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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. One approach popular for requirements analysis is Use Case analysis. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA. 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. For this purpose, algorithms are classified into orders using so-called Big O notation, which expresses resource use, such as execution time or memory consumption, in terms of the size of an input. 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.

High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. It is very difficult to determine what are the most popular modern programming languages. Programs were mostly entered using punched cards or paper tape. 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). New languages are generally designed around the syntax of a prior language with new functionality added, (for example C++ adds object-orientation to C, and Java adds memory management and bytecode to C++, but as a result, loses efficiency and the ability for low-level manipulation). It involves designing and implementing algorithms, step-by-step specifications of procedures, by writing code in one or more programming languages. 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. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. Following a consistent programming style often helps readability. Languages form an approximate spectrum from "low-level" to "high-level"; "low-level" languages are typically more machine-oriented and faster to execute, whereas "high-level" languages are more abstract and easier to use but execute less quickly. 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. Compilers harnessed the power of computers to make programming easier by allowing programmers to specify calculations by entering a formula using infix notation. 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. High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware.