

They are the building blocks for all software, from the simplest applications to the most sophisticated ones. 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. It is usually easier to code in "high-level" languages than in "low-level" ones. A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it. Following a consistent programming style often helps readability. Unreadable code often leads to bugs, inefficiencies, and duplicated code. Whatever the approach to development may be, the final program must satisfy some fundamental properties. 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. It involves designing and implementing algorithms, step-by-step specifications of procedures, by writing code in one or more programming languages. There exist a lot of different approaches for each of those tasks. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. Expert programmers are familiar with a variety of well-established algorithms and their respective complexities and use this knowledge to choose algorithms that are best suited to the circumstances. 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. 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. Computer programmers are those who write computer software. It affects the aspects of quality above, including portability, usability and most importantly maintainability. Popular modeling techniques include Object-Oriented Analysis and Design (OOAD) and Model-Driven Architecture (MDA). The first step in most formal software development processes is requirements analysis, followed by testing to determine value modeling, implementation, and failure elimination (debugging). Programming languages are essential for software development. Auxiliary tasks accompanying and related to programming include analyzing requirements, testing, debugging (investigating and fixing problems), implementation of build systems, and management of derived artifacts, such as programs' machine code. 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. 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. 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.