Sri Lanka Institute of Information Technology

B.Sc. Special Honours Degree/ Diploma

in

Information Technology

Final Examination

Year 2, Semester I (2017)

IT220 - Software Engineering I

Duration - 3 hours

November 2017

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 (30 Marks)

"National Health Services (NHS)" is a famous doctor patient management system, which serves intensively to the whole country. You are being hired to design an automated system for "NHS ". Analyze NHS requirements given below and answer subsequent questions. **State any assumptions made.**

Anyone who interested about "NHS" can access general information, check availability of the doctors and search for the organ donation. Also any patient who needs to make appointments, have to self-register with the system. Registered patients can make appointments. Once appointment has been made it automatically redirects to the payment process. Payment process is handled by third party payment gateway. If someone needs to cancel her/his appointments, he/she needs to fill the request form for the refund. But in case of valid period is exceeded (more than five days), refund will be rejected. Also registered patients can view their own medical reports.

In addition to the above registered patient can register for organ donation. In registering for organ donation, they need to fill the preference report. Once he/she has filled the forms it will be sent to the organ donation committee. Organ donation committee is responsible for making decisions. If registered patient has serious illness, organ donation committee will reject the registration.

Through a NHS doctor can manage his own booking slots. For that he needs to fill request form which includes room preferences. Also doctor can update medical reports of patients. When he updates patient record, he has to fill the details of update. If patient is no longer taking medication, the doctor can delete that patient record from the system. In addition to the above, doctors can make a new health record. So this health record can be blue line health record (emergency case) or red line health record (not an emergency case). In this process (while making health record), if he identifies any serious problems of patient such as cancer, he can send details to special laboratory. Special laboratory can receive the notification. If any urgent information (ex: if cancer spreads all over the brain), laboratory people can notify it to the doctor as soon as possible. Also doctor has right to view medical records of patients.

The system administrator of NHS is responsible for creating the user accounts and giving them the right responsibilities

a. Given the above requirements, identify two most important nonfunctional requirements for NHS. Justify your choice.

(02 Marks)

b. Analyzing the requirements given above, draw the use case diagram.

(28 Marks)

Question 2 (30 Marks)

"Hilton Hawaiian Village" is a famous hotel in central province, Sri Lanka. As a Software Engineer, you are asked to design an online reservation system for this hotel. Analyze the given requirements and answer the following questions. **State any assumptions made.**

A local or foreign guest can first read about facilities and services through the online reservation system. They can also request rooms and services availability if they need. For that they need to enter time period and number of guests. Then they can find available room categories for that period.

If the guest needs to reserve a room, he/she has to register with the system using his/her personal details. A GID (Guest ID) is given to the registered user for further references.

Once the guest is registered, he can login to the system .Then he can check room details and reserve the room against his/her GID. In reserving he needs to enter room details with his/her GID and then system will show the available room categories and details .Then user can confirm the room details that they need with his/ her GID. Once confirmed, the system will generate a Reservation ID (RID) and reservation notice.

When the guest arrives at the hotel, they can give reservation notice with his/her RID to the receptionist to check them in. System will show the room details in advance and the facilities for that price.

Also system will show payment details when the users check out. The receptionist will process the payment .The user has to provide his/her credit card details with RID and GID. Then invoice is given to the guest at end of the payment process.

In addition to that, any external reservation company can self-register with the system using company details and credit card details. Then System will provide unique id for external company (EID).Also system will send confirmation notice with it. Using EID, and time period, the company can find available rooms and reserve rooms that they need. Reservation notice and invoice will be sent to them.

End of each month, Sales manager can access system with using his own id (MID) and enter monthly details. Then system will generate monthly income report.

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

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

c. Write 3 entries to be included in the Data Dictionary for the above DFDs.
(03 Marks)

d. Convert your level balanced DFDs in part b) to a Structure Chart.
(10 Marks)

Question 3 (20 Marks)

Answer the following questions considering the activities shown below

Task	Duration (days)	Predecessors
A	7	
B	10	
C	5	A,E
D	12	E
E	10	A,B
F	10	E
G	4	C,F
H	4	D,G

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

(07 Marks)

b. Determine the project **duration**.

(01 Marks)

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

(08 Marks)

Activity	ES	LS	LF
D			
C			
A			
F			

d. As the project manager of this project, explain what steps you would take in order to deliver the project on the given deadline.

(02 Marks)

e. Briefly describe importance of the project management in software projects.

(02 Marks)