UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2011/2012 – 2nd Year Examination – Semester 3

IT3204: Software Engineering I

PART 2 - Structured Question Paper

25th February, 2012

(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 7 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. [X]) the numbers of the questions answered.

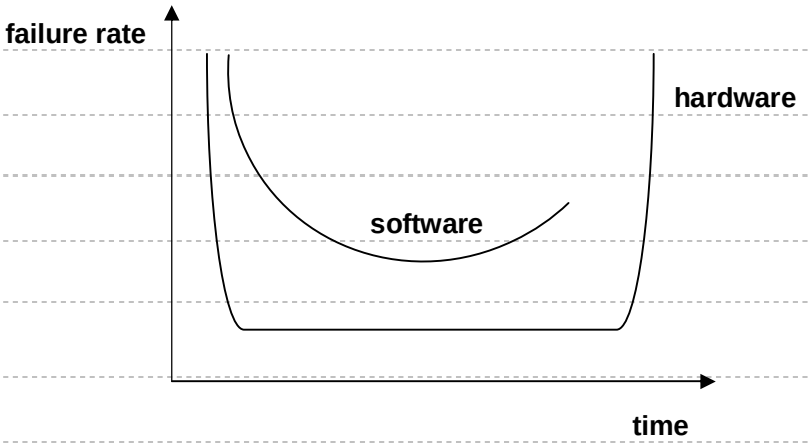
	Question numbers		
To be completed by the candidate by marking a cross (×).	1	2	
To be completed by the examiners:			

Index No ……..

1) (a) Sketch graphs to show how hardware and software fail with time.

(06 marks)

ANSWER IN THIS BOX



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

Suppose you are working in a software engineering team assigned the task of developing system for a bank. The system will be used for transactions handling, staff communication, management reporting and e-banking. Bank officers will be using the system for transactions handling and communication. The bank manager will be using the system to view management reports and communication. Bank customers will enjoy e-banking when the system is deployed.

(b) Name the 2 most important quality attributes the proposed system should possess.

(04 marks)

ANSWER IN THIS BOX

1. **security**
2. **accuracy**

(c) Identify and name the 4 main sub-systems of the proposed system.

(08 marks)

ANSWER IN THIS BOX

1. **transaction handling**
2. **staff communication**
3. **management reporting**
4. **e-banking**

(d) Do you think waterfall model is suitable to develop the presentation logic of the proposed system Justify your answer.

(04 marks)

ANSWER IN THIS BOX

no

Usually, the presentation logic has to be developed with customer feedback.

Waterfall model is a linear model which cannot incorporate customer feedback.

(e) Name a suitable architecture to develop the e-banking facility of the proposed system.

(02 marks)

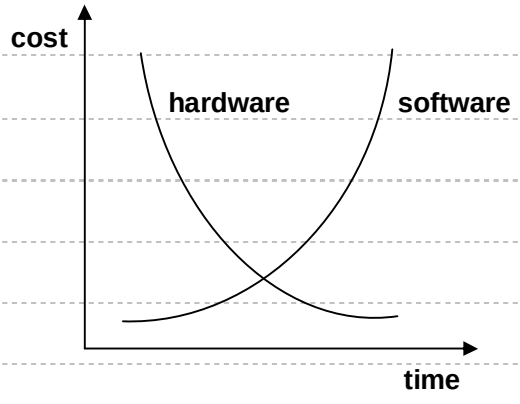
ANSWER IN THIS BOX

client-server architecture

f) Sketch graphs to show how hardware and software costs have varied with time.

(06 marks)

