

Ideally, the programming language best suited for the task at hand will be selected. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. Techniques like Code refactoring can enhance readability. 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. The first computer program is generally dated to 1843, when mathematician Ada Lovelace published an algorithm to calculate a sequence of Bernoulli numbers, intended to be carried out by Charles Babbage's Analytical Engine. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. Scripting and breakpointing is also part of this process. Different programming languages support different styles of programming (called programming paradigms). Implementation techniques include imperative languages (object-oriented or procedural), functional languages, and logic languages. 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. It is very difficult to determine what are the most popular modern programming languages. 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. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. The first computer program is generally dated to 1843, when mathematician Ada Lovelace published an algorithm to calculate a sequence of Bernoulli numbers, intended to be carried out by Charles Babbage's Analytical Engine. Also, specific user environment and usage history can make it difficult to reproduce the problem. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. Languages form an approximate spectrum from "low-level" to "high-level"; "low-level" languages are typically more machine-oriented and faster to execute, whereas "high-level" languages are more abstract and easier to use but execute less quickly. 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). 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. Implementation techniques include imperative languages (object-oriented or procedural), functional languages, and logic languages. However, Charles Babbage had already written his first program for the Analytical Engine in 1837. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. 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. 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. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages.