

Debugging is often done with IDEs. Standalone debuggers like GDB are also used, and these often provide less of a visual environment, usually using a command line. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. 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. 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. Unreadable code often leads to bugs, inefficiencies, and duplicated code. Sometimes software development is known as software engineering, especially when it employs formal methods or follows an engineering design process. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA. 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. Trial-and-error/divide-and-conquer is needed: the programmer will try to remove some parts of the original test case and check if the problem still exists. 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. Some languages are more prone to some kinds of faults because their specification does not require compilers to perform as much checking as other languages. Some text editors such as Emacs allow GDB to be invoked through them, to provide a visual environment. 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. FORTRAN, the first widely used high-level language to have a functional implementation, came out in 1957, and many other languages were soon developed—in particular, COBOL aimed at commercial data processing, and Lisp for computer research. Programming languages are essential for software development. 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. This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. It is usually easier to code in "high-level" languages than in "low-level" ones. 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. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. One approach popular for requirements analysis is Use Case analysis. Some languages are more prone to some kinds of faults because their specification does not require compilers to perform as much checking as other languages. However, readability is more than just programming style. 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.