

There exist a lot of different approaches for each of those tasks. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it. Ideally, the programming language best suited for the task at hand will be selected. 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. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them. Computer programmers are those who write computer software. 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. Different programming languages support different styles of programming (called programming paradigms). 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. Later a control panel (plug board) added to his 1906 Type I Tabulator allowed it to be programmed for different jobs, and by the late 1940s, unit record equipment such as the IBM 602 and IBM 604, were programmed by control panels in a similar way, as were the first electronic computers. Their jobs usually involve: Although programming has been presented in the media as a somewhat mathematical subject, some research shows that good programmers have strong skills in natural human languages, and that learning to code is similar to learning a foreign language. 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. In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them. Implementation techniques include imperative languages (object-oriented or procedural), functional languages, and logic languages. 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. This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. Computer programmers are those who write computer software. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. There exist a lot of different approaches for each of those tasks. However, Charles Babbage had already written his first program for the Analytical Engine in 1837. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. 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. Unreadable code often leads to bugs, inefficiencies, and duplicated code.