

Many applications use a mix of several languages in their construction and use. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA. 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. Code-breaking algorithms have also existed for centuries. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. However, with the concept of the stored-program computer introduced in 1949, both programs and data were stored and manipulated in the same way in computer memory. While these are sometimes considered programming, often the term software development is used for this larger overall process – with the terms programming, implementation, and coding reserved for the writing and editing of code per se. Assembly languages were soon developed that let the programmer specify instruction in a text format (e.g., ADD X, TOTAL), with abbreviations for each operation code and meaningful names for specifying addresses. 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. Different programming languages support different styles of programming (called programming paradigms). This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. 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. One approach popular for requirements analysis is Use Case analysis. The academic field and the engineering practice of computer programming are both largely concerned with discovering and implementing the most efficient algorithms for a given class of problems. Compilers harnessed the power of computers to make programming easier by allowing programmers to specify calculations by entering a formula using infix notation. Sometimes software development is known as software engineering, especially when it employs formal methods or follows an engineering design process. It is very difficult to determine what are the most popular modern programming languages. 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. It is very difficult to determine what are the most popular modern programming languages. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. 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.