**SE.QA.06: Regression Testing**

Testing is used to detect defects in a program and it is also used to estimate whether or not a program is operationally usable. It is important to remember that testing only is used for finding errors, it can’t prove their absence. Testing is therefore used to detect but not correct. The function of testing is the discovery of errors, and the correction of errors should be left until all the tests specified have been conducted. If errors are discovered, then the specified problem reporting and change control procedures must be followed in order to fix them. Then, all the tests that exercise a system containing the amended items must be repeated. Particular emphasis should be placed on testing boundary situations, both inside and outside boundaries. Error conditions should also be tested (For example, it detects out of bounds and throws a suitable error). Software on the group project will be subjected to three levels of testing: module, system, and acceptance. Module testing involves exercising a collection of related components, and the collection is tested in isolation from the rest of the system. In our context, a module is a Java class for the Software Engineering project and each module developed should test its functionality. Ideally, you should write this before designing and writing the code. **This means that the programmer is responsible for module testing.**

Module tests do not need formal test plans or specifications. **System testing involves integrating all the modules together to form a complete system and then exercising that system**. It is desirable that system testing is carried out by persons other than those involved in the design or programming of the modules being exercised. This is true both for the production of test specifications, and for the execution of tests.

**Acceptance testing** involves exercising the entire system according to a set of procedures produced by the client, such that if all the tests are passed, the client agrees to accept the product. Acceptance testing is normally carried out by the client in the presence of all group members.

The correct operation of testing within the project is the responsibility of the QA Manager. The QA Manager must check that appropriate module-level and system-level testing are being undertaken. The QA Manager should ensure that the group has prepared for the final acceptance testing by the client.

For the group project, all project teams will follow this testing plan:

* Module testing will be left to the coder - it should take the form of a set of tests that exercise all the significant behaviours of the class. Ideally, they would be written before the coding is done. However, since much of the original coding on the group project is done as spike work, the module tests should be written as soon as you know you are going to use the spike work in the final system and want to make a more robust version of what you quickly wrote.
* System testing will be done by writing a system Testing Specification during the design phase. This will cover all major functionality. When the system has been completed, a Test Report will document any features of the implementation that work incorrectly

The purpose of a test specification is to specify in detail each of the system tests to be executed as part of a formal test process. The test specification must cross-reference to the appropriate section of the Requirements Specification for each feature being tested. The test specification provides a set of reproducible actions to test all the main functionality of the system.

Each test specification will have an introductory section followed by a collection of test procedures. The introductory section of the specification document will match the structure specified in QA Document SE.QA.02 and must include a list of the documents (your user interface specification, the provided requirements specification) from which the Test Specification is derived. Full bibliographic details of the documents can be provided in the reference list at the end of the document, but each document must be referenced in the introductory text.

Each individual test must be described in detail. This description is known as a test procedure. It specifies in detail how the test will be carried out.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test Ref | Req being tested | Test Content | Input | Output | Pass Criteria |
| SE-F-001 | FR1 | Check that system can store the first two days of the earliest permitted year | Enter 1st March 1971 at date prompt. Hit return and enter 2nd March 1971 at date prompt. | List of stored dates should now include those dates | Data is stored correctly |

**Repository**

Details of test results must be maintained in a Test Report folder in the project repository. This must have two sections (folders) labelled Module Tests, and System Tests respectively. In each section, a dated report should be added whenever a new version of the software is built, saying which tests fail for that build. At the end of the project, the tests should be run, and the results submitted with the final report as a Test Report.