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. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. It is usually easier to code in "high-level" languages than in "low-level" ones. Computer programmers are those who write computer software. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. Whatever the approach to development may be, the final program must satisfy some fundamental properties.

Trial-and-error/divide-and-conquer is needed: the programmer will try to remove some parts of the original test case and check if the problem still exists. However, readability is more than just programming style. 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. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. 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. 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. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. Programming languages are essential for software development. Different programming languages support different styles of programming (called programming paradigms). 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 applications use a mix of several languages in their construction and use. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. Debugging is a very important task in the software development process since having defects in a program can have significant consequences for its users. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. 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). 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. Ideally, the programming language best suited for the task at hand will be selected. Different programming languages support different styles of programming (called programming paradigms).