

Many programmers use forms of Agile software development where the various stages of formal software development are more integrated together into short cycles that take a few weeks rather than years. 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. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. Debugging is a very important task in the software development process since having defects in a program can have significant consequences for its users. Integrated development environments (IDEs) aim to integrate all such help. Unreadable code often leads to bugs, inefficiencies, and duplicated code. 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. 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. 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. Some text editors such as Emacs allow GDB to be invoked through them, to provide a visual environment. 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. Methods of measuring programming language popularity include: counting the number of job advertisements that mention the language, the number of books sold and courses teaching the language (this overestimates the importance of newer languages), and estimates of the number of existing lines of code written in the language (this underestimates the number of users of business languages such as COBOL). Techniques like Code refactoring can enhance readability. 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. However, because an assembly language is little more than a different notation for a machine language, two machines with different instruction sets also have different assembly languages. Whatever the approach to development may be, the final program must satisfy some fundamental properties. 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. 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. Programmable devices have existed for centuries. They are the building blocks for all software, from the simplest applications to the most sophisticated ones. Also, specific user environment and usage history can make it difficult to reproduce the problem. Trial-and-error/divide-and-conquer is needed: the programmer will try to remove some parts of the original test case and check if the problem still exists. 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. 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.