

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. Whatever the approach to development may be, the final program must satisfy some fundamental properties. 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. 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. Following a consistent programming style often helps readability. They are the building blocks for all software, from the simplest applications to the most sophisticated ones. Some text editors such as Emacs allow GDB to be invoked through them, to provide a visual environment. It involves designing and implementing algorithms, step-by-step specifications of procedures, by writing code in one or more programming languages. 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. Following a consistent programming style often helps readability. 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. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. 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. 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. Auxiliary tasks accompanying and related to programming include analyzing requirements, testing, debugging (investigating and fixing problems), implementation of build systems, and management of derived artifacts, such as programs' machine code. 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. Scripting and breakpointing is also part of this process. A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it. 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. The first step in most formal software development processes is requirements analysis, followed by testing to determine value modeling, implementation, and failure elimination (debugging). For example, COBOL is still strong in corporate data centers often on large mainframe computers, Fortran in engineering applications, scripting languages in Web development, and C in embedded software. This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. Implementation techniques include imperative languages (object-oriented or procedural), functional languages, and logic languages.