**TESTING**

**Program Testing**

Testing a program consists of providing the program with a set of test inputs (or test cases) and observing if the program behaves as expected. If the program fails to behave as expected, then the conditions under which failure occurs are noted for later debugging and correction. Some commonly used terms associated with testing are:

**Failure:** This is a manifestation of an error (or defect or bug). But, the mere presence of¬ an error may not necessarily lead to a failure.

**Test case:** This is the triplet [I,S,O], where I is the data input to the system, S is the state¬ of the system at which the data is input, and O is the expected output of the system.

**Test suite:** This is the set of all test cases with which a given software product is to be tested.

**Aim of Testing**

The aim of the testing process is to identify all defects existing in a software product. However for most practical systems, even after satisfactorily carrying out the testing phase, it is not possible to guarantee that the software is error free. This is because of the fact that the input data domain of most software products is very large. It is not practical to test the software exhaustively with respect to each value that the input data may assume. Even with this practical limitation of the testing process, the importance of testing should not be underestimated. It must be remembered that testing does expose many defects existing in a software product. Thus testing provides a practical way of reducing defects in a system and increasing the users’ confidence in a developed system.

**Verification Vs Validation**

Verification is the process of determining whether the output of one phase of software development conforms to that of its previous phase, whereas validation is the process of determining whether a fully developed system conforms to its requirements specification. Thus while verification is concerned with phase containment of errors, the aim of validation is that the final product be error free.