

By the late 1960s, data storage devices and computer terminals became inexpensive enough that programs could be created by typing directly into the computers. Techniques like Code refactoring can enhance readability. The first step in most formal software development processes is requirements analysis, followed by testing to determine value modeling, implementation, and failure elimination (debugging). Programming languages are essential for software development. Their jobs usually involve: Although programming has been presented in the media as a somewhat mathematical subject, some research shows that good programmers have strong skills in natural human languages, and that learning to code is similar to learning a foreign language. Compilers harnessed the power of computers to make programming easier by allowing programmers to specify calculations by entering a formula using infix 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. 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. Sometimes software development is known as software engineering, especially when it employs formal methods or follows an engineering design process. It affects the aspects of quality above, including portability, usability and most importantly maintainability. Integrated development environments (IDEs) aim to integrate all such help. Programs were mostly entered using punched cards or paper tape. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. 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. Popular modeling techniques include Object-Oriented Analysis and Design (OOAD) and Model-Driven Architecture (MDA). It is very difficult to determine what are the most popular modern programming languages. Computer programmers are those who write computer software. It is very difficult to determine what are the most popular modern programming languages. 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. 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. Allen Downey, in his book *How To Think Like A Computer Scientist*, writes: Many computer languages provide a mechanism to call functions provided by shared libraries. 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. This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in *A Manuscript on Deciphering Cryptographic Messages*. Compilers harnessed the power of computers to make programming easier by allowing programmers to specify calculations by entering a formula using infix notation.