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..  
 Implementation techniques include imperative languages (object-oriented or procedural), functional languages, and logic languages.  
Also, specific user environment and usage history can make it difficult to reproduce the problem.  
Use of a static code analysis tool can help detect some possible problems.  
 Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications.  
The choice of language used is subject to many considerations, such as company policy, suitability to task, availability of third-party packages, or individual preference.  
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.  
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.  
 The first computer program is generally dated to 1843, when mathematician Ada Lovelace published an algorithm to calculate a sequence of Bernoulli numbers, intended to be carried out by Charles Babbage's Analytical Engine.  
 It is very difficult to determine what are the most popular modern programming languages.  
Proficient programming usually requires expertise in several different subjects, including knowledge of the application domain, details of programming languages and generic code libraries, specialized algorithms, and formal logic.  
There exist a lot of different approaches for each of those tasks.  
 Programs were mostly entered using punched cards or paper tape.  
Integrated development environments (IDEs) aim to integrate all such help.  
When debugging the problem in a GUI, the programmer can try to skip some user interaction from the original problem description and check if remaining actions are sufficient for bugs to appear.