

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. Code-breaking algorithms have also existed for centuries. 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. 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. Unreadable code often leads to bugs, inefficiencies, and duplicated code. Many applications use a mix of several languages in their construction and use. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in *A Manuscript on Deciphering Cryptographic Messages*. 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. In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. 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. However, Charles Babbage had already written his first program for the Analytical Engine in 1837. Their jobs usually involve: Although programming has been presented in the media as a somewhat mathematical subject, some research shows that good programmers have strong skills in natural human languages, and that learning to code is similar to learning a foreign language. 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. 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. 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. Computer programmers are those who write computer software. It involves designing and implementing algorithms, step-by-step specifications of procedures, by writing code in one or more programming languages. He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm. 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. It involves designing and implementing algorithms, step-by-step specifications of procedures, by writing code in one or more programming languages. Computer programmers are those who write computer software. He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm. 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.