

There exist a lot of different approaches for each of those tasks. 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. In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. Whatever the approach to development may be, the final program must satisfy some fundamental properties. High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware. As early as the 9th century, a programmable music sequencer was invented by the Persian Banu Musa brothers, who described an automated mechanical flute player in the Book of Ingenious Devices. Also, specific user environment and usage history can make it difficult to reproduce the problem. It affects the aspects of quality above, including portability, usability and most importantly maintainability. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. 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. 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. Compilers harnessed the power of computers to make programming easier by allowing programmers to specify calculations by entering a formula using infix notation. 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. Debugging is a very important task in the software development process since having defects in a program can have significant consequences for its users. Sometimes software development is known as software engineering, especially when it employs formal methods or follows an engineering design process. 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. There are many approaches to the Software development process. Proficient programming usually requires expertise in several different subjects, including knowledge of the application domain, details of programming languages and generic code libraries, specialized algorithms, and formal logic. 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. 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). In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. Different programming languages support different styles of programming (called programming paradigms).