of software (or [file](#) format) can be "ported", i.e. made to run on a new platform and/or compile with a new compiler.

The most important factor is the language in which the software is written and the most portable language is almost certainly [C](#) (though see Vaxocentrism for counterexamples). This is true in the sense that C compilers are available for most systems and are often the first compiler provided for a new system. This has led several compiler writers to compile other languages to C code in order to benefit from its portability (as well as the quality of compilers available for it).

The least portable type of language is obviously [assembly code](#) since it is specific to one particular (family of) [processor\(s\)](#). It may be possible to translate mechanically from one assembly code (or even machine [code](#)) into another but this is not really portability. At the other end of the scale would come interpreted or semi-compiled languages such as LISP or Java which rely on the availability of a portable interpreter or [virtual](#) machine written in a lower level language (often C for the reasons outlined above).

The act or result of porting a program is called a "port".

E.g. "I've nearly finished the Pentium port of my big bang simulation."

Portability is also an attribute of file formats and depends on their adherence to [standards](#) (e.g. ISO 8859) or the availability of the relevant "viewing" software for different platforms (e.g. PDF).

[[FOLDOP](#)]

16-03-2001

portable[portability](#)

21-11-2003

poset[partially ordered set](#)

21-11-2003

positive rights[rights](#)

21-11-2003

positivism

<[epistemology](#), [philosophy of science](#), [philosophical movement](#)> while positivism sounds like it should be synonymous with [optimism](#) (as in the power of positive thinking), it isn' t. Sometimes the word positivism is equivalent to [empiricism](#) (as in [logical positivism](#)), since positivism in the [philosophy of science](#) holds that we should admit as knowledge only that about which we can be absolutely certain, i.e., what is immediately graspable or "empirical". The first thinker who is labeled a positivist was the nineteenth-century French philosopher August Comte. Comte put great stress on science and progress and was interested only in observable phenomena and the laws that determine how they act together, without any investigation of ultimate causes or metaphysics. Another aspect of his thought was a [humanism](#) that bordered on a "religion of humanity", in which the object of worship was taken to be humanity as a whole. In more recent usage, positivism usually refers to [logical positivism](#).

Recommended Reading:

Auguste Comte, The Positive Philosophy (AMS, 1987);

A. J. Ayer, Logical Positivism (Free Press, 1966); and Jonathan H. Turner, Classical Sociological Theory: A Positivist' s Perspective (Burnham, 1993).

Based on [\[The Ism Book\]](#),[\[A Dictionary of Philosophical Terms and Names\]](#)

12-03-2002

possible

<[metaphysics](#)> what might be the case, as opposed to what' [necessary](#) (what must be the case) and what' [actual](#) (what really is the case).

[\[Philosophical Glossary\]](#)

22-06-2001

post hoc ergo propter hoc

<[philosophical terminology](#)> Latin phrase meaning "After this, therefore because of this." Thus, mistaken reliance upon temporal succession alone as enough to establish the presence of a [causal](#) relationship between two events.

[\[A Dictionary of Philosophical Terms and Names\]](#)

12-02-2002

postfix notation

<[language](#)> (Or "Reverse Polish Notation", RPN) One of the possible orderings of [functions](#) and operands: in postfix notation the functions are preceded by all their operands. For example, what may normally be written as "1+2" becomes "12 +". Postfix notation is well suited for stack based [architectures](#) but modern compilers reduced this advantage considerably. The best-known language that with strictly postfix syntax is FORTH.

Compare [infix notation](#), [prefix notation](#).

[[FOLDOC](#)]

16-03-2001

postfix syntax

[postfix notation](#)

28-11-2003

postmodernism

<[philosophical terminology](#)> most generally, abandonment of Enlightenment confidence in the achievement [objective](#) human [knowledge](#) through reliance upon reason in pursuit of [foundationalism](#), [essentialism](#), and [realism](#). In [philosophy](#), postmodernists typically express grave doubt about the [possibility](#) of [universal objective truth](#), reject artificially sharp dichotomies, and delight in the inherent irony and particularity of [language](#) and [life](#). Various themes and implications of postmodern thought are explored by [Foucault](#), [Derrida](#), [Lyotard](#), [Rorty](#), [Haraway](#), and [Cixous](#).

Recommended Reading:

Postmodernism: A Reader, ed. by Patricia Waught (Edward Arnold, 1992);

Jean-Francois Lyotard, The Postmodern Condition: A Report on Knowledge, tr. by Brian Massumi (Minnesota, 1985);

Steven Best and Douglas Kellner, Postmodern Theory (Guilford, 1991); and James N. Powell, Postmodernism for Beginners (Writers and Readers, 1998).

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

postulate

<[philosophical terminology](#)> a [proposition](#) assumed to be true without any appeal to evidentiary support, especially when it is then used to derive further statements in a [formal system](#) or general theory.

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

potentiality

<[philosophical terminology](#)> what might have been or could be, as opposed to what is the case. Hence, for [Aristotle](#), a disposition or tendency to manifest itself. See actuality - potentiality.

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

powerdomain

<[mathematics](#), [logic](#)> The powerdomain of a [domain](#) D is a domain containing some of the [subsets](#) of D. Due to the asymmetry condition in the definition of a [partial order](#) (and therefore of a domain) the powerdomain cannot contain all the subsets of D. This is because there may be different sets X and Y such that $X \leq Y$ and $Y \leq X$ which, by the asymmetry condition would have to be considered equal. There are at least three possible orderings of the subsets of a powerdomain:

Egli-Milner:

$X \leq Y$ iff for all x in X, exists y in Y: $x \leq y$
and for all y in Y, exists x in X: $x \leq y$
("The other domain always contains a related element").

Hoare or Partial Correctness or Safety:

$X \leq Y$ iff for all x in X, exists y in Y: $x \leq y$
("The bigger domain always contains a bigger element").

Smyth or Total Correctness or Liveness:

$X \leq Y$ iff for all y in Y, exists x in X: $x \leq y$
("The smaller domain always contains a smaller element").

If a powerdomain represents the result of an [abstract interpretation](#) in which a bigger value is a safe approximation to a smaller value then the Hoare powerdomain is appropriate because the safe approximation Y to the powerdomain X contains a safe approximation to each point in X.

[[FOLDOC](#)]

16-03-2001

powerset

<[mathematics](#)> <[logic](#)> The powerset of a set S is the set of all the subsets of S, usually written PS or 2^S .

16-03-2001

PPLambda

<[language](#)> essentially the first-order [predicate calculus](#) superposed upon the simply-[typed](#) polymorphic lambda-calculus. PPLambda is the [object language](#) for LCF.

Recommended Reading:

L. Paulson, Logic and Computation: Interactive Proof with Cambridge LCF (Cambridge 1987).

[[FOLDOC](#)]

16-03-2001

practical reasoning

<[philosophy of mind](#), [ethics](#), [logic](#)> figuring out what to do; reasoning directed towards [action](#) (as contrasted with reasoning directed towards arriving at belief).

1. Introduction

Practical reasoning is a rapidly changing area of study; this article describes the state of the field as it has shaped up over the 1980s and 1990s. For earlier work, see Raz (1978). The current debate in practical reasoning focuses on the question: what [inference patterns](#) are legitimate [methods](#) of arriving at [decisions](#) or [intentions](#) to act, or other characteristically practical predecessors of actions such as evaluations, plans, policies, and judgments about what one ought to do? The spectrum of competing theories ranges from the very minimal, allowing only one form of practical inference (or even none), to maximally permissive views that "let a thousand flowers bloom." The remainder of this entry surveys the most prominent positions on this spectrum. Other important questions in the field include: What mental states and processes are involved in practical reasoning? Is there a principled distinction to be made between practical and theoretical reasoning (that is, reasoning directed towards belief rather than [action](#))? How can one argue about what putative forms of practical inference are legitimate, i.e., are really inference? Is there a fixed list of forms of practical inference to be discovered, or can methods of practical reasoning be invented?

2. Nihilism

Nihilism about practical reasoning is the view that there are no legitimate forms of practical inference, and that consequently there is no such thing as practical reasoning: appearances notwithstanding, there is no mental activity that counts as figuring out what to do. This position is the most minimal on the spectrum of views about practical reasoning; it suffers from a shortage of contemporary defenders, but was argued for by Hume (1739/1978, pp. 413-418, 456-470). (Nihilism is canvassed as a possible form of irrationality by Korsgaard (1986, sec. 3). For discussion of Hume, see Hampton (1995) and Millgram (1995).) Nihilism was probably entailed by early twentieth-century noncognitivism in metaethics, in particular by emotivism; however, it was not

discussed at the time. Nihilism should be regarded as the null hypothesis against which other accounts of practical reasoning must be defended.

3. Instrumentalism

Instrumentalism holds that all practical reasoning is means-end reasoning, that is, that figuring out what to do is entirely a matter of determining how to achieve one's goals or satisfy one's desires. Such reasoning may consist in finding causes for the outcomes one wants; but it may also involve -- for instance -- scheduling, or picking one among the various options that would achieve one's goals. (Instrumentalism in this broad sense -- as opposed to the sense in which it is restricted to finding causes for outcomes -- has sometimes also been called "internalism about reasons for action" in the last few years, however, usage has been shifting to make internalism a distinct notion.) Because infinite regresses are generally thought not possible in instrumental justification (finite creatures have only finitely many suitably distinct desires), and because circularity in instrumental justification is thought to be unreasonable, the instrumentalist position usually has it that practical justification bottoms out in desires one just has: you can reason about how to get what you want, but not about what to want in the first place. Instrumentalism is the default view in the field, and probably among philosophers in general. However, despite its pervasiveness, there is very little explicit argument for it. Hume (1777/1975, p. 293) is perhaps the locus classicus of the view, which is -- despite Hume's apparent commitment elsewhere to nihilism about practical reasoning -- often called Humeanism. Smith (1987) attempts to tie instrumentalism to belief-desire psychology (see folk psychology) and to an understanding of beliefs and desires in terms of direction of fit. Williams (1981) argues that reasons for action must invoke desires on the grounds that only desires, broadly construed, can explain actions, and that reasons for action must be able, in suitable circumstances, to explain actions.

The shortfall of argument notwithstanding, there are a number of things to be said for the position. First, means-end reasoning is perhaps the least controversial form that practical reasoning has been alleged to take: we all know what it is like to try to figure out how to achieve a goal, and it is often straightforward to determine whether a mistake has been made. Second, since instrumental reasoning proceeds from desires you have, your stake in the results of such reasoning seems very clear -- the actions it tells you to take promise to get you things you already want. Third, when people do seem to act for reasons, it is generally possible to ascribe to them an appropriate desire. Fourth, non-instrumental practical reasoning would evidently allow one's ultimate desires to be corrected by others; but we are familiar with such attempts at correction, and they as a rule are paternalistic, heavy-handed, dogmatic, and unconvincing. Accordingly, instrumentalists insist that the burden of proof lies with their opponents. Whether or not instrumental reasoning is the only kind of practical reasoning there is, there is widespread agreement that it is a kind of practical reasoning (Thompson (1998) is a very interesting dissenting voice). But although it is uncontroversial in this respect, it is by no means well-understood. The central problem is the defeasibility of instrumental reasoning, that is, the fact that an apparently satisfactory instrumental inference can be defeated by adding further premises, and that we have no means of specifying the defeating conditions up front. For instance, if my end is to have an espresso, a suitable means might be going to a particular cafe... but I might quite properly retract my decision when I learn that its management donates a percentage of the cafe's profits to a terrorist group. There are obviously indefinitely many defeating conditions of this kind, and so we do not know how to say under what circumstances a means-end inference ought to go through. Whether or not instrumentalism is correct, perhaps the most important advance that could be made in the field would be to figure out how means-end reasoning really works.

4. Satisficing

In 1976, Jimmy Carter ran for President on the slogan: "Why not the best?" One answer, given some time back by Herbert Simon (1957, chs. 14, 15; see also 1979), is that finding the best choice can be computationally and otherwise too expensive. Another is that choice sets may fail to contain maximal elements; when there is no best, choosing the best is not an option (Landesman 1995, Fehige 1994). The alternative to maximising is satisficing, that is, choosing an option that is, while perhaps not the best, good enough. Satisficing is naturally thought of as instrumentalist in spirit, and defended as a kind of second-level maximising: the best first-level strategy, once typical information costs are taken into account, may be satisficing rather than maximising. However, satisficing has also been defended as simply being in line with our intuitions about the rationality of particular choices (Slote 1989).

5. Reasoning with maieutic ends

A standard objection to instrumentalism is that it makes ultimate ends come out arbitrary: your ultimate ends are the things you just happen to want, they are beyond the reach of deliberation and rational control, and we know from experience that this is unrealistic. A response to the objection can stay within the spirit of instrumentalism by appealing to maieutic ends (also called second-order ends or second-order desires), that is, ends that consist in having other ends or desires. For example, you might want to have a career in medicine for entirely financial reasons; in order to have the career, you have to care about the right things, e.g., healing the sick; so you come to want to have the end of healing the sick. As the example suggests, it is possible to reason about the desirability of wanting something, without expanding the repertoire of inference patterns beyond the instrumental. One can (it is held) adopt desires that are ultimate in the sense that their objects are not wanted as means to further ends; but one can adopt these desires for instrumental reasons, because although the desires' objects are not wanted as means to further ends, the desires themselves are so wanted. This approach is developed and defended by Schmidtz (1995).

6. Plans and intentions

On the planning view of rational deliberation advanced by Bratman (1987; see Bratman 1983 for an early but more concise presentation of the view), practical reasoning consists largely in the adoption, filling in, and reconsideration of intentions and plans. (In Bratman's usage, a plan is a more elaborate and developed intention, and an intention is a small plan.) Plans have two important characteristics that distinguish them from desires. First, they are typically incomplete: your plan for flying to Spain may include the intention of getting to the airport, but until the day arrives it may well not include a subplan for getting to the airport e.g., calling a taxi, waiting for it, getting in, and taking it there. Second, plans are stable: normally, one reasons about how to execute and fill in one's plan, but not, unless special circumstances arise, about whether to reject the plan in favour of some other.

Practical reasoning that avails itself of plans has advantages over reasoning that uses only beliefs and desires. Because plans are stable, plans make the practical reasoning one has to do manageable by framing one's

deliberations, and so restricting the number of options that need to be considered. For instance, in considering how to get to the airport, you must weigh the merits of driving, taking a cab, taking the bus, and getting a friend to drop you off; but because the plan to go to Spain frames your deliberations, you need not consider the option of going to Peru instead. Because plans are usually filled in as needed, they can efficiently take account of information that becomes available later rather than earlier: when you formed the intention of going to Spain, you could not know whether your spouse would want to use the car that day. Because plans are stable, they can facilitate interpersonal coordination: knowing that Joe plans to be at the cafe at 3:00 is an entirely different matter from knowing that he wants to be there at 3:00; I am much more willing to go there to meet him on the former basis than on the latter, because I know he will not reconsider unless special circumstances arise. Because plans are stable, they also facilitate intrapersonal coordination, that is, coordination over different times; knowing that you will finish the paper you have now started to write, because your intention to do so is stable, provides some assurance that the effort spent in starting it will not have been wasted.

Bratman's views regarding when reconsideration of plans is rational have been developing over the last decade. One [argument](#) turns on the consequences of having the policy that triggers reconsideration: if you must reconsider every time a new bit of information turns up, your decision making task will swamp your cognitive resources. Consequently, the planning theory of practical rationality can deliver prescriptions for [action](#) that differ from those of the traditional instrumentalist theory. For example, suppose you adopt a plan because you believe, rationally, that it will best satisfy your desires; suppose circumstances change so that it no longer does, but your rationally held policy for reconsidering plans does not take the change in circumstances to warrant reconsideration. Then the instrumentalist theory may hold that it is rational for you not to perform the actions dictated by the plan, whereas the planning theory may hold that it is rational -- even though executing the plan will not satisfy your desires anymore.

7. Specificationism

Many of our ends -- runs one objection to instrumentalism -- are simply too vague or indefinite to serve as starting points for means-end reasoning, so practical reasoning must consist partly in further specifying the overly indefinite ends. For instance, I want to improve my looks; but, before actually making purchases at the makeup counter, I need to figure out just what improvement in my looks would be. (The early pivotal papers are by Kolnai (1978) and Wiggins (1991); Kolnai, who thinks that Aristotle was an instrumentalist, develops the view as an alternative to Aristotle's, while Wiggins attributes the specificationist view to Aristotle.) Richardso (1994) advances a further reason for specification of ends. Many of our ends conflict, but often those conflicts (whether between one's own ends, or the ends of different people) can be removed by further specification of the ends in question. Since the point of cospecification is to remove conflict between ends, specifications should be chosen that make the ends cohere with one another (and with other background elements of one's evaluative system). In contrast to the three immediately preceding positions, which remain instrumentalist in spirit, specificationism is (like the further positions we will survey) a full-fledged alternative to the view that all practical reasoning is means-end reasoning: only when supplemented with the rational specification of ends is instrumental reasoning viable at all. The most important item on the specificationist agenda is to make out what distinguishes correct or rational from incorrect or irrational specifications of an insufficiently definite goal.

8. Practical contradiction resolution

One important aspect of theoretical reasoning (that is, reasoning directed towards belief) is resolving contradictions in one's [system](#) of beliefs. The way in which this is done is not well-understood, but it is nonetheless possible to ask whether it has a practical analog: a form of practical reasoning directed towards resolving (something that would count as) a practical contradiction. It has been suggested by Candace Vogler that such contradictions may be generated by practical versions of so-called "evening star-morning star" cases, as when one wants to visit Siam, and to avoid visiting Thailand, but then becomes aware that Siam is Thailand. Korsgaard (1990) has a useful discussion of the notion of a practical contradiction in Kant.

9. Coherence-driven reasoning

Practical reasoning is sometimes thought to be a matter of adjusting one's practical take on things, together with one's actions, in the direction of greater [coherence](#). Just what this suggestion comes to will depend both on what the elements of one's practical take on things are thought to be, and on what the coherence of such elements with one another is supposed to consist in. For instance, if preferences are the relevant items, coherence might be understood to consist in the agent's preferences satisfying the conditions for his having well-defined utility function. (For the canonical account of utility functions, see Luce and Raiffa, 1957, ch. 2.) However, the expected-utility approach to coherence has the problem that no sense is given to the notion of a set of preferences being more or less coherent; your preferences are either coherent (if they induce -- that is, can be represented by -- a utility function), or they are not. The expected-utility approach to coherence specifies an ideal that is unattainable for human beings, without saying what it would be to move closer to it, or farther away.

The elements of one's practical take on things might alternatively be thought to consist in goals, subgoals and actions. In this case, coherence-driven practical deliberation would amount to choosing the subset of the goals and actions under consideration that best cohere with one another. Practical reasoning of this kind can be described as "inference to the most coherent plan" -- in the event that finding the most coherent plan is impractical, the recommendation is to find as coherent a plan as one can. The most urgent issue in this area is the development of comparative notions of coherence that are precise enough to give clear answers to questions of the form: of these competing plans, which is the most coherent? Without notions of coherence that are usable in this way, appeals to coherence are empty, and the merits of coherence-driven accounts of practical reasoning cannot be assessed. One such comparative notion has been modeled computationally, by using quasi-connectionist networks to represent the competing plans. (Thagard and Millgram, 1995; Millgram and Thagard, 1996) Another is specified as a constraint satisfaction problem. (Thagard and Verbeurgt, 1998) Coherence-driven accounts are yet another alternative to the instrumentalist paradigm; on the goal-oriented notion, for example, goals can be adopted on the ground that they cohere with other goals that one already has, even if achieving them would not be a means to any end that one already has. If coherence-driven accounts of practical reasoning are to make headway, improved definitions of coherence and further development of techniques for modelling them are necessary.

10. Universalisability

Kantian theories of practical reasoning typically require that reasons be universalisable: roughly, that it be possible for everyone in like circumstances to act likewise on the basis of a similar reason. Nell (1975) argues

that the requirement imposes substantial constraints on what actions are permissible, and explains how the requirement can be proceduralised. Universalisability acts as a filter through which proposed actions and the reasons for them are passed, but it can also be used to generate reasons on its own, when not acting on a proposed reason would fail the universalisability test. Contemporary interest in universalisability is primarily due to the role it plays in Kantian moral theory, which is today one of the most prominent positions in ethics; Korsgaard (1990) reconstructs Kant' s reasons for insisting on the universalisability requirement.

11. Identity-based practical reasons

Korsgaard has recently suggested that a theory of practical reasoning should make room for a class of reasons that express one' s self-conception or "practical identity," "a description under which you value yourself ...find your life to be worth living and your actions worth undertaking" (1996, p. 101), e.g., being a philosophy professor, a Canadian, a "made man," and so on. The appeal to practical identities goes some of the way towards meeting a challenge posed by Williams on behalf of the instrumentalist position, that of showing how the practical reasons of different persons in what are substantially similar situations can vary, without (as the instrumentalist does) simply referring the difference to their differing desires. (Williams 1995, pp. 186-194)

12. Practical empiricism

On the views we have seen so far, the source of an agent' s reasons for [action](#) lies within the agent: in his goals or ends or desires (instrumentalism, satisficing, maieutic ends), in his intentions (the planning view, Kantian universalisability), in the ways all these cohere with one another, or in his practical identity. On the instrumentalist view, for instance, experience can supply the facts needed to determine how to attain one' ends, but the ends themselves are set from inside, by one' s desires. Against this, practical empiricism has that it is both possible and necessary to learn what matters, and what is important, from experience. There is no reason to think that goals, priorities, evaluations and other like pieces of an agent' s cognitive equipment will be useful guides to [action](#) if the world is not allowed to have its say in what they look like. The desires and intentions with which one comes to a situation may be simply irrelevant (likely when the circumstances are novel), or their objects may prove disappointing when obtained; successful agency requires an ability to correct one' s assessments and agenda on the fly. For example, perhaps I originally took climate control in a car to be more important than mechanical reliability; after many unpleasant experiences with mechanics, I conclude that I was mistaken, and that a reliable car is generally to be preferred to an air conditioned one. This suggests that the basis for correction will be a practical analog of observation, and that, because learning from experience requires the ability to generalize from past observations to future instances, practical empiricism should be committed to a practical version of inductive inference, one that moves from particular to general practical judgments. A version of practical empiricism along these lines is developed by Millgram (1997).

13. Redescription as practical reasoning

In order to draw the right conclusion about what to do, you normally have to proceed on the basis of an adequate description of your situation. Arriving at the description is usually regarded as theoretical rather than practical reasoning; you are reasoning about the facts, rather than about the values. Murdoch (1970) differs on this point: arriving at the description that is ultimately the basis for [action](#) is the important and hard part of practical reasoning (in part because facts cannot be distinguished from values -- or, more interestingly, because the attempt to do so is itself the expression of a particular set of values; on this last point, see Diamond 1996). Although Murdoch' s work predates the twødecade period under review, her writing is only now coming to be seen as advancing a view about practical reasoning. Murdoch' s discussion focusses almost entirely on one aspect of the process of redescription, that of overcoming the temptation to see situations in emotionally convenient ways. In her most famous example, a mother conquers her jealousy, and learns to see her daughter-in-law as refreshing, simple, spontaneous, and delightfully youthful, rather than vulgar, rude, undignified, and tiresomely juvenile. Her insight is important but incomplete: even if one agrees that redescribing one' s situation is practical reasoning, it will be hard to accept that such redescription is all there really is to figuring out what to do; and it will be as hard to agree that all there really is to successful redescription is getting past the emotionally induced distortions.

14. Other positions

There are a handful of other positions that deserve mention but are difficult to place on the spectrum.

First, there is the common idea that expected-utility theory (see Luce and Raiffa 1957) is a satisfactory rendition of practical reasoning; this is hard to place because the formalism is advanced both as a kind of instrumentalism (where the agent' s goal is to maximize his expected utility), and as a formal notion of coherence (see above). What is more, some of the justifications for the coherentist interpretation are meant to be instrumentalist in form and spirit; see, e.g., McClennan (1990). Hampton (1994) contains a recent critical discussion of the instrumentalist interpretation.

As a matter of fact, the formalism may well be compatible with other positions on the spectrum as well. It is certainly compatible with nihilism, and the wide availability of personal [computers](#) has made this easy to see. To the [computer](#)-literate, the expected-utility formalism looks like a data compression technique, or perhaps an encryption device, rather than a representation of reasoning, or even of rationality in one' s preferences. The formalism gives a way of representing one' s preferences- provided that they satisfy a handful of actually quite demanding conditions -- by assigning real numbers to outcomes, such that selecting the [action](#) with the highest expected utility (the sum of the products of those numbers and the probabilities of the respective outcomes, given that the [action](#) is performed) will be choice conforming to one' s preferences. That is, it performs a function analogous to those of the popular ZIP and Compress programs: just as these store your information in a file formatted to take up less space on your hard disk than an uncompressed file, so the expected utility formalism allows you to encode unmanageably many preferences as much more manageable real numbers. Of course, there may be as many numbers as there were preferences in the first place, and, if one is unlucky, they may not be much more manageable than the preferences had been; in that case, one can think of the encoding as encryption rather than compression. But, thought of in either of these two ways, retrieving your original preferences via an expected-utility calculation would be no more practical reasoning than retrieving your original file by decompressing a "zipped" file (or by decrypting an encrypted file) is theoretical reasoning. And the formalism could be used to encode suitably structured preferences even if there was nothing that counted as practical reasoning at all -- that is, even if nihilism were correct.

Second, Velleman (1989; see 1985 for a shorter and easier-to-read discussion) argues that intentions are self-fulfilling predictions (and so practical reasoning is in fact a variety of theoretical reasoning). The predictions are self-fulfilling because agents desire to understand what they are doing, and acting on the basis of such a self-

fulfilling prediction produces the requisite kind of self-understanding.

Third, Brandom (1994, pp. 243-253) claims that desire ascriptions merely express commitments to the material correctness of practical inferences that do not themselves involve desires. For instance, to say that someone desires not to get wet is to make explicit his commitment to inferring "I will take my umbrella" from "It is going to rain;" the desire is not itself a suppressed premise of the inference. This amounts to an [argument](#) against instrumentalism, to the effect that the instrumentalist position radically misconceives the point of desire ascriptions. The omnipresence of desires served by one's actions is not, as it has been taken to be, evidence for instrumentalism. Rather, that one's practical inferences can generally be recast in a form that invoke desires is entirely neutral with respect to the question: what patterns of practical inference are legitimate?

15. The state of the field

Two decades ago, practical reasoning was, in the minds of most professional philosophers, not separable as an area of study from ethics, and it tended to be associated with historical scholarship. Instrumentalism was the clearly dominant position, to which a revived Kantian morality was the most visible alternative. Some strong work was being done on prudential (i.e., future-regarding) reasons as well, since these were regarded as a possible model for a treatment of altruistic reasons (Nagel 1970). But, by and large, the field was stagnant.

It has since come a long way. Practical reasoning is no longer the handmaiden of ethics, and today theories of practical reasoning are not normally advanced merely as components of some favoured moral theory. The fortification and defence of a very small number of entrenched positions inherited from the great dead philosophers has given way to a healthy profusion of competing and largely new views. Important ideas and [arguments](#) turn up annually or semi-annually -- a rate that marks a philosophical subspecialty as rapidly developing. Work on practical reasoning has consequences for ethics and philosophy of mind: moral reasoning is practical reasoning concerned with moral subject matter; philosophical ontologies of the mental typically reflect whatever happens to be the current view of rationality. (E.g., the popularity of belief-desire psychology is partly attributable to the recently widespread acceptance of instrumentalism, a view in which desires loom very large.) So we can expect recent developments in practical reasoning to produce ripple effects in those areas also.

References

- Brandom, R. (1994) *Making It Explicit*. Cambridge, Mass., Harvard University Press.
- Bratman, M. (1983) "Taking Plans Seriously" *Social Theory and Practice* 9(2-3): 271-287.
- Bratman, M. (1987) *Intention, Plans, and Practical Reason* Cambridge, Mass., Harvard University Press.
- Broome, J. (1991) *Weighing Goods* Oxford, Basil Blackwell.
- Diamond, C. (1996) "We Are Perpetually Moralists": Iris Murdoch, Fact, and Value" M. Antonaccio and W. Schweiker, *Iris Murdoch and the Search for Human Goodness* Chicago, University of Chicago Press.
- Fehige, C. (1994) "The Limit Assumption in Deontic (and Prohairetic) Logic" G. Meggle and U. Wessels, *Analysomen 1* Berlin: de Gruyter.
- Hampton, J. (1994) "The Failure of Expected-Utility Theory as a Theory of Reason" *Economics and Philosophy* 10(2): 195-242.
- Hampton, J. (1995) "Does Hume Have an Instrumental Conception of Practical Reason?" *Hume Studies* 21(1): 57-74.
- Hume, D. (1739/1978) *A Treatise of Human Nature* Oxford, Clarendon Press. Edited by L. A. Selby-Bigge and P. H. Nidditch.
- Hume, D. (1777/1975) *Enquiry Concerning the Principles of Morals* Oxford, Oxford University Press. Edited by L. A. Selby-Bigge and P. H. Nidditch.
- Kolnai, A. (1978) "Deliberation is of Ends" *Ethics, Value and Reality* Indianapolis, Hackett.
- Korsgaard, C. (1986) "scepticism about Practical Reasoning", *Journal of Philosophy* 83(1): 5-25.
- Korsgaard, C. (1990) *The Standpoint of Practical Reason*. New York, Garland Publishing. Reprint of doctoral dissertation (Harvard University, 1981).
- Korsgaard, C. (1996) *The Sources of Normativity*. Cambridge, Cambridge University Press.
- Landesman, C. (1995) "When to Terminate a Charitable Trust?" *Analysis* 55(1): 12-13.
- Luce, R. D. and H. Raiffa (1957) *Games and Decisions* New York, John Wiley and Sons.
- McClelland, E. (1990) *Rationality and Dynamic Choice* Cambridge, Cambridge University Press.
- Millgram, E. (1995) "Was Hume a Humean?" *Hume Studies* 21(1): 75-93.
- Millgram, E. (1997) *Practical Induction* Cambridge, Mass., Harvard University Press.
- Millgram, E. and Thagard, P. (1996) "Deliberative Coherence" *Synthese* 108(1): 63-88.
- Murdoch, I. (1970) *The Sovereignty of Good* London, Routledge/Ark.
- Nagel, T. (1970) *The Possibility of Altruism* Princeton, Princeton University Press.
- Nell, O. (1975) *Acting on Principle* New York, Columbia University Press.
- Raz, J. (1978) *Practical Reasoning*. Oxford, Oxford University Press.
- Richardson, H. (1994) *Practical Reasoning about Final Ends*. Cambridge, Cambridge University Press.
- Schmidtz, D. (1995) *Rational Choice and Moral Agency*. Princeton, Princeton University Press.
- Simon, H. (1957) *Models of Man*. New York, John Wiley and Sons.
- Simon, H. (1979) "From Substantive to Procedural Rationality" F. Hahn and M. Hollis, *Philosophy and Economic Theory* (Oxford, Oxford University Press): 65-86.
- Slote, M. (1989) *Beyond Optimizing*. Cambridge, Mass., Harvard University Press.
- Smith, M. (1987) "The Humean Theory of Motivation", *Mind* 96(381): 36-61.
- Thagard, P. and Millgram, E. (1995) "Inference to the Best Plan: A Coherence Theory of Decision" D. Leake and A. Ram, *Goal-Driven Learning* (Cambridge, Mass., MIT Press): 439-454.
- Thompson, M. (1998) "Naive Action Theory" (unpublished manuscript).
- Thagard, P. and Verbeurgt, K. (1998) "Coherence as Constraint Satisfaction" *Cognitive Science* 22.
- Velleman, J. D. (1985) "Practical Reflection", *Philosophical Review* 94(1): 33-61.
- Velleman, J. D. (1989) *Practical Reflection* Princeton, Princeton University Press.
- Wiggins, D. (1991) "Deliberation and Practical Reason," *Needs, Values, Truth*. Oxford, Blackwell.
- Williams, B. (1981) "Internal and External Reasons", *Moral Luck*. Cambridge, Cambridge University Press.
- Williams, B. (1995) "Replies", J. Altham and R. Harrison, *World, Mind, and Ethics: Essays on the Ethical Philosophy of Bernard Williams*. Cambridge, Cambridge University Press.
- Elijah Millgram
- Chris Eliasmith - [\[Dictionary of Philosophy of Mind\]](#) Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

pragmatic theory of truth

<[philosophical terminology](#)> belief that a [proposition](#) is true when acting upon it yields satisfactory practical results. As formulated by William [James](#), the pragmatic theory promises (in the long term) a convergence of human opinions upon a stable body of scientific propositions that have been shown in experience to be successful principles for human [action](#).

Recommended Reading:

William James, *Pragmatism and the Meaning of Truth* (Harvard, 1978); Alan R. White, *Truth* (Anchor, 1970); and Richard L. Kirkham, *Theories of Truth: A Critical Introduction* (Bradford, 1995).

[\[A Dictionary of Philosophical Terms and Names\]](#)

12-03-2002

pragmatics

<[logic, discipline](#)> the characterization, for a natural or artificial, language or relationships between sentences, the world, and the situation of speaker and hearer. Pragmatics is particularly concerned with indexical words such as "I," "Here," "That," "She," "Now," which are sensitive to the context of utterance or statement.

[\[A Philosophical Glossary\]](#)

30-04-2001

pragmatism

<[philosophical school](#)> Pragmatism is generally considered to be the only truly philosophical school and tradition to have emerged in America (mainly because it is more technically rigorous than transcendentalism). While the term itself was originated by C.S. [Peirce](#), pragmatism's most famous exponents were William [James](#) and John [Dewey](#), although there were numerous lesser figures involved during its heyday in the late nineteenth and early twentieth centuries (G.H. [Mead](#), F.S.C. [Schiller](#), etc.).

The original formulation of pragmatism by Peirce applied to [epistemology](#) (the idea that [knowledge](#) must be tested by its usefulness), but the concept was quickly extended by James. Pragmatism in [ethics](#) is a form of [consequentialism](#), but it differs from [utilitarianism](#) in that pragmatism emphasizes action while utilitarianism emphasizes usefulness (Greek pragma = "action" while Latin utilis = "use"). Pragmatism is often said to be a kind of [humanism](#), since it stresses the importance of meeting human needs and the real interests of human beings. Pragmatism rejects any kind of ethical [naturalism](#) and tends to be a kind of [relativism](#).

In popular usage, to say that a person is pragmatic may indicate that he or she lacks principles, although it can simply be a positive statement that he or she has a "can-do attitude" or "knows how to get things done". (References from [altruism](#), [consequentialism](#), [empiricism](#), [humanism](#), instrumentalism, [realism](#), and [utilitarianism](#).)

Recommended Reading:

Pragmatism: A Reader, ed. by Louis Menand (Vintage, 1997);

H. Standish Thayer, *Meaning and Action: A Critical History of Pragmatism* (Hackett, 1981);

Louis Menand, *The Metaphysical Club: A Story of Ideas in America* (Farrar, Straus, & Giroux, 2001);

Howard Mounce, *The Two Pragmatisms: From Peirce to Rorty* (Routledge, 1997);

Charlene Haddock Seigfried, *Pragmatism and Feminism: Reweaving the Social Fabric* (Chicago, 1996);

Cornel West, *The American Evasion of Philosophy: A Genealogy of Pragmatism* (Wisconsin, 1989); and

Richard Shusterman, *Practicing Philosophy: Pragmatism and the Philosophical Life* (Routledge, 1997).

Based on [\[The Ism Book\]](#),

[\[A Dictionary of Philosophical Terms and Names\]](#)

12-03-2002

praxis

<[philosophical terminology](#)> Greek term for [action](#) or doing, as opposed to creative production ([poiesis](#)). According to [Aristotle](#), actions are subject to [moral](#) valuation if they result from deliberate choice.

Recommended Reading:

F. E. Peters, *Greek Philosophical Terms: A Historical Lexicon* (NYU, 1967).

[\[A Dictionary of Philosophical Terms and Names\]](#)

12-03-2002

pre-order

1. See pre-order traversal.

2. A [relation](#) R is a pre-order if it is [reflexive](#) ($x R x$) and [transitive](#) ($x R y \wedge y R z \Rightarrow x R z$). If it is also [antisymmetric](#) ($x R y \wedge y R x \Rightarrow x = y$) then it is a [partial ordering](#).

16-03-2001

pre-order traversal

A pre-order traversal of a tree visits each node in the tree before visiting its children. The opposite is post-order traversal.

16-03-2001

precision

<[mathematics](#)> The number of decimal places to which a number is computed. Compare [accuracy](#).

[[FOLDOP](#)]

16-03-2001

predecessor

[parent](#)

30-11-2003

predicate

<[logic](#)> Intuitively, whatever is said of the subject of a sentence. A [function](#) from individuals (or a sequence of individuals) to truth-values.
Notation: in " Px ", P is the predicate.

See [matrix](#), [function](#), n -adic predicate, [predicate logic](#), [prefix](#), [propositional function](#), [relation](#).

Argument of a predicate

Any of the individuals of which the predicate is asserted.

Notation: in " $Pxyz$ ", x , y , and z are the [arguments](#) of predicate P . In first-order predicate logic, only [terms](#) can be [arguments](#).

Extension of a predicate

The set of all objects of which the predicate is true.

Notation: the extension of predicate P is $x : Px$. See [Russell](#)'s paradox.

[Glossary of First-Order Logic]

16-03-2001

predicate calculus

<[philosophical terminology](#)> a [formal](#) logical system constructed to symbolize assertions that individual things have features; see [quantification theory](#).

Recommended Reading:

Graeme Forbes, *Modern Logic: A Text in Elementary Symbolic Logic* (Oxford, 1994);

Joseph Bessie and Stuart Glennan, *Elements of Deductive Inference: An Introduction to Symbolic Logic* (Wadsworth, 1999); and Merrie Bergmann, James Moor, and Jack Nelson, *The Logic Book* (McGraw-Hill, 1997).

[predicate logic](#)

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

predicate constant

<[philosophical terminology](#)> a [symbol](#) (usually uppercase letters such as F, G, H, etc.) used to represent a specific feature or [property](#) in [quantification theory](#).

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

predicate logic

<[logic, discipline](#)> the branch of logic dealing with propositions in which subject and [predicate](#) are separately signified, reasoning whose validity depends on this level of articulation, and systems containing such propositions and reasoning. Also called quantification theory or predicate calculus.

First-order predicate logic

Predicate logic in which [predicates](#) take only individuals as [arguments](#) and quantifiers only bind individual variables.

Higher-order predicate logic

Predicate logic in which predicates take other predicates as [arguments](#) and quantifiers bind predicate variables. For example, second-order predicates take first-order [predicates](#) as [arguments](#). Order n predicates take order n-1 predicates as [arguments](#) (n > 1).

See Grelling' s paradox.

Inclusive predicate logic

Predicate logic that does not exclude interpretations with empty domains. Standard predicate logic excludes empty domains and defines logical validity accordingly, i.e. true for all interpretations with non-empty domains. Also called inclusive quantification theory.

See [existential import](#), [logical validity](#).

Monadic predicate logic

Predicate logic in which [predicates](#) take only one [argument](#); the logic of attributes.

Polyadic predicate logic

Predicate logic in which predicates take more than one [argument](#); the logic of n-adic predicates (n > 1); the logic of relations.

Predicate logic with identity

A system of predicate logic with $(x)(x=x)$ as an axiom, and the following axiom schema, $[(x=y) \Rightarrow (A \Rightarrow A')]^{\wedge c}$ when A' differs from A only in that y may replace any free occurrence of x in A so long as y is free wherever replaces x (y need not replace every occurrence of x in A), and when B^{^c} is an arbitrary closure of B.

See first-order theory with identity, [identity](#).

Pure predicate calculus

A system of predicate logic whose language contains no [function](#) symbols or individual constants. As opposed to a number-theoretic predicate calculus which contains these things.

[Glossary of First-Order Logic]

16-03-2001

predicate logic with identity

[predicate logic](#)

30-11-2003

prediction

<[philosophical terminology](#)> the explanation of an [event](#) that has not yet occurred by reference to observed regularities in the [natural](#) world.

Recommended Reading:

Wesley C. Salmon, Causality and Explanation (Oxford, 1997);

Peter Spirtes, Clark Glymour, and Richard Scheines, Causation, Prediction, and Search (MIT, 2001);

Judea Pearl, Causality: Models, Reasoning, and Inference (Cambridge, 2001); and Karl Raimund Popper, Conjectures and Refutations: The Growth of Scientific Knowledge (Routledge, 1992).

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

predomain

<mathematics, logic> A domain with no bottom element.

[FOLDOC]

16-03-2001

prefix

1. <logic> In predicate logic wffs in which all quantifiers are clustered at the left, the section of quantifiers. See matrix, prenex normal form

[Glossary of First-Order Logic]

2. <unit> The standard metric prefixes used in the SI (Syst`eme International) conventions for scientific measurement. With units of time or things that come in powers of 10, such as money, they retain their usual meanings of multiplication by powers of 1000 = 10³. When used with bytes or other things that naturally come in powers of 2, they usually denote multiplication by powers of 1024 = 2¹⁰(10).

Here are the SI magnifying prefixes, along with the corresponding binary interpretations in common use:

prefix	abr	decimal	binary
yocto-	k	1000 ⁻⁸	
zepto-		1000 ⁻⁷	
atto-		1000 ⁻⁶	
femto-	f	1000 ⁻⁵	
pico-	p	1000 ⁻⁴	
nano-	n	1000 ⁻³	
micro-	*	1000 ⁻²	* Abbreviation: Greek mu
milli-	m	1000 ⁻¹	
kilo-	k	1000 ¹	1024 ¹ = 2 ¹⁰ = 1,024
mega-	M	1000 ²	1024 ² = 2 ²⁰ = 1,048,576
giga-	G	1000 ³	1024 ³ = 2 ³⁰ = 1,073,741,824
tera-	T	1000 ⁴	1024 ⁴ = 2 ⁴⁰ = 1,099,511,627,776
peta-		1000 ⁵	1024 ⁵ = 2 ⁵⁰ = 1,125,899,906,842,624
exa-		1000 ⁶	1024 ⁶ = 2 ⁶⁰ = 1,152,921,504,606,846,976
zetta-		1000 ⁷	1024 ⁷ = 2 ⁷⁰ = 1,180,591,620,717,411,303,424
yotta-		1000 ⁸	1024 ⁸ = 2 ⁸⁰ = 1,208,925,819,614,629,174,706,176

The prefixes zetta-, yotta-, zepto-, and yocto- have been included in these tables purely for completeness and giggle value; they were adopted in 1990 by the "19th Conference Generale des Poids et Mesures". The binary peta- and exa- loadings, though well established, are not in jargon use either - yet. The prefix milli-, denoting multiplication by 1000⁽⁻¹⁾, has always been rare in jargon (there is, however, a standard joke about the "millihelen" - notionally, the amount of beauty required to launch one ship). "Femto" and "atto" (which, interestingly, derive not from Greek but from Danish) have not yet acquired jargon loadings, though it is easy to predict what those will be once computing technology enters the required realms of magnitude (however, see attoparsec).

The abbreviated forms of these prefixes are common in electronics and physics. k, M and G are also common in computing where they stand for powers of two more often than powers of ten. Thus "MB" stands for megabytes (2²⁰ bytes). In speech, the unit is often dropped so one may talk of "a 40K salary" (40000 dollars) or "2M of disk space" (2²⁰ bytes).

The accepted pronunciation of the initial G of "giga-" was once soft, /ji' ga/ (like "gigantic"), but now the hard pronunciation, /gi' ga/, is probably more common.

Note that the formal SI metric prefix for 1000 is lower case "k"; some, including this dictionary, use this strictly, reserving "K" for multiplication by 1024 (KB is thus "kilobytes").

Confusing 1000 and 1024 (or other powers of 2 and 10 close in magnitude) - for example, describing a memory in units of 500K or 524K instead of 512K - is a sure sign of the marketroid. One example of this: it is common to refer to the capacity of 3.5" microfloppies as "1.44 MB" In fact, this is a completely bogus number. The correct size is 1440 KB, that is, 1440 * 1024 = 1474560 bytes. So the "mega" in "1.44 MB" is compounded of two "kilos", one of which is 1024 and the other of which is 1000. The correct number of megabytes would of course be 1440 / 1024 = 1.40625. Alas, this fine point is probably lost on the world forever.

In 1993, hacker Morgan Burke proposed, to general approval on Usenet, the following additional prefixes: groucho (10⁻³⁰), harpo (10⁻²⁷), harpi (10²⁷), grouchi (10³⁰). This would leave the prefixes zeppo-, gummo-, and chico- available for future expansion. Sadly, there is little immediate prospect that Mr. Burke' eminently sensible proposal will be ratified.

3. <language> Related to the prefix notation.

[FOLDOC]

16-03-2001

prefix notation

<[language](#)> One of the possible orderings of [functions](#) and operands: in prefix notation the function precedes all its operands. For example, what may normally be written as "1+2" becomes "(+ 1 2)". A few languages (e.g., lisp) have strictly prefix syntax, many more employ prefix notation in combination with [infix notation](#). Compare: [postfix notation](#), [prefix](#).

[[FOLDOC](#)]

16-03-2001

premise

<[logic](#)> A [wff](#) from which other [wffs](#) are derived or inferred. In an [argument](#) or [inference](#), all the propositions that support the conclusion. Also spelled "premiss".

[Glossary of First-Order Logic]

29-07-2001

prenex normal form

<[logic](#)> A [wff](#) of [predicate logic](#) is in prenex normal form [iff](#) (1) all its quantifiers are clustered at the left, (2) no quantifier is negated, (3) the scope of each quantifier extends to the end of the [wff](#), (4) no two quantifiers quantify the same variable, (5) every quantified variable occurs in the matrix of the [wff](#).

[Glossary of First-Order Logic]

16-03-2001

prescriptivism

<[ethics](#)> R. M. [Hare](#)'s contention that the use of [moral](#) language conveys an implicit commitment to act accordingly. Thus, for example, saying that "Murder is wrong" not only entails acceptance of a universalizable obligation not to kill, but also leads to avoidance of the [act](#) of killing.

Recommended Reading:

R. M. Hare, *The Language of Morals* (Clarendon, 1991);

R. M. Hare, *Moral Thinking: Its Levels, Methods, and Point* (Oxford, 1982); and R. M. Hare, *Objective Prescriptions: and Other Essays* (Oxford, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

The view according to which the function of [ethics](#) is to tell us what we should do, and not just describe what we actually do; thus it is opposed to [descriptivism](#).

12-03-2002

presocratic philosophers

<[philosophical terminology](#), [history of philosophy](#)> Greek philosophers of the sixth and fifth centuries B.C., many of them known to us only through fragmentary reports by later writers, whose speculative and [practical thought](#) predates the development of [critical philosophy](#) by [Socrates](#) and [Plato](#).

Prominent presocratics include: [Thales](#), [Anaximander](#), [Anaximenes](#), [Pythagoras](#), [Heraclitus](#), [Xenophanes](#), [Parmenides](#), [Zeno of Elea](#), [Empedocles](#), [Anaxagoras](#), [Protagoras](#), [Hippias](#), [Leucippus](#), [Democritus](#), and the [Sophists](#).

Recommended Reading:

Kathleen Freeman, *Ancilla to the Pre-Socratic Philosophers* (Harvard, 1983);

G. S. Kirk and J. E. Raven, *The Presocratic Philosophers: A Critical History With a Selection of Texts* (Cambridge, 1988);

Jonathan Barnes, *The Presocratic Philosophers* (Routledge, 1982); and *The Cambridge Companion to Early Greek Philosophy*, ed. by A. A. Long (Cambridge, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

presupposition

<[philosophical terminology](#)> what is implicitly involved in making an [assertion](#). Hence, according to P.F. [Strawson](#), a presupposition is a necessary [condition](#) for either the [truth](#) or the falsity of the statement that presupposes it. Thus, for example, "My grand-daughter is a smart baby" - whether or not she exhibits intelligent behavior - presupposes that I do, in fact, have at least one female grand-child.

Recommended Reading:

Douglas N. Walton, Argumentation Schemes for Presumptive Reasoning (Erlbaum, 1995);

Nirit Kadmon, Formal Pragmatics: Semantics, Pragmatics, Presupposition, and Focus (Blackwell, 2001); and Gennaro Chierchia, Dynamics of Meaning: Anaphora, Presupposition, and the Theory of Grammar (Chicago, 1995).

[\[A Dictionary of Philosophical Terms and Names\]](#)

12-03-2002

Price Henry Habberly

<[history of philosophy, biography](#)> British [philosopher](#) (1899-1984) who defended a comprehensive theory of the relation between [sense-data](#) and material [objects](#) in Perception (1932), Hume' s Theory of the External World (1946), and Thinking and Experience (1953).

Recommended Reading:

The Collected Works of Henry H. Price, ed. by Martha Kneale (Thoemmes, 1997); and Philosophical Interactions With Parapsychology: The Major Writings of H. H. Price on Parapsychology and Survival, ed. by Frank B. Dilley (Palgrave, 1995).

[\[A Dictionary of Philosophical Terms and Names\]](#)

12-03-2002

Price Richard

<[history of philosophy, biography](#)> Welsh [philosopher](#) and [theologian](#) (1723-1791). Price was an early proponent of an intuitionistic moral theory in his A Review of the Principle Questions and Difficulties in Morals (1758), where - in opposition to [Hume](#) - he argued that moral obligation has a [rational](#) foundation. Price' s firm commitment to [individual](#) liberty made him a vocal supporter of the American and French Revolutions. The actuarial principles expounded in Observations on Reversionary Payments (1771) provided a mathematical [foundation](#) for the development of the modern insurance industry.

Recommended Reading:

W. D. Hudson, Reason and Right: A Critical Examination of Richard Price' s Moral Philosophy (Anchor, 1984).

[\[A Dictionary of Philosophical Terms and Names\]](#)

12-03-2002

prima facie

<[jargon](#)> in the original Latin, this phrase means "at first glance."

In ethics, it usually occurs in discussions of duties. A prima facie duty is one which appears binding but which may, upon closer inspection, turn out to be overridden by other, stronger duties.

[\[Ethics Glossary\]](#)

Latin phrase meaning "at first sight." Thus, in the [ethics](#) of W. D. [Ross](#), a prima facie [duty](#) is a defeasible presumption that we are obligated to perform an [action](#).

Recommended Reading:

W. D. Ross, The Right and the Good (Hackett, 1988) and Mary Anne Warren, Moral Status: Obligations to Persons and Other Living Things (Clarendon, 1997).

[\[A Dictionary of Philosophical Terms and Names\]](#)

12-03-2002

primary qualities

<[ontology](#)> qualities such as shape, extension, duration, etc. which are perceived by several senses and which are thought to be more or less as much a part of the world as of our [perception](#) of it. As opposed to [secondary qualities](#) such as color, texture, pitch, odor, etc. which are perceived by particular senses and which are thought (by people making the distinction) to correspond to anything outside sensation, being an essentially subjective reaction.

[A Philosophical Glossary]

Distinction between perceived aspects of things. The primary qualities are intrinsic features of the thing itself (its size, shape, internal structure, mass, and momentum, for example), while the secondary qualities are merely its powers to produce sensations in us (its color, odor, sound, and taste, for example). This distinction was carefully drawn by [Galileo](#), [Descartes](#), [Boyle](#) and [Locke](#), whose statement of the distinction set the tone for future scientific inquiry. But [Foucher](#), [Bayle](#) and [Berkeley](#) argued that the distinction is groundless, so that all sensible [qualities](#) exist only in the [mind](#) of the perceiver.

