

Integrated development environments (IDEs) aim to integrate all such help. 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. It is very difficult to determine what are the most popular modern programming languages. Programs were mostly entered using punched cards or paper tape. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. Programmable devices have existed for centuries. 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. 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. Proficient programming usually requires expertise in several different subjects, including knowledge of the application domain, details of programming languages and generic code libraries, specialized algorithms, and formal logic. They are the building blocks for all software, from the simplest applications to the most sophisticated ones. As early as the 9th century, a programmable music sequencer was invented by the Persian Banu Musa brothers, who described an automated mechanical flute player in the *Book of Ingenious Devices*. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. Text editors were also developed that allowed changes and corrections to be made much more easily than with punched cards. Unreadable code often leads to bugs, inefficiencies, and duplicated code. Scripting and breakpointing is also part of this process. 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. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. The first computer program is generally dated to 1843, when mathematician Ada Lovelace published an algorithm to calculate a sequence of Bernoulli numbers, intended to be carried out by Charles Babbage's Analytical Engine. Many applications use a mix of several languages in their construction and use. It is usually easier to code in "high-level" languages than in "low-level" ones. Whatever the approach to development may be, the final program must satisfy some fundamental properties. 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. 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. 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. Various visual programming languages have also been developed with the intent to resolve readability concerns by adopting non-traditional approaches to code structure and display.