

After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. Techniques like Code refactoring can enhance readability. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. 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. Some text editors such as Emacs allow GDB to be invoked through them, to provide a visual environment. In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them. However, Charles Babbage had already written his first program for the Analytical Engine in 1837. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. Compilers harnessed the power of computers to make programming easier by allowing programmers to specify calculations by entering a formula using infix notation. 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. 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. Also, specific user environment and usage history can make it difficult to reproduce the problem. Many applications use a mix of several languages in their construction and use. Debugging is a very important task in the software development process since having defects in a program can have significant consequences for its users. 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. Unreadable code often leads to bugs, inefficiencies, and duplicated code. 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). Programmable devices have existed for centuries. Provided the functions in a library follow the appropriate run-time conventions (e.g., method of passing arguments), then these functions may be written in any other language. Programs were mostly entered using punched cards or paper tape. 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.