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**Phase 1 Progress Report**

* Progress
  + We began phase 1 by researching our project domain to get a better understanding of how to represent the database that an automobile company would have. We created all of the entities and relationships needed in the database and subsequently refined them in order to properly model the ER diagram. We have recognized the requirements of our database system and have now implemented an efficient layout.
* Description
  + The database will contain a vehicle relation that contains the vehicles made by the company. Sales of vehicles will happen between a dealer and a customer. Each dealer has an inventory represented by an inventory ID. The inventory will contain all cars represented by their VIN number, the corresponding inventory ID, and whether or not they’ve been sold.
* Choices made
  + The brand/model of an individual car will be an attribute rather than the parent of the car. As of now cars that don’t have complete attributes aren’t being represented. Marketing queries, such as the number of car sold of a particular brand, are more infrequent than the queries from the dealerships.
  + For now we decided to ignore information encoded in a real VIN number.
  + VIN numbers would be the primary key for individual cars
  + Customer will contain a foreign key to either a person or company
  + The inventory is a weak attribute of the dealer.
* Issues and solutions
  + Should a car’s VIN be stored in the sale table?
    - No, we create a seperate table for the many to many relationship since there can be multiple cars in a sale
  + Do we need separate ID’s for dealers and their inventories?
    - Yes, because there could a discrepancy if dealers changed inventories or retires
  + Do individual vehicles need another key in addition to the VIN number?
    - No, the VIN is unique and suffices to identify cars from one another and is enough to connect them to other tables
  + Should we worry about dealers being able to access the inventories of other dealers?
    - Inventories are not private information
  + Does the domain extend beyond tracking individual cars being bought and sold by dealers and customers?
    - Retail and inventory is different enough from other areas such as R&D that if the database was expanded outside of retail and inventory the design decisions would not make much difference.
  + Should the inventory be dependent on the dealer?
    - Yes because each dealer has their own inventory
  + How to separate corporate customers and individual customers?
    - Customer is a person who is either an individual or a company representative
  + Could there be a sale with multiple dealers, such as when selling to a company?
    - No, these would be considered separate sales. A sale can only have one dealer
  + Should being sold be an attribute of the inventory or the vehicle?
    - We put the sold attribute in the inventory because it is important to the dealer and is not important when accessing a vehicles description
  + Should sales and vehicles be one to one?
    - Sales IDs can indicate that a sale entry belongs to the same sale.
* ER Diagram and reduction to tables
  + The ER Diagram was designed in the following manner:
    - A sale contains one seller that is a dealer, one buyer that is a customer and one or more vehicles which are sold.
    - Every sale has a unique ID associated with it.
    - A dealer has a unique ID and one inventory associated with it.
    - An inventory is a weak entity that can only occur if there is a dealer.
    - Many inventories contains many vehicles.
    - A vehicle is sold in a sale and is acquired by it’s unique VIN number.
    - A customer has two types; an Individual or a Company.
    - Each customer has a unique ID.
    - A customer has a name, address, and at least one phone number.
    - When a customer is a company, the “name” attribute is the name of the representative person from the company
    - An Individual has an annual income.
    - A company has a company name.
  + Reduction to tables:
    - Inventory: Holds its ID, VIN numbers for all cars, and a boolean for if the car is sold or not
    - Dealer: Holds its ID, Name, and Inventory ID which connects the dealer to it’s inventory
    - Vehicle: Holds its VIN, Model, Brand, and Color
    - Customer: Holds its ID, Name, Street, City, State, Zip Code, Phone, Gender, and email
    - Sale: Holds its ID, Customer ID to link the sale to the customer, Dealer ID to link the sale to the dealer, Date, and Total cost
    - Sold: Tabled added to keep track of all sales made. Holds VIN and Sale ID to link the car that was sold to the sale it was associated with
    - Individual: Holds Customer ID to link it to the customer it is associated with and Annual Income
    - Company: Holds Customer ID to link it to the customer it is associated with and Company Name
* Description of data planned to be used
  + The database for now would be focused mostly on individual cars and the retail dealerships they will be sold at. It’s more important to find all the vehicles in a particular dealer inventory or in a particular sale than it is to find all vehicles of a particular model or brand.
  + Each car is represented by its VIN, each dealership with have one inventory which will contain the VIN of all the vehicles.
  + Customers will either be a person or company.
  + Sales will contain the date, customer, dealer, sale ID, and the vehicle
  + Vehicles will have model, price, year, and status
  + Model, Brand, and accessories will be represented in a hierarchical relationship of attributes that could be applied to individual vehicles