Term Test 2

COSC 4313 3.0 Software Engineering Testing

Section M, Winter 2007

Family Name: _____

Given Name(s): _____

Student Number: |___ |___ |___ |___ |___ |___ |___ |___ |___ |

Question	Out of	Mark
Q1	23	
Q2	30	
Q3	47	
Total	100	
Letter grade		

1. **[23 marks]** Consider the following three methods

```
int method1(int a, int b) {
   int result = 0;
   if (a>0) {
       result ++;
   }
   else {
       result = method2(result, 7);
       result --;
   }
   result = result * b;
   result = method3(result, b);
   return result;
}

int method2(int r, int c) {
    r = r * (c + 1);
    r ++;
    return r;
}

int method3 (int r, int b) {
    if (b > 0) {
        r = b;
    }
    else {
        r = 2 * b;
    }
    return r;
}
```

Assume that execution starts with `method1`. In the next two pages, do the following:

- Draw the MM-path graph for this system. For each method, clearly identify the module execution paths.
- Identify a set of test cases that will result in complete edge coverage of the MM-path graph. You only need to provide the values for arguments `a` and `b`, i.e. you do not have to compute the value of `result`.

2. **[30 marks]** Consider the following method

```
1   public void q2(int a, int b) {
2       if (a < 30)
3       {
4           i = 2;
5       }
6       else
7       {
8           i = 5;
9       }
10      if (a < b)
11      {
12          i = 8;
13      }
14      if (b < 30)
15      {
16          System.out.println(i);
17      }
18      else
19      {
20          System.out.println(i + 5);
21      }
22  }
```

[20 marks] Evaluate the data flow coverage of a test suite that contains the following three test cases:

a = 35, b = 32
a = 35, b = 29
a = 24, b = 25

In particular, you are required to calculate the coverage of the aforementioned test suite based on the following criteria:

(a) All-Defs

(b) All-Uses

(c) All-P-Uses / Some-C-Uses

(d) All-C-Uses / Some-P-Uses

In each case, clearly describe and explain your calculations.

[10 marks] Is it possible to achieve 100% coverage for the All-Uses criterion? If so, list the additional test cases that will be required. If not, explain why.

3. **[47 marks]** You are hired to test a currency converter GUI application whose specification is given below. Your task is to describe the application of any software testing strategies that you believe are appropriate in order to test this application. The derived test cases must be identified clearly in your answer. Answers that list test cases without describing how they were derived will receive a poor mark.

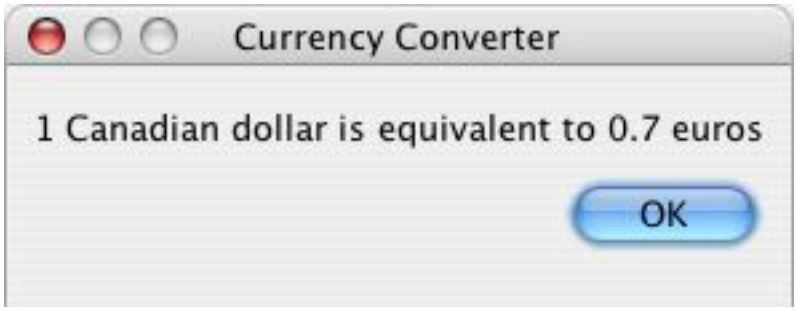
   The specification is provided as is. You may have to make assumptions about system behaviour that is not mentioned in the specification. If this is the case, choose reasonable ones and state them explicitly.

   Do not provide any Java code. Just describe what the test case entails.

   Specification

   Following is a screendump of the application immediately after it is launched.

   The user should be able to enter an amount of Canadian dollars in the textfield, select a currency to convert to (there are two options: american dollars and euros), and click the Convert button. A new window such as the one below should appear.



   Clicking on OK returns to the main window.

   The Clear button should clear the textfield and the currency selection, and the Quit button exits the application.

For the purposes of this question, you can assume that the conversion rates are fixed as follows: 1 Canadian dollar is 0.9 american dollars and 0.7 euros.

The Convert button should be disabled if there is no text in the textfield, or if no currency is selected. Whenever conversion is not possible, a window such as the one below should appear when the Convert button is pressed.

When a message window is shown, the main window should not be clickable.