



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

**B.Sc. (General) Degree
Second Year - Semester I Examination – September/ October 2019**

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 **ALL** questions in **Part A**.
 - **Part B** contains **FOUR (04)** questions. Answer **THREE (03)** questions in **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 script.
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Part A

1. a) Briefly describe why the amount of resources (time and money) spent on a system increases by the end of a system life. (05 marks)
- b) Briefly describe the activities of the **Strategic Management**. (02 marks)
- c) Briefly describe three (03) disadvantages of the Waterfall model. (03 marks)
- d) Briefly describe the purpose of **probing questions**. (01 marks)
- e) Briefly describe three (03) advantages of Open-ended questions. (03 marks)
- f) Briefly describe two (02) problems with measurement scales (used in information gathering). (02 marks)
- g) Briefly describe why we use **Sampling** in requirements gathering. (04 marks)
2. a) Briefly describe what a “Functional requirements” is. (03 marks)
- b) Briefly describe what a “Domain requirements” is. (03 marks)
- c) Briefly describe what a “Feasibility study” is. (05 marks)
- d) Briefly describe three (03) problems of requirements analysis. (03 marks)
- e) Briefly describe why requirements errors are difficult to fix than implementation errors. (04 marks)
- f) Briefly describe what “volatile requirements” is. (02 marks)

Part B

Assume that you are a project manager of a software development company. You and team has been requested to develop a software system for the railway department.

You had previous experience in developing travel management systems, school management systems and retail management systems.

Following section describes the scenario of proposed ticket reservation system and parts of questions 3 and 5 are based on this scenario

Online railway ticket reservation system

You need to build this system for all trains including intercity trains and other trains which have reservable tickets. Some trains do not have such reservable seats. For them, just allow them to take tickets which they can print on a train station.

A passenger should be able to reserve tickets (more than one ticket if needed) on all these trains and cancel the operation before a ticket is issued. Also, the passengers should be able to cancel a booking after a ticket has been issued.

It should be possible to book tickets from one month advance. There should be a correct way to identify individual users maybe using their NICs. Identify how other systems use to do this.

There should be limits on number of tickets that can be booked from a particular user to avoid scams.

Railway employees should be able to add/remove trains, add/edit seat numbers, ticket prices, and maintain train schedules.

There have been previous projects to develop similar systems but they have failed. Also the railway department (who would operate the system) is highly unionized.

3. a) As the Project Manager, describe the most important reasons why you need proper risk management in this project. (05 marks)
 - b) Describe the possible stakeholders who are involved in this project. (05 marks)
 - c) Draw a use case diagram for this project. Identify the actors and the use cases properly. (05 marks)
 - d) Describe the most suitable software process model to develop this system. Justify your decision. (05 marks)
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4. a) Describe possible architectural conflicts that you may face during the design of the above system. Consider the usage of the system, number of end users and its operational environment when answering the question. (06 marks)

- b) Describe three (03) factors on which the program language selection will depend on.
(06 marks)
- c) Describe the advantages of having proper coding standards.
(03 marks)
- d) Briefly explain the following statement.
“Inheritance is the only relationship in UML class diagrams to exhibit strong coupling”
(05 marks)
5. a) Describe the steps in the risk management process.
(08 marks)
- b) Describe the difference between defect testing and validation testing.
(04 marks)
- c) Describe what software inspections are.
(03 marks)
- d) Briefly describe what static analyzers are.
(02 marks)
- e) Describe the advantages of reengineering over forward engineering.
(03 marks)
6. a) Describe the following scheduled maintenance activities.
 - Adaptive maintenance
 - Preventive maintenance
 - Corrective maintenance
(06 marks)
- b) Describe the following maintenance cost factors
 - Team stability
 - Contractual responsibility
 - Staff skills
(06 marks)
- c) The task durations and dependencies of a project schedule is given in the Table 1.
i. Create the activity network using the details given in the Table 1.
ii. Identify the date of each milestone and the finish date.
(05+03 marks)
- Assume that the Project start date is 1st of August according to the calendar shown in Figure 1.
 - In addition to the weekend holidays (Saturday and Sunday), there are public

holidays indicated by **PH** mark.

Table 1: The task durations and dependencies

Activity	Duration (days)	Dependencies
T1	5	
T2	10	
T3	8	T1 (M1)
T4	10	T1,T2 (M2)
T5	8	T1,T2 (M2)
T6	5	T3 (M3)
T7	8	T3 (M3)
T8	10	T3,T4 (M4)
T9	15	T2,T4,T5 (M5)

August						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22 (PH)	23	24	25 (PH)
26	27	28	29	30	31	

September						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24 (PH)	25	26	27	28	29
30						

END