



Sri Lanka Institute of Information Technology

B.Sc. Honours Degree in Information Technology

Specialized in Information Technology

Final Examination
Year I, Semester II (2023)

IT1090 – Information Systems and Data Modelling

Duration: 02 Hours

June 2023

Instructions to Candidates:

- ◆ This paper is preceded by 10 minutes reading period. The supervisor will indicate when answering may commence.
- ◆ This paper has 05 questions.
- ◆ Answer all questions in the booklet given.
- ◆ This paper is marked out of 100 and contributes 60% of the Final Grade.
- ◆ This paper contains 06 pages, including the cover page.
- ◆ Electronic devices capable of storing and retrieving text, including calculators and mobile phones are not allowed.

Question 01**[Total 20 Marks]**

- a) “**Bangkok Fashion**” is an online clothing store that uses an e-commerce system to display and sell clothes. The owner of this shop, and customers use this system. Also, this shop does not keep any physical locations as showrooms.

Bangkok Fashion Clothing Store consists of several categories such as office wear, casual wear, party wear, etc. Customers can log in to the website and, select items and make payments using credit or debit cards. Card information will be verified using a payment gateway. Then the amount will be transferred from the customer’s bank account to the online clothing store’s bank account

Once a purchase is made the item availability will be updated. The owner can check the item availability through the admin dashboard, once logged into the system. If the stock count of the cloth category is less than three (03), the owner can buy another stock from the suppliers. At the end of each month, the system will be generating reports on items available in each category and the sales made.

- ✓ i. Identify inputs captured by the input function of the Bangkok Fashion Clothing system to get the monthly report? (02 Marks)
 - ii. Identify two (2) direct users and one (1) indirect user of this system? (04 Marks)
 - ✓ iii. Briefly explain what is “Customer Relationship Management (CRM) Systems?” If the above shop uses a CRM system, write two (02) advantages that the shop owner can gain. (08 Marks)
- b) Model the below process of The Bangkok Fashion clothing system using standard business process mapping tools. (06 Marks)

The process starts when the customer login to the system. Then he can select an item. Once the customer selects the item, the system checks the availability of that item from the items information database and displays it to the customer. If the item is available, the customer can add the item to the shopping cart. If the item is not available, the system will automatically display a message stating “item unavailable”. If the customer wishes to buy more than one item, he can select an item again and add it to the shopping cart.

Question 02**[Total 20 Marks]**

Consider the following information about the database of ABC Company. They undertake construction projects for different clients. And they have a set of employees who are working for them full-time on these projects.

- An employee has a SSN, a name, a date-of-birth, an address, and their expertise areas.
- A project has a unique code, a name, a start-date, an end-date and the location name where the project runs.
- A given project has several employees working in it.
- Most employees work in more than one project, since there can be several projects which requests the expertise of a particular employee.
- If an employee is allocated work in more than one project, he/she is assigned a specific time percentage to work in each project.
- Each project is supervised by one employee. And an employee is not assigned to supervise more than one project.
- Each junior employee is allocated, one senior employee as counselor to whom they can refer to incase of any concern they have. A senior employee might get assigned with more than one junior employee to counsel.
- Company is providing medical claim facilities for the dependents of their employees. But considering the limitations they provide the facility only for the spouse (wife/husband) of an employee.
- A dependent has a name, a date-of-birth and gender.
- Once the employee is terminated, they are not interested in keeping that employee's dependent information.

Design and draw the ER diagram that captures the above information about the ABC Company.

Use constructs in the basic ER model, to represent the information given in above scenario and to indicate any special constraints mentioned.

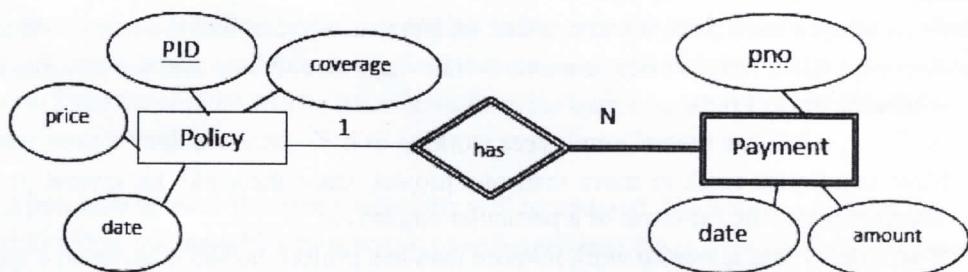
Question 03

[Total 20 Marks]

Convert the following ER Diagrams to the Relational Schemas.

