

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 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. Unreadable code often leads to bugs, inefficiencies, and duplicated code. Ideally, the programming language best suited for the task at hand will be selected. Methods of measuring programming language popularity include: counting the number of job advertisements that mention the language, the number of books sold and courses teaching the language (this overestimates the importance of newer languages), and estimates of the number of existing lines of code written in the language (this underestimates the number of users of business languages such as COBOL). 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. It involves designing and implementing algorithms, step-by-step specifications of procedures, by writing code in one or more programming languages. The academic field and the engineering practice of computer programming are both largely concerned with discovering and implementing the most efficient algorithms for a given class of problems. However, readability is more than just programming style. He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. There exist a lot of different approaches for each of those tasks. The academic field and the engineering practice of computer programming are both largely concerned with discovering and implementing the most efficient algorithms for a given class of problems. 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. The academic field and the engineering practice of computer programming are both largely concerned with discovering and implementing the most efficient algorithms for a given class of problems. Scripting and breakpointing is also part of this process. 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. They are the building blocks for all software, from the simplest applications to the most sophisticated ones. 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. The first compiler related tool, the A-0 System, was developed in 1952 by Grace Hopper, who also coined the term 'compiler'. 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. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it.