**Course: Software Testing**

**Lab. Report #2 – Automated Requirements-Based API Unit Testing using JUnit**

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# Unit testing plan

The black-box test technique(s) that you are using

In order to have a complete and wide range of testing that avoids test redundancy, we decided to use a combination of black-box testing techniques. We can cover the entire input set of a function for completeness using equivalence-class testing. This will be useful for functions with multiple inputs such as the Range function described in the familiarization section. We will also complement this with boundary-value analysis to identify errors between different equivalence classes.

For SUTs with a large amount of inputs, we will opt to use pair-wise testing instead as this will reduce the amount of test cases while still provide an effective ‘fault detection power’ within our test suite.

 How you will derive your test cases

 How you will organize your JUnit test suites (based on Appendix C)

The aim of this lab was to develop test classes for the Range and DataUtilities classes within org.jfree.data, so we decided to create two test classes named RangeTest and DataUtilitiesTest. Within each of these classes will contain the test methods that will be developed for the SUT. We prefixed each of the methods with ‘test’ for consistency

# Designing the unit test-cases using black-box test-case design techniques

Note: You should not include any test code in this section, but only the design of the test cases using the above methods, before coding them.

JFreeChart – Class org.jfree.data.Range

Text

Description automatically generated

No input parameters, but Range object has two attributes upper and lower, we can derive test cases from different ranges:

* When upper and lower are the same and positive
* When upper and lower are the same and negative

In cases where the upper and lower values are different:

* When upper and lower are both positive
* When upper is a positive number and lower is a negative number
* When both upper and lower and negative numbers

|  |  |  |  |
| --- | --- | --- | --- |
| TC | Inputs | | Expected Output |
| Lower | Upper |
| 1 | 5 | 5 | 5 |
| 2 | -8 | -8 | -8 |
| 3 | 3 | 9 | 9 |
| 4 | -4 | 6 | 6 |
| 5 | -7 | -3 | -3 |

Graphical user interface, text, application

Description automatically generated

Provides the same functionality as getUpperBound, but returns the lower bound instead. We can use the same ranges with a different expected outcome:

|  |  |  |  |
| --- | --- | --- | --- |
| TC | Inputs | | Expected Output |
| Lower | Upper |
| 1 | 5 | 5 | 5 |
| 2 | -8 | -8 | -8 |
| 3 | 3 | 9 | 3 |
| 4 | -4 | 6 | -4 |
| 5 | -7 | -3 | -7 |

DataUtilities Methods

# Output of test suite execution

## Screenshot of test-suite execution in JUnit (showing the names of test methods)

See the lab document for an example

## List of failed test cases, and the possible defects based on that information

Text…

# How the team work/effort was divided and managed

## How the team work/effort of the lab was managed and divided

* You can say for example discuss which sections / parts of the lab was done by who…
* And also discuss the meetings that you had to plan and run the lab work
* Etc.

## Writing the lab report

Fill up the following table to specify who wrote what part of the lab document:

|  |  |
| --- | --- |
| **Lab-report section** | **Written by** |
| 1- Introduction | Student A |
| 2-.. |  |
| … |  |

## Lessons learned from your teamwork in this lab

Text

# Difficulties/ challenges encountered, overcoming them, and lessons learned

This section has the following sub-sections.

## Difficulties/ challenges encountered

Text…

## How did you overcome the above difficulties/ challenges?

Text…

## Lessons learned

Text…

# Comments/feedback on the lab and lab document itself

This section has the following sub-sections.

## Did you find the lab a useful learning experience? How it helped you learn the new testing topics

Text…

## Was the lab document easy to follow?

Text…

## About time budget? (Was there too much/too little time for this lab?)

Text…

## Please provide your comments on how to improve the lab work and lab document

Text…