

Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. Computer programmers are those who write computer software. Following a consistent programming style often helps readability. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. 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. Trade-offs from this ideal involve finding enough programmers who know the language to build a team, the availability of compilers for that language, and the efficiency with which programs written in a given language execute. It affects the aspects of quality above, including portability, usability and most importantly maintainability. 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. However, Charles Babbage had already written his first program for the Analytical Engine in 1837. 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. Debugging is often done with IDEs. Standalone debuggers like GDB are also used, and these often provide less of a visual environment, usually using a command line. Ideally, the programming language best suited for the task at hand will be selected. The first step in most formal software development processes is requirements analysis, followed by testing to determine value modeling, implementation, and failure elimination (debugging). Some languages are very popular for particular kinds of applications, while some languages are regularly used to write many different kinds of applications. Some text editors such as Emacs allow GDB to be invoked through them, to provide a visual environment. There exist a lot of different approaches for each of those tasks. Use of a static code analysis tool can help detect some possible problems. Various visual programming languages have also been developed with the intent to resolve readability concerns by adopting non-traditional approaches to code structure and display. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA. 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. However, readability is more than just programming style. Computer programmers are those who write computer software. 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. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. However, Charles Babbage had already written his first program for the Analytical Engine in 1837.