Proficient programming thus usually requires expertise in several different subjects, including knowledge of the application domain, specialized algorithms, and formal logic.  
This can be a non-trivial task, for example as with parallel processes or some unusual software bugs.  
A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it.  
Expert programmers are familiar with a variety of well-established algorithms and their respective complexities and use this knowledge to choose algorithms that are best suited to the circumstances.  
He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm.  
Relatedly, software engineering combines engineering techniques and principles with software development.  
It is usually easier to code in "high-level" languages than in "low-level" ones.  
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.  
There exist a lot of different approaches for each of those tasks.  
Programming involves tasks such as analysis, generating algorithms, profiling algorithms' accuracy and resource consumption, and the implementation of algorithms (usually in a particular programming language, commonly referred to as coding).  
Methods of measuring programming language popularity include: counting the number of job advertisements that mention the language, the number of books sold and courses teaching the language (this overestimates the importance of newer languages), and estimates of the number of existing lines of code written in the language (this underestimates the number of users of business languages such as COBOL).  
Programming languages are essential for software development.  
Proficient programming thus usually requires expertise in several different subjects, including knowledge of the application domain, specialized algorithms, and formal logic.  
 Whatever the approach to development may be, the final program must satisfy some fundamental properties.  
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.