Recommended Reading:

Selected Philosophical Papers of Robert Boyle (Hackett, 1991);

Peter Alexander, Ideas, Qualities and Corpuscles: Locke and Boyle on the External World (Cambridge, 1983);

E. J. Lowe, Routledge Philosophy Guidebook to Locke on Human Understanding (Routledge, 1995);

P. M. S. Hacker, Appearance and Reality: A Philosophical Investigation into Perception and Perceptual Qualities (Blackwell, 1986);

Colin McGinn, The Subjective View: Secondary Qualities and Indexical Thoughts (Clarendon, 1983); and Austen Clark, Sensory Qualities (Oxford, 1996).

[A Dictionary of Philosophical Terms and Names]

12-03-2002

prime number theorem

<[mathematics](#)> The number of prime numbers less than x is about $x/\log(x)$. Here "is about" means that the ratio of the two things tends to 1 as x tends to infinity. This was first conjectured by [Gauss](#) in the early 19th century, and was proved (independently) by Hadamard and de la Vallée Poussin in 1896. Their proofs relied on complex [analysis](#), but Erdős and Selberg later found an "elementary" proof.

[FOLDOC]

16-03-2001

primitive

<[programming, PL](#)> A [function](#), [operator](#), or [type](#) which is built into a programming language (or operating system), either for speed of execution or because it would be impossible to write it in the language. Primitives typically include the arithmetic and logical operations (plus, minus, and, or, etc.) and are implemented by a small number of [machine](#) language instructions.

[FOLDOC]

16-03-2001

primitive recursion

<[logic](#)> One of the simple [function](#)-building operations of recursive function theory. If we are given the functions $f(x)$ and $g(x)$, then we can create a new function $h(x)$ from f and g by primitive recursion thus:

when $x = 0$,

then

$h(x) = f(x)$;

but when $x > 0$,

then

$h(x) = g(h(x-1))$.

(For rigor, the minus sign in the last expression should be replaced by another function, but I leave it this way for informal clarity.) Not to be mistaken for "primitive recursive functions".

[Glossary of First-Order Logic]

16-03-2001

principal type

The most general [type](#) of an expression. For example, the following are all valid types for the [lambda abstraction](#)

(x . x):
 Int -> Int
 Bool -> Bool
 (a->b) -> (a->b)

but any valid type will be an instance of the principal type: a -> a. An instance is derived by substituting the same type expression for all occurrences of some type [variable](#). The principal type of an expression can be computed from those of its subexpressions by Robinson' s unification [algorithm](#).

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16-03-2001

principle of closure

See [principle of closure of knowledge under entailment](#), [knowledge under known entailment principle of closure of](#)

16-03-2001

principle of closure of knowledge under entailment

<[epistemology](#)> if S knows p, and p entails q, then S knows q.

See [Cartesian scepticism](#), [knowledge under known entailment principle of closure of](#)

P. Mandik

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

principle of non contradiction

<[logic](#), [boolean logic](#), [neo-empiricism](#), [mathematics](#)>, excluded middle (law of), <[epistemology](#)>, <[essence](#)>, causality, <[syllogism](#), [ontology](#)> dating back to Aristotle, this basic logical [principle](#) or "law of thought" holds that a [statement](#) cannot simultaneously be both true and [false](#) or that nothing can at once both have an [attribute](#), like redness, and lack it.

[[Philosophical Glossary](#)]

22-06-2001

principle of the compositionality of representations

[compositionality](#)

01-12-2003

Pringle-Pattison Andrew Seth

<[history of philosophy](#), [biography](#)> see Seth Pringle-Pattison Andrew.

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

prior intention

<[philosophy of mind](#)> intention formed prior to the [action](#) that is its condition of satisfaction. The prior intention represents the projected [action](#) as a unified whole. Introduced by Searle in 1983.

See also [intentionality](#), intention-in-action

Daniel Barbiero

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://arts.wustl.edu/~philos/MindDict/>)

16-03-2001

privacy

Where only the intended recipients can read a message.

16-03-2001

private language argument

<[philosophy of language](#)> [Descartes'](#) arguments ([Cartesian Doubt](#)) eventually led many philosophers (especially Logical empiricists) to adopt [phenomenalism](#) and [solipsism](#). Wittgenstein argued (against this) that such a view amounts to a belief in an essentially-private language (the language in which the phenomenalist-solipsist philosopher states what he knows, that is, the contents of his purely private experience). And [Wittgenstein](#) argues that a purely private language is really impossible (language is essentially objectual and social in nature).

Recommended Reading:

Ludwig Wittgenstein, *Philosophical Investigations*, tr. by G. E. M. Anscombe (Prentice Hall, 1999);

Saul A. Kripke, *Wittgenstein on Rules and Private Language* (Harvard, 1984);

Marie McGinn, *Routledge Philosophy Guidebook to Wittgenstein and the Philosophical Investigations* (Routledge, 1997);

Owen Roger Jones, *The Private Language Argument* (Anchor, 1979); and Andreas Roser, *Die Privatsprache der Privatsprachenkritik bei Ludwig Wittgenstein*.

based on [[A Philosophical Glossary](#)], [[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

probabilism

<[epistemology](#)> the view according to which rational certainty about reality is unattainable; it is similar to [fallibilism](#) and can even border on total [skepticism](#).

[[The Ism Book](#)]

Edited by Giovanni Benzi

27-03-2001

probabilistic

<[probability](#)> Relating to, or governed by, probability. The behaviour of a probabilistic system cannot be predicted exactly but the probability of certain behaviours is known. Such systems may be simulated using pseudo-[random](#) numbers. [Evolutionary computation](#) uses probabilistic processes to generate new (potential) solutions to a problem.

See also [deterministic](#), non-probabilistic.

[[FOLDOP](#)]

16-03-2001

probabilistic automaton

non-deterministic automaton

01-12-2003

probability

<[philosophical terminology](#)> the likelihood that an [event](#) will occur, expressed quantitatively by a number ranging from 0 ([impossible](#)) to 1 (certain). Initial probabilities are often assigned either on the classical assumption that every [possible](#) outcome is equally likely to occur or by careful [empirical](#) observation of the relative frequency with which events have actually occurred in the past. The likelihood of alternative and joint occurrences can be calculated directly from these initial values.

Recommended Reading:

Patrick Suppes, Foundations of Probability With Applications (Cambridge, 1996);

Richard Jeffrey, Probability and the Art of Judgment (Cambridge, 1992);

Donald Gillies, Philosophical Theories of Probability (Routledge, 2000);

Henry Kyburg, Studies in Subjective Probability (Krieger, 1980); and The Theory of Gambling and Statistical Logic, ed. by Richard A. Epstein (Academic, 1995).

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

problematic - assertoric - apodeictic

<[philosophical terminology](#)> distinction among the modalities of propositions. A problematic [proposition](#) states what is [possible](#); an [assertoric proposition](#) states what is [actual](#); and an [apodeictic proposition](#) states what is [necessary](#). For example: "A novel could be larger than a dictionary." is problematic. "Atlanta is larger than Knoxville." is [assertoric](#). "142 is larger than 37." is [apodeictic](#).

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

procedural language

<[language](#)> (Or "imperative language") A term used in contrast to declarative language to describe a language where the programmer specifies an explicit sequences of steps to follow to produce a result. Common procedural languages include Basic, Pascal, C and Modula-2.

[[FOLDOP](#)]

16-03-2001

procedure

[subroutine](#)

01-12-2003

process

<[operating system, software](#)> An executing [program](#). A process consists of the program [code](#) (which may be shared with other processes which are executing the same program), and some private data. It may have other associated resources such as a process [identifier](#), open files, CPU time limits, shared memory, child processes, and signal handlers.

A [multitasking](#) operating system can run multiple processes concurrently or in [parallel](#).

[[FOLDOP](#)]

16-03-2001

product[tuple](#)*01-12-2003***product of sets**[intersection](#)*01-12-2003***production system**

A production system consists of a collection of productions (rules), a working memory of [facts](#) and an [algorithm](#) known as [forward chaining](#) for producing new facts from old. A rule becomes eligible to "fire" when its conditions match some set of elements currently in working memory. A conflict resolution strategy determines which of several eligible rules (the conflict set) fires next. A condition is a list of symbols which represent constants, which must be matched exactly; variables which bind to the thing they match and "<> symbol" which matches a field not equal to symbol. Examples are OPS5, CLIPS, flex.

*16-03-2001***productivity**

<[philosophy of mind](#)> [thought](#) is said to be productive, since, in a sense, normal cognitive agents are capable of having denumerably many distinct thoughts. In other words, to say that thought is productive means that normal cognitive agents have the competence to entertain denumerably many distinct thoughts.

Ken Aizawa

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)*16-03-2001***program**[software](#)*01-12-2003***programming**

1. The art of debugging a blank sheet of paper (or, in these days of on-line editing, the art of debugging an empty file).
2. A pastime similar to banging one' s head against a wall, but with fewer opportunities for reward.
3. The most fun you can have with your clothes on (although clothes are not mandatory).

[\[Jargon File\]](#)*16-03-2001*

programming language

<[language](#)> A formal language in which computer programs are written. The definition of a particular language consists of both [syntax](#) (how the various symbols of the language may be combined) and [semantics](#) (the meaning of the language constructs).

Languages are classified as low level if they are close to [machine](#) code and high level if each language statement corresponds to many machine code instructions (though this could also apply to a low level language with extensive use of macros, in which case it would be debatable whether it still counted as low level).

A roughly parallel classification is the description as first generation language through to [fifth generation language](#).

Another major distinction is between imperative languages and declarative languages.

[[FOLDOC](#)]

16-03-2001

projection

<[mathematics](#), [logic](#)> In domain theory, a [function](#), f , which is (a) [idempotent](#), i.e. $f(f(x))=f(x)$ and (b) whose result is no more defined than its [argument](#). E.g. $F(x)=\text{bottom}$ or $F(x)=x$.

In [reduction](#) systems, a function which returns some [component](#) of its argument. E.g. head, tail, $(x,y) . x$.

In a [graph reduction](#) system the function can just return a pointer to part of its argument and does not need to build any new graph.

[[FOLDOC](#)]

16-03-2001

projective plane

<[mathematics](#)> The space of [equivalence](#) classes of [vectors](#) under non-zero [scalar](#) multiplication. Elements are sets of the form

$kv: k \neq 0, k \text{ scalar}, v \neq O, v \text{ a vector}$

where O is the origin. v is a representative member of this equivalence class.

The projective plane of a [vector space](#) is the collection of its 1-dimensional subspaces. The properties of the vector space induce a [topology](#) and notions of smoothness on the projective plane.

A projective plane is in no meaningful sense a plane and would therefore be (but isn't) better described as "projective space".

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16-03-2001

proletarian

<[political theory](#), [marxism](#), [communism](#), [capitalism](#)> a worker or wage laborer under [capitalism](#). Contrast: [bourgeois](#).

See: [communism](#).

[[Philosophical Glossary](#)]

22-06-2001

Pronunciation

In this dictionary slashes (/./) bracket phonetic pronunciations of words not found in a standard English dictionary. The notation, and many of the pronunciations, was adapted from the Hacker' [sJargon File](#).

Syllables are separated by dash or followed single quote or back quote. Single quote means the preceding syllable is stressed (louder), back quote follows a syllable with intermediate stress (slightly louder), otherwise all syllables are equally stressed.

Consonants are pronounced as in English but note:

ch soft, as in "church"

g hard, as in "got"

gh aspirated g+h of "bughouse" or "ragheap"

j voiced, as in "judge"
 kh guttural of "loch" or "l" chaim"
 s unvoiced, as in "pass"
 zh as "s" in "pleasure"

Uppercase letters are pronounced as their English letter names; thus (for example) /H-L-L/ is equivalent to /aych el el/. /Z/ is pronounced /zee/ in the US and /zed/ in the UK (elsewhere?).

Vowels are represented as follows:

a back, that
 ah father, palm (see note)
 ar far, mark
 aw flaw, caught
 ay bake, rain
 e less, men
 ee easy, ski
 eir their, software
 i trip, hit
 i: life, sky
 o block, stock (see note)
 oh flow, sew
 oo loot, through
 or more, door
 ow out, how
 oy boy, coin
 uh but, some
 u put, foot
 *r fur, insert (only in stressed syllables; otherwise use just "r")
 y yet, young
 yoo few, chew
 [y]oo /oo/ with optional fronting as
 in ` news' (/nooz/ or /nyooz/)

A /*/ is used for the `schwa' sound of unstressed or occluded vowels (often written with an upsiddown `e'
 The schwa vowel is omitted in unstressed syllables containing vocalic l, m, n or r; that is, "kitten" and "colour" would be rendered /kit' n/ and /kuhl' r/, not /kit' *n/ and /kuhl' *r/.

The above table reflects mainly distinctions found in standard American English (that is, the neutral dialect spoken by TV network announcers and typical of educated speech in the Upper Midwest, Chicago, Minneapolis/St.Paul and Philadelphia). However, we separate /o/ from /ah/, which tend to merge in standard American. This may help readers accustomed to accents resembling British Received Pronunciation. Entries with a pronunciation of `//' are written only.

[FOLDOC]

16-03-2001

proof

1. <logic> A finite, non-empty sequence of wffs F1, F2, ... Fn, where each Fi either is an axiom, or follows by some rule of inference from some of the previous F' s, and Fn is the statement being proved. In short, derivation in which all premises are theorems.

See constructive proof, derivation, existence proof proof theory

[Glossary of First-Order Logic] and [FOLDOC]

2. A left-associative natural language parser by Craig R. Latta . Ported to Decstation 3100, Sun-4.

(ftp://scam.berkeley.edu/pub/src/local/proof/)

Recommended Reading:

Proof, Logic and Formalization, ed. by Michael Detlefsen (Routledge, 1992);
 Donald C. Benson, The Moment of Proof: Mathematical Epiphanies (Oxford, 2000);
 Lance J. Rips, The Psychology of Proof: Deductive Reasoning in Human Thinking (Bradford, 1994);
 and Handbook of Proof Theory, ed. by Samuel R. Buss (Elsevier, 1998).

based on [FOLDOC],

[A Dictionary of Philosophical Terms and Names]

12-03-2002

proof theory

<[logic](#)> The study of the deductive apparatuses of formal systems and associated questions of what is provable in a system (hence, [consistency](#), [completeness](#), and decidability ([decidable system](#)), even though these concepts have a semantic motivation). Broadly, any study of formal systems that makes no reference to the interpretation of the language but describes procedures for combining logical statements to show, by a series of truth-preserving transformations, that one statement is a consequence of some other statement or group of statements.

See also [model theory](#), [proof](#)

[Glossary of First-Order Logic]and [[FOLDOC](#)]

16-03-2001

proof-theoretic consistency

<[logic](#)> (p-consistency) The state of not implying a contradiction.

See maximal p-consistent set, model-theoretic consistency

[Glossary of First-Order Logic]

16-03-2001

proof-theoretic consistent set of wffs

<[logic](#)> (p-consistent set) A set of [wffs](#) is p-consistent there is no [wff](#) A such that both A and $\sim A$ can be derived from the set.

Proof-theoretic inconsistency (p-inconsistency). The state of implying a contradiction.

[Glossary of First-Order Logic]

16-03-2001

proper axiom

[axioms](#)

03-12-2003

proper names

<[logic](#), [philosophy of language](#)> the view that proper names simply stand for, or denote, individuals without describing them in any way by philosophers such as J. S. [Mill](#), [Russell](#), and S. [Kripke](#).

The contrary view is that proper names are equivalent to (or have the same meaning as) a definite description or a cluster of definite descriptions: i.e. that "Aristotle was a student of Plato" is equivalent to "The teacher of Alexander was a student of Plato", or in the cluster version "The individual who was most of the following -- teacher of Alexander, born in Stagira, wrote the Metaphysics, etc., was a student of Plato". Proper names, as understood in Mill or Russell's manner are sometimes also called "logically proper names" or [rigid designators](#)".

[[A Philosophical Glossary](#)]

30-04-2001

proper subset

[subset](#)

03-12-2003

property dualism

<[philosophy of mind](#)> the view that the mental and the physical comprise two different classes of property that are coinstantiated in the same objects.

According to property dualism, even though mental properties are totally different than physical properties, they are nonetheless all properties of the same kinds of objects. Thus, for example, a single object instantiates the property of my being six feet tall and my believing that the Eiffel tower is in France.

Property dualism is compatible with the token identity thesis, but not the type identity thesis. Property dualists are typically, if not unanimously, anti-reductionists about the mental, which is to say, they deny that it is in-principle possible to translate mental predicates into physical predicates.

See [dualism](#), [substance dualism](#)

Pete Mandik

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

proposition

<[logic](#)>

1. In truth-functional propositional logic, any statement.
2. In [predicate](#) logic, a closed [wff](#), as opposed to a propositional [function](#) or open [wff](#).
3. In logic generally (for some), the meaning of a sentence that is invariant through all the paraphrases and translations of the sentence.

See [compound proposition](#), [contingency](#), [contradiction](#), [simple proposition](#), [tautology](#).

Recommended Readings:

Gabriel Nuchelmans, Judgment and Proposition (Royal Netherlands Academy, 1983) and Philip L. Peterson, Fact, Proposition, Event (Kluwer, 1997).

based on [Glossary of First-Order Logic],
[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

propositional calculus

<[philosophical terminology](#)> A [formal system](#) of [symbolic logic](#) concerned with compound statements formed by the use of truth-functional logical connectives.

Recommended Reading:

Richard L. Epstein, Propositional Logics: The Semantic Foundations of Logic (Wadsworth, 2000);
Hans Kleine Buning and Theodor Lettman, Propositional Logic: Deduction and Algorithms (Cambridge, 1999);
and Howard Pospesel and William G. Lycan, Introduction to Logic: Propositional Logic (Prentice Hall, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

propositional function

<[logic](#)> In [predicate](#) logic, a [function](#) from individuals to truth-values.

A [wff](#) of [predicate](#) logic with at least one free variable.

An open [wff](#).

A propositional [function](#) becomes a proposition when it is closed (see [closure](#) of a wff); it is closed either by generalization or instantiation, that is, either by binding [free variables](#) or replacing them with constants.

See [generalization](#), [instantiation](#), [wff](#), [open](#)

[Glossary of First-Order Logic]

16-03-2001

propositional logic

<[discipline](#)> also called [sentence logic](#) and the sentential calculus. Such a logic concerns elementary propositions - p, q, r, s, etc. -- respecting which the only assumption is that they should individually be either true or false, and [operators](#) that form complex [propositons](#) when joined with appropriate numbers of elementary propositions. The [operators](#) include conjunction (&), hence ' p and q' ; disjunction (v), hence ' p or q' ; negation, hence '-p' ; conditional (\rightarrow), hence ' If p then q' ; and equivalence (\equiv), hence ' p is equivalent to q' . This logic is concerned with determining which complex propositions are logical truths, or [tautologies](#); this effectively determines what are [valid](#) arguments because such can always be treated as [complex propositions](#) in which the premisses of the [argument](#) appear as the [antecedent](#) and the [conclusion](#) as the [consequence](#). This logic, as opposed to first, or higher, order predicate logic, is complete and decidable.

[[A Philosophical Glossary](#)]

30-04-2001

Protagoras of Abdera

<[history of philosophy, biography](#)> [presocratic philosopher](#) (485-415 BC); one of the [sophists](#). Protagoras is best known for the [relativistic](#) assertion that human beings are "the measure of all things".

Recommended Reading:

G. S. Kirk and J. E. Raven, The Presocratic Philosophers: A Critical History With a Selection of Texts (Cambridge, 1988) and Jonathan Barnes, The Presocratic Philosophers (Routledge, 1982).

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

protasis

[implication](#)

03-12-2003

protocol

A set of formal rules describing how to transmit data, especially across a [network](#). Low level protocols define the electrical and physical standards to be observed, bit- and byte-ordering and the transmission and [error detection and correction](#) of the bit stream. High level protocols deal with the data formatting, including the [syntax](#) of messages, the terminal to computer dialogue, character [sets](#), sequencing of messages etc. Many protocols are defined by RFCs or by OSI.

See also handshaking.

[[Jargon File](#)] and [[FOLDOP](#)]

16-03-2001

prototyping

The creation of a model and the [simulation](#) of all aspects of a product. CASE tools support different degrees of prototyping. Some offer the end-user the ability to review all aspects of the user [interface](#) and the structure of documentation and reports before code is generated.

16-03-2001

Proudhon Pierre-Joseph

<[history of philosophy, biography](#)> French [anarchist](#) (1809-1865). Proudhon' s Qu' est que la propriété? (What is Property?) (1840) defined [property](#) as theft and demanded that individual workers be allowed to control the means of their own [production](#). Proudhon was notoriously anti-feminist, arguing in La Pornocratie (Pornocracy) that sexual equality and economic independence for women would undermine traditional marriage.

Recommended Reading:

Pierre-Joseph Proudhon, The General Idea of the Revolution in the Nineteenth Century (Pluto, 1989); John Ehrenberg, Proudhon and His Age (Prometheus, 1996); and George Woodcock, Pierre-Joseph Proudhon: A Biography (Black Rose, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

provably difficult

The set or property of problems for which it can be proven that no polynomial-time [algorithm](#) exists, only exponential-time [algorithms](#).

16-03-2001

provably unsolvable

The set or property of problems for which no [algorithm](#) at all exists. E.g. the [Halting Problem](#). See also [provably difficult](#).

16-03-2001

prudence

<[philosophical terminology](#)> practical [wisdom](#); sound [judgment](#) in everyday [life](#) as distinguished from theoretical wisdom. According to [Aristotle](#), this ability to discover and carry out the proper goals of human [life](#) is a vital element in [moral](#) deliberation.

Recommended Reading:

Daniel Mark Nelson, The Priority of Prudence: Virtue and Natural Law in Thomas Aquinas and the Implications for Modern Ethics (Penn. State, 1992) and Douglas J. Den Uyl, The Virtue of Prudence (Peter Lang, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

psyche

<[philosophical terminology](#)> Greek term for [soul](#) as the essential principle of [life](#) and the locus of [consciousness](#). Although used pre-philosophically simply in reference to the "breath of life," the term was associated by [presocratic philosophers](#), including especially [Anaxagoras](#), with an explanatory principle. [Pythagorean](#) thought proposed that the psyche be understood as the persistent element in the [life](#) of an [individual](#). [Plato](#) expanded upon this view with a detailed account of the tripartite soul, with associated human virtues, and an [argument](#) for the [immortality](#) of its rational component. [Aristotle](#) restored a broader sense of the term, using it for the several functions characteristic of living things generally. [Neoplatonic](#) thinkers made it the cosmic [principle](#) of all motion.

Recommended Reading:

F. E. Peters, Greek Philosophical Terms: A Historical Lexicon (NYU, 1967).

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

psychological egoism

<[ethics](#), [psychology](#)> in [ethics](#) and [psychology](#), the view that in fact all human beings act solely in their individual self-interest (so far as they calculate correctly as to what this is). This view -- particularly in the ethical tradition established by [Hobbes](#) -- is often combined, or confused, with the view, which is labeled "ethical egoism" that all human being ought (whether they do or don' t) each to act in their individual self interest.

[[A Philosophical Glossary](#)]

30-04-2001

psychologism

<[philosophy](#), [philosophy of mind](#)> the view according to which psychology (orr cognitive science) is the foundation for philosophy. Psychologism tends to hold that the current branches of philosophy will become superfluous or be absorbed by psychology with the development of that science, just as the development of astronomy removed cosmology from the realm of philosophy.

Based on [[The Ism Book](#)]

Edited by Giovanni Benzi

27-03-2001

public domain

(PD) The total absence of [copyright](#) protection. If something is "in the public domain" then anyone can copy it or use it in any way they wish. The author has none of the exclusive rights which apply to a copyright work. The phrase "public domain" is often used incorrectly to refer to freeware or shareware (software which is copyrighted but is distributed without (advance) payment). Public domain means no copyright -- no exclusive rights. In fact the phrase "public domain" has no legal status at all in the UK.

See also archive site, careware, charityware, copyleft, crippleware, guiltware, postcardware and -ware. Compare payware.

16-03-2001

public domain software

[public domain](#)

03-12-2003

public-key cryptography

public-key encryption

03-12-2003

Public-Key Cryptography Standards

<[cryptography](#), [standard](#)> (PKCS) A set of standards for public-key cryptography, developed by RSA Data Security, Inc. in cooperation with an informal consortium, originally including Apple, Microsoft, DEC, Lotus, Sun and MIT. The PKCS have been cited by the OSI Implementers' Workshop (OIW) as a method for implementation of OSI standards.

PKCS includes both [algorithm](#)-specific and algorithm-independent implementation standards. Many algorithms are supported, including RSA and Diffie-Hellman key exchange, however, only the latter two are specifically detailed. PKCS also defines an algorithm-independent [syntax](#) for [digital](#) signatures, digital envelopes, and extended digital certificates; this enables someone implementing any cryptographic algorithm whatsoever to conform to a standard syntax, and thus achieve interoperability.

[[FOLDOP](#)]

16-03-2001

public-key encryption

<[cryptography](#)> (PKE, Or "public-key cryptography") An [encryption](#) scheme, introduced by Diffie and Hellman in 1976, where each person gets a pair of keys, called the public key and the private key. Each person' s publi key is published while the private key is kept secret. Messages are encrypted using the intended recipient' public key and can only be decrypted using his private key. This is often used in conjunction with a [digital](#) signature.

The need for sender and receiver to share secret information (keys) via some secure channel is eliminated: all communications involve only public keys, and no private key is ever transmitted or shared.

Public-key encryption can be used for [authentication](#), confidentiality, [integrity](#) and non-repudiation.

RSA encryption is an example of a public-key cryptosystem.

alt.security FAQ

(<http://www.cis.ohio-state.edu/hypertext/faq/bngusenet/alt/security/top.html>).

See also knapsack problem.

[[FOLDOC](#)]

16-03-2001

Pufendorf Samuel

<[history of philosophy](#)> German political philosopher (1632-1694). In De jure naturae et gentium (On the Law of Nature and Nations) (1672) and De officio hominis et civis (On the Duty of Man and Citizen) (1673) Pufendorf defended a [social contract](#) with significant attention to the regulative force of [natural law](#).

Recommended Reading:

Grotius, Pufendorf and Modern Natural Law, ed. by Knud Haakonssen (Dartmouth, 1999) and The Political Writings of Samuel Pufendorf, ed. by L. Carr Craig and Michael J. Seidler (Oxford, 1995).

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

punishment

<[philosophical terminology](#)> deliberate infliction of harm as a moral [sanction](#) against offenders. Punishment may be understood, designed, and applied according to any of the three major varieties of [normative](#) theory: retribution and reparation focus on satisfaction of duties, deterrence and prevention on securing desirable outcomes, and reform and rehabilitation on improving moral character.

Recommended Reading:

Nigel Walker, Why Punish? (Oxford, 1991);

David A. Hoekema, Rights and Wrongs: Coercion, Punishment and the State (Susquehanna, 1987);

Punishment, ed. by John Simmons, Marshall En, Joshua Cohen, and Thomas Scanlon (Princeton, 1994);

Louis P. Pojman and Jeffrey Reiman, The Death Penalty (Rowman & Littlefield, 1998); and David Garland, Punishment and Modern Society: A Study in Social Theory (Chicago, 1993).

[[A Dictionary of Philosophical Terms and Names](#)]

12-03-2002

pure lambda-calculus

Lambda-calculus with no constants, only functions expressed as [lambda abstractions](#).

[[FOLDOC](#)]

16-03-2001

pure predicate calculus

[predicate logic](#)

03-12-2003

Putnam Hilary

<[history of philosophy](#), [biography](#)> American [philosopher](#) (1926-). Author of *Mind, Language, and Reality* (1975) and *Reason, Truth, and History* (1981), Putnam decisively rejects the [verificationism](#) of the [logical positivists](#). Although he had earlier defended functionalist accounts of [human](#) nature and the external [world](#), Putnam criticized them in *Representation and Reality* (1988) and *Realism with a Human Face* (1990), preferring a more moderate position he calls "internal [realism](#)".

Recommended Reading:

Hilary Putnam, *Renewing Philosophy* (Harvard, 1995);

Hilary Putnam, *The Threefold Cord* (Columbia, 2001);

The Twin Earth Chronicles: Twenty Years of Reflection on Hilary Putnam's 'The Meaning of ' Meaning' ', Andrew Pessin and Sanford Goldberg (M. E. Sharpe, 1996); and Mark Q. Gardiner, *Semantic Challenges to Realism: Dummett and Putnam* (Toronto, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

12-03-2002

Pyrrho of Elis

<[history of philosophy](#), [biography](#)> Greek [philosopher](#) (365-270 BC) who originated classical [skepticism](#). Since there are plausible arguments for both sides of any issue, Pyrrho argued, the only [rational](#) practice is to suspend all [judgments](#), abandon worries of every kind (Gk. [ataraxia](#)), and live comfortably in an appreciation of the appearances. His teachings were preserved and amplified by his pupil [Timon of Philius](#).

Recommended Reading:

Edwyn Bevan, *Stoics and Sceptics* (Ares, 1980) and Richard Bett, *Pyrrho, His Antecedents, and His Legacy* (Oxford, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

12-03-2002

Pythagoras

<[history of philosophy](#), [biography](#)> legendary [presocratic philosopher](#) (585-497 BC) whose followers studied [mathematics](#), astronomy, and music in their pursuit of lives of [harmony](#) with the [natural](#) world. The work of the Pythagoreans is known to us only through fragmentary reports in the writings of other philosophers. According to [Aristotle](#), for example, the Pythagoreans held that the ultimate constituents of all [material](#) objects are [numbers](#), perhaps understood as geometrical [points](#). Apparently they also held with religious devotion that souls are naturally [immortal](#) and therefore transmigrate at death to other human or animal bodies.

Recommended Reading:

Edouard Schure, *Pythagoras and the Delphic Mysteries* (Kessinger, 1997);

The Pythagorean Sourcebook and Library, ed. by Kenneth Sylvan Guthrie (Phanes, 1991);

Dominic J. O' Meara, *Pythagoras Revived: Mathematics and Philosophy in Late Antiquity* (Oxford, 1991); and

John Strohmeier and Peter Westbrook, *Divine Harmony: The Life and Teachings of Pythagoras* (Berkeley Hills, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

12-03-2002

QED - quod erat demonstrandum

<[logic](#), [rhetoric](#)> Latin for "what was to be proven". Hence, a common way of identifying the conclusion of a mathematical or logical [argument](#). (It doesn't really mean "Quite Easily Done").

[\[A Dictionary of Philosophical Terms and Names\]](#)

02-06-2002

qualia

<[ontology](#)> the intrinsic phenomenal features of subjective [consciousness](#), or [sense data](#). Thus, [qualia](#) include what it is like to see green grass, to taste salt, to hear birds sing, to have a headache, to feel pain, etc. Providing an adequate account of [qualia](#) is sometimes held to be a difficult problem for functionalist explanations of mental states.

Recommended Reading:

Leopold Stubenberg, *Consciousness and Qualia* (Benjamins, 1998);
 Emotion, Qualia and Consciousness, ed. by Alfred Kaszniak (World Scientific, 2001);
 Ming Singer, *Unbounded Consciousness: Qualia, Mind and Self* (Free Assn., 2001);
 Joseph Levine, *Purple Haze: The Puzzle of Consciousness* (Oxford, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

02-06-2002

quality

the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs. Not to be mistaken for "degree of excellence" or "fitness for use" which meet only part of the definition.

[\[ISO8402\]](#).

[\[FOLDOC\]](#)

16-03-2001

quality - propositional

<[philosophical terminology](#)> along with propositional quantity, one of the distinguishing features among [categorical propositions](#): an affirmative proposition (A or I) states a relation of inclusion between members of the classes designated by its terms; a negative proposition (E or O) states a relation of exclusion between members of the classes designated by its terms.

[\[A Dictionary of Philosophical Terms and Names\]](#)

02-06-2002

Quality Assurance

<[testing](#)> (QA) A planned and systematic pattern of all actions necessary to provide adequate confidence that the product optimally fulfils customer' s expectations.

[\[FOLDOC\]](#)

16-03-2001

Quality Control

<[testing](#)> The assessment of product compliance. Independently finding deficiencies assures compliance of the product with stated requirements.

[\[FOLDOC\]](#)

16-03-2001

quantification rules

<[philosophical terminology](#)> valid argument forms, including: Universal Instantiation, Universal Generalization, Existential Instantiation, and Existential Generalization, whose substitution instances may be used to manipulate the use of quantifiers in a formal proof of the validity of a more complex deductive argument.

[[A Dictionary of Philosophical Terms and Names](#)]

02-06-2002

quantification theory

<[philosophical terminology](#)> the formal system of logic (also known as the [predicate calculus](#)) that incorporates the entire [propositional calculus](#) and adds a set of [quantification rules](#).

[[A Dictionary of Philosophical Terms and Names](#)]

02-06-2002

quantifier

<[logic](#)> In [predicate](#) logic, a symbol telling us of how many objects (in the domain) the [predicate](#) is asserted. The quantifier applies to, or binds, variables which stand as the [arguments](#) of [predicates](#). In first-order logic these variables must range over individuals; in higher-order logics they may range over [predicates](#). See [bound variable](#), [existential import](#), [free variable](#), [generalization](#), [instantiation](#), [predicate logic](#).

Existential quantifier

The quantifier asserting, "there are some" or "there is at least one".

Notation: E, also V.

For example, the natural translation of $(\exists x)Px$ is, "There is at least one thing with property P."

Universal quantifier

The quantifier asserting, "for all" or "for all things". Notation: (x).

For example, the natural translation of $(x)Px$ is, "All things have property P." The "all" in the universal quantifier refers to all the objects in the domain of the interpretation ([universe of discourse](#)), not to all objects whatsoever.

Vacuous quantifier

A quantifier that binds no variables, e.g. "(y)" in $(x)(y)(Ax \supset Bx)$.

[[Glossary of First-Order Logic](#)]

18-10-2003

quantity - propositional

<[philosophical terminology](#)> along with [propositional quality](#), one of the distinguishing features among [categorical propositions](#): a universal proposition (A or E) refers to all members of the class designated by its subject term; a particular proposition (I or O) refers only to some members of that class.

[[A Dictionary of Philosophical Terms and Names](#)]

02-06-2002

quantum bogodynamics

A theory that characterises the universe in terms of [bogon](#) sources (such as politicians, used-car salesmen, TV evangelists, and [suits](#) in general), bogon sinks (such as taxpayers and computers), and bogosity potential fields. Bogon absorption causes human beings to behave mindlessly and machines to fail (and may also cause both to emit secondary bogons); however, the precise mechanics of bogon-[computron](#) interaction are not yet understood.

Quantum bogodynamics is most often invoked to explain the sharp increase in hardware and software failures in the presence of suits; the latter emit bogons, which the former absorb.

[[Jargon File](#)] and [[FOLDOP](#)]

16-03-2001

quantum computer

<[computer](#)> A type of computer which uses the ability of quantum systems, such as a collection of atoms, to be in many different states at once. In theory, such superpositions allow the computer to perform many different computations simultaneously. This capability is combined with interference among the states to produce answers to some problems, such as factoring integers, much more rapidly than is possible with conventional computers. In practice, such machines have not yet been built due to their extreme sensitivity to noise.

Oxford University (<http://eve.physics.ox.ac.uk/QCHome.html>),
Stanford University (<http://feynman.stanford.edu/qcomp/>).

A quantum search algorithm (<ftp://parcftp.xerox.com/pub/dynamics/quantum.html>) for [constraint satisfaction](#) problems exhibits the phase transition for NP-complete problems.

[[FOLDOC](#)]

16-03-2001

quantum computing[quantum computer](#)

15-05-2004

quantum consciousness theories of

<[philosophy of mind](#)> theories which explore possible connections between quantum mechanical phenomena and [consciousness](#).

Rick Grush

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

16-03-2001

quantum mechanics

<[philosophical terminology](#)> a physical theory developed by [Planck](#), [Heisenberg](#), and [Schroedinger](#). [Quantum theory](#) typically permits only probable or statistical calculation of the observed features of subatomic particles, understood in terms of wave functions.

Recommended Reading:

Roland Omnes, Understanding Quantum Mechanics (Princeton, 1999);
Peter Kosso, Appearance and Reality: An Introduction to the Philosophy of Physics (Oxford, 1997);
Hans Reichenbach, Philosophic Foundations of Quantum Mechanics (Dover, 1998);
A. P. French and Edwin F. Taylor, Introduction to Quantum Physics (Norton, 1978);
What Is Quantum Mechanics?: A Physics Adventure, ed. by John Nambu and Philip Heit (Blackwell, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

02-06-2002

quaternio terminorum

<[philosophical terminology](#)> Latin name for the [fallacy](#) of four terms.

[[A Dictionary of Philosophical Terms and Names](#)]

04-06-2002

Queens Puzzle

[Eight Queens Puzzle](#)

15-05-2004

query

1. [<database, information science>](#) A user' s ([oagent](#)' s) request for information, generally as a formal request to a [database](#) or [search engine](#).

[SQL](#) is the most common [database query language](#).

2. [<character>](#) [question mark](#).

[[FOLDOC](#)]

16-03-2001

queue

[<programming, PI>](#) A first-in first-out data structure used to sequence multiple demands for a resource such as a [printer](#), [processor](#) or communications channel. Objects are added to the tail of the queue and taken off the head.

A typical use of queues in an [operating system](#) involves a user command which places something on a queue, e.g. a file on a printer queue or a job on a job queue, and a [background](#) process or "[demon](#)" which takes things off and processes them (e.g. prints or executes them). Another common use is to pass data between an [interrupt handler](#) and a user process.

[[FOLDOC](#)]

16-03-2001

Quine Willard Van Orman

[<history of philosophy>](#) born in Ohio, Quine (1908-2000) studied at Oberlin College and Harvard University, where he became professor of [philosophy](#) in 1936. His contributions to the development of contemporary philosophy often involve subtle modification of the empiricist traditions of [pragmatism](#) and [logical positivism](#). In "Two Dogmas of Empiricism" (1951), for example, [Quine](#) criticized excessive reliance on the analytic/synthetic distinction, maintaining that a whole system of beliefs must be held up for scrutiny in the light of new experience. The other papers collected in From a Logical Point of View (1953) amplify on this suggestion. In the naturalistic mode of Word and Object (1960) [Quine](#) proposed the [indeterminacy of radical translation](#), on which a single sentence must always be taken to have more than one different meaning. Author of the textbook Mathematical Logic (1940), [Quine](#) applied the techniques of formal reasoning in The Ways of Paradox (1966), and Ontological Relativity (1969), holding that the ontological commitments of any view can be determined by examining the entities over which a formal language expressing it is employed to quantify. More recent expositions of [Quine' s philosophy](#) appear in The Roots of Reference (1973) and Pursuit of Truth (1990). Although his own positions are commonly naturalistic and physicalistic, [Quine' s](#) major contribution to contemporary American [philosophy](#) has been the consistent application of his analytic methods.

Recommended Reading:

Primary sources:

W.V.O.Quine, From a Logical Point of View: Nine Logico-Philosophical Essays (Harvard, 1980);
W.V.O.Quine, Word and Object (MIT, 1964);
W.V.O.Quine, The Ways of Paradox, and Other Essays (Harvard, 1976);
W.V.O.Quine, Ontological Relativity (Columbia, 1977);
W.V.O.Quine, From Stimulus to Science (Harvard, 1998);
W.V.O.Quine, Theories and Things (Belknap, 1986);
W.V.O.Quine, Pursuit of Truth (Harvard, 1992);
W.V.O.Quine, Quiddities: An Intermittently Philosophical Dictionary (Harvard, 1989).

Secondary sources:

Ilham Dilman, Quine on Ontology, Necessity, and Experience (SUNY, 1984);
The Philosophy of W. V. Quine, ed. by Lewis Edwin Hahn and Paul A. Schilpp (Open Court, 1998).

Additional on-line information about Quine includes:

Douglas Boynton Quine' s professional and personal information.
Eddie Yeghiayan' s bibliography of Quine' s writings.
C. J. Hookway' s article in The Oxford Companion to Philosophy.

Also see: American philosophy, analytic and synthetic statements, analytic philosophy, existence, Harvard

philosophy, intersubjectivity, philosophy of language, philosophy of mathematics, meaning, opposition to metaphysics, neo-pragmatism, things, ' to be' , the verb, and the indeterminacy of translation.

The article in the Columbia Encyclopedia at Bartleby.com.
 The thorough collection of resources at EpistemeLinks.com.
 Roger Gibson' s discussion of Quine' s ontology.
 Nicke Bostrum on Quine' s theories of indeterminacy.
 Snippets from Quine in The Oxford Dictionary of Quotations.
 A short article in Oxford' s Who' s Who in the Twentieth Century.
 Assessment of Quine' s mathematical logic from
 Mathematical MacTutor.
 A brief entry in The Macmillan Encyclopedia 2001.

[\[A Dictionary of Philosophical Terminology\]](#)

04-06-2002

quotient

The number obtained by dividing one number (the "numerator") by another (the "denominator"). If both numbers are [rational](#) then the result will also be rational.

16-03-2001

radix

<[mathematics](#)> (Or "base", "number base") In a positional representation of numbers, that integer by which the significance of one digit place must be multiplied to give the significance of the next higher digit place. Conventional decimal numbers are radix ten, [binary](#) numbers are radix two.

[\[FOLDOP\]](#)

16-03-2001

Ramsey Frank Plumpton

<[biography](#), [history of philosophy](#)> British mathematician and philosopher (1903-1930) who contributed to the second edition of [Russell](#) and [Whitehead](#)' s Principia Mathematica. [Ramsey](#)' s "Truth and Probability" (1926) and Foundations of Mathematics (1931) clarified the nature of semantic paradox, developed modern applications of the probability calculus, and introduced the [redundancy theory of truth](#). He was an early admirer of [Wittgenstein](#), whose Tractatus [Ramsey](#) translated into English and whose return to England in 1929 he helped to arrange.

Recommended Reading: Frank Plumpton Ramsey, Philosophical Papers, ed. by D. H. Mellor (Cambridge, 1990) and Nils-Eric Sahlin, The Philosophy of F. P. Ramsey (Cambridge, 1990).

[\[A Dictionary of Philosophical Terms and Names\]](#)

25-11-2003

Ramus Petrus - Pierre de la Ramee

<[biography](#), [history of philosophy](#)> French logician (1515-1572). In his Dialecticae Partitiones (The Structure of Dialectic) (1543), [Ramus](#) attacked the influence of Aristotelean thinking on education and philosophy, proposing an alternative method of reasoning that emphasized the invention of rhetorical dichotomies. This work was a significant influence on that of [Bacon](#) and [Hobbes](#).

Recommended Reading: Arguments in Rhetoric Against Quintilian: Translation and Text of Peter Ramus' s Rhetoricae Distinctiones in Quintilianum, tr. by James Murphy and Carole Newlands (Northern Illinois, 1986).

[\[A Dictionary of Philosophical Terms and Names\]](#)

25-11-2003

Rand Ayn - Alissa Rosenbaum

<[biography](#), [history of philosophy](#)> Russian-American novelist and essayist (1905-1982). In addition to the social theories reflected in her popular novels, [Rand](#) introduced the [philosophy](#) of objectivism in Introduction to Objectivist Epistemology (1966) and defended a version of ethical [egoism](#) in The Virtue of Selfishness: A New Concept of Egoism (1964). Recommended Reading: Chris Matthew Sciabarra, Ayn Rand: Her Life and Thought (Objectivist Center, 1999); David Kelley, The Contested Legacy of Ayn Rand (Objectivist Center, 2000); Leonard Peikoff, Objectivism: The Philosophy of Ayn Rand (Meridian, 1993); and Feminist Interpretations of Ayn Rand, ed. by Mimi Reisel Gladstein and Chris Matthew Sciabarra (Penn. State, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

25-11-2003

random

1. Unpredictable (closest to mathematical definition); weird. "The system' s been behaving pretty randomly."
2. Assorted; undistinguished. "Who was at the conference?" "Just a bunch of random business types."
3. (pejorative) Frivolous; unproductive; undirected. "He' s just a random loser."
4. Incoherent or inelegant; poorly chosen; not well organised. "The program has a random set of misfeatures." "That' s a random name for that function." "Well, all the names were chosen pretty randomly."
5. In no particular order, though [deterministic](#). "The I/O channels are in a pool, and when a file is opened one is chosen randomly."
6. Arbitrary. "It generates a random name for the scratch file."
7. Gratuitously wrong, i.e. poorly done and for no good apparent reason. For example, a program that handles file name defaulting in a particularly useless way, or an assembler routine that could easily have been coded using only three registers, but redundantly uses seven for values with non-overlapping lifetimes, so that no one else can invoke it without first saving four extra registers. What [randomness!](#)
8. A random hacker; used particularly of high-school students who soak up computer time and generally get in the way.
9. Anyone who is not a hacker (or, sometimes, anyone not known to the hacker speaking). "I went to the talk, but the audience was full of randoms asking bogus questions".
10. (occasional MIT usage) One who lives at Random Hall. See also J. Random, some random X.

[\[Jargon File\]](#) and [\[FOLDOC\]](#)

25-11-2003

randomness

1. An inexplicable misfeature; gratuitous inelegance.
2. A hack or crock that depends on a complex combination of coincidences (or, possibly, the combination upon which the crock depends for its accidental failure to malfunction).
"This hack can output characters 40--57 by putting the character in the four bit accumulator field of an XCT and then extracting six bits - the low 2 bits of the XCT opcode are the right thing." "What randomness!"
3. Of people, synonymous with "flakiness". The connotation is that the person so described is behaving weirdly, incompetently, or inappropriately for reasons which are (a) too tiresome to bother inquiring into, (b) are probably as inscrutable as quantum phenomena anyway, and (c) are likely to pass with time. "Maybe he has a real complaint, or maybe it' s just randomness. See if he calls back."

[[Jargon File](#)]

25-11-2003

range

<[logic](#)>

The set of objects that may serve as the values (outputs) of a [function](#).

[Glossary of First-Order Logic]

16-03-2001

rational

<[Mathematics](#)> a fractional number n/d , where n and d are integers, n is the numerator and d is the denominator. The set of all rational numbers is usually called Q . Computers do not usually deal with rational numbers but instead convert them to [real](#) numbers which are represented (approximately in some cases) as floating-point numbers. Compare [irrational](#).

<[logic](#), [epistemology](#)> respecting logical principles of [validity](#) and [consistency](#) and answering to the [evidence](#) of experience.

based on [[Philosophical Glossary](#)]

25-11-2003

rational numbers

<[logic](#)>

All numbers that are equal to the ratio of two integers.

[Glossary of First-Order Logic]

16-03-2001

rationalism

<[philosophical terminology](#)> reliance on [reason](#) as the only reliable source of human knowledge. In the most general application, [rationalism](#) offers a naturalistic alternative to appeals to religious accounts of human nature and conduct. More specifically, [rationalism](#) is the epistemological theory that significant [knowledge](#) of the world can best be achieved by [a priori](#) means; it therefore stands in contrast to [empiricism](#). Prominent rationalists of the modern period include [Descartes](#), [Spinoza](#) and [Leibniz](#).

Recommended Reading: The Rationalists (Anchor, 1960); The Rationalists: Critical Essays on Descartes, Spinoza, and Leibniz, ed. by Dirk Pereboom (Rowman & Littlefield, 1999); John Cottingham, Rationalism (St. Augustine Press, 1997); David Miller, Critical Rationalism: A Restatement and Defence (Open Court, 1994); and Laurence Bonjour, In Defense of Pure Reason: A Rationalist Account of A Priori Justification (Cambridge, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

25-11-2003

rationalist

<[philosophical school](#)> specifically, continental philosopher of the 17th-18th century such as [Descartes](#), [Spinoza](#), [Leibniz](#). These philosophers tended to believe that science abounds in pure, [a priori](#), [necessary](#), [rational](#) truths that may be discovered through introspective, rational analysis of [concepts](#) or [ideas](#) that derive more from innate principles of human thought than from our actual sensory experience. empiricist, neorationalist, neo-empiricist

[[A Philosophical Glossary](#)]

25-11-2003

raw data

[data](#)

[[A Dictionary of Philosophical Terms and Names](#)]

25-11-2003

Rawls John

<[history of philosophy, biography](#)> American political philosopher born in 1921. As presented in A Theory of Justice (1971), Rawls' s concept of "justice as fairness" offers a non-historical or hypothetical variation on the social contract theory, in which rational agents make social decisions from behind a "veil of ignorance" that prevents them from knowing in advance what status they will hold. According to Rawls, this method will produce a society where individual liberties are maximized for all citizens and social inequality is justifiable only under conditions that would be beneficial for its least-favored members. Further exposition of this theory, along with a restatement Rawls' s opposition to utilitarianism and an examination of political pluralism, appear in Political Liberalism (1993). Two Concepts of Rules (1955) is an early statement of Rawls' s basic principles.

Recommended Reading: John Rawls, Collected Papers, ed. by Samuel Freeman (Harvard, 2001); John Rawls, The Law of Peoples (Harvard, 2001); Chandran Kukathas and Philip Pettit, Rawls: A Theory of Justice and Its Critics (Stanford, 1991);

and Reading Rawls: Critical Studies on Rawls' ' A Theory of Justice' , ed. by Norman Daniels (Stanford, 1989).

25-11-2003

re-engineering

[reverse engineering](#)

00-00-0000

real

1. Not simulated. Often used as a specific antonym to [virtual](#) in any of its jargon senses.

2. <[mathematics](#)> [real number](#).

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

real number

<[mathematics](#)> Briefly,
The rational plus the irrational numbers. The real number line is also called the real number (or numerical) continuum.

[Glossary of First-Order Logic]

One of the infinitely divisible range of values between positive and negative [infinity](#), used to represent continuous physical quantities such as distance, time and temperature.

Between any two real numbers there are infinitely many more real numbers. The [integers](#) ("counting numbers") are real numbers with no fractional part and real numbers ("measuring numbers") are complex numbers with no imaginary part. Real numbers can be divided into [rational numbers](#) and irrational numbers.

Real numbers are usually represented (approximately) by computers as floating point numbers.

Strictly, real numbers are the equivalence classes of the [Cauchy sequences](#) of [rationals](#) under the equivalence relation " \sim ", where $a \sim b$ if and only if $a-b$ is [Cauchy](#) with limit 0.

The real numbers are the minimal topologically closed [field](#) containing the rational field.

A sequence, r , of rationals (i.e. a function, r , from the [natural numbers](#) to the rationals) is said to be Cauchy precisely if, for any tolerance δ there is a size, N , beyond which: for any n, m exceeding N ,

$$| r[n] - r[m] | < \delta$$

A [Cauchy sequence](#), r , has limit x precisely if, for any tolerance δ there is a size, N , beyond which: for any n exceeding N ,

$$| r[n] - x | < \delta$$

(i.e. r would remain Cauchy if any of its elements, no matter how late, were replaced by x).

It is possible to perform addition on the reals, because the equivalence class of a sum of two sequences can be shown to be the equivalence class of the sum of any two sequences

equivalent to the given originals: ie, $a \sim b$ and $c \sim d$ implies $a + c \sim b + d$; likewise $a.c \sim b.d$ so we can perform multiplication. Indeed, there is a natural **embedding** of the rationals in the reals (via, for any rational, the sequence which takes no other value than that rational) which suffices, when extended via continuity, to import most of the algebraic properties of the rationals to the reals.

[FOLDOC]

25-11-2003

Real World

1. Those institutions at which "programming" may be used in the same sentence as "Fortran", "COBOL", "RPG", "IBM", "DBASE", etc. Places where programs do such commercially necessary but intellectually uninspiring things as generating payroll checks and invoices.
2. The location of non-programmers and activities not related to programming.
3. A bizarre dimension in which the standard dress is shirt and tie and in which a person' s working hours are defined as 9 to 5 (see code grinder).
4. Anywhere outside a university. "Poor fellow, he' s left MIT and gone into the Real World." Used pejoratively by those not in residence there. In conversation, talking of someone who has entered the Real World is not unlike speaking of a deceased person. It is also noteworthy that on the campus of Cambridge University in England, there is a gaily-painted lamp-post which bears the label "REALITY CHECKPOINT". It marks the boundary between university and the Real World; check your notions of reality before passing. This joke is funnier because the Cambridge "campus" is actually coextensive with the centre of Cambridge.

