

The Online Car Shopping Data Base ER

A. Entities

1. Customer(CustomerID[PK], FirstName, LastName, Password, Email, SalespersonID [FK])
2. Car(CarID [PK], Price, Warranty, EngineID[FK], CategoryID [FK], Maker[FK], Color, ModelID[FK], ConditionTypeID[FK])
3. Engine(EngineID, EngineName, FuelType, HorsePower, TorquePower, Size, Maker[FK])
4. Maker(MakerID, MakerName, Country, MakerEstablishedYear, MakerWebsiteURL)
5. Category(CategoryID [PK], CategoryName, CategoryDescription)
6. Review (ReviewID[PK], CustomerID[FK], CarID[FK], Rating, Comment, DataPosted)
7. Inventory(CarID[PK], Sales, StockQuantity, ReorderThreshold, LastRestockDate, AverageRestockTime)
8. ConditionType (ConditionTypeID [PK], ConditionTypeAdjective)
9. Model (ModelID [PK], ModelName, ModelYear, TransmissionType, AverageFuelConsumption)
10. PaymentMethod(PaymentID (PK), card number, CustomerName, ExpiryDate, CVC, PaymentDate, CustomerID [FK])
11. Salesperson (SalespersonID [PK], FirstName, LastName, Email, PhoneNumber)
12. Address(AddressID [PK], CustomerID [FK], Street, City, State, ZIPCode)
13. Order (OrderID [PK] CustomerID [FK], OrderDate, Total amount, Status)
14. OrderItem(OrderItemID [PK], OrderID [FK], CarID [FK], Quantity, Subtotal)

B. Entity Relationships: **(Business Rules are part of the “Explanation” of the relationships)**

1. Customer and PaymentMethod:
 - Type: One-to-Many
 - Strength: Weak

- Explanation: A customer can have multiple payment methods, and the existence of payment methods depends on the customer. A customer must have at least one payment method, and a payment method must have only one customer.

2. Car and Model:

- Type: Many-to-One
- Strength: Weak
- Explanation: A car can only belong to one model, and a model can belong to many cars, a model must have one or more cars, and a car must have a model.

3. Car and Category:

- Type: Many-to-One
- Strength: Weak
- Explanation: A car must belong to a single category, and a category can belong to many cars. A category must have at least one car.

4. Car and Maker:

- Type: Many-to-One
- Strength: Weak
- Explanation: A car must be made by one maker, and a maker can make many cars. A maker must have at least one car.

5. Car and ConditionType:

- Type: Many-to-one
- Strength: Weak
- Explanation: A car must belong to one condition (such as new or used), and a condition can belong to many cars. A condition must have at least one car.

6. Car and Engine:

- Type: Many-to-one
- Strength: Weak
- Explanation: A car has just one engine type, and many cars can have the same engine. Each engine has at least one car.

7. Engine and Maker:

- Type: Many-to-one
- Strength: Weak
- Explanation: An engine belongs to one maker only, and a maker can make many engines and has made at least one.

8. Salesperson to Order:

- Type: One to Many
- Strength: Weak
- Explanation: A salesperson may approve many orders, an order must belong to one salesperson. Not all salespeople have approved orders.

9. Order and Customer:

- Type: One-to-Many
- Strength: Weak
- Explanation: A customer can place multiple orders, and an order must be placed by one customer. Not every customer has an order.

10. OrderItem and Order:

- Type: Many-to-one
- Strength: Weak
- Explanation: An order can have multiple order items, and an order item must belong to one order. An order must have at least one order item.

11. Review and Customer:

- Type: Many-to-One
- Strength: Weak
- Explanation: Many reviews can be written by a single customer, and reviews must belong to one customer. Not every customer has a review.

12. Review and Car:

- Type: Many-to-one
- Strength: Weak

- Explanation: A car can have many reviews and a review must belong to only one car. It is possible for a car to have no reviews.

13. Car and Inventory:

- Type: One-to-One
- Strength: Strong
- Explanation: Each car in the inventory has a one-to-one relationship with its stock quantity and sales information, indicating a strong dependency.

14. Car and Review:

- Type: One-to-Many
- Strength: Strong
- Explanation: A car can have multiple reviews, and the existence of reviews is dependent on the

15. Customer and Salesperson:

- Type: Many-to-One
- Strength: Weak
- Explanation: Many customers can be associated with one salesperson, and a customer can only be helped by one salesperson. A customer must have a salesperson, a salesperson must have at least one customer.

16. Address and Customer:

- Type: One-to-Many
- Strength: Weak
- Explanation: A customer must have a single address, an address can belong to many customers and must belong to at least one customer.