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. In the 9th century, the Arab mathematician Al-Kindi described a cryptographic algorithm for deciphering encrypted code, in A Manuscript on Deciphering Cryptographic Messages. Popular modeling techniques include Object-Oriented Analysis and Design (OOAD) and Model-Driven Architecture (MDA). Provided the functions in a library follow the appropriate run-time conventions (e.g., method of passing arguments), then these functions may be written in any other language. There exist a lot of different approaches for each of those tasks. After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug. Programming languages are essential for software development. 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. Different programming languages support different styles of programming (called programming paradigms). However, Charles Babbage had already written his first program for the Analytical Engine in 1837. Programs were mostly entered using punched cards or paper tape. Provided the functions in a library follow the appropriate run-time conventions (e.g., method of passing arguments), then these functions may be written in any other language. Ideally, the programming language best suited for the task at hand will be selected. Integrated development environments (IDEs) aim to integrate all such help. It is usually easier to code in "high-level" languages than in "low-level" ones. A similar technique used for database design is Entity-Relationship Modeling (ER Modeling). 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. It is very difficult to determine what are the most popular modern programming languages. This can be a non-trivial task, for example as with parallel processes or some unusual software bugs. As early as the 9th century, a programmable music sequencer was invented by the Persian Banu Musa brothers, who described an automated mechanical flute player in the Book of Ingenious Devices. In the 1880s, Herman Hollerith invented the concept of storing data in machine-readable form. Different programming languages support different styles of programming (called programming paradigms). Unreadable code often leads to bugs, inefficiencies, and duplicated code. Use of a static code analysis tool can help detect some possible problems. Proficient programming usually requires expertise in several different subjects, including knowledge of the application domain, details of programming languages and generic code libraries, specialized algorithms, and formal logic.