



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2012/2013 – 2nd Year Examination – Semester 3

IT3204: Software Engineering I
PART 2 - Structured Question Paper

02nd March, 2013
(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.**
- **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 (X), (e.g.

X

) the numbers of the questions answered.

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

1. (a) Name and briefly explain the type of systems which are old and difficult to maintain because of high costs.

(06 marks)

ANSWER IN THIS BOX

Legacy systems

Legacy systems are systems which are difficult to maintain due to age. The software engineers who developed the system are no longer available.

- (b) Name and briefly explain the 4 main phases of the Rational Unified Process (RUP) model.

(12 marks)

ANSWER IN THIS BOX

1. Inception – Project planning and initiate requirement understanding.

2. Elaboration – Elaborate requirements and design architecture.

3. Construction – Build the software product.

4. Transition – Transition of the system from development to production.

Consider the following description about an information system for tourists.

TourGuide is a web-based information system which is expected to be developed by June 2013 for the Sri Lanka Tourist Board. The Sri Lanka Tourist Board expects a boost in the number of tourist arrivals in 2014 and expects to extend its business activities by launching a new website to handle several activities. *TourGuide* will be used by tourists to view information about locations of ancient interest such as Anuradhapura, Kandy and Galle. The information will be updated from time to time by an administrator of the Sri Lanka Tourist Board. The tourists will use the system to book hotels which are close to such locations and do tour plan which will be assisted by instructors of the Sri Lanka Tourist Board. The payments for these services must be made by credit card online. The *TourGuide* is expected to be developed in consultation with the Sri Lanka Tourist Board which will provide its feedback from time to time as the system is developed.

Suppose you are working as a software engineer to develop the above system. Answer parts (c) to (f) of Question 1 based on the above description.

- (c) What is the most important quality attribute of the proposed system when considering the need of the system to be fast enough when running? Briefly explain your answer.

(06 marks)

ANSWER IN THIS BOX

Efficiency

Efficiency describes how the system utilises time effectively.

- (d) What is the most suitable process model to develop the proposed system based on the information provided? Briefly explain your answer.

(06 marks)

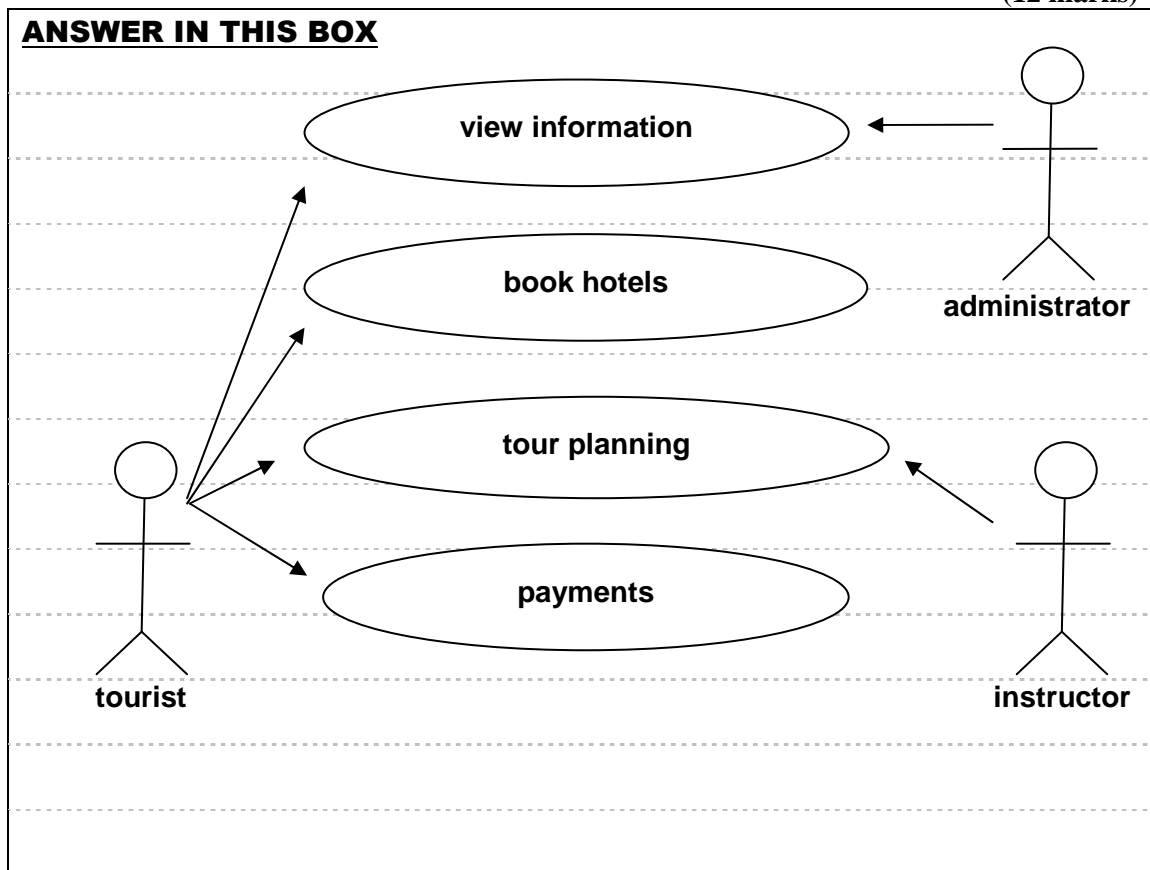
ANSWER IN THIS BOX

Evolutionary prototyping

It is because the system is expected to be developed in consultation with the Sri Lanka Tourist Board.

