Sri Lanka Institute of Information Technology

B.Sc. Honours Degree in Information Technology

Final Examination
Year 1, Semester 1 (2018)

# IT1090 – Information Systems and Data Modeling

Duration: 2 Hours

October 2018

Instructions to Candidates:

- This paper is preceded by 10 minutes reading period. The supervisor will indicate when answering may commence.
- This paper has 4 questions.
- Answer all questions in the booklet given.
- The total marks for the paper is 100.
- This paper contains 6 pages, including the cover page.
- Electronic devices capable of storing and retrieving text, including calculators and mobile phones are not allowed.

## Question 1 [Total: 25 Marks]

a) "Information System is an arrangement of people, data, processes, information presentation, and IT that interact to support and improve day-to-day operations in an organization".

Assume that you are been hired to develop a Sales Information System to The Best Foodcity, a retail store selling consumer goods to its customers.

i. Identify the components of the proposed Sales Information System at The Best Foodcity. (7.5 Marks)

ii. Identify the types of end-users of the proposed Sales Information System at The Best Foodcity. (2 Marks)

iii. Explain TWO possible benefits gained by Sales Information System at The Best Foodcity. (2 Marks)

b) Customer Relationship Management (CRM) systems analyze customer interactions and data throughout the customer lifecycle, with the goal of improving business relationships with customers, assisting in customer retention and driving sales growth.

i. Identify a type of modern Information System that has CRM systems as an essential component. (1 Mark)

ii. Briefly explain the capabilities of such Information Systems. (2.5 Marks)

c) While analyzing the requirements to develop the sales information system in part a) for The Best Foodcity, assume that you were able to gather the information about the sales process of the company. Model the below sales process of The Best Foodcity using standard business process mapping tools. (10 Marks)

The sales process starts by receiving a sales request from the customer. The sales request consists of the items the customer wants to purchase. The cashier checks the availability of the items from the items information database. Depending on the items requested, there will be a minimum delay of 10 seconds per sale. If the items are available, the cashier adds

them to compute the sales order. If the items are not available, the system will automatically display a message stating "items unavailable". Once the sales order is compiled, the total bill is calculated. The customer is having the option of paying by cash or credit cards. If the customer pays cash, there is a 5% discount given. The bill is printed once the payment is made and the payment is recorded in the payment information database. The items purchased will be deducted from the items information database. Upon updating the items information, the sale will be closed.

## Question 2 [Total: 25 Marks]

Refer the following description of the requirements for a software system for a Painting Hiring Business. Analyze the data requirements and model the database of the software system using the Entity Relationship (ER) model. Identify a suitable Primary Key for each entity, and inlude any other attributes mentioned in the description.

A local businesswoman has decided to start her own Internet business, called Masterpieces Ltd, hiring paintings to private individuals and commercial companies. Because of your reputation as a database designer she has called upon your services to design and implement a database to support her new business. At the initial planning meeting, to discuss the design, the following user requirements were requested.

The system must be able to manage the details of customers and available paintings. Also it should be able to identify those paintings currently on hire to customers. Customers are categorized as B (bronze), S (silver), G (gold) or P(platinum). These categories entitle a customer to a discount of 0%, 5%, 10% or 15% respectively.

Customers often request paintings by a particular artist or theme (eg:animal, landscape, seascape, naval, still-life, etc). One painting will have one theme only. Each painting can only have one artist associated with it.

