Case Study: Car Agency

Overview

Mr. Abdelfattah is launching a new car agency in Talkha and is keen on digitalizing his business operations. He has enlisted your help to develop a database system. Initially, he wants to keep things simple and then progressively enhance the system to meet new requirements.

Initial Requirements

At the onset of his business, Mr. Abdelfattah needs to store information about the cars in his agency. This includes:

- Car model
- Available colors
- Capacity
- Additional features
- Quantity of each car in stock

When a client purchases a car, the system should record the following:

- Client contact information
- Contract details (price, payment method, additional fees based on payment method)
- Salesperson responsible for the sale

Tasks:

1. Design an ER Diagram to model these requirements.
2. Implement an SQL database based on the ER Diagram.
3. Create SQL queries to ensure Mr. Abdelfattah can perform the following operations:
    - Register a new car.
    - Record the sale of a car to a new client, allowing payment via bank account.
    - Retrieve the number of clients who bought cars in the last month.
    - Fetch details of cars purchased by a client based on their phone number.
    - Identify the top 10 salespersons by the number of sales.
    - Determine the town with the most customers.
    - Calculate the total revenue from car sales in 2024.

Updated Requirements

The business is tough, Mr. Abdelfattah's business is growing fast. There are a few changes that he wants to update in the current system:

- **Allow Installments:** He is aware that not all people are able to pay the whole amount, so he wants to implement an installments system that gives the customer the ability to pay a deposit and split the rest of the amount over 12 months. If a customer chooses the

installments system, the deposit and the rest of the amount should be saved to the database.

- **Coupon Cards:** He wants to encourage more people to buy from him, so he thought that he could distribute coupon cards in well-attended events to give the card holders the ability to get a discount on their purchase. Each coupon card has a unique number and can be used exactly once.
- **Extended Car Dataset:** As his business grows, Mr. Abdelfattah deals with more car companies. Sometimes he gets cars that he can't determine their prices. To overcome this, he wants you to save data about prices of all cars even if he doesn't even have them yet. Then any time he is selling a car, he will look up these data to get the accurate price. There will be workers who will make sure the prices are still up to date.
- **Shareholders:** Mr. Abdelfattah now isn't the only owner of the car agency. He has business partners where each of them owns a share (percentage) of the agency. By now, Mr. Abdelfattah owns 43.56% of the agency. His friend, Mr. Madboli, owns 19.34% of the agency. A British investor, Mr. McMan, owns the rest of the agency.
- **Branching:** It's expected from the huge success of the car agency that they will not stick to Talkha only. They opened branches in many other cities, like Mit Ghamr, Belqas, Aga and Al Mahalla Al Kubra. Now each branch has its own cars, workers and purchases. Make sure you can provide separate and reliable data for each branch.

Update the ER Diagram and the database tables from the initial requirements to implement the new functionality. Download the data for all cars from here: https://www.kaggle.com/datasets/sidharth178/car-prices-dataset. The data is provided in CSV format. Write a script using any programming language to insert these data into your database. Then illustrate using SQL queries how you can perform:

- Get the average price of all Toyota cars.
- Buy a car in installments system with deposit 10000, then calculate the amount of money collected after 5 months from the contract. Make sure you get the car price from the dataset.
- Get the total price of cars which are in Mit Ghamr branch.
- If the profit of each shareholder is proportional to their share in the agency, calculate the profit of Mr. McMan in the last two months (the profit is the money collected from cars sold)
- Order the branches according to the most sales, and then according to the most profit.
- Apply a coupon on a car purchase. Make sure the coupon is no longer usable after applied once.
- You know that the manager of the agency is the shareholder with the most share. Get the current manager of the agency. Then get the manager of the agency in case Mr. Madboli bought 20% of the agency from Mr. Abdelfattah.

Submission

1. Submit the ER Diagrams and database schemas for both the initial and updated requirements.

2. Populate the databases with mock data before executing the queries.
3. Execute the queries and submit the SQL code along with their output (use transactions where recommended).
4. Export the final database using the DBMS interface and provide a guide on how to open and explore the database.
5. Upload all the required files to a GitHub public repository.