

After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. The first compiler related tool, the A-0 System, was developed in 1952 by Grace Hopper, who also coined the term 'compiler'. Allen Downey, in his book *How To Think Like A Computer Scientist*, writes: Many computer languages provide a mechanism to call functions provided by shared libraries. Techniques like Code refactoring can enhance readability. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). By the late 1960s, data storage devices and computer terminals became inexpensive enough that programs could be created by typing directly into the computers. It is usually easier to code in "high-level" languages than in "low-level" ones. Unreadable code often leads to bugs, inefficiencies, and duplicated code. Programs were mostly entered using punched cards or paper tape. 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. Use of a static code analysis tool can help detect some possible problems. He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA. Also, specific user environment and usage history can make it difficult to reproduce the problem. The academic field and the engineering practice of computer programming are both largely concerned with discovering and implementing the most efficient algorithms for a given class of problems. 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. It is usually easier to code in "high-level" languages than in "low-level" ones. Normally the first step in debugging is to attempt to reproduce the problem. Some text editors such as Emacs allow GDB to be invoked through them, to provide a visual environment. It affects the aspects of quality above, including portability, usability and most importantly maintainability. It is usually easier to code in "high-level" languages than in "low-level" ones. Some text editors such as Emacs allow GDB to be invoked through them, to provide a visual environment. 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*. The first step in most formal software development processes is requirements analysis, followed by testing to determine value modeling, implementation, and failure elimination (debugging).