Test Plan

SENG437 – Software Testing

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1. Test Plan Identifier

JC05-0110

2. Introduction

2.1 Objectives

The following test plan for the Java Calculator will support the following objectives:

i. To detail the activities required to the preparation and the conduct of the test.
ii. To communicate the responsibilities and the schedule of the test plan to the test team.
iii. To define sources of information used in preparation of the test.
iv. To define the tools needed within the test.

2.2 Background

The calculator is based in Java and is a replacement scientific calculator so that users can get extra functionality. The basic calculators don't always offer everything a user may need and java allows the program to be accessible for all users on any platform.

2.3 Scope

The test plan will be covering the main functionality of the Java Calculator. This entails testing the main classes that use mathematical utilities in performing its purpose. One of the non-functional features that will be tested and evaluated is the graphical user interface (GUI).

2.4 References

Java Scientific Calculator Official Homepage - http://jscicalc.sourceforge.net/
JUnit Official Homepage/Wiki - http://junit.org/

3. Test Items

3.1 Program Modules

The program modules to be tested will be identified as follows:

Type	Library	Member Name
Executable Code	jscicalc2-0.5.src.jar	JC0301
Source Code	Expressions	JC0302
Source Code	Buttons	JC0303
Source Code	pobject	JC0304

3.2 User Procedures

The Basic operations procedures specified in the Java Scientific Calculator website (http://jscicalc.sourceforge.net/) and in Javadoc will be tested.

3.3 Operator Procedures

The system test includes the procedures specified in the Java Scientific Calculator website (http://jscicalc.sourceforge.net/) and in Javadoc.

4. Features to be Tested

Basic Calculator Functions

- Addition
- Subtraction
- Division
- Multiplication
- Numbers
- Deleting items
- Clearing calculator

Ways of Interaction

- GUI
- Keyboard (Keyboard Shortcuts)

Advanced Calculator Functions

- Memory Storing
- Functions involving Parentheses
- Exponential Functions
- nth Root
- Trigonometric Functions (ie. Sine, Cosine…etc.)
- Logarithmic Functions
- Combination/Permutations
- Imaginary Number
- Functions involving π
- Shift Functions
- Modes

5. Features not to be Tested

Hidden functionality

Since the user is not using this functions like "`public string tooltip()`" located in `CalculatorButton.java`, we don't need to test their functionality. Only a developer would notice this issue and the program would have noticeable bugs if these types of functions were not functional. The developers of the application aren't even sure if this exact function is used in the final product so if we tested it we might be testing a dead piece of code, which would be a waste of time.

Dead Functions

Any functions the developers find no use for and have managed to stay in the code for fear of it potentially getting called somewhere. The previous example can be used in this case.

6. Approach

The program testing team will use the program documentation along with a created Javadoc to prepare all test designs and procedures.

6.1 Performance Testing

Performance will be evaluated by measuring the run times of various simple and complex calculations and tasks. In addition system resource utilization will be examined.

6.2 Accuracy Testing

Accuracy of the answers given by the various calculations will be tested against the accuracy requirements as stated in the programs documentation.

6.3 GUI Testing

Combinations of manual and automated GUI testing will be used to determine the quality of the GUI.

6.4 Reliability Testing

Various loads will be placed on the program for various time periods to determine program stability and reliability.

6.5 Correctness Testing

The correctness of the calculations provided by the program will be tested using a pre-existing known list of answers to ensure the program is calculating as intended as outlaid in the documentation provided. Several comparable programs will be used to determine a list of known answers.

6.6 Constraints

All testing must be done by the schedule as provided in the document "SENG 437 - Project Timeline.pdf" located in Blackboard.

7. Item Pass/Fail Criteria

In a program such as this, the calculator has one main criteria of pass/fail: it must produce the correct answer to the calculation inputted. This must remain consistent for all mathematical queries that are inputted into the program.

The other main criterion for a calculator is usability. The GUI of the calculator must be able to display the correct answers and must be responsive to user interaction. State changes must be obvious to the user.

8. Suspension Criteria and Resumption Criteria

8.1 Suspension Criteria

i. The inability to interpret the code, due to lack of documentation, will cause the temporary cessation of testing activities.

ii. When a new iteration is released, there will be a temporary cessation of testing activities.

8.2 Resumption Criteria

i. When documentation is found, and after a period of interpretation has occurred, testing can then be resumed.

ii. When documentation of bug fixes or updates is found, and after a period of interpretation has occurred, testing can then be resumed.

9. Test Deliverables

The following documentation will be submitted to the Department Manager by the test team after test completion.

Test Documentation

- Test Plan
- Test Design Specifications
- Test Case Specifications
- Test Procedure Specifications
- Test Logs
- Test Incident Report Log
- Test Incident Reports
- Test Summary Report

Test Data

i. Copies of input and output test files will be submitted along with the Test Documentation to the Department Manager

10. Testing Tasks

See Attachment A for details.

11. Environmental Needs

11.1 Hardware

Testing will be conducted on machines that can run Java 2 Runtime Environment 1.5. This assessment was made from the hardware requirements listed on the program's homepage. The minimum requirements for Java 2 Runtime Environment 1.5 are: Windows 2000/XP/2003/Vista, IE 5.5/6.x or Mozilla 1.4+ or Firefox.

11.2 Software

11.2.1 Operating System

The primary operating systems that will be used is Windows 8.1 and Mac OSX Maverick 10.9.

11.3 Tools

JUnit – A programming-oriented framework for Java will be used as the primary testing tool.

12. Responsibilities

12.1 Program Testing Team

This team will be providing all technical testing expertise and will be conducting all manners of the test plan.

12.2 Test Manager

This person will be overseeing all activities of the test team and will ensure that the team meets all testing schedule milestones.

13. Schedule

See Attachment A for details.

14. Risks and Contingencies

To prevent interruptions that may be caused by computer hardware failures, all activities done by the team will be documented and backed up to the cloud storage systems available.

If a test team member is unable to fulfill their duties assigned, that member must communicate that to the team leader well in advance; those tasks will be assigned to another team member.

If a milestone will be missed, the team manager will attempt to modify the schedule in order to meet the most (if not all) objectives of the milestone missed.

15. Approvals

____________________________________ ____________________

Department Manager Date

____________________________________ ____________________

Team Leader Date

Attachment A. – Schedule/Task List

Task	Predecessor Task	Special Skills	Responsibility	Finish Date
1. Test Preparation	None	Interpreting Code Documentation	Program Testing Team/Test Manager	January 30
2. Black-Box Testing	Task 1		Program Testing Team	February 13
3. White-Box Testing	Task 2		Program Testing Team	March 3
4. Code Coverage	Task 2		Program Testing Team	March 3
5. Mutation Testing	Task 3		Program Testing Team	March 20
6. GUI and Non-Functionality Testing	Task 4	UI Experience	Program Testing Team	April 3
7. Presentation to Department Manager	Task 5		Program Testing Team/Test Manager	April 14