

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. Programs were mostly entered using punched cards or paper tape. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. The first step in most formal software development processes is requirements analysis, followed by testing to determine value modeling, implementation, and failure elimination (debugging). In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in *A Manuscript on Deciphering Cryptographic Messages*. Whatever the approach to development may be, the final program must satisfy some fundamental properties. Also, specific user environment and usage history can make it difficult to reproduce the problem. Popular modeling techniques include Object-Oriented Analysis and Design (OOAD) and Model-Driven Architecture (MDA). Auxiliary tasks accompanying and related to programming include analyzing requirements, testing, debugging (investigating and fixing problems), implementation of build systems, and management of derived artifacts, such as programs' machine code. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). Ideally, the programming language best suited for the task at hand will be selected. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. 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. Compilers harnessed the power of computers to make programming easier by allowing programmers to specify calculations by entering a formula using infix notation. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. 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. 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. 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. Code-breaking algorithms have also existed for centuries. High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware. Also, specific user environment and usage history can make it difficult to reproduce the problem. Normally the first step in debugging is to attempt to reproduce the problem. One approach popular for requirements analysis is Use Case analysis. 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. Whatever the approach to development may be, the final program must satisfy some fundamental properties.