

6.10 DEBUGGING

On successful culmination of software testing, debugging is performed. **Debugging** is defined as a process of analyzing and removing the error. It is considered necessary

in most of the newly developed software or hardware and in commercial products/ personal application programs. For complex products, debugging is done at all the levels of the testing.

Debugging is considered to be a complex and time-consuming process since it attempts to remove errors at all the levels of testing. To perform debugging, debugger (debugging tool) is used to reproduce the conditions in which failure occurred, examine the program state, and locate the cause. With the help of debugger, programmers trace the program execution step by step (evaluating the value of variables) and halt the execution wherever required to reset the program variables. Note that some programming language packages include a debugger for checking the code for errors while it is being written.

Some guidelines that are followed while performing debugging are discussed here.

- Debugging is the process of solving a problem. Hence, individuals involved in debugging should understand all the causes of an error before starting with debugging.
- No experimentation should be done while performing debugging. The experimental changes instead of removing errors often increase the problem by adding new errors in it.
- When there is an error in one segment of a program, there is a high possibility that some other errors also exist in the program. Hence, if an error is found in one segment of a program, rest of the program should be properly examined for errors.
- It should be ensured that the new code added in a program to fix errors is correct and is not introducing any new error in it. Thus, to verify the correctness of a new code and to ensure that no new errors are introduced, regression testing should be performed.