

The first compiler related tool, the A-0 System, was developed in 1952 by Grace Hopper, who also coined the term 'compiler'. Implementation techniques include imperative languages (object-oriented or procedural), functional languages, and logic languages. Programs were mostly entered using punched cards or paper tape. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. Normally the first step in debugging is to attempt to reproduce the problem. In 1206, the Arab engineer Al-Jazari invented a programmable drum machine where a musical mechanical automaton could be made to play different rhythms and drum patterns, via pegs and cams. Unreadable code often leads to bugs, inefficiencies, and duplicated code. 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. Some of these factors include: The presentation aspects of this (such as indents, line breaks, color highlighting, and so on) are often handled by the source code editor, but the content aspects reflect the programmer's talent and skills. 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. 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. Integrated development environments (IDEs) aim to integrate all such help. Techniques like Code refactoring can enhance readability. 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. Debugging is a very important task in the software development process since having defects in a program can have significant consequences for its users. It is very difficult to determine what are the most popular modern programming languages. 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. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. 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. Code-breaking algorithms have also existed for centuries. 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. 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. Many applications use a mix of several languages in their construction and use. Popular modeling techniques include Object-Oriented Analysis and Design (OOAD) and Model-Driven Architecture (MDA).