Sri Lanka Institute of Information Technology

B.Sc. Special Honours Degree
in
Information Technology

Final Examination

Year 3, Semester 1 (2019)

SE3010 - Software Engineering Process and Quality Management

Duration: 2 Hours

May/June 2019

Instructions to Candidates:

♦ This paper is preceded by a **10-minute** reading period. The supervisor will indicate when answering may commence.

♦ This paper contains **four** questions. Answer **all** questions.

♦ Total marks for the paper is 100 (Contributes to 60% of the final grade).

♦ This paper contains **four** pages including the cover page.

♦ Electronic devices capable of storing and retrieving text, including calculators and mobile phones are **not allowed**.

Question 01   (25 marks)

a) Sri Lanka has decided to introduce a digital driver's license to replace the existing physical driver's license. The new digital license should be able to store in a mobile phone by installing a custom app and whenever an official wants to verify the license, he/she could use his/her mobile phone with a digital license reader app to view and verify the details.

- License App - Installed by the license holder. Data is downloaded from a central server and stored in the device for offline use. This is a one-time setup.

- License Reader App - Installed by officials. Capable of communicating with nearby License apps and querying identity data. Then use that identity data to connect with a central server and pull additional information such as validity and historical records of the driver.

License App and License Reader App communicate via bluetooth and both apps communicate with central server by using HTTP based RESTful APIs.

State your assumptions prior to answering the questions below.

   i. List **four** risks. Prioritize **three** most important risks you've listed and describe strategies on how to handle those **three** risks.   (10 Marks)

   ii. Define **three** measurements that could be used when implementing the solution for the above given scenario.
                                                                                      (5 Marks)

   iii. Describe how to move from an already existing physical driving license system to the new digital driving license system when rolling out the solution to the Sri Lankan public?   (10 Marks)

Question 02   (25 marks)

a) A new team member has joined a project and he has to prepare the Unit Test plan for a module. He says that he would prepare Unit Test plan after completing the code development. Explain what the Project Leader of this project should do in this circumstance.   (6 marks)

b) List **two** prevention cost, **two** appraisal cost and **two** failure cost activities from the following quality cost activities which are associated with a typical software project.   (6 marks)

1. Test planning	5. System test	9. Bug fixes
2. Code reviews	6. Component testing	10. Re-testing bug fixes
3. Training	7. Test case writing	11. Post-mortem review
4. Quality audits	8. Requirements review	12. Help desk support

c) With proper explanation defend or refute the following statement:

"A designated testing team (also referred as QA team) can also participate to resolve production issues"

(6 marks)

d) A complex software application which is nearly at the end of the testing phase is about to be released to the client. Final cycle of testing is due. There is a large suite of test cases written for the entire application. There is simply not enough time to execute all the test cases. Explain the actions that could be taken by the test lead of this project. **(7 marks)**

Question 03   (25 marks)

a) Explain why it is required to test software. **(3 marks)**

b) Explain the term "**black-box testing**". **(3 marks)**

c) Using **Boundary Value Analysis** and **Equivalence Partitioning** test design techniques, identify the optimum set of test cases for testing the business requirement given below. **(5 marks)**

> A system that is designed to work out the tax to be paid should check the following requirements:
> - If the salary of an employee is less than Rs.50,000, then he/she is not taxed.
> - If the salary of an employee is greater than or equal to Rs. 50,000 and less than Rs. 200,000, then he/she is taxed at 10%.
> - If the salary of an employee is greater than or equal to Rs. 200,000 and less than Rs. 400,000, then he/she is taxed at 15%.
> - If the salary of an employee is greater than or equal to Rs. 400,000, then he/she is taxed at 25%.

d) Consider the following snippet from a pseudocode which is used to validate the start/end date of an assignment submission:

```
1.  Read startDate, endDate
2.  If (startDate >= endDate)
3.      Print ("Invalid time duration")
4.      Abort saving
5.  Else
6.      Print ("Assignment dates saved")
7.      Save the dates to DB
8.  Endif

9.  If (startDate < currentDate)
10.     Print ("Attention: Start date is in past")
```

Following set of test data are used for testing the above code snippet:

Test data set number	startDate	endDate
1	12/04/2019	30/04/2019
2	15/04/2019	15/04/2019
3	10/05/2019	25/04/2019

Note: Assume that the date should be given in the following format "dd/mm/yyyy" and that the current date is 10/04/2019.

    i. What is the percentage of **statement coverage** achieved by the given test data sets? **(3 marks)**

    ii. List an additional test data set to achieve 100% **statement coverage**. **(4 marks)**

    iii. What is the percentage of **path coverage** achieved by the given test data sets? **(3 marks)**

    iv. List an additional test data set to achieve 100% **path coverage**. **(4 marks)**

Question 04 (25 marks)

a) Explain the differences between "**dynamic techniques**" and "**static techniques**" in test designing and provide an example each for both testing techniques. **(5 marks)**

b) Create a **decision table** and mark the optimized set of combinations of the conditions which could be used for testing the business requirement given below. **(20 marks)**

A garment manufacturing company provides discounts to its customers based on the following conditions:

    i. Wholesale customers receive a 2% discount on all orders.

    ii. If it is a wholesale customer and if he/she pays by cash, an additional 3% discount is offered.

    iii. If **fifty** or more items are ordered by any type of customer, then in addition to the above mentioned discounts, the ordered items will be delivered to that customer free of charge.

END OF EXAMINATION PAPER