

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. These compiled languages allow the programmer to write programs in terms that are syntactically richer, and more capable of abstracting the code, making it easy to target varying machine instruction sets via compilation declarations and heuristics. 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. By the late 1960s, data storage devices and computer terminals became inexpensive enough that programs could be created by typing directly into the computers. High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware. 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. Use of a static code analysis tool can help detect some possible problems. 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. 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. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). Programs were mostly entered using punched cards or paper tape. Integrated development environments (IDEs) aim to integrate all such help. 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. Normally the first step in debugging is to attempt to reproduce the problem. 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. They are the building blocks for all software, from the simplest applications to the most sophisticated ones. These compiled languages allow the programmer to write programs in terms that are syntactically richer, and more capable of abstracting the code, making it easy to target varying machine instruction sets via compilation declarations and heuristics. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. Integrated development environments (IDEs) aim to integrate all such help. Popular modeling techniques include Object-Oriented Analysis and Design (OOAD) and Model-Driven Architecture (MDA). Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. Implementation techniques include imperative languages (object-oriented or procedural), functional languages, and logic languages. 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). 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.