Assembly languages were soon developed that let the programmer specify instruction in a text format (e.g., ADD X, TOTAL), with abbreviations for each operation code and meaningful names for specifying addresses.  
Programming languages are essential for software development.  
A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it.  
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).  
However, while these might be considered part of the programming process, often the term software development is more likely used for this larger overall process – whereas the terms programming, implementation, and coding tend to be focused on the actual writing of code.  
He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm.  
A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it.  
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.  
Proficient programming thus usually requires expertise in several different subjects, including knowledge of the application domain, specialized algorithms, and formal logic.  
 High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware.  
Ideally, the programming language best suited for the task at hand will be selected.  
Transpiling on the other hand, takes the source-code from a high-level programming language and converts it into bytecode.  
 Programs were mostly entered using punched cards or paper tape.  
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.  
This is interpreted into machine code.