25-11-2003

real-time

1. Describes an application which requires a program to respond to stimuli within some small upper limit of response time (typically milli- or microseconds). Process control at a chemical plant is the classic example. Such applications often require special operating systems (because everything else must take a back seat to response time) and speed-tuned hardware.
2. In jargon, refers to doing something while people are watching or waiting. "I asked her how to find the calling procedure' s program counter on the stack and she came up with an algorithm in real time."

Used to describe a system that must guarantee a response to an external event within a given time.

[FOLDOC]

16-03-2001

realism

<[philosophical terminology](#)> belief that [universals](#) exist independently of the [particulars](#) that instantiate them. [Realists](#) hold that each general term signifies a real feature or [quality](#), which is numerically the same in all the things to which that term applies. Thus, opposed to [nominalism](#).

Recommended Reading: The Problem of Universals, ed. by Andrew B. Schoedinger (Humanity, 1991); Richard I. Aaron, Our Knowledge of Universals (Haskell House, 1975); Theodore Scaltsas, Substances and Universals in Aristotle's Metaphysics (Cornell, 1994); Properties, ed. by D. H. Mellor and Alex Oliver (Oxford, 1997); and D. M. Armstrong, Universals: An Opinionated Introduction (Westview, 1989).

[[A Dictionary of Philosophical Terms and Names](#)]

25-11-2003

realism perceptual

<[philosophical terminology](#)> belief that material objects exist independently of our [perception](#) of them. (Thus, opposed to [idealism](#).) Realistic theories of [perception](#) include both [representationalism](#), in which awareness of objects is mediated by our ideas of them, and [direct realism](#), which presumes an immediate relation between observer and observed.

Recommended Reading: Critical Realism: Essential Readings, ed. by Margaret Archer, Roy Bhaskar, Andrew Collier, and Tony Lawson (Routledge, 1999); David Kelley, The Evidence of the Senses: A Realist Theory of Perception (Louisiana State, 1988); Hilary Putnam, Realism With a Human Face (Harvard, 1992); Gustav Bergmann, Realism: A Critique of Brentano & Meinong (Wisconsin, 1967); and Simon Blackburn, Essays in Quasi-Realism (Oxford, 1995).

[[A Dictionary of Philosophical Terms and Names](#)]

06-05-2002

realist

<[epistemology](#), [realism](#), [philosophical school](#)>

1. generally, someone who claims that various sorts of things that are not realized completely in our (sensory) experience are real. The things in question might be, e.g.: numbers, infinite constructions, material objects, theoretical entities (atoms, the unconscious mind, etc.) and so on.

2. during the middle ages "realist" specifically meant someone who maintained that there are [universals](#) (e.g. "horsiness", "humanity") corresponding to words such as "horse" and "human" and not just individual things. [nominalist](#)

[[A Philosophical Glossary](#)]

30-04-2001

reality

<[philosophical terminology](#)> the totality of what is, as opposed to what merely seems to be. Metaphysicians and ontologists differ widely in their convictions about what kinds of entities are properly included.

Recommended Reading: Peter Loftson, Reality: Fundamental Topics in Metaphysics (Toronto, 2001); Milton K. Munitz, The Question of Reality (Princeton, 1992); John W. Yolton, Realism and Appearances: An Essay in Ontology (Cambridge, 2000); John R. Searle, The Construction of Social Reality (Free Press, 1997); and Robert Kirk, Relativism and Reality:

A Contemporary Introduction (Routledge, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

06-05-2002

reason

<[philosophical terminology](#)> the intellectual ability to apprehend the [truth](#) cognitively, either immediately in [intuition](#), or by means of a process of [inference](#).

Recommended Reading: Thomas Nagel, *The Last Word* (Oxford, 1996); Harold I. Brown, *Rationality* (Routledge, 1988); Martin Hollis, *The Cunning of Reason* (Cambridge, 1988); Max Horkheimer, *Eclipse of Reason* (Continuum, 1974); Ernest Gellner, *Reason and Culture: The Historic Role of Rationality and Rationalism* (Blackwell, 1992); and Paul M. Churchland, *The Engine of Reason, the Seat of the Soul: A Philosophical Journey into the Brain* (MIT, 1996).

[\[A Dictionary of Philosophical Terms and Names\]](#)

06-05-2002

recipient

<[communications](#)> One who receives; receiver. E.g. "No recipient of the e-mail message will know about the other addresses who were listed in the BCC header."

[\[FOLDOC\]](#)

25-11-2003

recollection

<[philosophical terminology](#)> belief that we come to know fundamental truths by recalling our acquaintance with their eternal objects before birth. [Plato](#) (perhaps following the lead of [Socrates](#)) defended [recollection](#) as the source of our [knowledge](#) of [mathematics](#) and [morality](#) in *Meno*, *Phaedo*, and *The Republic*.

Recommended Reading: Plato, *Five Dialogues: Euthyphro, Apology, Crito, Meno, Phaedo*, tr. by G.M.A. Grube (Hackett, 1983) and Dominic Scott, *Recollection and Experience: Plato's Theory of Learning and Its Successors* (Cambridge, 1995).

[\[A Dictionary of Philosophical Terms and Names\]](#)

06-05-2002

record

<[data](#), [database](#)> An [ordered set](#) of [fields](#). The term is used in both files (where a record is also called a "line") and databases (where it is also called a "row"). In a spreadsheet it is always called a "row". In all these cases the records represent different entities with different values for the attributes represented by the fields.

Fields may be of a fixed width ([bits](#) or characters) or they may be separated by a delimiter character, often comma (CSV) or HT (TSV).

The collection of all values of a given field from all records is called a column.

[\[FOLDOC\]](#)

25-11-2003

recourse

To perform [recursion](#).

16-03-2001

recursion

<[mathematics](#), [programming](#), [PI](#)> When a [function](#) (or [procedure](#)) calls itself. Such a function is called "recursive". If the call is via one or more other functions then this group of functions are called "mutually recursive".

If a function will always call itself, however it is called, then it will never terminate. Usually however, it first performs some test on its arguments to check for a "base case" - a condition under which it can return a value without calling itself.

The [canonical](#) example of a recursive function is factorial:

factorial 0 = 1
factorial n = n * factorial (n-1)

Functional programming languages rely heavily on recursion, using it where a [procedural language](#) would use [iteration](#).

See also [recursion](#), recursive definition, tail recursion.

[[Jargon File](#)] and [[FOLDOC](#)]

<[philosophical terminology](#)> capable of being indefinitely re-applied to the results of its own application. Hence, a [recursive definition](#) is one that begins with one or more initial instances and then specifies the repeatable rules for deriving others. Thus, for example: "A person' s descendants include that person' s children and all of their descendants" is a [recursive definition](#) (not a [circular definition](#)) of the word "descendant". (The compound statements of the [propositional calculus](#) and the [natural numbers](#) of arithmetic are often defined recursively.)

Recommended Reading: Robert L. Causey, Logic, Sets, and Recursion (Jones & Bartlett, 2001); Raymond M. Smullyan, Recursion Theory for Metamathematics (Oxford, 1993); George S. Boolos and Richard D. Jeffrey, Computability and Logic (Cambridge, 1989); and Joseph R. Shoenfield, Recursion Theory (A. K. Peters, 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

27-11-2003

recursive

[recursion](#)

00-00-0000

recursive definition

[recursive definition](#).

00-00-0000

recursive function

<logic>

Any [function](#) obtained from a small number of intuitively computable functions by a finite number of applications of [function-building](#) operations.

General recursive functions

The set of primitive recursive [functions](#) plus those that can be built with terminating unbounded [minimization](#).

Partial recursive [functions](#)

The set of general recursive [functions](#) plus those that can be built with non-terminating unbounded minimization.

Primitive recursive [functions](#)

The set of recursive [functions](#) that can be built using only composition, primitive recursion, and bounded (hence terminating) minimization.

[Glossary of First-Order Logic]

16-03-2001

recursive function theory

<logic>

If we start with a small number of intuitively computable [functions](#), and a small number of operations that create new computable [functions](#) from old ones, then we can generate a large set of [functions](#) called recursive [functions](#). If we pick the initial [functions](#) and building operations so as to capture what we take to be all the intuitively computable [functions](#), then we generate a set with the same extension as the set of Turing-computable [functions](#). (This led Church to conjecture - Church' s thesis that all intuitively computable [functions](#) or effective methods are recursive [functions](#).) Recursive [function](#) theory studies these [functions](#), their method of generation, ways to prove that some [functions](#) are not recursive in this sense, and related matters.

[Glossary of First-Order Logic]

16-03-2001

recursive set

<logic>

A set for which there is a recursive [function](#) to determine whether any given object is a member. See [decidable set](#), [recursive function](#)

See recursively [enumerable set](#)

[Glossary of First-Order Logic]

16-03-2001

recursive type

A data type which contains itself. The commonest example is the list type, in Haskell:

```
data List a = Nil | Cons a (List a)
```

which says a list of 'a' s is either an empty list or a cons cell containing an 'a' (the "head" of the list) and another list (the "tail").

Recursion is not allowed in Miranda or Haskell synonym types, so the following Haskell types are illegal:

```
type Bad = (Int, Bad)
type Evil = Bool -> Evil
```

whereas the seemingly equivalent [algebraic data types](#) are acceptable:

```
data Good = Pair Int Good
data Fine = Fun (Bool->Fine)
```

[[FOLDOC](#)]

27-11-2003

reductio ad absurdum

<[philosophical terminology](#)> a method of proving that a proposition must be false (or true) by assuming the [truth](#) (or falsity) of the [proposition](#) and then showing that this assumption, taken together with other premises whose [truth](#) is already established, would lead to a [contradiction](#) (or, at least, to an obvious falsehood). This method is sometimes called [indirect proof](#).

[[A Dictionary of Philosophical Terms and Names](#)]

27-11-2003

reduction

<PI>

(Or "contraction") The process of transforming an expression according to certain reduction rules. The most important forms are [beta reduction](#) (application of a lambda abstraction to one or more argument expressions) and delta reduction (application of a mathematical function to the required number of arguments).

An evaluation strategy (or reduction strategy), determines which part of an expression (which redex) to reduce first. There are many such strategies.

See graph reduction, string reduction, normal order reduction, applicative order reduction, parallel reduction, alpha conversion, [beta conversion](#), delta conversion, eta conversion.

[[FOLDOP](#)]

27-11-2003

reductionism

<[philosophical terminology](#)> belief that statements or expressions of one sort can be replaced systematically by statements or expressions of a simpler or more certain kind.

Thus, for example, some philosophers have held that [arithmetic](#) can be reduced to [logic](#), that the mental can be reduced to the [physical](#), or that the life sciences can be reduced to the physical sciences.

Recommended Reading: Ernest Nagel, *Structure of Science* (Hackett, 1979); Richard H. Jones, *Reductionism: Analysis and the Fullness of Reality* (Bucknell, 2000);

Reduction, Explanation and Realism, ed. by David Charles and Kathleen Lennon (Oxford, 1993); Valerie Gray Hardcastle, *How to Build a Theory in Cognitive Science* (SUNY, 1996); and Harold Kincaid, *Individualism and the Unity of Science* (Rowman & Littlefield, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

27-11-2003

redundancy

1. <[parallele](#)> The provision of multiple interchangeable components to perform a single function in order to cope with failures and errors. Redundancy normally applies primarily to hardware. For example, one might install two or even three computers to do the same job. There are several ways these could be used. They could all be active all the time thus giving extra performance through [parallel processing](#) as well as extra availability; one could be active and the others simply monitoring its activity so as to be ready to take over if it failed ("warm standby"); the "spares" could be kept turned off and only switched on when needed ("cold standby"). Another common form of hardware redundancy is disk mirroring.

Redundancy can also be used to detect and recover from errors, either in hardware or software. A well known example of this is the cyclic redundancy check which adds redundant data to a block in order to detect corruption during storage or transmission. If the cost of errors is high enough, e.g. in a safety-critical system, redundancy may be used in both hardware AND software with three separate computers programmed by three separate teams and some system to check that they all produce the same answer, or some kind of majority voting system.

2. <[communications](#)> The proportion of a message' s gross information content that can be eliminated without losing essential information.

Technically, redundancy is one minus the ratio of the actual uncertainty to the maximum uncertainty. This is the fraction of the structure of the message which is determined not by the choice of the sender, but rather by the accepted statistical rules governing the choice of the symbols in question.

[Shannon and Weaver, 1948, p. l3]

[Better explanation?]

[[FOLDOP](#)]

27-11-2003

redundancy theory of truth

<[philosophical terminology](#)> belief that it is always logically superfluous to claim that a [proposition](#) is true, since this claim adds nothing further to a simple affirmation of the [proposition](#) itself. "It is true that I am bald" means the same thing as "I am bald".

Recommended Reading: Theories of Truth, ed. by Paul Horwich (Dartmouth, 1994) and Richard L. Kirkham, Theories of Truth: A Critical Introduction (Bradford, 1995).

[[A Dictionary of Philosophical Terms and Names](#)]

27-11-2003

reference

<[philosophical terminology](#)> the relation that holds between a term and the things to which it applies;

Recommended Reading: A. W. Moore, Meaning and Reference (Oxford, 1993); The Varieties of Reference, ed. by Gareth Evans, Garbeth Evans, and John McDowell (Oxford, 1983); P. T. Geach, Reference and Generality: An Examination of Some Medieval and Modern Theories (Cornell, 1962); The Frege Reader, ed. by Michael Beaney (Blackwell, 1997); and The New Theory of Reference - Kripke, Marcus, and Its Origins, ed. by Paul W. Humphreys and James H. Fetzer (Kluwer, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

27-11-2003

reflection

<[epistemology](#), [psychology](#)> according to Locke: the inner perception by which minds are aware of their own thoughts. See [apperception](#).

[[Philosophical Glossary](#)]

27-11-2003

reflexive

<[mathematics](#), [logic](#)>

A [relation](#) R is reflexive if, for all x, x R x.

Equivalence relations, pre-orders, partial orders and total orders are all reflexive.

[[FOLDOP](#)]

27-11-2003

reflexive domain

A domain satisfying a recursive domain equation.
E.g. $D = D \rightarrow D$.

16-03-2001

Reflexive transitive closure

Two elements, x and y , are related by the reflexive transitive closure, R^+ , of a relation, R , if they are related by the transitive closure, R^* , or they are the same element.

16-03-2001

refutable

In lazy functional languages, a refutable pattern is one which may fail to match. An expression being matched against a refutable pattern is first evaluated to head normal form (which may fail to terminate) and then the top-level constructor of the result is compared with that of the pattern. If they are the same then any arguments are matched against the pattern's arguments otherwise the match fails.

An irrefutable pattern is one which always matches. An attempt to evaluate any variable in the pattern forces the pattern to be matched as though it were refutable which may fail to match (resulting in an error) or fail to terminate.

Patterns in Haskell are normally refutable but may be made irrefutable by prefixing them with a tilde (\sim). For example,

```
( (x,y) -> 1) undefined ==> undefined
( ~ (x,y) -> 1) undefined ==> 1
```

Patterns in Miranda are refutable, except for tuples which are irrefutable. Thus

```
g [x] = 2
g undefined ==> undefined
```

```
f (x,y) = 1
f undefined ==> 1
```

Pattern bindings in local definitions are irrefutable in both languages:

```
h = 1 where [x] = undefined ==> 1
Irrefutable patterns can be used to simulate unlifted products because they effectively ignore the top-level constructor of the expression being matched and consider only its components.
```

16-03-2001

Regan Tom

<[history of philosophy, biography](#)> American [philosopher](#) born in 1938. In *The Case for Animal Rights* (1983) and *The Thee Generation: Reflections on the Coming Revolution* (1991) [Regan](#) develops a comprehensive theory in favor of granting moral respect to non-human animals.

Recommended Reading: Tom Regan, *Defending Animal Rights* (Illinois, 2001) and Carl Cohen and Tom Regan, *The Animal Rights Debate* (Rowman & Littlefield, 2001).

[\[A Dictionary of Philosophical Terms and Names\]](#)

06-05-2002

Regis Pierre-Sylvain

<[history of philosophy, biography](#)> French Cartesian [philosopher](#) (1632-1707). Unable to secure an adequate metaphysical defense of mind-body dualism, [Regis](#) proposed that the interaction of accidentally conjoined substances can only be accepted on [faith](#).

[[A Dictionary of Philosophical Terms and Names](#)]

27-11-2003

regression

1. <[mathematics](#)> A mathematical method where an empirical function is derived from a set of experimental data.

2. regression testing.

[[FOLDOC](#)]

27-11-2003

Reichenbach Hans

<[history of philosophy, biography](#)> German-American [philosopher](#) of science (1891-1953) whose Philosophie der Raum-Zeit-Lehre (The Philosophy of Space and Time) (1928) considered the philosophical implications of [Einstein](#)'s theory of relativity. [Reichenbach](#) contributed significantly to the mathematical conception of [probability](#) as relative frequency of occurrence. Despite his long association with the logical positivists, in Experience and Prediction (1938), he explicitly rejected their reductionist and phenomenalist aims. The Rise of Scientific Philosophy (1951) provides an accessible summary of [Reichenbach](#)'s thought.

Recommended Reading: Hans Reichenbach, Philosophic Foundations of Quantum Mechanics (Dover, 1998); Hans Reichenbach, The Direction of Time (Dover, 2000); Karin Gerner, Hans Reichenbach: sein Leben und Wirken: eine wissenschaftliche Biographie; and Logical Empiricism and the Special Sciences: Reichenbach, Feigl, and Nagel, ed. by Sahotra Sarkar (Garland, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

27-11-2003

Reid Thomas

<[history of philosophy, biography](#)> Scottish [philosopher](#) (1710-1796) who developed "common-sense" philosophy in reaction against the [skepticism](#) of [Hume](#) in his An Inquiry into the Human Mind on the Principles of Common Sense (1764). [Reid](#) criticized the trend of modern philosophy in Essays on the Intellectual Powers (1785), rejecting the [representationalism](#) he called "the way of ideas" in order to defend [direct realism](#) in [perception](#). In Essays on the Active Powers of the Human Mind (1788) [Reid](#) developed an intuitionist moral theory that drew heavily upon the natural law tradition.

Recommended Reading: Thomas Reid's Inquiry and Essays (Hackett, 1983); Keith Lehrer, Thomas Reid (Routledge, 1999); Peimin Ni, On Reid (Wadsworth, 2000); Nicholas Wolterstorff, Thomas Reid and the Story of Epistemology (Cambridge, 2001); The Philosophy of Thomas Reid, ed. by Melvin Dalgarno and Eric Matthews (Kluwer, 1989); and William L. Rowe, Thomas Reid on Freedom and Morality (Cornell, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

27-11-2003

reification

<[philosophical terminology](#)> improperly treating something as if it were an [object](#). In the political thought of [Lukacs](#) and other Marxists, [reification](#) often involves trying to turn human beings into marketable commodities. The philosophical [reification](#) of abstract concepts is commonly called [hypostasization](#).
Recommended Reading: Joseph Gabel, *False Consciousness: An Essay on Reification* (Harpercollins, 1985) and Bryan D. Palmer, *Descent into Discourse: The Reification of Language and the Writing of Social History* (Temple, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

12-05-2002

reify

to regard something abstract as a material thing.

16-03-2001

reinvent the wheel

<[jargon](#)> To design or implement a tool equivalent to an existing one or part of one, with the implication that doing so is silly or a waste of time. This is often a valid criticism. On the other hand, automobiles don' t use wooden rollers, and some kinds of wheel have to be reinvented many times before you get them right. On the third hand, people reinventing the wheel do tend to come up with the moral equivalent of a trapezoid with an offset axle.

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

relation1. <[logic](#)>

A way in which two or more objects are connected, associated, or related, or (at a different level) a polyadic [predicate](#) symbolizing such

a

relation. See [attribute](#), [predicate logic](#)

[Glossary of First-Order Logic]

2. <[mathematics](#)> A subset of the [product](#) of two sets, $R : A \times B$. If (a, b) is an element of R then we write $a R b$, meaning a is related to b by R . A relation may be: [reflexive](#) ($a R a$), [symmetric](#) ($a R b \Rightarrow b R a$), [transitive](#) ($a R b \ \& \ b R c \Rightarrow a R c$), [antisymmetric](#) ($a R b \ \& \ b R a \Rightarrow a = b$) or [total](#) ($a R b$ or $b R a$).

See [equivalence relation](#), [partial ordering](#), pre-order, [total ordering](#).

3. <[database](#)> A table in a relational database.

[[FOLDOC](#)]

27-11-2003

relational algebra

<[database](#), [theory](#)> A family of [algebra](#) with a well-founded [semantics](#) used for modelling the data stored in relational databases, and defining queries on it. The main operations of the relational algebra are the [set](#) operations (such as [union](#), [intersection](#), and [Cartesian product](#)), selection (keeping only some lines of a table) and the [projection](#) (keeping only some columns).

The relational data model describes how the data is structured.

Codd' s reduction algorithm can convert from relational calculus to [relational algebra](#).

[[FOLDOC](#)]

27-11-2003

relational calculus

<[database](#)> An operational methodology, founded on predicate calculus, dealing with descriptive expressions that are equivalent to the operations of [relational algebra](#). Codd' s reduction algorithm can convert from [relational calculus](#) to [relational algebra](#).

Two forms of the relational calculus exist: the tuple calculus and the domain calculus.

["An Introduction To Database Systems" (6th ed), C. J. Date, Addison Wesley].

[[FOLDOC](#)]

27-11-2003

relative consistency proof

<[logic](#)>

The proof that some system S is consistent by appeal to [theorems](#) and methods of reasoning from some other system S' . The result is that we know that S is consistent only if system S' is consistent.

[Hilbert](#)' s program

[Glossary of First-Order Logic]

27-11-2003

relatively prime

<[mathematics](#)> Having no common divisors (greater than 1).

Two numbers are said to be relatively prime if there is no number greater than unity that divides both of them evenly.

For example, 10 and 33 are relatively prime. 15 and 33 are not relatively prime, since 3 is a [divisor](#) of both.

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16-03-2001

relativism

<ethics, epistemology>

generally speaking, relativism holds that **truth** and **value** are relative to an observer or group of observers. In ethics, there are two main type of relativism.

1. Descriptive ethical relativism simply claims as a matter of fact that different people have different moral beliefs, but it takes no stand on whether those beliefs are valid or not.

2. Normative ethical relativism claims that each culture' s (or group' s) beliefs are right within that culture, and that it is wrong to judge another culture' s values from the outside.

Relativism is often just another word for **subjectivism**. Popularly, relativism is usually contrasted with some form of ethical **objectivism**, while subjectivism has connotations of a sort of **individualism** and, in the extreme, of **solipsism**.

Based oon the [[Ethics Glossary](#)] and the [[The Ism Book](#)]

<**philosophical terminology**> belief that human judgments are always conditioned by the specific social environment of a particular person, time, or place. Cognitive relativists hold that there can be no universal knowledge of the world, but only diverse interpretations of it. Moral relativists hold that there are no universal standards of moral value, but only the cultural norms of particular societies.

Recommended Reading: Robert Kirk, *Relativism and Reality: A Contemporary Introduction* (Routledge, 1999); Larry Laudan, *Science and Relativism: Some Key Controversies in the Philosophy of Science* (Chicago, 1990); Ernest Gellner, *Relativism and the Social Sciences* (Cambridge, 1987); *Moral Relativism: A Reader*, ed. by Paul K. Moser and Thomas L. Carson (Oxford, 2000); Richard Rorty, *Objectivity, Relativism, and Truth* (Cambridge, 1991); and Christopher Norris, *Against Relativism: Philosophy of Science, Deconstruction, and Critical Theory* (Blackwell, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

12-05-2002

relevance

<**information science**> A measure of how closely a given object (file, web page, database **record**, etc.) matches a user' s search for information.

The relevance **algorithms** used in most large web search engines today are based on fairly simple word-occurrence measurement: if the word "daffodil" occurs on a given page, then that page is considered relevant to a **query** on the word "daffodil"; and its relevance is quantised as a factor of the number of times the word occurs in the page, on whether "daffodil" occurs in title of the page or in its META keywords, in the first N words of the page, in a heading, and so on; and similarly for words that a stemmer says are based on "daffodil".

More elaborate (and resource-expensive) relevance algorithms may involve thesaurus (or synonym ring) lookup; e.g. it might rank a document about narcissuses (but which may not mention the word "daffodil" anywhere) as relevant to a query on "daffodil", since narcissuses and daffodils are basically the same thing. Ditto for queries on "jail" and "gaol", etc.

More elaborate forms of thesaurus lookup may involve multilingual thesauri (e.g. knowing that documents in Japanese which mention the Japanese word for "narcissus" are relevant to your search on "narcissus"), or may involve thesauri (often auto-generated) based not on equivalence of meaning, but on word-proximity, such that "bulb" or "bloom" may be in the thesaurus entry for "daffodil".

Word spamming essentially attempts to falsely increase a web page' s relevance to certain common searches.

See also [subject index](#).

[FOLDOC]

27-11-2003

reliability

<[system](#)> An attribute of any system that consistently produces the same results, preferably meeting or exceeding its specifications. The term may be qualified, e.g. software reliability, [reliable communication](#).

Reliability is one component of RAS.

[FOLDOC]

27-11-2003

reliable communication

Communication where messages are guaranteed to reach their destination complete and uncorrupted and in the order they were sent. This reliability can be built on top of an unreliable [protocol](#) by adding sequencing information and some kind of checksum or cyclic redundancy check to each message or packet. If the communication fails, the sender will be notified. Transmission Control Protocol is a reliable protocol used on Ethernet.

28-11-2003

renaissance

<[philosophical terminology](#)> fourteenth-, fifteenth- and sixteenth-century European intellectual movement characterized by rejection of [scholastic](#) authority, renewed interest in classical antiquity, and excitement about the prospect of achieving scientific knowledge. Prominent [Renaissance](#) thinkers include Lorenzo Valla, Marsilio Ficino, Giovanni Pico della Mirandola, Desiderius Erasmus, Thomas More, Giordano Bruno, and Francisco Suarez. Recommended Reading: Cambridge Translations of Renaissance Philosophical Texts, ed. by Jill Kraye (Cambridge, 1998); Paul Oskar Kristeller, Renaissance Thought and Its Sources (Columbia, 1981); The Cambridge History of Renaissance Philosophy, ed. by Charles B. Schmitt, Quentin Skinner, and Jill Kraye (0521397480); and Renaissance Philosophy of Man: Petrarca, Valla, Ficino, Pico, Pomponazzi, Vives, ed. by Ernst Cassirer, Paul Oskar Kristeller, and John H. Randall (Chicago, 1956).

[[A Dictionary of Philosophical Terms and Names](#)]

28-11-2003

replacement - rules of

<[philosophical terminology](#)> tautologies that express the logical [equivalence](#) of pairs of elementary statement forms, each of whose substitution instances may be used to replace those of the other wherever they occur within a formal proof of the [validity](#) of a deductive argument. The rules of [replacement](#) that we employ here include: De Morgan' s Theorems, Commutation, [Association](#), [Distribution](#), [Double Negation](#), [Transposition](#), [Implication](#), [Equivalence](#), Exportation, and [Tautology](#). These, taken together with the nine rules of [inference](#), adequately secure the [completeness](#) of the [propositional calculus](#).

[[A Dictionary of Philosophical Terms and Names](#)]

28-11-2003

representationalism

<[epistemology](#), [aesthetics](#)>

1. in [epistemology](#), representationalism is the view that the only things we can know are our [representations](#) of the world (e.g., ideas, perceptions, beliefs, etc.), not the world itself. Epistemological representationalism is therefore opposed to [realism](#), especially to direct realism. The term is most often used in discussions of [perception](#), [phenomenalism](#) being the more general term of this sort.

2. in [aesthetics](#), representationalism is the idea that art ought to represent reality. This view is sometimes and especially popularly called [realism](#), at least in the visual arts - in literature, realism is something akin to [naturalism](#). (References from [empiricism](#), [formalism](#), [realism](#), and [sensationalism](#)).

[[The Ism Book](#)]

Edited by Giovanni Benzi

<[philosophical terminology](#)> theory of perception according to which we are aware of objects only through the mediation of the ideas that represent them. [Descartes](#) and [Locke](#) were both representationalists. Although it handily accounts for [perceptual illusion](#) and [memory](#), such a [theory](#) often leads (as in [Hume](#)) to [skepticism](#) about the [existence](#) of external objects.

Recommended Reading: Robert Audi, *Epistemology: A Contemporary Introduction to the Theory of Knowledge* (Routledge, 1998); Hilary Putnam, *Representation and Reality* (MIT, 1991); Richard A. Watson, *Representational Ideas: From Plato to Patricia Churchland* (Kluwer, 1995); Richard Rorty, *Philosophy and the Mirror of Nature* (Princeton, 1981); and Ray Jackendoff, *Languages of the Mind: Essays on Mental Representation* (MIT, 1995).

[[A Dictionary of Philosophical Terms and Names](#)]

28-11-2003

repression

<[psychoanalysis](#)> [freudian mechanism](#) by which unacceptable wishes and thoughts are banished from conscious awareness but continue to unconsciously and, thence, find [expression](#) in dreams and slips of the tongue, and sometimes in compulsive behavior, obsessive thoughts, and other [forms](#) of psychopathology. Herbert Marcuse distinguishes necessary repression (without which civilization could not exist) from surplus repression (which serves to maintain unnecessary forms of economic and political control and oppression). Compare: [sublimation](#).

[[Philosophical Glossary](#)]

28-11-2003

requirements

<[programming, PI](#)> The first stage of software development which defines what the potential users want the system to do. In modern methods these requirements should be testable, and will usually be traceable in later development stages. A common feature of nearly all software is that the requirements change during its lifetime.

See software life-cycle.

[[FOLDOC](#)]

16-03-2001

requirements analysis

<[project](#)> The process of reviewing a business' s processes to determine the business needs and [functional requirements](#) that a system must meet.

[[FOLDOC](#)]

16-03-2001

Requirements Engineering

<[programming, PI](#)> The task of capturing, structuring, and accurately representing the user' s [requirements](#) so that they can be correctly embodied in systems which meet those requirements (i.e. are of good quality).

[[FOLDOC](#)]

16-03-2001

res cogitans - res extensa

<[philosophical terminology](#)> [Descartes](#)' s Latin distinction of the two major ontological categories comprising [reality](#): thinking things and extended things, or minds and bodies. Recommended Reading: RenèDescartes, Meditationes De Prima Philosophia / Meditations on First Philosophy (Bilingual Edition), ed. by George Heffernan (Notre Dame, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

12-05-2002

residues - method of

<[philosophical terminology](#)> one of [Mill](#)' s Methods for discovering causal relationships. If portions of a complex phenomenon can be explained by [reference](#) to parts of a complex antecedent circumstance, whatever remains of that circumstance may be inferred to be the cause of the remainder that phenomenon. Example: "The old prescription contained vitamins A, B-12, and C, and taking it regularly improved night vision, reduced stress, and prevented colds. The new prescription contains calcium along with vitamins A, B-12, and C, and taking it regularly improves night vision, reduces stress, prevents colds, and increases bone density. Therefore, taking calcium regularly increases bone density." Recommended Reading: John Stuart Mill, System of Logic (Classworks, 1986).

[A Dictionary of Philosophical Terms and Names]

12-05-2002

resolution

1. <[hardware](#)> the maximum number of pixels that can be displayed on a monitor, expressed as (number of horizontal pixels) x (number of vertical pixels), i.e., 1024x768. The ratio of horizontal to vertical resolution is usually 4:3, the same as that of conventional television sets.

2. <[logic](#)> A mechanical method for proving statements of first order logic, introduced by J. A. Robinson in 1965. Resolution is applied to two clauses in a [sentence](#). It eliminates, by unification, a literal that occurs "positive" in one and "negative" in the other to produce a new clause, the resolvent.

For example, given the sentence:

$(\text{man}(X) \Rightarrow \text{mortal}(X)) \text{ AND } \text{man}(\text{Socrates}).$

The literal "man(X)" is "negative". The literal "man(Socrates)" could be considered to be on the right hand side of the degenerate implication

True \Rightarrow man(Socrates)

and is therefore "positive". The two literals can be unified by the binding $X = \text{Socrates}$.

The [truth table](#) for the implication function is

A	B	A \Rightarrow B
F	F	T
F	T	T
T	F	F
T	T	T

(The implication only fails if its premise is true but its conclusion is false). From this we can see that

$A \Rightarrow B \equiv (\text{NOT } A) \text{ OR } B$

Which is why the left hand side of the implication is said to be negative and the right positive. The sentence above could thus be written

$((\text{NOT } \text{man}(\text{Socrates})) \text{ OR } \text{mortal}(\text{Socrates}))$
AND
man(Socrates)

Distributing the AND over the OR gives

$((\text{NOT } \text{man}(\text{Socrates})) \text{ AND } \text{man}(\text{Socrates}))$
OR
mortal(Socrates) AND man(Socrates)

And since $(\text{NOT } A) \text{ AND } A \equiv \text{False}$, and $\text{False OR } A \equiv A$ we can simplify to just

mortal(Socrates) AND man(Socrates)

So we have proved the new literal, mortal(Socrates).

Resolution with [backtracking](#) is the basic control mechanism of Prolog.

See also [modus ponens](#), SLD Resolution.

3. <[networking](#)> address resolution.

[FOLDOP]

28-11-2003

responsibility

<[philosophical terminology](#)> accountability for the actions one performs and the consequences they bring about, for which a moral agent could be justly punished or rewarded. Moral [responsibility](#) is commonly held to require the agent' s [freedom](#) to have done otherwise.

Recommended Reading: John Martin Fischer and Mark Ravizza, Responsibility and Control: A Theory of Moral Responsibility (Cambridge, 2000); Peter A. French, Responsibility Matters (Kentucky, 1994); Marion Smiley, Moral Responsibility and the Boundaries of Community: Power and Accountability from a Pragmatic Point of View (Chicago, 1992); and Hans Jonas, The Imperative of Responsibility (Chicago, 1985).

[[A Dicitonary of Philosophical terms and Names](#)]

12-05-2002

restructuring

the transformation from one representation form to another at the same relative abstraction level, while preserving the subject system' s external behaviour (functionality and semantics).

16-03-2001

reusability

[reuse](#)

00-00-0000

reuse

Using code developed for one application program in another application. Traditionally achieved using program libraries. Object-oriented programming offers reusability of code via its techniques of [inheritance](#) and genericity. [Class](#) libraries with intelligent browsers and application generators are under development to help in this process. [Polymorphic](#) functional languages also support reusability while retaining the benefits of strong typing.

See also DRAGOON, National Software Reuse Directory, RLF.

28-11-2003

revealed theology

<[theology](#), [metaphysics](#), [ethics](#)> truths about [God](#) that can only be revealed by supernatural means and cannot be discovered by the unaided exercise of [reason](#) and [perception](#). Compare: [natural theology](#).

[[Philosophical Glossary](#)]

28-11-2003

reverse engineering

[aka](#) re-engineering.

The process of analysing an existing system to identify its components and their interrelationships and create representations of the system in another form ([implementation](#)) or at a higher level of abstraction. Reverse engineering is usually undertaken in order to modify or redesign the system for better maintainability or to produce a copy of a system without access to the design from which it was originally produced.

For example, one might take the executable code of a computer program, run it to study how it behaved with different input and then attempt to write a program oneself which behaved identically (or better). An [integrated circuit](#) might also be reverse engineered by an unscrupulous company wishing to make unlicensed copies of a popular chip.

[[FOLDOP](#)]

28-11-2003

Reverse Polish Notation

[postfix notation](#)

00-00-0000

Ricoeur Paul

<[history of philosophy, biography](#)> French [philosopher](#) and theologian born in 1913. Influenced by the work of [Husserl](#) and [Marcel Ricoeur](#)' s *Le Volontaire et l' involontaire* (Freedom and Nature) (1950) analyzes human [volition](#) into [decision](#), movement, and consent - each of which is to be understood in relation to an involuntary analogue. *L' Homme faillible* (Fallible Man) (1965) and *La Symbolique du mal* (The Symbolism of Evil) (1967) provide a hermeneutic account of the [existence](#) and [nature](#) of human [evil](#). Recommended Reading: *A Ricoeur Reader*, ed. by Mario J. Valdes (Toronto, 1991); *Paul Ricoeur, Freud and Philosophy: An Essay on Interpretation*, tr. by Denis Savage (Yale, 1986); *Paul Ricoeur, Oneself As Another*, tr. by Kathleen Blarney (Chicago, 1994); *Paul Ricoeur and Narrative: Context and Contestation*, ed. by Joy Morny (Calgary, 1997); *Charles E. Reagan, Paul Ricoeur: His Life and His Work* (Chicago, 1998); *John B. Thompson, Critical Hermeneutics: A Study in the Thought of Paul Ricoeur and Jurgen Habermas* (Cambridge, 1984); and *The Philosophy of Paul Ricoeur*, ed. by Lewis Edwin Hahn (Open Court, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

28-11-2003

Riemann Georg Friedrich Bernhard

<[history of philosophy, biography](#)> German mathematician and physicist (1826-1866). [Riemann](#) developed field theory as a mathematical description of [phenomena](#) as apparently diverse as gravitation, magnetism, electricity, and light and contributed to the development of [topology](#) and non-Euclidean geometry.

Recommended Reading: *Bernhard Riemann, Gesammelte Mathematische Werke, Wissenschaftlicher Nachlass & Nachtrage: Collected Papers* (Springer Verlag, 1998); *Detlef Laugwitz, Bernhard Riemann, 1826-1866: Turning Points in the Conception of Mathematics*, tr. by Abe Shenitzer (Springer Verlag, 1999); and *Krzysztof Maurin, The Riemann Legacy: Riemannian Ideas in Mathematics and Physics* (Kluwer, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

28-11-2003

rights<[ethics](#)>

rights are entitlements to do something without interference from other people (negative rights) or entitlements that obligate others to do something positive to assist you (positive rights). Some rights (natural rights, human rights) belong to everyone by nature or simply by virtue of being human; some rights (legal rights) belong to people by virtue of their membership in a particular political state; other rights (moral rights) are based on acceptance of a particular moral theory.

26-03-2001

rigid designator

<[philosophical terminology](#)> an expression that refers to the same thing in every [possible world](#). According to Saul Kripke, [proper names](#) and terms that signify natural kinds (unlike definite descriptions) designate rigidly, so that we can make counterfactual assertions about their referents whether or not they exist in our world. Recommended Reading: Saul A. Kripke, Naming and Necessity (Harvard, 1982) and The New Theory of Reference - Kripke, Marcus, and Its Origins, ed. by Paul W. Humphreys and James H. Fetzer (Kluwer, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-11-2003

ring network

<[networking](#), [topology](#)> A network topology in which all nodes are connected to a single wire in a ring or point-to-point. There are no endpoints. This topology is used by token ring networks.

Compare: bus network, star network.

[\[FOLDOP\]](#)

28-11-2003

ring topology[ring network](#)

00-00-0000

Ritchie David George

<[history of philosophy](#), [biography](#)> Scottish idealist philosopher (1853-1903). [Ritchie](#) is usually remembered for his political thought, and primarily for his analysis of natural [rights](#) and for his criticisms of the positions of [Spencer Herbert](#) and [Mill](#) on the nature and role of the state in *The Principles of State Interference* (1891) and *Natural Rights* (1895). [Ritchie](#) is also known for his attempts to reconcile [Darwinism](#) and [idealist](#) thought in *Darwinism and Politics* (1889) and *Darwin and Hegel with Other Philosophical Studies* (1893). (Contributed by Will Sweet.) Recommended Reading: *The Collected Works of D. G. Ritchie*,

ed. by Peter Nicholson (Thoemmes, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-11-2003

robot

1. <[robotics](#)> A mechanical device for performing a task which might otherwise be done by a human, e.g. spraying paint on cars.

See also [cybernetics](#).

2. <[chat](#)> An IRC or MUD user who is actually a program. On IRC, typically the robot provides some useful service. Examples are NickServ, which tries to prevent random users from adopting nicks already claimed by others, and MsgServ, which allows one to send asynchronous messages to be delivered when the recipient signs on. Also common are "annoybots", such as KissServ, which perform no useful function except to send cute messages to other people. Service robots are less common on MUDs; but some others, such as the "Julia" robot active in 1990--91, have been remarkably impressive [Turing test](#) experiments, able to pass as human for as long as ten or fifteen minutes of conversation.

3. <[World-Wide Web](#)> spider.

02-12-2003

robust

Said of a system that has demonstrated an ability to recover gracefully from the whole range of exceptional inputs and situations in a given environment. One step below bulletproof. Carries the additional connotation of elegance in addition to just careful attention to detail. Compare smart, opposite: [brittle](#).

[\[Jargon File\]](#)

28-11-2003

Rohault Jacques

<[history of philosophy, biography](#)> French [philosopher](#) and physicist (1620-1672); author of System of Natural Philosophy (1667). As a follower of [Descartes](#), [Rohault](#) argued that animal behavior can be explained in purely mechanistic terms. But, unlike many of his fellow Cartesians, he held that in human beings, the [mind](#) and the body participate in reciprocal relations of genuine causal interaction.

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-11-2003

romanticism<[aesthetics](#)>

name for the theory and movement of art and philosophy that developed in the nineteenth century in opposition to [classicism](#). The term is not clearly defined and has different meanings in different disciplines. In art and aesthetics the term usually refers to the various attributes of Romantic art in contrast with classicism and [naturalism](#), including a free-flowing style, expression of emotion, concern with values and personal experience, etc. In philosophy the term is often equivalent to [emotionalism](#). (References from [aestheticism](#), [classicism](#), [emotionalism](#), and [naturalism](#).)

[\[The Ism Book\]](#)

Edited by Giovanni Benzi

27-03-2001

Rorty Richard

<[history of philosophy, biography](#)> American [philosopher](#) born in 1931; author of *Consequences of Pragmatism* (1982) and *Contingency, Irony, and Solidarity* (1989). Extolling the critical work of [Dewey](#), [Heidegger](#), and [Wittgenstein](#), [Rorty](#) attacked the foundationalist presumptions of traditional [epistemology](#) in *Philosophy and the Mirror of Nature* (1979), proposing instead a postmodern conception of philosophical method as edifying discourse. [Rorty](#)' s philosophical papers are collected in *Objectivity, Relativism, and Truth, Essays on Heidegger and Others, and Truth and Progress*. Recommended Reading: *Richard Rorty, Philosophy and Social Hope* (Penguin, 2000); *Reading Rorty: Critical Responses to Philosophy and the Mirror of Nature and Beyond*, ed. by Alan Malachowski (Blackwell, 1990); *Rorty & Pragmatism: The Philosopher Responds to His Critics*, ed. by Herman J. Saatkamp, Jr. (Vanderbilt, 1995); *Rorty: And His Critics*, ed. by Robert B. Brandom (Blackwell, 2000); David L. Hall, *Richard Rorty: Prophet and Poet of the New Pragmatism* (SUNY, 1994); *Recovering Pragmatism' s Voice: The Classical Tradition, Rorty, and the Philosophy of Communication*, ed. by Lenore Langsdorf and Andrew R. Smith (SUNY, 1995); and *Rorty*, ed. by Matthew Festenstein and Simon Thompson (Polity, 2001).

[\[A Dictionary of Philosophical Terms and Names\]](#)

02-12-2003

Ross William David

<[history of philosophy, biography](#)> British moral [philosopher](#) (1877-1971) who also produced valuable translations of the philosophical works of [Aristotle](#). In *The Right and the Good* (1930) [Ross](#) criticized the ethical theory of [Moore](#) and offered in its place an intuitionist theory giving central importance to the possession of prima facie moral duties to perform certain actions. Recommended Reading: *W. David Ross, Foundations of Ethics* (Oxford, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

12-05-2002

Rousseau Jean-Jacques

<[history of philosophy, biography](#)> as a brilliant and self-educated (but undisciplined and unconventional) thinker, Jean-Jacques Rousseau (1712-1778) spent most of his life being driven by controversy back and forth between Paris and his native Geneva. His autobiographical *Les Confessions* (Confessions) (1783) offer a thorough (if somewhat self-serving) account of his turbulent life. [Rousseau](#) first attracted wide-spread attention with his prize-winning essay *Discours sur les Sciences et les Arts* (Discourse on the Sciences and the Arts) (1750), in which he decried the harmful effects of modern civilization. He continued to explore this theme throughout his career, proposing in *Smile, ou l'Éducation* (1762) a method of education that would minimize the damage by noticing, encouraging, and following the natural proclivities of the student instead of striving to eliminate them. [Rousseau](#) began to apply these principles to political issues specifically in his *Discours sur l'origine et les fondements de l'égalité parmi les hommes* (Discourse on the Origin of Inequality) (1755), which maintains that every variety of injustice found in human society is an artificial result of the control exercised by defective political and intellectual influences over the healthy natural impulses of otherwise noble savages. The alternative he proposed in *Du contrat social* (On the Social Contract) (1762) is a civil society voluntarily formed by its citizens and wholly governed by reference to the [general will](#) (Fr. *volonté générale*) expressed in their unanimous consent to authority. [Rousseau](#) also wrote *Discourse on Political Economy* (1755), *Constitutional Program for Corsica* (1765), and *Considerations on the Government of Poland* (1772). Although the authorities made every effort to suppress [Rousseau](#)'s writings, the ideas they expressed, along with those of [Locke](#), were of great influence during the French Revolution. - For a very different interpretation of that historical event, you might wish to look at Edmund [Burke](#)'s *Reflections on the Revolution in France* (1790).

Recommended Reading:

Primary sources:

Jean-Jacques Rousseau, *Oeuvres complètes*, ed. by B. Gagnebin and M. Raymond (Pliade, 1959-); Jean-Jacques Rousseau, *The Social Contract*, tr. by Maurice Cranston (Penguin, 1987); Jean-Jacques Rousseau, *The Discourses and Other Early Political Thought*, ed. by Victor Gourevitch (Cambridge, 1997); Jean-Jacques Rousseau, *Confessions*, ed. by Patrick Coleman and Angela Scholar (Oxford, 2000); Jean-Jacques Rousseau, *Emile or on Education*, tr. by Allan Bloom (Basic, 1979).

Secondary sources:

Robert Wokler, *Rousseau* (Oxford, 1995); Elizabeth Rose Wingrove, *Rousseau's Republican Romance* (Princeton, 2000).

Additional on-line information about Rousseau includes:

Nicholas Dent's article in *The Oxford Companion to Philosophy*.
An introduction to Rousseau's political thought by Frederick Watkins.

Also see: the social contract, philosophy of education, French philosophy, the general will, master and slave, and political philosophy.

The thorough collection of resources at [EpistemeLinks.com](#).

A brief article in *The Internet Encyclopedia of Philosophy*.

The article in the *Columbia Encyclopedia* at [Bartleby.com](#).

An article on *The Social Contract* in *The Catholic Encyclopedia*.

Snippets from Rousseau (French and English) in *The Oxford Dictionary of Quotations*.

Björn Christensson's brief guide to Internet resources.

A brief entry in *The Macmillan Encyclopedia 2001*.

[\[A Dictionary of Philosophical Terms and Names\]](#)

02-12-2003

routine

[subroutine](#)

00-00-0000

Royce Josiah

<[history of philosophy](#), [biography](#)> American [philosopher](#) (1855-1916). [Royce](#)' s subtle reasoning in defence of absolute [idealism](#) in *The Religious Aspect of Philosophy* (1885) and *The World and the Individual* (1901) fostered (in opposition) the development of [pragmatism](#) by [James](#). Recommended Reading: *The Philosophy of Josiah Royce* (Hackett, 1982); *Josiah Royce, The Spirit of Modern Philosophy* (Dover, 1983); *Josiah Royce, Metaphysics*, ed. by William Ernest Hocking and Frank Oppenheim (SUNY, 1998); *Josiah Royce: Selected Writings*, ed. by John E. Smith and William Kluback (Paulist, 1988); *John Clendenning, The Life and Thought of Josiah Royce* (Vanderbilt, 1998); and *Griffin Trotter, On Royce* (Wadsworth, 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

02-12-2003

Ruddick Sara Loop

<[history of philosophy](#), [biography](#)> American [philosopher](#) born in 1935. In *Maternal Thinking: Towards a Politics of Peace* (1989), [Ruddick](#) argues that focus on preserving, fostering, and training children has a transformative effect on moral judgment and practice. People who empathize with others, teach the need for interpersonal respect, and aim for reconciliation, she argues, can be freed from the violent effects of (masculine) human aggression. Recommended Reading: *Mother Troubles: Rethinking Contemporary Maternal Dilemmas*, ed. by Julia E. Hanigsberg, Sara Ruddick, and Amy Caldwell (Beacon, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

12-05-2002

rule

<[philosophy of mind](#), [ethics](#), [philosophy of AI](#)>
a theoretical device for the explanation of behavioural regularities and/or [cognitive](#) states.

Rules are generally, but not always, characterised in terms of causally-operative mental [representations](#).

See [computation](#), [symbolicism](#), [connectionism](#)

Daniel Barbiero

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

02-12-2003

rules of inference

<[logic](#)>
Explicit rules for producing a [theorem](#) when given one or more other [theorems](#). [functions](#) from sequences of [theorems](#) to [theorems](#). In a formal system they should be formal (that is, syntactical or typographical) in nature, and work without reference to the meanings of the strings they manipulate. Also called rules of transformation, rules of production. See for example

[[Glossary of First-Order Logic](#)]

16-03-2001

run-time

(Or "runtime", occasionally "[run time](#)").

1. The elapsed time to perform a computation on a particular computer, that is the period of time during which a program is being executed, as opposed to compile-time or load time.
2. The amount of time a processor actually spends on one process and not on other processes or overhead (see time-sharing).

02-12-2003

Russell Bertrand Arthur William

<[history of philosophy, biography](#)> orphaned at the age of four, [Bertrand Russell](#) (1872-1970) studied (and later taught) both [mathematics](#) and [philosophy](#) at Cambridge. As the grandson of a British prime minister, [Russell](#) devoted much of his public effort to matters of general social concern. Jailed as a pacifist during the First World War, he later supported the battle against Fascism but deplored the development of weapons of mass destruction, as is evident in "The Bomb and Civilization" (1945), New Hopes for a Changing World (1951), and his untitled last essay. Throughout his life, [Russell](#) was an outspoken critic of organized religion, detailing its harmful social consequences in "Why I Am Not a Christian" (1927) and defending an [agnostic](#) alternative in "A Free Man' s Worship" (1903). His Marriage and Morals (1929) is an attack upon the repressive character of conventional sexual [morality](#). [Russell'](#) s Autobiography (1967) is an excellent source of information, analysis, and self-congratulation regarding his interesting life. Its pages include his eloquent statements of "What I Have Lived For" and "A Liberal Decalogue". [Russell](#) was awarded the Nobel Prize for literature in 1950. Through an early appreciation of the philosophical work of [Leibniz](#), published in A Critical Exposition of the Philosophy of Leibniz (1900), [Russell](#) came to regard logical analysis as the crucial [method](#) for [philosophy](#). In Principia Mathematica (1910-13), written jointly with Alfred North [Whitehead](#), he showed that all of [arithmetic](#) could be deduced from a restricted set of logical axioms, a thesis defended in less technical terms in [Russell'](#) s Introduction to Mathematical Philosophy (1919). Applying similarly analytical methods to philosophical problems, [Russell](#) believed, could resolve disputes and provide an adequate account of human experience. Indeed, his A History of Western Philosophy (1946) tried to show that the philosophical tradition had moved slowly but steadily toward just such a culmination. The attempt to account clearly for every constituent of ordinary assertions soon proved problematic, however. [Russell](#) proposed a ramified theory of types in order to avoid the self-referential paradoxes that might otherwise emerge from such abstract notions as "the barber who shaves all but only those who do not shave themselves" or "the class of all classes that are not members of themselves". In the theory of descriptions put forward in On Denoting (1905), [Russell](#) argued that proper analysis of denoting phrases enables us to represent all thought symbolically while avoiding philosophical difficulties about non-existent objects. As his essay on "Vagueness" (1923) shows, [Russell](#) long persisted in the belief that adequate explanations could provide a sound basis for human [speech](#) and [thought](#). In similar fashion, the [analysis](#) of statements attributing a common predicate to different subjects in "On the Relations of Universals and Particulars" (1911) convinced [Russell](#) that both particulars and universals must really exist. He developed this realistic view further in The Problems of Philosophy (1912). Our Knowledge of the External World (1914) continues this project by showing how [Russell'](#) [philosophy](#) of logical atomism can construct a world of public physical objects using private individual experiences as the atomic facts from which one could develop

a complete description of the world. Although [Russell](#)'s philosophical positions were soon eclipsed by those of [Wittgenstein](#) and the logical positivists, his model of the possibilities for analytic thought remains influential.

