Databases

10th September 2024

Examination Paper

Answer ALL questions.

Clearly cross out surplus answers.

Time: 3 hours

The maximum mark for this paper is 100.

Any reference material brought into the examination room must be handed to the invigilator before the start of the examination.

Marks

Answer ALL questions

Question 1

a) Identify FOUR (4) main functions for which a bookstore may want to use a computerised database system. **4**

b) Define metadata in the context of a Database Management System. Then provide TWO (2) examples of information it might contain. **4**

c) Compare and contrast data and information. **2**

Total 10 Marks

Question 2

a) The following table is in Third Normal Form (3NF). Suggest appropriate data types and key type (if applicable) for the attributes listed. **9**

Attribute Name	Data Type	Key
PurchaseID		
PurchaseDate		
SupplierID		
ProductID		
Quantity		
TotalCost		

b) Would a data type of VARCHAR be a suitable choice for the TotalCost attribute? Justify your answer. **1**

Total 10 Marks

© NCC Education Limited 2024

Marks

Question 3

Consider the following scenario:

A gym that records membership details has several membership plans available. A membership consists of the member's personal details and the membership plans they are subscribed to. A member may have more than one plan.

a) Draw an Entity Relationship Diagram to represent the scenario described above. You need to identify entities, relationships (including cardinality), and all the primary and foreign keys. **10**

Total 10 Marks

Question 4

a) Consider the ER diagram below for a veterinary clinic where pets visit the clinic and a vet will conduct a consultation. **6**

Create a CRUD matrix to show the following transactions:

Transaction 1 – Add a new Pet.

Transaction 2 – Update an existing vet's specialisation.

Transaction 3 – Schedule a new Appointment for a pet.

Transaction 4 – Update an appointment date.

Transaction 5 – Delete a vet and all their appointments.

Transaction 6 – Change the appointment time and date.

© NCC Education Limited 2024

Marks

b) Consider the following table. **4**

tblRoom

RoomID	Type	DailyRate
1	Single	50
2	Double	70
3	Suite	120

Explain the actions of running the following SQL command.

```
UPDATE tblRoom
SET DailyRate = DailyRate * 1.10

WHERE Type = 'Double';
```

Total 10 marks

© NCC Education Limited 2024

Question 5

Marks

Consider the following tables.

tblReservation

ReservationID	CustomerID	RoomID	CheckInDate	CheckOutDate
101	901	1	01/06/2024	05/06/2024
102	903	2	03/06/2024	07/06/2024
103	902	3	10/06/2024	12/06/2024

tblCustomer

CustomerID	FirstName	LastName	LastVisit
901	John	Smith	20/05/2024
902	Mohammed	Irfan	25/05/2024
903	Kwame	Agyeman	18/05/2024

tblRoom

RoomID	RoomType
1	Single
2	Double
3	Suite

a) Write an SQL statement that produces a list of all customers ordered by their LastVisit date in descending order. **2**

b) Write an SQL statement that produces a list of all reservations where the CheckOutDate is after 06/06/2024. **2**

c) Write an SQL statement that lists RoomType and CheckInDate. **3**

d) Write an SQL statement that counts the number of reservations each RoomType has. **3**

Total 10 Marks

© NCC Education Limited 2024

Question 6

Marks

Consider the table tblCustomer provided in Question 5. The table is reproduced below for clarity.

tblCustomer

CustomerID	FirstName	LastName	LastVisit
901	John	Smith	20/05/2024
902	Mohammed	Irfan	25/05/2024
903	Kwame	Agyeman	18/05/2024

a) Write the appropriate SQL statement that will create the table tblCustomer. **5**

b) Write the appropriate SQL statement to add the THREE (3) records to the table. **5**

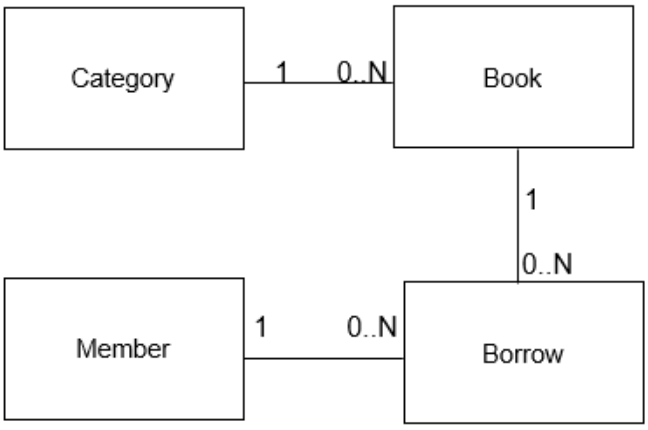
Total 10 Marks

Question 7

Consider the following scenario:

In a public library, there are many books available for lending. Each book belongs to a specific category. The library needs to keep track of which books are borrowed by which members and the due date for returning the books.

The completed ERD is shown below.



a) Using the entities shown in the ERD above, create a list of attributes that you are likely to see in each entity/table. **10**

There is no need to identify the datatypes. But you should identify Primary and Foreign Keys.

Total 10 Marks

© NCC Education Limited 2024

Marks

Question 8

a) In the context of the relational model, describe FIVE (5) properties of a relation in the context of relational model. **5**

b) Describe the concept of functional dependency giving ONE (1) example. **4**

c) Discuss the purpose of foreign keys in a relational database. **1**

Total 10 Marks

Question 9

a) A retail clothing store is experiencing issues with managing its inventory, tracking sales and maintaining customer records. The store owner is considering investing in a database system to address these challenges and enhance overall operations. **10**

Identify and explain FIVE (5) key benefits that a database system could provide to the retail clothing store.

Total 10 Marks

Question 10

a) Define First, Second, and Third Normal Form. **6**

b) Tech Solutions is a growing software development company that has recently decided to upgrade its data management system. They have been using traditional file-based systems to store and manage their data but are considering moving to a database management system (DBMS) to handle their increasing data needs. **4**

The manager is concerned about potential disadvantages that might come with implementing a DBMS. They have asked you to identify FOUR (4) such disadvantages before making a final decision.

Total 10 Marks

End of Paper

© NCC Education Limited 2024