

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. It affects the aspects of quality above, including portability, usability and most importantly maintainability. 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. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. It is usually easier to code in "high-level" languages than in "low-level" ones. 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. 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. 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. 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. Different programming languages support different styles of programming (called programming paradigms). These compiled languages allow the programmer to write programs in terms that are syntactically richer, and more capable of abstracting the code, making it easy to target varying machine instruction sets via compilation declarations and heuristics. Assembly languages were soon developed that let the programmer specify instruction in a text format (e.g., ADD X, TOTAL), with abbreviations for each operation code and meaningful names for specifying addresses. 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. 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. 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. Also, specific user environment and usage history can make it difficult to reproduce the problem. Programming languages are essential for software development. There are many approaches to the Software development process. In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them. Some text editors such as Emacs allow GDB to be invoked through them, to provide a visual environment. Whatever the approach to development may be, the final program must satisfy some fundamental properties. It is usually easier to code in "high-level" languages than in "low-level" ones. Unreadable code often leads to bugs, inefficiencies, and duplicated code.