

The first compiler related tool, the A-0 System, was developed in 1952 by Grace Hopper, who also coined the term 'compiler'. Computer programmers are those who write computer software. There exist a lot of different approaches for each of those tasks. 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. Unreadable code often leads to bugs, inefficiencies, and duplicated code. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). 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. Unreadable code often leads to bugs, inefficiencies, and duplicated code. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA. The first step in most formal software development processes is requirements analysis, followed by testing to determine value modeling, implementation, and failure elimination (debugging). Programmers typically use high-level programming languages that are more easily intelligible to humans than machine code, which is directly executed by the central processing unit. For this purpose, algorithms are classified into orders using so-called Big O notation, which expresses resource use, such as execution time or memory consumption, in terms of the size of an input. There are many approaches to the Software development process. 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. Techniques like Code refactoring can enhance readability. 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. Sometimes software development is known as software engineering, especially when it employs formal methods or follows an engineering design process. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA. Implementation techniques include imperative languages (object-oriented or procedural), functional languages, and logic languages. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. 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. 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. 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. One approach popular for requirements analysis is Use Case analysis. He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm.