Automobile Dealership Management System

Project Group 14

1. Introduction

To remain competitive in the vehicle dealership market, strong operational efficiency and customer satisfaction are essential. Dealerships must handle a diverse selection of vehicles, including both new and used cars, while maintaining accurate records of their characteristics, history, and availability. Customers also demand a hassle-free purchasing experience, including rapid access to vehicle information, warranties, insurance data, and after-sales services like roadside assistance.

The goal of this project is to create an effective database system for a car dealership that simplifies its operations. The system will manage inventories, sales operations, and after-sales services. It aims to improve operating efficiency, increase customer happiness, and keep detailed records of each vehicle and client interaction.

2. Business Problems Addressed

The goal of the car dealership management system is to address multiple important business issues:

• **Inventory Management**: Dealerships are responsible for overseeing a sizable and dynamic fleet of automobiles. The system tackles the problem of keeping up-to-date data on the availability, whereabouts, and condition of automobiles (both new and secondhand). The technology makes sure that cars are precisely tracked from arrival to sale by tying inventories to sales.

• **Sales Tracking and Reporting**: The system makes sure that all relevant information about sales transactions, such as customer and salesperson details, financing information, and so forth, is accurately documented. It allows dealerships to compile monthly sales statistics, track the success of sales staff, and identify consumer purchasing habits.

• **Management of Vehicle History**: It's critical to keep thorough records of prior owners, damage reports, and service history for pre-owned cars. Every used automobile has a complete vehicle history available through the system, which ensures transparency throughout the sales process and fosters customer trust.

• **Customer Interaction**: By organizing test drives, service appointments, and gathering customer feedback, the system meets the need for more efficient customer interactions. This improves customer satisfaction by streamlining the tracking of the client's interaction with the dealership.

• **After-Sales Service and Warranties**: Keeping customers satisfied requires effective management of after-sales services including auto maintenance, repairs, and warranty coverage. By ensuring that warranties are associated with particular cars and parts and that services are booked effectively, the system enhances customer care in general.

3. Entities Description

The following are the key entities in the **Automobile Dealership Management System** based on your ERD:

1. **User**:
    - Captures information about all users, including both customers and employees.
    - Attributes: UserID, Name, Address, Phone, Email.

2. **Customer**:
    - Represents customers interacting with the dealership. Customers can purchase vehicles, schedule appointments, and provide feedback.
    - Attributes: CustomerID.
3. **Sales Person**:
    - Represents the employees involved in sales transactions, responsible for selling vehicles.
    - Attributes: EmployeeID, JobTitle, HireDate, Salary.
4. **Vehicle**:
    - Represents vehicles available for sale, both new and used. The system tracks details such as model, make, year, and price.
    - Attributes: VehicleID, ModelName, Make, Year, Status (Available, Sold), Cost.
    - Subtypes: **New Vehicle** and **Used Vehicle** with additional attributes like Mileage and Previous Owners for used vehicles.
5. **Sales Management**:
    - Captures information about each sales transaction, including the salesperson involved, sale price, and customer.
    - Attributes: SaleID, SaleDate, SalePrice, SalesPersonName
6. **Inventory**:
    - Manages vehicles currently in stock, tracking their availability, location, and price range.
    - Attributes: InventoryID, Quantity, Location, AvailabilityStatus, PriceRange, Arrivaldate.
7. **Test Drive**:
    - Tracks details of test drives scheduled by customers.
    - Attributes: TestDriveID, TestDriveDate, VehicleID.
8. **Service**:
    - Tracks repair and maintenance services provided for vehicles, including parts used.
    - Attributes: ServiceID, ServiceDate, ServiceDescription, ServiceCost.
9. **Parts**:
    - Represents individual parts used during service or repairs.
    - Attributes: PartID, PartName, PartCost, Status.
10. **Warranty**:
    - Tracks warranty coverage for vehicles and specific parts.
    - Attributes: WarrantyID, Part, ExpiryDate, CoverageDetails.Renewed date
11. **Transaction**:
    - Captures payment details related to sales transactions.
    - Attributes: TransactionID, TransactionMethod, TransactionDate, TransactionAmount.
12. **Financing**:
    - Tracks financing agreements provided to customers for vehicle purchases.
    - Attributes: FinancingID, FinanceProvider, FinanceAmount, InterestRate, Terms.
13. **Vehicle History**:
    - Records the history of used vehicles, including previous owners, damage records, and service history.
    - Attributes: HistoryID, PreviousOwners, DamageRecords, ServiceRecords.
14. **Feedback**:
    - Allows customers to provide feedback about services or purchases.
    - Attributes: FeedbackID, Rating, Comments.
15. **Dealer**:
    - Represents the dealership as a whole, managing the sale and service of vehicles.
    - Attributes: DealerID, DealerName, DealerAddress, Phone, License Number.

