



**UNIVERSITY OF COLOMBO, SRI LANKA**

**UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING**

**DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)**

**Academic Year 2013/2014 – 2<sup>nd</sup> Year Examination – Semester 3**

***IT3204: Software Engineering I***  
***PART 2 - Structured Question Paper***

**01<sup>st</sup> March, 2014**  
**(ONE HOUR)**

**To be completed by the candidate**

BIT Examination Index No: \_\_\_\_\_

**Important Instructions:**

- The duration of the paper is **1 (one) hour**.
- The medium of instruction and questions is English.
- This paper has **2 questions** and **8 pages**.
- **Answer both questions (50 marks each).**
- **Both questions carry equal marks.**
- **Write your answers** in English using the space provided **in this question paper**.
- Do not tear off any part of this answer book.
- Under no circumstances may this book, used or unused, be removed from the Examination Hall by a candidate.
- Note that questions appear on both sides of the paper.  
If a page is not printed, please inform the supervisor immediately.

**Questions Answered**

Indicate by a cross (×), (e.g. ☐ **×** ☐) the numbers of the questions answered.

To be completed by the candidate by marking a cross (×).	Question numbers	
	1	2
To be completed by the examiners:		

- 1) (a) Name and briefly explain the 5 stages of the Traditional Lifecycle Model of software development.

(15 marks)

**ANSWER IN THIS BOX**

**1. Requirement Analysis – defines what the system should do**

**2. Design – defines how the system should be developed**

**3. Coding - implements design as software**

**4. Testing – checks whether software conforms to its specification**

**5. Maintenance – sustains software in use by correcting faults, adapting to new environments and incorporating new features**

Answer parts (b) to (f) based on the following description.

Suppose the Department of Railway of Sri Lanka has obtained financial grants from the government to install touch screens at chosen railway stations covering the entire island. The system must display information such as the train time table and ticket prices and provide means to book seats in long distance trains by credit card. Since this is a public information system, options will be provided for the commuters to communicate in Sinhala, Tamil or English. It has also been emphasized that sufficient help demonstrations be provided so that the users can easily learn to operate the system. The IT Unit of the Ministry of Transport will take care of the administration of the system. The system is planned to be developed with continuous user feedback at the IT Unit of the Ministry of Transport. An open-source software framework will be used as the starting point. The system will be tested by the software engineers and real users at the IT Unit before being installed at railway stations. The system will be put into operation step by step with initially only Fort, Kandy and Galle railway stations being equipped with touch screens. The agreement of the IT Unit states that apart from fixing problems, the system has to be maintained each year up to a maximum of 5 years in order extend the system to be able to be used on mobile platform for the same requirement set.

- (b) Name and explain the 2 most important quality attributes the proposed system should possess given that the system provides help demonstrations and a booking facility by credit card.

(06 marks)

**ANSWER IN THIS BOX****1. Usability**

**Usability is the quality attribute which defines ease of use.**

**2. Security/Accuracy**

**Credit card transactions must be secure/accurate.**

- (c) Based on the description given, do you think that the IT Unit of the Ministry will use the waterfall model to develop the system? Justify your answer.

(06 marks)

