

The first step in most formal software development processes is requirements analysis, followed by testing to determine value modeling, implementation, and failure elimination (debugging). Following a consistent programming style often helps readability. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. Their jobs usually involve: Although programming has been presented in the media as a somewhat mathematical subject, some research shows that good programmers have strong skills in natural human languages, and that learning to code is similar to learning a foreign language. Whatever the approach to development may be, the final program must satisfy some fundamental properties. They are the building blocks for all software, from the simplest applications to the most sophisticated ones. 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. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. New languages are generally designed around the syntax of a prior language with new functionality added, (for example C++ adds object-orientation to C, and Java adds memory management and bytecode to C++, but as a result, loses efficiency and the ability for low-level manipulation). FORTRAN, the first widely used high-level language to have a functional implementation, came out in 1957, and many other languages were soon developed—in particular, COBOL aimed at commercial data processing, and Lisp for computer research. It is usually easier to code in "high-level" languages than in "low-level" ones. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. For example, when a bug in a compiler can make it crash when parsing some large source file, a simplification of the test case that results in only few lines from the original source file can be sufficient to reproduce the same crash. In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them. 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. Debugging is a very important task in the software development process since having defects in a program can have significant consequences for its users. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. By the late 1960s, data storage devices and computer terminals became inexpensive enough that programs could be created by typing directly into the computers. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. 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. Sometimes software development is known as software engineering, especially when it employs formal methods or follows an engineering design process. Ideally, the programming language best suited for the task at hand will be selected. Techniques like Code refactoring can enhance readability. 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.