

After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. One approach popular for requirements analysis is Use Case analysis. 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. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. Debugging is a very important task in the software development process since having defects in a program can have significant consequences for its users. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA. 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. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). Some of these factors include: The presentation aspects of this (such as indents, line breaks, color highlighting, and so on) are often handled by the source code editor, but the content aspects reflect the programmer's talent and skills. 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. Trade-offs from this ideal involve finding enough programmers who know the language to build a team, the availability of compilers for that language, and the efficiency with which programs written in a given language execute. 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 choice of language used is subject to many considerations, such as company policy, suitability to task, availability of third-party packages, or individual preference. It is usually easier to code in "high-level" languages than in "low-level" ones. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. Allen Downey, in his book *How To Think Like A Computer Scientist*, writes: Many computer languages provide a mechanism to call functions provided by shared libraries. Programmable devices have existed for centuries. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. It is usually easier to code in "high-level" languages than in "low-level" ones. One approach popular for requirements analysis is Use Case analysis. Normally the first step in debugging is to attempt to reproduce the problem. 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. 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. 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. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation.