

Computer programmers are those who write computer software. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. Ideally, the programming language best suited for the task at hand will be selected. A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it. A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it. Following a consistent programming style often helps readability. It affects the aspects of quality above, including portability, usability and most importantly maintainability. Compilers harnessed the power of computers to make programming easier by allowing programmers to specify calculations by entering a formula using infix notation. This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm. 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. 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. There are many approaches to the Software development process. Computer programmers are those who write computer software. Debugging is often done with IDEs. Standalone debuggers like GDB are also used, and these often provide less of a visual environment, usually using a command line. Integrated development environments (IDEs) aim to integrate all such help. 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. 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. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. By the late 1960s, data storage devices and computer terminals became inexpensive enough that programs could be created by typing directly into the computers. 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. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). Whatever the approach to development may be, the final program must satisfy some fundamental properties. Popular modeling techniques include Object-Oriented Analysis and Design (OOAD) and Model-Driven Architecture (MDA). 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.