- (e) Draw a use case diagram to depict the functional requirements of the different users of the system.

(12 marks)



- (f) Suppose you are designing the architecture of this system and are required to build a framework for the rest of the team members to start work. Name the 4 main subsystems you would identify in the system and briefly describe them.

(08 marks)

ANSWER IN THIS BOX

View information - Displays information to the user

Book hotels – Handles hotel reservations

Tour planning – Handles tour planning and allows communication between instructors and tourists

Payments – Handles all the online credit card payments

2. (a) Name and briefly describe the 4 main aspects which need to be thought of at the design stage of software development.

(12 marks)

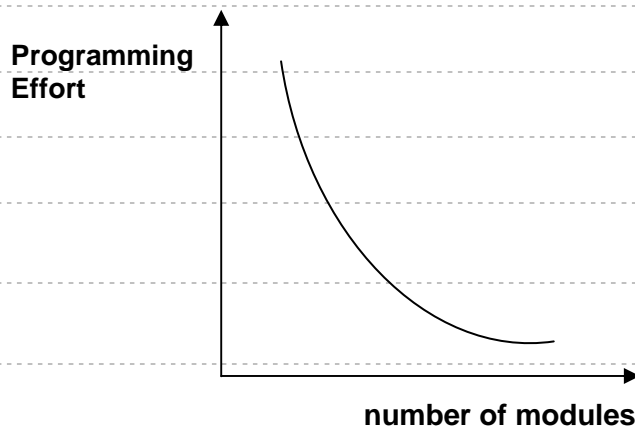
ANSWER IN THIS BOX

1. **Architecture design - The structure of the software system is established.**
2. **Data design – Consider what/how data needs to be stored in the system.**
3. **Procedural design – The design of the program logic to process data**
4. **User interface design – The design of the usability aspects of the system**

- (b) Draw a graph to show how the programming effort per module decreases as the number of modules increase.

(05 marks)

ANSWER IN THIS BOX



(c) Consider the following applications which are numbered from 1 to 9.

1. A system to predict earthquakes by using seismic data
2. A new kernel routine of an operating system
3. A middleware application to run on the internet to secure a transfer of funds between banks
4. A knowledge based system to help diagnose cancer
5. A database system for a hotel information system
6. A functional programming application
7. A real-time missile guidance system
8. An event driven application
9. A web application to attract tourists to Sri Lanka

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.

LISP, PROLOG, C, ADA, MATLAB, HTML, VB, JAVA, SQL

(09 marks)

<u>ANSWER IN THIS BOX</u>
1. MATLAB
2. C
3. JAVA
4. PROLOG
5. SQL
6. LISP
7. ADA
8. VB
9. HTML

(d) Consider the following situations of software testing which are numbered from 1 to 9.

1. Kamal wants his program to be tested on every possible execution path.
2. The virus scanner developed for DNS servers needs to be tested with peak volumes of data.
3. The company wants its software team to correct errors of the recently installed system.
4. The software was released to a wider audience external to the software development company for real use.
5. The modules developed by different members of the team need to be tested as a whole before proceeding further.
6. The client insists testing the software with the client's representatives at its site before starting to use it.
7. The project manager insists upon the requirement of checking individual software components as they are developed.

8. A meeting was called to find undeclared variables by looking at code printouts.
9. Non-functional requirements can only be ascertained by executing the software.

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.

1. Beta testing
2. Acceptance testing
3. Stress testing
4. Inspections
5. Dynamic testing
6. Unit testing
7. Path testing
8. Regression testing
9. Integration testing

(09 marks)

ANSWER IN THIS BOX

1. Path testing

2. Stress testing

3. Regression testing

4. Beta testing

5. Integration testing

6. Acceptance testing

7. Unit testing

8. Inspections

9. Dynamic testing

- (e) Software quality can be considered the prime factor which satisfies the user. Name and briefly explain the 3 main tasks which must be performed by a QA head in order to manage quality of software.

(09 marks)

ANSWER IN THIS BOX**1. Quality assurance****Establishing quality criteria in a company****2. Quality planning****Selecting quality criteria to be applied for a project****3. Quality control****Checking whether the team follows the quality criteria**

- (f) Name and briefly explain the technique which can be used to renovate an old system which is not maintainable anymore.

(06 marks)

ANSWER IN THIS BOX**Software re-engineering****Software re-engineering involves reverse engineering and forward engineering.****Reverse engineering tries to understand the design based on the current system while forward engineering tries to redevelop the system in a new technological context.**