Recommended Reading:

Primary sources:

Bertrand Russell, *A Critical Exposition of the Philosophy of Leibniz: With an Appendix of Leading Passages* (Routledge, 1993); Alfred North Whitehead and Bertrand Arthur Russell, *Principia Mathematica* (Cambridge, 1997); Bertrand Russell, *The Principles of Mathematics* (Norton, 1996); Bertrand Russell, *Introduction to Mathematical Philosophy* (Dover, 1993); Bertrand Russell, *The Philosophy of Logical Atomism*, ed. by David Pears (Open Court, 1985); Bertrand Russell, *The Problems of Philosophy* (Oxford, 1998); Bertrand Russell, *Why I Am Not a Christian, and Other Essays on Religion and Related Subjects* (Simon & Schuster, 1977); Bertrand Russell, *A History of Western Philosophy and Its Connection With Political and Social from the Earliest Times to the Present Day* (Simon & Schuster, 1975); *The Autobiography of Bertrand Russell* (Routledge, 2000).

Secondary sources:

Ray Monk, *Russell* (Routledge, 1999); *Essays on Bertrand Russell*, ed. by E. D. Klemke (Illinois, 1971); John G. Slater, *Bertrand Russell* (St. Augustine, 1994); Peter Hylton, *Russell, Idealism, and the Emergence of Analytic Philosophy* (Oxford, 1992); Jan Dejnozka, *Bertrand Russell on Modality and Logical Relevance* (Ashgate, 1999).

Additional on-line information about Russell includes:

McMaster University' s *The Bertrand Russell Archives*.
The Bertrand Russell Society Home Page, hosted by John Lenz.
A.D. Irvine' s article in *The Stanford Encyclopedia of Philosophy*.
Mark Sainsbury' s article in *The Oxford Companion to Philosophy*.

Also see: acquaintance and description, analysis, analytic philosophy, logical atomism, Cambridge philosophy, descriptions, logical empiricism, English philosophy, impredicative definition, logic, logically proper names, logicism, philosophy of mathematics, mnemonic causation, names, the persecution of philosophers, the axiom of reducibility, referential opacity, the nature of relations, skepticism about religion, Russell' s paradox, set theory, ' to be' , the verb, the theory of types, and vicious circles.

The article in the *Columbia Encyclopedia* at Bartleby.com.

The thorough collection of resources at *EpistemeLinks.com*.

Eric Weisstein' s discussion at *Treasure Trove of Scientific Biography*.

Snippets from Russell in *The Oxford Dictionary of Quotations*.

Bjoern Christensson' s brief guide to Internet material on Russell.

A short article in *Oxford' s Who' s Who in the Twentieth Century*.

An entry in *The Oxford Dictionary of Scientists*.

Discussion of Russell' s logical treatment of mathematics from *Mathematical MacTutor*.

A brief entry in *The Macmillan Encyclopedia 2001*.

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02-12-2003

Ryle Gilbert

<[history of philosophy](#), [biography](#)> Oxford professor and editor of the journal *Mind* for nearly twenty-five years, [Gilbert Ryle](#) (1900-1976) had an enormous influence on the development of twentieth-century [analytic philosophy](#). In "Systematically Misleading Expressions" (1932) [Ryle](#) proposed a philosophical method of dissolving problems by correctly analyzing the derivation of inappropriate abstract inferences from ordinary uses of [language](#). Applying this method more generally in "Categories" (1938), [Ryle](#) showed how the misapplication of an ordinary term can result in a category mistake by which philosophers may be seriously misled. Dealing with the traditional mind-body problem in *The Concept of Mind* (1949), [Ryle](#) sharply criticized Cartesian dualism, arguing that adequate descriptions of human behavior need never refer to anything but the operations of human bodies. This form of logical behaviorism became a standard view among ordinary language - philosophers for several decades. [Ryle](#)' s *Dilemmas* (1954) and *Collected Papers*

(1971) cover a wide range of topics in philosophical [logic](#) and the history of philosophy.

Recommended Reading:

Primary sources:

Gilbert Ryle, *The Concept of Mind* (Chicago, 2000);

Gilbert Ryle, *Dilemmas* (Cambridge, 1954).

Additional on-line information about Ryle includes:

Geoffrey J. Warnock' s article in *The Oxford Companion to Philosophy*.

Also see: analytic philosophy, the category mistake, dualism, English philosophy, the ghost in the machine, infinite regress, philosophy of mind, Oxford philosophy, privileged access, and topic-neutrality.

The article in the *Columbia Encyclopedia* at [Bartleby.com](#).

The thorough collection of resources at [EpistemeLinks.com](#).

Snippets from Ryle in *The Oxford Dictionary of Quotations*.

A short article in *Oxford' s Who' s Who in the Twentieth Century*.

A brief entry in *The Macmillan Encyclopedia 2001*.

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02-12-2003

Saadia Gaon Sa adyah ben Joseph

<[history of philosophy](#), [biography](#)> Jewish philosopher (882-942) and linguist who translated classic Hebrew literature into Arabic and offered rational arguments in defense of religious doctrine in his "Sefer ha-Nivhar ha-Emunot ve-D' eol" ("The Book of Critically Chosen Beliefs and Convictions") (933). According to Saadia, the destructive force of pleasure in human life can be overcome only by attention to the Torah.

Recommended Reading: Saadia Ben Joseph Al-Fayyumi, "The Book of Theodicy: Translation and Commentary on the Book of Job", tr. by L. E. Goodman (Yale, 1988) and "The Jewish Philosophy Reader", ed. by Daniel H. Frank , Oliver Leaman, and Charles H. Manekin (Routledge, 2000).

Also see [noesis](#) e [CoIE](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

17-09-2003

safety-critical system

A computer, electronic or electromechanical system whose failure may cause injury or death to human beings. E.g. an aircraft or nuclear power station control system. Common tools used in the design of safety-critical systems are [redundancy](#) and [formal methods](#).

[\[FOLDOC\]](#)

16-03-2001

Saint-Simon Claude-Henri de Rouvroy

<[history of philosophy](#), [biography](#)> French political thinker (1760-1825) whose socialism greatly influenced the work of [Comte](#) and [Marx](#). Saint-Simon' s "Du syst me industriel" ("On the Industrial System") (1821) acknowledged the functional difference between distinct social classes, decried reliance on a feeble bureaucracy, and suggested that the organized state would wither away once economic benefits have been equitably distributed. "Letters from an Inhabitant of Geneva" (1803) offers a brief statement of several of these notions. Saint-Simon' s criticism of traditional religion may be found in "Nouveau christianisme" ("New Christianity") (1825).

Recommended Reading: Henri Comte De Saint-Simon: "Selected Writings", ed. by F.M.H. Markham (Hyperion, 1991); Henri Saint-Simon: "Selected Writings on Science, Industry and Social Organization", ed. by Keith Taylor (Holmes & Meier, 1975); and Emmanuel De Witt, "Saint-Simon Et Le Systeme Industriel"

(Frankfort, 1973).

[\[A Dictionary of Philosophical Terms and Names\]](#)

17-09-2003

salva veritate

<[philosophical terminology](#)> Latin for «saving the [truth](#)». If two expressions can be interchanged without changing the truth-value of the statements in which occur, they are said to be substitutable salva veritate.

[\[A Dictionary of Philosophical Terms and Names\]](#)

21-03-2002

sanction moral

<[philosophical terminology](#)> an extrinsic force that is supposed to motivate moral agents to perform their duties. Positive and negative sanctions commonly include reward and punishment by the state, praise and blame by other people, and the dictates of one' s own [conscience](#). The natural consequences of one' s actions are not usually regarded as sanctions.

Recommended Reading: Martin Lawrence Friedland, "Sanction and Rewards in the Legal System: A Multidisciplinary Approach" (Toronto, 1989) and Herbert L. Packer, "Limits of the Criminal Sanction "(Stanford, 1968).

[\[A Dictionary of Philosophical Terms and Names\]](#)

21-03-2002

Santayana George

<[history of philosophy, biography](#)> Spanish-American philosopher(1863-1952) who defended the primacy of aesthetic value in human life. In "Scepticism" and "Animal Faith" (1923) Santayana argued that all human [knowledge](#) derives from an instinctive urge to believe, even though [objective truth](#) necessarily lies beyond our capacity. He also wrote the multivolume works "The Life of Reason" (1905-6), extolling the unique values of a spiritual appreciation of the universe, and "Realms of Being" (1927-1940), identifying [matter](#), spirit, [essence](#), and [truth](#) as his basic categories.

Recommended Reading: George Santayana, "Sense of Beauty: Being the Outline of Aesthetic Theory" (Dover, 1985); George Santayana, "The Genteel Tradition: Nine Essays", ed. by Douglas L. Wilson and Robert Dawidoff (Nebraska, 1998); George Santayana, "Persons and Places" (MacMillan, 1981); George Santayana, "The Last Puritan: A Memoir in the Form of a Novel", ed. by Herman J., Jr. Saatkamp and William G. Holsberger (MIT, 1995); "George Santayana: A Bibliographical Checklist 1880-1980", ed. by Herman J. Saatkamp and John Jones (Phil. Doc. Center, 1982); Timothy L. S. Sprigge, "Santayana: An Examination of His Philosophy" (Routledge, 1995); Michael P. Hodges and John Lachs, "Thinking in the Ruins: Wittgenstein and Santayana on Contingency" (Vanderbilt, 2000); and Irving Singer, "George Santayana, Literary Philosopher" (Yale, 2000). Also see [SEP](#), [T.P. Davis](#), [ColE](#), [ELC](#), and [BIO](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

21-03-2002

Sartre Jean-Paul

<[history of philosophy](#), [biography](#)> Educated at Paris and Goettingen, Jean-Paul Sartre (1905-1980) participated actively in the French resistance to German occupation. Recognizing a connection between the principles of [existentialism](#) and the concerns of social and political struggle, he wrote [philosophy](#), fiction, and political treatises, becoming one of the most respected leaders in post-war French culture. Sartre declined the Nobel Prize for literature in 1964. "L' être et le né/ant" ("Being and Nothingness") (1943) offers an account of [existence](#) in general, including both that of objects and the being-for-itself that only humans have. Sartre devotes particular concern to human emotions and [action](#), including the self-deception by which one may try to elude the [consequences](#) of [freedom](#). In the lecture "L' Existentialisme est un humanisme" ("Existentialism is a Humanism") (1946), Sartre described the human condition in summary form: [freedom](#) entails total [responsibility](#), in the face of which we experience anguish, forlornness, and despair. Sartre' s Marxist inclinations are more evident in Critique de la raison dialectique (Dialectical Reason) (1960).

Recommended Reading:

Primary sources: "The Philosophy of Jean-Paul Sartre", ed. by Robert D. Cummings (Random House, 1972); Jean-Paul Sartre, "Being and Nothingness: A Phenomenological Essay on Ontology", tr. by Hazel E. Barnes (Washington Square, 1993); Jean-Paul Sartre, "Existentialism and Human Emotions" (Lyle Stuart, 1984).

Secondary sources: "The Cambridge Companion to Sartre", ed. by Christina Howells (Cambridge, 1992); "Feminist Interpretations of Jean-Paul Sartre", ed. by Julien S. Murphy (Penn. State, 1999); Gregory McCulloch, "Using Sartre: An Analytical Introduction to Early Sartrean Themes" (Routledge, 1994).

Additional on-line information about Sartre includes: Katharena Eiermann' s discussion of Sartre at [the Realm of Existentialism](#). Also see: abandonment, [bad faith](#), dirty hands, emotion and feeling, [existence](#) precedes [essence](#), [existentialism](#), for-itself and in-itself, French philosophy, self-deception, sexual morality, and slime. The [article in the Columbia Encyclopedia](#) at Bartleby.com. [Heiner Wittman' s site](#) on Sartre' s aesthetics. The thorough collection of [resources at EpistemeLinks.com](#). Andy Blunden' [biography of Sartre](#). Snippets from Sartre (French and English) in "The Oxford Dictionary of Quotations". A short article in Oxford' s "Who' s Who in the Twentieth Century". A brief entry in The Macmillan Encyclopedia 2001.

[[A Dictionary of Philosophical Terms and Names](#)]

18-09-2003

satisfaction

<[logic](#)>

1. In truth-functional propositional logic, a [wff](#) A is satisfied [iff](#) at least one row of its truth-table makes it true, i.e. [iff](#) A is either a contingency or a tautology.

2. In [predicate](#) logic, a [wff](#) A is satisfied [iff](#) there is a sequence of objects from the domain of some interpretation such that A is true for that sequence. What it means for a [wff](#) to be true for a sequence is [satisfaction](#) defined differently for several distinct kinds of [predicate](#) logic [wff](#), e.g. quantified [wffs](#), atomic [wffs](#), [wffs](#) compounded with the various connectives of the language, and

naked propositional symbols. Among atomic [wffs](#), satisfaction is defined differently depending on whether the [arguments](#) of the [predicate](#) are constants, variables, or [functions](#), and in the last case, whether the [arguments](#) of the [functions](#) are constants, variables, or [functions](#). Hence the concept of satisfaction cannot be made more precise without giving each of perhaps a dozen precise tests for different kinds of [wff](#). See [truth for an interpretation](#).

16-03-2001

satisfiability

<[logic](#)>

A [wff](#) is satisfiable [iff](#) there is some interpretation in which it is satisfied.

Simultaneous satisfiability

A set of [wffs](#) is simultaneously satisfiable [iff](#) there is an interpretation in which each member of the set is satisfied. In [predicate logic](#), each member may be satisfied by a different sequence from that interpretation, but all must be satisfied in the same interpretation.

[Glossary of First-Order Logic]

25-09-2003

satisfiability problem

A problem used, as an example, in complexity theory. It can be stated thus:

Given a Boolean expression E, decide if there is some [assignment](#) to the [variables](#) in E such that E is true.

A Boolean expression is composed of Boolean [variables](#), (logical) [negation](#) (NOT), (logical) [conjunction](#) (AND) and parentheses for grouping. The satisfiability problem was the first problem to be proved to be NP-complete (by Cook).

["Introduction to Automata Theory, Languages, and Computation" by Hopcroft and Ullman, pub. Addison-Wesley].

[[FOLDOC](#)]

25-09-2003

satisficing

<[philosophy of mind](#), [philosophy of AI](#)>

a concept, due to Herbert Simon, which identifies the decision making process whereby one chooses an option that is, while perhaps not the best, good enough.

See [practical reasoning](#)

[[Dictionary of Philosophy of Mind](#)]

25-09-2003

Satyagraha

<[philosophical terminology](#)> Sanskrit term (literally, truth-force) used by [Gandhi](#) for the practice of non-violence in the face of political oppression.

Recommended Reading: M. K. Gandhi, "Non-Violent Resistance" (Dover, 2001); M. K. Gandhi, "Satyagraha in South Africa" (Greenleaf, 1979); and K. S. Bharathi, "Satyagraha of Mahatma Gandhi" (South Asia, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

21-03-2002

Saussure Ferdinand de

<[history of philosophy, biography](#)> Swiss linguist (1857-1913). Saussure' s emphasis on the communicative value of [language](#) in "Cours de linguistique gènèrale" ("Course in General Linguistics") (1916) constituted the foundation of modern [structuralism](#).

According to Saussure, each signifying [concept](#) is produced in the context of a [system](#) of differences, the range of alternative choices that its user might have employed in its stead. Thus, the [meaning](#) of a word has less to do with its referent than with its relation to other words. On this view, the structured [language](#) of a [society](#) is a closed [system](#) whose [coherence](#) and generality are independent of what it signifies.

Recommended Reading: Jonathan Culler, "Ferdinand De Saussure" (Cornell, 1986); David Holdcroft, "Saussure: Signs, System and Arbitrariness" (Cambridge, 1991); Roy Harris, "Reading Saussure: A Critical Commentary on the Cours De Linquistique Generale" (Open Court, 1987); Paul J. Thibault, "Re-Reading Saussure: The Dynamics of Signs in Social Life" (Routledge, 1996); and Roy Harris, "Language, Saussure, and Wittgenstein: How to Play Games With Words" (Routledge, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

21-03-2002

scalability

How well a solution to some problem will work when the size of the problem increases. For example, a central server of some kind with ten clients may perform adequately but with a thousand clients it might fail to meet response time requirements. In this case, the average response time probably scales linearly with the number of clients, we say it has a [complexity](#) of O(N) ("order N") but there are problems with other complexities. E.g. if we want N nodes in a network to be able to communicate with each other, we could connect each one to a central exchange, requiring O(N) wires or we could provide a direct connection between each pair, requiring O(N^2) wires (the exact number or formula is not usually so important as the highest power of N involved).

[[FOLDOC](#)]

16-03-2001

scalar

1. <[mathematics](#)> A single [number](#), as opposed to a [vector](#) or [matrix](#) of [numbers](#). Thus, for example, "scalar multiplication" refers to the operation of multiplying one [number](#) (one scalar) by another and is used to contrast this with "matrix multiplication" etc.

2. <[architecture](#)> In a [parallel processor](#) or [vector processor](#), the "scalar processor" handles all the sequential operations - those which cannot be parallelised or vectorised.

See also [superscalar](#).

3. <[programming, PI](#)> A data type in [Perl](#) combining what in many other languages is either a [string](#) or a [number](#).

[[FOLDOC](#)]

16-03-2001

scepticism

<[epistemology](#)> any of a class of views that denies some claim to [knowledge](#).

See [Cartesian scepticism](#)

[Pete Mandik](#)

[[Dictionary of Philosophy of Mind](#)]

16-03-2001

Schelling Friedrich Wilhelm Joseph von

<[history of philosophy, biography](#)> German philosopher (1775-1854) whose "System des Transzendentalen Idealismus" ("System of Transcendental Idealism") (1800) introduced Romantic elements into the development of post-Kantian idealism. Arguing that [Fichte](#)'s [idealism](#) put too much emphasis on the merely [subjective](#) individual ego, [Schelling](#) proposed a notion of [objective transcendental consciousness](#). His identification of nature with intellect in "Darstellung meines Systems der Philosophie" ("Presentation of my System of Philosophy") (1801), and "Vorlesungen ueber die Methode des akademischen Studiums" ("Lectures on the Method of Academic Study") (1803) provided a basis from which [Hegel](#) would derive the fully considered [concept](#) of the [Absolute](#).

Recommended Reading: Dale E. Snow, "Schelling and the End of Idealism" (SUNY, 1996); Andrew Bowie, "Schelling and Modern European Philosophy: An Introduction" (Routledge, 1994); "Schelling: Between Fichte and Hegel", ed. by Christoph Asmuth, Alfred Denker, and Michael Vater (Benjamins, 2001); and Martin Heidegger, "Schelling' s Treatise on the Essence of Human Freedom" (Ohio, 1984).

[[A Dictionary of Philosophical Terms and Names](#)]

26-03-2002

schema

<[logic](#)> (Plural: schemata). See [axiom schema](#), [tautology schema](#), [theorem schema](#)

16-03-2001

Schiller Johann Christoph Friedrich von

<[history of philosophy](#), [biography](#)> German philosopher and poet (1759-1805) who writes a series of popular «Sturm und Drang» plays, including "Die Raeber and Wilhelm Tell". Although he criticized [Kant](#)' [æthical](#) theory in "Ueber Anmuth und Wuerde" ("On Grace and Dignity") (1793), Schiller applied Kantian notions to the sensuous appreciation of [aesthetic](#) experience in "Briefe ueber die Aesthetische Erziehung des Menschen" ("Letters on the Aesthetic Education of Man") (1795).

Recommended Reading: Frederick Schiller, "Aesthetical and Philosophical Essays" (Erlbaum, 2001); Friedrich Von Schiller, "Wilhelm Tell", tr. by William F. Mainland (Chicago, 1973); Friedrich Schiller, "Five Plays", tr. by Robert David MacDonald (Consortium, 1998); and Patricia Ellen Guenther-Gleason, "On Schleiermacher and Gender Politics" (Trinity, 1997).

[\[A Dictionary of Philosophical Terms and Names\]](#)

26-03-2002

Schleiermacher Friedrich Daniel Ernst

<[history of philosophy](#), [biography](#)> German philosopher and theologian (1768-1834); author of "Der Christliche Glaube" ("The Christian Faith") (1822). In "Über die Religion. Reden an Gebildeten unter ihren Veraechtern" ("On Religion: Speeches to its Cultured Despisers") (1799), Schliermacher proposed that religious experience be based on human emotions (especially the feeling of dependency) rather than on [reason](#). He also founded the University of Berlin, translated the dialogues of [Plato](#) into German, and invented the modern study of [hermeneutics](#).

Recommended Reading: Friedrich Daniel Ernst Schleiermacher, "Kritische Gesamtausgabe", ed. by Hermann Fischer and Gerhard Ebeling (de Gruyter, 1994); Friedrich Schleiermacher, "Hermeneutics and Criticism: And Other Writings", ed. by Andrew Bowie (Cambridge, 1999); James M. Brandt, "All Things New: Reform of Church and Society in Schleiermacher' s Christian Ethics" (Westminster, 2001); Thandeka, "The Embodied Self: Friedrich Schleiermacher' s Solution to Kant' s Problem of the Empirical Self" (SUNY, 1995); and Patricia Ellen Guenther-Gleason, "On Schleiermacher and Gender Politics" (Trinity, 1997).

[\[A Dictionary of Philosophical Terms and Names\]](#)

26-03-2002

Schlick Moritz

<[history of philosophy](#)> Austrian philosopher (1882-1936). As the personable leader of the [Vienna Circle](#), Schlick was instrumental in the formation of the logical positivist movement, whose work is preserved in the "Gesammelte Aufsätze" ("Collected Essays") (1938). Some of Schlick's basic principles are expressed in "Allgemeine Erkenntnislehre" ("Epistemology & Modern Physics") (1925). Unlike many of his fellow positivists, Schlick was willing to include [ethics](#) (understood as a strictly empirical study of human desires and their consequences for human action) within the province of meaningful (verifiable) scientific discourse, as in "Fragen der Ethik" ("Problems of Ethics") (1930).

Recommended Reading: Moritz Schlick, "General Theory of Knowledge", tr. by Albert E. Blumberg and Herbert Feigl (Open Court, 1985); "Moritz Schlick", ed. by Brian McGuinness (Reidel, 1986); "Logical Empiricism at Its Peak: Schlick, Carnap, and Neurath", ed. by Sahotra Sarkar (Garland, 1996); and "Rationality and Science: A Memorial Volume for Moritz Schlick", ed. by Eugene T. Gadol (Springer Verlag, 1983).

[[A Dictionary of Philosophical Terms and Names](#)]

26-03-2002

Scholastic logic

Traditional, scholastic, or [aristotelian logic](#)

28-09-2003

scholasticism

<[philosophical terminology](#)> philosophical study as practiced by Christian thinkers in medieval universities. The scholastics typically relied upon ancient authorities as sources of [dogma](#) and engaged in elaborate disputations over their proper [interpretation](#). These practices were largely discontinued by philosophers of the [Renaissance](#).

Recommended Reading: Etienne Gilson, "The Spirit of Medieval Philosophy", tr. by A.H.C. Downes (Notre Dame, 1991); John W. Baldwin, "The Scholastic Culture of the Middle Ages, 1000-" (Waveland, 1997); "Individuation in Scholasticism: The Later Middle Ages and the Counter-Reformation 1150-1650", ed. by Jorge J. E. Gracia (SUNY, 1994); and "Scholasticism: Cross-Cultural and Comparative Perspectives", ed. by Jose Ignacio Cebazon and Laurie L. Patton (SUNY, 1998).

[[A Dictionary of Philosophical Terms and Names](#)]

26-03-2002

Schopenhauer Arthur

<[history of philosophy, biography](#)> German philosopher (1788-1860). Rejecting the [idealism](#) of [Hegel](#), Schopenhauer's "Die Welt als Wille und Vorstellung" (vol. 1-4) ("The World as Will and Representation") (1818) (vol. 1-2) employed [Kant](#)'s notion of the [noumenal](#) self as the foundation for a comprehensive account of human nature, in contrast to the [phenomenal](#) realm of objects. We are, for better or (much more commonly, according to the pessimistic Schopenhauer) for worse, manifestations of our own [wills](#), rarely exhibiting the universal

compassion for others that would render our egoistic impulses aesthetically valuable. Only by eliminating desire can we hope to achieve harmony and peace, he argued, but even that is possible only in [ascetic](#) living or death. Our very name for the "world", Schopenhauer suggested, is an acronym for the characteristics of human life - woe, misery, suffering, and death (Ger. WELT = Weh, Elend, Leid, Tod).

Recommended Reading: Arthur Schopenhauer, "Philosophical Writings", ed. by Wolfgang Schirmacher (Continuum, 1994); Arthur Schopenhauer, "Prize Essay on the Freedom of the Will", ed. by Gunter Zoller and Eric F. J. Payne (Cambridge, 1999); Bryan Magee, "The Philosophy of Schopenhauer" (Oxford, 1997); Patrick Gardiner, "Schopenhauer" (St. Augustine, 1997); "The Cambridge Companion to Schopenhauer", ed. by Christopher Janaway (Cambridge, 1999); Christopher Janaway, "Schopenhauer" (Oxford, 1994); Michael Tanner, "Schopenhauer" (Routledge, 1999); Rudiger Safranski, "Schopenhauer and the Wild Years of Philosophy" (Harvard, 1991); and Christopher Janaway, "Self and World in Schopenhauer's Philosophy" (Oxford, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

26-03-2002

Schrodinger Erwin

<[history of philosophy, biography](#)> Austrian physicist (1887-1961) who established modern wave mechanics and employed thought-experiments about the superposition of contradictory states to explore the apparently paradoxical consequences of quantum mechanics. Schrodinger shared the Nobel Prize for Physics in 1933.

Recommended Reading: Erwin Schrodinger, "Statistical Thermodynamics" (Dover, 1989); Erwin Schrodinger, "Space-Time Structure" (Cambridge, 1985); Erwin Schrodinger, "What Is Life?: The Physical Aspect of the Living Cell" with ' Mind and Matter' and ' Autobiographical Sketches' ", ed. by Roger Penrose (Cambridge, 1992); Walter Moore, "Schrodinger: Life and Thought" (Cambridge, 1989); Jagdish Mehra and Helmut Rechenberg, "Erwin Schrodinger and the Rise of Wave Mechanics: Schrodinger in Vienna and Zurich 1887-1925" (Springer Verlag, 2000); and John Gribbin, "In Search of Schrodinger's Cat: Quantum Physics and Reality" (Bantam, Doubleday, Dell, 1985).

[\[A Dictionary of Philosophical Terms and Names\]](#)

26-03-2002

scientia

<[philosophical terminology](#)> Latin term for an organized body of [theoretical knowledge](#) (Gk. επιστήμη, epistēmē).

[\[A Dictionary of Philosophical Terms and Names\]](#)

26-03-2002

scientific law

<[epistemology](#), [determinism](#), [cause](#)> a general scientific [hypothesis](#) that is [true](#) or (more weakly understood) well confirmed or established. On [realist](#) conceptions the laws of science are generally regarded as expressing the causal laws according to which all occurs, or by which all is governed. See [cause](#), [determinism](#).

[\[Philosophical Glossary\]](#)

22-06-2001

scientific method

<[philosophical terminology](#)> a procedure for the development and evaluation of explanatory hypotheses.

Recommended Reading: Barry Gower, "Scientific Method: A Historical and Philosophical Introduction" (Routledge, 1997); Henry H. Bauer, "Scientific Literacy and the Myth of the Scientific Method" (Illinois, 1994); and Edgar Bright Wilson, "An Introduction to Scientific Research" (Dover, 1991).

[\[A Dictionary of Philosophical Terms and Names\]](#)

26-03-2002

scientific realism

<[epistemology](#), [metaphysics](#), [instrumentalism](#)> view that holds that [reality](#) really is as science describes it or as science ultimately would describe it at the ideal end-point of inquiry. Contrast: [instrumentalism](#).

[\[Philosophical Glossary\]](#)

22-06-2001

scientific theory

<[epistemology](#)> a logically closely interconnected [set](#) of [scientific laws](#).

[\[Philosophical Glossary\]](#)

22-06-2001

scientism

<[epistemology](#), [philosophy of science](#)> the view according to which the methods of the natural or physical sciences are universally valid, and therefore should apply to the "social sciences" and the humanities as well. Scientism is often roughly equivalent to [reductionism](#), since the outcome for the study of human and social affairs of applying each of these approaches is much the same.

[\[The Ism Book\]](#)

27-03-2001

Scott domain

<[mathematics](#), [logic](#)> An [algebraic](#), [boundedly complete](#), [complete partial order](#). Often simply called a [domain](#).

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16-03-2001

Scott-closed

<[logic](#)>

A [set](#) S, a [subset](#) of D, is Scott-closed if

(1) If Y is a [subset](#) of S and Y is [directed](#) then lub Y is in S and

(2) If $y \leq s$ in S then y is in S.

I.e. a Scott-closed [set](#) contains the lubs of its [directed subsets](#) and anything less than any [element](#). (2) says that S is downward [closed](#) (or left [closed](#)).

[[FOLDOC](#)]

16-03-2001

Scotus John Duns

<[history of philosophy](#), [biography](#)> British Franciscan philosopher (1266-1308). Scotus developed the notion of a formal distinction (more than nominal but less than real) as the key to resolving problems of individuation. On this basis, Scotus distinguished intellect from [volition](#) and defended freedom of the will against the [determinism](#) of the radical [Aristotelians](#). His "Treatise on God as First Principle" employs a revision of [Anselm](#)'s ontological argument in defence of the existence of [god](#).

Recommended Reading: John Duns Scotus, "Philosophical Writings: A Selection" (Hackett, 1987); "Duns Scotus on the Will and Morality", tr. by William A. Frank and Alan B. Wolter (Catholic U. of Am., 1998); Richard Cross, "Duns Scotus" (Oxford, 1999); William A. Frank and Allan B. Wolter, "Duns Scotus, Metaphysician" (Purdue, 1995); and "Five Texts on the Mediaeval Problem of Universals": "Porphyry, Boethius, Abelard, Duns Scotus, Ockham", ed. by Paul Vincent Spade (Hackett, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

26-03-2002

search problem

<[computability](#)> A computational problem that requires identifying a solution from some, possibly infinite, solution space ([set](#) of possible solutions). E.g. "What is the millionth [prime number](#)?". This contrasts with a [decision problem](#) which merely asks whether a given answer is a solution or not.

[[FOLDOC](#)]

16-03-2001

search term

<[information science](#)> An element of a search or query. A search term is the basic building block of a [Boolean search](#) or a weighted search. In a search engine a search term is typically a word, phrase, or pattern match expression. For example: cosmonaut or "space travel" or astronaut*.

In a [database](#) a term is typically the comparison of a column with a constant or with another column. For example: last_name like ' Smith%' .

[[FOLDOC](#)]

16-03-2001

Searle John

<[history of philosophy, biography](#)> American philosopher born in 1932. Expanding on the work of [Austin John Langshaw](#), Searle's "Speech Acts: An Essay in the Philosophy of Language" (1969) treats all communication as instances of the performance of [speech acts](#). In "Intentionality: An Essay in the Philosophy of Mind" (1983) and "The Rediscovery of the Mind" (1992) Searle emphasizes the irreducibility of [consciousness](#) and [intentionality](#) to the merely physical elements of human existence. The "Chinese Room" thought-experiment in his "Minds, Brains, and Programs" (1980) purports to show that even effective computer simulations do not embody genuine intelligence, since rule-governed processes need not rely upon understanding by those who perform them.

Recommended Reading: John R. Searle, "Minds, Brains and Science" (Harvard, 1986); John R. Searle, "Mind, Language, and Society: Philosophy in the Real World" (Basic, 2000); John R. Searle, "The Mystery of Consciousness" (N. Y. Review, 1997); John R. Searle, "The Construction of Social Reality" (Free Press, 1997); Nick Fotion, John Searle (Princeton, 2001); "John Searle and His Critics", ed. by Robert Van Gulick and Ernest Lepore (Blackwell, 1993); and William Hirstein, "On Searle" (Wadsworth, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

26-03-2002

second-order desire

<[philosophy of mind](#)> desire about desires, that is, desire of the form "S wants x" where x is a desire".

[[Dictionary of Philosophy of Mind](#)]

16-03-2001

secondary qualities

<[history of philosophy, biography](#)> the extrinsic features that things produce in us when we perceive them, as opposed to the [primary qualities](#) the things are supposed to have in themselves.

Recommended Reading: "Selected Philosophical Papers of Robert Boyle" (Hackett, 1991); P. M. S. Hacker, "Appearance and Reality: A Philosophical Investigation into Perception and Perceptual Qualities" (Blackwell, 1986); Colin McGinn, "The Subjective View: Secondary Qualities and Indexical Thoughts" (Clarendon, 1983).

[\[A Dictionary of Philosophical Terms and Names\]](#)

26-03-2002

secularism

<[metaphysics](#), [ethics](#)> the view according to which there exist no gods or purely spiritual entities. Sometimes the sense of the word is less strong, connoting something close to [humanism](#), i.e., that affairs of this world should be the most important concerns for ethics and human life (it is in this sense that [Aristotelianism](#) and other classical philosophies can be described as secularist). Thus, while [atheism](#) is a form of secularism, not every secularist is an atheist. In popular usage, secularism often has the same connotations of [immoralism](#) that are imputed more strongly to atheism. (References from [atheism](#), [Christianity](#), [humanism](#), and [pessimism](#).)

Based on [\[The Ism Book\]](#)

27-03-2001

secundum quid

<[philosophical terminology](#)> Latin for «according to something» (in contrast with [simpliciter](#)). Hence, a common abbreviation for «a dicto simpliciter ad dictum secundum quid» and «a dicto secundum quid ad dictum simpliciter». Latin designations for the informal fallacies of accident and converse accident.

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-03-2002

self-deception

<[philosophical terminology](#)> avoidance or outright denial of unpleasant aspects of [reality](#), especially those which might otherwise warrant an unfavorable opinion about ourselves. Thus, for example, the wishful thought, "I'm not really addicted to nicotine; I could quit smoking any time." is clearly self-deceptive. Kierkegaard, [Heidegger](#), and [Sartre](#) condemned self-deception as bad faith, or an inauthentic response to the anxiety produced by contemplation of human [freedom](#). Although most of us retrospectively acknowledge the role of such a practice in our own lives, it isn't clear what makes it possible for a single person to be both deceived and deceiver. How can I both know the [truth](#) and yet keep it from myself at the same time? Unless the deception is entirely [unconscious](#), there must be some degree of willful disregard of the evidence that I suspect would lead to the unpleasant [truth](#) I would rather not face.

Recommended Reading: Jean-Paul Sartre, "Being and Nothingness: A Phenomenological Essay on Ontology", tr. by Hazel E. Barnes (Washington Square, 1993); "Perspectives on Self-Deception", ed. by Brian P. McLaughlin and Amelia O. Rorty (California, 1988); Alfred R. Mele, "Self-Deception Unmasked" (Princeton, 2001); Daniel P. Goleman, "Vital Lies Simple Truths: The Psychology of Self-Deception" (Touchstone, 1996); Mike W. Martin, "Self-Deception and Morality" (Kansas, 1988); Herbert Fingarette, "Self-Deception" (California, 2000); Alfred R. Mele, "Irrationality: An Essay on Akrasia, Self-Deception, and Self-Control" (Oxford, 1992); and Annette Barnes, "Seeing Through Self-Deception" (Cambridge, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

26-03-2002

self-evident

<[philosophical terminology](#)> certainly known without proof. The notion of self-evidence is commonly assimilated either to that of [a priori](#) knowledge or to that of logical [tautology](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

26-03-2002

Sellars Wilfrid

<[history of philosophy, biography](#)> American philosopher (1912-1989); author of "Science, Perception, and Reality" (1963) and "Essays in Philosophy and its History" (1974). Sellars employed the methods of [logical positivism](#) and [analytic philosophy](#) to forge a unique account of human [knowledge](#). In "Empiricism and the Philosophy of Mind" (1956) Sellars tried to develop functional descriptions of human behavior by means of which to reconcile [intentionality](#) with [materialism](#).

Recommended Reading: Wilfrid Sellars, "Philosophical Perspectives: Metaphysics and Epistemology" (Ridgeview, 1967); Wilfrid Sellars, "Philosophical Perspectives: History of Philosophy" (Ridgeview, 1979); Wilfrid Sellars, "Naturalism and Ontology" (Ridgeview, 1980); C. Delaney, "The Synoptic Vision: Essays on the Philosophy of Wilfrid Sellars" (Notre Dame, 1977); and "Knowledge, Mind, and the Given: Reading Wilfrid Sellars' s "Empiricism and the Philosophy of Mind", Including the Complete Text of Sellars' s Essay", ed. by Willam A. DeVries and Tim Triplett (Hackett, 2000).

[\[A Dictionary of Philosophical Terms and Names\]](#)

26-03-2002

semantic[semantics](#)

00-00-0000

semantic completeness

<[logic](#)> The condition of a formal system in which (1) the [formal language](#) has the power to express as [wffs](#) all the propositions intended by the maker to be meaningful, and (2) the deductive apparatus has the power to prove as [theorems](#) all the propositions intended by the maker to be true. The second condition can be put more succinctly: all logically valid [wffs](#) of the language are [theorems](#) of the system. The first of these is also called expressive completeness; the second is called deductive completeness.

Semantic incompleteness: Failure of semantic completeness, but especially when not all logically valid [wffs](#) are [theorems](#).

[Glossary of First-Order Logic]

16-03-2001

semantic consequence

<logic>

1. In truth-functional propositional logic, B is the semantic consequence of A iff there is no interpretation, I, in which A is true for I and B is false for I, or in short, if all models of A are models of B.

2. In predicate logic, B is the semantic consequence of A iff for every interpretation, every sequence that satisfies A also satisfies B. Or, there is no sequence in any interpretation that satisfies A but not B.

Notation: $A \models B$.

See satisfaction.

[Glossary of First-Order Logic]

16-03-2001

semantic gap

The difference between the complex operations performed by high-level language constructs and the simple ones provided by computer instruction sets. It was in an attempt to try to close this gap that computer architects designed increasingly complex instruction set computers.

[FOLDOC]

16-03-2001

semantic network

<data> A graph consisting of nodes that represent physical or conceptual objects and arcs that describe the relationship between the nodes, resulting in something like a data flow diagram. Semantic nets are an effective way to represent data as they incorporate the inheritance mechanism that prevents duplication of data. That is, the meaning of a concept comes from its relationship to other concepts and the information is stored by interconnecting nodes with labelled arcs.

[FOLDOC]

16-03-2001

semantic tautology

<logic> A wff of truth-functional propositional logic whose truth table column contains nothing but T' s when these are interpreted as the truth-value Truth.

See syntactic tautology

[Glossary of First-Order Logic]

16-03-2001

semantic theory of truth

<[philosophy of science](#), [logic](#)> belief that any claim that a [proposition](#) is true can be made only as a formal requirement regarding the [language](#) in which the [proposition](#) itself is expressed. Thus, according to [Tarski](#), «It rained today» is [true iff](#) it rained today. The distinction between different levels of [language](#) employed by this [theory](#) is presumed to offer a convenient evasion of otherwise troublesome semantic [paradoxes](#).

Recommended Reading: Richard L. Kirkham, "Theories of Truth: A Critical Introduction" (Bradford, 1995); "Theories of Truth", ed. by Paul Horwich (Dartmouth, 1994); and "Truth", ed. by Simon Blackburn and Keith Simmons (Oxford, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

26-03-2002

semantic validity

<[logic](#)> An [inference](#) is semantically [valid iff](#) it can not be the case that all the [premises](#) are true and the [conclusion](#) false at the same time.

See [syntactic validity](#)

[Glossary of First-Order Logic]

16-03-2001

semantics

1. <[philosophy of language](#), [PI](#)> the [meaning](#) of a string in some [language](#), as opposed to [syntax](#) which describes how [symbols](#) may be combined independent of their meaning.

The semantics of a programming language is a function from programs to answers. A program is a [closed term](#) and, in practical languages, an answer is a member of the syntactic category of values. The two main kinds are [denotational semantics](#) and [operational semantics](#).

2. <[philosophy of mind](#)> the study of [relations](#) between a [representation](#) and what it represents.

See also [naturalised semantics](#)

16-03-2001

semiotics

<[philosophical terminology](#)> theory of signs, comprising both [semantics](#) and [syntactics](#), especially in the philosophy of language of [Peirce](#) and [Saussure](#).

Recommended Reading: Charles Morris, "Signs, Language, and Behavior" (Braziller, 1955); Umberto Eco, "Theory of Semiotics" (Indiana, 1979); Thomas A. Sebeok, "Signs: An Introduction to Semiotics" (Toronto, 1995); Winfried Noth, "Handbook of Semiotics" (Indiana, 1995); and Umberto Eco, "Semiotics and the Philosophy of Language" (Indiana, 1986).

[[A Dictionary of Philosophical Terms and Names](#)]

26-03-2002

Seneca Lucius Annaeus

<[history of philosophy](#), [biography](#)> Roman statesman (4 BC - 65 CE) whose "Epistulae Morales" ("Moral Letters") and "Dialogi" ("Dialogues") propounded the [stoic](#) philosophy, of which his suicide was popularly taken to be an exemplary application.

Recommended Reading: "Seneca: Essays and Letters", tr. by Moses Hadas (Norton, 1968); "Seneca: Moral and Political Essays", ed. by John M. Cooper and J. F. Procope (Cambridge, 1995); and "Seneca: A Critical Bibliography, 1900-1980: Scholarship on His Life, Thought, Prose, and Influence", ed. by Anna L. Motto (Hakkert, 1989).

[[A Dictionary of Philosophical Terms and Names](#)]

26-03-2002

sensationalism

<[epistemology](#)> radical form of [representationalism](#) which posits that all [knowledge](#) is constructed from or consists in pure [sensations](#) (such as blotches of color, pure tones, etc.). Some adherents go further and claim that we do not have any direct [knowledge](#) of [reality](#), only of [sensations](#). The popular [meaning](#) is obviously non-philosophical and quite unrelated. (References from [associationalism](#) and sensualism.)

[[The Ism Book](#)]

27-03-2001

sensations

<[epistemology](#), [metaphysics](#), [empiricism](#)> what we experience directly -- such as shapes, colors, and smells - in perceptual experience. Roughly identifiable, with [Locke](#)' s«simple ideas» and [Hume](#)' s«[impressions](#)». For [Kant](#) these are the «[matter](#)» of [perception](#) for which [time](#) and space are the [a priori forms](#). Among contemporary philosophers, sensations (or their distinctive «felt» properties) are commonly called «[qualia](#)». Among the presumed contents of the [mind](#), sensations (being concrete & particular) stand in contrast to (abstract & general, or universal) [concepts](#): compare the experience of seeing red to the [idea](#) of redness.

[[Philosophical Glossary](#)]

22-06-2001

sense

<[philosophy of language](#)> the property of [representations](#) of a part of the world that captures that part as being a certain way; meaning.

See sense-reference.

01-10-2003

sense data

<[philosophical terminology](#)> immediate objects of [sensation](#), also known as *sensa* or *sensibilia*, especially in representationalist theories of [perception](#).

Recommended Reading: Bertrand Russell, "The Problems of Philosophy" (Oxford, 1998); J. L. Austin, "Sense and Sensibilia", ed. by Geoffrey J. Warnock (Oxford, 1962); R. J. Hirst, "Problems of Perception" (Prometheus, 1992); and D. M. Armstrong, "A World of States of Affairs" (Cambridge, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

28-03-2002

sense-reference

<[philosophical terminology](#)> distinction about the [meaning](#) of words introduced by [Frege](#). The [sense](#) of an expression is the [thought](#) it expresses, while its [reference](#) is the object it represents. Since the ability to use a term presupposes familiarity with its [sense](#) but not knowledge of its [reference](#), statements of [identity](#) can be genuinely informative when they link two terms with the same [reference](#) but distinct senses, as in «The husband of Barbara Bush is the President who succeeded Ronald Reagan».

Recommended Reading: "The Frege Reader", ed. by Michael Beaney (Blackwell, 1997); Wolfgang Carl, "Frege' s Theory of Sense and Reference: Its Origins and Scope" (Cambridge, 1994); and "Frege: Sense and Reference One Hundred Years Later", ed. by John Biro and Peter Kotatko (Kluwer, 1995).

[[A Dictionary of Philosophical Terms and Names](#)]

28-03-2002

senses

<[psychology](#), [empiricism](#), [epistemology](#)> metaphorically, "the doors of [perception](#)" (Wm. Blake): the [input](#) channels by which the [mind](#) is affected by the external world. Following [Aristotle](#), traditionally, there are said to be five: taste, touch, smell, hearing, and sight. See [perceive](#).

[[Philosophical Glossary](#)]

29-07-2001

sentence

<[logic](#)> A collection of clauses.
See also [closure](#), [wff](#), [proposition](#)

16-03-2001

sequence

<[logic](#)> An ordered series or string of elements (called terms). Also called an n-tuple when n is the number of terms in the sequence. Notation: angled braces, <...>. Notation: $s(d/k)$, the sequence s when the kth member is replaced by object d from the domain. Notation: t^*s , the member of the domain of an interpretation I assigned by I to term t for sequence s.

[Glossary of First-Order Logic]

16-03-2001

set

A collection of objects, known as the elements of the set, specified in such a way that we can tell in principle whether or not a given object belongs to it. E.g. the set of all prime numbers, the set of zeros of the cosine function.

For each set there is a [predicate](#) (or property) which is true for (possessed by) exactly those objects which are elements of the set. The predicate may be defined by the set or vice versa. Order and repetition of elements within the set are irrelevant so, for example, $1, 2, 3 = 3, 2, 1 = 1, 3, 1, 2, 2$.

Some common set of numbers are given the following names:

N = the [natural numbers](#) 0, 1, 2, ...

Z = the [integers](#) ..., -2, -1, 0, 1, 2, ...

Q = the [rational numbers](#) p/q where p, q are in Z and $q \neq 0$.

R = the [real numbers](#)

C = the [complex numbers](#).

The empty set is the set with no elements. The intersection of two sets X and Y is the set containing all the elements x such that x is in X and x is in Y. The union of two sets is the set containing all the elements x such that x is in X or x is in Y.

The intuitive notion of a set leads to paradoxes, and there is considerable mathematical and philosophical disagreement on how best to refine the intuitive notion. In a set, the order of members is irrelevant, and repetition of members is not meaningful.

See also [complement](#) of a set, [complement](#), [countable set](#), [decidable set](#), [denumerable set](#), [difference](#), [disjoint sets](#), [enumerable set](#), [equivalent sets](#), [intersection](#), [membership](#), [null set](#), [power set](#), [proper subset](#), [representation](#) of a set, Russell' s paradox, [set theory](#), [subset](#), [superset](#), [symmetric difference](#), [uncountable set](#), [union](#), [universal set](#)

[[FOLDOP](#)] and [Glossary of First-Order Logic]

16-03-2001

set theory

<[mathematics](#)> A mathematical formalisation of the theory of "sets" (aggregates or collections) of objects ("elements" or "members"). Many mathematicians use set theory as the basis for all other mathematics.

[Axiomatic set theory](#)

The study of formal systems whose [theorems](#), on the intended interpretation, are the truths of set theory.

[Cantorian set theory](#)

Set theory in which either the generalized continuum hypothesis or the [axiom of choice](#) is an [axiom](#).

Constructible set theory

Set theory limited to sets whose existence is assured by the axioms of [restricted set theory](#) (see below). In 1938 Goedel proved that the axiom of choice, continuum hypothesis, and generalized continuum hypothesis are [theorems](#) (even if not axioms) of constructible set theory.

Non-Cantorian set theory

Set theory in which either the [negation](#) of the generalized continuum hypothesis (GCH) or the [negation](#) of the axiom of choice (AC) is an axiom. Since $GCH \Rightarrow AC$, if $\sim AC$ is an axiom, then $\sim GCH$ will be a [theorem](#).

[Restricted set theory](#)

standard set theory minus the axiom of choice. Goedel proved in 1938 that if restricted set theory is consistent, then it remains consistent when the axiom of choice is added (and also when the continuum hypothesis is added).

Standard set theory

The formal system first formulated by Ernst Zermelo and Abraham Frankel. Also called Zermelo-Frankel set theory or ZF.

Mathematicians began to realise towards the end of the 19th century that just doing "the obvious thing" with sets led to embarrassing [paradoxes](#), the most famous being Russell' s Paradox. As a result, they acknowledged the need for a suitable [axiomatisation](#) for talking about sets. Numerous such axiomatisations exist; the most popular among ordinary mathematicians is Zermelo Fr"nkel set theory.

[The translation into Latin of Sextus' s comprehensive criticism of ancient schools of thought in "Adversos Mathematicos" \("Against the Dogmatists"\) provided an important resource for the development of modern skepticism during the sixteenth century.](#)

Recommended Reading: "The Original Sceptics: A Controversy", ed. by Myles Burnyeat and Michael Frede (Hackett, 1997); Tad Brennan, "Ethics and Epistemology in Sextus Empiricus" (Garland, 1999); and Luciano Floridi, "Sextus Empiricus: The Transmission and Recovery of Pyrrhonism" (Oxford, 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

28-03-2002

Shaftesbury - Third Earl of - Anthony Ashley Cooper

<[history of philosophy, biography](#)> English moral essayist (1671-1713). Raised in genteel circumstances by his grandfather, one of the Lords Proprietor of the Carolina colonies and a close associate of [Locke](#), Shaftesbury proposed a set of practical rules for living that he claimed to arise from the natural dispositions of all human beings, without any reliance on divine revelation in "An Inquiry concerning Virtue or Merit" (1699). This was an important step in the development of the notion of a [moral sense](#) by [Hutcheson](#) and [Hume](#). Shaftesbury' s works were collected in "Characteristics of Men, Manners, Opinions, and Times" (1711).

Recommended Reading: "The Shaftesbury Collection" (Thoemmes, 1997); John L. Hammond and Barbara Hammond, "Lord Shaftesbury" (Ayer, 1970); Lawrence E. Klein, "Shaftesbury and the Culture of Politeness: Moral Discourse and Cultural Politics in Early Eighteenth-Century England" (Cambridge, 1994); and John Andrew Bernstein, "Shaftesbury, Rousseau, and Kant: An Introduction to the Conflict Between Aesthetic and Moral Values in Modern" (Fairleigh Dickinson, 1980).

[[A Dictionary of Philosophical Terms and Names](#)]

28-03-2002

Sheffer stroke

[stroke function](#)

00-00-0000

short term memory

<[philosophy of mind](#)> STM, the temporary memory store accessed after recent exposure to a stimulus to be recalled.