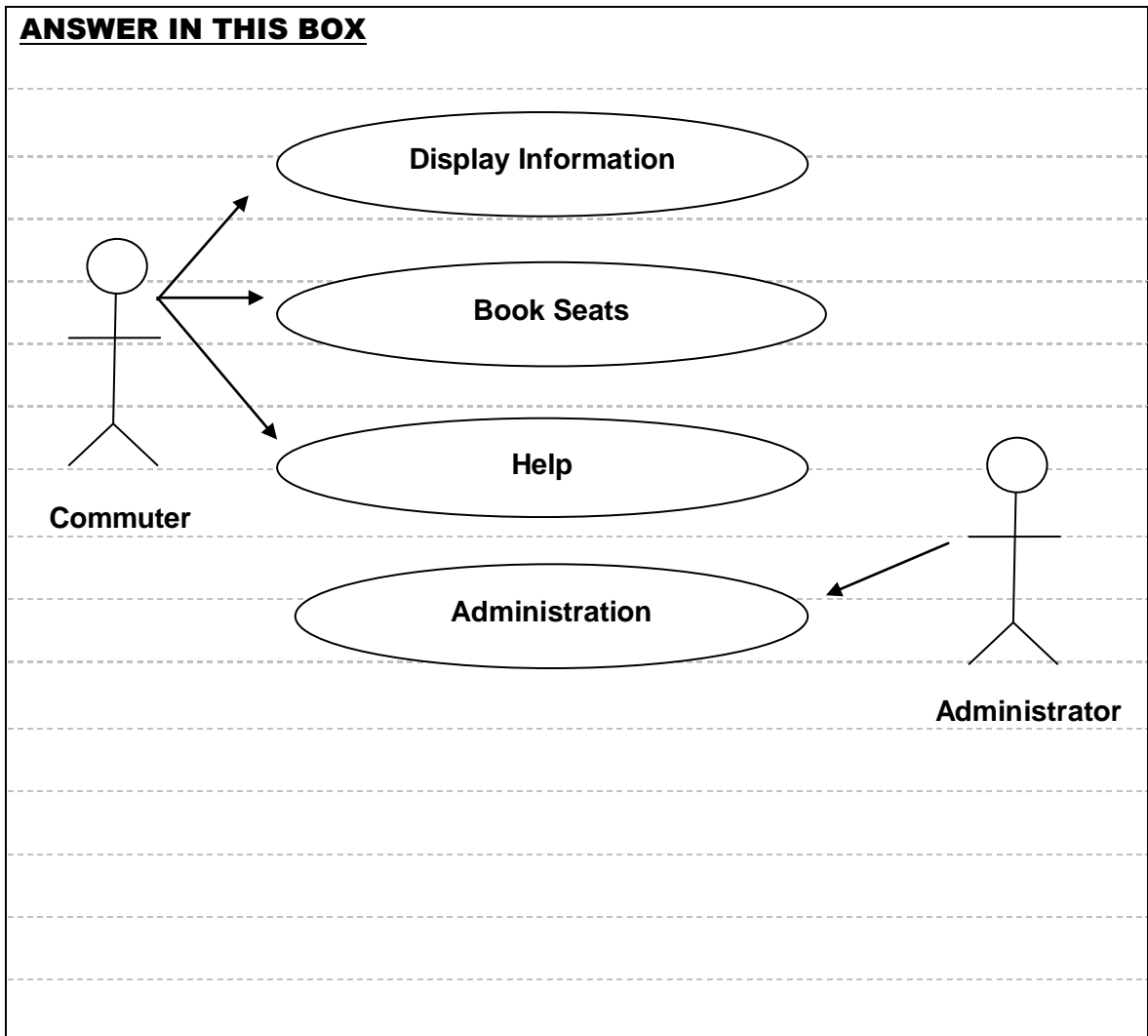
**ANSWER IN THIS BOX**

**No.**

**The system is planned to be developed with continuous user feedback at the IT Unit of the Department of Transport. Waterfall model is a linear model which cannot incorporate customer feedback.**

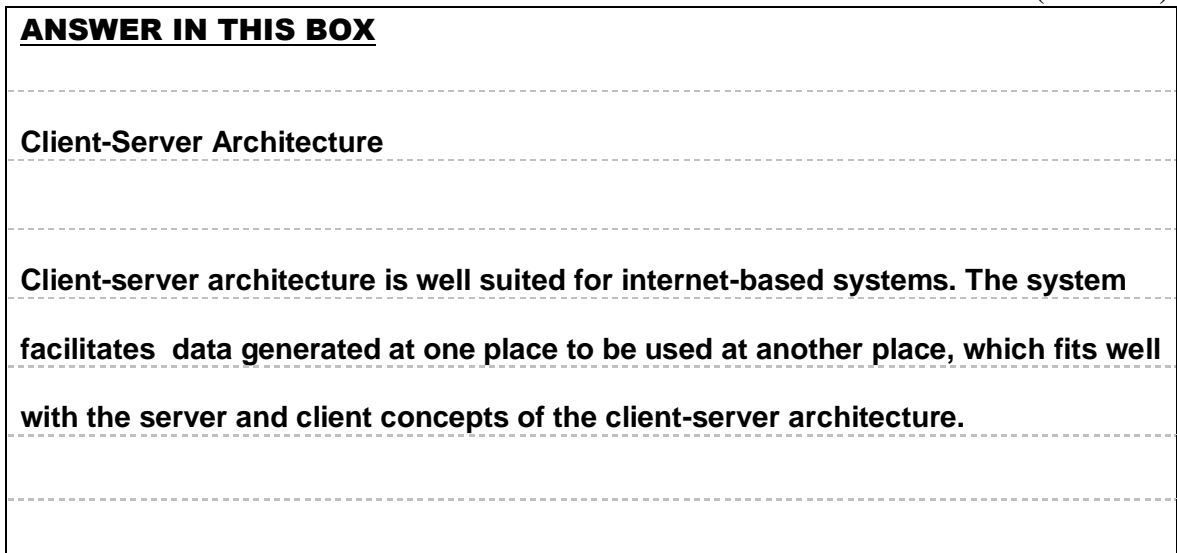
- (d) Draw a use case diagram to depict the interaction of different users with the system.

