

Whatever the approach to development may be, the final program must satisfy some fundamental properties. Debugging is a very important task in the software development process since having defects in a program can have significant consequences for its users. Programs were mostly entered using punched cards or paper tape. 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. 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*. Use of a static code analysis tool can help detect some possible 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. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. 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. Text editors were also developed that allowed changes and corrections to be made much more easily than with punched cards. It involves designing and implementing algorithms, step-by-step specifications of procedures, by writing code in one or more programming languages. Some text editors such as Emacs allow GDB to be invoked through them, to provide a visual environment. 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. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. Their jobs usually involve: Although programming has been presented in the media as a somewhat mathematical subject, some research shows that good programmers have strong skills in natural human languages, and that learning to code is similar to learning a foreign language. 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. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in *A Manuscript on Deciphering Cryptographic Messages*. He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm. Following a consistent programming style often helps readability. 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. Their jobs usually involve: Although programming has been presented in the media as a somewhat mathematical subject, some research shows that good programmers have strong skills in natural human languages, and that learning to code is similar to learning a foreign language. Many applications use a mix of several languages in their construction and use.