

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. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. Programming languages are essential for software development. 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. 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. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. There exist a lot of different approaches for each of those tasks. 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. 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. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. Various visual programming languages have also been developed with the intent to resolve readability concerns by adopting non-traditional approaches to code structure and display. Whatever the approach to development may be, the final program must satisfy some fundamental properties. 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. Debugging is a very important task in the software development process since having defects in a program can have significant consequences for its users. He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). 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. Text editors were also developed that allowed changes and corrections to be made much more easily than with punched cards. 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. He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm. Use of a static code analysis tool can help detect some possible problems. 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. 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. Some text editors such as Emacs allow GDB to be invoked through them, to provide a visual environment.