Department of Computer Science and Engineering

Faculty of Engineering

University of North Texas

Assignment 1 CSCE5350 Spring 2024

Due on or before 19th February

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1. Let's design an Entity-Relationship (ER) model for a Car Rental System with ten entities, considering various relationships, attributes, and constraints:

This Car Rental System scenario involves entities representing customers, cars, car categories, rentals, employees, branches, insurance, payments, pickup locations, and drop-off locations. The relationships between these entities capture the complexities of a real-world car rental system, considering factors such as customer rentals, car categories, employee management, branch oversight, insurance coverage, and payment transactions.

Customer: Attributes: CustomerID (Primary Key), Name, ContactNumber, Email

Customer may have many rentals.

Car: Attributes: CarID (Primary Key), Model, Manufacturer, Year, RentalRate

One car can be rented many times by many customers in each instance.

Car belongs to a one car category and many cars can be in one car category.

CarCategory: Attributes: CategoryID (Primary Key), CategoryName

CarCategory can have many cars in it. Each rental has a car category.

Rental: Attributes: RentalID (Primary Key), RentalDate, ReturnDate, TotalCost

Customer may have many car rentals. Rental may have one or many cars.

Employee: Attributes: EmployeeID (Primary Key), Name, Position

Employee processes the rental. One employee may process many rentals. One employee manages several branches. Some employees do not manage any branch.

Branch: Attributes: BranchID (Primary Key), Location

One branch can store (park) many cars. In a branch, there can be many employees working for that branch.

Insurance: Attributes: InsuranceID (Primary Key), PolicyNumber, CoverageDetails

Insurance can cover many rentals.

Payment: Attributes: PaymentID (Primary Key), PaymentDate, Amount

Customer may have many payments. One rental can be made in many payments.

PickupLocation: Attributes: PickupLocationID (Primary Key), Location

Many rentals can be picked up from a single PickupLocation

DropoffLocation: Attributes: DropoffLocationID (Primary Key), Location

Many rentals can be returned to a DropoffLocation

Ans:

A diagram of a rental company

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**Assumptions/Total Participations:**

* Customer-Rental: Every Rental has a customer associated with it.
* Car-Rental: Every rental must have a car that is been rented.
* Car-CarCategory: Every car must belong to a car category.
* Rental-CarCategory: Each rental has a carCategory
* Employee-Rental: Every rental is processed by a customer.
* Branch-Car: Every car is stored at some or the other branch.
* Rental-PickupLocation: Every rental has a pickupLocation associated with it.
* Rental-DropoffLocation: Every rental has a dropoffLocation associated with it.

1. Answer the following questions based on the above ER model.
   1. Write an SQL query to perform the following tasks.

A screenshot of a phone

Description automatically generated

* + 1. To create the table Customer-10

Ans:

CREATE TABLE Customer (

CustomerID INT PRIMARY KEY,

Name VARCHAR(255),

ContactNumber VARCHAR(20),

Email VARCHAR(255)

);

Result table:

A black and white screen with white text

Description automatically generated

* + 1. To retrieve the rental history of a given customer (Customer Id is provided)-10

Ans:

SELECT RentalID, RentalDate, ReturnDate, TotalCost

FROM Rental

WHERE CustomerID = <CustomerID>;

Ex: SELECT RentalID, RentalDate, ReturnDate, TotalCost FROM Rental WHERE CustomerID = 2;

Result table:

A black and white screen with numbers and numbers

Description automatically generated

Customer table:

A screenshot of a phone number

Description automatically generated

Rental table:

A black and white screen with numbers

Description automatically generated

* + 1. To find the employee details with the branch he/she is working at and the rentals that he/she has processed so far. The employee Id is provided.-10

Ans:

SELECT

e.EmployeeID,

e.Name AS EmployeeName,

e.Position,

b.Location AS BranchLocation,

r.RentalID,

r.RentalDate,

r.ReturnDate,

r.TotalCost,

c.Name AS CustomerName

FROM

Employee AS e

JOIN

EmployeeBranch AS eb ON e.EmployeeID = eb.EmployeeID

JOIN

Branch AS b ON eb.BranchID = b.BranchID

JOIN

Rental AS r ON e.EmployeeID = r.EmployeeID

JOIN

Customer AS c ON r.CustomerID = c.CustomerID

WHERE

e.EmployeeID = <employee\_id>;

Ex:

SELECT

e.EmployeeID, e.Name AS EmployeeName, e.Position, b.Location AS BranchLocation, r.RentalID, r.RentalDate, r.ReturnDate, r.TotalCost, c.Name AS CustomerName

FROM

Employee AS e JOIN EmployeeBranch AS eb ON e.EmployeeID = eb.EmployeeID JOIN Branch AS b ON eb.BranchID = b.BranchID JOIN Rental AS r ON e.EmployeeID = r.EmployeeID JOIN Customer AS c ON r.CustomerID = c.CustomerID

WHERE

e.EmployeeID = 2;

Result table:

A black and white screen with white text

Description automatically generated

* + 1. The amount of money each customer spent on rentals for the past month. -15

Ans:

SELECT c.CustomerID, c.Name AS CustomerName, SUM(r.TotalCost) AS TotalAmountSpent

FROM Customer c

JOIN Rental r ON c.CustomerID = r.CustomerID

WHERE r.RentalDate >= DATE\_SUB(CURRENT\_DATE(), INTERVAL 1 MONTH)

GROUP BY c.CustomerID, c.Name;

Result table:

A black and white table with white text

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Customer table:

A screenshot of a phone number

Description automatically generated

Rental table:

A black and white screen with numbers

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1. Install and run your queries on MySQL -**5 Marks**

Steps

1. Install MySQL server and MySQL Workbench.
2. Load the sample dataset from <https://www.db-book.com/>.
3. Run this SQL statement. **select \* from instructor**;
4. Submit the result table as a screenshot.

Ans:

A screenshot of a computer

Description automatically generated

**You must state the assumptions that you made during the design process. But you must design all the requirements mentioned above.**

**Note**: Plagiarism is strictly enforced, and identical solutions get ZERO marks and no negotiations.

**You Must use a software (Lucid Chart or equivalent) to create ER diagram. Handwritten diagrams will not be graded.**

Please contact graders if you have any questions regarding the E-R diagrams, mapping into relations, or normalization.