4. Entity Relationships

The following relationships define the interactions between entities in the **Automobile Dealership Management System**:

- **Customer to Sales Management**: A customer can purchase multiple vehicles, but each sale is linked to one specific customer. (mandatory many to one optional)
- **Sales Person to Sales Management**: A salesperson can manage multiple sales, but each sale is handled by one specific salesperson. (mandatory many to mandatory onel)
- **Vehicle to Inventory**: Each vehicle must be part of the dealership's inventory, ensuring availability and price details are managed in real-time. (mandatory One-to-One)
- **Vehicle History to Used Vehicle**: Each used vehicle must have an associated history record, capturing previous ownership and service details. (mandatory One-to-Many)
- **Inventory to Sales Management**: Once a vehicle is sold, its inventory record is updated to reflect that it is no longer available for sale. (optional many -to- mandatory One)
- **Sales Management to Transaction**: Each sale must have an associated payment record, capturing details about how the sale was paid for. (One-to-One)
- **Sales Management to Financing**: If applicable, each sale can have one associated financing agreement, detailing loan terms and interest rates. (Optional One-to-mandatory Many)
- **Service to Parts**: A service may involve multiple parts being replaced or repaired, but each part must be linked to a specific service record. (mandatoy One-to-optional Many)
- **Warranty to Vehicle**: Each vehicle must have a warranty, ensuring coverage for specific parts or services. (Mandatory One-to-Many)
- **Feedback to Customer**: A customer may provide feedback on a purchase or service experience. (mandatory One-to-Mandatory Many)
- **Appointments to Test Drive**: A customer can make appointments for test-drives. (mandatory one to mandatory Many)
- **Appointments to Services:** A customer can make appointments for test-drives. (mandatory one to mandatory Many)
- **Vehicle to dealer:** The dealer supplies the vehicles (optional many to mandatory many).
- **Customer to Appointment:** Customer books Appointments (optional many to mandatory many)
- **Warranty to parts :** Each part has warranty included(optional many to optional many).
- **Test drive to vehicle :**Vehicle is involved in a test drive (Mandatory many to mandatory Many)
- **Inventory to Parts :**Inventory has the parts associated for the serving (mandatory many to mandatory many)

5. Key Design Decisions

1. **Supertype/Subtype for Vehicle:**There are subtypes for New Vehicle and Used Vehicle within the Vehicle entity. This allows for monitoring additional properties related to used automobiles, such as Mileage and Used Vehicles associated with the VehicleHistory Entity, while sharing common attributes like ModelName and Make.

2. **Supertype and Subtype for User :** The User Supertype is divided into Customer and Employee subtypes. This classification is done to determine the Customer with CustomerID attribute and SalesPerson with EmployeeID attribute to differentiate between the salesperson working in the organization and the Customer who purchases products or services. Total Overlap Generalisation is assigned since the Salesperson can also become a Customer.

3. The system links information from past ownership, damage reports, and service histories to manage complete vehicle histories for used cars. Customers buying pre-owned cars may be assured of openness thanks to this, which increases dealership trust

Conclusion

The proposed ERD for the automobile dealership addresses the critical business needs of managing vehicle inventory, sales, services, and customer interactions. By integrating key entities such as customers, sales management, automobiles, and services, the database ensures operational efficiency and helps the dealership maintain customer satisfaction. The careful consideration of entity relationships and cardinalities ensures the system is both scalable and capable of providing valuable insights through reporting.

Conceptual ERD