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.  
Normally the first step in debugging is to attempt to reproduce the problem.  
The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA.  
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.  
To produce machine code, the source code must either be compiled or transpiled.  
By the late 1960s, data storage devices and computer terminals became inexpensive enough that programs could be created by typing directly into the computers.  
There exist a lot of different approaches for each of those tasks.  
Relatedly, software engineering combines engineering techniques and principles with software development.  
 Following a consistent programming style often helps readability.  
 It is very difficult to determine what are the most popular modern programming languages.  
Techniques like Code refactoring can enhance readability.  
Some text editors such as Emacs allow GDB to be invoked through them, to provide a visual environment.  
Techniques like Code refactoring can enhance readability.  
 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.  
In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages.