RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

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

COM 2301 - SYSTEM ANALYSIS AND DESIGN

Time: Three (03) hours

- This paper contains **FIVE (05)** questions on **FIVE (05)** pages.
- 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 square 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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1. (a) Describe why the amount of resources (time and money) spent on a system increases by the end of a system life.

(5 marks)

(b) Briefly describe the activities of the Strategic Management.

(2 marks)

(c) Briefly describe three (03) disadvantages of the Waterfall model.

(3 marks)

(d) Describe the purpose of probing questions.

(1 marks)

(e) Describe three (03) advantages of Open-ended questions.

(3 marks)

(f) Briefly Describe two (02) problems with measurement scales (used in information gathering).

(2 marks)

(g) Describe why we use **Sampling** in requirements gathering.

(4 marks)

2. (a) Describe what "Functional requirement" are.

(3 marks)

(b) Describe what "Domain requirements" are.

(3 marks)

(c) Describe what a "Feasibility study" is.

(5 marks)

(d) Briefly describe three (03) problems of requirements analysis.

(3 marks)

(e) Briefly describe why requirements errors are difficult to fix than implementation errors.

(4 marks)

(f) Describe what "volatile requirements" are.

(2 marks)

Read the following case

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 3, 4 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 has 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 to have proper risk management in this project.
(5 marks)

b) Describe the possible stakeholders who are involved in this project.
(5 marks)

c) Draw a use case diagram for this project. Identify the actors and the use cases properly.
(5 marks)

d) Briefly describe the purpose of a Component diagram.
(3 marks)

e) Briefly describe what a Component in **Component diagrams** is in the physical sense.
(2 marks)

4. a) Write a Use-case scenario to describe the "creating a user account" action which happens in this project. Assume that it is the first scenario that you write. Identify all the alterative scenarios, exceptions, pre-conditions, post-conditions, business rules, etc.
(5 marks)

b) Write a Use-case scenario to describe the "Adding a new train to the system by railway department." action which happens in this project. Assume that it is the second scenario that you write. Identify all the alterative scenarios, exceptions, pre-conditions, post-conditions, business rules, etc.
(5 marks)

c) Draw the activity diagram for the Use-case scenario that you describe for question 4 (b).
(5 marks)

d) Briefly explain the following statement.
"Inheritance is the only relationship in UML class diagrams to exhibit strong coupling"
(5 marks)

5. a) Model the relationships and classes among the following scenarios.

- Logging in to the system.
- Creating a user account.
- Adding a new train to the system by railway department.

[2x3 marks]

b) Draw a Sequence diagram for the "login" scenario which you created for question 4 (b). Use the answers for 4 (c) and 5 (a) when creating this sequence diagram.
(6 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.
(5+3 marks)

- Assume that the Project start date is 1st of August 2018 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, 2018						
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, 2018						
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