

High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. It is usually easier to code in "high-level" languages than in "low-level" ones. 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). 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. 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. 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. He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. 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. 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. 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. 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. However, readability is more than just programming style. They are the building blocks for all software, from the simplest applications to the most sophisticated ones. 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. However, because an assembly language is little more than a different notation for a machine language, two machines with different instruction sets also have different assembly languages. 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. Unreadable code often leads to bugs, inefficiencies, and duplicated code. 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. High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware. In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them. 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.