8.8 SYSTEM TESTING

System tests are designed to validate a fully developed system with a view to assuring that it meets its requirements. There are essentially three main kinds of system testing:

1. **Alpha testing.** Alpha testing refers to the system testing that is carried out by the test team within the organization.

2. **Beta testing.** Beta testing is the system testing performed by a select group of friendly customers.

3. **Acceptance Testing.** Acceptance testing is the system testing performed by the customer to determine whether or not to accept the delivery of the system.

During system testing, in addition to functional and performance tests, stress tests are performed to determine the limitations of the system.

8.8.1 Stress Testing / endurance testing

Stress testing is also known as *endurance testing*. Stress tests are black-box tests which are designed to impose a range of abnormal and even illegal input conditions so as to stress the capabilities of the software. Input data volume, input data rate, processing time, utilization of memory, etc. are tested beyond the designed capacity. For example, suppose an operating system is designed to support 15 multiprogrammed jobs; the system is stressed by attempting to run 15 or more jobs simultaneously. A real-time system might be tested to determine the effect of simultaneous arrival of several high-priority interrupts. Stress testing usually involves an element of time or size, such as the number of records transferred per unit time, the maximum number of users active at any time, input data size, etc. Therefore stress testing may not be applicable to many types of systems.

Error seeding works satisfactorily only if the kind of seeded errors matches closely with the kind of defects that actually exist. However, it is difficult to predict the types of errors that may exist in a software. To some extent, the different categories of errors that remain can be estimated to a first approximation by analyzing the historical data of similar projects. Due to the shortcoming that the types of seeded errors should match closely with the types of errors actually existing in the code, error seeding is useful only to a moderate extent.

8.9 GENERAL ISSUES ASSOCIATED WITH TESTING

In this section, we shall discuss the following general issues associated with testing.

Testing documentation. A piece of documentation which is generated towards the end of testing is the *test summary report*. This report normally covers each subsystem and represents a summary of the tests which have been applied to all the subsystems. It will specify how many tests have been applied to each subsystem, how many tests have been successful, how many have been unsuccessful, and the degree to which they have been unsuccessful, e.g. whether a test was an outright failure or whether some of the expected results of the test were actually observed.

Regression testing. Regression testing does not belong to either unit testing, integration testing, or system testing. Instead, it is a separate dimension to these three forms of testing. Regression testing is the practice of running an old test suite after each change to the system or after each bug fix to ensure that no new bug has been introduced due to the change or the bug fix.