See also [long term memory](#), [memory](#)

[[Dictionary of Philosophy of Mind](#)]

16-03-2001

Sidgwick Henry

<[history of philosophy, biography](#)> English moral and political philosopher (1838-1900). In "The Methods of Ethics" (1874) and "Outlines of the History of Ethics" (1886), Sidgwick surveyed the varieties of argument that may be applied to moral judgments, including intuitive common-sense, calculation of self-interest, and a utilitarian normative theory. He supposed that although each is well-founded, the three cannot be wholly reconciled with each other. We are therefore perpetually vulnerable to the possibility of conflicting moral obligations.

Recommended Reading: "The Works of Henry Sidgwick", ed. by John Slater (Thoemmes, 1997); Henry Sidgwick, "Essays on Ethics and Method", ed. by Marcus G. Singer (Oxford, 2001); "Henry Sidgwick, Philosophy: Its Scope and Relations" (St. Augustine, 1998); J. B. Schneewind, "Sidgwick' s Ethics and Victorian Moral Philosophy" (Oxford, 1977); and "Essays on Henry Sidgwick", ed. by Bart Schultz (Cambridge, 1992).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-03-2002

Siger of Brabant

<[history of philosophy](#), [biography](#)> French philosopher (1235-1282). As one of the radical Aristoteleans in Paris, Siger endorsed the [philosophy](#) of Ibn Rushd and rejected medieval preoccupation with theological concerns in his "Quaestiones in Metaphysicam" ("Metaphysical Questions"). Suspected of pursuing a «double truth», Siger became one of the chief targets of the Condemnation of 1270.

Recommended Reading: Tony Dodd, "The Life and Thought of Siger of Brabant" (Edwin Mellen, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-03-2002

signal

<[operating system](#)> A predefined message sent between two Unix processes or from the [kernel](#) to a process. Signals communicate the occurrence of unexpected external events such as the forced termination of a process by the user. Each signal has a unique number associated with it and each process has a signal handler set for each signal. Signals can be sent using the kill system call.

[\[FOLDOC\]](#)

16-03-2001

signal-to-noise ratio

1. <[communications](#)> (SNR, "s/n ratio", "s:n ratio") "Signal" refers to useful information conveyed by some communications medium, and "noise" to anything else on that medium. The ratio of these is usually expressed logarithmically, in decibels.

2. <[networking](#)> The term is often applied to Usenet newsgroups though figures are never given. Here it is quite common to have more noise (inappropriate postings which contribute nothing) than signal (relevant, useful or interesting postings). The signal gets lost in the noise when it becomes too much effort to try to find interesting articles among all the crud. Posting "noise" is probably the worst breach of [netiquette](#) and is a waste of bandwidth.

[\[Jargon File\]](#) and [\[FOLDOC\]](#)

16-03-2001

signalling rate

<[communications](#)> The number of times per second the amplitude, frequency or phase of the signal transmitted down a communications channel changes each second. The signalling rate is measured in baud.

[[FOLDOC](#)]

16-03-2001

silicon chip replacement thought experiment

<[philosophy of mind](#)> a thought experiment proposed to support the notion of [causal functionalism](#) by Pylyshyn.

[Pete Mandik](#)

[[Dictionary of Philosophy of Mind](#)]

16-03-2001

simple consistency

<[logic](#)> A system is simply consistent [iff](#) there is no [wff](#) A such that both A and \sim A are [theorems](#).

Simple inconsistency

A system is simply inconsistent if there is some [wff](#) A such that both A and \sim A are [theorems](#).

[[Glossary of First-Order Logic](#)]

16-03-2001

simple propositions

<[logic](#)> A proposition whose internal structure does not interest us; hence a proposition whose internal structure we do not make visible in our notation. Notation: p, q, r, etc.

[[Glossary of First-Order Logic](#)]

16-03-2001

simpliciter

<[philosophical terminology](#)> Latin for "simply" or "naturally" (in contrast with [secundum quid](#)). Hence, what anything is when considered absolutely or without qualification.

[[A Dictionary of Philosophical Terms and Names](#)]

28-03-2002

simplification

<[logic](#), [philosophy of science](#)> a rule of [inference](#) of the form:

$$p \cdot q$$

$$p$$

Example: "Jevona is tall and Jevona is thin. Therefore, Jevona is tall". Although trivial in ordinary language, this pattern of reasoning is vital for proof construction in the [propositional calculus](#).

[[A Dictionary of Philosophical Terms and Names](#)]

28-03-2002

simulated annealing

A technique which can be applied to any minimisation or learning process based on successive update steps (either random or [deterministic](#)) where the update step length is proportional to an arbitrarily set parameter which can play the role of a temperature. Then, in analogy with the annealing of metals, the temperature is made high in the early stages of the process for faster minimisation or learning, then is reduced for greater stability.

16-03-2001

simulation

Attempting to predict aspects of the behaviour of some system by creating an approximate (mathematical) model of it. This can be done by physical modelling, by writing a special-purpose computer program or using a more general simulation package, probably still aimed at a particular kind of simulation (e.g. structural engineering, fluid flow). Typical examples are aircraft flight simulators or electronic circuit simulators. A great many simulation languages exist, e.g. Simula.

See also [emulation](#), [Markov chain](#).

Usenet newsgroup: news:comp.simulation.

[[FOLDOC](#)]

16-03-2001

sine qua non

<[philosophical terminology](#)> Latin for "without which, not"; hence, an alternative way of expressing the presence of a necessary condition.

[[A Dictionary of Philosophical Terms and Names](#)]

28-03-2002

Singer Peter

<[history of philosophy, biography](#)> Australian philosopher born in 1946. Singer is an ethicist whose "Practical Ethics" (1979) emphasizes the application of consequentialist moral principles to matters of personal and social concern. He is most widely admired for "Animal Liberation" (1975), in which Singer shows that, since a difference of species entails no moral distinction between sentient beings, it is wrong to mistreat non-human animals; it follows that animal experimentation and the eating of animal flesh are morally indefensible. In "Do Animals Feel Pain?", Singer argues for the moral relevance of animal pain.

Recommended Reading: Peter Singer, "How Are We to Live?: Ethics in an Age of Self-Interest" (Prometheus, 1995); Peter Singer, Rethinking "Life & Death: The Collapse of Our Traditional Ethics" (St. Martin' s 1996; Peter Singer, "Ethics Into Action" (Rowman & Littlefield, 1998); Peter Singer, "Writings on an Ethical Life" (Ecco, 2000); and "Singer and His Critics", ed. by Dale Jamieson (Blackwell, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-03-2002

singleton

[singleton variable](#)

00-00-0000

singleton variable

<[programming, PI](#)> A [variable](#) which is only referred to once in a piece of code, probably because of a programming mistake. To be useful, a variable must be set and read from, in that order. If it is only referred to once then it cannot be both set and read.

There are various exceptions. C-like assignment operators, e.g. "x += y", read and set x and return its new value (they are abbreviations for "x = x+y", etc). A [function argument](#) may be passed only for the sake of uniformity or to support future enhancements. A good compiler or a [syntax](#) checker like lint should report singleton variables but also allow specific instances to be marked as deliberate by the programmer.

[\[FOLDOP\]](#)

16-03-2001

singular proposition

<[philosophical terminology](#)> a statement that some individual has a particular feature. In [categorical logic](#), since its subject term designates a unit class, the singular proposition should be interpreted as the [conjunction](#) of corresponding universal and particular propositions (either as A and I or as E and O).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-03-2002

Sinn - Bedeutung

<[philosophical terminology](#)> Frege' s German distinction between the [sense](#) and [reference](#) of a term, intended to account for the possibility of genuinely informative statements of [identity](#).

[[A Dictionary of Philosophical Terms and Names](#)]

28-03-2002

skepticism

<[philosophical terminolgy](#)> belief that some or all human [knowledge](#) is impossible. Since even our best methods for learning about the [world](#) sometimes fall short of perfect certainty, skeptics argue, it is better to suspend [belief](#) than to rely on the dubitable products of [reason](#). Classical skeptics include [Pyrrho](#) and [Sextus Empiricus](#). In the modern era, [Montaigne](#), [Bayle](#), and [Hume](#) all advocated some form of skeptical [philosophy](#). [Fallibilism](#) is a more moderate response to the lack of certainty.

Recommended Reading: "Skepticism: A Contemporary Reader", ed. by Keith DeRose and Ted A. Warfield (Oxford, 1998); "Skepticism", ed. by Ernest Sosa an, Enrique Villanueva (Blackwell, 2000); Richard Henry Popkin, "The History of Skepticism from Erasmus to Spinoza" (California, 1979); Barry Stroud, "The Significance of Philosophical Skepticism" (Clarendon, 1984); Panayot Butchvarov, "Skepticism in Ethics" (Indiana, 1989); and Skepticism, ed. by Michael Williams (Dartmouth, 1993).

[[A Dictionary of Philosophical Terms and Names](#)]

28-03-2002

Skinner Burrhus Frederic

<[history of philosophy, biography](#)> American psychologist (1904-1990); author of "Science and Human Behavior" (1953) and "Verbal Behavior" (1957). Expanding on the behaviorist theories of [Watson](#), Skinner engaged in strict scientific study of human behavior and proposed the application of [psychology](#) to the deliberate engineering of human societies. Skinner' s "Two Types of Conditioned Reflex" (1935) provided a technical description of the ways in which animals acquire novel patterns of behavior. "Walden 2" (1948) proposed the systematic use of psychological conditioning in pursuit of an improved [society](#). Skinner rejected the notion of [moral autonomy](#) more generally in "Beyond Freedom and Dignity" (1971). In "The Origins of Cognitive Thought" (1989) Skinner offered a behaviourist explanation for human thinking.

Recommended Reading: B. F. Skinner, "About Behaviorism" (Random House, 1976); William T. O' Donohue and Kyle E. Ferguson, "The Psychology of B. F. Skinner" (Sage, 2001); "Modern Perspectives on B. F. Skinner and Contemporary Behaviorism", ed. by James T. Todd and Edward K. (Greenwood, 1995); and Robert D. Nye, "The Legacy of B. F. Skinner: Concepts and Perspectives, Controversies and Misunderstandings" (Wadsworth, 1992).

[[A Dictionary of Philosophical Terms and Names](#)]

28-03-2002

Skolem normal form

<logic> A [wff](#) of [predicate](#) logic is in Skolem normal form [iff](#) (1) it is in prenex normal form, (2) it contains no [function](#) symbols, and (3) all existential quantifiers are to the left of all universal quantifiers.

See [prenex normal form](#)

[Glossary of First-Order Logic]

16-03-2001

Skolem paradox

<logic> The paradox that results from the Lowenheim-Skolem theorem (LST). Does LST mean that the real numbers have the same cardinality as the natural numbers? Does it mean that the difference between the real numbers and the natural numbers that explains the greater cardinality of the reals cannot in principle be described or proved? Does it mean that no set is "absolutely" uncountable but only "relatively" to a given set of axioms and a given interpretation?

[Glossary of First-Order Logic]

16-03-2001

Skolemisation

A means of removing [quantifiers](#) from first order logic formulas.

See [Skolem normal form](#).

16-03-2001

Smart John Jameison Carswell

<[history of philosophy, biography](#)> English-Australian philosopher born in 1920. Influenced by the methods of [Ryle](#), Smart defends a strictly physicalist [philosophy of mind](#) in "Philosophy and Scientific Realism" (1963). Smart' s noncognitivist approach to [morality](#) yields a defence of act utilitarianism in "Utilitarianism: For and Against" (1973), co-authored with Bernard Williams.

Recommended Reading: J. J. C. Smart and J. J. Haldane, "Atheism and Theism" (Blackwell, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

28-03-2002

Smith Adam

<[history of philosophy, biography](#)> Scottish philosopher and economist (1723-1790). Smith modified the [moral sense](#) theory in his "Theory of Moral Sentiments" (1759), placing greater emphasis than had [Hutcheson](#) on the sentiment of sympathy and the [virtue](#) of self-control. Smith' s "An Inquiry into the Nature and Causes of the Wealth of Nations" (1776) proposed the economic theory that social goods are maximized when individual human beings are permitted to pursue their own interests, restricted only by the most general principles of justice.

Recommended Reading: Jack Russell Weinstein, "On Adam Smith" (Wadsworth, 2000); "Three Great Economists: Smith, Malthus, Keynes", ed. by D. D. Raphael, Donald Winch, Robert Skidelsky, and Keith Thomas (Oxford, 1997); Charles L. Griswold, Jr., "Adam Smith and the Virtues of Enlightenment" (Cambridge, 1998); and Jerry Z. Muller, "Adam Smith in His Time and Ours" (Princeton, 1995).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-03-2002

social constructivism

<[epistemology](#)> view marked by its rejection of the [objectivity](#) of [truth](#), generally, and of scientific truth in particular. Constructivists hold that [scientific laws](#), descriptions, and even observations are social constructs -- products or projections of human cultures or communities. As such, they are thoroughly [theory laden](#) and vary between cultures. Consequently scientific truth is neither [objective](#) nor [universal](#). Contrast: [objective truth](#). Compare [theory laden](#), [theory neutral](#).

[\[Philosophical Glossary\]](#)

22-06-2001

social contract theory

<[philosophical terminology](#)> belief that political structures and the legitimacy of the state derive from an (explicit or implicit) agreement by individual human beings to surrender (some or all of) their private rights in order to secure the protection and stability of an effective social organization or government. Distinct versions of social contract theory were proposed by [Hobbes](#), [Locke](#), [Rousseau](#), and Rawls.

Recommended Reading: "Social Contract: Essays by Locke, Hume, and Rousseau", ed. by Ernest Barker (Oxford, 1962); "The Social Contract Theorists: Critical Essays on Hobbes, Locke, and Rousseau", ed. by Christopher W. Morris (Rowman & Littlefield, 1999); Brian Skyrms, "Evolution of the Social Contract" (Cambridge, 1996); John Rawls, "The Law of Peoples" (Harvard, 2001); and Patrick Riley, "Will and Political Legitimacy: A Critical Exposition of Social Contract Theory in Hobbes, Locke, Rousseau, Kant, and Hegel" (iUniverse, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-03-2002

social Darwinism

<[ethics](#), [political philosophy](#)> movement of thought that started in the late nineteenth century as an application of Charles [Darwin](#)' s insights to human affairs; its most (in)famous exponent was Herbert Spencer. Social Darwinism holds that the principle of "the survival of the fittest" applies to human ethics and politics just as it does to biological evolution. Left-leaning critics often allege that social Darwinism provides an accurate description of - or an inexcusable attempt at justification for - life under [capitalism](#).

[\[The Ism Book\]](#)

27-03-2001

Socrates

<[history of philosophy, biography](#)> Greek philosopher (470-399 BC). As the heir of an wealthy Athenian sculptor, Socrates used his financial independence as an opportunity to invent the practice of philosophical dialogue. Since he wrote nothing of his own, we are dependent upon contemporary writers like Aristophanes and [Xenophon](#) for our information about his life. After dignified service as a soldier in the Peloponnesian War, he lived for the rest of his life in Athens and devoted nearly all of his time to free-wheeling discussion with its aristocratic young citizens, insistently questioning their confidence in the [truth](#) of popular opinions, even though he often offered no clear alternative. Unlike the professional [Sophists](#), Socrates declined to accept payment for his work with students, many of whom were fanatically loyal to him. Their parents, however, were often displeased with his influence, and his association with opponents of the democratic regime made him a controversial political figure. An Athenian jury officially convicted Socrates (of corrupting youth and interfering with the religion of the city) and sentenced him to death in 399 BC. Accepting this outcome, Socrates drank hemlock and died in the company of his friends and disciples. Our best sources of information about Socrates' s philosophical views are the early dialogues of his student [Plato](#), who attempted to provide a faithful picture of the methods and teachings of the master. Here the extended conversations of Socrates aim at understanding (and, therefore, achieving) [virtue](#) (Gk. aretē) through the careful application of a dialectical method that uses critical inquiry to undermine the plausibility of widely-held doctrines. In "Eutifron" ("Euthyphro"), for example, Socrates systematically refutes the superficial notion of piety or moral rectitude defended by a confident young man. [Plato](#)' s "Apologia" ("Apology") is an account of Socrates' s (unsuccessful) speech in his own defense before the Athenian jury; it includes a detailed description of the motives and goals of philosophical activity as he practiced it. The "Kriton" ("Crito") reports that during Socrates' s imprisonment he responded to friendly efforts to secure his escape by seriously debating whether or not an individual citizen can ever be justified in refusing to obey the laws of the state. The Socrates of the "Menon" ("Meno") investigates the nature of [virtue](#), defending the doctrine of [recollection](#) as an explanation of our most significant [knowledge](#) and maintaining that [knowledge](#) and [virtue](#) are so closely related that no human [agent](#) ever knowingly chooses evil: improper conduct is a product of [ignorance](#) rather than of [weakness of the will](#) (Gk. akrasia). The same view is also defended in the "Protagora" ("Protagoras"), along with the unity of the virtues. Although Socrates continues to appear as a character in the later dialogues of [Plato](#), these writings more often express philosophical positions [Plato](#) himself developed long after Socrates' s death.

Recommended Reading:

Primary sources:

Plato, "The Last Days of Socrates", ed. by Hugh Tredennick (Penguin, 1995); Xenophon, "Conversations of Socrates", ed. by Hugh Tredennick (Penguin, 1990).

Secondary sources:

"Essays on the Philosophy of Socrates", ed. by Hugh H. Benson (Oxford, 1992); Christopher Taylor, "Socrates" (Oxford, 1999); Anthony Gottlieb, "Socrates" (Routledge, 1999); Gregory Vlastos, "Socrates, Ironist and Moral Philosopher" (Cornell, 1991); Alexander

Nehamas, "Virtues of Authenticity" (Princeton, 1998); I. F. Stone, "The Trial of Socrates" (Anchor, 1989).

Additional on-line information on Socrates includes: Richard Hooker's excellent treatment. C. C. W. Taylor's article in "The Oxford Companion to Philosophy".

Also see: ancient philosophy, divine command ethics, elenchus, Euthyphro problem, Socratic irony, Socratic method, and the Socratic paradox. The article in the Columbia Encyclopedia at Bartleby.com. The thorough collection of resources at EpistemeLinks.com. Snippets from Socrates in The Oxford Dictionary of Quotations. A brief entry in The Macmillan Encyclopedia 2001.

[\[A Dictionary of Philosophical Terms and Names\]](#)

04-04-2002

Socraticism

<[ethics](#), [epistemology](#)> Socraticism is not a word that pops up very often (even in philosophy). It refers to either of two things: Socrates' position of [intellectualism](#) in ethics, or his method of asking questions in order to arrive at universal definitions of concepts such as courage and justice (what's come to be known as the "[Socratic method](#)"). His intellectualism has not been very influential, but his methodology forms the foundation of Western philosophy. The legacy of Socrates was transmitted through the works of [Plato](#) and [Aristotle](#), who continued on the paths he started and who are sometimes called Socratic philosophers. Socrates is also a central figure of Western [humanism](#), since he insisted that the central concerns of philosophy must be ethics and the good life, not technical issues that are of little or no interest to human beings in general.

[\[The Ism Book\]](#)

27-03-2001

software

<[programming](#), [PI](#)> (Or "computer program", "program") The instructions executed by a computer, as opposed to the physical device on which they run (the "[hardware](#)"). "[Code](#)" is closely related but not exactly the same.

Programs stored on non-volatile storage built from [integrated circuits](#) (e.g. [ROM](#) or [PROM](#)) are usually called [firmware](#).

Software can be split into two main types - [system software](#) and application software or [application programs](#). System software is any software required to support the production or execution of application programs but which is not specific to any particular application. Examples of system software would include the [operating system](#), [compilers](#), editors and sorting programs.

Examples of application programs would include an accounts package or a [CAD](#) program. Other broad classes of application software include real-time software, [business software](#), scientific and engineering software, [embedded software](#), personal computer software and [artificial intelligence](#) software. Software includes both [source code](#) written by humans and executable [machine code](#) produced by [assemblers](#) or [compilers](#). It does not usually include the data processed by programs unless this is in a format such as [multimedia](#) which depends on

the use of computers for its presentation. This distinction becomes unclear in cases such as spread sheets which can contain both instructions (formulae and [macros](#)) and data. There are also various intermediate compiled or semi-compiled, forms of software such as [library](#) files and byte-code. Some claim that [documentation](#) (both paper and electronic) is also software. Others go further and define software to be programs plus documentation though this does not correspond with common usage.

The noun "program" describes a single, complete and more-or-less self-contained list of instructions, often stored in a single [file](#), whereas "code" and "software" are uncountable nouns describing some number of instructions which may constitute one or more programs or part thereof. Most programs, however, rely heavily on various kinds of [operating system](#) software for their execution.

[FOLDDOC]

16-03-2001

software law

<[legal](#)> Software may, under various circumstances and in various countries, be restricted by patent or [copyright](#) or both. Most commercial software is sold under some kind of [software license](#).

A patent normally covers the design of something with a function such as a machine or process. Copyright restricts the right to make and distribute copies of something written or recorded, such as a song or a book of recipes. Software has both these aspects - it embodies functional design in the [algorithms](#) and data structures it uses and it could also be considered as a recording which can be copied and "performed" (run). "[Look and feel](#)" lawsuits attempt to monopolize well-known command languages; some have succeeded. [Copyrights](#) on command languages enforce gratuitous incompatibility, close opportunities for competition, and stifle incremental improvements. [Software patents](#) are even more dangerous; they make every design decision in the development of a program carry a risk of a lawsuit, with draconian pretrial seizure. It is difficult and expensive to find out whether the techniques you consider using are patented; it is impossible to find out whether they will be patented in the future.

The proper use of [copyright](#) is to prevent [software piracy](#) - unauthorised duplication of software. This is completely different from copying the idea behind the program in the same way that photocopying a book differs from writing another book on the same subject.

[Usenet](#) newsgroup: [news:misc.legal.computing](#).

["The Software Developer' s and Marketer' s Legal Companion", Gene K. Landy, 1993, AW, 0-201-62276-9].

[FOLDDOC]

16-03-2001

software life-cycle

<[programming, PI](#)> The phases a software product goes through between when it is conceived and when it is no longer available for use. The software life-cycle typically includes the following: [requirements analysis](#), [design](#), construction, testing ([validation](#)), installation, operation, maintenance, and retirement.

The development process tends to run iteratively through these phases rather than linearly; several models (spiral, waterfall etc.) have been proposed to describe this process.

Other processes associated with a software product are: quality assurance, marketing, sales and support.

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16-03-2001

Software Method

[Software Methodology](#)

00-00-0000

Software Methodology

<[programming, PI](#)> The study of how to navigate through each phase of the software process model (determining data, control, or uses hierarchies, partitioning functions, and allocating requirements) and how to represent phase products (structure charts, stimulus-response threads, and [state transition diagrams](#)).

[FOLDOC]

16-03-2001

software metric

A measure of software quality which indicate the complexity, understandability, testability, description and intricacy of code.

[FOLDOC]

16-03-2001

software patent

<[legal](#)> A patent intended to prevent others from using some programming technique.

There have been several infamous patents for software techniques which most experienced programmers would consider fundamental or trivial, such as the idea of using exclusive-or to plot a cursor on a [bitmap display](#). The spread of software patents could stifle innovation and make programming much harder because programmers would have to worry about patents when designing or choosing [algorithms](#).

There are over ten thousand software patents in the US, and several thousand more are issued each year. Each one may be owned by, or could be bought by, a grasping company whose lawyers carefully plan to attack people at their most vulnerable moments. Of

course, they couch the threat as a "reasonable offer" to save you miserable years in court. "Divide and conquer" is the watchword: pursue one group at a time, while advising the rest of us to relax because we are in no danger today.

Compuserve developed the [GIF](#) format for graphical images many years ago, not knowing about [Unisys'](#) s 1985 patent covering the [LZW](#) data compression [algorithm](#) used in GIF. GIF was subsequently adopted widely on the [Internet](#). In 1994 Unisys threatened to sue Compuserve, forcing them to impose a sublicensing agreement for GIF on their users. Compuserve users can accept this agreement now, or face Unisys later on their own. The rest of us don' t have a choice- we get to face Unisys when they decide it' s our turn. So much trouble from just one software patent.

Patents in the UK can' t describe [algorithms](#) or mathematical methods.

See also [LPF](#), [software law](#).

[patent search](#)

[[FOLDOC](#)]

16-03-2001

software piracy

[software theft](#)

00-00-0000

software pirate

[software theft](#)

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software theft

<[legal](#)> The unauthorised duplication and/or use of computer [software](#). This usually means unauthorised copying, either by individuals for use by themselves or their friends or, less commonly, by companies who then sell the illegal copies to users. Many kinds of [software protection](#) have been invented to try to reduce software theft but, with sufficient effort it is always possible to bypass or "crack" the protection, and [software protection](#) is often annoying for legitimate users.

Software theft was estimated for 1994 to have cost \$15 billion in worldwide lost revenues to software publishers. It is a serious offence under the Copyright, Designs and Patents Act 1988, which states that "The owner of the copyright has the exclusive right to copy the work."

It is illegal to: 1. Copy or distribute software or its documentation without the permission or licence of the copyright owner. 2. Run purchased software on two or more computers simultaneously unless the licence specifically allows it. 3. Knowingly or unknowingly allow, encourage or pressure employees to make or use illegal copies sources within the organisation. 4. Infringe laws against unauthorised software copying because a superior, colleague or friend compels or requests it. 5. Loan software in order that a copy be made of it.

Both individuals and companies may be convicted of piracy offences. Officers of a company are also liable to conviction if the offences were carried out by the company with their consent. On conviction, the guilty party can face imprisonment for up to two years (five in USA), an unlimited fine or both as well as being sued for copyright infringement (with no limit) by the copyright owner.

When software is upgraded it is generally the case that the licence accompanying the new version revokes the old version. This means that it is illegal to run both the old and new versions as only the new version is licensed.

Some people mistakenly think that, because it is so easy to make illegal copies of software, that it is less wrong than, say, stealing it from a shop. In fact, both actions deprive software producers of the income they need to continue their business and develop their products.

Software theft should be reported to the [Federation Against Software Theft](#) (FAST).

See also [Business Software Alliance](#), [software audit](#), [software law](#).

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16-03-2001

solipsism

<[philosophical terminology](#)> belief that only I myself and my own experiences are [real](#), while anything else - a physical object or another person - is nothing more than an object of my [consciousness](#). As a philosophical position, [solipsism](#) is usually the unintended consequence of an over-emphasis on the reliability of internal [mental states](#), which provide no [evidence](#) for the [existence](#) of external referents.

Recommended Reading: Gilbert Ryle, *The Concept of Mind* (Chicago, 1984); P. F. Strawson, *Individuals: an Essay in Descriptive Metaphysics* (Routledge, 1979); and Albert A. Johnstone, *Rationalized Epistemology: Taking Solipsism Seriously* (SUNY, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

04-04-2002

sophia

<[philosophical terminology](#)> Greek term for the intellectual virtue of wisdom, in contrast with the more practical function of [phronesis](#). According to [Plato](#), this is the distinctive feature of rulers in the [ideal state](#) and the crowning achievement of the [rational soul](#) of an individual.

Recommended Reading: F.E. Peters, *Greek Philosophical Terms: A Historical Lexicon* (NYU, 1967).

[[A Dictionary of Philosophical Terms and Names](#)]

04-04-2002

sophism

<[philosophical terminology](#)> a plausible argument that is actually fallacious, especially when someone dishonestly presents it as if it were legitimate reasoning.

[[A Dictionary of Philosophical Terms and Names](#)]

04-04-2002

sophists

<[philosophical terminology](#)> [Presocratic philosophers](#) who offered to teach young Athenians how to use [logic](#) and [rhetoric](#) to defeat opponents in any controversy. [Socrates](#) and [Plato](#) sharply criticized most of the [sophists](#) because they accepted monetary rewards for encouraging unprincipled persuasive methods.

Recommended Reading: W. K. C. Guthrie, *The Sophists* (Cambridge, 1971); *The Older Sophists*, ed. by Rosamond Kent Sprague (Hackett, 2001); *The First Philosophers: The Presocratics and Sophists*, ed. by Robin Waterfield (Oxford, 2000); and Susan C. Jarratt, *Rereading the Sophists: Classical Rhetoric Refigured* (Southern Illinois, 1998).

[[A Dictionary of Philosophical Terms and Names](#)]

04-04-2002

sophrosine

<[philosophical terminology](#)> Greek term for [moderation](#), the capacity to exercise self-control over one' s desire for pleasure. For [Plato](#), this is the [virtue](#) best exemplified by the masses in the [ideal state](#). According to [Aristotle](#), however, [sophrosune](#) is even more crucial, since every moral virtue is properly conceived as the mean between vicious extremes.

Recommended Reading: F. E. Peters, *Greek Philosophical Terms: A Historical Lexicon* (NYU, 1967).

[[A Dictionary of Philosophical Terms and Names](#)]

04-04-2002

sorites

<[philosophical terminology](#)> a complex variety of arguments consisting entirely of categorical syllogisms linked together by the use of the same propositions as the conclusions of some and the premises of others. Example: "Some pets are cardinals, but all cardinals are finches, while every finch is a bird, and only warm-blooded animals are birds. Hence, some pets are birds." Applied to vague predicates, such chains of reasoning may result in [paradox](#): if one grain of sand does not make a heap, and the addition of a second grain of sand does not make a heap, and the addition of a third grain of sand does not make a heap, etc., etc., then it would seem to follow (contrary to fact) that a collection of ten billion grains of sand must not be a heap.

Recommended Reading: Lewis Carroll, *Symbolic Logic & Game of Logic* (Dover, 1958) and Linda Claire Burns, *Vagueness: An Investigation into Natural Languages and the Sorites Paradox* (Kluwer, 1991).

[[A Dictionary of Philosophical terms and Names](#)]

06-04-2002

soul

<[philosophical terminology](#)> the active principle present in living things. [Plato](#) distinguished three distinct components of the human [soul](#), and [Aristotle](#) supposed that plants and animals, no less than human beings, have souls of some sort. Under the influence of Christianity, medieval philosophers focussed on the intellectual component of the human [soul](#), and [Descartes](#) identified it as an immaterial substance.

Recommended Reading: Plato, *Phaedo* (Oxford, 1999); Aristotle, *De Anima / On the Soul* (Penguin, 1987); Thomas Aquinas, *On Human Nature* (Hackett, 1999); Jan N. Bremmer, *The Early Greek Concept of the Soul* (Princeton, 1987); and *Whatever Happened to the Soul? Scientific and Theological Portraits of Human Nature*, ed. by Warren S. Brown, Nancey C. Murphy, and H. Newton Malony (Fortress, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

06-04-2002

sound - unsound

<[philosophical terminology](#)> distinction among deductive arguments. A [sound](#) argument both has [true](#) premises and employs a [valid inference](#); its [conclusion](#) must therefore be true. An unsound argument either has one or more [false](#) premises or relies upon an invalid [inference](#); its [conclusion](#) may be either [true](#) or [false](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

06-04-2002

soundness

<[logic](#)> An [argument](#) or [inference](#) is sound [iff](#) its reasoning is valid and all its premises are true. It is unsound otherwise, i.e. if either its reasoning is invalid, or at least one premise is false, or both.

[Glossary of First-Order Logic]

16-03-2001

source

[source code](#)

00-00-0000

source code

<[language, programming, Pl](#)> (Or "source", or rarely "source language") The form in which a computer program is written by the programmer. Source code is written in some formal programming language which can be compiled automatically into [object code](#) or [machine code](#) or executed by an [interpreter](#).

[[FOLDOC](#)]

16-03-2001

Souvre Madeleine de Marquise de Sable

<[history of philosophy, biography](#)> French intellectual leader. Madame de Sabli  (1599-1678) hosted an influential salon at Port-Royal and wrote *Maximes et Pens es Diverses* (Moral Maxims and Reflections) (1691) summarizing her view of human nature.

[[A Dictionary of Philosophical Terms and Names](#)]

06-04-2002

space complexity

<[complexity](#)> The way in which the amount of storage space required by an [algorithm](#) varies with the size of the problem it is solving. Space complexity is normally expressed as an order of magnitude, e.g. $O(N^2)$ means that if the size of the problem (N) doubles then four times as much working storage will be needed.

See also [computational complexity](#), [time complexity](#).

[[FOLDOC](#)]

16-03-2001

specialisation

A reduction in generality, usually for the sake of increased efficiency. If a piece of code is specialised for certain values of certain variables (usually function arguments), this is known as "[partial evaluation](#)". In a language with [overloading](#) (e.g. [Haskell](#)), an overloaded function might be specialised to a non-overloaded instance at compile-time if the types of its arguments are known.

16-03-2001

speech acts

<[philosophical terminology](#)> the complex group of things we typically perform when speaking. J.L. [Austin](#) famously distinguished the simple [locutionary act](#) of saying something meaningful, the force of the [illocutionary act](#) of employing this language for some purpose, and the further [perlocutionary act](#) of having an actual effect on those who hear the utterance. Thus, for example, in saying (locution) to a friend, "That' s an ugly necktie", I may also insult him (illocution) and persuade him to dress differently (perlocution).

Recommended Reading: J.L. Austin, *Philosophical Papers*, ed. by Geoffrey J. Warnock and J. O. Urmson

(Oxford, 1990); J.L. Austin, *How to Do Things With Words*, ed. by Marina Sbisa and J. O. Urmson (Harvard, 1975); and John R. Searle, *Speech Acts* (Cambridge, 1970).

[\[A Dictionary of Philosophical Terms and Names\]](#)

06-04-2002

speech recognition

<[application](#)> (Or voice recognition) The identification of spoken words by a machine. The spoken words are digitised (turned into sequence of numbers) and matched against coded dictionaries in order to identify the words.

Most systems must be "trained," requiring samples of all the actual words that will be spoken by the user of the system. The sample words are digitised, stored in the computer and used to match against future words. More sophisticated systems require voice samples, but not of every word. The system uses the voice samples in conjunction with dictionaries of larger vocabularies to match the incoming words. Yet other systems aim to be "speaker-independent", i.e. they will recognise words in their vocabulary from any speaker without training.

Another variation is the degree with which systems can cope with connected speech. People tend to run words together, e.g. "next week" becomes "nekweek" (the "t" is dropped). For a voice recognition system to identify words in connected speech it must take into account the way words are modified by the preceding and following words.

It has been said (in 1994) that computers will need to be something like 1000 times faster before large vocabulary (a few thousand words), speaker-independent, connected speech voice recognition will be feasible.

[\[FOLDOC\]](#)

16-03-2001

Spencer Herbert

<[history of philosophy](#), [biography](#)> English philosopher (1820-1903) whose *Education* (1861) promoted a scientific approach to the creative development of intellect. In the systematic philosophical work that began with *First Principles* (1862) [Spencer](#) tried to generalize from Darwinian [evolution](#) a comprehensive account of [progress](#) in human [knowledge](#), [morality](#) and [society](#). The political views expressed in *Man versus the State* (1884) include a nearly absolute defence of [individual liberty](#) and a strict opposition to governmental interference.

Recommended Reading: Herbert Spencer, *Principles of Ethics*, ed. by Tibor R. Machan (Liberty Fund, 1981); W. H. Hudson, *An Introduction to the Philosophy of Herbert Spencer* (Thoemmes, 1999); Robert G. Perrin, *Herbert Spencer: A Primary and Secondary Bibliography* (Garland, 1993); and Herbert Spencer and the Limits of the State: The Late Nineteenth-Century Debate Between Individualism and Collectivism, ed. by Michael Taylor (St. Augustine, 1996).

[\[A Dictionary of Philosophical Terms and Names\]](#)

06-04-2002

Spinoza Baruch

<[history of philosophy, biography](#)> born into the Portuguese-Jewish community living in exile in Holland, [Baruch Spinoza](#) (1632-1677) engaged in profound study of medieval Jewish thought as well as modern philosophy and the new science. Expelled for his heretical theological opinions from the synagogue at Amsterdam in 1656, he supported himself by grinding optical lenses and began a serious study of Cartesian philosophy. Private circulation of his philosophical treatises soon earned him a significant reputation throughout Europe, but [Spinoza](#) so treasured his intellectual independence that in 1673 he declined the opportunity to teach at Heidelberg. [Spinoza](#)' s first published work was a systematic presentation of the philosophy of [Descartes](#), together with his own modifications. The Principles of [Descartes](#)' s Philosophy (1663). While completing the development of his own philosophical views, [Spinoza](#) turned his attention to other issues. The Tractatus Theologico-Politicus (A Theologico-Political Treatise) (1670) is a treatment of popular religion and toleration. [Spinoza](#) disavowed anthropomorphic conceptions of [god](#), proposed modern methods for [biblical interpretation](#), and defended political toleration of alternative religious practices, especially between Christians and Jews. In the metaphysical speculations that dominated his philosophical reflections, the firm conviction that the universe is a unitary whole led rationalist [Spinoza](#) to express his philosophy in a geometrical form like that of [Euclid](#)' s Elements. Thus, each of the five books of the Ethica Ordine Geometrico Demonstrata (Ethics) (1677) presents a series of significant propositions, each of which is deduced from self-evident definitions and axioms. In Book I [Spinoza](#) claimed to demonstrate both the necessary existence and the essential nature of the unique, single [substance](#) that comprises all of [reality](#). The infinite attributes of this being ("god or nature") account for every feature of the universe. Book II describes the parallel structure and necessary function of the ideas and things we, with our dual natures, comprehend through the two attributes best known to us, [thought](#) and [extension](#). It also accounts for the possibility of human [knowledge](#) based ultimately on the coordination of these diverse realms. [Spinoza](#) applied similar principles to human desires and agency in Books III-V of the Ethics, recommending a life that acknowledges the fundamental consequences of our position as mere modes of the one true being. Recognizing the invariable influence of desire over our passionate natures, we must always strive for the peace of mind that comes through an impartial attachment to [reason](#). Although such an attitude is not easy to maintain, he concluded that "All noble things are as difficult as they are rare". [Spinoza](#)' s Tractatus de Intellectus Emendatione (On the Improvement of the Understanding) (1677) provides additional guidance on the epistemological consequences of his metaphysical convictions. Here [Spinoza](#) proposed a "practical" method for achieving the best [knowledge](#) of which human thinkers are capable.

Recommended Reading:

Primary sources:

Spinoza Opera, ed. by C. Gebhardt (Heidelberg, 1925); The Collected Works of Spinoza, Volume I, ed. by Edwin Curley (Princeton, 1985); Benedict De Spinoza, Ethics including the Improvement of the Understanding, tr. by R. H. M. Elwes (Prometheus, 1989); Baruch Spinoza, Theologico-Political Treatise, tr. by R. H. M. Elwes (Dover, 1951).

Secondary sources:

The Cambridge Companion to Spinoza, ed. by Don Garrett (Cambridge, 1995); Henry Allison, Benedict de Spinoza: An Introduction (Yale, 1987); Roger Scruton, Spinoza (Oxford, 1987); Genevieve Lloyd, Routledge Philosophy Guidebook to Spinoza and the Ethics

(Routledge, 1996); Steven M. Nadler, *Spinoza: A Life* (Cambridge, 1999); Edwin M. Curley, *Behind the Geometrical Method: A Reading of Spinoza's Ethics* (Princeton, 1988); Errol E. Harris, *Spinoza's Philosophy: An Outline* (Humanity, 1992); Harry Austryn Wolfson, *The Philosophy of Spinoza: Unfolding the Latent Processes of His Reasoning* (Harvard, 1983).

Additional on-line information about Spinoza includes: Ron Bombardi's comprehensive guide to Spinoza at [Studia Spinoziana](#). Joseph B. Yesselman's tribute to the philosophy of Spinoza. T. L. S. Sprigge's article in *The Oxford Companion to Philosophy*.

Also see: double aspect theory, Jewish philosophy, metaphysics, the persecution of philosophers, and rationalism. The article in the *Columbia Encyclopedia* at [Bartleby.com](#). The thorough collection of resources at [EpistemeLinks.com](#). Santiago Barona's [SpinozaWeb](#). A section on Spinoza from Alfred Weber's history of philosophy. Snippets from Spinoza (Latin and English) in *The Oxford Dictionary of Quotations*. Rosalba Dur'n Forero's comparison of Hobbes with Spinoza on gender equality. A paper on Spinoza's treatment of Cartesian ideas by Timo Kajamies. Olli Koistinen's paper on the practical aims of Spinoza's philosophy. An unfinished article in *The Internet Encyclopedia of Philosophy*. Bjoern Christensson's brief guide to Internet resources. A brief entry in *The Macmillan Encyclopedia 2001*.

[\[A Dictionary of Philosophical Terms and Names\]](#)

08-04-2002

Stael-Holstein Anne Louise Germaine Necker Baronne de

<[history of philosophy](#), [biography](#)> French novelist, essayist and philosopher (1766-1817). Although her controversial political views were often condemned, Madame de [Stael](#)'s *De l' influence des passions sur le bonheur des individuals et des nations* (*A Treatise on the Influence of the Passions on the Happiness of Individuals and of Nations*) (1796) was the chief source of her generation's information about the philosophies of [Rousseau](#) and [Kant](#), while her *De l' Allemagne* (*On Germany*) emphasized the work of [Fichte](#), [Schelling](#), and the [Romantics](#).

Recommended Reading: Germaine De Stael, *Politics, Literature, and National Character*, tr. by Monroe Berger (Transaction, 2000); *Major Writings of Germaine De Stael*, ed. by Vivian Folkenflik (Columbia, 1992); and J. Christopher Herold, *Mistress to an Age* (Greenwood, 1975).

[\[A Dictionary of Philosophical terms and Names\]](#)

08-04-2002

standard form

<[philosophical terminology](#)> a consistent way of organizing deductive arguments. The standard form for a [categorical syllogism](#) is: [Major Premise](#), [Minor Premise](#), [Conclusion](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

08-04-2002

standard semantics

The standard interpretation of a term in some language yields the term' s standard denotational semantics, i.e. its "meaning". This is usually given by a semantic function which maps a term in the abstract syntax to a point in some domain. The domain is the interpretation of the term' s type. The semantic function also takes an environment - a function which maps the free variables of the term to their meaning. We say that a domain point "denotes", or "is the denotation of", a term. A non-standard semantics results from some other interpretation, e.g. an abstract interpretation.

16-03-2001

Stanton Elizabeth Cady

<[history of philosophy](#), [biography](#)> American journalist and political activist (1815-1902). Author of Degradation of Disenfranchisement (1892) and The Woman' s Bible (1898), where she postulated an androgynous deity and defended the historical reality of matriarchy. [Stanton](#) founded the National Woman' s Suffrage Association and devoted her career to the abolition of slavery and efforts to secure the rights of women to vote. Her speech "Dare to Question" argues for a strict separation between church and state.

Recommended Reading: The Elizabeth Cady Stanton-Susan B. Anthony Reader: Correspondence, Writings, Speeches, ed. by Ellen Carol Dubois and Gerda Lerner (Northeastern, 1992); Elizabeth Cady Stanton: A Radical for Woman' s Rights, ed. by Lois W. Banner and Oscar Handlin (Little, Brown, 1995); Elisabeth Griffith, In Her Own Right: The Life of Elizabeth Cady Stanton (Oxford, 1985); and Geoffrey C. Ward, Martha Saxton, Ann D. Gordon, Ellen Carol Dubois, and Paul Barnes, Not for Ourselves Alone: The Story of Elizabeth Cady Stanton & Susan B. Anthony: An Illustrated History (Knopf, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

08-04-2002

state

<[storage](#), [architecture](#), [jargon](#), [theory](#)> How something is; its configuration, attributes, condition, or information content. The state of a system is usually temporary (i.e. it changes with time) and volatile (i.e. it will be lost or reset to some initial state if the system is switched off).

A state may be considered to be a point in some [space](#) of all possible states. A simple example is a light, which is either on or off. A complex example is the electrical activation in a human brain while solving a problem.

In computing and related fields, states, as in the light example, are often modelled as being [discrete](#) (rather than continuous) and the transition from one state to another is considered to be instantaneous. Another (related) property of a system is the number of possible states it may exhibit. This may be finite or infinite. A common model for a system with a finite number of discrete state is a [finite state machine](#).

[\[Jargon File\]](#) and [\[FOLDOC\]](#)

16-03-2001

state diagram

[state transition diagram](#)

00-00-0000

state machine

[finite state machine](#)

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state transition diagram

A diagram consisting of circles to represent states and directed line segments to represent transitions between the states. One or more actions (outputs) may be associated with each transition. The diagram represents a [finite state machine](#).

16-03-2001

statement

<[philosophical terminology](#)> the content of a [declarative](#) sentence employed in its typical use; a [proposition](#).

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

statement constant

<[philosophical terminology](#)> a [symbol](#) (usually uppercase letters such as A, B, C, etc.) used to represent a specific simple [statement](#) in the [propositional calculus](#).

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

statement form

<[philosophical terminology](#)> in the [propositional calculus](#), a string of symbols including only [statement](#) variables, and connectives (along with parenthetical punctuation) such that the substitution of a [statement](#) for each of its variables would result in a well-formed compound [statement](#).

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

statement variable

<[philosophical terminology](#)> a [symbol](#) (usually lowercase letters such as p, q, r, s, etc.) used to represent any [statement](#) whatsoever in the [propositional calculus](#).

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

statistics

<[statistics](#), [mathematics](#)> The practice, study or result of the application of mathematical [functions](#) to collections of [data](#) in order to summarise or [extrapolate](#) that data.

The subject of statistics can be divided into descriptive statistics - describing data, and analytical statistics - drawing conclusions from data.

[[FOLDOC](#)]

16-03-2001

Stevenson Charles Leslie

<[history of philosophy](#), [biography](#)> American philosopher (1908-1979). [Stevenson](#)' s "The Emotive Meaning of Ethical Terms" (1937), "Persuasive Definitions" (1938), and Ethics and Language (1944) developed [emotivism](#) as a meta-ethical [theory](#) in which moral judgments invariably express and encourage human feelings of characteristic sorts. His papers are collected in Facts and Values (1963).

Recommended Reading: Stephen Satris, Ethical Emotivism (Martinus Nijhoff, 1987).

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

Stewart Dugald

<[history of philosophy](#), [biography](#)> Scottish philosopher (1753-1828) whose Elements of the Philosophy of the Human Mind (1792) helped to perpetuate [Reid](#)' s [philosophy of common sense realism](#). [Stewart](#) was an influential teacher whose students included [Benjamin Constant](#), [James Mill](#), and [Walter Scott](#).

Recommended Reading: Collected Works of Dugald Stewart, ed. by William Hamilton (Thoemmes, 1997) and Dugald Stewart, Biographical Memoir of Adam Smith (Kelley, 1993).

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

stipulative definition

<[philosophical terminology](#)> the arbitrary assignment of [meaning](#) to a term not previously in use. Although it may be relatively inconvenient or useless, such a [definition](#) can never be mistaken or incorrect.

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

STM

[short term memory](#)

00-00-0000

stochastic

[probabilistic](#)

00-00-0000

stoicism

<[history of philosophy](#), [philosophical terminology](#)>
School of [philosophy](#) organized at Athens in the third century BC by [Zeno of Citium](#) and [Chrysippus](#). The stoics provided a unified account of the world that comprised [formal logic](#), [materialistic physics](#), and [naturalistic ethics](#). Later [Roman stoics](#), including [Seneca](#), [Epictetus](#), and [Marcus Aurelius](#) emphasized more exclusively the development of recommendations for living in harmony with a natural world over which one has no direct control.

Recommended Reading: Stoicorum Veterum Fragmenta, ed. by Johannes ab Arnim (Irrington, 1986); Handbook of Epictetus, tr. by Nicholas P. White (Hackett, 1983); A. A. Long, Stoic Studies (California, 2001); Brad Inwood, Ethics and Human Action in Early Stoicism (Oxford, 1987); Marcia L. Colish, The Stoic Tradition from Antiquity to the Early Middle Ages: Stoicism in Classical Latin Literature (Brill, 1990); and Lawrence C. Becker, A New Stoicism (Princeton, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

storage

<[storage](#)> (Or "memory") A device into which data can be entered, in which they can be held, and from which they can be retrieved at a later time.

16-03-2001

strength reduction

An optimisation where a function of some systematically changing variable is calculated more efficiently by using previous values of the function. In a [procedural language](#) this would apply to an expression involving a loop variable and in a [declarative language](#) it would apply to the argument of a [recursive](#) function. E.g.

f x = ... (2

00-00-0000

strict

A function f is strict in an argument if

f bottom = bottom

(See [bottom](#)).

In other words, the result depends on the argument so evaluation of an application of the function cannot terminate until evaluation of the argument has terminated.

If the result is only [bottom](#) when the argument is bottom then the function is also bottom-unique.

See also [strict evaluation](#), [hyperstrict](#).

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16-03-2001

strict evaluation

Call-by-value evaluation order is sometimes called "strict evaluation" because, in a sequential system, it makes functions behave as though they were [strict](#), in the sense that evaluation of a function application cannot terminate before evaluation of the argument. Similarly, languages are called strict if they use call-by-value argument passing.

Compare [eager evaluation](#), [lazy evaluation](#).

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16-03-2001

stroke function

<[logic](#)> The dyadic truth [function](#) "not both". One of only two dyadic truth [functions](#) capable of expressing all truth [functions](#) by itself.

Notation:

p|q. Also called the Sheffer stroke, and alternative denial.

See [dagger function](#)

[Glossary of First-Order Logic]

p	q	p		q
T	T	F		
T	F	T		
F	T	T		
F	F	T		

A truth-functional [connective](#) that suffices to symbolize every [dyadic relation](#) between

statements. Since " $p \mid q$ " (or "not both p and q ") takes the truth-values illustrated in the truth-table at right, **negation** can be defined as " $p \mid p$ " and **disjunction** as " $(p \mid p) \mid (q \mid q)$ ". From these, in turn, all of the other **connectives** can be derived.

Recommended Reading: Willard V. O. Quine, *Mathematical Logic* (Harvard, 1981) and Alfred North Whitehead and Bertrand Arthur Russell, *Principia Mathematica* to 56 (Cambridge, 1997).

[\[A Dictionary of Philosophical Terms and Names\]](#)

28-03-2002

strongly connected component

(SCC) A subset, S , of the nodes of a **directed graph** such that any node in S is reachable from any other node in S and S is not a subset of any larger such set. SCCs are **equivalence classes** under the **transitive closure** of the "directly connected to" **relation**.

[FOLDOC]

16-03-2001

structural recursion

The process of transforming an expression by expressing its structure as a syntax tree and applying a certain transformation rule to each kind of node, starting from the top. Rules for non-**leaf nodes** will normally return a result which depends on applying the rules recursively to its sub-nodes. Examples include **syntax analysis**, **code generation**, **abstract interpretation** and **program transformation**.

[FOLDOC]

16-03-2001

structuralism

<**history of philosophy**, **philosophical terminology**>
method of interpreting social phenomena in the context of a **system of signs** whose **significance** lies solely in the interrelationships among them. Initiated in the **linguistics** of **Saussure** and **Chomsky**, **structuralism** was applied to other disciplines by L'Évi-Strauss, **Piaget**, **Althusser**, **Lacan**, **Barthes**, **Foucault**, and **Eco**. Most structuralists share a conviction that individual human beings function solely as elements of the (often hidden) social networks to which they belong.

Recommended Reading: Edith Kurzweil, *The Age of Structuralism: From Levi-Strauss to Foucault* (Transaction, 1996); Peter Caws, *Structuralism: A Philosophy for the Human Sciences* (Prometheus, 1997); *Structuralism and Since: From Levi Strauss to Derrida*, ed. by John Sturrock (Oxford, 1981); and Donald D. Palmer, *Structuralism and Poststructuralism for Beginners* (Writers & Readers, 2001).

