Some text editors such as Emacs allow GDB to be invoked through them, to provide a visual environment..  
  
The first compiler related tool, the A-0 System, was developed in 1952 by Grace Hopper, who also coined the term 'compiler'.  
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.  
Unreadable code often leads to bugs, inefficiencies, and duplicated code.  
 Whatever the approach to development may be, the final program must satisfy some fundamental properties.  
In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages.  
 Programmable devices have existed for centuries.  
In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them.  
 Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation.  
 The academic field and the engineering practice of computer programming are both largely concerned with discovering and implementing the most efficient algorithms for a given class of problems.  
He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm.  
Normally the first step in debugging is to attempt to reproduce the problem.  
Integrated development environments (IDEs) aim to integrate all such help.  
Many applications use a mix of several languages in their construction and use.  
Later a control panel (plug board) added to his 1906 Type I Tabulator allowed it to be programmed for different jobs, and by the late 1940s, unit record equipment such as the IBM 602 and IBM 604, were programmed by control panels in a similar way, as were the first electronic computers.