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21AIE304 Big Data and DataBase Management Systems

Practice Problems -2

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Instructions

a. Please compile the practice problems into a Word document for PP1 and save it in your OneDrive folder.
b. Create a section titled 'Practice Problem 2.' For each question, provide the associated code in text format immediately below the question.
c. Kindly refrain from including any screenshots.

1. Create table that establish many to many relationship and explain the same.
2. You are working for an online bookstore, and your manager has asked you to create a report that displays the discount amount for each book in the inventory based on its price. Books priced differently will have different discount rates applied to them.

Here are the requirements:

If the book's price is less than $20, apply a 10% discount.
If the book's price is between $20 and $50 (inclusive), apply a 20% discount.
If the book's price is greater than $50, apply a 30% discount.

Write an SQL query to generate a report that includes the book's title, original price, and the discounted price based on the criteria above.

3. You are managing a student course registration system. Create a table called **Registrations** with the following attributes:

student_id (not unique, same id given to students of different semester,year and section)
course_id
semester
year
section

Perform the following

- Identify the super key(s) for the **Registrations** table.
- Determine the candidate key(s) among the attributes.
- Specify which attribute(s) serve as the primary key.

- Explain the rationale behind your choices for candidate and primary keys.

4. The client wants you to create an efficient registration database. The client has come up with attributes, student_id, semester, section,course,instructor name, department, first name, last name.

   Hint: Perform normalisation over this, find keys and create table . Also explain your choice.

5. Consider the following table representing a company's employee information:

```
EmployeeID -unique to each employee,
EmployeeName
Department
ManagerID,
ManagerName (manager is also one of the employee)
Salary
HireDate
```

Normalize the table to at least 3NF. Pay special attention to the hierarchical relationship between employees and managers.

6. Imagine a university database that keeps track of courses, instructors, and student enrollments. The original table is as follows:

CREATE TABLE University (CourseID INT, CourseName VARCHAR(50), InstructorID INT, InstructorName VARCHAR(50), StudentID INT, StudentName VARCHAR(50), Grade CHAR(1), PRIMARY KEY (CourseID, InstructorID, StudentID));

Normalize the table to at least 3NF.

7. You have a table representing library transactions:

```
          CREATE TABLE LibraryTransactions (
              TransactionID INT PRIMARY KEY,
               BookID INT,
BookTitle VARCHAR(100),
AuthorID INT,
    AuthorName VARCHAR(50),
    MemberID INT,
    MemberName VARCHAR(50),
    CheckOutDate DATE,
    ReturnDate DATE
);
```

Check whether the table is normalized. If not, normalize the table to at least 3NF.

8. Create a university database with the following attribute:
    - `student_id`
    - `first_name`
    - `last_name`
    - `department_name`
    - `course_name`
    - `grade`

Normalize if needed. Also, write an SQL query that retrieves a report containing the following information for each student:

- `student_id`
- Full name (`first_name` + " " + `last_name`)
- `department_name`
- The list of courses the student is enrolled in along with the corresponding grades.
- A column indicating whether the student passed or failed each course. Consider a pass if the grade is greater than or equal to 60.

9. Create a retail database with the following tables:
    - `customer_name`
    - `email`
    - `product_name`
    - `price`
    - `order_date`
    - `quantity`
    - `discount_percent`

Normalize if needed. Also, write an SQL query that calculates the total amount spent by each customer in terms of the total order value after applying discounts. Assume that the discount is in percentage and is applied to each product in an order. The query should include:

- **`customer_id`**
- **`customer_name`**
- Total amount spent by the customer (considering discounts)

10. Consider a weather database with the following tables:
    - **Cities:**
    - **`city_id`** (Primary Key)
    - **`city_name`**
    - **`country`**
    - **TemperatureReadings:**
    - **`reading_id`** (Primary Key)
    - **`city_id`** (Foreign Key)
    - **`temperature`**
    - **`reading_date`**

Write an SQL query to find the average temperature for each city in the last week. Include the following information in the result:

- **`city_name`**
- **`country`**
- Average temperature for the last week