**CHAPTER 5**

**SYSTEM TESTING**

System testing is actually a series of different tests whose primary purpose is to fully exercise the computer based system. The common view of testing held by users is that it is performed to prove that there are no errors in the system. All though each test has a different purpose, all work should verify that all system elements have properly integrated and perform allocated functions. System tests are test designed to verify that the finished system meets its requirements. Once the application has undergone system testing, it may be put through actual use within the development organization. The purpose of this is to test the system under realistic condition, but with understanding and forgiving users.

Software testing is a critical element of software quality assurance and represents the ultimate review of specifications, design and coding. Testing includes verification that the entire system works properly. The programmers facilitate testing by coding as clearly as possible. Test case design focuses on a set of techniques for the creation of test cases that meet overall testing objectives.

Testing objectives are:

* Testing is a process of executing a program with the intent of finding an error.
* A good test case is one that has a high probability of finding an unconsidered error.
* A successful test is one that uncovers an undiscovered error.

Testing demonstrates that software functions appear to be working according to specifications that performs requirements has been met. In addition data collected as testing is conducted provide a good indication of software reliability and some indication of software quality as a while.

But, testing cannot show the absence of defects, it can only show that software defects are present. The debugging process is the most unpredictable part of the testing process.

**5.1 TEST PLAN**

A test plan implies a series of desired course of action to be followed in accomplishing various testing methods. The Test Plan acts as a blue print for the action that is to be followed. The software engineers create a computer program, its documentation and related data structures. The software developers is always responsible for testing the individual units of the programs, ensuring that each performs the function for which it was designed. There is an independent test group (ITG) which is to remove the inherent problems associated with letting the builder to test the thing that has been built. The specific objectives of testing should be stated in measurable terms. So that the mean time to failure, the cost to find and fix the defects, remaining defect density or frequency of occurrence and test work-hours per regression test all should be stated within the test plan. The levels of testing include:

* Unit Testing
* Integration Testing
* System Testing
* Output Testing

**5.2 UNIT TESTING**

The unit testing forces verification of errors on the smallest unit of the software design, the module. The unit testing tests the interface, local data, structure, boundary conditions, independent paths, error handling paths. In this testing each module is tested individually. This testing is carried out during the programming stage itself. This is essential for verification of the code produced during the coding phase, and hence the goal is to test the internal logic of the modules.

In this website the unit testing carried out by individual web pages. The following test procedures are used.

* All the links are available for navigation.
* For login process first inputting invalid username and password and check that showing error messages when submit the form.
* In registration each fields are check with valid and invalid data.
* Check the output data that must be produced according to the input data.
* Check the security of user’s private data.

**5.3 INTEGRATION TESTING**

Integration testing is a systematic technique for constructing the program structure while at the same time conducting test to uncover errors associated within the interface. The objective is to take the unit tested modules and then testing them as a whole. The goal here is to see if the modules can be integrated properly, emphasize being on testing interfaces between modules.

* All the modules are integrated for this testing.
* Test the system by navigating from all available links to another.
* All the functionality should maintain at a single run.

**5.4 SYSTEM TESTING**

This is the final step in testing. In this the entire system was tested as a whole with all forms, code, modules and class modules. This form of testing is popularly known as Black Box testing or System Testing.

Black Box testing method focuses on the functional requirements of the software. That is, Black Box testing enables the software engineer to derive sets of input conditions that will fully exercise all functional requirements for a program.

Black Box testing attempts to find errors in the following categories; incorrect or missing functions, interface errors, errors in data structures or external data access, performance errors and initialization errors and termination errors.

**5.5 OUTPUT TESTING**

User acceptance of a System is a key factor for the Success of a system. The system under consideration is tested for user acceptance by constantly keeping in touch with prospective system users at the time of development and making changes whenever required. This testing is done to find out whether the user gets the real output for the input entered.

The system considered is tested for user acceptance; here it should satisfy the firm’s need. The software should keep in touch with perspective system; user at the time of developing and making changes whenever required. This done with respect to the following points

* Input Screen Designs
* Output Screen Designs

The above testing is done taking various kinds of test data. Preparation of test data plays a vital role in the system testing. After preparing the test data, the system under study is tested using that test data. While testing the system by which test data errors are again uncovered and corrected by using above testing steps and corrections are also noted for future use.

In my project “Fully Automated Services of Transport Department” testing was conducted at every step. Initially each module was tested separately to check whether they gave the desired output for the given input. The forms used to enter data by user were validated and appropriate error messages were displayed if incorrect data was entered. Once the data was entered correctly, the processing was done and testing was done to check whether the correct output was obtained. Once the test cases were conducted successfully for each module, the modules were integrated together as a single system. After integration, the test cases were again applied to check whether the entire system as a whole produced the desired output. At times, the test cases failed and the shortcomings were noted down and appropriate corrections were done. Once the integration testing was performed correctly, output testing was done and it did not result in any change or correction in the system. Black box testing and white box testing was also conducted successfully. All the loops, decisions, relations were executed at least once before giving it to the users for testing. In black box testing, it was checked whether the data in the proper format was stored in the database or not. Also, it was checked whether the interfaces were working properly or not. On successful completion of these tests, the system was then given to undergo user acceptance testing where the users entered test data to check whether the correct output was obtained. The users were satisfied with the output and thus the testing phase was completed successfully.