

In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them. 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. For example, COBOL is still strong in corporate data centers often on large mainframe computers, Fortran in engineering applications, scripting languages in Web development, and C in embedded software. 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. 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. 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. Implementation techniques include imperative languages (object-oriented or procedural), functional languages, and logic languages. Assembly languages were soon developed that let the programmer specify instruction in a text format (e.g., ADD X, TOTAL), with abbreviations for each operation code and meaningful names for specifying addresses. 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. 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. Readability is important because programmers spend the majority of their time reading, trying to understand, reusing and modifying existing source code, rather than writing new source code. Compilers harnessed the power of computers to make programming easier by allowing programmers to specify calculations by entering a formula using infix notation. 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. Sometimes software development is known as software engineering, especially when it employs formal methods or follows an engineering design process. The first step in most formal software development processes is requirements analysis, followed by testing to determine value modeling, implementation, and failure elimination (debugging). Techniques like Code refactoring can enhance readability. Programmable devices have existed for centuries. 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. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. Popular modeling techniques include Object-Oriented Analysis and Design (OOAD) and Model-Driven Architecture (MDA). Readability is important because programmers spend the majority of their time reading, trying to understand, reusing and modifying existing source code, rather than writing new source code. Many applications use a mix of several languages in their construction and use. Computer programmers are those who write computer software. A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it.