Trade-offs from this ideal involve finding enough programmers who know the language to build a team, the availability of compilers for that language, and the efficiency with which programs written in a given language execute..  
 After the bug is reproduced, the input of the program may need to be simplified to make it easier to debug.  
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.  
Ideally, the programming language best suited for the task at hand will be selected.  
One approach popular for requirements analysis is Use Case analysis.  
It affects the aspects of quality above, including portability, usability and most importantly maintainability.  
Normally the first step in debugging is to attempt to reproduce the problem.  
 Allen Downey, in his book How To Think Like A Computer Scientist, writes:  
 Many computer languages provide a mechanism to call functions provided by shared libraries.  
Also, specific user environment and usage history can make it difficult to reproduce the problem.  
Use of a static code analysis tool can help detect some possible problems.  
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.  
Some text editors such as Emacs allow GDB to be invoked through them, to provide a visual environment.  
 Various visual programming languages have also been developed with the intent to resolve readability concerns by adopting non-traditional approaches to code structure and display.  
  
The first compiler related tool, the A-0 System, was developed in 1952 by Grace Hopper, who also coined the term 'compiler'.  
 High-level languages made the process of developing a program simpler and more understandable, and less bound to the underlying hardware.