

Programming languages are essential for software development. It involves designing and implementing algorithms, step-by-step specifications of procedures, by writing code in one or more programming languages. Implementation techniques include imperative languages (object-oriented or procedural), functional languages, and logic languages. Computer programmers are those who write computer software. The first step in most formal software development processes is requirements analysis, followed by testing to determine value modeling, implementation, and failure elimination (debugging). Scripting and breakpointing is also part of this process. Programming languages are essential for software development. Computer programmers are those who write computer software. For this purpose, algorithms are classified into orders using so-called Big O notation, which expresses resource use, such as execution time or memory consumption, in terms of the size of an input. In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them. 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. However, readability is more than just programming style. It involves designing and implementing algorithms, step-by-step specifications of procedures, by writing code in one or more programming languages. 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. 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. 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. A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it. Computer programmers are those who write computer software. When debugging the problem in a GUI, the programmer can try to skip some user interaction from the original problem description and check if remaining actions are sufficient for bugs to appear. 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 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. Debugging is often done with IDEs. Standalone debuggers like GDB are also used, and these often provide less of a visual environment, usually using a command line. However, Charles Babbage had already written his first program for the Analytical Engine in 1837. Scripting and breakpointing is also part of this process. By the late 1960s, data storage devices and computer terminals became inexpensive enough that programs could be created by typing directly into the computers.