

ABSTRACTION

Abstraction is a technique for managing complexity. It works by suppressing the more complex details below the current level of abstraction. details may be abstracted away, (information hiding) leaving just the definition or programmer interface (the what as opposed to the how).

Abstraction in computing has evolved on many levels and has been going on ever since those first "virtual machines" which led to the "FOR-TRAN machines" and other high-level, automatic coding systems. It has been going on since the first COBOL compiler modeled an abstract machine that understood English like commands and worked with data files. After all, a computer is a nice little gadget, but it is not exactly a machine, in the sense of doing anything useful, without appropriate software. In that sense, any software provides the computer user with a machine abstraction and, indeed, it has been so taken over the years. Thus, programming languages and their processors become abstract, high-level, even programmer-friendly, "computers," which may be used without regard for such machine-level clerical details as keeping track of memory locations, program instruction counters, etc.

Even the evolution of programming languages has followed a course of continuing abstraction of these languages and systems away from the level of the machine and towards the level of the human user.].

Abstraction can apply to control or to data: Control abstraction is the abstraction of program operations while data abstraction is that of data structures.

Control abstraction involves the use of subprograms like functions

Data abstraction allows for the organizing of data in meaningful ways. This includes the notion of a datatype. Data-level abstractions include data types, which are generally built into the language and abstract data types. An abstract data type facility may be used to implement data structures as true user-defined data types by hiding the details of the implementation (the how) behind the wall of a user interface (the what). In the object-oriented programming paradigm, the object is a data abstraction. The data models of database management systems are data-level abstractions as are the models for knowledge representation in artificial intelligence applications.

an object as a way to combine abstractions of data and code.

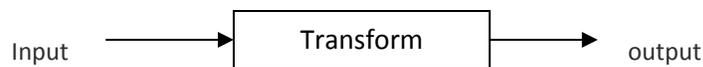


Figure The Black Box model