(11 marks)



- (e) Name a suitable architecture to develop the transaction logic of the proposed system. Justify your answer.

(06 marks)



- (f) Name and explain the type of maintenance, the maintenance agreement should contain apart from fixing problems.

(06 marks)

**ANSWER IN THIS BOX****Adaptive Maintenance**

The system is planned to be deployed on mobile infrastructure with the same requirement set.

- 2) (a) Name and briefly describe 5 design principles considered important when designing software.

(10 marks)

**ANSWER IN THIS BOX**

1. Abstraction – working at summarized level

2. Stepwise Refinement & Partitioning – decomposition to problem solving

3. Modularity – design must be a set of components

4. Information Hiding/Encapsulation – hide irrelevant details from a module

5. Reuse – using tried and tested patterns again

(b) Consider the following applications which are numbered from 1 to 6.

1. An internet application to do online auctions using mobile telephony
2. A prototype to gather client requirements about an interface
3. A scientific software to visualize weather dynamics of the South Asian region
4. A system for the University of Colombo to store BIT student data
5. An artificial reasoning system to check consistency of logical axioms
6. Embedded software for a mechanical manipulator

Select the most suitable programming language from among the following to develop each of the above applications and write against the correct number corresponding to the application in the answer box.

VB, PROLOG, SQL, C, MATLAB, JAVA,

(06 marks)

**ANSWER IN THIS BOX**

1. JAVA

2. VB

3. MATLAB

4. SQL

5. PROLOG

6. C

(c) Consider the following situations of software testing which are numbered from 1 to 6.

1. Code printouts were verified and validated by members involved in the project.
2. Software is tested against the pre-conditions and post-conditions before deployment.
3. Software was re-tested to ensure that no errors have been introduced due to recent changes which were incorporated.
4. The software product was released to an audience inside the software house for real use before deployment.
5. Software was checked to see whether individual software components worked correctly.
6. Every possible execution path was tested to ensure that the software is defect free.

Select the correct type of testing from the following list and write against the number corresponding to the most matching situation in the answer box.

System testing, Alpha testing, Path testing, Regression testing, Inspections, Unit testing

(06 marks)

**ANSWER IN THIS BOX**

1. Inspections
2. System testing
3. Regression testing
4. Alpha testing
5. Unit testing
6. Path testing

- (d) Name and explain the 3 main types of maintenance activities.

**(12 marks)****ANSWER IN THIS BOX****1. Corrective Maintenance**

Correcting uncovered problems while software is in use.

**2. Adaptive Maintenance**

Adapting software to new environments without changing function.

**3. Perfective Maintenance**

Adding new features to the software.

- (e) Name and explain the 2 main types of quality standards that can be applied to a software product and its development process respectively.

(06 marks)

**ANSWER IN THIS BOX****1. Product Standards**

These are standards that apply to the software product being developed.

**2. Process Standards**

These are standards that define the processes which should be followed during software development.

- (f) Suppose you have taken a new job as a Project Manager of a software development company. Name and explain the 5 main aspects you will need to consider when managing a software project.

(10 marks)

**ANSWER IN THIS BOX**

**1. Project Planning – planning the project considering schedule, costs, risks and**

**2. Scheduling – work break down and allocation of time**

**3. Cost Estimation – Estimate how much money will be required for the project**

**4. Risk Management – Identify possible risks and plan to avoid them**

**5. Human Resource Management – Managing people**

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