

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. 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. Use of a static code analysis tool can help detect some possible problems. 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. 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. Sometimes software development is known as software engineering, especially when it employs formal methods or follows an engineering design process. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. 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). One approach popular for requirements analysis is Use Case analysis. A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it. Later a control panel (plug board) added to his 1906 Type I Tabulator allowed it to be programmed for different jobs, and by the late 1940s, unit record equipment such as the IBM 602 and IBM 604, were programmed by control panels in a similar way, as were the first electronic computers. However, readability is more than just programming style. It is usually easier to code in "high-level" languages than in "low-level" ones. Following a consistent programming style often helps readability. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA. Different programming languages support different styles of programming (called programming paradigms). Some languages are more prone to some kinds of faults because their specification does not require compilers to perform as much checking as other languages. 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. Sometimes software development is known as software engineering, especially when it employs formal methods or follows an engineering design process. 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. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. 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). 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 programmers are those who write computer software.