

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

SEMESTER FINAL EXAMINATION**SUMMER SEMESTER, 2017-2018****DURATION: 3 Hours****FULL MARKS: 100****CSE 4407: System Analysis and Design****Programmable calculators are not allowed. Do not write anything on the question paper.**There are 8 (eight) questions. Answer any 6 (six) of them.

Figures in the right margin indicate marks.

1. a) ABC Travel Agency is a company based in Dhaka. They specialize in organizing day trips to various destinations in Bangladesh. Customers of ABC Travel Agency include institutions such as schools, nursing homes etc., They hire buses with drivers for trips. The manager of ABC is responsible for allocation of buses and drivers. Trip records are created when trips are arranged. If a customer (for whom a trip is being arranged) is 'new' then the customer's details are recorded. Otherwise, the customer's record is updated. Customers will typically request that a day trip be organized for them on a specific date. The number of buses allocated to a trip depends on the number of seats required. In response to this request ABC will check to see if the required buses can be made available on that date. If the buses are available ABC will allocate one or more drivers and create a trip record for the customer. Customers are allowed to cancel a trip before a deposit is paid. The deposit should be paid within 7 days of the booking for the trip being taken. If a trip is cancelled after that, the deposit is kept by ABC Travel Agency. If a trip is cancelled the trip record will record this. ABC will request full payment for a trip in the week before it takes place. A cancelled trip is deleted from the system 6 months after cancellation. Other trip records are deleted 12 months after the corresponding trips were completed.
 Based on the given information, Draw the following for ABC Travel Agency.
 - i. Context Diagram
 - ii. Diagram 0
 - b) Write short notes on the following
 - i. Cash-flow analysis
 - ii. Payback period
 - iii. Scrum
 - c) What do you mean by 'fit and adaptation' in HCI elements of human, task and computer and how can it increase the performance of the system and well-being of the users.
-
2. a) What is prototype? Explain different types of prototypes with appropriate examples.
 - b) Musixscore.com is an online service providing sheet music to customers. On the "browse music" Web page, customers select a genre of music from a drop-down list. The Web page uses Ajax to obtain a list of performers, musicians, or groups that match the genre, which is formatted as a dropdown list. When a selection is made from the performer's drop-down list, the Web page uses Ajax to display a third drop-down list displaying all the CDs or other works of the performer. When a CD is selected, the Web page uses Ajax to obtain all the songs on the CD in a fourth drop-down list. The viewer may make multiple selections.

When the Add to Shopping Cart image is clicked, the songs are added to the shopping cart. The viewer may change any of the drop-down lists to select additional sheet music, and the process is repeated.

Based on the above, answer the following questions

- i. Draw the Use Case diagram of the website.
 - ii. Draw the activity diagram of the website with clear indications of swim-lanes.
 - iii. Draw a sequence diagram of the website.
- c) What is Probing in questionnaires? 1.66
3. a) What are the alternative choices of software for a system analyst with their advantages and disadvantages. 4
- b) Discuss the values and principles of Agile Development process. 6
- c) What is Software Quality Assurance (SQA)? Briefly discuss the different steps in six sigma with examples. What are Structured Walkthroughs in SQA? 6.66
4. a) What is RAD? What are the phases of RAD? 4
- b) Discuss the Human limitations and disabilities considered when designing an HCI interface 7
- c) Explain the causes of the following DFD mistakes 4
 - i. Black holes
 - ii. Spontaneous generation or miracle.
 - iii. Entity mismatch.
- d) Describe the uses of swimlanes on activity diagram. 1.66
5. a) Draw an ER diagram to model the application with the following assumptions: 7
 - We have a set of teams, each team has a unique identifier (ID), name, main stadium, and to which city this team belongs.
 - Each team has many players, and each player belongs to one team. Each player has a number (unique identifier), name, Date of Birth, start year, and shirt number that he uses.
 - Teams play matches, in each match there is a host team and a guest team. The match takes place in the stadium of the host team.
 - For each match we need to keep track of the following:
 - The date on which the game is played
 - The final result of the match
 - The players participated in the match. For each player, how many goals he scored, whether or not he got yellow card, and whether or not he got red card.
 - During the match, one player may substitute another player. We want to record this substitution and the time at which it took place.
 - Each match has exactly three referees. For each referee we have a unique identifier (ID), name, Date of Birth, years of experience. One referee is the main referee and the other two are assistant referees.

Design an ER diagram to meet the above requirements. State any assumption you have that affects your design. Make sure cardinalities and primary keys are clear.
- b) Differentiate between Aggregation and composition relationships. Give proper examples. 6
- c) What are the advantages of Prototyping with SDLC? 3.66

6. a) Describe the four categories into which Unified Modeling Language (UML) classes falls. 5
Give examples for each.
- b) Interglobal Paper Company has asked for your help in comparing its present computer system with a new one its board of directors would like to see implemented. Proposed system and present system costs are as follows: 7

Table 1: Cost comparison between present and proposed systems

Item	Proposed System Costs	Present System Costs
Year 1		
Equipment Lease	\$20,000	\$11,500
Salaries	30,000	50,000
Overhead	4,000	3,000
Development	30,000	--
Year 2		
Equipment Lease	\$20,000	\$10,500
Salaries	33,000	55,000
Overhead	4,400	3,300
Development	12,000	--
Year 3		
Equipment Lease	\$20,000	\$10,500
Salaries	36,000	60,000
Overhead	4,900	3,600
Development	--	--
Year 4		
Equipment Lease	\$20,000	\$10,500
Salaries	39,000	66,000
Overhead	5,500	4,000
Development	--	--

Using break-even analysis, determine the year in which Interglobal Paper will break even. Graph the costs and show the break-even point.

- c) What are the different ways of arranging questions in an interview? 4.66
7. a) What is CRC? What are the different parts of CRC? Discuss "Object think" in CRC. 4
b) Design a Class diagram for a system for a movie-shop, in order to handle ordering of movies and browsing of the catalogue of the store, and user subscriptions with rechargeable cards. Only subscribers are allowed hiring movies with their own card. Credit is updated on the card during rent operations. Both users and subscribers can buy a movie and their data are saved in the related order. When a movie is not available it is ordered. 6
c) Compare RAD to the SDLC. 3
d) What are user stories? Differentiate between nominal and interval scale of measurements. 3.66

8. a) Discuss any four user interfaces in terms of HCI. Give their advantages. 6
 b) A company has decided to purchase 'off the shelf' (OTS) software to handle the financial 4
 aspects of its business. Describe some general criteria that should be used to decide which
 OTS software applications are suitable for the company.
 c) Draw the PERT diagram for the following activities and determine the critical path. Also 6.66
 draw the corresponding Gantt chart, assume you are in week 6 and you may have valid
 parallel activities in your diagram.

Table 2: A list of activities

Activity	Predecessor	Duration (In weeks)
A	None	2
B	A	4
C	B	3
D	B	4
E	C	1
F	D	2
G	E	2
H	F	4
I	G, H	2