

Sometimes software development is known as software engineering, especially when it employs formal methods or follows an engineering design process. 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. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA. Ideally, the programming language best suited for the task at hand will be selected. It is very difficult to determine what are the most popular modern programming languages. This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. Computer programmers are those who write computer software. 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. 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). Scripting and breakpointing is also part of this process. 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). However, with the concept of the stored-program computer introduced in 1949, both programs and data were stored and manipulated in the same way in computer memory. One approach popular for requirements analysis is Use Case analysis. 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. 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. Also, specific user environment and usage history can make it difficult to reproduce the problem. Unreadable code often leads to bugs, inefficiencies, and duplicated code. 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. Whatever the approach to development may be, the final program must satisfy some fundamental properties. 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. Text editors were also developed that allowed changes and corrections to be made much more easily than with punched cards. However, readability is more than just programming style. Provided the functions in a library follow the appropriate run-time conventions (e.g., method of passing arguments), then these functions may be written in any other language. One approach popular for requirements analysis is Use Case analysis.