Heriot-Watt University

School of Mathematical and Computer Sciences

Software Engineering 4 (F22HX3)

Assignment (Part 2): An Exercise in Testing

Andrew Ireland

May 3, 2005

1 Introduction

Your task is to test the Java *triangle classification* program which you submitted for Part 1 of the assignment. It is **very important** that you **do not** initially make any modifications to the program you submitted by email in Part 1.

2 Testing Strategy

In testing the program that you submitted in Part 1 **you must** follow the strategy outlined in the lecture for *Dynamic Analysis Techniques Part 1*, *i.e.*

1. Use functional testing and error guessing techniques to design initial test cases.
2. Use coverage metrics to determine the effectiveness of the initial test cases.
3. Use structural testing techniques to increase coverage if judged necessary.

Both positive (desirable behaviour) and negative (undesirable behaviour) test cases should be applied.

For the purposes of this assignment, **you must use the Condition/Decision coverage metric** as the basis for i) determining the effectiveness of your functional testing, and ii) any structural testing that is subsequently required. This will involve you in identifying the:

- Decision points within your code.
- Condition/Decision coverage criteria for each decision point.
- Condition/Decision cases that were **not exercised by your functional testing.**
- Test cases that will cover the missing Condition/Decision cases.

3 Deliverables

A hard-copy submission is required. Your submission should include:

D1: A table showing your functional testing. The table should include:

- Test case specifications, *i.e.* what you are testing for, including the expected results.
- For each test case specification, the actual data used in implementing the test.
- Actual results of applying the functional testing, *i.e.* a reference within the table to an appendix where the results are presented. Note that "actual results" **must be supported** by the output from actual program runs!

D2: Your original Java *triangle classification* program, with the decision points highlighted.

D3: A table showing your Condition/Decision coverage analysis and any structural testing that was required. The table should:

- Include the Condition/Decision coverage criteria for each decision point – clearly indicate how the table entries correspond to D2, your highlighted code.
- Indicate which parts of the coverage criteria were achieved by your functional testing, *i.e.* for each decision point.
- Include a reference to the structural test cases that were used to cover any Condition/Decision cases that were missed by your functional testing.
- Actual results of applying the structural testing, *i.e.* a reference within the table to an appendix where the results are presented. Note that "actual results" **must be supported** by the output from actual program runs!

D4: A summary of any bugs or omissions that the overall testing strategy uncovered in your original program, together with possible program patches.

This part of the assignment is due on **Tuesday, May 17th 2005 at 4pm**, and should be submitted via the course work box located within the "crush area". Note that in order to obtain a grade for the assignment **ALL PARTS OF THE ASSIGNMENT MUST BE ATTEMPTED**. Collectively, the three parts of the assignment count towards 25% of the final assessment of this module. **Note that this is an individual project which means that the submission MUST be your own work.**