

Debugging is a very important task in the software development process since having defects in a program can have significant consequences for its users. Programs were mostly entered using punched cards or paper tape. Some languages are more prone to some kinds of faults because their specification does not require compilers to perform as much checking as other languages. Compilers harnessed the power of computers to make programming easier by allowing programmers to specify calculations by entering a formula using infix notation. 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. He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation. 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. It is usually easier to code in "high-level" languages than in "low-level" ones. FORTRAN, the first widely used high-level language to have a functional implementation, came out in 1957, and many other languages were soon developed—in particular, COBOL aimed at commercial data processing, and Lisp for computer research. Code-breaking algorithms have also existed for centuries. Languages form an approximate spectrum from "low-level" to "high-level"; "low-level" languages are typically more machine-oriented and faster to execute, whereas "high-level" languages are more abstract and easier to use but execute less quickly. Computer programmers are those who write computer software. Following a consistent programming style often helps readability. Scripting and breakpointing is also part of this process. Ideally, the programming language best suited for the task at hand will be selected. A study found that a few simple readability transformations made code shorter and drastically reduced the time to understand it. However, readability is more than just programming style. 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, 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. He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling).