

By the late 1960s, data storage devices and computer terminals became inexpensive enough that programs could be created by typing directly into the computers. 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. Use of a static code analysis tool can help detect some possible problems. 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. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. However, Charles Babbage had already written his first program for the Analytical Engine in 1837. Ideally, the programming language best suited for the task at hand will be selected. In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them. Sometimes software development is known as software engineering, especially when it employs formal methods or follows an engineering design process. They are the building blocks for all software, from the simplest applications to the most sophisticated ones. Integrated development environments (IDEs) aim to integrate all such help. This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it. 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. Following a consistent programming style often helps readability. However, with the concept of the stored-program computer introduced in 1949, both programs and data were stored and manipulated in the same way in computer memory. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. Debugging is a very important task in the software development process since having defects in a program can have significant consequences for its users. Different programming languages support different styles of programming (called programming paradigms). There exist a lot of different approaches for each of those tasks. Scripting and breakpointing is also part of this process. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. Unreadable code often leads to bugs, inefficiencies, and duplicated code. Normally the first step in debugging is to attempt to reproduce the problem.