# *Systems III (420-E31-HR)*

# *Lab 6 – Testing Levels and Types of Testing*

Date assigned: Wednesday, October 11, 2017

Date due: **Wednesday, October 11, 2017, 12:00pm.**

**Learning Objectives**

Upon successful completion of this lab exercise, the student will be able to:

* Use basic testing terminology and describe testing principles
* Describe static testing techniques
* Identify the various levels of testing
* Describe how regression testing and exploratory testing can be applied in an agile project
* Define performance testing

To do:

Save this document as a Word document named **YourUserName\_E31\_L06\_TestingLevels.docx** in moodle. The document will hold your answers for your lab.

**Part A – Testing Terminology**

1. Complete the Lab 6 Terminology quiz on Moodle.

**Part B – Testing Fundamentals**

1. Consider the following simple program that contains:

* Input Box A
* Input Box B
* Addition button
* Result Text Box [=A+B]

Identify **all** of the test cases needed to fully test the program. For example: Press the Addition button without entering anything in Input Box A and B. **(10 marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test case | Input A | Input B | Expected Value | Error Message |
| Happy path | 1 | 1 | 2 | N/A |
| 1. Input A is missing | N/A | 1 | N/A | Please enter a value in input A |
| 1. Input B is missing | 1 | N/A | N/A | Please enter a value in input B |
| 1. Input A and B are missing | N/A | N/A | N/A | Please enter values for input A and B |
| 1. Input A is not a number | “a” | 1 | N/A | Please enter a valid number for input A |
| 1. Input B is not a number | 1 | “b” | N/A | Please enter a valid number for input B |
| 1. Input A and B are not numbers | “a” | “b” | N/A | Please enter a valid number for input A and B |
| 1. Input A is a decimal value | 1.1 | 1 | 2.1 | N/A |
| 1. Input B is a decimal value | 1 | 1.1 | 2.1 | N/A |
| 1. Input A and B are decimals | 1.1 | 1.1 | 2.2 | N/A |
| 1. Input A is a negative number | -1 | 1 | 0 | N/A |
| 1. Input B is a negative number | 1 | -1 | 0 | N/A |
| 1. Input A and B are negative | -1 | -1 | -2 | N/A |
| 1. Input A is above MAX\_INT | MAX\_INT+ 1 | 1 | N/A | Please enter a number smaller than MAX\_INT |
| 1. Input B is above MAX\_INT | 1 | MAX\_INT+1 | N/A | Please enter a number smaller than MAX\_INT |
| 1. Input A is smaller than MIN\_INT | MIN\_INT-1 | 1 | N/A | Please enter a number larger than MIN\_INT |
| 1. Input B is smaller than MIN\_INT | 1 | MIN\_INT-1 | N/A | Please enter a number larger than MIN\_INT |

1. Hold a pen. Identify all of the types of testing you would perform on it to make sure that it is of the highest quality, and explain why. For each test, make sure you say what type of testing it is (reliability, performance, etc.) **(10 marks)**

* How thick of a line the pen draws
* How much ink the pen has
* What kind of material the pen is made of
* If it’s a click or a cap pen
* If it’s ballpoint or fountain pen
* What colour the ink is
* If it’s a cap, if the cap is interchangeable with other types of pens
* If the pen has a clip to attach it to a binder
* If the pen is round or has a fitted shape
* If the pen has a rough grip, or a softer one

**Part C – Levels of Testing**

1. The following questions relate to the levels of testing: **(10 marks)**
   1. What are the four levels of testing, in the order in which they are typically performed?

* Unit
* Integration
* System
* Acceptance
  1. Which levels of testing use white box testing techniques?

Unit testing, Integration

* 1. Which levels of testing use black box testing techniques?
* Integration, System, Acceptance
  1. Which levels of testing are performed by the developers?
* Unit, Integration
  1. Which levels of testing are performed by independent testers?
* Integration, System, Acceptance
  1. Which levels of testing are performed by end users?
* Acceptance testing

**Part D – Regression, Performance and Exploratory Testing**

1. Refer to the following web site about exploratory testing to answer the questions: <http://msdn.microsoft.com/en-us/library/vstudio/jj620911.aspx> **(10 marks)**
   1. Explain how exploratory testing works.

In exploratory testing, testers may interact with the application in whatever way they want and use the information the application provides to react, change course, and generally explore the application’s functionality without restraint

* 1. What is the drawback to exploratory testing?

