

It affects the aspects of quality above, including portability, usability and most importantly maintainability. Programming languages are essential for software development. The following properties are among the most important: In computer programming, readability refers to the ease with which a human reader can comprehend the purpose, control flow, and operation of source code. 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. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. 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. Text editors were also developed that allowed changes and corrections to be made much more easily than with punched cards. Ideally, the programming language best suited for the task at hand will be selected. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. Sometimes software development is known as software engineering, especially when it employs formal methods or follows an engineering design process. 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. The choice of language used is subject to many considerations, such as company policy, suitability to task, availability of third-party packages, or individual preference. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). Unreadable code often leads to bugs, inefficiencies, and duplicated code. 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. Popular modeling techniques include Object-Oriented Analysis and Design (OOAD) and Model-Driven Architecture (MDA). 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. This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. 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. Ideally, the programming language best suited for the task at hand will be selected. 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. This can be a non-trivial task, for example as with parallel processes or some unusual software bugs.