

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. One approach popular for requirements analysis is Use Case analysis. Unreadable code often leads to bugs, inefficiencies, and duplicated code. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. Programs were mostly entered using punched cards or paper tape. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA. High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware. 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). Normally the first step in debugging is to attempt to reproduce the problem. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. Integrated development environments (IDEs) aim to integrate all such help. Assembly languages were soon developed that let the programmer specify instruction in a text format (e.g., ADD X, TOTAL), with abbreviations for each operation code and meaningful names for specifying addresses. 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. 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. 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. Programming languages are essential for software development. Later a control panel (plug board) added to his 1906 Type I Tabulator allowed it to be programmed for different jobs, and by the late 1940s, unit record equipment such as the IBM 602 and IBM 604, were programmed by control panels in a similar way, as were the first electronic computers. 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. Later a control panel (plug board) added to his 1906 Type I Tabulator allowed it to be programmed for different jobs, and by the late 1940s, unit record equipment such as the IBM 602 and IBM 604, were programmed by control panels in a similar way, as were the first electronic computers. Techniques like Code refactoring can enhance readability. 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. 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. One approach popular for requirements analysis is Use Case analysis. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications.