

High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware. These compiled languages allow the programmer to write programs in terms that are syntactically richer, and more capable of abstracting the code, making it easy to target varying machine instruction sets via compilation declarations and heuristics. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in *A Manuscript on Deciphering Cryptographic Messages*. Popular modeling techniques include Object-Oriented Analysis and Design (OOAD) and Model-Driven Architecture (MDA). There are many approaches to the Software development process. In 1206, the Arab engineer Al-Jazari invented a programmable drum machine where a musical mechanical automaton could be made to play different rhythms and drum patterns, via pegs and cams. Normally the first step in debugging is to attempt to reproduce the problem. Ideally, the programming language best suited for the task at hand will be selected. 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, when a bug in a compiler can make it crash when parsing some large source file, a simplification of the test case that results in only few lines from the original source file can be sufficient to reproduce the same crash. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). 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. 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. It affects the aspects of quality above, including portability, usability and most importantly maintainability. Text editors were also developed that allowed changes and corrections to be made much more easily than with punched cards. The first step in most formal software development processes is requirements analysis, followed by testing to determine value modeling, implementation, and failure elimination (debugging). Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. Computer programmers are those who write computer software. 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. For this purpose, algorithms are classified into orders using so-called Big O notation, which expresses resource use, such as execution time or memory consumption, in terms of the size of an input. Normally the first step in debugging is to attempt to reproduce the problem. Compilers harnessed the power of computers to make programming easier by allowing programmers to specify calculations by entering a formula using infix notation. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form.