

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. 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. However, Charles Babbage had already written his first program for the Analytical Engine in 1837. There are many approaches to the Software development process. Techniques like Code refactoring can enhance readability. Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. Normally the first step in debugging is to attempt to reproduce the problem. It involves designing and implementing algorithms, step-by-step specifications of procedures, by writing code in one or more programming languages. Popular modeling techniques include Object-Oriented Analysis and Design (OOAD) and Model-Driven Architecture (MDA). 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. Their jobs usually involve: Although programming has been presented in the media as a somewhat mathematical subject, some research shows that good programmers have strong skills in natural human languages, and that learning to code is similar to learning a foreign language. 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. 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. Unreadable code often leads to bugs, inefficiencies, and duplicated code. Readability is important because programmers spend the majority of their time reading, trying to understand, reusing and modifying existing source code, rather than writing new source code. Use of a static code analysis tool can help detect some possible problems. However, Charles Babbage had already written his first program for the Analytical Engine in 1837. Integrated development environments (IDEs) aim to integrate all such help. There exist a lot of different approaches for each of those tasks. Programs were mostly entered using punched cards or paper tape. Auxiliary tasks accompanying and related to programming include analyzing requirements, testing, debugging (investigating and fixing problems), implementation of build systems, and management of derived artifacts, such as programs' machine code. He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm. Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. Also, specific user environment and usage history can make it difficult to reproduce the problem. 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.