

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. Compilers harnessed the power of computers to make programming easier by allowing programmers to specify calculations by entering a formula using infix notation. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. Many applications use a mix of several languages in their construction and use. Programming languages are essential for software development. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in *A Manuscript on Deciphering Cryptographic Messages*. Use of a static code analysis tool can help detect some possible problems. 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. It involves designing and implementing algorithms, step-by-step specifications of procedures, by writing code in one or more programming languages. 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. High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware. Text editors were also developed that allowed changes and corrections to be made much more easily than with punched cards. 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. 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. One approach popular for requirements analysis is Use Case analysis. 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. Expert programmers are familiar with a variety of well-established algorithms and their respective complexities and use this knowledge to choose algorithms that are best suited to the circumstances. 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. Some languages are more prone to some kinds of faults because their specification does not require compilers to perform as much checking as other languages. Code-breaking algorithms have also existed for centuries. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. There are many approaches to the Software development process. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA.