

Normally the first step in debugging is to attempt to reproduce the problem. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. Whatever the approach to development may be, the final program must satisfy some fundamental properties. 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. Normally the first step in debugging is to attempt to reproduce the problem. They are the building blocks for all software, from the simplest applications to the most sophisticated ones. Techniques like Code refactoring can enhance readability. Popular modeling techniques include Object-Oriented Analysis and Design (OOAD) and Model-Driven Architecture (MDA). Also, specific user environment and usage history can make it difficult to reproduce the problem. Techniques like Code refactoring can enhance readability. However, readability is more than just programming style. There are many approaches to the Software development process. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. 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. Many applications use a mix of several languages in their construction and use. Programs were mostly entered using punched cards or paper tape. Assembly languages were soon developed that let the programmer specify instruction in a text format (e.g., ADD X, TOTAL), with abbreviations for each operation code and meaningful names for specifying addresses. Trade-offs from this ideal involve finding enough programmers who know the language to build a team, the availability of compilers for that language, and the efficiency with which programs written in a given language execute. Unreadable code often leads to bugs, inefficiencies, and duplicated code. 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. In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them. For example, when a bug in a compiler can make it crash when parsing some large source file, a simplification of the test case that results in only few lines from the original source file can be sufficient to reproduce the same crash. It is very difficult to determine what are the most popular modern programming languages. Programming languages are essential for software development. It is usually easier to code in "high-level" languages than in "low-level" ones.