



**RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES**

**B.Sc. (General) Degree in Applied Sciences
Second Year - Semester I Examination – June/ July 2018**

COM 2401 - SYSTEM ANALYSIS AND DESIGN

Time: Three (03) hours

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- This paper contains six (06) questions on five (05) pages.
 - **Part A** contains two (02) questions. Answer one (01) question from **Part A**.
 - **Part B** contains four (04) questions. Answer All questions of **Part B**.
 - This examination accounts for 60% of the course assessment. The total maximum mark attainable is 100. The marks assigned for each question and section, thereof are indicated in brackets.
 - This is a closed book examination.
 - Mobile phones or any other communication devices are not permitted.
 - Clearly state the assumptions you make. If you have any doubts regarding the interpretation of the wording of a question, make your own decision, but clearly state it on the answer script.
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Part A

1. a) Describe what System Development Life Cycle (SDLC) is. (2 marks)
- b) Give your opinion on the amounts of resources consumed during a systems lifetime. (6 marks)
- c) Briefly describe what a Virtual Team is. (3 marks)
- d) Discuss the advantages of Close-Ended questions over Open-ended questions in requirements gathering. (5 marks)
- c) Justify the following statement.
"Requirements should be both complete and consistent" (4 marks)
2. a) Briefly describe why non-Functional Requirements should be measurable. (3 marks)
- b) List **three (03)** problems in using a natural language for requirements specification and explain them. (3 marks)
- c) What are the differences between User requirements and System requirements? (4 marks)
- d) Briefly describe **three (03)** human factors in User Interface (UI) design. (6 marks)
- e) Discuss the importance of having a clear and complete design of your system before starting implementation. (4 marks)

Part B

Assume that you are a 4th year university student. You and team of your fellow students have been requested to develop a software system for your department. You and your team have some programming experience including industrial training.

As the most experienced team member in your team, you are requested to function as the project manager for this project.

Following section describes the scenario of proposed Student registration system and questions appeared in Part B are based on this scenario.

Scenario: Student registration system

This system will cater for a faculty. The system needs to cover students in all the internal degree programs including both general (3 year) and special (4 year).

All degree programs have a fixed syllabus for the first two years and a wide range of optional subjects for the third and fourth years. At the beginning of each semester, students should be able to login to the system and register for the subjects that they are following. After the registration period (after the deadline), system should freeze registrations. After the deadline, only the admins should be able to deregister students.

There should be user accounts for the employees of the exams who can insert student grades for the subjects that they sit. Adding new subjects to the system should be the responsibility of the admins.

Managing the user accounts of the students and employees is the responsibility of the admins. Managing the admin accounts is the responsibility of the super admins. This system should be available through the Internet so that users can login from anywhere. Users should be given at least three attempts to login before freezing the account for about an hour. For the password/account reset, users should contact either the admin or the super admin based on their account type.

Deleting and editing existing subjects should be the responsibility of the super admins. Note that even if a student pass out of the university, his/her details should be in the system. Even adding and deleting subjects should not alter existing records.

System should be able to calculate the GPA of each student. The system should allow the admins to define the GPA calculating criteria. System should allow to enter the criteria and guidelines for compulsory subjects, optional subjects, mandatory amounts of credits and pre-requisites.

Currently, the university is using a paper based system to gather and record these details as well as a MS Excel to store the details.

Project duration is 6 months.

- 3 a) Briefly describe the requirements gathering process that you would use for this project. (4 marks)
- b) Identify the possible stakeholders who are involved in the project. (4 marks)
- c) Suggest a suitable Software Process Model for this project and briefly explain the reasons for suggesting it. (6 marks)
- d) As the Project Manager, describe your tasks in the first phase in the Software Development Life Cycle (SDLC). (6 marks)
- 4 a) Draw a use case diagram for this proposed Student registration system. Identify the actors and the use cases properly. (6 marks)
- b) Write a Use-case scenario to describe the “login” action which happens in the project (Student registration system) described in question 3. Assume that it is the first scenario that you write. Identify all the alternative scenarios, exceptions, pre-conditions, post-conditions, business rules, etc. (8 marks)
- c) Draw the activity diagram for the Use-case scenario that you describe for question 4 (b). (6 marks)
- 5 a) Discuss the most important **Non-Functional Requirements** associated with this project. (8 marks)
- b) Describe the importance of using proper naming and documenting guidelines during the implementation of this project while considering the maintainability of the system and the maintenance cost factors. (8 marks)
- c) Describe **two (02)** types of cyber-attacks which this system may face. (4 marks)
- 6 a) Describe the Verification and Validation techniques that you will use during the development of this project. Consider that you have a limited time and not all techniques are applicable for all situations. (10 marks)

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b) Briefly describe the importance of risk management.

(4 marks)

c) Describe six (06) risks associated with this project.

(6 marks)

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