The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Electrical & Computer Engineering

Study Programme   : Bachelor of Technology Honours in Engineering
Name of the Examination : Final Examination
Course Code and Title   : EEX5567/ECX5267 Software testing and quality assurance
Academic Year   : 2017/18
Date   : 22nd January 2019
Time   : 0930-1230hrs
Duration   : **3 hours**

General Instructions

1. Read all instructions carefully before answering the questions.

2. This question paper consists of **Five (5)** questions in **ten (10)** pages.

3. Answer **Questions 1 and 2** in **Section A. Both questions in Section A are compulsory.**

4. **Answer** any **two (2) Questions** from **Section B** which contains 3 questions.

5. Answers for two questions in Section A must be written on the paper itself and handed over.

6. Answers for Section B must be done in separate papers and each question should commence from a new page.

7. This is a Closed Book Test (CBT).

8. Answers should be in clear hand writing.

9. Do not use Red colour pen.

SECTION A [Answer All Questions]

SECTION A is compulsory. Answer all questions. This section will provide you 50 marks in total. The marks belongings to each part is displayed separately.

Question 1 [underline the correct answers]   *[20 Marks]*

a) One of the fields on a form contains a text box which accepts alphabets in lower or upper case. Identify the invalid input value.
    A. MARS
    B. mARS
    C. MArs
    D. MAa01ss

b) Which of the following types of testing assumes that a path of logic in a unit or program is known?
    A. White-box testing
    B. Black-box testing
    C. Incremental testing
    D. Thread testing

c) Which solution below lists techniques that can all be categorized as Black Box design techniques?

    A. Equivalence Partitioning, decision tables, state transition, and boundary value.
    B. Equivalence Partitioning, decision tables, use case.
    C. Equivalence Partitioning, decision tables, checklist based, statement coverage, use case.
    D. Equivalence Partitioning, cause-effect graph, checklist based, decision coverage and boundary value.

d) Software testing activities should start

    A. as soon as the code is written
    B. during the design stage
    C. when the requirements have been formally documented
    D. as soon as possible in the development life cycle

e) Enough testing has been performed when:

    A. time runs out
    B. the required level of confidence has been achieved
    C. no more faults are found.
    D. the users won't find any serious faults

f) Which statement is a valid explanation as to why black-box test design techniques can be useful?

    A. They can help to derive test data based on analysis of the requirement specification
    B. They can help derive test cases based on analysis of a component code structure
    C. They can help to derive test conditions based on analysis of a system internal structure
    D. They can help to reduce testing costs

g) Which of the following BEST describes the relationship between test planning and test execution?

    A. Test planning ensures the level of detail in test procedures is appropriate for test execution
    B. Test planning schedules test execution but does not assign resources
    C. Test planning defines the overall approach to testing but does not schedule specific activities such as test execution
    D. Test planning identifies test objectives related to scope and risk but does not define the level of detail for test procedures used in test execution

h) If the pseudocode below were a programming language, how many tests are required to achieve 100% statement coverage?

> *If x=3 then*
>   *Display_messageX;*
> *If y=2 then*
>   *Display_messageY;*
> *Else*
>   *Display_messageZ;*
> *Else*
>   *Display_messageZ;*

    A. 1 test case
    B. 2 test cases
    C. 3 test cases
    D. 4 test cases

i) When should we run regression tests?

    A. Every week
    B. After the software has changed
    C. As often as possible
    D. When the environment has changed

j) The cost of fixing a fault:

    A. Is not important
    B. Increases as we move the product towards live use
    C. Decreases as we move the product towards live use
    D. Is more expensive if found in requirements than functional design

Question 2 *[30 Marks]*

Suppose you are working as an Associate Quality Engineer in a software company and Your Quality Engineering lead assigned a task to test the following form.

> User should enter valid exam mark, course work mark and needs to click on "Calculate total Mark" button. Then system calculate **Total Mark** and **Grade** and then those values will appear in the same interface in-line with mentioned text

Figure - 1

Exam mark should be out of 75 and a coursework mark should be out of 25. From those system generates a grade for the course in the range 'A' to 'D'. The grade is calculated from the total mark (out of 100) which is calculated as the sum of the exam mark (out of 75) and coursework marks (out of 25), as follows:

- greater than or equal to 70 - 'A'
- greater than or equal to 50, but less than 70 - 'B'
- greater than or equal to 30, but less than 50 - 'C'
- less than 30 - 'D'

Where a mark is outside its expected range then a fault message ('FM') is generated. All inputs are passed as integers.

a) Present Partitioned ranges of values for **exam marks** pictorially. (Use following line to present pictorially)

[2 Marks]

$\longleftrightarrow$
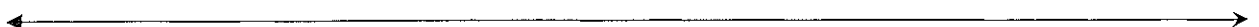
b) Present Partitioned ranges of values for **course work** pictorially.(Use following line to present pictorially)

[2 Marks]

⟵───⟶

c) Present **equivalence partitions** and **boundaries** for <u>**total mark**</u> pictorially. (Use following line to present pictorially)

[8 Marks]

⟵───⟶

d) Lets say that you have decided to do **only equivalent partitioning**. Discuss the impact of this decision for this example.

