Open University of Mauritius

BSc (HONS) COMPUTER SCIENCE [OUbs033]

BSc (HONS) APPLIED ICT [OUbs017]

EXAMINATION FOR: November - December 2022

MODULE : Software Engineering [OUbs033214]
Distributed System [OUbs017224]

DATE : Friday 02 December 2022

DURATION : 2 Hours

INSTRUCTIONS TO CANDIDATES

1. This question paper consists of **SECTION A** and **SECTION B**.
2. Answer **ANY TWO (2) Questions** from **Section A**.
3. Answer **ANY TWO (2) Questions** from **Section B**
4. Always start a new question on a fresh page.
5. Total marks: **100**

This question paper contains 6 questions and 5 pages.

SECTION A

ANSWER <u>ANY TWO (2)</u> QUESTIONS

QUESTION 1 [25 MARKS]

You have been asked to work on the software design for a ride-sharing mobile phone app, which matches people who require transport with drivers in the local area who have spare seats in their vehicles.

<u>The initial system requirements include the following:</u>

- Users should be able to register as either a vehicle owner/driver or a passenger, with a name, mobile phone, and payment details. They will be assigned a unique identification. Users who own vehicles also need to register the type, colour, and registration plate of their vehicle, along with the number of passenger seats it has.
- Passengers can request a ride from their current location to a destination of their choosing. They may also specify the type of vehicle (small car, luxury car, tuk-tuk, etc.) and number of seats required. Based on their choice, the system will calculate a price for the journey.
- When logged in, drivers in the area will be notified of suitable passenger requests and given the option to accept or reject each ride. Drivers can only accept one ride at a time.
- Once a driver has accepted a passenger for a ride, the passenger will be notified of the driver's name and vehicle's details and have the option to track the vehicle's location on a map.
- The driver must inform the system when a passenger has been collected, and again when they have arrived at the agreed destination. Payment will be taken automatically from the passenger at the end of the ride. The passenger will have the opportunity to rate and give feedback to the driver through the app.
- Up until the point the driver collects the passenger, either user may cancel the ride.

a) Draw a class diagram to show the static structure of the system.

(12 marks)

b) Draw a sequence diagram to illustrate the scenario of a passenger successfully requesting a ride and being driven to their destination. The diagram should be consistent with the class diagram you drew in answer to part a).

(13 marks)

QUESTION 2 [25 MARKS]

a) You have joined a small software development team. Your colleague has told you that the team will be following an iterative/incremental development life cycle, and that the next project will have one analysis iteration followed by a design iteration and finally two construction iterations. The first construction iteration is likely to produce software with many bugs, but these will be fixed in the second construction iteration.

i. Discuss your colleague's misunderstandings about iterative development.

(10 marks)

ii. Describe **two (2)** potential disadvantages of incremental delivery.

(8 marks)

After talking to your colleague again, you have discovered that the new project is similar to one the team completed last year. The domain is well understood, the product will use existing technology, the requirements are not expected to change, and all the resources for the project are available.

b) Suggest an appropriate development life cycle for this project. Justify your choice.

(7 marks)

QUESTION 3 [25 MARKS]

a) Compare and contrast the **main features and practices of the agile approach** compared to traditional approaches at each of the key phases of the software development life cycle.

(15 marks)

b) Discuss how the clearly identifiable good practices in agile methodologies can be effectively incorporated into any software life cycle environment.

(10 marks)

SECTION B

ANSWER ANY TWO (2) QUESTIONS

QUESTION 4 [25 MARKS]

a) List down the **twelve (12)** principles of Agile Manisfesto.

(12 marks)

b) What do you understand by the term 'Scrum'?

(3 marks)

c) Explain how to plan and execute scrum sprints?

(10 marks)

QUESTION 5 [25 MARKS]

Testing is an important aspect of software development and maintenance.

a) Explain the purpose of each of the following different types of testing:

i. Unit testing;

(3 marks)

ii. White Box testing;

(3 marks)

iii. Black Box testing;

(3 marks)

iv. Integration testing.

(3 marks)

b) Explain how the types of testing in part a) are used together.

(6 marks)

c) Explain what is meant by regression testing and why this is important in maintenance activities.

(7 marks)

QUESTION 6 [25 MARKS]

a) What do you understand by the term **Digital Transformation**?

(4 marks)

b) Explain why during the pandemic of COVID 19, there has been a rise in demand for Digital Transformation by companies.

(5 marks)

c) Explain the Digital Transformation framework.

(10 marks)

d) Do you think that Digital Transformation is an important aspect of Software Engineering?

(6 marks)