

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. There exist a lot of different approaches for each of those tasks. Following a consistent programming style often helps readability. It is very difficult to determine what are the most popular modern programming languages. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. 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. 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. Sometimes software development is known as software engineering, especially when it employs formal methods or follows an engineering design process. Computer programmers are those who write computer software. Popular modeling techniques include Object-Oriented Analysis and Design (OOAD) and Model-Driven Architecture (MDA). Many applications use a mix of several languages in their construction and use. Implementation techniques include imperative languages (object-oriented or procedural), functional languages, and logic languages. 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, Charles Babbage had already written his first program for the Analytical Engine in 1837. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it. There exist a lot of different approaches for each of those tasks. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. Programming languages are essential for software development. This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. 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. FORTRAN, the first widely used high-level language to have a functional implementation, came out in 1957, and many other languages were soon developed—in particular, COBOL aimed at commercial data processing, and Lisp for computer research. 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. Programming languages are essential for software development.