CS132: Software Engineering

HW4: Testing

In this homework, we will practice how to generate test cases that cover system execution from different perspectives. There are 10pts in this homework. Please try to answer all the questions in English and submit a .pdf report on Blackboard.

1 Control Flow Testing (7pts)

1.1 For the following algorithm:

```
1   def foo(y):
2       s = x = 0
3       while( x < y ):
4           x = x + 3
5           y = y + 2
6           if( x + y < 10 ):
7               s = s + x + y
8           else:
9               s = s + x - y
10          s = s + 1
11      if(s > 0):
12          return True
13      else:
14          return False
```

a. Draw the Control Flow diagram for this function (1pt)

b. Identify a set of linearly independent paths from the control flow (2pts)

Note: A linearly independent path is any path through the application that introduces at least one new edge that is not included in any other linearly independent path.

c. Identify complete test cases (input, output) corresponding to the linearly independent paths. (2pts)

Note: All variables are Int type.

1.2 For the following code segment:

```
if(A < 3 and B >= 1):
    X = X / A
    return
if(A >= 4 or X == 7):
    X = X - 2
    return
if(B < 2 and X <=4 ):
    X = A
    return
```

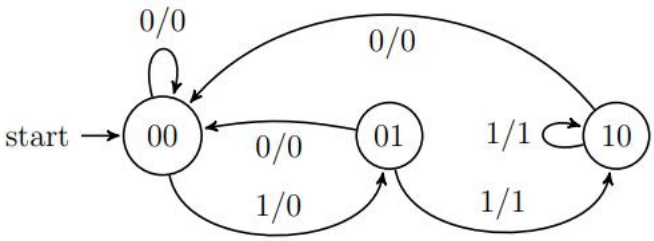
a. What is the minimum number of test cases needed for a complete coverage in branch (decision) testing? Provide a set of such test cases and justify.(1pt)

b. What is the minimum number of test cases needed for a complete coverage in condition testing? Provide a set of such test cases and justify.(1pt)

Note: All variables are Int type.

1 State Transition Coverage Testing (3pts)

For a State Machine shown below:



a. Draw the State Table for the state machine (1pt)

State\Input		

b. Identify 0-switch test cases for the state machine (2pts)

Note: The x/y on each transition refers to input/output of the transition. Also each test case should contain: start state, input, expected output, finish state and test coverage item.