Beijing Jiaotong University

2019—2020 School Year Second Semester Exam (A)

Course Name: Software Quality Assurance and Testing Techniques

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Class:_____ Name:_____ Student ID:_____

No.	1	2	3				Total Score
Score							
Examiner							

Take care:
Plagiarism is extremely forbidden in the exam, if detected, the exam score will be marked as 0 !!!

Part 1. Short questions. (2*15=30 marks)

1. White box testing and Black box testing (**15 marks**)

(1) Please explain the difference between white box testing and black box testing.

(2) Please explain how to combine them together to test a system (in detail).

(3) Please explain your solution to reduce the complexity of testing a system.

Answer:

2. Static testing and Dynamic testing (**15 marks**)

(1) Please explain the difference between static testing and dynamic testing.

(2) Could you provide the list of document or content that static testing can test? And provide the different levels of static testing.

(3) Please explain how to combine them together to test a system (in detail).

Answer:

Part 2. Long Questions (30+20=50 marks)

1. Consider a software module that is intended to accept the name of a grocery item and a list of the different sizes the item comes in, specified in ounces. The specifications state that the item name is to be alphabetic **characters 3 to 10 characters in length**. Each size may be a value in the **range of 1 to 10**. Whole numbers only. The sizes are to be entered in **ascending order** (**smaller sizes first**). A **maximum of 5 sizes** may be entered for each item.

   The item name is to be entered first, followed by a comma, then followed by a list of sizes. A comma will be used to separate each size. Spaces (blanks) are to be ignored anywhere in the input. (**30 marks**)

(1) Please provide at least 15 equivalence classes of the above description (including valid and invalid classes).

Example:

Equivalence Class No.	Description of the class	Type
1	Item name is not alphabetic	Invalid

(2) Please provide at least 15 test cases to cover the classes you mentioned.

Example:

No.	Test Data	Expected Outcome	Equivalence Classes Covered
1	A2Y,1	F	1

(3) Please provide the Boundary Value Analysis of the variables: **item name, item size, item list** mentioned above. And **provide corresponding test cases**.

2. Now we have simple requirement of:

- This program calculates the grade of a student based on the marks entered by user in each subject. Program prints the grade based on this logic.
- If the average of marks is >= 80 then prints Grade ‘A’
- If the average is <80 and >=60 then prints Grade ‘B’
- If the average is <60 and >=40 then prints Grade ‘C’
- else prints Grade ‘D’

the corresponding java codes are shown below: (**20 marks**)

```
1       public static void main(String args[])
2       {
3               int marks[] = new int[6];
4               int i;
5               float total=0, avg;
6               Scanner scanner = new Scanner(System.in);
7               for(i=0; i<6; i++) {
8                   System.out.print("Enter Marks of Subject"+(i+1)+":");
9                   marks[i] = scanner.nextInt();
10                  total = total + marks[i];
11              }
12              scanner.close();
13              avg = total/6;
14              System.out.print("The student Grade is: ");
15              if(avg>=80)
16              {
17                      System.out.print("A");
18              }
19              else if(avg>=60 && avg<80)
20              {
21                  System.out.print("B");
22              }
23              else if(avg>=40 && avg<60)
24              {
25                      System.out.print("C");
26              }
27              else
28              {
```

```
29                  System.out.print("D");
30              }
31      }
```

(1) Please draw the control flow graph of above code, and compute the cyclomatic complexity of the graph.

(2) Verify whether the code has an error and provide the minimum "Full path coverage" test cases. If it has an error in the control flow, please explain where the error is and how to solve it.

Part 3. Open Question (2*10=20 marks)

1. Here are some ambiguous requirements, in order to make requirements clear to anyone who read it, could you modify the following sentences to reduce the ambiguity?
   (1) The product shall show the weather for the next 24 hours.
   (2) Shut off the pumps if the water level remains above 100 meters for more than 4 seconds
   (3) If the ATM accepts the card, the user enters the PIN. If not, the card is rejected.
   (4) The doors of the lift never open at a floor unless the lift is stationary at that floor.
   (5) When the user presses the L- and R-button simultaneously, the alarm is turned off.

2. In your opinion, what is the most difficult part in current software testing techniques?