

Debugging is often done with IDEs. Standalone debuggers like GDB are also used, and these often provide less of a visual environment, usually using a command line. Some text editors such as Emacs allow GDB to be invoked through them, to provide a visual environment. 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. Programming languages are essential for software development. In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them. One approach popular for requirements analysis is Use Case analysis. Different programming languages support different styles of programming (called programming paradigms). 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. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. 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. Scripting and breakpointing is also part of this 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. Whatever the approach to development may be, the final program must satisfy some fundamental properties. 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. 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. Scripting and breakpointing is also part of this process. Code-breaking algorithms have also 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. Many applications use a mix of several languages in their construction and use. 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. 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. 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.