

Many applications use a mix of several languages in their construction and use. This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. 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. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA. 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. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. Many applications use a mix of several languages in their construction and use. 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. For example, when a bug in a compiler can make it crash when parsing some large source file, a simplification of the test case that results in only few lines from the original source file can be sufficient to reproduce the same crash. Many programmers use forms of Agile software development where the various stages of formal software development are more integrated together into short cycles that take a few weeks rather than years. It affects the aspects of quality above, including portability, usability and most importantly maintainability. 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 more prone to some kinds of faults because their specification does not require compilers to perform as much checking as other languages. 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. Sometimes software development is known as software engineering, especially when it employs formal methods or follows an engineering design process. Following a consistent programming style often helps readability. In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them. The following properties are among the most important: In computer programming, readability refers to the ease with which a human reader can comprehend the purpose, control flow, and operation of source code. Trial-and-error/divide-and-conquer is needed: the programmer will try to remove some parts of the original test case and check if the problem still exists. He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm. The first compiler related tool, the A-0 System, was developed in 1952 by Grace Hopper, who also coined the term 'compiler'. 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. Unreadable code often leads to bugs, inefficiencies, and duplicated code. 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.