

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. 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. Programming languages are essential for software development. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. Normally the first step in debugging is to attempt to reproduce the problem. 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. Techniques like Code refactoring can enhance readability. The academic field and the engineering practice of computer programming are both largely concerned with discovering and implementing the most efficient algorithms for a given class of problems. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. Code-breaking algorithms have also existed for centuries. There are many approaches to the Software development process. Debugging is a very important task in the software development process since having defects in a program can have significant consequences for its users. There exist a lot of different approaches for each of those tasks. The first compiler related tool, the A-0 System, was developed in 1952 by Grace Hopper, who also coined the term 'compiler'. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. 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. 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. Also, specific user environment and usage history can make it difficult to reproduce the problem. 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. 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. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA. 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. 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. 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.