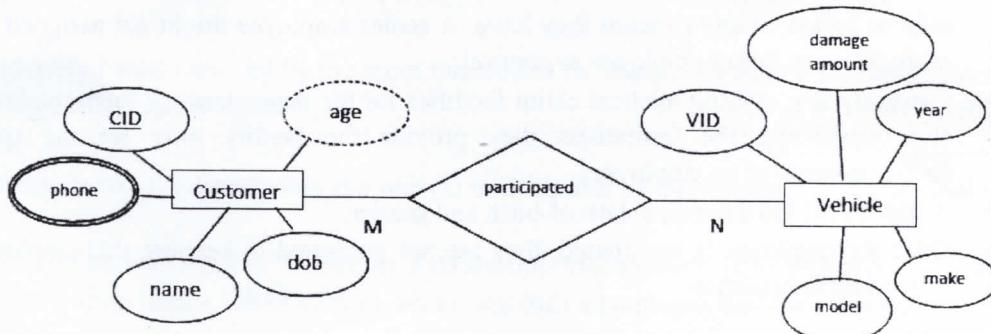
Note: Use the names given in the ER when converting to the schema whenever possible

a)



(10 marks)

b)



(10 marks)

Question 04**[Total 15 Marks]**

Consider the following schema and the set of functional dependencies.

Order (OrderID, Cus_ID, Cus_Name, TotalPrice, City, State)

OrderID, Cus_ID —————→ TotalPrice

Cus_ID —————→ Cus_Name

City —————→ State

2-10 . 4 . 3

a) In which Normal Form (NF) is the schema Order in? Explain your answer.

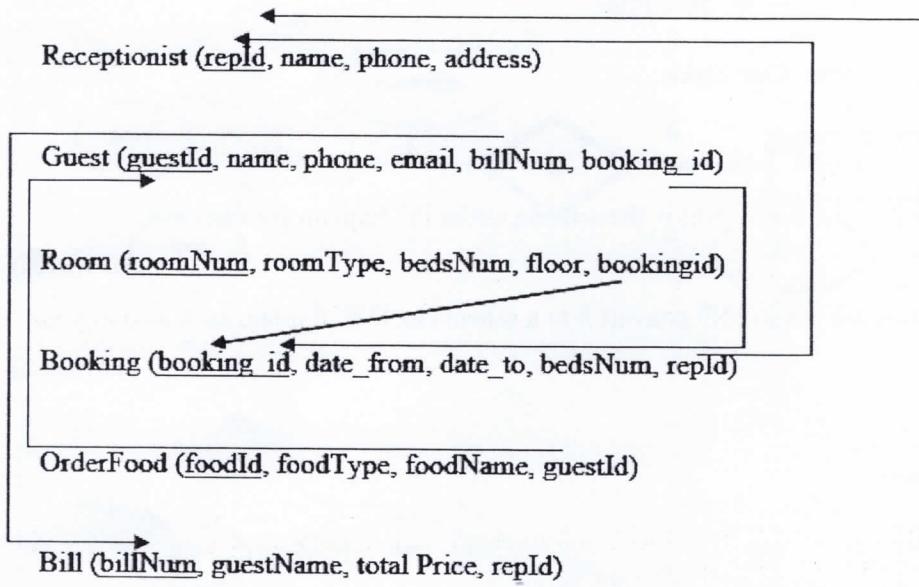
(03 marks)

b) If the schema is not in 3NF convert it to a schema in 3NF. Explain each step of your answer.

(12 marks)

Question 05**[Total 25 Marks]**

Consider the following database schema for a **Hotel Management System** and construct the given queries in SQL.



- Find the bill number and total price for which the total price is more than 20000.
(4 marks)
- Find the guest Ids and the guest names who had booked a 'Deluxe' room. Then, sort the result according to the descending order of the guest's name.
(7 marks)
- Find the guest who had to pay the most expensive total bill than all the other guests. Display the guest's name, phone, and the email.
(7 marks)
- For each guest who had ordered with many food types, display guest name along with the guest phone.
(7 marks)