[\[A Dictionary of Philosophical Terms and Names\]](#)

08-04-2002

structure diagram

<[programming](#), [PI](#), [data](#)> A pictorial representation of the composition, grouping and relationship of data items.

[[FOLDOC](#)]

16-03-2001

structured analysis

one of a number of requirements analysis methods used in software engineering.

16-03-2001

structured design

<[programming](#), [PI](#)> (SD) One of a number of systematic top-down design techniques used in [software engineering](#), usually after [structured analysis](#).

[[FOLDOC](#)]

16-03-2001

structured language

<[programming](#), [PI](#)> A programming language where the program may be broken down into blocks or [procedures](#) which can be written without detailed knowledge of the inner workings of other blocks, thus allowing a top-down design approach.

See also [abstract data type](#), [module](#).

[[FOLDOC](#)]

16-03-2001

structured programming

<[programming](#), [PI](#)> Any software development technique that includes [structured design](#) and results in the development of a [structured program](#).

[[FOLDOC](#)]

16-03-2001

Suarez Francisco

<[history of philosophy](#), [biography](#)> Spanish philosopher and theologian (1548-1617) whose rejection of Aristotelian authority in the Disputationes Metaphysicae (Metaphysical Disputations) (1597) became a significant component of much [Renaissance](#) thinking. In De legibus ac Deo legislatore (On Law) (1612) Suarez qualified the [natural law theory](#) of [Aquinas](#), defending instead a voluntaristic notion of the effect of legislative edicts.

Recommended Reading: Jorge J. Gracia, Suarez on Individuation (Marquette, 1982).

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

sub specie aeternitatis

<[philosophical terminology](#)> Latin for "under the aspect of eternity"; hence, from [Spinoza](#) onwards, an honorific expression describing what is universally and eternally [true](#), without any reference to or dependence upon the merely temporal portions of [reality](#).

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

subalternation

<[philosophical terminology](#)> in the traditional [square of opposition](#), the relationship between a [universal proposition](#) and its corresponding [particular proposition](#). Thus, an I is the subaltern of its A proposition, and an O is the subaltern of its E proposition. Thus, for example: "Some larks are birds" is subaltern to "All larks are birds", and "Some robins are not fish" is subaltern to "No robins are fish". [Subalternation](#) is a reliable pattern of [inference](#) only on the assumption of [existential import](#) for universal propositions.

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

subclass

<[programming, PI](#)> In object-oriented programming, a [class](#) that is derived from a [superclass](#) by [inheritance](#). The subclass contains all the features of the superclass, but may have new features added or redefine existing features.

[[FOLDOC](#)]

16-03-2001

subcontraries

<[philosophical terminology](#)> a pair of categorical propositions which (provided that we assume [existential import](#)) cannot both be [false](#), although both could be [true](#). In the traditional [square of opposition](#), an I proposition and its corresponding O are subcontraries. Thus, for example: "Some business leaders are women" and "Some business leaders are not women" are subcontraries.

[[A Dictionary of Philosophical Terms and Names](#)]

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subject

<[programming, PI](#)> In subject-oriented programming, a subject is a collection of [classes](#) or class fragments whose [class hierarchy](#) models its domain in its own, subjective way. A subject may be a complete application in itself, or it may be an incomplete fragment that must be composed with other subjects to produce a complete application. Subject composition combines class hierarchies to produce new subjects that incorporate functionality from existing subjects.

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subject index

<[information science](#)> An information resource that contains references to other resources, categorised by subject, usually in a [hierarchy](#).

[Yahoo](#) is the most popular [Internet](#) subject index. Like most [other subject indices](#), Yahoo is arranged [ontologically](#).

Subject indices are not to be confused with [search engines](#), which are based not on subject, but instead on [relevance](#), although (1) this difference is often (possibly rightly) hidden from the unsophisticated user, and (2) future integration of [knowledge representation](#) into relevance ranking [algorithms](#) will make this a hazy distinction.

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16-03-2001

subjective

<[philosophical terminology](#)> that which depends upon the personal or individual, especially where - in contrast with the [objective](#) - it is supposed to be an arbitrary expression of private taste.

Recommended Reading: Nick Mansfield, *Subjectivity: Theories of the Self from Freud to Haraway* (NYU, 2001); Roger Frie, *Subjectivity and Intersubjectivity in Modern Philosophy and Psychoanalysis* (Rowman & Littlefield, 1997); and Sonia Kruks, *Retrieving Experience: Subjectivity and Recognition in Feminist Politics* (Cornell, 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

subjectivism

<[ethics](#)> an extreme version of [relativism](#), which maintains that each person' s beliefs are relative to that person alone and cannot be judged from the outside by any other person.

26-03-2001

subjectivity

the property of being [subjective](#).

16-03-2001

sublimation

<[psychoanalysis](#)> the redirection, according to Freud, of [antisocial sexual](#) and aggressive [impulses](#) into socially constructive [activity](#). Compare: [repression](#).

[[Philosophical Glossary](#)]

22-06-2001

sublime

<[philosophical terminology](#)> the [aesthetic feeling](#) aroused by experiences too overwhelming in scale to be appreciated as [beautiful](#) by the senses. The awe produced by standing on the brink of the Grand Canyon or the terror induced by witnessing a hurricane are properly said to be [sublime](#).

Recommended Reading: Immanuel Kant, *Observations on the Feeling of the Beautiful and Sublime*, ed. by John T. Goldthwait (California, 1991); Paul Crowther, *The Kantian Sublime: From Morality to Art* (Oxford, 1991); and *The Sublime Reader: A Reader in British Eighteenth-Century Aesthetic Theory*, ed. by Andrew Ashfield and Peter De Bolla (Cambridge, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

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subroutine

<[programming, Pl](#)> (Or "procedure") A sequence of [instructions](#) for performing a particular task. Most programming languages, including most [machine languages](#), allow the programmer to define subroutines. This allows the subroutine code to be called from multiple places, even from within itself (in which case it is called [recursive](#)). The programming language implementation takes care of returning control to (just after) the calling location, usually with the support of call and return instructions at [machine language](#) level.

Most languages also allow [arguments](#) to be passed to the subroutine, and one, or occasionally more, [return values](#) to be passed back.

A [function](#) is often very similar to a subroutine, the main difference being that it is called chiefly for its return value, rather than for any [side effects](#).

[[FOLDOP](#)]

16-03-2001

subset

<[logic](#)> A set all of whose members belong to a second set (a superset of the subset).

Proper subset

A subset lacking at least one member of its superset. Set A is a proper subset of set B **iff** all members of A are members of B, but at least one member of B is not a member of A.

[Glossary of First-Order Logic]

16-03-2001

substance

<[ontology](#), [epistemology](#), [causality](#), [necessity](#), [empiricism](#)> technically (for Leibniz, Spinoza, Descartes, et. al.) - a self-subsistent [entity](#) or [thing](#), not depending on anything (except, possibly [God](#)) for its [existence](#): also, the ultimate bearer of [attributes](#) or [properties](#). In a somewhat looser sense (closer to Aristotle' s) "substance" is used to refer to the [individuals](#) which are the bearers of attributes or havens of properties as opposed to the attributes or properties - [universals](#) - that they have or which [inhere](#) in them.

[[Philosophical Glossary](#)]

<[philosophical terminology](#)> what a thing is made of; hence, the underlying being that supports, exists independently of, and persists through time despite changes in, its [accidental](#) features. [Aristotle](#) identified [substance](#) - both primary and secondary - as the most fundamental of the ten [categories of being](#). According to [Spinoza](#), there can be no more than one truly independent being in the universe.

Recommended Reading: Mary Louise Gill, Aristotle on Substance (Princeton, 1991); Charlotte Witt, Substance and Essence in Aristotle (Cornell, 1994); R. S. Woolhouse, Descartes, Spinoza, Leibniz: The Concept of Substance in Seventeenth-Century Metaphysics (Routledge, 1993); Jeffrey Edwards, Substance, Force, and the Possibility of Knowledge: On Kant' s Philosophy of Material Nature (California, 2000); Joshua Hoffman and Gary S. Rosenkranz, Substance: Its Nature and Existence (Routledge, 1996); Anthony Quinton, The Nature of Things (Routledge, 1993); and David Wiggins, Sameness and Substance Renewed (Cambridge, 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

substance dualism

<[philosophy of mind](#), [ontology](#)> the view that the mental and the physical comprise two different classes of objects: minds and bodies.

Perhaps the most famous proponent of [substance dualism](#) was Descartes, who cashed out the distinction between minds and bodies as follows: minds are things that think but lack spatial magnitude, and bodies are things that have spatial magnitudes, but don' t think. Different substance dualists may disagree as to how best to define what' s essential to being mental and physical, but they do agree that the difference in question is one of objects, not properties. So, for example, my belief that the Eiffel tower is in France and my being six feet tall are properties of different objects, i.e., my mind and my body,

respectively.

See [property dualism](#)

[Pete Mandik](#)

[[Dictionary of Philosophy of Mind](#)]

16-03-2001

substantialism

[essentialism](#)

substitution

<[logic](#)> To replace one symbol with another or with a [wff](#). In axiom schemata, to replace metalanguage variables with object language [wffs](#). In instantiation, to replace a variable with a constant. In generalization, to replace a constant with a variable. Notation (for one of these): At/v (the result of substituting term t for the free occurrences of variable v in [wff](#) A).

[Glossary of First-Order Logic]

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substrate

<[hardware](#)> The body or base layer of an [integrated circuit](#), onto which other layers are deposited to form the circuit. The substrate is usually Silicon, though Sapphire is used for certain applications, particularly military, where radiation resistance is important. The substrate is originally part of the [wafer](#) from which the [die](#) is cut. It is used as the electrical [ground](#) for the circuit.

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subtype

<[programming, PI](#)> If S is a subtype of T then an expression of [type](#) S may be used anywhere that one of type T can and an [implicit type conversion](#) will be applied to convert it to type T.

In [object oriented programming](#), this means that [objects](#) of type S must accept every [message](#) that one of type T would.

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sufficient condition

<[philosophical terminology](#)> what logically or causally secures the [occurrence](#) of something else; see necessary - sufficient. Thus, [Leibniz](#) supposed that there must always be a [sufficient reason](#) for the way things are.

[[A Dictionary of Philosophical Terms and Names](#)]

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sufficient reason

<[determinism](#)> [principle](#) formulated by Leibniz according to which, for whatever is the case, there is a sufficient reason why it is the case. Closely akin to this is the Law of [Universal Causation](#), according to which every [event](#) has a [cause](#). See also: [Determinism](#).

[[Philosophical Glossary](#)]

22-06-2001

sui generis

<[philosophical terminology](#)> Latin for «of its own kind»; hence, whatever is absolutely [unique](#) or distinctive about something.

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

sum

1. <[mathematics](#)> In [domain theory](#), the sum $A + B$ of two [domains](#) contains all elements of both domains, modified to indicate which part of the union they come from, plus a new [bottom](#) element. There are two constructor functions associated with the sum:

$\text{inA} : A \rightarrow A+B$ $\text{inB} : B \rightarrow A+B$
 $\text{inA}(a) = (0,a)$ $\text{inB}(b) = (1,b)$

and a disassembly operation:

case d of isA(x) \rightarrow E1; isB(x) \rightarrow E2

This can be generalised to arbitrary numbers of domains.

See also [smash sum](#), [disjoint union](#).

2. <[tool](#)> A [Unix](#) utility to calculate a 16-bit [checksum](#) of the data in a file. It also displays the size of the file, either in [kilobytes](#) or in 512-byte blocks. The checksum may differ on machines with 16-bit and 32-bit ints.

[Unix manual page](#): `sum(1)`.

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sum of sets

[union](#)

00-00-0000

summum bonum

<[philosophical terminology](#)> Latin phrase meaning "highest good". Hence, that which is intrinsically valuable, the ultimate goal or end of human [life](#) generally.

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

superclass

[base class](#)

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supercomputer

<[computer](#)> A broad term for one of the fastest computers currently available. Such computers are typically used for [number crunching](#) including scientific [simulations](#), (animated) [graphics](#), analysis of geological data (e.g. in petrochemical prospecting), structural analysis, computational fluid dynamics, physics, chemistry, electronic design, nuclear energy research and meteorology. Perhaps the best known supercomputer manufacturer is [Cray Research](#).

A less serious definition, reported from about 1990 at The [University Of New South Wales](#) states that a supercomputer is any computer that can outperform [IBM](#)' s current fastest, thus making it impossible for IBM to ever produce a supercomputer.

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16-03-2001

supererogatory

<[ethics](#)> literally, "above the call of duty." A supererogatory act is one that is morally good and that goes beyond what is required by duty. Some ethical theories, such as certain versions of [utilitarianism](#), that demand that we always do the act that yields the most good have no room for supererogatory acts. It is sometimes used negatively, to object that an ethical prescription is too demanding.

<[philosophical terminology](#)> above and beyond the call of [duty](#). Although agents are not obliged by the dictates of ordinary [morality](#) to perform [supererogatory](#) acts - extraordinary feats of heroism or extreme deeds of self-sacrifice, for example - they may be commended for doing so. [Normative](#) theories that demand the performance of the best possible action in every circumstance render supererogation impossible by identifying the permissible with the [obligatory](#).

Recommended Reading: Gregory Mellema, Beyond the Call of Duty: Supererogation, Obligation, and Offence (SUNY, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

superset

<[logic](#)> A set some of whose members form a reference set. If A is a subset of B, then B is a superset of A.

[Glossary of First-Order Logic]

16-03-2001

supervenience

<[philosophy of mind, ontology](#)> a [set](#) of properties or facts M supervenes on a set of properties or facts P if and only if there can be no changes or differences in M without there being changes or differences in P.

[Pete Mandik](#)

[[Dictionary of Philosophy of Mind](#)]

16-03-2001

supervenient

<[philosophical yterminology](#)> belonging to or characteristic of something only in [virtue](#) of its having other features. Although a [supervenient](#) property cannot be defined in terms of, or reduced to, the properties on which it supervenes, nothing possess (or can possess) those properties without also having it. In this sense, [Hare](#) supposed that [moral](#) properties are [supervenient](#) with respect to straightforward descriptions of human [conduct](#), and [Davidson](#) proposes that [mental events](#) supervene on [physical events](#).

Recommended Reading: R. M. Hare, *The Language of Morals* (Clarendon, 1991); *Supervenience*, ed. by Jaegwon Kim (Ashgate, 2001); Gabriel M. A. Segal, *A Slim Book About Narrow Content* (MIT, 2000); *Supervenience: New Essays*, ed. by Elias E. Savellos and Umit D. Yalcin (Cambridge, 1995); Jaegwon Kim, *Supervenience and Mind: Selected Philosophical Essays* (Cambridge, 1993); and *Reality and Humean Supervenience: Essays on the Philosophy of David Lewis*, ed. by Gerhard Preyer and Frank Siebelt (Rowman & Littlefield, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

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supremum

[least upper bound](#)

00-00-0000

surjection

<[mathematics](#)> A function $f : A \rightarrow B$ is surjective or onto or a surjection if $f(A) = B$. I.e. f can return any value in B . This means that its [image](#) is its [codomain](#).

Only surjections have [right inverses](#), $f' : B \rightarrow A$ where $f'(f(x)) = x$ since if f were not a surjection there would be elements of B for which f' was not defined.

See also [bijection](#), [injection](#).

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surjective

[surjection](#)

00-00-0000

syllogism

<[philosophical terminology](#)> an important variety of [deductive argument](#) in which a conclusion follows from two or more premises; especially the [categorical syllogism](#).

Recommended Reading: "Aristotle, Categories, On Interpretation, Prior Analytics", tr. by Hugh Tredennick (Harvard, 1938); Jan Lukasiewicz, "Aristotle's Syllogistic from the Standpoint of Modern Formal Logic" (Clarendon, 1957); "The New Syllogistic", ed. by George Englebretsen (Peter Lang, 1987); and Bruce E. R. Thompson, "An Introduction to the Syllogism and the Logic of Proportional Quantifiers" (Peter Lang, 1993).

[[A Dictionary of Philosophical Terms and Names](#)]

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symbolic inference

The derivation of new facts from known facts and [inference rules](#). This is one of the fundamental operations of artificial intelligence and [logic programming](#) languages like Prolog.

Inference is a basic part of human reasoning. For example given that all men are mortal and that Socrates is a man, it is a trivial step to infer that Socrates is mortal. We might express these symbolically:

$\text{man}(X) \Rightarrow \text{mortal}(X)$.
 $\text{man}(\text{Socrates})$.

("if X is a man then X is mortal" and "Socrates is a man"). Here, "man", "mortal" and "Socrates" are just arbitrary symbols which the computer manipulates without reference to or knowledge of their external meaning. A [forward chaining](#) system (a [production system](#)) could use these to infer the new fact

$\text{mortal}(\text{Socrates})$.

simply by matching the left-hand-side of the implication against the fact and substituting Socrates for the variable X .

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16-03-2001

symbolic logic 1

<[philosophical terminology](#)> the systematic representation of [logic](#). See [propositional calculus](#) and [quantification theory](#).

Recommended Reading: P. H. Nidditch, "The Development of Mathematical Logic" (St. Augustine, 1998); Graeme Forbes, "Modern Logic: A Text in Elementary Symbolic Logic" (Oxford, 1994); Irving M. Copi, "Symbolic Logic" (Prentice Hall, 1979); Willard V. O. Quine, "Mathematical Logic" (Harvard, 1981); and Alfred North Whitehead and Bertrand Arthur Russell, "Principia Mathematica to 56" (Cambridge, 1997).

[[A Dictionary of Philosophical Terminology](#)]

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symbolic logic 2

<[logic](#)> The discipline that treats formal [logic](#) by means of a formalised artificial language or symbolic calculus, whose purpose is to avoid the ambiguities and logical inadequacies of [natural language](#).

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16-03-2001

symbolic mathematics

<[mathematics, application](#)> (Or "symbolic math") The use of computers to manipulate mathematical equations and expressions in symbolic form, as opposed to manipulating the numerical quantities represented by those symbols. Such a system might be used for symbolic integration or differentiation, substitution of one expression into another, simplification of an expression, change of subject etc.

One of the best known symbolic mathematics software packages is [Mathematica](#). Others include [ALAM](#), [ALGY](#), [AMP](#), [Ashmedai](#), [AXIOM*](#), [CAMAL](#), [CAYLEY](#), [CCalc](#), [GLAM](#), [CoCoA\(?\)](#), [ESP](#), [FLAP](#), [FORM](#), [FORMAL](#), [Formula ALGOL](#), [GAP](#), [JACAL](#), [LiE](#), [Macaulay](#), [MACSYMA](#), [Magic Paper](#), [MAO](#), [Maple](#), [Mathcad](#), [MATHLAB](#), [MuMath](#), [Nother](#), [ORTHOCARTAN](#), [Pari](#), [REDUCE](#), [SAC-1](#), [SAC2](#), [SAINT](#), [Schoonschip](#), [Scratchpad I](#), [SHEEP](#), [STENSOR](#), [SYMBAL](#), [SymbMath](#), [Symbolic Mathematical Laboratory](#), [TRIGMAN](#), [UBASIC](#).

[Usenet](#) newsgroup: [news:sci.math.symbolic](#).

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symbolicism

<[philosophy of mind](#)> an approach to understanding human [cognition](#) that is committed to language like symbolic processing as the best method of explanation.

See also [distributed representation](#), [connectionism](#), [dynamical systems theory](#) [computational models](#)

[[Dictionary of Philosophy of Mind](#)]

16-03-2001

symbols - logical

<[logic](#), [philosophy of science](#), [philosophical terminology](#)> throughout this site, references to connectives of the [propositional calculus](#) and the quantifiers of [quantification theory](#) employ the following logical symbols:

~ negation
& conjunction
v disjunction
--> material implication
<-> material equivalence
/(x) universal quantifier
V(x) existential quantifier

[[A Dictionary of Philosophical Terms and Names](#)]

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symmetric

<[mathematics](#)> 1. A [relation](#) R is symmetric if, for all x and y,

$x R y \Rightarrow y R x$

If it is also [antisymmetric](#) ($x R y \ \& \ y R x \Rightarrow x == y$) then $x R y \Rightarrow x == y$, i.e. no two different elements are related.

2. In linear algebra, a member of the [tensor product](#) of a [vector space](#) with itself one or more times, is symmetric if it is a [fixed point](#) of all of the [linear isomorphisms](#) of the tensor product generated by [permutations](#) of the ordering of the copies of the vector space as factors. It is said to be antisymmetric precisely if the action of any of these linear maps, on the given tensor, is equivalent to multiplication by the sign of the permutation in question.

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16-03-2001

symmetric difference of sets

<[logic](#)> The symmetric difference of two sets, A and B, is the set of objects that are members of either A or B but not both. No standard notation. The symmetric difference of sets A and B is the set $x : (x \in A) \neq (x \in B)$. The symmetric difference of sets is the set-theoretic equivalent of exclusive disjunction; for the equivalent of inclusive disjunction.

[[Glossary of First-Order Logic](#)]

16-03-2001

syncategorematic

<[philosophical terminology](#)> not included among the categories of [Aristotle](#) and therefore incapable of serving as a [categorical term](#). Hence, any linguistic expression that does not refer to anything else. Thus, "if", "while", and "and" are all syncategorematic terms.

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

synchronous

<[operating system, communications](#)>

1. Two or more processes that depend upon the occurrences of specific events such as common timing signals.
2. Occurring at the same time or at the same rate or with a regular or predictable time relationship or sequence.

Opposite: asynchronous.

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16-03-2001

syncretism

<[philosophy](#)> the word syncretism refers to attempts to unify existing and seemingly inharmonious theories or systems of philosophy. In general, syncretism reflects a more serious intellectual endeavor than [eclecticism](#).

[[The Ism Book](#)]

27-03-2001

synderesis

<[philosophical terminology](#)> immediate, intuitive apprehension of the fundamental principles of [morality](#). For such medieval ethicists as Peter [Lombard](#) and [Aquinas](#), synderesis, unlike mere [conscience](#), is both infallible and general.

Recommended Reading: Ralph M. McInerney, "Ethica Thomistica: The Moral Philosophy of Thomas Aquinas" (Catholic U. of Am., 1997) and Daniel Westberg, "Right Practical Reason: Aristotle, Action, and Prudence in Aquinas" (Clarendon, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

synonymous

<[philosophical terminology](#)> having exactly the same [meaning](#) in more than one use; see homonymous - synonymous - paronymous. Although many since [Aristotle](#) have supposed this to be essential for effective [communication](#), [Quine](#) has shown that the indeterminacy of translation renders genuine synonymy difficult to secure.

[[A Dictionary of Philosophical Terms and Names](#)]

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syntactic

[syntax](#)

00-00-0000

syntactic completeness

<[logic](#)> A system is syntactically complete [iff](#) there is no unprovable schema B that could be added to the system as an axiom schema without creating simple inconsistency.

Syntactic incompleteness

The failure of syntactic completeness; there is at least one unprovable schema that could be added as an axiom schema without creating simple inconsistency.

[Glossary of First-Order Logic]

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syntactic consequence

<[logic](#)> A is the syntactic consequence of a set G of [wffs](#) [iff](#) A can be derived from G (and the axioms).

Notation:

$G \vdash A$.

[Glossary of First-Order Logic]

16-03-2001

syntactic tautology

<[logic](#)> A [wff](#) of truth-functional logic whose truth table column contains nothing but T' s when these T' s are uninterpreted tokens rather than, say, truth-values. The rules for generating the truth table column tell us to use one of these uninterpreted T' s in exactly those cases where semantic considerations would have led us to use the truth-value Truth.

See [semantic tautology](#).

[Glossary of First-Order Logic]

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syntactic validity

<logic> An [inference](#) is syntactically valid [iff](#) the conclusion can be derived from the premises by means of stipulated rules of [inference](#).

See [semantic validity](#)

[Glossary of First-Order Logic]

16-03-2001

syntactics 1

<[philosophical terminology](#)> study of the grammatical relationships among signs, independently of their [interpretation](#) or [meaning](#), which is the subject of [semantics](#).

Recommended Reading: Rudolf Carnap, "Philosophy and Logical Syntax" (Thoemmes, 1997); Noam Chomsky, "Aspects of the Theory of Syntax" (MIT, 1965); and Robin Cooper, "Quantification and Syntactic Theory" (Reidel, 1983).

[[A Dictionary of Philosophical Terms and Names](#)]

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syntactics 2

<[logic](#), [discipline](#), [syntax](#)> the characterization, for an artificial, or natural, language, of what constitutes a well-formed sentence, or, to put it another way, a grammatical sentence, or a sentence of the language. It is usually assumed that a well-formed, or grammatical, sentence need not be meaningful. [semantics](#)

[[A Philosophical Glossary](#)]

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syntax

The structure of strings in some language. A language' s syntax is described by [grammar](#). For example, the syntax of a binary number could be expressed as

binary_number = bit [binary_number]

bit = "0" | "1"

meaning that a binary number is a bit optionally followed by a binary number and a bit is a literal zero or one digit.

The meaning of the language is given by its [semantics](#).

See also [abstract syntax](#), [concrete syntax](#).

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16-03-2001

syntax tree

<[mathematics](#), [theory](#), [language](#)> A [tree](#) representing the [abstract syntax](#) of some [tokens](#) in a [language](#).

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synthesis

<[philosophical terminology](#)> the combination or reconciliation of opposed notions; see [thesis](#) - [antithesis](#) - [synthesis](#).

[[A Dictionary of Philosophical Terms and Names](#)]

08-04-2002

synthetic 1

<[logic](#), [epistemology](#), [ontology](#), [empiricism](#)> having factual or [empirical](#) content; i.e. not being true or false by [definition](#). Contrast term: [analytic](#).

[[Philosophical Glossary](#)]

22-06-2001

synthetic 2

<[philosophy of language](#)> a [sentence](#), [proposition](#), [thought](#), or judgement is synthetic if it is neither logically (analytically) true, or false; generally, synthetic claims are said to be empirical in that they are discovered through experiment and observation, and in that "a bare conception of the subject" will not make it immediately obvious that the predicate applies to it.

[[A Philosophical Glossary](#)]

30-04-2001

systematicity

<[philosophy of mind](#)> a number of putative psychological properties or regularities go by the name of systematicity. These diverse regularities are meant to constitute explananda that are supposed to support the view that there exists a [syntactically](#) and [semantically](#) combinatorial [language of thought](#).

See productivity of thought, [compositionality](#), [symbolicism](#)

[Ken Aizawa](#)

[[Dictionary of Philosophy of Mind](#)]

16-03-2001

tacit knowledge

<[philosophy of mind](#), [epistemology](#)> knowledge that enters into the production of behaviours and/or the constitution of mental states but is not ordinarily accessible to [consciousness](#).

See also [cognize](#), [implicit memory](#), [background](#), [rules](#).

[Daniel Barbiero](#)

[[Dictionary of Philosophy of Mind](#)]

16-03-2001

taoism

<[philosophy](#), [religion](#)> Taoism is an ancient strand of Chinese philosophical thought, similar in many ways to [Platonism](#) in the West (just as [Confucianism](#) holds a position similar to [Aristotelianism](#)). However, Taoism was a reaction against the conservative and action-oriented thought of Confucius: one of the central Taoist concepts was wu-wei or "non-activity". Taoists stress the necessity of living in accordance to nature (their policy of non-activity could be phrased as "do nothing that is contrary to nature or to your own native character"), and their doctrines can be compared to [stoicism](#) in this regard. The Taoist emphasis on lack of emotion and "disturbance" - that is, on inner peace - can also be compared to the doctrines of [Epicureanism](#). Taoist thinkers, foremost among them Lao Tzu and Chuang Tzu (the two great authors of classical Taoism), stressed the inherent untrustworthiness of appearances, the unity of the real world behind the appearances, the necessity of understanding this real unity "spontaneously", and the cultivation of one' s character so that one could become a "free spirit". Taoism was and is a strong tradition in China, which accounts for the fact that Chinese forms of [Buddhism](#) (e.g., Ch' an or Zen Buddhism) show such a heavy dependence on Taoist concepts. (References from [Buddhism](#), [Epicureanism](#), and [humanism](#).)

[[The Ism Book](#)]

27-03-2001

Tarski Alfred

<[biography](#), [history of philosophy](#)> Polish-American logician (1902-1983) who defended a [correspondence theory of truth](#) in "The Concept of Truth in Formalized Languages" (1933) and "The Semantic Conception of Truth and the Foundations of Semantics" (1944). According to Tarski, we must distinguish between a [formal language](#) and its interpretation as applicable within a specific domain, in order to define the [truth](#) of propositions within the [formal language](#) in terms of their satisfaction by the external conditions that obtain. Tarski' s logical papers were collected in "A Decision Method for Elementary Algebra and Geometry" (1948) and "Logic, Semantics, Metamathematics" (1956).

Recommended Reading: Alfred Tarski, "Introduction to Logic and to the Methodology of Deductive Sciences", tr. by Olaf Helmer (Dover, 1995) and "Alfred Tarski and the Vienna Circle: Austro-Polish Connections in Logical Empiricism", ed. by Jan Wolenski and Eckhart Kohler (Kluwer, 1998).

[[A Dictionary of Philosophical Terms and Names](#)]

15-04-2002

tautology

<logic> a logically valid [wff](#) of truth-functional propositional logic. A compound proposition that is true in every row of its truth table or in every interpretation. [contingency](#), [contradiction](#), [logical validity](#), [semantic tautology](#), [syntactic tautology](#). Or also, a non-atomic, or molecular, proposition that is true no matter what the assignment of truth value to the atomic propositions that it contains. Example: "p or not-p". This molecular proposition is true whether we assign "p" the value true or the value false.

based on [\[A Philosophical Glossary\]](#)

05-06-2001

tautology schema

<logic> (plural: schemata). A formula containing variables of the metalanguage which becomes a tautology when the variables are instantiated to [wffs](#) of the [formal language](#).

[Glossary of First-Order Logic]

16-03-2001

Taylor Harriet Hardy

<[biography](#), [history of philosophy](#)> English philosopher (1807-1858). In The "Enfranchisement of Women" (1851) Taylor argued that the confinement of women to domestic pursuits was harmful to all human beings. She wrote eloquently on behalf of voting [rights](#) for women, equal opportunities in education and employment, and the abolition of restrictive laws governing marriage and divorce. Through her long and intimate association with [Mill John Stuart](#), Taylor significantly contributed to the application of [utilitarian](#) principles to social and political issues.

Recommended Reading: "The Complete Works of Harriet Taylor Mill", ed. by Jo Ellen Jacobs and Paula Harms Payne (Indiana, 1998) and "Sexual Equality: A John Stuart Mill, Harriet Taylor Mill, and Helen Taylor Reader", ed. by Ann P. Robson and John M. Robson (Toronto, 1994).

[\[A Dictionary of Philosophical Terms and Names\]](#)

23-04-2002

techne

<[philosophical terminology](#)> (τεχνη) Greek term for the art, craft, or skill involved in deliberately producing something (ποίησις [[poiesis](#)]), by contrast with those things that merely derive from nature (φύσις [[physis](#)] or chance (τύχη [[tyche](#)])). Both [Plato](#) and [Aristotle](#) distinguished its productive and practical components from more theoretical concerns.

Recommended Reading: F. E. Peters, "Greek Philosophical Terms: A Historical Lexicon" (NYU, 1967) and David Roochnik, "Of Art and Wisdom:

Plato' s Understanding of Techne" (Penn. State, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

23-04-2002

teleological argument

<[metaphysics](#), [philosophical terminology](#)> an attempt to prove the existence of [god](#) based upon an observation of the regularity or [beauty](#) of the universe. As employed by [Cicero](#), [Aquinas](#), and [Paley](#), the argument maintains that many aspects of the natural world exhibit an orderly and purposive character that would be most naturally explained by reference to the intentional [design](#) of an intelligent creator. [Hume](#) pointed out that since we have no experience of universe-formation generally, supposed inferences to its cause are unwarranted. Moreover, [Darwin](#)' s theory of natural selection offered an alternative, non-teleological account of biological adaptations. In addition, anyone who accepts this line of argument but acknowledges the presence of imperfection in the natural order is faced with the problem of [evil](#). Nevertheless, reasoning of this sort remains a popular pastime among convinced theists.

Recommended Reading: "Thomas St. Aquinas", tr. by Anton C. Pegis (Notre Dame, 1997); William Paley, "Natural Theology: Evidences of the Existence and Attributes of the Deity" (Classworks, 1986); David Hume, "Principal Writings on Religion, Including ' Dialogues Concerning Natural Religion' and ' Natural History of Religion' ", ed. by J. C. A. Gaskin (Oxford, 1998); and Delvin Lee Ratzsch, "Nature, Design, and Science: The Status of Design in Natural Science" (SUNY, 2001).

[\[A Dictionary of Philosophical Terms and Names\]](#)

23-04-2002

teleological ethics

<[ethics](#)> it claims that it is the consequences (or goals-fostered-by) of actions that determine their moral worth. [Mill](#)' [utilitarianism](#) ("act so as to achieve the greatest possible balance of pleasure over pain for all sentient creation") is considered a typical example. deontological.

Based on [\[A Philosophical Glossary\]](#)

30-04-2001

teleology

<[philosophy of history](#), [ethics](#), [finalism](#), [metaphysics](#)>
<[scholasticism](#), [philosophy of nature](#), [epicureism](#), [ockhamism](#)>
<[vitalism](#), [mechanism](#), [determinism](#)> purpose or direction.

[\[Philosophical Glossary\]](#)

22-06-2001

telos

<[philosophical terminology](#)> Greek term for the [end](#), completion, purpose, or goal of any thing or activity. According to [Aristotle](#), this is the [final cause](#) which accounts for the existence and nature of a thing. Following [Wolff](#), modern philosophers (often pejoratively) designate as [teleological](#) any explanation, theory, or argument that emphasizes purpose.

Recommended Reading: F. E. Peters, "Greek Philosophical Terms: A Historical Lexicon" (NYU, 1967); F. M. J. Waanders, "History of Telos and Teleo in Ancient Greek" (Benjamins, 1984); Immanuel Kant, "Critique of Judgment", tr. by Werner S. Pluhar (Hackett, 1987); Rowland Stout, "Things That Happen Because They Should: A Teleological Approach to Action" (Oxford, 1996); and Ernest Nagel, "Teleology Revisited" (Columbia, 1982).

[[A Dictionary of Philosophical Terms and Names](#)]

23-04-2002

temporal logic

<[logic](#)> An extension of [predicate calculus](#) which includes notation for arguing about "when" statements are true. Time is discrete and extends indefinitely into the future. Three [prefix](#) operators, represented by a circle, square and diamond mean "is true at the next time instant", "is true from now on" and "is eventually true". $x \text{ U } y$ means x is true until y is true. $x \text{ P } y$ means x precedes y.

There are two types of formula: "state formulae" about things true at one point in time, and "path formulae" about things true for a sequence of steps. An example of a path formula is " $x \text{ U } y$ ", and example of a state formula is "next x" or a simple atomic formula such as "waiting".

"true until" in this context means that a state formula holds at every point in time up to a point when another formula holds. " $x \text{ U } y$ " is the "strong until" and implies that there is a time when y is true. " $x \text{ W } y$ " is the "weak until" in which it is not necessary that y holds eventually.

There are two types of temporal logic used: branching time and linear time. The basic propositional temporal logic cannot differentiate between the two, though. Linear time considers only one possible future, in branching time you have several alternative futures. In branching temporal logic you have the extra operators "A" (for "all futures") and "E" (for "some future"). For example, " $A(\text{work U go_home})$ " means "I will work until I go home" and " $E(\text{work U go_home})$ " means "I may work until I go home".

[[FOLDOP](#)]

16-03-2001

tensor product

<[mathematics](#)> A function of two [vector spaces](#), U and V, which returns the space of [linear maps](#) from V' [dual](#) to U.

Tensor product has natural symmetry in interchange of U and V and it produces an associative "multiplication" on vector spaces.

Writing \otimes for tensor product, we can map $U \times V$ to $U \otimes V$ via: (u,v) maps to that linear map which takes any w in V' [dual](#) to u times w' 's action on v . We call this linear map $u \otimes v$. One can then show that

$$\begin{aligned} u \otimes v + u \otimes x &= u \otimes (v+x) \\ u \otimes v + t \otimes v &= (u+t) \otimes v \\ \text{and} \\ h(u \otimes v) &= h(u) \otimes hv \end{aligned}$$

ie, the mapping respects linearity: whence any bilinear map from $U \times V$ (to wherever) may be factorised via this mapping. This gives us the degree of natural symmetry in swapping U and V. By rolling it up to multilinear maps from products of several vector spaces, we can get to the natural associative "multiplication" on vector spaces.

When all the vector spaces are the same, permutation of the factors doesn't change the space and so constitutes an automorphism. These permutation-induced iso-auto-morphisms form a group which is a [model](#) of the group of permutations.

[[FOLDDOC](#)]

16-03-2001

Teresa of Avila

<[biography](#), [history of philosophy](#)> Teresa Sanchez de Cepeda y Ahumada, Spanish mystic (1515-1582). Teresa's "The Way of Perfection" (1566) and "The Interior Castle" sharply distinguished intellectual from volitional portions of human nature and recommended the total surrender of the [soul](#) to [god](#) through both prayerful meditation and ecstatic union with the divine.

Recommended Reading: "The Life of Saint Teresa of Avila" by Herself, tr. by J.M. Cohen (Penguin, 1988); Rowan Williams, "Teresa of Avila" (Continuum, 2000); and Cathleen Medwick, "Teresa of Avila: The Progress of a Soul" (Doubleday, 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

17-04-2002

term

<[logic](#)> Grammatically, the type of expression that can serve as the [argument](#) of a [predicate](#) or [function](#). The subject of predication; the input of a [function](#). As such (in first-order [predicate logic](#)) either an individual [constant](#), individual variable, or a [function](#) (with its own [arguments](#)) defined for a domain and range of individuals.

[Glossary of First-Order Logic]

16-03-2001

terminus

«terminus a quo» - «terminus ad quem» Latin phrases for «limit from which» and «limit to which»; hence, the temporal starting-point and ending-point for the occurrence of any event, the moments of its beginning and its completion.

[\[A Dictionary of Philosophical Terms and Names\]](#)

24-04-2002

test

1. The process of exercising a product to identify differences between expected and actual behaviour. Typically testing is bottom-up: unit test, integration test and finally system test. Ideally testing should be done by real users bashing on a prototype long enough to get thoroughly acquainted with it, with careful monitoring and followup of the results.

Test coverage attempts to assess how complete a test has been.

2. The second stage in a generate and test search [algorithm](#).

[\[Jargon File\]](#)

16-03-2001

texture

<[graphics](#)> A measure of the variation of the intensity of a surface, quantifying properties such as smoothness, coarseness and regularity. It' s often used as a region descriptor in image analysis and computer vision.

The three principal approaches used to describe texture are statistical, structural and spectral. Statistical techniques characterise texture by the statistical properties of the grey levels of the points comprising a surface. Typically, these properties are computed from the grey level histogram or grey level cooccurrence matrix of the surface.

Structural techniques characterise texture as being composed of simple primitives called "texels" (texture elements), that are regularly arranged on a surface according to some rules. These rules are formally defined by [grammars](#) of various types.

Spectral techniques are based on properties of the Fourier spectrum and describe global periodicity of the grey levels of a surface by identifying high energy peaks in the spectrum.

[\[FOLDOC\]](#)

16-03-2001

Thales

<[biography](#), [history of philosophy](#)> presocratic philosopher (c. 585 BCE) who first proposed rational explanation of the natural world. In fragmentary reports from other philosophers, Thales is supposed to have held that «All is water». His [Milesian](#) followers commonly disagreed with this simple identification of the αρχη [[arche](#)].

Recommended Reading: G. S. Kirk and J. E. Raven, "The Presocratic Philosophers: A Critical History With a Selection of Texts" (Cambridge, 1988); Jonathan Barnes, "The Presocratic Philosophers" (Routledge, 1982); and "The Cambridge Companion to Early Greek Philosophy", ed. by A. A. Long (Cambridge, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

16-04-2002

The Ism Book

<[source](#)> [The Ism Book](#) edited by Peter Saint-André. From the Home Page: "I wrote The Ism Book in 1990 at the request of a businessman who wanted a brief guide to philosophy in the form of a dictionary. I included the popular meanings of the isms, brought out the practical consequences of viewpoints in all the branches of philosophy, defined various types of isms, and even tried to make it entertaining. While I' ve changed several of these features over the years, the book retains much of its original stamp".

Definitions in this dictionary are from the version 3.0 (1999).

Edited by Giovanni Benzi

23-03-2001

theism

<[metaphysics](#), [philosophy of religion](#)> the word theism is used to describe any belief in the existence of a god or divine powers. While the true opposite of theism is [atheism](#), in Western philosophy theism is sometimes contrasted with [deism](#) or with [pantheism](#), in which case it refers to the active involvement of God in the world or to the separation of God from his creation. (References from [atheism](#), [deism](#), [humanism](#), [naturalism](#), and [polytheism](#).)

Recommended Reading: Richard Swinburne, "The Coherence of Theism" (Clarendon, 1993); J. J. C. Smart and J. J. Haldane, "Atheism and Theism" (Blackwell, 1996); Alvin Plantinga, "God and Other Minds: A Study of the Rational Justification of Belief in God" (Cornell, 1990); Richard Swinburne, "The Existence of God" (Clarendon, 1991); and Stephen T. Davis, "God, Reason, and Theistic Proofs" (Eerdmans, 1997).

based on [[The Ism Book](#)]
[[A Dictionary of Philosophical Terms and Names](#)]

16-04-2002

theodicy

<[metaphysics](#), [teleology](#)> an attempt to explain or defend the perfect [benevolence](#) of [god](#) despite the apparent presence of evil in the world. In this vein, for example, [Leibniz](#) devoted great effort to demonstrating that this is the best of all possible worlds.

Recommended Reading: Gottfried Wilhelm Leibniz, "Theodicy: Essays on the Goodness of God, the Freedom of Man, and the Origin of Evil", ed. by Austin Marsden Farrer (Open Court, 1988); "The Problem of Evil: A Reader", ed. by Mark Larrimore (Blackwell, 2000); Richard Swinburne, "Providence and the Problem of Evil" (Oxford, 1998); and Alvin Plantinga, "God, Freedom, and Evil" (Eerdmans, 1978).

[[A Dictionary of Philosophical Terms and Names](#)]

16-04-2002

theorem

<[logic](#)> A [wff](#) that is proved or provable. Axioms are special cases of theorems.

Notation:

|- A (A is a [theorem](#));

or |- SA (A is a [theorem](#) in system S).

See [antitheorem](#), [proof](#)

16-03-2001

theorem schema

<[logic](#)> (plural: schemata). A formula containing variables of the metalanguage which becomes a [theorem](#) when the variables are instantiated to [wffs](#) of the [formal language](#).

[Glossary of First-Order Logic]

16-03-2001

theoretical definition

<[biography](#), [history of philosophy](#)> a proposal for understanding the [meaning](#) of a term in relation to a set of scientifically useful hypotheses.

[[A Dictionary of Philosophical Terms and Names](#)]

16-04-2002

theoretical knowledge

<[philosophical terminology](#)> an organized body of learning, the ultimate aim of human study for many classical philosophers.

[[A Dictionary of Philosophical Terms and Names](#)]

28-09-2003

theory

The consensus, idea, plan, story, or set of rules that is currently being used to inform a behaviour. This usage is a generalisation and (deliberate) abuse of the technical meaning. "What' s the theory on fixing this TECO loss?" "What' s the theory on dinner tonight?" ("Chinatown, I guess.") "What' s the current theory on letting lusers on during the day?" "The theory behind this change is to fix the following well-known screw...."

[[FOLDOC](#)]

16-03-2001

theory change

<[artificial intelligence](#)> The study of methods used to incorporate new information into a [knowledge base](#) when the new information may conflict with existing information.

[Belief revision](#) is one area of theory change.

[[FOLDOC](#)]

16-03-2001

theory laden

<[epistemology, philosophy of science](#)> the property of observations varying with or depending upon the theoretical commitments of the observer. Insofar as observations are theory laden, your [beliefs](#) -- as shaped by the [theory](#) or [paradigm](#) you accept -- determines what you observe, so that partisans of different theories (or paradigms) will observe differently.

[[Philosophical Glossary](#)]

22-06-2001

theory neutral

<[epistemology, philosophy of science](#)> the property of observations being uninfluenced by the theoretical commitments of the observer. Insofar as observations are theory neutral, your [beliefs](#) -- as shaped by the [theory](#) (or [paradigm](#)) you accept -- do not color what you observe, so that partisans of different theories (or paradigms) all observe alike.

[[Philosophical Glossary](#)]

22-06-2001

theory of definite descriptions

[Russell'](#) s theory of description.

08-10-2003

thesis - antithesis - synthesis

<[philosophical terminology](#), [history of philosophy](#)> in the philosophy of [Hegel](#), the inevitable transition of [thought](#), by [contradiction](#) and reconciliation, from an initial conviction to its opposite and then to a new, higher conception that involves but transcends both of them. Thus, for example: Being / Non-being / Becoming, [subjective](#) / [objective](#) / [absolute](#), or symbolic / classical / romantic. Since he identified reality with thought, Hegel believed that the same triadic movement is to be found in nature, cultural progress, and history.

Recommended Reading: "Hegel' s Science of Logic", tr. by A. V. Miller (Humanity, 1998); Quentin Lauer, "Essays in Hegelian Dialectic" (Fordham, 1977); and Hans-Georg Gadamer, "Hegel' s Dialectic", tr. by P. Christopher Smith (Yale, 1982).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-04-2002

thing-in-itself

<[metaphysics](#), [ontology](#)> an object as it is (or would be) independently of our awareness of it; the [noumenon](#). As [Kant](#) showed, we cannot know things-in-themselves but can only postulate their nature from what we know about observable phenomena.

Recommended Reading: Immanuel Kant, "Critique of Pure Reason", tr. by Werner S. Pluhar and Patricia Kitcher (Hackett, 1996); Sebastian Gardner, Routledge "Philosophy Guidebook to Kant and the Critique of Pure Reason" (Routledge, 1999); Gerold Prauss, "Kant und das Problem der Dinge an sich"; and Rae Langton, "Kantian Humility: Our Ignorance of Things in Themselves" (Clarendon, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-04-2002

Thomas Aquinas

<[biography](#), [history of philosophy](#)> Italian Dominican philosopher and theologian. For a discussion of his life and works, see [Aquinas](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-04-2002

thomism

<[philosophical school](#)> term used to describe the doctrines and legacy of Thomas Aquinas, who effected a synthesis between [Christianity](#) and [Aristotelianism](#). Thomist philosophers continue to be active today, mostly at Catholic or Jesuit universities (neothomism, neoscholasticism).

[\[The Ism Book\]](#)

27-03-2001

Thomson Judith Jarvis

<[biography](#), [history of philosophy](#)> American moral philosopher (1929-); author of "Acts and Other Events" (1977), "The Realm of Rights" (1990), and "Moral Relativism and Moral Objectivity" (1996). In "Rights, Restitution, and Risk: Essays in Moral Theory" (1986) Thomson develops an ethical stance grounded upon the defeasible presumption of individual [rights](#). Thomson' s "A Defence of Abortion" (1971) famously establishes that termination of pregnancy, under certain circumstances, is morally permissible even if the fetus is granted status as a person entitled to rights. "Abortion" (1995) offers her more recent reflections on the same subject.

Recommended Reading: "Fact and Value: Essays on Ethics and Metaphysics for Judith Jarvis Thomson", ed. by Alex Byrne, Robert Stalnaker, and Ralph Wedgwood (MIT, 2001).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-04-2002

Thoreau Henry David

<[literature](#), [history of philosophy](#)> American writer (1817-1862). Thoreau' s essay "On Civil Disobedience" (1849) is a classic statement of the principles, later employed by [Gandhi](#) and King, of passive resistance against governmental authority on the basis of individual conscience. Thoreau' s "Walden, or Life in the Woods" (1854) describes and recommends a spontaneous life of creativity in purposeful union with the natural world.

Recommended Reading: "The Portable Thoreau", ed. by Carl Bode (Viking, 1977) and Robert D. Richardson, Jr. and Barry Moser, "Henry Thoreau: A Life of the Mind" (California, 1988).

[\[A Dictionary of Philosophical Terms and Names\]](#)

16-04-2002

thought

<[philosophy of mind](#)> an [intentional](#) mental phenomenon which has contents about things in the world.

See [intentionality](#)

[\[Dictionary of Philosophy of Mind\]](#)

16-03-2001

throughput

1. The rate at which a processor can work expressed in instructions per second or jobs per hour or some other unit of performance.

2. The amount of data a communications channel can carry, usually in bytes per second.

The other important characteristic of a channel is its [latency](#).

[\[FOLDOP\]](#)

16-03-2001

Tillich Paul

<[biography](#), [history of philosophy](#)> German-American theologian (1886-1965). Tillich' s "Systematic Theology" (1951-1964) (vol. 1-2) defines religion as the most ultimate of all human concerns, identifies [god](#) with the ground of all being, and treats religious language and ritual as symbolic. In "The Courage to Be" (1952) Tillich employed central concepts from [existentialism](#) to recommend a life of personal authenticity in the face of cultural and political obstacles.

Recommended Reading: Paul Tillich, "Theology of Culture", ed. by Robert C. Kimball (Oxford, 1959); Paul Tillich, Dynamics of Faith (Harpercollins, 1986); "The Essential Tillich: An Anthology of the Writings of Paul Tillich", ed. by F. Forrester Church (Chicago, 1999); John Heywood Thomas, "Tillich" (Continuum, 2000); and Richard Grigg, "Symbol and Empowerment: Paul Tillich' s PostTheistic System" (Mercer, 1985).

[[A Dictionary of Philosophical Terms and Names](#)]

16-04-2002

time

<[metaphysics](#), [ontology](#), [gnoseology](#), [philosophy of science](#)> temporal duration. Philosophers have traditionally addressed such questions as: whether time is an independent feature of [reality](#) or merely an aspect of our experience; whether or not it makes sense to think of time as having had a beginning; why time is directional and the past and future are asymmetrical; whether time flows continuously or is composed of discrete moments; and whether there is absolute time in addition to relations of temporal succession.

The [Eleatics](#) developed general arguments to show that time and motion are impossible, and [Augustine](#) employed the analysis of time to explain human freedom in the face of divine power. [Leibniz](#) maintained that time is nothing more than temporal relations, [Newton](#) and [Clarke](#) defended its absolute character, and [Kant](#) tried to mediate by regarding space and time as pure [forms](#) of sensible intuition. Later idealists commonly followed [McTaggart](#) in denying the [reality](#) of time.

Recommended Reading: "The New Theory of Time", ed. by L. Nathan Oaklander and Quentin Smith (Yale, 1994); Martin Heidegger, "History of the Concept of Time", tr. by Theodore Kisiel (Indiana, 1992); Michael Tooley, "Time, Tense, and Causation" (Oxford, 2000); L. Nathan Oaklander, "Temporal Relations and Temporal Becoming" (Univ. Pr. of Am., 1984); and Michael Friedman, "Foundations of Space-Time Theories" (Princeton, 1986).

[[A Dictionary of Philosophical Terms and Names](#)]

17-04-2002

time complexity

[<complexity>](#) The way in which the number of steps required by an [algorithm](#) varies with the size of the problem it is solving. Time complexity is normally expressed as an order of magnitude, e.g. $O(N^2)$ means that if the size of the problem (N) doubles then the algorithm will take four times as many steps to complete.

See also [computational complexity](#), [space complexity](#)

[[FOLDOC](#)]

16-03-2001

time-sharing

[<operating system>](#) (Or "timesharing") An operating system feature allowing several users to run several tasks concurrently on one processor, or in parallel on many processors, usually providing each user with his own terminal for input and output. time-sharing is [multitasking](#) for multiple users.

