

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. Compilers harnessed the power of computers to make programming easier by allowing programmers to specify calculations by entering a formula using infix notation. Computer programmers are those who write computer software. 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. Programming languages are essential for software development. The first computer program is generally dated to 1843, when mathematician Ada Lovelace published an algorithm to calculate a sequence of Bernoulli numbers, intended to be carried out by Charles Babbage's Analytical Engine. 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. Allen Downey, in his book *How To Think Like A Computer Scientist*, writes: Many computer languages provide a mechanism to call functions provided by shared libraries. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. Debugging is a very important task in the software development process since having defects in a program can have significant consequences for its users. Popular modeling techniques include Object-Oriented Analysis and Design (OOAD) and Model-Driven Architecture (MDA). However, because an assembly language is little more than a different notation for a machine language, two machines with different instruction sets also have different assembly languages. Normally the first step in debugging is to attempt to reproduce the problem. The following properties are among the most important: In computer programming, readability refers to the ease with which a human reader can comprehend the purpose, control flow, and operation of source code. Ideally, the programming language best suited for the task at hand will be selected. Scripting and breakpointing is also part of this process. One approach popular for requirements analysis is Use Case analysis. Normally the first step in debugging is to attempt to reproduce the problem. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. 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*. However, with the concept of the stored-program computer introduced in 1949, both programs and data were stored and manipulated in the same way in computer memory. 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. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA.