

A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). Programmers typically use high-level programming languages that are more easily intelligible to humans than machine code, which is directly executed by the central processing unit. Various visual programming languages have also been developed with the intent to resolve readability concerns by adopting non-traditional approaches to code structure and display. High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware. Expert programmers are familiar with a variety of well-established algorithms and their respective complexities and use this knowledge to choose algorithms that are best suited to the circumstances. The choice of language used is subject to many considerations, such as company policy, suitability to task, availability of third-party packages, or individual preference. Trade-offs from this ideal involve finding enough programmers who know the language to build a team, the availability of compilers for that language, and the efficiency with which programs written in a given language execute. As early as the 9th century, a programmable music sequencer was invented by the Persian Banu Musa brothers, who described an automated mechanical flute player in the Book of Ingenious Devices. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. New languages are generally designed around the syntax of a prior language with new functionality added, (for example C++ adds object-orientation to C, and Java adds memory management and bytecode to C++, but as a result, loses efficiency and the ability for low-level manipulation). For this purpose, algorithms are classified into orders using so-called Big O notation, which expresses resource use, such as execution time or memory consumption, in terms of the size of an input. High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware. For example, when a bug in a compiler can make it crash when parsing some large source file, a simplification of the test case that results in only few lines from the original source file can be sufficient to reproduce the same crash. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. Programmable devices have existed for centuries. A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it. Some of these factors include: The presentation aspects of this (such as indents, line breaks, color highlighting, and so on) are often handled by the source code editor, but the content aspects reflect the programmer's talent and skills. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. Provided the functions in a library follow the appropriate run-time conventions (e.g., method of passing arguments), then these functions may be written in any other language. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. Also, specific user environment and usage history can make it difficult to reproduce the problem. Whatever the approach to development may be, the final program must satisfy some fundamental properties. Programming languages are essential for software development. Ideally, the programming language best suited for the task at hand will be selected. They are the building blocks for all software, from the simplest applications to the most sophisticated ones.