

USED CAR SALES MANAGEMENT SYSTEM

Used Car Sales Management system aims at capturing the data with respect to the sales of the used car over a period where the software can keep track of the earnings and the expenditures required for the evaluation of the business growth.

This database system helps in managing the used cars that the dealer buys from the customer, the money the dealer spends on refurbishing the car, the amount he gets by selling the refurbished car, and the money spent on services.

Problem Description

A dealer has multiple branches at different locations. A dealer employs several employees who work as either sales employee or a maintenance employee. The employee's information (name, date of birth, phone number, address, date of joining, monthly salary, and employee type) are stored.

If the employee is a sales employee, his total commission per month should be calculated at the end of each month. The sales employee will only earn a commission from selling a car to a customer, but not from buying. The commission per sale will be calculated as 25% of the selling price minus the dealer's buying price of the car.

A customer may sell his car to the dealer through the sales employee and/or buy a used car from the dealer through the sales employee. The customer's information (name, date of birth, phone number, address, email id) are collected and stored.

Assuming the sales employee knows what price, a car may sell for, he/she will not buy a car that cannot make a profit. The sales employee records the car that was bought, the customer who sold the car, the date, and the price which the dealer paid.

After acquiring a used car, the maintenance employee refurbishes the car. He records the services performed to refurbish the car, the date they were performed, and the amount spent on refurbishing the car.

When a customer buys a car, the employee should record the car that was sold, the customer who bought the car, the price which the car was sold at, and the commission that the employee makes from this sale. The customer will also be offered to buy a warranty from the sales employee. The warranty lasts for 3 years from the date of

purchase. At the end, the customer will be given a survey to rate his experience of the sale from 1 to 10.

If a customer has a problem with a car that is still within the period of warranty, he may bring the car to any dealer location and the dealer will cover the cost of the services required. The car VIN, services, date, and cost to the dealer should be recorded.

Profit/Loss = prices of cars sold + money generated from warranty sales - (prices of cars bought + refurbishment cost + employee salaries + employee commission (car sale)+cost spent on servicing(under warranty))

Some of the functionalities in the designed database are listed as follows:

1. Generate list of the cars on the lot which have not been sold for a specified period of time i.e., cars that have not sold for 6 months
2. Calculate the total cost that is spent on servicing the cars that are under warranty.
3. Calculate total amount spent on buying and refurbishing a car in order to set selling price
4. Calculate total profit/loss for past month in order to compare to previous months and evaluate the business growth.
5. Generate the list of cars with the specification told by the customer (Engine Capacity, Mileage, Color) (helps us in filtering the car choice as told by Customers)
6. Generate the list of all cars which are still under the warranty
7. Generate the count and list of the cars that were serviced (under warranty) in a given time range
8. Calculate the total amount of revenue generated from warranty sales in a given time range
9. Identify the make, model, and color (optional) of car that has sold the most/least (count) in any given date range, in order to determine what kind of cars the dealer should buy more or less of
10. Identify the make, model, and color (optional) of car that has made the most/least amount of money in any given date range, in order to determine what kind of cars the dealer should buy more or less of
11. Identify the month that has the most/least number of car purchases to understand sales trend and when to buy more cars

12. Identify the employee making most/least number of sales in past month to evaluate employee's performance for the appraisal cycle
13. Identify employee with highest/lowest average customer satisfaction rating in past month to determine if employee needs to be fired or get a raise.
14. Calculate the commission that should be paid to each sales employee for that month
15. Identify the dealer location that has made the most money in any given date range.
16. Identify the city (or state) where most customers are from to identify where the business should expand

Data Description:

1. Car

- Cars are the vehicles which are bought from or sold by the dealer to the customer.
- Similarly the customer can also sell their car or buy a used car from the dealer.
- Car is bought or sold many times by the customer from the dealer
- Every car has a unique VIN i.e. Vehicle Identification Number
- Every car is associated with a MSRP i.e., Manufacturer's Suggested Retail Price
- A car may have multiple colors
- Details :
VIN, Make, Model, Year, Color, Engine_capacity, Mileage, MSRP

2. Dealer

- Dealer are the places where the business buys and sells used cars from customers.
- They operate at many locations.
- Details :
Dealer_ID, Location, Phone_no

3. Customer

- Customer are the people who buy the used cars from the dealer or sell their cars to the dealer through the sales employees.
- Customers' address can be broken down into its components for demographic analysis
- A customer may have multiple phone numbers
- Details:
Cust_ID, Name, Birth_date, Phone_no, Address (Street_no, Street_name, City, State), Email_Id

4. Employee

- Employee are the people working under the Dealer. They can be either:
 - i) Sales Employee : Helps in buying and selling the car
 - ii) Maintenance Employee : Helps in refurbishing and servicing the car
- An employee may have multiple phone numbers
- All employees are associated with a salary
- No need for employee address to be broken down into its components
- Details :

Employee_id, Name (First_Name, Last_Name), Birth_date, Phone_no, Address, Salary

5. Sales Employee

- Handles the customer interaction involved in buying and selling a car
- Along with salary, sales employee gets commission from the car sales made by him/her. Commission formula is said in the above problem description.
- The commission will be derived from the sales he has made
- The employee's rating will be derived as the average of the sales he has made
- Details:

Commission, Rating

6. Maintenance Employee

- Performs the refurbishments and services under warranty on the car
- Does not get paid a commission on top of his regular salary

Relationships :

1. Employs

- Binary Relationship between Dealer and Employee
- Dealer employs many employees
- An employee can only work at one dealer
- Details:

Join_Date

2. Buys

- Ternary relationship between sales person, customer, and car
- The sales person buys a car from the customer

- Details:
Buying Price, Date

3. Sells

- Ternary relationship between sales person, customer, and car
- Sales employee sells a car to the customer
- The commission that the employee earns for that sale will be derived from the selling price and buying price of the car
- Details:
Selling_Price, Date, Commission, Cust_Rating

4. Warranty

- Binary Relationship between Car and Customer
- Customer can buy a warranty for a car
- The warranty lasts for 3 years from the date of purchase.
- Within the warranty period, the customer can bring in his car to any dealer location if it has problems and the dealer will cover the cost of fixing it.
- Details:
Start_date, End_date, Price

5. Service

- Binary Relationship between Maintenance_Employee and Car
- The maintenance employee services a car that is under warranty.
- Within the warranty period, a customer can bring the car to any dealer to be fixed.
- A maintenance employee can fix the same car multiple times.
- Details:
Service_type, Date, Cost

6. Refurbish

- Binary Relationship between Maintenance_Employee and Car
- The maintenance employee refurbishes the car
- Refurbishments are performed on a car that is bought by the dealer before it can be sold
- Details:
Service_type, Date, Cost