

However, readability is more than just programming style. Debugging is a very important task in the software development process since having defects in a program can have significant consequences for its users. Code-breaking algorithms have also existed for centuries. 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). A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it. 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. 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. Text editors were also developed that allowed changes and corrections to be made much more easily than with punched cards. Sometimes software development is known as software engineering, especially when it employs formal methods or follows an engineering design process. Normally the first step in debugging is to attempt to reproduce the problem. High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). Compilers harnessed the power of computers to make programming easier by allowing programmers to specify calculations by entering a formula using infix notation. One approach popular for requirements analysis is Use Case analysis. 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. Whatever the approach to development may be, the final program must satisfy some fundamental properties. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. These compiled languages allow the programmer to write programs in terms that are syntactically richer, and more capable of abstracting the code, making it easy to target varying machine instruction sets via compilation declarations and heuristics. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. Proficient programming usually requires expertise in several different subjects, including knowledge of the application domain, details of programming languages and generic code libraries, specialized algorithms, and formal logic. While these are sometimes considered programming, often the term software development is used for this larger overall process – with the terms programming, implementation, and coding reserved for the writing and editing of code per se. Scripting and breakpointing is also part of this process. It is usually easier to code in "high-level" languages than in "low-level" ones. 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. However, readability is more than just programming style.