

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. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). Programming languages are essential for software development. Implementation techniques include imperative languages (object-oriented or procedural), functional languages, and logic languages. Different programming languages support different styles of programming (called programming paradigms). Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. Sometimes software development is known as software engineering, especially when it employs formal methods or follows an engineering design process. 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. Programmable devices have existed for centuries. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. Programs were mostly entered using punched cards or paper tape. However, Charles Babbage had already written his first program for the Analytical Engine in 1837. Different programming languages support different styles of programming (called programming paradigms). 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. Programmable devices have existed for centuries. Later a control panel (plug board) added to his 1906 Type I Tabulator allowed it to be programmed for different jobs, and by the late 1940s, unit record equipment such as the IBM 602 and IBM 604, were programmed by control panels in a similar way, as were the first electronic computers. 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. New languages are generally designed around the syntax of a prior language with new functionality added, (for example C++ adds object-orientation to C, and Java adds memory management and bytecode to C++, but as a result, loses efficiency and the ability for low-level manipulation).

Trial-and-error/divide-and-conquer is needed: the programmer will try to remove some parts of the original test case and check if the problem still exists. Compilers harnessed the power of computers to make programming easier by allowing programmers to specify calculations by entering a formula using infix notation. This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. It involves designing and implementing algorithms, step-by-step specifications of procedures, by writing code in one or more programming languages. Also, specific user environment and usage history can make it difficult to reproduce the problem. 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. When debugging the problem in a GUI, the programmer can try to skip some user interaction from the original problem description and check if remaining actions are sufficient for bugs to appear.