Sri Lanka Institute of Information Technology

B.Sc. Special Honours Degree/ Diploma

in

Information Technology

Final Examination

Year 2, Semester I (2016)

IT220 - Software Engineering I

Duration : 3 Hours

October 2016

Instructions to Candidates:

1. This paper contains **four** Essay Type Questions. **Answer All** Questions.

2. Total Marks: 100.

3. This paper contains 5 pages with Cover Page.

Question 1   (25 marks)

a) Read the description given below and draw a Use Case diagram to model the given requirements.

"ZENETH" is a private travel agency functioning in Sri Lanka, that provides travel and tourism related services to its clients such as airlines, car rentals, cruise lines, hotels, railways, and package tours. "ZENETH"s' main function is to act as an agent, selling travel products and providing services on behalf of suppliers. You have been hired as the designer to develop their automated web based system.

Any person can view available tour packages provided by "ZENETH" but to proceed he/she has to register with the system. Only registered customers can request a quotation. To request a quotation first customers should select a package from the already defined tour packages. (eg: Maldives 3 nights package, Singapore 4 nights package). Before finalizing the package customers have to reserve hotels and select their required airlines. All other expenses such as traveling cost, cruise cost and ticket cost to visit places are covered within the package cost.

An operator in "ZENETH" can access the system and view requested quotations. He/she will then add the quotation to the system. Once the quotation is added to the system, a sms will be sent to the customer mentioning the availability of the requested quotation.

Registered customer can confirm the quotation, if he/she is satisfied with it. If not he/she can decline the quotation. Payment should be settled within 7 days of confirmation. Otherwise the package will be cancelled. When the payment is completed customers have to provide all the necessary information relevant to obtain their visa.

Operator will view the confirmed quotations and take necessary actions to book hotels and airlines. For that "ZENETH" will access the relevant external hotel management systems and airline reservation systems.

Manager of "ZENETH" can view the monthly profit. If required, manager can also view the commissions they obtained from hotels and airlines. Furthermore, manager can generate reports of the processed package details, declined package details and financial statement monthly.

Note : You are not required to model the login function.

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Question 2 (35 marks)

Given below is a set of requirements for a vehicle renting system. Analyze the given requirements and answer the questions. **State any assumptions you made.**

"Rent-me" is a vehicle renting company who rents cars and vans for customers according to their needs. Cars range from luxury, everyday use and budget save.

All car details are registered in the system. When a new car is brought to "Rent-me", all physical car details such as make, model, year of manufacture, registration no and rent details such as deposit amount, daily rate needs to be entered to the system. At a given time vehicles can be on-rent, on-service-repair or available to-rent. These status are stored in rent data store.

When a customer needs to rent a vehicle, customer will explain the details of the vehicle he/she prefer to rent to the clerk. According to the details told by the customer, clerk will search the availability from the system and inform the customer. According to the availability of vehicles customers can rent vehicles. Clerk is responsible to enter and maintain all the vehicle related details and customer requests.

Customer can rent vehicles for long term and short term use. If an existing customer wants to rent a vehicle, the NIC is entered and the customer details will be displayed. When it's a new customer, all personal details of the customer needed to be entered along with the rental information. Renting details such as rent date, return date, daily cost, deposit amount and total cost will be stored in the system. A reference note including renting details will be printed and given to the customer. When a vehicle is rented the status of the vehicle is updated as on-rent.

Each vehicle is assigned to a driver and he is responsible for maintaining (servicing and/or repair) a particular vehicle. When a vehicle is on service or repair the status of the vehicle is updated as on-service–repair. A new maintenance record will be added to the system. Drivers will be assigned at the time of the vehicle registration by giving the driver details. When a servicing or a repair is due, driver needs to update the system with the relevant details. At that time the manager will be notified via an E-mail about the maintenance.

Following reports can be generated and viewed by the manager for a given time period. (Daily, weekly or monthly). Rented vehicle report, Maintenance report, Vehicle availability report and Report on most frequently rented cars.

Note: Payment process is handled separately and is not in your context to handle.

a) Draw a Context Level Data Flow Diagram for the above scenario.

(5 marks)

b) Draw a level-balanced DFD (Level 1) for part a).

(11 marks)

c) Draw the level-balanced DFD (Level 2) for Rent Car process

(5 marks)

d) Write **3 entries** to be included in the Data Dictionary for the above DFDs.

(3 marks)

e) Convert your level balanced DFDs in part b) and c) to a Structure Chart.

(11 marks)

Question 3   (20 marks)

Answer the following questions considering the activities shown below

Task	Duration (days)	Preceding Activity
		-
A	3	
B	1	-
C	3	-
D	8	A
E	1	B
F	1	C,E
G	2	D
H	2	F
J	16	G
K	1	G,H

a) Draw a CPM graph for the above project and mark the **critical path** on the graph.

(8.5 marks)

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b) Determine the project duration

(1 mark)

c) Find the **Earliest Start Time, Latest Start Time, Latest Finish Time and Slack Time** for the following activities.

Activity	ES	LS	EF	LF	Slack
C					
D					
K					

(7.5 marks)

d) Explain the impact if the activities given below are delayed by the given days.

Activity	Delayed by
F	5 days
G	2 day

(3 marks)

Question 4   **(20 marks)**

a)

  i. Briefly describe the two characteristics to be avoided when creating a SRS documents

(4 marks)

  ii. What does "Phase Containment of Errors" means? Why is it considered to be important?

(3 marks)

b) Table below lists two User Acceptance testing types. Fill the table with relevant facts.

(2 marks)

Testing Type	Parties involved in testing	Testing Environment
Alpha Testing		
Beta Testing		

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c) How does the "Programing Language" and "Programing Style" affects the cost of software maintenance.

(3 marks)

d) Explain the role of the "product owner" in a scrum project.

(2 marks)

e) What is a sprint goal and who declares it?

(2 marks)

f) "Ocean Edge" is a well-established hotel in Sri Lanka. You are one of the team members involved in developing an online hotel reservation system for them. Your team uses "SCRUM" to develop this system. You are asked to derive the list of user stories for the room reservation.

Customers can search and reserve one or more rooms online by giving their preferences. To reserve, the customers need to register with the system. If it's an existing customer keying the NIC will retrieve their earlier reservation details. Receptionist is responsible to check-in/check-out customers and update the system upon arrival/departure. A deposit has to be made, when they are reserving the room online. When arriving they have to make the full payment.

i)   Write down **three** user stories of the system that you are going to design.

(3 marks)

ii)   Your team members have started implementing the system, after 2 weeks scrum master thinks that the team is behind the schedule. Which artifact should be referred to obtain a clear idea about the progress of the project?

(1 mark)

**************** End of Final Paper *********************