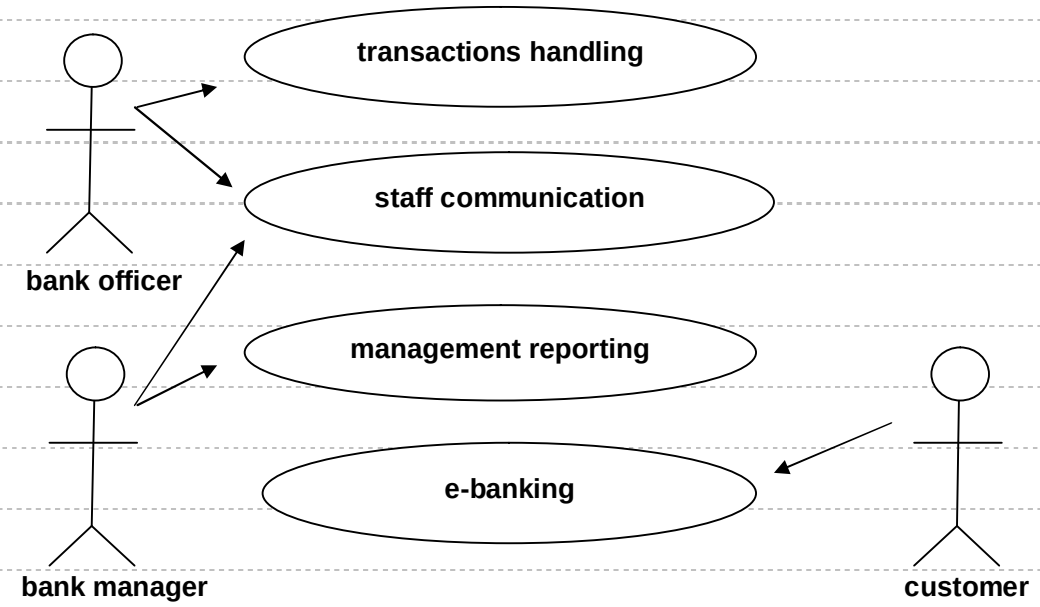
ANSWER IN THIS BOX



g) Draw a use case diagram to depict requirements of different users of the system.

(10 marks)

ANSWER IN THIS BOX



h) List the stages of the waterfall model and briefly explain each of the stages listed.

(10 marks)

ANSWER IN THIS BOX

requirement analysis – defines what the system should do

design – defines how the system should be developed

coding - implements design as software

testing – checks whether software conforms to its requirement specification

maintenance – sustains software in use by correcting faults, adapting to new environments and incorporating new features

2) (a) Suppose you are working in a software development company and your project manager wants you to compile the requirements specification for a software product that is to be released in few months time. List 4 main steps you are going to take in order to do that.

(08 marks)

ANSWER IN THIS BOX

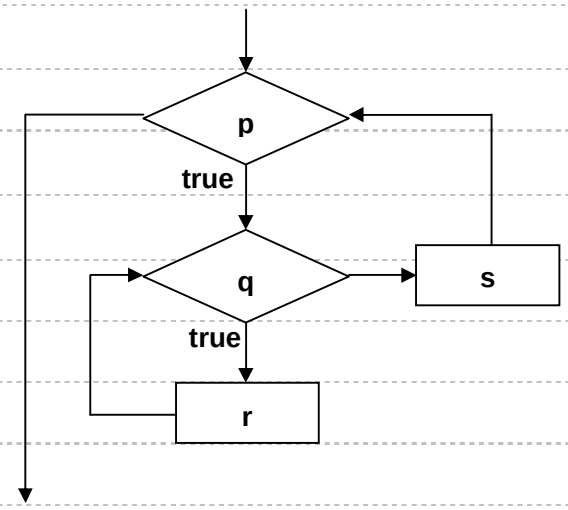
1. **perform feasibility study (check whether the system can be developed)**
2. **gather requirements (obtain requirements from the customer)**
3. **analyze requirements (study and prioritize requirements)**
4. **validate requirements (check customer needs are properly captured)**

(b) Draw a flowchart corresponding to the following code fragment.

```
while p
{
while q
r
s
}
```

(08 marks)

ANSWER IN THIS BOX



(c) Consider the following programming languages.

Java, C, SQL, Prolog, Ada, HTML, Lisp and Fortran

Select the most suitable language from the above list to be used for the development of each of the applications mentioned in the answer box and write the selected language against the relevant application.

(08 marks)

ANSWER IN THIS BOX

database system for a university – SQL

knowledge based expert system – Prolog

internet application for an airliner – Java

webpage for a company – HTML

statistical package to analyse scientific data - Fortran

operating system for a car dashboard system – C

functional programming application – Lisp

real time missile guidance application – ADA

(d) Consider the following function and its pre and post conditions.

reverse (x,y)
preconditions: x has to be a non-empty list of integers of length 10.
post conditions: returns y, which is the entered list of integers in reverse order.

Using a black box approach, generate 6 test cases for the above function.

(12 marks)

ANSWER IN THIS BOX

empty list => {}, invalid

list with 1 integer => {1}, {1}

list with 2-9 integers => {12345}, {54321}

list with 10 integers => {1234567890}, {0987654321}

list with more than 10 integers => {12345678901234}, invalid

list with invalid data => {abcdef}, invalid

(e) Name and explain the 3 main types of maintenance which will need to be addressed after a software product is deployed at a customer site.

(09 marks)

ANSWER IN THIS BOX

1. **Corrective maintenance**

   Corrective maintenance is concerned with repairing faults of the software.

2. **Adaptive maintenance**

   Adaptive maintenance concerned with adapting software to new environments without incorporating new functionality.

3. **Perfective maintenance**

   Perfective maintenance is concerned with adding new functionality to software.

(f) List the 5 main project management activities.

(05 marks)

ANSWER IN THIS BOX

1. **planning**
2. **scheduling**
3. **cost estimation**
4. **risk management**
5. **human resource management**

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