

Text editors were also developed that allowed changes and corrections to be made much more easily than with punched cards. The first compiler related tool, the A-0 System, was developed in 1952 by Grace Hopper, who also coined the term 'compiler'. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. 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. Debugging is a very important task in the software development process since having defects in a program can have significant consequences for its users. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). Following a consistent programming style often helps readability. 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. 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. New languages are generally designed around the syntax of a prior language with new functionality added, (for example C++ adds object-orientation to C, and Java adds memory management and bytecode to C++, but as a result, loses efficiency and the ability for low-level manipulation). Many programmers use forms of Agile software development where the various stages of formal software development are more integrated together into short cycles that take a few weeks rather than years. It affects the aspects of quality above, including portability, usability and most importantly maintainability. He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm. It is very difficult to determine what are the most popular modern programming languages. Programmable devices have existed for centuries. It is very difficult to determine what are the most popular modern programming languages. Code-breaking algorithms have also existed for centuries. 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. It is usually easier to code in "high-level" languages than in "low-level" ones. In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them. 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. However, with the concept of the stored-program computer introduced in 1949, both programs and data were stored and manipulated in the same way in computer memory. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. Implementation techniques include imperative languages (object-oriented or procedural), functional languages, and logic languages.