UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)
Academic Year 2010/2011 – 2nd Year Examination – Semester 3

IT3204 Software Engineering 1

PART 2 – Structured Question Paper

26th February, 2011
(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 **08 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.

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

Index No: ……...

1) (a) What is the difference between software engineering and system engineering?

(06 marks)

ANSWER IN THIS BOX

Software engineering is an engineering discipline which is concerned with all aspects of software production.

System engineering is concerned with all aspects of computer-based systems development, including Hardware, software and process engineering. Software engineering is part of this process.

(b) Briefly describe the following attributes of good software.

(12 marks)

ANSWER IN THIS BOX

	Description
Maintainability	Software should be written in such a way that it may evolve to meet the changing needs of customers. This is a critical attribute because software change is an inevitable consequence of a changing business environment.
Dependability	Software dependability has a range of characteristics, including reliability, security and safety. Dependable software should not cause physical or economic damage in the event of system failure.
Efficiency	Software should not make wasteful use of system resources such as memory and processor cycles. Efficiency therefore includes responsiveness, processing time, memory utilization, etc..
Usability	Software must be usable, without undue effort, by the type of user for whom it is designed. This means that it should have an appropriate user interface and adequate documentation.

(c) There are two fundamental types of evolutionary development – Exploratory development and Throwaway prototyping. Briefly describe these two types.

(06 marks)

ANSWER IN THIS BOX

Exploratory development – where the objective of the process is to work with the customer to explore their requirements and deliver a final system.

The development starts with the parts of the system that is understood.

The system evolves by adding new features proposed by the customer.

Throwaway prototyping – where the objective of the evolutionary development process is to understand the customer's requirements and hence develop a better requirements definition for the system.

The prototype concentrates on experimenting with the customer requirements that are poorly understood.

(d) Suggest 3 possible stakeholders of a library system.

(05 marks)

ANSWER IN THIS BOX

Library User, Library Staff, Supplier

(e) Identify 3 non-functional requirements of a library system.

(06 marks)

ANSWER IN THIS BOX

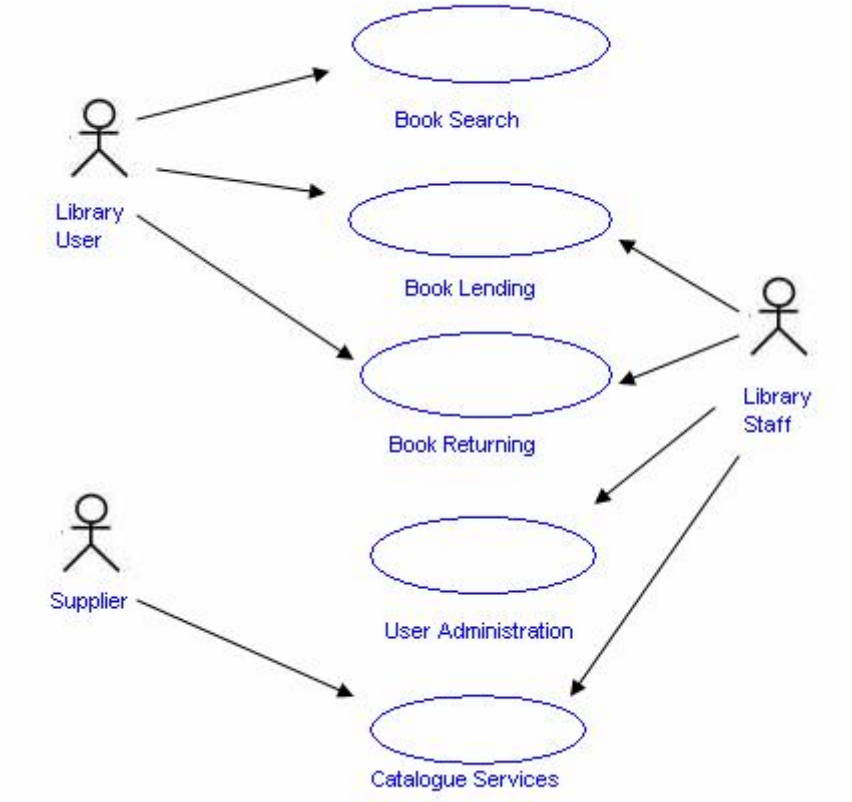
Any three from the following or any other non-functional requirements:

- Usability – a user-friendly interface for catalogue search and for use by the library staff
- Efficiency – should be able to provide fast responses to user queries
- Accuracy – should provide correct information and should correctly support the operations of book reservations, management of reference material and book lending for members
- Maintainability – should be able to evolve the software to support new requirements
- Portability – should be able to use the system in a different configuration

(f) Use cases can be used to identify the type of interaction and the actors involved in a system. Book search, book lending, book returning, user administration and catalogue services are some of the interactions in a typical library system. Draw a high-level use case diagram for this system.

