

Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. Use of a static code analysis tool can help detect some possible problems. Code-breaking algorithms have also existed for centuries. Debugging is a very important task in the software development process since having defects in a program can have significant consequences for its users. Unreadable code often leads to bugs, inefficiencies, and duplicated code. Techniques like Code refactoring can enhance readability. 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. 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. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. 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. However, readability is more than just programming style. 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. 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. However, Charles Babbage had already written his first program for the Analytical Engine in 1837. Popular modeling techniques include Object-Oriented Analysis and Design (OOAD) and Model-Driven Architecture (MDA). 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. It is usually easier to code in "high-level" languages than in "low-level" ones. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. However, readability is more than just programming style. It affects the aspects of quality above, including portability, usability and most importantly maintainability. He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm. 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. For this purpose, algorithms are classified into orders using so-called Big O notation, which expresses resource use, such as execution time or memory consumption, in terms of the size of an input. 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. Also, specific user environment and usage history can make it difficult to reproduce the problem.