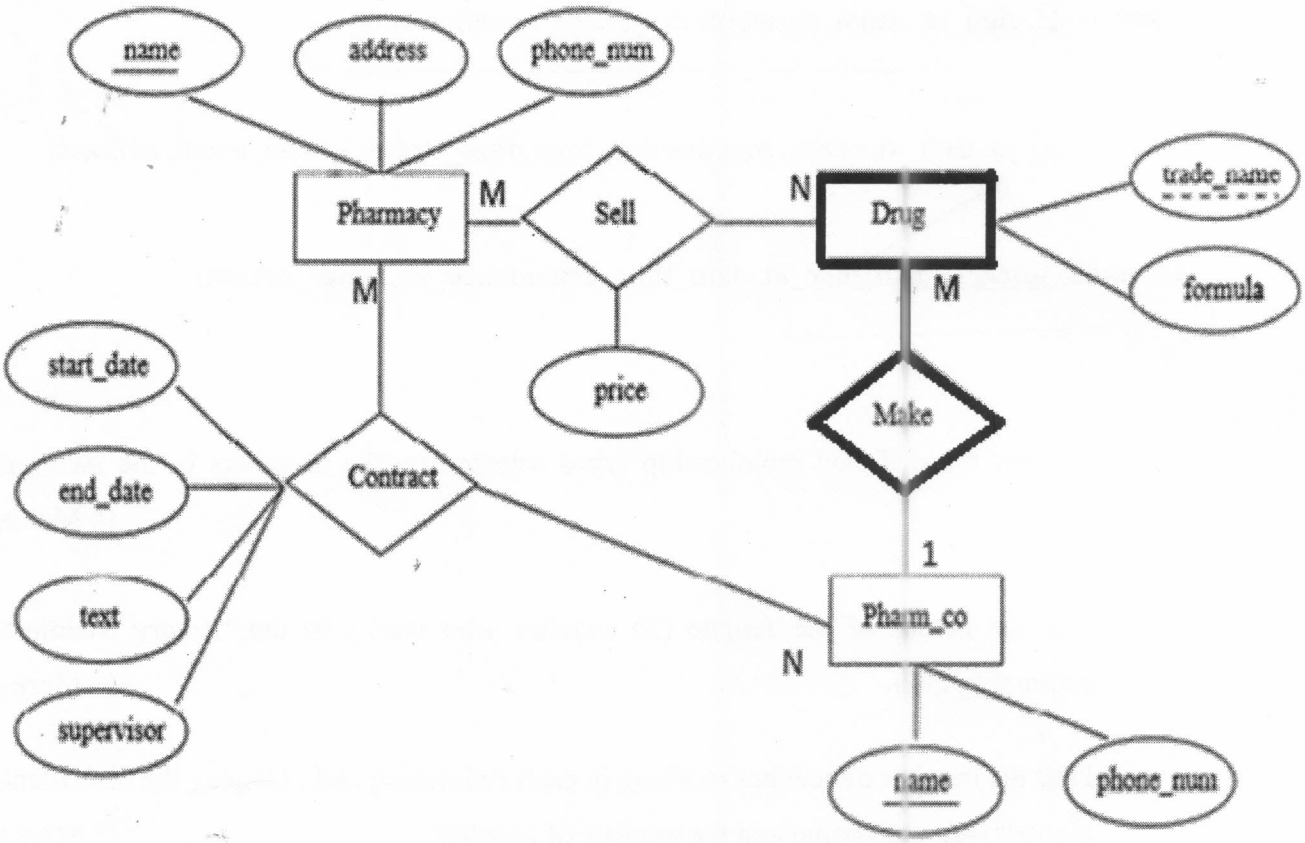
Each painting is allocated a customer monthly rental price defined by the owner. The owner of the painting is then paid 10% of that customer rental price. Any paintings that are not hired within six months are returned to the owner. However, after three months, an owner may resubmit a returned painting.

Several reports are required from the system. Three main reports mentioned by the client are:

a) For each customer, a report showing an overview of all the paintings they have hired or are currently hiring
b) For each artist, a report of all paintings submitted for hire
c) For each artist, a returns report for those paintings not hired over the past six months

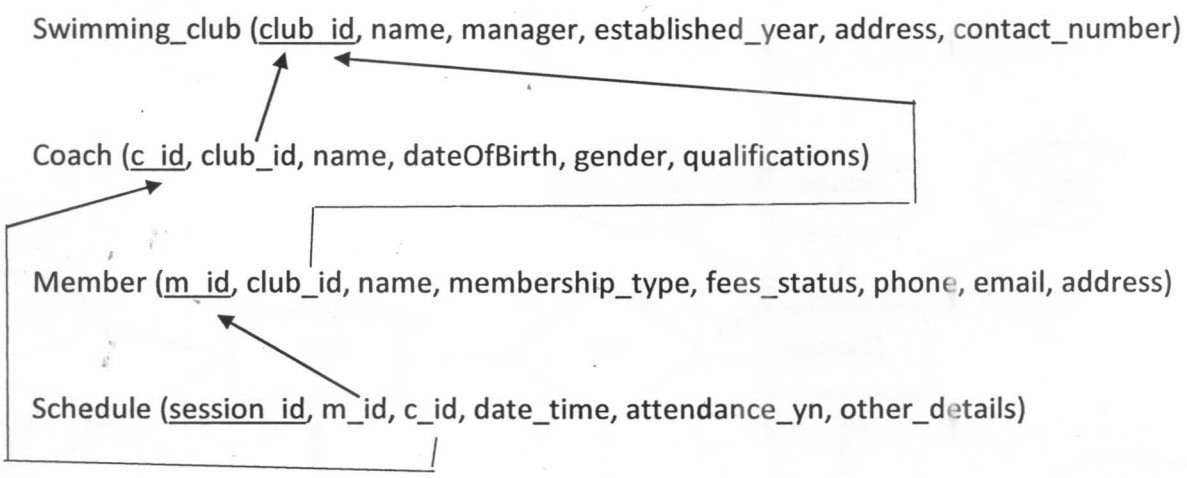
## Question 3 [Total: 25 Marks]

Consider the following given Entity Relationship (ER) diagram to construct the shema of the database. Mark the Primary Keys and Foreign Keys in the schema appropriately.



## Question 4 [Total: 25 Marks]

Consider the folowing schema, and write the given queries in SQL.




a) Display the different membership types selected by the members in the swimming clubs. (4 Marks)

b) List the names of the female (F) coaches who works in the 'Rotary Swimmers' swimming club. (6 Marks)

c) Find the number of coaches working in each swimming club. Display the club identity number (id), club name and the number of coaches. (7 Marks)

d) List the names of all members, who are enrolled in the same swimming club in which 'Akash Perera' is enrolled as a member. (8 Marks)