

Whatever the approach to development may be, the final program must satisfy some fundamental properties. Many applications use a mix of several languages in their construction and use. 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. Compilers harnessed the power of computers to make programming easier by allowing programmers to specify calculations by entering a formula using infix notation. Techniques like Code refactoring can enhance readability. Different programming languages support different styles of programming (called programming paradigms). Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. 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. 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. 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. 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). Different programming languages support different styles of programming (called programming paradigms). Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. Many applications use a mix of several languages in their construction and use. 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. Unreadable code often leads to bugs, inefficiencies, and duplicated code. Readability is important because programmers spend the majority of their time reading, trying to understand, reusing and modifying existing source code, rather than writing new source code. However, Charles Babbage had already written his first program for the Analytical Engine in 1837. Code-breaking algorithms have also existed for centuries. Popular modeling techniques include Object-Oriented Analysis and Design (OOAD) and Model-Driven Architecture (MDA). Sometimes software development is known as software engineering, especially when it employs formal methods or follows an engineering design process. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form.