

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. It involves designing and implementing algorithms, step-by-step specifications of procedures, by writing code in one or more programming languages. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. While these are sometimes considered programming, often the term software development is used for this larger overall process – with the terms programming, implementation, and coding reserved for the writing and editing of code per se. Proficient programming usually requires expertise in several different subjects, including knowledge of the application domain, details of programming languages and generic code libraries, specialized algorithms, and formal logic. There exist a lot of different approaches for each of those tasks. 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, 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. Different programming languages support different styles of programming (called programming paradigms). Ideally, the programming language best suited for the task at hand will be selected. 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. This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. In 1206, the Arab engineer Al-Jazari invented a programmable drum machine where a musical mechanical automaton could be made to play different rhythms and drum patterns, via pegs and cams. 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. Following a consistent programming style often helps readability. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. 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. Following a consistent programming style often helps readability. Following a consistent programming style often helps readability. Ideally, the programming language best suited for the task at hand will be selected. Proficient programming usually requires expertise in several different subjects, including knowledge of the application domain, details of programming languages and generic code libraries, specialized algorithms, and formal logic. 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. However, readability is more than just programming style. 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. 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.