[[FOLDOC](#)]

16-03-2001

timeout

A period of time after which an error condition is raised if some event has not occurred. A common example is sending a message. If the receiver does not acknowledge the message within some preset timeout period, a transmission error is assumed to have occurred.

[[FOLDOC](#)]

16-03-2001

Timon of Philius

[<biography, history of philosophy>](#) Greek skeptic (320-230 BC) who expounded and defended the views of [Pyrrhonism](#) by offering satirical commentary on the works of [Plato](#), [Aristotle](#), and other Greek philosophers.

[[A Dictionary of Philosophical Terms and Names](#)]

17-04-2002

token

1. [<grammar>](#) A basic, grammatically indivisible unit of a language such as a keyword, operator or identifier. Compare: [lexeme](#).

2. [<convention>](#) (Or "pumpkin") An abstract concept passed between cooperating agents to ensure synchronised access to a shared resource. Such a token is never duplicated or destroyed (unless the resource is) and whoever has the token has exclusive access to the resource it controls. See for example token ring.

If several programmers are working on a program, one programmer will "have the token" at any time,

meaning that only he can change the program whereas others can only read it. If someone else wants to modify it he must first obtain the token.

[[FOLDOC](#)]

16-03-2001

token identity thesis

<[philosophy of mind](#)> the view that for each mental event token there is a physical event token that it is numerically identical to.

[Pete Mandik](#)

[[Dictionary of Philosophy of Mind](#)]

16-03-2001

Toland John

<[biography, history of philosophy](#)> English philosopher (1670-1722). Toland' s "Christianity not Mysterious" (1696) offered a purely rational defense of god' s existence and relation to the natural world, marking a transition between the philosophy of John [Locke](#) and the rise of [Deism](#).

Recommended Reading: Robert Rees Evans, "Pantheisticon: The Career of John Toland" (Peter Lang, 1991) and Stephen Daniel, "John Toland: His Methods, Manners, and Mind" (McGill Queens, 1984).

[[A Dictionary of Philosophical Terms and Names](#)]

17-04-2002

top-down design

<[programming, PI](#)> (Or "stepwise refinement"). The software design technique which aims to describe functionality at a very high level, then partition it repeatedly into more detailed levels one level at a time until the detail is sufficient to allow coding. This approach to software design probably originated at IBM, and grew out of [structured programming](#) practices.

[[FOLDOC](#)]

16-03-2001

topology

1. The study of interconnections.
2. A [network](#) topology shows the hosts and the links between them. A network layer must stay abreast of the current network topology to be able to route packets to their final destination.

16-03-2001

total function

<logic> A [function](#) whose value is defined for all possible [arguments](#) (from that domain). See [partial function](#).

[Glossary of First-Order Logic]

16-03-2001

total ordering

<mathematics> A [relation](#) R on a set A which is a [partial ordering](#); i.e. it is reflexive (xRx), transitive ($xRyRz \rightarrow xRz$) and antisymmetric ($xRyRz \rightarrow x=y$) and for any two elements x and y in A , either $x R y$ or $y R x$.

See also [equivalence relation](#), well-ordered.

[FOLDOC]

16-03-2001

totalitarianism

<political philosophy> totalitarianism is [authoritarianism](#) or political [collectivism](#) taken to its logical and physical conclusion - the state in which government possesses total control over the individual. (References from [authoritarianism](#), [capitalism](#), [collectivism](#), [communism](#), [Marxism](#), [Platonism](#), and [pluralism](#).)

[The Ism Book]

27-03-2001

totally ordered set

<mathematics> A [set](#) with a [total ordering](#).

16-03-2001

traditional logic

<philosophical school> traditional logic was first developed by [Aristotle](#) and systematized (somewhat differently) by the medieval school persons. It was thought to be all there was to logic by most until the end of the nineteenth century (until G. [Frege](#), for example, came out with a version of modern logic in his Concept-Writing (Begriffsschrift). The assumption of traditional logic was that all propositions (sentences) are of a subject - predicate form (strictly, SUBJECT TERM + COPULA + PREDICATE TERM: for example, fist + are + backboneed mammals). This exclusive emphasis on the subject - predicate form is though misleading, and the underlying cause of mistaken [metaphysics](#) by many modern logicians (vice versa for some recent critics of modern logic). Traditional [logic](#) is concerned with immediate and mediate inferences between (subject - predicate) [propositions](#). Immediate inference is from one (premiss) to one (conclusion) with the two terms of the premiss both appearing in the conclusion. Mediate inference involves more premisses with the use of "mediating", or middle, terms that do not appear in the conclusion. The [syllogism](#), the primary study of

traditional logic, is an argument in which the premisses connect the subject and predicate of the conclusion by means of a middle term.

[\[A Philosophical Glossary\]](#)

30-04-2001

transcendent

<[metaphysics](#), [ethics](#), [epistemology](#), [theology](#), [pantheism](#)> surpassing or apart from sensible or material [reality](#). For [Kant](#), what is beyond the realm of either outer (perceptive) or inner (apperceptive) experience. In some religious views (on orthodox Christian views, e.g.) [God](#) is held to be transcendent (beyond the world). On other pantheistic views (e.g., those of the Stoics or [Spinoza](#)) [God](#) is held to be an [immanent](#) guiding spirit in and of the sensible material world, not existing apart or beyond it. Similarly, [Plato](#) asserts the transcendence while [Aristotle](#) maintains the immanence of the [Forms](#) or [essences](#) of things.

[\[Philosophical Glossary\]](#)

29-07-2001

transcendental

<[epistemology](#)> relating to the grounds of possible experience. E.g. [Kant](#) thought that most of our pure rational knowledge is [synthetic](#) or [a priori](#), or transcendental. Thus [Kant](#) believed that geometry expresses the pure form of our intuitive faculty for experiencing things visually as in space: this faculty sets the rules for what can be a possible experience of vision.

[\[A Philosophical Glossary\]](#)

30-04-2001

transcendental argument

<[metaphysics](#), [philosophical terminology](#)> reasoning from the fact that we do have experiences or engage in practices of a certain sort to the [truth](#) of those conditions without which these experiences or practices would not be possible. [Kant](#) employed transcendental arguments to establish our [synthetic](#) yet [a priori](#) knowledge of mathematics and natural science as features of the world as it appears to us. Strawson employs a similar pattern of reasoning to show that our identification of particulars presupposes the existence of material objects.

Recommended Reading: Immanuel Kant, "Critique of Pure Reason", tr. by Werner S. Pluhar and Patricia Kitcher (Hackett, 1996); F. C. White, "Kant' s First Critique and the Transcendental Deduction" (Avebury, 1996); Henry E. Allison, "Kant' s Transcendental Idealism: An Interpretation and Defense" (Yale, 1986); and Frederick C. Doepke, "The Kinds of Things: A Theory of Personal Identity Based on Transcendental Argument" (Open Court, 1996).

[\[A Dictionary of Philosophical Terms and Names\]](#)

17-04-2002

transfinite cardinal

<logic> Any infinite cardinal number, that is, any cardinality greater than or equal to aleph0.

[Glossary of First-Order Logic]

16-03-2001

transformation rules

[rules of inference](#)

00-00-0000

transitive

A relation R is transitive if $x R y$ & $y R z \rightarrow x R z$.
Equivalence relations, pre-, partial and total orders are all transitive.

16-03-2001

transitive closure

The transitive closure R^* of a relation R is defined by

$x R y \rightarrow x R^* y$

$x R y$ and $y R^* z \rightarrow x R^* z$

I.e. elements are related by R^* if they are related by R directly or through some sequence of intermediate related elements.

E.g. in graph theory, if R is the relation on nodes "has an edge leading to" then the transitive closure of R is the relation "has a path of zero or more edges to". See also Reflexive transitive closure.

16-03-2001

transparent

1. <jargon> Not visible, hidden; said of a system which functions in a manner not evident to the user. For example, the Domain Name System transparently resolves a fully qualified domain name into an Internet address without the user being aware of it.

Compare this to what Donald Norman calls "invisibility", which he illustrates from the user's point of view:

"You use computers when you use many modern automobiles, microwave ovens, games, CD players and calculators. You don't notice the computer because you think of yourself as doing the task, not as using the computer." ["The Design of Everyday Things", New York, Doubleday, 1989, p. 185].

2. <theory> Fully defined, known, predictable; said of a sub-system in which matters generally subject to volition or stochastic state change have been chosen, measured, or determined by the environment. Thus for transparent systems, output is a known function of the inputs, and users can both predict the behaviour and depend upon it.

[FOLDOP]

16-03-2001

transposition

<[logic](#), [philosophy of science](#)> a rule of replacement of the form:

$$(p \rightarrow q) = (\sim q \rightarrow \sim p)$$

Example: "If it produces pleasure, then it is right." is equivalent to "If it isn't right, then it doesn't produce pleasure". A simple truth-table shows the reliability of [inferences](#) of this sort.

[[A Dictionary of Philosophical Terms and Names](#)]

17-04-2002

travelling salesman problem

<[algorithm](#), [complexity](#)> (TSP or "shortest path", US: "traveling") Given a set of towns and the distances between them, determine the shortest path starting from a given town, passing through all the other towns and returning to the first town.

This is a famous problem with a variety of solutions of varying complexity and efficiency. The simplest solution (the [brute force](#) approach) generates all possible routes and takes the shortest. This becomes impractical as the number of towns, N, increases since the number of possible routes is $(N-1)!$. A more intelligent [algorithm](#) (similar to iterative deepening) considers the shortest path to each town which can be reached in one hop, then two hops, and so on until all towns have been visited. At each stage the algorithm maintains a "frontier" of reachable towns along with the shortest route to each. It then expands this frontier by one hop each time.

[Pablo Moscato' s TSP bibliography](#)
[Fractals and the TSP](#)

[[FOLDOC](#)]

16-03-2001

tree

<[mathematics](#), [data](#)> A directed acyclic [graph](#); i.e. a [graph](#) wherein there is only one route between any pair of nodes, and there is a notion of "toward top of the tree" (i.e. the root node), and its opposite direction, toward the leaves. A tree with n nodes has n-1 edges.

Although maybe not part of the widest definition of a tree, a common constraint is that no node can have more than one parent. Moreover, for some applications, it is necessary to consider a node' s daughter nodes to be an ordered [list](#), instead of merely a [set](#).

As a data structure in computer programs, trees are used in everything from B-trees in [databases](#) and file systems, to game trees in game theory, to [syntax](#) trees in a human or computer [languages](#).

[[FOLDOC](#)]

16-03-2001

triad - Hegelian

<[philosophical terminology](#)> see
thesis - antithesis - synthesis.

[[A Dictionary of Philosophical Terms and Names](#)]

17-04-2002

Trotsky Leon - Lev Davidovich Bronstein

<[biography](#), [history of philosophy](#)> Russian social and political philosopher (1879-1940) who participated in the Bolshevik revolution but was later exiled by Stalin. Although he often expressed respect for the psychological theories of [Freud](#), Trotsky' s effort to establish philosophical foundations for the political theories of [Marx](#) in the later book In "Defence of Marxism" emphasized a narrow reliance on [dialectical materialism](#) as a comprehensive view of social reality.

Recommended Reading: Leon Trotsky, "The Revolution Betrayed: What Is the Soviet Union and Where Is It Going" (Mehring, 1990); Leon Trotsky, "History of the Russian Revolution" (Pathfinder, 1980); Dmitri Volkogonov, "Trotsky: The Eternal Revolutionary", tr. by Harold Shukman (Free Press, 1996); and Alex Callinicos, "Trotskyism" (Minnesota, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

18-04-2002

truth

<[epistemology](#), [logic](#), [correspondence](#), [coherence](#), [metaphysics](#)>
<[evidence](#), [phenomenology](#), [pragmatism](#), [theology](#)>
a property of statements, [thoughts](#), or [judgments](#).
According to [correspondence](#) theories, a [statement](#) (e.g.) is true if it corresponds to the [facts](#), and false if it doesn' t. (See [Universals](#), below, for further explanation.) According to [coherence](#) theories, the truth of [thoughts](#) (e.g.) consists in their coherence with other [thoughts](#).

[[Philosophical Glossary](#)]

22-06-2001

truth for an interpretation

<[logic](#)>

1. For a [wff](#) of propositional logic, to be true under the assignments of a given interpretation.
2. For a [wff](#) of [predicate logic](#), to be true for all sequences of some interpretation. Also called true for I. How a [wff](#) can be true for an interpretation must be defined separately for each [connective](#) in the language.

See [logical validity](#), [satisfaction](#)

[Glossary of First-Order Logic]

16-03-2001

truth function

<logic> an [operator](#) in a [logical language](#) ([sentence](#), [logic](#)) is said to be truth functional iff the truth-value of a [proposition](#) in which it appears is wholly determined by the truth-value of the subsidiary [propositions](#) on which it operates. E.g. the truth value of p&q is wholly determined once we know the truth-value of p and the truth-value of q; hence the [operator](#), &, is truth functional. non-truth-functional [conjunction](#), [dagger function](#), [disjunction](#), [equivalence](#), [implication](#), [negation](#), [stroke function](#) .

[[A Philosophical Glossary](#)]

05-06-2001

truth of fact

<[epistemology](#), [empiricism](#)> as distinguished by Leibniz, these [truths](#) could have been otherwise since their denials are [possible](#) and noncontradictory: such truths hold only contingently (as a matter of [fact](#)), so [knowledge](#) of them requires observation or [empirical](#) evidence for its certification. Contrast: [truth of reason](#).

[[Philosophical Glossary](#)]

22-06-2001

truth of reason

<[epistemology](#), [rationalism](#)> as distinguished by [Leibniz](#), these are truths which cannot be false because their denials would be contradictory and [impossible](#): such truths hold of necessity and can be known to be true by the exercise of [reason](#) alone. Contrast: [truth of fact](#).

[[Philosophical Glossary](#)]

22-06-2001

Truth Sojourner - Isabella Baumfree van Wagener

<[law](#), [history of philosophy](#)> American advocate for [human rights](#) (1797-1883). After her emancipation from [slavery](#), [Sojourner](#) Truth became famous as public speaker; one of her best-known orations is "Ain' t I a Woman?" (1851), an eloquent plea for recognition of the dignity of working-class women. The Narrative of [Sojourner](#) Truth, a "Bondswoman of Olden Time" (dictated to Olive Gilbert in 1850) is a clear statement of her principled defence of women' s [rights](#), temperance, and the abolition of slavery.

Recommended Reading: Sojourner Truth, "Book of Life" (X-Press, 1999) and Nell Irvin Painter, "Sojourner Truth: A Life, a Symbol" (Norton, 1997).

[[A Dictionary of Philosophical Terms and Names](#)]

18-04-2002

truth table

<logic> A table listing all possible combinations of inputs and the corresponding output of a **Boolean** function such as **AND**, **OR**, **NOT**, **IMPLIES**, **XOR**, **NAND**, **NOR**. Truth tables can be used as a means of representing a function or as an aid in designing a circuit to implement it.

[[FOLDOP](#)]

16-03-2001

truth theories

<logic> the correspondance theory of truth insists on the common sense view that what makes a sentence true is its **correspondance** to something external to language (usually), some state of affairs. The **coherence theory** emphasizes that truth involves above all a **coherence** between some sentence we are considering and the rest of our **beliefs** (rest of the sentences that we hold). **semantics**

[[A Philosophical Glossary](#)]

30-04-2001

truth-functional compound proposition

<logic> a compound proposition whose truth-value can be determined solely on the basis of the truth-values of its components and the definitions of its connectives.

[[Glossary of First-Order Logic](#)]

16-03-2001

truth-functional connective

<logic> a connective that makes only truth-functional compounds.

[[Glossary of First-Order Logic](#)]

16-03-2001

truth-functional propositional logic

<logic> the branch of logic that deals with the truth-functional connectives and the relations they permit among propositions. The logic of the relations between or among propositions, as opposed to **predicate logic** which covers the structure within propositions.

[[Glossary of First-Order Logic](#)]

16-03-2001

truth-value

<[logic](#)> The state of being true or the state of being false.

2-valued logics

Logics in which there are only two truth-values, namely, truth and falsehood.

Many-valued logics

Logics that recognize more than two truth-values. In 3-valued logics, for example, the third truth-value is often "unknown" or "unprovable" or "neither true nor false". Also called n-valued logics.

[Glossary of First-Order Logic]

16-03-2001

tu quoque

<[logic](#), [philosophy of science](#)> the [informal fallacy](#) of replying to criticism by arguing that one's opponent is guilty of something equally improper. Example: "Republicans claim that Democrats make illegal use of campaign funds. But they do the same thing themselves, so there is no reason to enforce campaign finance laws." This fallacy is usefully regarded as a special case of the circumstantial [ad hominem argument](#).

[[A Dictionary of Philosophical Terms and Names](#)]

18-04-2002

Turing Alan Mathison

<[biography](#), [history of philosophy](#)> English mathematician (1912-1954). Extrapolating from the mathematical discoveries of [Goedel](#), Turing proposed in *Computing Machinery and Intelligence* (1950) a specific description of just what an idealized [machine](#) could, in principle, compute. In addition to its practical importance for the development of digital computing equipment, Turing's theory provides support for a functionalist account of the mind by proposing the practical test of whether or not we would attribute intelligence to a system whose performance is indistinguishable from that of a human agent.

Recommended Reading: Alan Mathison Turing, "Mathematical Logic" (Elsevier, 2001); Andrew Hodges, "Alan Turing: The Enigma" (Walker, 2000); Andrew Hodges, "Turing" (Routledge, 1999); and "Machines and Thought: The Legacy of Alan Turing", ed. by Peter Millican and Andy Clark (Oxford, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

18-04-2002

Turing Machine

<computability> A hypothetical machine defined in 1935-6 by Alan Turing and used for [computability theory](#) proofs. It consists of an infinitely long "tape" with symbols (chosen from some finite [set](#)) written at regular intervals. A pointer marks the current position and the machine is in one of a finite set of "internal states". At each step the machine reads the symbol at the current position on the tape. For each combination of current state and symbol read, a program specifies the new state and either a symbol to write to the tape or a direction to move the pointer (left or right) or to halt.

In an alternative scheme, the machine writes a symbol to the tape "and" moves at each step. This can be encoded as a write state followed by a move state for the write-or-move machine. If the write-and-move machine is also given a distance to move then it can emulate an write-or-move program by using states with a distance of zero. A further variation is whether halting is an action like writing or moving or whether it is a special state.

[What was Turing' s original definition?]

Without loss of generality, the symbol set can be limited to just "0" and "1" and the machine can be restricted to start on the leftmost 1 of the leftmost string of 1s with strings of 1s being separated by a single 0. The tape may be infinite in one direction only, with the understanding that the machine will halt if it tries to move off the other end.

All computer instruction [sets](#), high level [languages](#) and computer architectures, including [parallel processors](#), can be shown to be equivalent to a Turing Machine and thus equivalent to each other in the sense that any problem that one can solve, any other can solve given sufficient time and memory.

Turing generalised the idea of the Turing Machine to a "Universal Turing Machine" which was programmed to read instructions, as well as data, off the tape, thus giving rise to the idea of a general-purpose programmable computing device. This idea still exists in modern computer design with low level microcode which directs the reading and decoding of higher level machine code instructions.

A [busy beaver](#) is one kind of Turing Machine program.

Dr. Hava Siegelmann of Technion reported in "Science" of 28 Apr 1995 that she has found a mathematically rigorous class of machines, based on ideas from [chaos](#) theory and [neural networks](#), that are more powerful than Turing Machines. Sir Roger Penrose of Oxford University has argued that the brain can compute things that a Turing Machine cannot, which would mean that it would be impossible to create [artificial intelligence](#). Dr. Siegelmann' s work suggests that this is true only for conventional computers and may not cover [neural networks](#).

See also Turing tar-pit, [finite state machine](#).

[FOLDOC]

16-03-2001

Turing test

<[artificial intelligence](#)> A criterion proposed by Alan [Turing](#) in 1950 for deciding whether a computer is intelligent. Turing called it "the Imitation Game" and offered it as a replacement for the question, "Can machines think?"

A human holds a written conversation on any topic with an unseen correspondent (nowadays it might be by electronic mail or chat). If the human believes he is talking to another human when he is really talking to a computer then the computer has passed the Turing test and is deemed to be intelligent.

Turing predicted that within 50 years (by the year 2000) technological progress would produce computing machines with a capacity of 10 ...

09-10-2003

twin earth

<[philosophy of mind](#), [philosophy of language](#)> the duplicate planet in a series of thought experiments inspired by Hilary Putnam.

See [externalism](#).

[[Dictionary of Philosophy of Mind](#)]

16-03-2001

two-valued logic

<[logic](#)> (Commonly known as "[Boolean algebra](#)") A mathematical system concerning the two [truth values](#), TRUE and FALSE and the functions [AND](#), [OR](#) and [NOT](#). Two-valued logic is one of the cornerstones of [logic](#) and is also fundamental in the design of digital electronics and programming languages.

The term "Boolean" is used here with its common meaning - two-valued, though strictly [Boolean algebra](#) is more general than this.

Boolean functions are usually represented by [truth tables](#) where "0" represents "false" and "1" represents "true". E.g.:

A	B	A AND B
0	0	0
0	1	0
1	0	0
1	1	1

This can be given more compactly using "x" to mean "don't care" (either true or false):

A	B	A AND B
0	x	0
x	0	0
1	1	1

Similarly:

A	NOT A
0	1
1	0

A	B	A OR B
0	0	0
0	1	1
1	0	1
1	1	1

```

0 | 0 | 0
x | 1 | 1
1 | x | 1

```

Other functions such as [XOR](#), [NAND](#), [NOR](#) or functions or more than two inputs can be constructed using combinations of AND, OR and NOT. AND and OR can be constructed from each other using [De Morgan'](#) s Theorem:

A OR B = NOT ((NOT A) AND (NOT B))
A AND B = NOT ((NOT A) OR (NOT B))

In fact any Boolean function can be constructed using just NOR or just NAND using the identities:

NOT A = A NOR A
A OR B = NOT (A NOR B)

and [De Morgan'](#) s Theorem.

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16-03-2001

tyche

<[metaphysics](#), [moral philosophy](#)> Greek term for fortune, luck, or chance, as opposed to the necessity (Gk. ananké) of logical or causal connections. In [moral](#) life, especially, this significantly diminishes the tendency of [virtue](#) to produce [happiness](#) with any regularity or certainty.

Recommended Reading: F. E. Peters, "Greek Philosophical Terms: A Historical Lexicon" (NYU, 1967); Martha C. Nussbaum, "The Fragility of Goodness: Luck and Ethics in Greek Tragedy and Philosophy" (Cambridge, 2001); Bernard Williams, "Moral Luck" (Cambridge, 1982); and Claudia Card, "The Unnatural Lottery: Character and Moral Luck" (Temple, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

18-04-2002

type

<[theory](#), [programming](#), [PI](#)> (Or "data type") A set of values from which a variable, constant, function, or other expression may take its value.

Types supported by most programming languages include [integers](#) (usually limited to some range so they will fit in one word of storage), [Booleans](#), [real numbers](#), and characters. Strings are also common, though they may be represented as [lists](#) of characters in some languages.

If s and t are types, then so is s -> t, the type of [functions](#) from s to t; that is, give them a term of type s, functions of type s -> t will return a term of type t

Some types are primitive - built-in to the language, with no visible internal structure - e.g. Boolean; others are composite - constructed from one or more other types (of either kind) - e.g. lists, [structures](#), [unions](#).

Some languages provide strong typing, others allow implicit type conversion and/or explicit type conversion.

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16-03-2001

type - token

<[philosophical terminology](#)> a distinction, first drawn by [Peirce](#), between signs considered as abstract things ([types](#)) or as particular instances ([tokens](#)). Thus, for example, the number of words ([tokens](#)) in this Dictionary - the "word-count" of its content - may be quite large, but the number of different words ([types](#)) it uses-the working vocabulary of its author - is surely much smaller. The distinction is also used by [Davidson](#) and other philosophers of mind to emphasize that a reasonable [identity theory](#) need only argue for the [identity](#) of mental and physical events as [types](#), not necessarily as [tokens](#).

[[A Dictionary of Philosophical Terms and Names](#)]

18-04-2002

type assignment

A mapping of the [free variables](#) of some expression E to types. This is used in [type inference](#) to deduce the type of E and its subexpressions.

16-03-2001

type class

A set of types for which certain operations or [method](#)s are defined. E.g. the class Number might have methods for addition and subtraction. [Classes](#) are a feature of object oriented languages and of the functional programming language Haskell. See also [inheritance](#).

16-03-2001

type inference

<[programming, PI](#)> An [algorithm](#) for ascribing types to expressions in some language, based on the types of the constants of the language and a set of type inference rules such as

$$\begin{array}{l} f :: A \rightarrow B, x :: A \\ \hline f x :: B \end{array} \quad (\text{App})$$

This rule, called "App" for application, says that if expression f has type A → B and expression x has type A then we can deduce that expression (f x) has type B. The expressions above the line are the premises and below, the conclusion. An alternative notation often used is:

$$G \vdash x : A$$

where "⊢" is the turnstile symbol and G is a type assignment for the free variables of expression x. The above can be read "under assumptions G, expression x has type A". (As in Haskell, we use a double "::" for type declarations and a single ":" for the [infix](#) list constructor, cons).

Given an expression

plus (head l) 1

we can label each subexpression with a type, using type variables X, Y, etc. for unknown types:

```
(plus :: Int -> Int -> Int)
(((head :: [a] -> a) (l :: Y)) :: X)
(1 :: Int)
```

We then use unification on type variables to match the partial application of plus to its first argument against the App rule, yielding a type (Int -> Int) and a substitution X = Int. Re-using App for the application to the second argument gives an overall type Int and no further substitutions. Similarly, matching App against the application (head l) we get Y = [X]. We already know X = Int so therefore Y = [Int].

This process is used both to infer types for expressions and to check that any types given by the user are consistent.

See also generic type variable, [principal type](#).

[FOLDOC]

16-03-2001

type scheme

A typing of an expression which may include type variables.

E.g.

```
x . x :: a -> a
```

where a is a generic type variable which may be instantiated to any type.

[FOLDOC]

16-03-2001

typed lambda-calculus

<[mathematics](#), [logic](#)> (TLC) A variety of lambda-calculus in which every term is labelled with a [type](#).

A [function application](#) (A B) is only syntactically valid if A has type s --> t, where the type of B is s (or an [instance](#) or s in a [polymorphic](#) language) and t is any type.

If the types allowed for terms are restricted, e.g. to Hindley-Milner types then no term may be applied to itself, thus avoiding one kind of non-terminating evaluation.

Most functional programming languages, e.g. Haskell, ML, are closely based on variants of the typed lambda-calculus.

[FOLDOC]

16-03-2001

types - theory of

<[logic](#), [philosophy of science](#)> the solution proposed by [Russell](#) for the self-referential paradox that arises from the notion of "the class of all classes that are not members of themselves." [Russell](#) envisioned an indefinite hierarchy of types to be symbolized: ordinary objects; the properties and [relations](#) of ordinary objects; the features of properties of objects; etc. Defining each item by reference only to those of a lower type avoids paradox, but may not resolve every instance of difficulty with self-reference.

Recommended Reading: Irving M. Copi, "The Theory of Logical Types" (Routledge, 1971); Bertrand Russell, "Introduction to Mathematical Philosophy" (Dover, 1993); and Roy L. Crole, "Categories for Types" (Cambridge, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

19-04-2002

uebermensch

<[ethics](#), [history of philosophy](#)> German term for "Overman" or "Superman." Hence, in the philosophy of [Nietzsche](#), an extraordinary individual who transcends the limits of traditional [morality](#) to live purely by the will to power.

[[A Dictionary of Philosophical Terms and Names](#)]

03-05-2002

Unamuno Miguel de

<[biography](#), [history of philosophy](#)> Spanish philosopher (1864- 1936). In *Del sentimiento tragico de la vida en los hombres y en los pueblos* (The Tragic Sense of Life) (1913), Unamuno described human [existence](#) as torn between the irrational hope for immortality and the rational expectation of death. Since [faith](#) can never outweigh [reason](#), Unamuno supposed, the best we can achieve is a life of authentic struggle with the human predicament.

Recommended Reading:
Miguel De Unamuno, *Three Exemplary Novels*, tr. by Angel Flores (Grove, 1987);
Victor Ouimette, *Reason Aflame: Unamuno and the Heroic Will* (Yale, 1986);
Gemma Roberts, *Unamuno: afinidades y coincidencias kierkegaardianas* (Colorado, 1986).

[[A Dictionary of Philosophical Terms and Names](#)]

03-05-2002

unbounded minimization

[minimization](#)

31-05-2004

unconscious the

<[philosophy of mind](#)> those mental states of which a human being is unaware and can normally only access and/or alter with great difficulty, if at all.

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://artsci.wustl.edu/~philos/MindDict/>)

<[psychology](#), [philosophical terminology](#)> mental activity of which the person engaging in it is not aware; hence a presumed source of unknown internal influences over the conduct of [human](#) agent.

Psychoanalysts like [Freud](#), [Jung](#), and Lacan supposed it possible to discover the content and significance of such influences with suitable methods of psychiatric investigation.

Recommended Reading:

Alasdair C. McIntyre, *The Unconscious: A Conceptual Analysis* (St. Augustine, 1997);
 Cogito and the Unconscious, ed. by Slavoj Zizek (Duke, 1998);
 John Hanwell Riker, *Ethics and the Discovery of the Unconscious* (SUNY, 1997);
 Donald Levy, *Freud Among the Philosophers: The Psychoanalytic Unconscious and Its Philosophical Critics* (Yale, 1996).

[\[A Dictionary of Philosophical Terms and Names\]](#)

03-05-2002

uncountable

[countable](#)

31-05-2004

uncountable set

<logic> A set whose cardinality is greater than aleph0 (see [countable set](#))

[Glossary of First-Order Logic]

16-03-2001

undecidable set

<logic> A set for which there is no effective method.

See decidable set, [decidable system](#), [decidable wff](#)

[Glossary of First-Order Logic]

16-03-2001

undecidable system

<logic> A system for which there is no [effective method](#).

See [decidable system](#)

[Glossary of First-Order Logic]

16-03-2001

undecidable wff

<logic> A [wff](#) that is neither a [theorem](#) nor the [negation](#) of a [theorem](#). See [decidable wff](#)

[Glossary of First-Order Logic]

16-03-2001

underdetermination

<logic, [philosophy of science](#)> the characteristic of rival hypotheses each of which is consistent with the available evidence. The possibility that every [scientific theory](#) must always remain undetermined raises significant doubt about the success of abductive reasoning.

[\[A Dictionary of Philosophical Terms and Names\]](#)

04-05-2002

understanding

<[theory of knowledge](#), [gnoseology](#)> the human capacity for comprehending the nature of [reality](#). In [Plato](#)' theory of [knowledge](#), we comprehend the [truths](#) of mathematics through understanding. For modern philosophers following [Descartes](#) or [Locke](#), the understanding is the intellectual faculty considered more broadly or generally.

Recommended Reading:

Vincent G. Potter, *On Understanding Understanding: A Philosophy of Knowledge* (Fordham, 1994);
John Carriero, *Descartes and the Autonomy of the Human Understanding* (Garland, 1990);
Nicholas Rescher, *Nature of Understanding: The Metaphysics and Method of Science* (Oxford, 2001); Michael Martin, *Verstehen: The Uses of Understanding in the Social Sciences* (Transaction, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

04-05-2002

undistributed middle

<[logic](#), [philosophy of science](#)> the formal fallacy committed in a [categorical syllogism](#) that is invalid because its [middle term](#) is not distributed in either [premise](#). Example: All dogs are mammals. Some mammals are whales. Therefore, some dogs are whales.

[[A Dictionary of Philosophical Terms and Names](#)]

04-05-2002

uniformity of nature

<[philosophy of science](#)> presumption that the future will be like the past; assumption that the world exhibits enough regularity to warrant [inductive](#) reasoning. [Hume](#) pointed out that such uniformity is presupposed by all of our belief in matters of fact, [Mill](#) identified several practical methods for recognizing its instances, but [Goodman](#) raised a significant paradox of induction.

Recommended Reading:

Barry Stroud, *Hume* (Routledge, 1981);
Nelson Goodman, *Fact, Fiction, and Forecast* (Harvard, 1954);
Grue!: *The New Riddle of Induction*, ed. by Douglas Stalker (Open Court, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

04-05-2002

union of sets

<[logic](#)> The union of two sets, A and B, is the set of objects that are members of either A or B or both. Also called the sum of two sets.

The union of sets is the set-theoretic equivalent of inclusive disjunction; for the equivalent of exclusive disjunction

See [symmetric difference of sets](#).

[Glossary of First-Order Logic]

16-03-2001

universal

<[logic](#), [dialectic](#), [ockhamism](#), [ontology](#), [epistemology](#)> pertaining to all, especially all [times](#), all places, and all things.

[[Philosophical Glossary](#)]

22-06-2001

universal algebra

<logic> the [model theory](#) of first-order [equational logic](#).

[FOLDOC]

16-03-2001

universal generalization

<logic, philosophy of science> [inference](#) from the features of a representative individual to a [general](#) truth about everything of the same sort; hence, a [quantification rule](#) of the form:

$\forall y$

$\frac{}{(x)(\forall x)}$

Example: "Any arbitrarily chosen spaniel must also be a dog. Therefore, all spaniels are dogs". With appropriate qualifications, this pattern of reasoning provides an important basis for proofs in [quantification theory](#).

[[A Dictionary of Philosophical Terms and Names](#)]

04-05-2002

universal instantiation

[instantiation](#)

31-05-2004

universal proposition

<logic, philosophy of science> a [statement](#) whose propositional quantity is determined by its assertion that all members of one [class](#) of things are either included or excluded from membership in some other [class](#). Examples: "All spaniels are dogs" and "No wristwatches are nuclear weapons" are both universal. Although it is often difficult in practice to establish the [truth](#) of universal propositions, those that are accepted have extensive [deductive consequences](#).

[[A Dictionary of Philosophical Terms and Names](#)]

04-05-2002

universal quantifier

[quantifier](#)

31-05-2004

universal set

<logic> The set of all things. Cantor' [theorem](#) (that the power set of a given set has a greater cardinality than the given set) implies that there is no largest set or all-inclusive set, at least if every set has a power set. Hence as "the set of all things", the universal set is not recognized in standard set theory. Sometimes the set of all things under consideration in the context; the universe of discourse. The [complement](#) of the null set. Notation: 1 (numeral one), or V.

See [universe of discourse](#)

[Glossary of First-Order Logic]

16-03-2001

universalisability

<[ethics](#)> Immanuel Kant used this term when discussing the [maxims](#), or subjective rules, that guide our [actions](#). A maxim is universalisable if it can consistently be willed as a law that everyone ought to obey. The only maxims which are morally good are those which can be universalised. The test of universalisability ensures that everyone has the same moral obligations in morally similar situations.

[[Ethics Glossary](#)]

<[ethics](#), [moral philosophy](#)> the applicability of a [moral rule](#) to all similarly situated individuals. According to both [Kant](#) and [Hare](#), universalisability is a distinguishing feature of moral judgments and a substantive guide to moral obligation: moral [imperatives](#) must be regarded as equally binding on everyone. The force of this principle, however, depends upon the generality of the judgments and the particularity of the situations to which they are applied.

Recommended Reading:

Immanuel Kant, *Grounding for the Metaphysics of Morals*, tr. by James W. Ellington (Hackett, 1993);
 R. M. Hare, *The Language of Morals* (Clarendon, 1991);
 Marcus George Singer, *Generalization in Ethics* (Eyre & Spottiswoode, 1967);
Morality and Universality: Essays on Ethical Universalizability, ed. by Nelson Potter (Reidel, 1985).

[[A Dictionary of Philosophical Terms and Names](#)]

04-05-2002

universals problem of

<[philosophy of science](#), [metaphysics](#)>, <[controversy about universals](#), [metaphysics](#), [scholasticism](#)> <[realism](#), [nominalism](#), [ockhamism](#), [formalism](#), [logic](#)> <[conceptualism](#)> universals are features (e.g., redness or tallness) shared by many individuals, each of which is said to instantiate or exemplify the [universal](#). Although it began with dispute over the status of Platonic Forms, the problem of universals became a central concern during the middle ages. The metaphysical issue is whether or not these features exist independently of the particular things that have them: realists hold that they do; nominalists hold that they do not; conceptualists hold that they do so only mentally.

Recommended Reading:

Properties, ed. by D. H. Mellor and Alex Oliver (Oxford, 1997);
 Richard Ithamar Aaron, *Our Knowledge of Universals* (Haskell, 1975);
The Problem of Universals, ed. by Andrew B. Schoedinger (Humanity, 1991);
Five Texts on the Mediaeval Problem of Universals, ed. by Paul Vincent Spade (Hackett, 1994);
 D. M. Armstrong, *Universals: An Opinionated Introduction* (Westview, 1989).

[[A Dictionary of Philosophical Terms and Names](#)]

the properties or attributes expressed (or kinds denoted) by [abstract](#) or [general](#) words or [predicates](#) in [speech](#) (or concepts in [thought](#)). Just as the words (or concepts) apply to many things, properties corresponding to the words (or concepts) [inhere](#) in many [individuals](#); in just those same individuals to which the word (or [concept](#)) can be truly applied. The [relation](#) between the [universal](#) corresponding to the word and the things to which the word is applied in [speech](#) (or the concept in thought) is supposed to explain the [truth](#) of that application. If the universal the word expresses does belong to the thing to which the word is applied then the application (an [assertion](#), or affirmative judgement) is [true](#); if the universal does not belong to the thing, then the application is [false](#). "Grass is green" is true because grass has the [property](#) of being green; "Grass is carnivorous" is false because grass hasn't the property of being carnivorous; etc. See [nominalism](#) and [realism](#) above.

[[Philosophical Glossary](#)]

04-05-2002

universe of discourse

<[logic](#)> The set of all things under consideration in the context; the set of things covered by universal quantification.

See [complement](#), [universal set](#)

[[Glossary of First-Order Logic](#)]

16-03-2001

univocal - equivocal

<[philosophical terminology](#)> distinction among [statements](#), expressions, and terms: those are univocal which have only one [meaning](#); ambiguous terms are equivocal, having more than one [meaning](#).

[[A Dictionary of Philosophical Terms and Names](#)]

04-05-2002

upper bound

An upper bound of two elements x and y under some [relation](#) \leq is an element z such that $x \leq z$ and $y \leq z$.

See also [least upper bound](#).

[[FOLDOC](#)]

16-03-2001

ursache

<[philosophical terminology](#)> German term for [cause](#).

[[A Dictionary of Philosophical Terms and Names](#)]

04-05-2002

urteil

<[philosophical terminology](#)> German term for [judgement](#).

[[A Dictionary of Philosophical Terms and Names](#)]

04-05-2002

usability

<[programming](#), [PI](#)> The effectiveness, efficiency, and satisfaction with which users can achieve tasks in a particular environment of a product. High usability means a system is: easy to learn and remember; efficient, visually pleasing and fun to use; and quick to recover from errors.

(<http://www.orrnet.com/>).

[[FOLDOC](#)]

16-03-2001

use - mention

<[philosophical terminology](#)> distinction between two ways of employing a word or phrase: in order to refer to something else (use) or in order to draw attention its own features (mention). "Sarah does well in chemistry" uses the name "Sarah". But: Sarah" is an anagram for "a rash", merely mentions it. Thus, the first proposition expresses a [truth](#) about my daughter, while the second merely points out an odd feature of her name.

[[A Dictionary of Philosophical Terms and Names](#)]

04-05-2002

use theory of meaning

<[philosophy of mind](#), [philosophy of language](#)> the [semantic](#) theory according to which the [meaning](#) of a word is determined by its use in [communication](#) and more generally, in social interaction.

Ned Block

Chris Eliasmith - [[Dictionary of Philosophy of Mind](#)] Homepage (<http://arts.wustl.edu/~philos/MindDict/>)

16-03-2001

utilitarianism

<[ethics](#), [liberalism](#), [finalism](#)> a moral theory originally advanced by Jeremy Bentham according to which the moral character of an act -- whether it' s good or bad or right or wrong-- is entirely determined by its consequences, and likening moral reasoning to economic calculation Utilitarians maintain the right course of action is always the one that has the most beneficial or least detrimental consequences overall, for all affected. Bentham' s hedonistic brand of utilitarianism identifies the benefits in question with pleasure and the costs wit pain. John Stuart Mill speaks, instead, of "happiness": according to Mill' s greatest happiness principle, or moral aim should be "the greatest happiness for the greatest number." Contemporary utilitarians, like Peter Singer, are more apt to speak of the benefits to be counted as "preference satisfactions" or "interest satisfactions," counting the corresponding dissatisfactions as costs. Rule utilitarians hold that utilitarian calculation should be used to make rules rather than directly applied to evaluate actions.

[Philosophical Glossary]

<[ethics](#), [moral philosophy](#)> normative theory that human conduct is right or wrong because of its tendency to produce favorable or unfavorable consequences for the people who are affected by it. The hedonistic utilitarianism of Bentham, Mill, and Sidgwick maintains that all moral judgments can be derived from the greatest happiness principle. The ideal utilitarianism espoused by G. E. Moore, on the other hand, regarded aesthetic enjoyment and friendship as the highest ethical values. Contemporary utilitarians differ about whether the theory should be applied primarily to acts or rules.

Recommended Reading:

John Stuart Mill, *Utilitarianism and Other Essays*, ed. by Alan Ryan (Viking, 1987);

Ernest Albee, *History of English Utilitarianism* (Prometheus, 1957);

M. D. Bayles, *Contemporary Utilitarianism* (Peter Smith, 1980);

Anthony Quinton, *Utilitarian Ethics* (Open Court, 1989); Robert E. Goodin, *Utilitarianism As a Public Philosophy* (Cambridge, 1995);

J. J. C. Smart and Bernard Williams, *Utilitarianism: For and Against* (Cambridge, 1973);

Amartya Sen and Bernard Williams, *Utilitarianism and Beyond* (Cambridge, 1982).

[A Dictionary of Philosophical Terms and Names]

<[ethics](#)> form of [consequentialism](#) made famous by John Stuart Mill (1806-1873) and continued by mostly British philosophers of the 19th and 20th centuries. According to utilitarianism, what is morally right is whatever produces the greatest overall amount of [pleasure](#) ([hedonistic](#) utilitarianism) or happiness ([eudaimonistic](#) utilitarianism). Some utilitarians (act utilitarians) claim that we should weigh the consequences of each individual action, while others (rule utilitarians) maintain that we should look at the consequences of adopting particular rules of conduct. Utilitarianism' s famous creed is "the greatest good for the greatest number", whic sounds like and in fact tends to result in a kind of [altruism](#), but which is not necessarily altruistic (for instance, Mill advocated a kind of [individualism](#) and individual fulfillment in life, since he thought that the best way for humanity to make progress was through the achievements of individuals).

Utilitarianism has never made a deep impression in America, where consequentialism has generally taken the form of [pragmatism](#). Popularly, utilitarianism has the same mild connotations of expediency and lack of principles that pragmatism does, although without the positive emphasis on action.

(References from [altruism](#), [behaviorism](#), [consequentialism](#), [hedonism](#), and [pragmatism](#).)

Based on the [[Ethics Glossary](#)] and on [[The Ism Book](#)]

28-04-2001

utility

<[ethics](#), [utilitarianism](#)> for utilitarians, the measure of the [moral](#) character of an [act](#) or (or for Rule utilitarians a [rule](#)), of whether it's good (or right) or bad (or wrong). The utility of an act (or rule) equals the sum of its beneficial [consequences](#) minus the sum of its detrimental consequences: the [principle](#) of utility says whatever course of [action](#) (or rule) has the most utility -- the best overall benefit-cost outcome -- is the [morally right choice](#).

[[Philosophical Glossary](#)]

22-06-2001

vagueness

<[philosophical terminology](#), [philosophy of science](#)> the characteristic of words or phrases whose [meaning](#) is not determined with precision. Use of one or more vague terms typically renders it impossible to establish the [truth](#) or falsity of the [sentences](#) in which they appear. Example: "The temperature is warm today." is difficult to evaluate because there is no clear borderline between "warm" and "not warm". Note the difference between vagueness and [ambiguity](#). Recommended Reading: Timothy Williamson, Vagueness (Routledge, 1996); Vagueness: A Reader, ed. by Rosanna Keefe and Peter Smith (MIT, 1999); Linda Claire Burns, Vagueness: An Investigation into Natural Languages and the Sorites Paradox (Kluwer, 1991); and Rosanna Keefe, Theories of Vagueness (Cambridge, 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

06-05-2002

Vaihinger Hans

<[biography](#), [history of philosophy](#)> German philosopher (1852-1933). In Die Philosophie des Als-Ob (The Philosophy of As-If) (1911) Vaihinger extrapolated from [Kant'](#) [epistemology](#) (as understood by [Schopenhauer](#)) the notion that all of our [concepts](#) - including those involved in both science and [morality](#) - are nothing more than useful fictions. This outlook was a significant influence on the psychological theories of Alfred Adler. Vaihinger described the origins of his theory in Wie die Philosophie des Als Ob entstand (1924). Recommended Reading: Hans Vaihinger, Kommentar zu Kants Kritik der reinen Vernunft (Garland, 1992) and Andrea Wels, Die Fiktion des Begreifens und das Begreifen der Fiktion: Dimensionen und Defizite der Theorie der Fiktionen in Hans Vaihingers Philosophie des Als Ob.

[[A Dictionary of Philosophical Terms and Names](#)]

06-05-2002

valid

<[logic](#), [epistemology](#)> a property of [arguments](#): being such that the [truth](#) of the [premises](#) guarantees or necessitates the truth of the [conclusion](#).

[[Philosophical Glossary](#)]

22-06-2001

valid - invalid

<[logic](#), [philosophy of science](#)> the most crucial distinction among [deductive](#) arguments and the [inferences](#) upon which they rely. In a [valid argument](#), if the [premises](#) are true, then the [conclusion](#) must also be [true](#). Alternatively: it is impossible for the [premises](#) of a [valid argument](#) to be [true](#) while its [conclusion](#) is [false](#). All other arguments are invalid; that is, it is possible for their [conclusions](#) to be false even when their [premises](#) are true. Thus, even the most reliable instances of [inductive](#) reasoning fall short of [deductive](#) validity.

Recommended Reading: Graham Priest, *Logic: A Very Short Introduction* (Oxford, 2000) and Patrick Suppes, *Introduction to Logic* (Dover, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

06-05-2002

validity

<[logic](#)>

1. For [wffs](#) or propositions, see [logical validity](#)
2. For [arguments](#) and [inferences](#), see [semantic validity](#), [soundness](#), syntactic validity.

[Glossary of First-Order Logic]

16-03-2001

Valla Lorenzo

<[biography](#), [history of philosophy](#)> a leader of the Italian Renaissance (1407-1457). Valla' s humanistic philosophy criticized the sterility of [scholastic](#) logical distinctions and tried to synthesize [Christian](#) principles with [Stoic](#) and [Epicurean](#) thought. In *De libero arbitrio* (Of Free Choice) Valla noted the incompatibility of divine omnipotence with human [freedom](#).
Recommended Reading: *The Treatise of Lorenzo Valla on the Donation of Constantine*, tr. by Christopher B. Coleman (Toronto, 1993) and *Renaissance Philosophy of Man: Petrarca, Valla, Ficino, Pico, Pomponazzi, Vives*, ed. by Ernst Cassirer, Paul Oskar Kristeller, and John H. Randall (Chicago, 1956).

[[A Dictionary of Philosophical Terms and Names](#)]

06-05-2002

value

<[ethics](#), [axiology](#)> worth in some respect, which may be either [intrinsic](#) or [extrinsic](#) to the things that have it. The most general philosophical issue in the study of value ([axiology](#)) is whether values arise from [objective](#) or [subjective](#) features of [experience](#). Noncognitivists defend a strict distinction between [fact](#) and [value](#), and many contemporary thinkers challenge the presumption that human [knowledge](#) can ever be genuinely free of value-judgments.

Recommended Reading: Michael J. Zimmerman, *The Nature of Intrinsic Value* (Rowman & Littlefield, 2001); Joel J. Kupperman, *Value...and What Follows* (Oxford, 1999); Gilbert Harman, *Explaining Value: And Other Essays in Moral Philosophy* (Clarendon, 2000); *Forms of Value and Valuation*, ed. by John W. Davis and Rem B. Edwards (Univ. Pr. of Am., 1992); Robin Attfield, *Value, Obligation, And Meta-ethics* (Rodopi, 1995); and Elizabeth Anderson, *Value in Ethics and Economics* (Belknap, 1996).

[[A Dictionary of Philosophical Terms and Names](#)]

06-05-2002

variable

<logic>

A symbol whose referent varies or is unknown. A place-holder, as opposed to an abbreviation or name (a constant). See bound variables, [constant](#), free variables.

Individual variable of a system

Only individual variables and constants can serve as the [arguments](#) of [functions](#) and first order [predicates](#). See [domain](#)

Metalanguage variable

A variable in the metalanguage of some system S which ranges over [wffs](#) of S.

Predicate variable

A variable ranging over attributes and relations in higher order logic.

[Glossary of First-Order Logic]

16-03-2001

Veblen Thorsten

<[biography](#), [history of philosophy](#)> American social philosopher (1857-1929) whose work contributed to the sociology of knowledge by emphasizing the influence of material conditions on the development of human thought. Veblen' s critical analysis of American [capitalism](#) is evident in The Theory of the Leisure Class (1899), and The Higher Learning in America (1918) comments on the devastating effect of treating higher [education](#) as a business.

Recommended Reading: Thorstein B. Veblen, (Kelley, 1964); John Patrick Diggins, Thorstein Veblen (Princeton, 1999); Michael Keaney and Douglas Fitzgerald Dowd, Thorstein Veblen (Transaction, 2000); and Samuel Schneider, An Identification, Analysis and Critique of Thorstein B. Veblen' s Philosophy of Higher Education (Edwin Mellen, 1998).

[[A Dictionary of Philosophical Terms and Names](#)]

06-05-2002

vector

1. <[mathematics](#)> A member of a [vector space](#).
2. <[graphics](#)> A line or movement defined by its end points, or by the current position and one other point. See vector graphics.
3. <[operating system](#)> A memory location containing the address of some code, often some kind of exception handler or other operating system service. By changing the vector to point to a different piece of code it is possible to modify the behaviour of the operating system.

Compare hook.

4. <[programming, PI](#)> A one-dimensional array.

[[FOLDOP](#)]

16-03-2001

vector space

<[mathematics](#)> An additive group on which some ([scalar field](#)) has an associative multiplicative action which distributes over the addition of the vector space and respects the addition of the (scalar) field: for vectors u, v and scalars h, k ; $h(u+v) = hu + hv$; $(h+k)u = hu + ku$; $(hk)u = h(ku)$.

[Simple example?]

[\[FOLDOC\]](#)

16-03-2001

Venn diagrams

<[logic, mathematics](#)> John [Venn](#)' s modern pictorial method of representing and evaluating the [validity](#) of categorical [syllogisms](#). The classes designated by the terms of a [syllogism](#) are represented by overlapping circles, with shading and \times s indicating, respectively, the impossibility and existence of their common members.
Recommended Reading: Sun-Joo Shin, The Logical Status of Diagrams (Cambridge, 1994).

[\[A Dictionary of Philosophical Terms and Names\]](#)

06-05-2002

Venn John

<[biography, history of philosophy](#)> British logician (1834-1923). In Symbolic Logic (1881) Venn applied the insights of [Boole](#), [Euler](#), and others in developing a diagrammatic method for testing the [validity](#) of [categorical syllogisms](#). He also contributed to the development of modern theories of [probability](#) in The Logic of Chance (1867) and The Principles of Empirical or Inductive Logic (1889).

