He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm..  
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.  
 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.  
However, with the concept of the stored-program computer introduced in 1949, both programs and data were stored and manipulated in the same way in computer memory.  
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.  
Use of a static code analysis tool can help detect some possible problems.  
While these are sometimes considered programming, often the term software development is used for this larger overall process – with the terms programming, implementation, and coding reserved for the writing and editing of code per se.  
Provided the functions in a library follow the appropriate run-time conventions (e.g., method of passing arguments), then these functions may be written in any other language.  
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.  
 It is very difficult to determine what are the most popular modern programming languages.  
 Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation.  
Unreadable code often leads to bugs, inefficiencies, and duplicated code.  
 Programs were mostly entered using punched cards or paper tape.  
This can be a non-trivial task, for example as with parallel processes or some unusual software bugs.  
Text editors were also developed that allowed changes and corrections to be made much more easily than with punched cards.