

In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them. However, because an assembly language is little more than a different notation for a machine language, two machines with different instruction sets also have different assembly languages. These compiled languages allow the programmer to write programs in terms that are syntactically richer, and more capable of abstracting the code, making it easy to target varying machine instruction sets via compilation declarations and heuristics. Use of a static code analysis tool can help detect some possible problems. 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, because an assembly language is little more than a different notation for a machine language, two machines with different instruction sets also have different assembly languages. High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware. 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. Text editors were also developed that allowed changes and corrections to be made much more easily than with punched cards. When debugging the problem in a GUI, the programmer can try to skip some user interaction from the original problem description and check if remaining actions are sufficient for bugs to appear. 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. 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. Implementation techniques include imperative languages (object-oriented or procedural), functional languages, and logic languages. This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. 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. The choice of language used is subject to many considerations, such as company policy, suitability to task, availability of third-party packages, or individual preference. Programs were mostly entered using punched cards or paper tape. These compiled languages allow the programmer to write programs in terms that are syntactically richer, and more capable of abstracting the code, making it easy to target varying machine instruction sets via compilation declarations and heuristics. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. However, Charles Babbage had already written his first program for the Analytical Engine in 1837. There exist a lot of different approaches for each of those tasks. The first compiler related tool, the A-0 System, was developed in 1952 by Grace Hopper, who also coined the term 'compiler'. They are the building blocks for all software, from the simplest applications to the most sophisticated ones. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability.