

Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. It is very difficult to determine what are the most popular modern programming languages. 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. Text editors were also developed that allowed changes and corrections to be made much more easily than with punched cards. Techniques like Code refactoring can enhance readability. Different programming languages support different styles of programming (called programming paradigms). Ideally, the programming language best suited for the task at hand will be selected. 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 a few lines from the original source file can be sufficient to reproduce the same crash. Normally the first step in debugging is to attempt to reproduce the problem. Unreadable code often leads to bugs, inefficiencies, and duplicated code. Programs were mostly entered using punched cards or paper tape. A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. Programmers typically use high-level programming languages that are more easily intelligible to humans than machine code, which is directly executed by the central processing unit. However, readability is more than just programming style. Normally the first step in debugging is to attempt to reproduce the problem. Many applications use a mix of several languages in their construction and use. This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. 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. The following properties are among the most important: In computer programming, readability refers to the ease with which a human reader can comprehend the purpose, control flow, and operation of source code. There exist a lot of different approaches for each of those tasks. Various visual programming languages have also been developed with the intent to resolve readability concerns by adopting non-traditional approaches to code structure and display. 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. 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. Popular modeling techniques include Object-Oriented Analysis and Design (OOAD) and Model-Driven Architecture (MDA).