[\[A Dictionary of Philosophical Terms and Names\]](#)

06-05-2002

verbal dispute

<[philosophy of science](#)> the appearance of disagreement between parties who have not resolved the [ambiguity](#) of one or more key terms. Agreement on the definition of these terms eliminates a verbal dispute completely.

[\[A Dictionary of Philosophical Terms and Names\]](#)

06-05-2002

verecundiam - argumentum ad

<[logic, philosophy of science](#)> the fallacy of making an illicit appeal to [authority](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

06-05-2002

verifiability principle

<[logic](#), [philosophy of science](#)> the claim that the [meaning](#) of a [proposition](#) is just the set of observations or experiences which would determine its [truth](#), so that an [empirical proposition](#) is meaningful only if it either actually has been verified or could at least in principle be verified. ([Analytic statements](#) are non-empirical; their truth or falsity requires no verification.) [Verificationism](#) was an important element in the philosophical program of [logical positivism](#).
 Recommended Reading: A. J. Ayer, *Language, Truth, and Logic* (Dover, 1946); Carl Gustav Hempel, *Selected Philosophical Essays*, ed. by Richard C. Jeffrey (Cambridge, 2000); C. J. Misak, *Verificationism: Its History and Prospects* (Routledge, 1995); and Michael Friedman, *Reconsidering Logical Positivism* (Cambridge, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

06-05-2002

verification

The process of determining whether or not the products of a given phase in the life-cycle fulfil a [set](#) of established requirements.

16-03-2001

veritas

<[philosophy of science](#), [methaphysics](#)> Latin word for [truth](#).

[[A Dictionary of Philosophical Terms and Names](#)]

06-05-2002

vernunft

<[philosophical terminology](#)> German term for [reason](#). [Kant](#) distinguished *reine Vernunft* ("pure [reason](#)") or abstract thought from *praktische Vernunft* ("practical [reason](#)") or [volition](#).

[[A Dictionary of Philosophical Terms and Names](#)]

06-05-2002

Verstehen

<[philosophical terminology](#)> German term for [understanding](#).

[[A Dictionary of Philosophical Terms and Names](#)]

06-05-2002

vice

<[ethics](#), [psychology](#), [anthropology](#)> an undesirable or despicable personality trait, such as cruelty, or cowardice. According to [Aristotle](#) vices are either of excess or defect: e.g., cowardice is not facing up to danger enough (a vice of defect); rashness is facing up to danger too much (a vice of excess); while courage, the intermediate virtue, is facing up to danger appropriately, at the right time, in the right place, for the right reasons.

[[Philosophical Glossary](#)]

22-06-2001

Vico Giambattista

<[biography](#), [history of philosophy](#)> Italian philosopher (1668-1744). In *Principi di una scienza nuova d' intorno alla comune natura delle nazioni* (Principles of a New Science of the Common Nature of Nations) (1725) [Vico](#) argued that study of the cycles exhibited in human history rests on a foundation and methodology (distinct from that pursued by the natural sciences) under which the genius of each age must be understood in its own terms alone. This position was a significant influence on the work of [Hegel](#), [Marx](#), and [Croce](#).
Recommended Reading: Benedetto Croce, *The Philosophy of Giambattista Vico*, tr. by Alan Sica (Transaction, 2001); [Vico](#), ed. by Robert Mayer and J.P. Flint (Ayer, 1979); Leon Pompa, *Vico: A Study of the ' New Science'* (Cambridge, 1990); Mark Lilla, *G. B. Vico: The Making of an Anti-Modern* (Harvard, 1994); and Isaiah Berlin, *Three Critics of the Enlightenment* (Princeton, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

31-05-2002

Vienna Circle

<[history of philosophy](#)> a group of philosophers, mathematicians, and scientists in Austria during the 1920s and early 1930s who founded [logical positivism](#) with their joint publication of *Wissenschaftliche Weltauffassungóder Wiener Kreis* (A Scientific World-viewóThe Vienna Circle) in 1929. Members of the Circle included [Carnap](#), [Feigl](#), [Gódel](#), [Hahn](#), [Neurath](#), [Schlick](#), and [Waismann](#). [Schlick](#) died in 1936, and the others all left for England or the United States by 1938.
Recommended Reading: Friedrich Stadler, *The Vienna Circle* (Springer Verlag, 2000); Edmund Runggaldier, *Carnap' s Early Conventionalism: An Inquiry into the Historical Background of the Vienna Circle* (Rodopi, 1984); Ramon Cirera, *Carnap and the Vienna Circle: Empiricism and Logical Syntax* (Rodopi, 1994); and *Rediscovering the Forgotten Vienna Circle: Austrian Studies on Otto Neurath and the Vienna Circle*, ed. by Thomas E. Uebel (Kluwer, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

31-05-2002

virtual

(Via the technical term [virtual memory](#), probably from the term "virtual image" in optics) 1. Common alternative to [logical](#); often used to refer to the artificial objects (like addressable virtual memory larger than physical memory) created by a computer system to help the system control access to shared resources.

2. Simulated; performing the functions of something that isn' t really there. An imaginative child' s doll may be a virtual playmate.

Opposite of [real](#) or physical.

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

virtual reality

[aka](#) VR

1. [<application>](#) Computer simulations that use 3D graphics and devices such as the [data glove](#) to allow the user to interact with the simulation.
2. [<games>](#) A form of network interaction incorporating aspects of role-playing games, interactive theatre, improvisational comedy, and "true confessions" magazines. In a virtual reality forum (such as Usenet' s news:alt.callahans newsgroup or the MUD experiments on Internet and elsewhere), interaction between the participants is written like a shared novel complete with scenery, "foreground characters" that may be personae utterly unlike the people who write them, and common "background characters" manipulable by all parties. The one iron law is that you may not write irreversible changes to a character without the consent of the person who "owns" it, otherwise, anything goes.

See [cyberspace](#).

[[Jargon File](#)]

16-03-2001

virtue

[<ethics, politics, moral philosophy>](#) excellence, skill, or art. In classical thought, virtues are admirable human characteristics or [dispositions](#) that distinguish good people from bad. [Socrates](#) sought a singular virtue for human life, while [Plato](#) identified four central virtues present in the ideal state or person. [Aristotle](#) held that every moral virtue is the mean between vicious extremes. Modern deontologists and [utilitarians](#) tend to suppose that individual virtues are morally worthwhile only when they encourage the performance of duty or contribute to the general welfare.
Recommended Reading: *Virtue and Vice*, ed. by Ellen Frankel Paul, Fred D. Miller, and George Sher (Cambridge, 1998); Nancy Sherman, *Making a Necessity of Virtue: Aristotle and Kant on Virtue* (Cambridge, 1997); Alasdair MacIntyre, *After Virtue: A Study in Moral Theory* (Notre Dame, 1997); John Casey, *Pagan Virtue: An Essay in Ethics* (Oxford, 1992); Jonathan Jacobs, *Choosing Character: Responsibility for Virtue and Vice* (Cornell, 2001); and Michael A. Weinstein, *Finite Perfection: Reflections on Virtue* (Massachusetts, 1985).

[[A Dictionary of Philosophical Terms and Names](#)]

31-05-2002

virtue ethics

[<ethics, moral philosophy>](#) normative theory that all moral [value](#) is derived from the character of [moral](#) agents. [Aristotle](#) and many medieval Christians assumed that the acquisition of [virtue](#) is the proper goal of human conduct, though they differed significantly in their valuation of particular [virtues](#). Rejecting the impersonality of moral judgments in the ethical theories of [Kant](#) and [Mill](#), contemporary [virtue](#) ethicists emphasize the achievement of a meaningful life.
Recommended Reading: *Nichomachean Ethics*, tr. by Terence Irwin (Hackett, 1985); *Virtue Ethics*, ed. by Roger Crisp and Michael Slote (Oxford, 1997); *Virtue Ethics: A Critical Reader*, ed. by

Daniel Statman (Georgetown, 1997); Rosalind Hursthouse, On Virtue Ethics (Oxford, 2000); and Christine McKinnon, Character, Virtue Theories, and the Vices (Broadview, 1999).

[\[A Dictionary of Philosophical Terms and Names\]](#)

31-05-2002

virus

(By analogy with biological viruses, via SF) A cracker program that searches out other programs and "infects" them by embedding a copy of itself in them, so that they become Trojan horses. When these programs are executed, the embedded virus is executed too, thus propagating the "infection". This normally happens invisibly to the user.

Unlike a worm, a virus cannot infect other computers without assistance. It is propagated by vectors such as humans trading programs with their friends. The virus may do nothing but propagate itself and then allow the program to run normally. Usually, however, after propagating silently for a while, it starts doing things like writing "cute" messages on the terminal or playing strange tricks with the display (some viruses include [display hacks](#)). Many nasty viruses, written by particularly antisocial crackers, do irreversible damage, like deleting all the user's files.

In the 1990s, viruses have become a serious problem, especially among IBM PC and Macintosh users (the lack of security on these machines enables viruses to spread easily, even infecting the operating system). The production of special antivirus software has become an industry, and a number of exaggerated media reports have caused outbreaks of near hysteria among users; many users tend to blame *everything* that doesn't work as they had expected on virus attacks. Accordingly, this sense of "virus" has passed into popular usage (where it is often incorrectly used to denote a worm or even a Trojan horse).

[\[Jargon File\]](#) and [\[FOLDOC\]](#)

16-03-2001

visualisation

The act of making a visible presentation of numerical data, particularly a graphical one. This might include anything from a simple X-Y graph of one dependent variable against one independent variable to a [virtual reality](#) which allows you to fly around the data.

[Gnuplot](#) is the [Free Software Foundation](#)'s utility for producing various kinds of graphs.

[Usenet](#) newsgroup: [news:comp.graphics](#).

The [Computer Graphics Resource Listing](#) contains pointers to several visualisation tools.

FAQ

(<ftp://src.doc.ic.ac.uk/usenet/news-info/comp.graphics/>).

Electronic Visualization Laboratory, University of Illinois at Chicago (<http://www.ncsa.uiuc.edu/EVL/docs/Welcome.html>).

[\[FOLDOC\]](#)

16-03-2001

vitalism<[metaphysics](#)>

vitalism was a reaction against the currents of [materialism](#) and mechanistic [determinism](#) in the eighteenth and nineteenth centuries. The vitalists posited that human beings are not purely physical but contain some kind of spiritual component or "vital essence". In practice, since the vitalists could not deny the progress of materialist science, they advocated a kind of [dualism](#) of matter and life.

Based on [[The Ism Book](#)]

Edited by Giovanni Benzi

25-03-2001

voice recognition[speech recognition](#)

00-00-0000

volition

<[ethics](#), [moral philosophy](#)> exercise of the faculty of willing. The supposition that an act of volition is a necessary precondition for any voluntary [action](#) notoriously leads to an [infinite regress](#) in explaining the voluntary nature of the volition itself.

Recommended Reading: Peter Van Inwagen, *An Essay on Free Will* (Clarendon, 1983); Thomas Pink, *The Psychology of Freedom* (Cambridge, 1996); *Experimental Slips and Human Error: Exploring the Architecture of Volition*, ed. by Bernard J. Baars (Plenum, 1992); and Richard Freedman, *Threads of Life: Autobiography and the Will* (Chicago, 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

31-05-2002

Voltaire - Francois Marie Arouet

<[biography](#), [history of philosophy](#)> French philosopher (1694-1778). Like the other [Encyclopedists](#), Voltaire greatly admired the philosophy of John [Locke](#), and he defended his own version of [sensationalism](#) in the *Dictionnaire Philosophique* (Philosophical Dictionary) (1764) and *Lettres Philosophiques* (Letters Concerning the English Nation) (1734). As a freethinker and deist, Voltaire opposed institutional religion generally. In *Poeme sur la Désastre de Lisbonne* (On the Lisbon Disaster) (1756) and *Candide, ou l' optimisme* (Candide) (1759), Voltaire' s acknowledgement of the presence of evil grounded a bitter rejection of [Leibniz'](#) s conviction that god has created the best of all possible worlds.

Recommended Reading: Voltaire, *Oeuvres Completes* (French & European, 1999); *The Portable Voltaire*, ed. by Ben Ray Redman (Viking, 1977); *Francois Voltaire, Treatise on Tolerance: And Other Writings*, tr. by Brian Masters and Simon Harvey (Cambridge, 2000); *Voltaire: Political Writings*, ed. by David Williams (Cambridge, 1994); and John Gray, *Voltaire* (Routledge, 1999).

[[A Dictionary of Philosophical Terms and Names](#)]

03-06-2002

voluntarism

<[metaphysics](#)> The word voluntarism in philosophy is usually used to describe the doctrine of [Schopenhauer](#) that all the universe is fundamentally or exclusively will. The term is sometimes used as another word for [libertarianism](#) with regard to freedom of the will.

[[The Ism Book](#)]

Edited by Giovanni Benzi

25-03-2001

voluntarism

<[ethics, philosophy of politics](#)> belief that the nature of [reality](#), the principles of [morality](#), or the structure of society derives from the determinations of human or (especially) [divine will](#).

[[A Dictionary of Philosophical Terms and Names](#)]

03-06-2002

voluntary - involuntary

<[ethics, moral philosophy](#)> in [moral philosophy](#) since [Aristotle](#), the distinction between actions that are freely performed in accordance with determination of the [will](#) of a [moral agent](#) and those which are produced by force or ignorance. Recommended Reading: Nichomachean Ethics, tr. by Terence Irwin (Hackett, 1985) and T. D. J. Chappell, Aristotle and Augustine on Freedom: Two Theories of Freedom, Voluntary Action and Akrasia (Palgrave, 1995).

[[A Dictionary of Philosophical Terms and Names](#)]

03-06-2002

von Neumann integer

<[mathematics](#)> A [finite von Neumann ordinal](#).

The von Neumann integer N is a finite set with N elements which are the von Neumann integers 0 to N-1. Thus

0 = =
 1 = 0 =
 2 = 0, 1 = ,
 3 = 0, 1, 2 = , , ,
 ...

The set of von Neumann integers is [infinite](#), even though each of its elements is finite.

[[FOLDOP](#)]

16-03-2001

von Neumann John

<[biography](#), [history of philosophy](#)> Hungarian-American mathematician (1903-1957) whose work included study of [mathematical logic](#), set [theory](#), and [game theory](#). The complex calculations required for work on weapons systems led to the invention of modern computing machinery, and [von Neumann](#) was the first to devise a functional set of [program instructions](#) for an [electronic computer](#). Any device that sequentially reads and performs a stored program, providing for [input](#) and [output](#), through a central processing unit, is commonly called a "[von Neumann machine](#)."

Recommended Reading: John Von Neumann, *Mathematical Foundations of Quantum Mechanics* (Princeton, 1996); John Von Neumann, *The Computer and the Brain*, ed. by Paul M. Churchland and Patricia Smith Churchland (Yale, 2000); Oskar Morgenstern and John Von Neumann, *Theory of Games and Economic Behavior* (Princeton, 1980); Norman MacRae, *John Von Neumann: The Scientific Genius Who Pioneered the Modern Computer, Game Theory, Nuclear Deterrence, and Much More* (Am. Math. Soc., 2000); William Poundstone, *Prisoner' s Dilemma: John Von Neumann, Game Theory and the Puzzle of the Bomb* (Anchor, 1993); and William Aspray, *John von Neumann and the Origins of Modern Computing* (MIT, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

03-06-2002

von Neumann ordinal

<[mathematics](#)> An implementation of [ordinals](#) in [set theory](#) (e.g. Zermelo Fr"nkel set theory or [ZFC](#)). The von Neumann ordinal alpha is the well-ordered set containing just the ordinals "shorter" than alpha.

"Reasonable" set theories (like ZF) include Mostowski' s Collapsing Theorem: any well-ordered set is [isomorphic](#) to a von Neumann ordinal. In really screwy theories (e.g. NFU -- New Foundations with Urelemente) this theorem is false.

The finite von Neumann ordinals are the von Neumann integers.

[[FOLDOC](#)]

16-03-2001

voting paradox

<[sociology](#), [philosophy of politics](#)> a systematic difficulty with the attempt to make consistent social choices by majority rule. Suppose that among three options, equal portions of the population rank them 1-2-3, 2-3-1, and 3-1-2. Then, even though the relative preferences seem rational and evenly divided, in head-to-head competitions, two-thirds of the voters favor 1 over 2, and two-thirds 2 over 3, yet two-thirds favor 3 over 1. Although several Enlightenment thinkers had pointed out similar difficulties in the foundations of [social contract theory](#), twentieth-century economist Kenneth Arrow demonstrated formally that the collective preferences of groups cannot always be determined from the individual preferences of their members. Recommended Reading: Kenneth J. Arrow, *Social Choice and Individual Values* (Yale, 1970); Michael A. E. Dummett, *Voting Procedures* (Clarendon, 1985); and James M. Buchanan and Gordon Tullock, *The Calculus of Consent* (Michigan, 1962).

[[A Dictionary of Philosophical Terms and Names](#)]

03-06-2002

Wahrheit

<[philosophical terminology](#)> German term for [truth](#).

[[A Dictionary of Philosophical Terms and Names](#)]

09-06-2002

Waismann Friedrich

<[history of philosophy](#), [biography](#)> Austrian [philosopher](#) (1896-1959). One of the original members of the [Vienna Circle](#) gathering of [logical positivists](#), [Waismann](#) defended a [conventionalist logic](#) in Einführung in das mathematische Denken (An Introduction to Mathematical Thinking) (1936).

Sprachspiele und Vagheit der Sprache and his later lectures, published posthumously as The Principles of Linguistic Philosophy (1965), contributed to the development of [analytic philosophy](#) by encouraging serious analysis of [ordinary language](#). [Waismann](#) held that even precisely-defined terms have an "open texture", since novel circumstances might always render their application uncertain.

Recommended Reading:

Friedrich Waismann, Lectures on the Philosophy of Mathematics, ed. by Wolfgang Grassl (Rodopi, 1982).

[[A Dictionary of Philosophical Terms and Names](#)]

09-06-2002

watchmaker argument

<[metaphysics](#), [God-proofs of the existence of](#)> the world is an orderly and beautiful structure; we can tell that it must have been made by someone, just as if you found a watch on an empty beach, you would know, even if you had never seen a watch before, that it must have been made by someone.

[[A Philosophical Glossary](#)]

02-05-2001

Watson John Broadus

<[history of philosophy](#), [biography](#)> American psychologist (1878-1958) whose Psychology from the Standpoint of a Behaviorist (1913) and Behavior: an Introduction to Comparative Psychology (1914) founded modern [behaviorism](#) by requiring that the science of [psychology](#) study only public, external stimuli and responses, rather than appealing to the [introspection](#) of putatively private, internal experiences.

Recommended Reading:

John B. Watson, Behaviorism (Transaction, 1998) Modern Perspectives on John B. Watson and Classical Behaviorism, ed. by James T. Todd and Edward K. Morris (Greenwood, 1991).

[[A Dictionary of Philosophical Terms and Names](#)]

09-06-2002

weakness of will

<[philosophical terminology](#)> inability to carry out an [action](#) in accordance with [reason](#) or [virtue](#). [Socrates](#) held that agents never knowingly do wrong, but [Aristotle](#) maintained that the influence of the passions often results in [incontinence](#).

Recommended Reading:

Justin C. B. Gosling, Weakness of the Will (Routledge, 1990);
Robert Dunn, The Possibility of Weakness of Will (Hackett, 1987);
Alfred R. Mele, Irrationality: An Essay on Akrasia, Self-Deception, and Self-Control (Oxford, 1992).

[[A Dictionary of Philosophical Terms and Names](#)]

09-06-2002

Weber Max

<[history of philosophy](#)> German social theorist (1864-1920) who developed many of the principles of the modern discipline of [sociology](#); author of Sociology as Science (1897) and Methodology of the Social Sciences (1907). [Weber](#) argued for a strict separation between scientific [objectivity](#) and all judgments of value in Die "Objectivität" sozialwissenschaftlicher und sozialpolitischer Erkenntnis (The "Objectivity" of Knowledge in Social Science and Social Policy) (1904). Ultimately, [Weber](#) supposed, ethical and political commitments are properly embraced without any effort to supply their rational foundations. In Die protestantische Ethik und der Geist des Kapitalismus (The Protestant Ethic and the Spirit of Capitalism) (1905) [Weber](#) warned against the loss of individual [freedom](#) to the efficient but over-rationalized bureaucracy that arises in service of economic investment.

Recommended Reading:

Max Weber, Essays in Sociology, ed. by C. Wright Mills and Hans H. Gerth (Oxford, 1958);
 Dirk Kasler, Max Weber: An Introduction to His Life and Work, tr. by Philippa Hurd (Chicago, 1989); Reinhard Bendix, Max Weber: An Intellectual Portrait (California, 1978);
 The Cambridge Companion to Weber, ed. by Stephen Turner (Cambridge, 2000);
 Stephen Kalberg, Max Weber's Comparative-Historical Sociology (Chicago, 1994);
 Martin Albrow, Max Weber's Construction of Social Theory (Palgrave, 1990).

[[A Dictionary of Philosophical Terms and Names](#)]

09-06-2002

Weil Simone

<[history of philosophy, biography](#)> French [philosopher](#) and [mystic](#) (1909-1943); author of Waiting for God, Gravity and Grace, and Leçons de Philosophie (Lectures on Philosophy). Following her conversion to Christianity in 1938, [Weil](#) argued in Intimations of Christianity Among the Ancient Greeks that its central theological themes could be discerned by a careful reader in the philosophical works of [Plato](#) and other Greek sages. In Oppression et liberté (Oppression and Liberty) (1955) Weil argued that individuals can overcome the alienation characteristic of modern society only through their engagement in meaningful work.

Recommended Reading:

Simone Weil: An Anthology, ed. by Sian Miles (Grove Press, 2000);
 The Simone Weil Reader, ed. by George A. Panichas (Moyer Bell, 1985);
 Francine Du Plessix Gray, Simone Weil: A Penguin Life (Viking, 2001);
 Stephen Plant and Peter Vardy, Simone Weil (Liguori, 1997);
 Miklos Veto, The Religious Metaphysics of Simone Weil, tr. by Joan Dargan (SUNY, 1994);
 Diogenes Allen and Eric O. Springsted, Spirit, Nature, and Community: Issues in the Thought of Simone Weil (SUNY, 1994).

[[A Dictionary of Philosophical Terms and Names](#)]

09-06-2002

well-formed formula

[wff](#)

31-05-2004

well-ordered set

<[mathematics](#)> A set with a [total ordering](#) and no infinite descending [chains](#). A total ordering " \leq " satisfies $x \leq x$; $x \leq y \leq z \Rightarrow x \leq z$; $x \leq y \leq x \Rightarrow x=y$; and for all x, y , $x \leq y$ or $y \leq x$. In addition, if a set W is well-ordered then all non-empty subsets A of W have a least element, i.e. there exists x in A such that for all y in A , $x \leq y$.

[Ordinals](#) are [isomorphism classes](#) of well-ordered sets, just as [integers](#) are [isomorphism classes](#) of finite sets.

[[FOLDOP](#)]

16-03-2001

Weltanschauung

<[philosophical terminology](#)> German term for "World-view", a general outlook on human life and its place in the greater order of the universe.

[[A Dictionary of Philosophical Terms and Names](#)]

09-06-2002

Wert

<[philosophical terminology](#)> German term for [value](#). [Max Weber](#) held that all social science is properly Wertfrei ("value-free").

[[A Dictionary of Philosophical Terms and Names](#)]

09-06-2002

West Cornel

<[history of philosophy](#), [biography](#)> American theologian and social philosopher born in 1953. His *The American Evasion of Philosophy: A Genealogy of Pragmatism* (1989) traces the origins of American thought in the work of Emerson and Thoreau. In *The Ethical Dimensions of Marxist Thought* (1991) and *Race Matters* (1993), West addresses the significance of racial concerns in contemporary American culture.

Recommended Reading:

Cornel West, *Keeping Faith: Philosophy and Race in America* (Routledge, 1994);

The Cornel West Reader (Basic, 2000);

Cornel West: A Critical Reader, ed. by George Yancy (Blackwell, 2001);

bell hooks and Cornel West, *Breaking Bread: Insurgent Black Intellectual Life* (South End, 1991).

[[A Dictionary of Philosophical terms and Names](#)]

09-06-2002

wetware

<[jargon](#)> /wet' weir/ (Probably from the novels of Rudy Rucker, or maybe Stanislaw Lem) The human nervous system, as opposed to electronic computer [hardware](#) or [software](#). "Wetware has 7 plus or minus 2 temporary [registers](#)." Also, human beings (programmers, operators, administrators) attached to a computer system, as opposed to the system' s hardware or software.

See [liveware](#), [meatware](#).

[True origin? Dates?]

[[Jargon File](#)] and [[FOLDOC](#)]

16-03-2001

wff

<[logic](#)> Acronym of "well-formed formula", pronounced whiff. A string of symbols from the alphabet of the [formal language](#) that conforms to the grammar of the [formal language](#).

See [decidable wff](#), [formal language](#),

Closed wff

In [predicate logic](#), a wff with no free occurrences of any variable; either it has constants in place of variables, or its variables are bound, or both. Also called a sentence.

See [bound variables](#), [free variables](#), [closure](#) of a wff

Open wff

In [predicate logic](#), a wff with at least one free occurrence a variable. Some logicians use the terms, 1-wff, 2-wff,...n-wff for open wffs with 1 free variable, 2 free variables, ...n free variables. (Others call these 1-formula, 2-formula,...n-formula.)

16-03-2001

Whately Richard

<[history of philosophy](#), [biography](#)> English logician and theologian (1787-1863). Considered largely responsible for the revival of the study of [logic](#) in England in the early part of the nineteenth century, [Whately](#) was the author of two standard texts-Elements of Rhetoric (1828) and Elements of Logic (1826). His logic was largely Aristotelian, but explicitly followed [Locke](#) in many respects. [Whately](#) was also the author of numerous books, essays, and pamphlets in politics, economics, and religion. He admired the work of [William Paley](#) and, in his most famous work, the Historic Doubts relative to Napoleon Buonaparte (1819), argued that, if one were to adopt [Hume](#)' s criteria for judging the reliability of testimony, one could deny that Napoleon had ever existed (Contributed by Will Sweet.)

Recommended Reading:

Craig Parton, Richard Whately: A Man For All Seasons (Canadian, 1997)
Erkki Patokorpi, Rhetoric, Argumentative and Divine: Richard Whately and His Discursive Project of the 1820s (Peter Lang, 1996).

[\[A Dictionary of Philosophical Terms and Names\]](#)

09-06-2002

Whewell William

<[history of philosophy](#), [biography](#)> British philosopher of science (1794-1866). In the Philosophy of the Inductive Sciences, Founded upon Their History (1840) and The Plurality of Worlds (1858) Whewell defended a hypothetico-deductive model of Baconian natural science, emphasizing the role of intellectual creativity in theory-formation and defending a strict scientific [realism](#) in opposition to the strictly empiricist views of [Mill](#). Thus, he held that [Newton](#)' s [mechanics](#) for celestial and terrestrial motion provides necessary truths about the structure of the universe. [Whewell](#) considered the implications of this view for [ethics](#) in The Elements of Morality (1856).

Recommended Reading:

Collected Works of William Whewell, ed. by Richard Yeo (Thoemmes, 2001);
William Whewell, Mathematical Exposition of Some Doctrines of Political Economy (Augustus Kelley, 1971);
William Whewell: Theory of Scientific Method, ed. by Robert E. Butts (Hackett, 1989);
William Whewell: A Composite Portrait, ed. by Menachem Fisch and Simon Schaffer (Oxford, 1991); Richard Yeo, Defining Science: William Whewell, Natural Knowledge, and Public Debate in Early Victorian Britain (Cambridge, 1993).

[\[A Dictionary of Philosophical Terms and Names\]](#)

09-06-2002

Whitehead Alfred North

<[history of philosophy](#), [biography](#)> English mathematician and philosopher (1861-1947) who collaborated with [Russell](#) on Principia Mathematica (1910-13). After a long career in mathematics at Cambridge and London, [Whitehead](#) accepted a position in [philosophy](#) at Harvard in 1924. In Process and Reality (1929) he developed an abstract methodology through which to propose a comprehensive metaphysical view according to which events and processes, rather than independent substances constitute [reality](#). This view points toward the progressive development of conscious organic beings mutually involved in prehensive relations to each other.

Recommended Reading:

Alfred North Whitehead, Science and the Modern World (Free Press, 1997);
A Key to Whitehead' s ' Process and Reality' , ed. by Donald W. Sherburne (Chicago, 1981);
Nathaniel Lawrence, Alfred North Whitehead: A Primer of His Philosophy (Elliot' s, 1974);
Leemon B. McHenry, Whitehead and Bradley: A Comparative Analysis (SUNY, 1992);
Judith A. Jones, Intensity: An Essay in Whiteheadian Ontology (Vanderbilt, 1998).

[\[A Dictionary of Philosophical Terms and Names\]](#)

11-06-2002

Wiener Kreis

<[history of philosophy](#), [biography](#)> group of Austrian analytical philosophers known (in English) as the [Vienna Circle](#).

[[A Dictionary of Philosophical Terms and Names](#)]

11-06-2002

will

<[philosophical terminology](#)> the faculty of deciding, choosing, or acting.

Recommended Reading:

Gary Watson, Free Will (Oxford, 1983)

Robert Kane, The Significance of Free Will (Oxford, 1998).

[[A Dictionary of Philosophical Terms and Names](#)]

11-06-2002

Wilson Edward Osborne

<[history of philosophy](#), [biography](#)> American biologist born in 1929; author of Sociobiology: The New Synthesis (1975) and On Human Nature (1978). Extrapolating from his zoological studies, [Wilson](#) promotes the discipline of "[sociobiology](#)", offering explanations of human social [behavior](#) in strictly biological terms. In Biophilia (1986) [Wilson](#) proposes that human appreciation of the natural [world](#) is an innate expression of a vital biological aspect of our evolutionary development.

Recommended Reading:

Edward O. Wilson, The Diversity of Life (Norton, 1999); Edward O. Wilson, Consilience: The Unity of Knowledge (Random House, 1999);

Ullica Segerstrale, Defenders of the Truth: The Battle for Science in the Sociobiology Debate and Beyond (Oxford, 2000).

[[A Dictionary of Philosophical Terms and Names](#)]

11-06-2002

Wilson John Cook

<[history of philosophy](#), [biography](#)> English logician and philosopher (1849-1915). Although he had studied with [Green](#), [Wilson](#) rejected [idealism](#) in favor of a realistic [epistemology](#). His classroom teaching and posthumously-collected papers - Statement and Inference - were influential on a generation of Oxford philosophers.

[[A Dictionary of Philosophical Terms and Names](#)]

11-06-2002

Wirklichkeit

<[philosophical terminology](#)> German term for [reality](#).

[[A Dictionary of Philosophical Terms and Names](#)]

11-06-2002

Wirkung

<[philosophical terminology](#)> German term for [effect](#).

[[A Dictionary of Philosophical Terms and Names](#)]

11-06-2002

wisdom

<[philosophical terminology](#)> good judgment with respect to abstract truth or theoretical matters (in contrast to prudence in concrete, practical affairs). For [Plato](#), [wisdom](#) is the virtue appropriate to the rational soul, and for [Aristotle](#), it is the highest intellectual [virtue](#).

[[A Dictionary of Philosophical Terms and Names](#)]

11-06-2002

Wisdom John

<[history of philosophy, biography](#)> British philosopher (1904-1993) whose [Other Minds](#) (1952) and [Philosophy and Psychoanalysis](#) (1953) applied the analytic methods of [Moore](#) and the later [Wittgenstein](#) to significant issues in the [philosophy of mind](#).

Recommended Reading:

John Wisdom, [Paradox and Discovery](#) (California, 1987);

John Wisdom, [Philosophy and Its Place in Our Culture](#) (Gordon & Breach, 1975);

[Philosophy and Life: Essays on John Wisdom](#), ed. by Ilham Dilman (Martinus Nijhoff, 1984).

[[A Dictionary of Philosophical Terms and Names](#)]

11-06-2002

Wissen

<[philosophical terminology](#)> German term for [knowledge](#).

[[A Dictionary of Philosophical Terms and Names](#)]

11-06-2002

Wittgenstein Ludwig

<[history of philosophy, biography](#)> raised in a prominent Viennese family, [Ludwig Wittgenstein](#) (1889-1951) studied engineering in Germany and England, but became interested in the foundations of [mathematics](#) and pursued philosophical studies with [Moore](#) at Cambridge before entering the Austrian army during World War I. The notebooks he kept as a soldier became the basis for his [Logische-Philosophische Abhandlung](#) ([Tractatus Logico-Philosophicus](#)) (1922), which later earned him a doctorate and exerted a lasting influence on the philosophers of the [Vienna circle](#). After giving away his inherited fortune, working as a village schoolteacher in Austria, and designing his sister's Vienna home, [Wittgenstein](#) returned to Cambridge, where he developed a new conception of the philosophical task. His impassioned teaching during this period influenced a new generation of philosophers, who tried to capture it in [The Blue and Brown Books](#) (1958). From the late ' thirties [Wittgenstein](#) himself began writing the materials which would be published after his death as the [Philosophical Investigations](#) (1953). In the cryptic [Tractatus](#), the earlier [Wittgenstein](#) extended [Russell](#)' s notion of logic: [analysis](#) by describing a [world](#) composed of facts, pictured by thoughts, which are in turn expressed by the propositions of a logically structured [language](#). On this view, [atomic sentences](#) express the basic [data of sense](#) experience, while the [analytic propositions of logic](#) and [mathematics](#) are merely formal tautologies. Anything else is literally nonsense, which [Wittgenstein](#) regarded as an attempt to speak about what cannot be said. [Metaphysics](#) and [ethics](#), he supposed, transcend the limits of human [language](#). Even the propositions of the [Tractatus](#) itself are of merely temporary use, like that of a ladder one can discard after having climbed up it: they serve only as useful reminders of the boundaries of our linguistic ability.

This work provided the philosophical principles upon which the [logical positivists](#) relied in their development of a narrowly anti-metaphysical standpoint. But just as his theories began to transform twentieth-century [philosophy](#), [Wittgenstein](#) himself became convinced that they were mistaken in demanding an excessive precision from human expressions.

The work eventually published in the [Investigations](#) pursued an different path. In [ordinary language](#), he now supposed, the [meaning](#) of words is more loosely aligned with their use in a variety of particular "language games". Direct [reference](#) is only one of many ways in which our linguistic activity may function, and the picturing of [reality](#) is often incidental to its success. Belief that [language](#) can perfectly capture [reality](#) is a kind of bewitchment, [Wittgenstein](#) now proposed.

Thus, [philosophy](#) is properly a therapeutic activity, employed to relieve the puzzlement generated by (philosophical) misuses of [ordinary language](#). In particular, the philosophical tradition erred in supposing that simple reports of [subjective](#) individual [experience](#) are primary sources for human [knowledge](#).

Efforts to employ a [private language](#) as expressions of interior [mental states](#), for example, [Wittgenstein](#) argued to be an avoidable mistake that had caused great difficulties in the [philosophy of mind](#). His views on this issue were a significant influence on [Ryle](#) and others. In his later work, [Wittgenstein](#) applied this method of analysis to philosophical problems related to [epistemology](#), [mathematics](#) and [ethics](#).

Recommended Reading:

Primary sources:

Ludwig Wittgenstein, *Schriften*, ed. by Friedrich Waismann (Suhrkamp, 1960-);
 Wittgenstein Reader, ed. by Anthony Kenny (Blackwell, 1994);
 Ludwig Wittgenstein, *Notebooks, 1914-1916*, ed. by G. E. M. Anscombe and George H. Von Wright (Chicago, 1984);
 Ludwig Wittgenstein, *Tractatus Logico-Philosophicus*, ed. by D. F. Pears (Routledge, 1981);
 Ludwig Wittgenstein, *Blue and Brown Books* (Harpercollins, 1986);
 Ludwig Wittgenstein, *Philosophical Investigations*, tr. by G. E. M. Anscombe (Prentice Hall, 1999);
 Ludwig Wittgenstein, *On Certainty / Über Gewissheit*, ed. by G. E. M. Anscombe and G. H. Von Wright (Harpercollins, 1986);
 Ludwig Wittgenstein, *Remarks on the Foundations of Mathematics*, ed. by Rush Rhees and G. E. M. Anscombe (MIT, 1983).

Secondary sources:

P. M. S. Hacker, *Wittgenstein* (Routledge, 1999);
 Saul A. Kripke, *Wittgenstein on Rules and Private Language* (Harvard, 1984);
 Marie McGinn, *Routledge Philosophy Guidebook to Wittgenstein and the Philosophical Investigations* (Routledge, 1997);
The Cambridge Companion to Wittgenstein, ed. by Hans D. Sluga (Cambridge, 1996);
 Joachim Schulte, *Wittgenstein: An Introduction*, tr. by John F. Holley and William H. Brenner (SUNY, 1992);
 Ray Monk, *Ludwig Wittgenstein: The Duty of Genius* (Penguin, 1991);
 A. C. Grayling, *Wittgenstein* (Oxford, 1988).

Additional on-line information about Wittgenstein includes:

The outstanding guide (in German) from Deutsche Ludwig Wittgenstein Gesellschaft.
 Duncan J. Richter' s thorough article in The Internet Encyclopedia of Philosophy.
 The University of Bergen' s The Wittgenstein Archives.
 Peter Hacker' s article in The Oxford Companion to Philosophy.

Also see: analytic philosophy, the beetle in the box, Cambridge philosophy, criteria, the duck-rabbit, English philosophy, family resemblance, forms of life, the autonomy of grammar, grammatical proposition, the paradox of identity, philosophy of language, language-games, linguistic philosophy, the linguistic turn, logic, logically perfect language, meaning, open texture, the picture theory of meaning, the private language problem, philosophy of religion, representation, rules, explanation by samples, saying and showing, seeing as, solipsism, truth-functions, and Wittgensteinians.

The article in the Columbia Encyclopedia at Bartleby.com.
 The thorough collection of resources at EpistemeLinks.com.
 Jean Laberge' s article (in French) at EnEphi.
 An article by Tadeusz Zawidzki in The Dictionary of the Philosophy of Mind.
 Robert Sarkissian' s summary treatment of Wittgenstein' s philosophy.
 Björn Christensson' s brief guide to online resources.
 A philosophical biography from Uwe Wiedemann.
 Snippets from Wittgenstein (German and English) in The Oxford Dictionary of Quotations.
 A personal tribute from Screaming Chimp Productions.
 Brief entries on Wittgenstein and ' family resemblance' in Oxford' s Concise Dictionary of Linguistics.
 Andy Blunden' s biography of Wittgenstein.
 A short article in Oxford' s Who' s Who in the Twentieth Century.
 A brief biography from Österreich-Lexikon.
 Discussion of Wittgenstein' s mathematical significance from Mathematical MacTutor.
 A brief entry in The Macmillan Encyclopedia 2001.

[\[A Dictionary of Philosophical Terms and Names\]](#)

11-06-2002

Wolff Christian

<[history of philosophy](#), [biography](#)> German philosopher (1679-1754) who wrote in both Latin and German, developing an extensive philosophical nomenclature for his native tongue and introducing a style that insisted upon thorough treatment of every issue.

Wolff developed a philosophical system similar to that of [Leibniz](#) in his *Philosophia Prima sive Ontologia* (First Philosophy, or Ontology) (1721). Although his rationalistic metaphysical doctrines were condemned for their fatalistic implications in [ethics](#), they remained influential until subjected to [Kant' s critique](#).

[\[A Dictionary of Philosophical Terms and Names\]](#)

11-06-2002

Wollstonecraft Mary

<[history of philosophy, biography](#)> a self-taught native of London, [Mary Wollstonecraft](#) (1759-1797) worked as a schoolteacher and headmistress at a school she established at Newington Green with her sister Eliza. The sisters soon became convinced that the young women they tried to teach had already been effectively enslaved by their social training in subordination to men. In *Thoughts on the Education of Daughters* (1787) [Wollstonecraft](#) proposed the deliberate extrapolation of Enlightenment ideals to include [education](#) for women, whose rational natures are no less capable of intellectual achievement than are those of men. Following a period of service as a governess to Lord Kingsborough in Ireland, [Wollstonecraft](#) spent several years observing political and social developments in France, and wrote *History and Moral View of the Origins and Progress of the French Revolution* (1793). Her *A Vindication of the Rights of Men* (1790) is a spirited defense of the ideals of the Revolution against the conservative objections of [Burke](#). Upon her return to England, she joined a radical group whose membership included [Blake](#), [Paine](#), [Fuseli](#) and [Wordsworth](#).

Her first child, Fanny, was born in 1795, the daughter of American Gilbert Imlay. After his desertion, he joined the radical activist [William Godwin](#), a long-time friend whom she married in 1797. [Wollstonecraft](#) died a few days after the birth of their daughter, Mary, who later married [Percy Bysshe Shelley](#) and wrote *Frankenstein*, or *The Modern Prometheus* and other novels. [Wollstonecraft](#)'s lasting place in the [history of philosophy](#) rests upon *A Vindication of the Rights of Woman* (1792). In this classical feminist text, she appealed to egalitarian [social philosophy](#) as the basis for the creation and preservation of equal rights and opportunities for women. The foundation of [morality](#) in all human beings, male or female, is their common possession of the faculty of [reason](#), [Wollstonecraft](#) argued, and women must claim their [equality](#) by accepting its unemotional dictates. Excessive concern for romantic love and physical desirability, she believed, are not the natural conditions of female existence but rather the socially-imposed means by which male domination enslaves them. The posthumously-published *Maria, or the Wrongs of Woman* develops similar themes.

Recommended Reading:

Primary sources:

Mary Wollstonecraft, *Political Writings: A Vindication of the Rights of Men; A Vindication of the Rights of Woman; An Historical and Moral View of the Origin and Progress of the French Revolution*, ed. by Janet Todd (Toronto, 1993);
 Mary Wollstonecraft, *A Vindication of the Rights of Woman* (Penguin, 1993);
 Mary Wollstonecraft, *Maria or the Wrongs of Woman*, ill. by Anne K. Mellor (Norton, 1994).

Secondary sources:

Jane Moore, *Mary Wollstonecraft* (Mississippi, 1999);
Feminist Interpretations of Mary Wollstonecraft, ed. by Maria J. Falco (Penn. State, 1996);
 Janet Todd, *Mary Wollstonecraft: A Revolutionary Life* (Columbia, 2000);
 Gary Kelly, *Revolutionary Feminism: The Mind and Career of Mary Wollstonecraft* (St. Martin' s, 1995);
 Calvin Craig Miller, *Mary Wollstonecraft and the Rights of Women* (Morgan Reynolds, 1999).

Additional on-line information about Wollstonecraft includes:

The comprehensive guide maintained by Harriet Devine Jump.
 Jennifer Hornsby' s article in *The Oxford Companion to Philosophy*.

Also see: feminism and women in philosophy.

The article in the Columbia Encyclopedia at Bartleby.com.
 The thorough collection of resources at EpistemeLinks.com.
 An entry in the Penguin Biographical Dictionary of Women.
 An article in *The Macmillan Dictionary of Women' s Biography*.
 Literary analysis from Patrice Cucinello.
 A timeline of Wollstonecraft' s life from Bill Uzgalis.
 Snippets from Wollstonecraft in *The Oxford Dictionary of Quotations*.
 Steven Kreis' s brief biography.
 A brief tribute from *Philosopher All-Stars*.
 A brief entry in *The Macmillan Encyclopedia 2001*.

[[A Dictionary of Philosophical Terms and Names](#)]

11-06-2002

Xenocrates

<[history of philosophy, biography](#)> Greek philosopher (396-314 BCE) who defended the philosophy of [Plato](#) against the criticism of [Aristotle](#). As head of the [Academy](#) in the fourth century, Xenocrates held forth the quasi-[Pythagorean](#) view that the [Platonic Forms](#), including even the individual human [soul](#), are all numbers.

[[A Dictionary of Philosophical Terms and Names](#)]

11-06-2002

Xenophanes of Colophon

<[history of philosophy](#), [biography](#)> [Presocratic](#) philosopher (570-475 BCE). He criticized the militarism and anthropomorphism of traditional Greek [morality](#) and [religion](#), arguing that fundamental [truth](#) about the world is difficult to achieve. His opposition to conventional notions earned him the respect of later, more completely [skeptical](#) thinkers. [Parmenides](#) and [Zeno](#) studied with [Xenophanes](#) in Sicily before establishing their own school at Elea.

Recommended Reading:

Xenophanes of Colophon: Fragments, tr. by J. H. Lesher (Toronto, 1992).

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11-06-2002

Xenophon

<[biography](#), [philosophical historiography](#)> Greek historian (430-350 B.C.E.). Xenophon' s dialogues, especiall the Apologhma (Apology) and Memorabilia, offer an account of the philosophical career of [Socrates](#) through more practical, worldly eyes than do the dialogues of Plato.

Recommended Reading:

Xenophon: Memorabilia, Oeconomicus, Symposium, Apologia, tr. by E. C. Marchant and O. J. Todd (Harvard, 1923);

Xenophon, Conversations of Socrates, tr. by Hugh Tredennick (Penguin, 1990);

Leo Strauss, Xenophon' s Socrates (St. Augustine, 1997).

[\[A Dictionary of Philosophical Terms and Names\]](#)

11-06-2002

xor

/X' or/, /kzor/ Exclusive or. "A xor B" means "A or B, but not both". The [truth table](#) is

A	B	A xor B
F	F	F
F	T	T
T	F	T
T	T	F

[\[Jargon File\]](#) and [\[FOLDOC\]](#)

16-03-2001

Zeit

<[metaphysics](#), [philosophy of science](#)> German term for [time](#); thus die Zeitgeist, or "Spirit of the Age" is the set of conceptions characteristic of the thinkers of a particular era.

[\[A Dictionary of Philosophical Terms and Names\]](#)

11-06-2002

Zen

[Buddhism](#)

30-05-2004

Zeno

<[history of philosophy](#), [biography](#)> Greek philosopher (334-262 BCE). An early exponent of stoic philosophy, he devised its characteristic separation of [logic](#), natural science, and [ethics](#). According to [Zeno](#), only acceptance of objective reality permits human beings to overcome their subjective passions.

Recommended Reading:
Edwyn Bevan, Stoics and Skeptics (Ares, 1980).

[[A Dictionary of Philosophical Terms and Names](#)]

11-06-2002

Zeno of Elea

<[history of philosophy](#), [biography](#)> follower of [Parmenides](#) whose work is known to us only through fragmentary reports from other philosophers. [Zeno](#) (c. 450 BCE) was the [presocratic](#) philosopher who devised clever paradoxes to show that motion of any kind is impossible and that reality must be unitary and unchanging.

Recommended Reading:
J. A. Farris, The Paradoxes of Zeno (Avebury, 1996) Zeno' s Paradoxes, ed. by Wesley C. Salmon (Hackett 2001).

[[A Dictionary of Philosophical Terms and Names](#)]

11-06-2002

Zermelo - Ernst Friedrich Ferdinand

<[biography](#), [history of philosophy](#)> German mathematician (1871-1953) who developed the first systematic axiomatization of [set theory](#). This achievement drew attention to the importance of the [axiom](#) of choice.

Recommended Reading:
Gregory H. Moore, Zermelo' s Axiom of Choice: Its Origins, Development, and Influence (Springer Verlag 1988).

[[A Dictionary of Philosophical Terms and Names](#)]

11-06-2002

Zermelo Fraenkel set theory

<[mathematics](#)> A [set theory](#) with the [axioms](#) of [Zermelo set theory](#) (Extensionality, Union, Pair-set, Foundation, Restriction, Infinity, Power-set) plus the Replacement [axiom schema](#):

If $F(x,y)$ is a [formula](#) such that for any x , there is a unique y making F true, and X is a set, then $F x : x \text{ in } X$ is a set. In other words, if you do something to each element of a set, the result is a set.

An important but controversial [axiom](#) which is NOT part of ZF theory is the [Axiom of Choice](#).

[[FOLDOP](#)]

16-03-2001

Zermelo set theory

<[mathematics](#)> A [set theory](#) with the following set of [axioms](#):

Extensionality: two sets are equal if and only if they have the same elements.

Union: If U is a set, so is the union of all its elements.

Pair-set: If a and b are sets, so is $\{a, b\}$.

Foundation: Every set contains a set disjoint from itself.

Comprehension (or Restriction): If P is a [formula](#) with one [free variable](#) and X a set then $\{x : x \text{ is in } X \text{ and } P(x) \text{ is a set}\}$ is a set.

Infinity: There exists an [infinite set](#).

Power-set: If X is a set, so is its [power set](#).

Zermelo set theory avoids Russell' s paradox by excluding sets of elements with arbitrary properties- the Comprehension axiom only allows a property to be used to select elements of an existing set.

Zermelo Fraenkel set theory adds the Replacement axiom.

[\[FOLDOC\]](#)

16-03-2001

zombie

<[philosophy of mind](#), [philosophy of AI](#)> <[science-fiction](#), [computing machines](#), [artificial intelligence](#)> in contemporary discussions of the [philosophy of mind](#), a hypothetical being whose appearance, behavior, and speech is indistinguishable from that of a normal human being despite its total lack of conscious experience in any form.

Recommended Reading:

Daniel C. Dennett, *Consciousness Explained* (Little, Brown, 1992)

The Nature of Consciousness: Philosophical Debates, ed. by Ned Block and Owen Flanagan (MIT, 1997).

[\[A Dictionary of Philosophical Terms and Names\]](#)

11-06-2002

Zubiri Xavier Apalátegui

Xavier Zubiri Apalátegui (1898-1983) was born in San Sebastian in the Basque country and studied philosophy and theology in Madrid, Louvain, Freiburg, Brigovia and Rome. He met Ortega y Gasset in 1919: it was an important event for his education, as Ortega introduced him to all the main currents of contemporary European philosophy, in particular to the Husserl's phenomenology. Ortega was also the supervisor of his doctoral thesis, entitled *Ensayo de una teoría fenomenológica del juicio*.

He taught History of philosophy at the University of Madrid from 1926 to the outbreak of Civil War (1936). After he was for a short time at the University of Barcelona, in 1941 he went back to Madrid to give cycles of private lectures. The genesis of his oeuvre can be only partially reconstructed thanks to his lecture notes and the articles he published in several reviews, because a huge amount of notes and works he developed during his life were published only after his death.

His extremely complex ontology aims at discovering what reality is grounded on: Zubiri claims that it is not the being the ground of reality, as it is commonly believed, but that it is reality what is primary and grounds the being. It is not naive realism, because our apprehensions and things-in-themselves, which is the task of philosophy to investigate, are not confused. Zubiri's anthropology aims at showing the deep unity of reality, expressed by the formula "sensible intelligence". Zubiri's interest extends to all the great problems of classical, modern and contemporary philosophy and it provides an absolutely original view of philosophy.

Primary sources:

Socrates and greek Wisdom. Translated by R.S. Willis, Jr. The Thomist. Washington 1944. pp. 1-64.

The origin of man. Translated by A. Robert Caponigri, with an Introduction. University of Notre Dame. Indiana-USA 1967.

On Essence. Translation and Introduction (pp.13-37) by A. Robert Caponigri. The Catholic University of America Press. Washington, D.C. 1980.

Nature, History, God. Translation and Introduction by Thomas B. Fowler Jr., University Press of America. Washington D.C. 1981.

*Sentient Intelligence: Intelligence and Reality**. *Intelligence and Logos***. *Intelligence and Reason****, Translated by Thomas B. Fowler.

Dynamic Structure of Reality, Traducida y anotada por Nelson R. Orringer, University of Illinois Press, Urbana y Chicago, 2003.

Secondary sources:

Rafael Lazcano, *Panorama bibliográfico de Javier Zubiri* (1993)

Web-bibliography: www.zubiri.org

Sandro Borzoni

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