[2 Marks]

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....

e) Write down **one positive, one negative** and **one extreme** test scenario for the above GUI.   [6 Marks]

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Imagine user have entered **valid exam mark** and **valid coursework mark** and then **click on "Calculate Total Mark"** as Figure -2 given below. Then **you got the error window which is not expected behavior.**
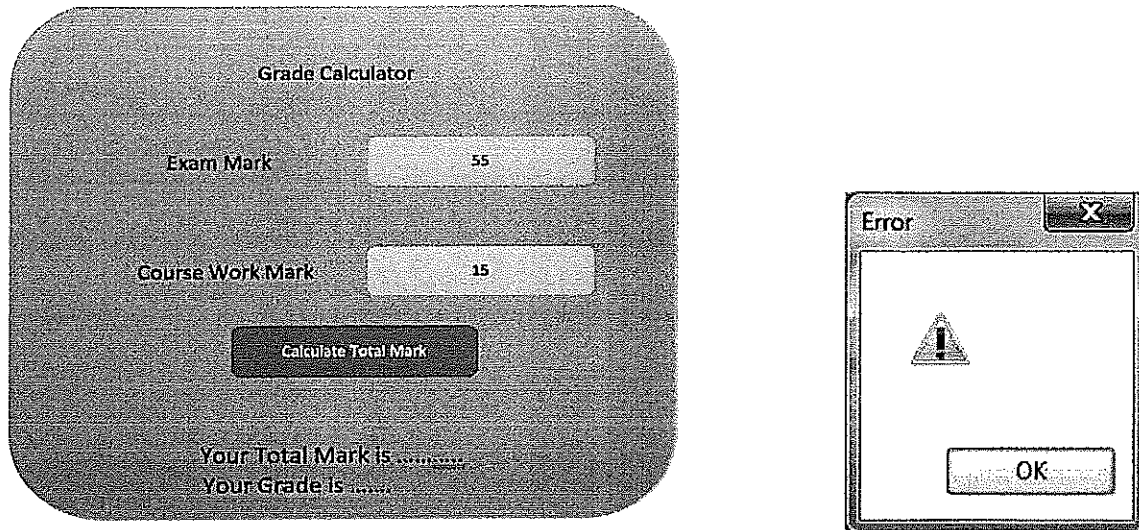
Figure – 2

f) What is the difference between priority and severity of an issue?   [2 Marks]

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....

g) Report above defect to developer using following format
   [8Marks]

Defect ID	TEST-001
Title	
Priority	
Severity	
Precondition	
Steps to Reproduce the Issue	
Error	
Expected Behavior	
Other Notes	

-------------------------------- SECTION A - END --------------------------------

SECTION B
Essay Questions - Answer any 2 Questions out of 3. Each question carry 25 marks.

Question 03

"Computer systems are used in many *critical applications* where a failure can have severe damages."

a) Give 3 example of critical applications.   [3 Marks]

b) List down 5 quality attributes of critical application. **Explain** each of these attribute using one example mentioned above (a)   [10 Marks]

c) What is a Risk? Briefly explain   [4 Marks]

d) List down contingency plans for following risk areas   [8 Marks]

- Bad Data
- Lack of user trainings
- Scope creep
- Interface problems

Question 04

"Verification and Validation (V&V) is the process of checking that a software system meets specifications and that it fulfils its intended purpose. "

a) Define and distinguish verification and validation.   [6 Marks]

b) List down the techniques used for Verification and Validation   [4 Marks]

d) List down the similarities and differences between system and acceptance testing   [5 Marks]

e) Describe the costs associated with quality with an example for each cost category   [10 marks]

Question 05

Following are the major environment involve in deployment process and testing

a) Explain the main purpose and objective of those environment   [8 Marks]
   • Dev
   • QA
   • UAT
   • PROD

b) Compare and contrast objective of Testing Vs Debugging.   [4 Marks]

c) Following are the major components of quality engineering process. **Briefly** describe each of those by including main goal and activities of each phase.   [9 Marks]

   • Pre-QA activities
   • In-QA activities
   • Post-QA activities

d) Test plan is the main document of QA process that describes what testing activities are required. What are the main purposes of a test plan ?   [4 Marks] .

------------------------------ **SECTION B - END** ------------------------------

10/10