

Ideally, the programming language best suited for the task at hand will be selected. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. It is usually easier to code in "high-level" languages than in "low-level" ones. Code-breaking algorithms have also existed for centuries. 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. It affects the aspects of quality above, including portability, usability and most importantly maintainability. High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware. They are the building blocks for all software, from the simplest applications to the most sophisticated ones. 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, 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. 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. 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. Also, specific user environment and usage history can make it difficult to reproduce the problem. 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. They are the building blocks for all software, from the simplest applications to the most sophisticated ones. 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. 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. It affects the aspects of quality above, including portability, usability and most importantly maintainability. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. Allen Downey, in his book How To Think Like A Computer Scientist, writes: Many computer languages provide a mechanism to call functions provided by shared libraries. Programming languages are essential for software development.