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.  
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.  
Techniques like Code refactoring can enhance readability.  
The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA.  
However, Charles Babbage had already written his first program for the Analytical Engine in 1837.  
By the late 1960s, data storage devices and computer terminals became inexpensive enough that programs could be created by typing directly into the computers.  
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.  
Normally the first step in debugging is to attempt to reproduce the problem.  
Transpiling on the other hand, takes the source-code from a high-level programming language and converts it into bytecode.  
Transpiling on the other hand, takes the source-code from a high-level programming language and converts it into bytecode.  
Integrated development environments (IDEs) aim to integrate all such help.  
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.  
They are the building blocks for all software, from the simplest applications to the most sophisticated ones.  
By the late 1960s, data storage devices and computer terminals became inexpensive enough that programs could be created by typing directly into the computers.  
 Implementation techniques include imperative languages (object-oriented or procedural), functional languages, and logic languages.