

Also, specific user environment and usage history can make it difficult to reproduce the problem. 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. It is usually easier to code in "high-level" languages than in "low-level" ones. Many factors, having little or nothing to do with the ability of the computer to efficiently compile and execute the code, contribute to readability. It affects the aspects of quality above, including portability, usability and most importantly maintainability. Different programming languages support different styles of programming (called programming paradigms). 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. New languages are generally designed around the syntax of a prior language with new functionality added, (for example C++ adds object-orientation to C, and Java adds memory management and bytecode to C++, but as a result, loses efficiency and the ability for low-level manipulation). A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). New languages are generally designed around the syntax of a prior language with new functionality added, (for example C++ adds object-orientation to C, and Java adds memory management and bytecode to C++, but as a result, loses efficiency and the ability for low-level manipulation). Readability is important because programmers spend the majority of their time reading, trying to understand, reusing and modifying existing source code, rather than writing new source code. Also, specific user environment and usage history can make it difficult to reproduce the problem. Following a consistent programming style often helps readability. The Unified Modeling Language (UML) is a notation used for both the OOAD and MDA. Different programming languages support different styles of programming (called programming paradigms). Many applications use a mix of several languages in their construction and use. In 1801, the Jacquard loom could produce entirely different weaves by changing the "program" – a series of pasteboard cards with holes punched in them. 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. 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. There exist a lot of different approaches for each of those tasks. Text editors were also developed that allowed changes and corrections to be made much more easily than with punched cards. However, Charles Babbage had already written his first program for the Analytical Engine in 1837. Unreadable code often leads to bugs, inefficiencies, and duplicated code. 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. 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.