Cairo University
Faculty of Computers and Information

ثالثة + رابعة

Name
ID Number
Ear Code

موضوعات مختارة في علوم الحاسب

Course: Software Testing

Course Code: CS496

Year: Fall 2015-2016

Date: 5 Jan 2016

Duration: 2 hours

Instructor: Dr. Soha Makady

Question	Mark
One	
Two	
Three	
Four	
Five	
Six	
Total Marks	

60

Total Marks in Writing: _____

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Attempt ALL Questions

Note: The exam booklet has 12 pages. The questions are in the first 10 pages only. There are two empty pages that you can use as a draft to think about any question. But, you need to write your answer below its corresponding question (not in the draft empty pages).

Question 1: (10 marks)

We begin with some basic knowledge regarding software testing:

a) What is a test case? What are its main components? (4 marks)

b) Define the terms verification and validation, and explain which of those two terms should software testing be targeting. (4 marks)

c) Explain the difference between software testing, and quality assurance. (2 marks)

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Question 2: (20 Marks)

We have looked at a number of black-box techniques for testing.

a) Consider the "File-Save As" dialog that appears in the Windows operating system, when you save a file. The dialog requests that you enter a filename. That filename can contain any character except for: \ / : * ? " < > and |. Furthermore, that filename can have from 1 to 255 characters.

Use equivalence partitioning to design the test cases needed to test this "File-Save As" functionality. Note that you need to: (i) identify the equivalence partitions, (ii) explain how you would use those partitions in order to design the test cases, and (iii) show your concrete test cases that satisfy your test case design. (8 marks)

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b) Consider a credit card processing company that validates whether a credit card can be used to perform any purchases (مشتريات) as follows:

- It checks if the credit card belongs to a real bank account.
- It checks if the bank account is an active one, or not.
- It checks if the person is within, or above their limit for the purchase transaction.
- It checks if the transaction is coming from a normal or a suspicious location.

According to such checks, the company would:

- Approve the transaction if the 4 checks are valid.
- Call the vendor (the selling company) if the account is not active, or if it doesn't seem to be a real account.
- Call the card holder if the account is real and either: his location seems suspicious, or the performed transaction is above his allowed limit for purchase.

Build a cause-effect graph for that system. (5 marks)

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c) Consider a loan application, where you can enter the amount of monthly repayment or the number of years you want to take to pay it back (the term of the loan).

If you enter both (i.e., the amount of monthly payment and the number of years), the system will make a compromise between the two if they conflict. If you do not enter anything, the system will display an error message.

Derive the decision table for that loan application. Note that you do not required to create concrete test cases. You only need to create, and fill-in the decision table.

(7 marks)

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Question 3: (8 Marks)

We have looked at a number of white-box testing techniques.

a) **Given the following function "foo". Derive a number of test cases to achieve a 100 percent decision/branch coverage (4 marks)**

```
public int foo(int A, int B, int X)
    {
        if(A>1 && B==0)
            X = X/A;
        else
            X = X-1;
        if(A==2 || X>1)
            X=X+1;
        return X;
    }
```

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b) Consider the following code. Given a test suite T that has two tests t1, and t2 as follows: T1: <x=-3, y=-2>, T2: <x=-4, y=2>

Calculate the condition coverage of that the test suite T. You need to show all the steps for your calculation. (4 marks)

```
1   begin
2     int x, y, z;
3     input (x, y);
4     if(x<0 and y<0)
5       z=foo1(x,y);
6     else
7       z=foo2(x,y);
8     output(z);
9   end
```

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Question 4: (10 Marks)

We have discussed module testing in our lectures.

a) Clarify the difference between a stub module, and a driver module. (4 marks)

b) Compare between incremental and non-incremental testing. Use only three of t following criteria in your comparison: (i) required work, (ii) programming errors d to mismatched interfaces/incorrect assumptions, (iii) amount of exposure to testin (iv) machine time, and (v) debugging. (6 marks)

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Question 5: (8 Marks)

We discussed some types of testing including security testing and mobile apps testing.

a) We explained the OWASP Top Ten list. What is the purpose of this list? Note that you need to explain its purpose, rather than mention its 10 included items. (4 marks)

b) Within mobile-app testing, we discussed the "fragmentation problem". Explain the fragmentation problem and explain how it can be handled.

(4 marks)

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Question 6: (4 Marks)

We have discussed several testing-related topics within your presentations.

a) What is regression testing? (1 mark)

b) What is usability testing? (1 mark)

c) What are the advantages and disadvantages of automated test case generation? (2 marks)

The End of the Exam

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