The drawback to exploratory testing is that testers risk wasting a great deal of time wandering around an application looking for things to test and trying to find bugs.

* 1. Explain the “plan as you test” mindset of exploratory testing.

exploratory techniques have the advantage that they encourage testers to plan as they test and to use information gathered during testing to affect the actual way testing is performed

* 1. Should exploratory testing be done in addition to traditional testing? Why or why not?

Having formal scripts can provide a structure to frame exploration, and exploratory methods can add an element of variation to scripts that can amplify their effectiveness.

* 1. Explain scenario-based exploratory testing.

Scenario-based exploration will cover cases that simple scenario testing will not and more accurately mimics real users, who often stray from the main scenario: After all, the product allows many possible variations.

1. Refer to the following web site about regression testing to answer the questions: [http://blog.xebia.com/regression-testing-with-an-agile-mindset/](http://blog.xebia.com/regression-testing-with-an-agile-mindset/%20) **(10 marks)**
   1. What is the target area of a regression test?

The target area of the regression test is the complete set of (end-to-end) business functions that a system encompasses.

* 1. What is one of the main success factors of the agile approach?

In an agile context this means that regression test results are of great value to the product owner at the end of each sprint, when he has to evaluate and accept not only the newly developed functionality, but the overall functionality of the system after the changes have been made.

* 1. When should regression tests be executed? How can this be achieved?

To allow the team to respond efficiently to any findings from the regression tests, it is imperative that the regression tests are executed shortly after changes have been made.

* 1. What are functional tests used to prove in an agile context?

In an agile context, functional tests are used to prove that the team has delivered the functionality that is planned for a sprint.

* 1. In your own words, what are the problems with running the functional tests for previous sprints as regression tests for current and coming sprints?

Because the development is evolutionary, the same logic is often modified on several occasions over many iterations. This results in lots of testing being done for identical functionality. Because the logic is being modified, older tests need updating, therefore increasing the size of effort in every subsequent sprint.

* 1. What is the recommendation for how to deal with these problems?

it is better to work with (or towards) a smaller, relatively stable set of regression tests. This set should be constructed on the basis of knowledge of the business functions and of the technical implementation, to ensure sufficient but not superfluous coverage.

* 1. In your own words, briefly describe the 4 steps that should be used to develop the set of regression tests.
     1. Over the course of multiple sprints, the product owner will create a list of functions that need to be included in regression tests.
     2. Throw aside the functional tests for now, hold on to some to be updated later.
     3. Convert some functional tests into regression tests to replace some existing tests. The old ones can then be taken out.
     4. Update the regression tests when necessary.

1. Refer to the following web site about performance testing to answer the questions: <http://msdn.microsoft.com/en-us/library/bb924357.aspx> **(10 marks)**
   1. What are the key types of performance testing for web applications and the purpose of each one?

Performance test:

To determine or validate speed, scalability, and/or stability.

Load test:

To verify application behavior under normal and peak load conditions.

Stress test:

To determine or validate an application’s behavior when it is pushed beyond normal or peak load conditions.

Capacity test:

To determine how many users and/or transactions a given system will support and still meet performance goals.

* 1. Navigate to Chapter 4 - Web Application Performance Testing Core Activities. What are the seven-core performance-testing activities?

1. Identify test environment
2. Identify performance acceptance criteria
3. Plan and design test cases
4. Configure the test environment
5. Implement the test design
6. Execute the tests
7. Analyze results, report, and retest
   1. Navigate to Chapter 17 – Load Testing Web Applications. What does load testing help to identify?
      1. Network-specific metrics.
      2. System-related metrics.
      3. Platform-specific metrics.
      4. Application-specific metrics.
      5. Service-level metrics.
      6. Business metrics.
   2. What are the five test objectives that are frequently included in load testing?
      1. Response time.
      2. Throughput.
      3. Resource utilization.
      4. Maximum user load.
      5. Business related metrics.
   3. Navigate to Chapter 18 – Stress Testing Web Applications. What is stress testing focused on?

Stress testing is a type of performance testing focused on determining an application’s robustness, availability, and reliability under extreme conditions.

* 1. What are two examples of stress conditions?
* Unexpected sequencing.
* Unexpected outages/outage recovery.

**To submit**

When you have completed the assignment, upload the document to the Moodle page for this course.