

Computer programmers are those who write computer software. This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. Techniques like Code refactoring can enhance readability. Also, specific user environment and usage history can make it difficult to reproduce the problem. In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them.

Trial-and-error/divide-and-conquer is needed: the programmer will try to remove some parts of the original test case and check if the problem still exists. 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. Also, specific user environment and usage history can make it difficult to reproduce the problem. It affects the aspects of quality above, including portability, usability and most importantly maintainability. 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. However, readability is more than just programming style. However, Charles Babbage had already written his first program for the Analytical Engine in 1837. Languages form an approximate spectrum from "low-level" to "high-level"; "low-level" languages are typically more machine-oriented and faster to execute, whereas "high-level" languages are more abstract and easier to use but execute less quickly. Programmable devices have existed for centuries. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. Many applications use a mix of several languages in their construction and use. High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in *A Manuscript on Deciphering Cryptographic Messages*. Code-breaking algorithms have also existed for centuries. The choice of language used is subject to many considerations, such as company policy, suitability to task, availability of third-party packages, or individual preference. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. Text editors were also developed that allowed changes and corrections to be made much more easily than with punched cards. 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. In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them.