Assumptions

- VIN and driver license are 10-digit integers.

- We assume the build year of the vehicle is between 1950 and 2025.

- We assume the description of a vehicle listing cannot exceed 255 characters (`VARCHAR(255)`).

- We assume the images in vehicle listings are stored as `BYTEA`.

- We assume that in `TestDriveRecord`, the feedback cannot exceed 255 characters.

- We assume that `People` store names separately in `FirstName` and `LastName`.

- We assume that `SAGCustomer` stores addresses divided into `State`, `Street`, `City`, and `ZipCode`.

- We assume that in `BankFinancing`, a value of `TRUE` for `ProofOfApproval` indicates that secured bank financing has been obtained.

- We assume that duplicate options cannot be selected in the aftermarket options — that is, options with the same name but different IDs are not allowed.

- We assume that a "for sale" vehicle listing may contain multiple images, but it must contain at least one image. In addition, image cannot be the same for each vehicle.

- We assume that each vehicle can have at most one vehicle listing. In the case of a resale, it is sufficient to update the existing listing using the foreign key `VIN`.

- We assume that `People` can be both a `SAGCustomer` and a `Salesperson` at the same time.

- We assume that different customers may share the same phone number, as some might change their numbers without updating their records promptly.

- Due to the ambiguity of the description, we assume that the discount price refers only to the discount amount. We calculate the final price as:
  Final Price = (Base Price - Discount Price) + Aftermarket Options Cost - TradeIn Vehicle Price (if applicable)

- Since the formula for calculating the trade-in value is unclear, we chose to store it directly in the `Sale` table, assuming a one-to-one relationship with each sale.

- We assume that payments will only set the balance to zero; if the balance is less than or greater than zero, the sale will not be marked as complete.

- Referencing "A vehicle can only be sold to one single customer" from the additional relationship constraints — since the statement is vague, we assume that once a vehicle is sold, it will not be sold again in any form. In addition, a car can only be sold to one customer in the Sale record.

- Since the trade-in price and discount might not be applicable, we assume that their values are set to be greater than or equal to 0.

- All entities that use a foreign key must be inserted **before** their referenced target entities within a transaction. This ensures that the "at least one" relationship is maintained. The clause for it is DEFERRABLE INITIALLY DEFERRED

Entity-Relationship diagram for a vehicle sales system.

Entities and attributes:

VehicleListing: Image, Description, VID

Vehicle: VIN, Make, Model, BuildYear, OdometerRecords, Color, TransmissionType, ListedPrice, Status

NewCar

PreOwnedCar: PreOwnerName

TradeInCar: BodyCond, MechanicalCond

TestDriveRecord: TID, Date, Time, FeedBack

Customer: CustomerID

SAGCustomer: DriveID, Address (Street, City, State, zipcode)

People: PID, Name (First, Last), PhoneNum, Email

SalesPerson: AnnualSalesSalary, CommissionRate

Sale: SID, Date, BasePrice, Discount, AfterMarketPrice, TradeInPrice, Status, FinalPrice

Aftermarket: AID, Name, Description, Price

Payment: PayID, POption, Amount, Date

BankFinancing: BFID, Bank, LoanTerm, InterestRate, ProofOfApproval

Relationships: Access, Belongs, Has, Become, ScheduleBy, Generate, Process, SoldIn, IsA, TradeIn, Involve, Include

Handwritten annotations:
- disjoint (red, near Vehicle IsA)
- ? place a sale. Do not pay pending (green, near SalesPerson / Sale)
- cardinality 1..2 on People IsA
- cardinality 0..8 on Sale Involve