

The first step in most formal software development processes is requirements analysis, followed by testing to determine value modeling, implementation, and failure elimination (debugging). The first compiler related tool, the A-0 System, was developed in 1952 by Grace Hopper, who also coined the term 'compiler'. One approach popular for requirements analysis is Use Case analysis. These compiled languages allow the programmer to write programs in terms that are syntactically richer, and more capable of abstracting the code, making it easy to target varying machine instruction sets via compilation declarations and heuristics. Readability is important because programmers spend the majority of their time reading, trying to understand, reusing and modifying existing source code, rather than writing new source code. Text editors were also developed that allowed changes and corrections to be made much more easily than with punched cards. Whatever the approach to development may be, the final program must satisfy some fundamental properties. Unreadable code often leads to bugs, inefficiencies, and duplicated code. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. 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. The first compiler related tool, the A-0 System, was developed in 1952 by Grace Hopper, who also coined the term 'compiler'. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. It is usually easier to code in "high-level" languages than in "low-level" ones. 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. Integrated development environments (IDEs) aim to integrate all such help. 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. The academic field and the engineering practice of computer programming are both largely concerned with discovering and implementing the most efficient algorithms for a given class of problems. Code-breaking algorithms have also existed for centuries. 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. Debugging is a very important task in the software development process since having defects in a program can have significant consequences for its users. 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. It is very difficult to determine what are the most popular modern programming languages. Also, specific user environment and usage history can make it difficult to reproduce the problem.