

One approach popular for requirements analysis is Use Case analysis. 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.

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. A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it. Various visual programming languages have also been developed with the intent to resolve readability concerns by adopting non-traditional approaches to code structure and display. 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. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it. 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. A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it. Compilers harnessed the power of computers to make programming easier by allowing programmers to specify calculations by entering a formula using infix notation. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. It involves designing and implementing algorithms, step-by-step specifications of procedures, by writing code in one or more programming languages. 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. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. 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. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. 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. Code-breaking algorithms have also existed for centuries. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. However, Charles Babbage had already written his first program for the Analytical Engine in 1837. Integrated development environments (IDEs) aim to integrate all such help. For example, COBOL is still strong in corporate data centers often on large mainframe computers, Fortran in engineering applications, scripting languages in Web development, and C in embedded software. Use of a static code analysis tool can help detect some possible problems. Also, specific user environment and usage history can make it difficult to reproduce the problem.