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MINI-015

M.Tech. IN ADVANCED INFORMATION TECHNOLOGY – SOFTWARE TECHNOLOGY (MTECHST)

00384

Term-End Examination

December, 2014

MINI-015 : INFORMATION SYSTEMS ANALYSIS AND DESIGN

Time : 3 hours *Maximum Marks : 100*

Note :

(i) *Section I is* ***compulsory****.*

(ii) *In Section II, answer any* ***five*** *questions. It carries maximum 70 marks.*

(iii) *Assume suitable data wherever required.*

(iv) *Draw suitable sketches wherever required.*

(v) *Italicized figures to the right indicate maximum marks.*

SECTION I

1. Case Study :

The 'Sweet Treat' company is a small, independent business that sells sweets and cakes to the public. The proprietor is very keen on baking and specializes in making homemade sweets and cakes for sale in the shop. As well as

making a lot of the confectionery sold in the shop, the proprietor also buys sweets and some cakes from suppliers to increase the range of products for sale. The proprietor keeps records of the quantities of stock he has on hand. The stock includes raw ingredients for his baking and also the sweets and cakes he buys from suppliers. Once a week the proprietor checks the stock to dispose of anything that is past its 'sell by' date. He also checks to see if any raw ingredients or any pre-made sweets and cakes need to be ordered from the suppliers. The proprietor orders supplies on a 'Cash on Delivery' basis, so all deliveries are paid for immediately as they arrive. At the end of each day the proprietor checks how many of each homemade items have been sold. He keeps a record of these sales, and uses this to decide how many of each cake or sweet to make for the following day.

Questions :

(a) Produce a top level data flow diagram of the 'Sweet Treat' company. *15*

(b) Compare Data Flow Models with Entity Relationship Diagrams. You need to produce a complete ERD and illustrate your answer with examples. *15*

SECTION II

2. (a) (i) Describe the role and responsibilities of the Business Analyst. *5*

(ii) Identify the stages of the system development life cycle that a business analyst would typically be involved in. *5*

(b) Identify two other types of stakeholders describing their roles and responsibilities. *4*

3. (a) Explain what is a prototype and describe how can it be used in Requirements gathering . *3+3*

(b) What are the advantages of prototyping ? *4*

(c) Describe the main steps in the prototyping cycle. *4*

4. The table below shows an example of a list of products order by the 'Sweet Treat' company described above.

Product code : C7	**Product name :** Chocolate cake	**Supplier no. :** S23	**Supplier name :** Vivek	**Cost per item :** ₹ 2·70	
	Order no. : 27/2011	**Order date :** 3/8/2011	**Order total :** ₹ 210	**Delivery code :** 8/8/2011/1	**Deliver firm :** ABC
	Order no. : 34/2011	**Order date :** 1/9/2011	**Order total :** ₹ 112	**Delivery code :** 6/9/2011/3	**Deliver firm :** XYZ
	....	....	....	....	...
Product code : C9	**Product name :** Carrot cake	**Supplier no. :** S11	**Supplier name :** Soham	**Cost per item** ₹ 2·50	
	Order no. : 29/2011	**Order date :** 14/8/2011	**Order total :** ₹ 112	**Delivery code :** 20/8/2011/11	**Deliver firm :** XYZ
	....	....	....	....	....
Product code : C6	**Product name :** Pastry	**Supplier no. :** S23	**Supplier name :** Vivek	**Cost per item :** ₹ 2·40	
	Order no. : 25/2011	**Order date :** 24/7/2011	**Order total :** ₹ 150	**Delivery code :** 30/7/2011/10	**Deliver firm :** Z-cakes
	....	....	....	....	....

(a) Normalize the table to produce a set of relations in the Third Normal Form. You must show all of your working explaining each step. You may assume that each product is provided by one supplier. State any further assumptions you made. *5+5*

(b) Explain briefly how would you map an inheritance hierarchy in a class diagram to relational database tables. Consider two possible approaches. *2+2*

5. (a) Consider the following extra information about the 'Sweet Treat' system described above :

There are two types of products: sweets and cakes. The following data should be stored about sweets : Product code, Product name, 'Use by' date and Cost per kilogram. The following data should be kept about cakes :

Product code, Product name, 'Use by' date and Price per item.

An object of class Order consists of an order heading followed by order lines.

Explain the following relationships between classes, using examples from the 'Sweet Treat' system to illustrate your answers : *3+3+3*

(i) Association

(ii) Aggregation or Composition

(iii) Generalization/Inheritance

The examples should show relevant fragments of a class diagram.

(b) Provide a brief explanation of the following characteristics/attributes of well-designed software : Reliable, General, Flexible and Reusable. 5

6. (a) Activity diagrams can be used to model different aspects of a system. Give examples of three different applications of activity diagrams in systems modelling. 4

(b) Produce a state machine/state chart for the class Order in the 'Sweet Treat' system described above. You may assume that objects of this class are affected by the following 'events' : placing a new order, order cancellation, order delivery, amending an order and deleting an order. Note that existing orders can be amended only once and that orders are deleted automatically a few weeks after their delivery. 10

7. ATM stands for Automated Teller Machine. It is nothing but the immediate aspect of getting money by using a simple word. User can simply insert an ATM card into the ATM Machine and follow the simple instructions provided by the machine to get the required amount from his/her own account. To protect their account from other users against access, password is provided which is called a pin number and is provided uniquely

for each user. ATM Machine acts as an excellent technical development which provides for those users, who require money at any time. The various models that have been used here are :

- Password Derived
- Re-enter Password
- Account Number
- Deposit
- Withdrawal
- Balance
- Exit

For the given scenario, develop System Requirement Specification (SRS) document. SRS should consist of functional and non-functional requirements. Make necessary assumptions. 7+7