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.  
 Debugging is often done with IDEs. Standalone debuggers like GDB are also used, and these often provide less of a visual environment, usually using a command line.  
 After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug.  
 Programs were mostly entered using punched cards or paper tape.  
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.  
Programming languages are essential for software development.  
FORTRAN, the first widely used high-level language to have a functional implementation, came out in 1957, and many other languages were soon developed—in particular, COBOL aimed at commercial data processing, and Lisp for computer research.  
One approach popular for requirements analysis is Use Case analysis.  
Trial-and-error/divide-and-conquer is needed: the programmer will try to remove some parts of the original test case and check if the problem still exists.  
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.  
Many applications use a mix of several languages in their construction and use.  
He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm.  
Techniques like Code refactoring can enhance readability.  
In 1206, the Arab engineer Al-Jazari invented a programmable drum machine where a musical mechanical automaton could be made to play different rhythms and drum patterns, via pegs and cams.