(10 marks)

ANSWER IN THIS BOX



(g) Briefly describe what is meant by Ethnography.

(05 marks)

ANSWER IN THIS BOX

Ethnography is an observational technique that can be used to understand social and organizational requirements.

An analyst immerses him or herself in the working environment where the system will be used. He or she observers the day-to-day work and notes made of the actual tasks in which participants are involved.

2)

(a) Consider the following software process models: Waterfall model, Prototyping, Incremental development, Spiral model and Rapid Application Development.

Identify which process model is most suitable for each of the following types of projects.

(10 marks)

ANSWER IN THIS BOX

Description	Process Model
Customer involvement throughout the software development process is really important to the success of the project. Customer does not like to wait until the entire system is developed and they are interested in core project features at very first.	**Incremental development**
Requirements are well understood and project scope is constrained and this is a data intensive business application. Customer needs a faster development; hence they need to deploy the system as soon as possible.	**Rapid Application Development**
Requirements are easily understandable and requirements can be defined early in the cycle. According to the domain of this application, requirements are unlikely to be changed.	**Waterfall model**
Project has to use so many new technologies depending on the customer requirements; hence a risk analysis should be conducted in order to identify issues of using those technologies.	**Spiral model**
Customer only has a generic set of objectives for their system and does not identify the requirements in detail. High user involvement is necessary in order to explore a more detailed view of the requirements from the customer.	**Prototyping**

(b) List 2 advantages of a shared repository model for system architecture.

(08 marks)

ANSWER IN THIS BOX

Any 2 from the following;

- It is an efficient way to share large amounts of data. There is no need to transmit data explicitly from one sub-system to another.
- Sub-systems that produce data need not be concerned with how that data is used by other sub-systems.
- Activities such as backup, security, access control and recovery from error are centralized. They are the responsibility of the repository manager. Tools can focus on their principal function rather than be concerned with these issues.
- The model of sharing is visible through the repository schema. It is straight-forward to integrate new tools given that they are compatible with the agreed data model.

(c) Briefly describe Integration Testing.

(05 marks)

ANSWER IN THIS BOX

Integration testing is the initial system testing activity where you test integrated components for defects. Integration testing checks that these components actually work together, are called correctly and transfer the right data at the right time across their interfaces.

(d) What is the type of testing that is run every time a major change is made to the software (including the integration of new components and bug fixes)?

(04 marks)

ANSWER IN THIS BOX

Regression Testing

(e) Quality Assurance, Quality Planning and Quality Control are the three main activities in Software Quality Management.

Identify which description is most suitable for each of the above activities.

(06 marks)

ANSWER IN THIS BOX

Description	Activity
The selection of appropriate procedures and standards from the established organizational framework, adopted for a specific software project	**Quality Planning**
The establishment of a framework of organizational procedures and standards that lead to high-quality software	**Quality Assurance**
The definition and enactment of processes that ensure the software development team have followed project quality procedures and standards	**Quality Control**

(f) Describe following 3 terms associated with version and release management.

I. Version
II. Variant
III. Release

(09 marks)

ANSWER IN THIS BOX

	Description
Version	An instance of a system that differs, in some way from other instances Versions of the system may have different functionality, enhanced performance or repaired system faults. Some versions may be functionally equivalent but designed for different hardware or software configurations.
Variant	Versions with only small differences
Release	A version that is distributed to customers Each system release should either include new functionality or should be intended for a different hardware platform.

(g) List 4 items that are included in a typical project plan

(08 marks)

ANSWER IN THIS BOX
Any 5 from the following;
▪ Introduction ▪ Project Organization (how the development team is organized and their roles, etc.)
▪ Risk Analysis ▪ Hardware and software resource requirements
▪ Work breakdown (activities, milestones, deliverables) ▪ Project schedule (dependencies, time lines, allocations)
▪ Monitoring and reporting mechanisms

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