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Stage IV

Elaboration: Database Design

### BCNF Relations

| Vehicle    |            |      |      |       |                   |      |           |                   |
|------------|------------|------|------|-------|-------------------|------|-----------|-------------------|
| VIN_Number | Department | Year | Make | Model | Vehicle_Type_Code | Type | Time_Line | Year_Incorporated |
|            |            |      |      |       |                   |      |           |                   |

| Vehicle_Types     |              |        |                     |               |              |            |                  |                  |         |
|-------------------|--------------|--------|---------------------|---------------|--------------|------------|------------------|------------------|---------|
| Vehicle_Type_Code | Vehicle_Type | Engine | Anticipated_Mileage | Estimated_MPG | Initial_Cost | Incentives | Annual_Fuel_Cost | Maintenance_Cost | Repairs |
|                   |              |        |                     |               |              |            |                  |                  |         |

| Tire_Replacement | Battery_Replacement | Insurance | Lifetime_Cost | Annual_Cost | GHC_Emissions |
|------------------|---------------------|-----------|---------------|-------------|---------------|
|                  |                     |           |               |             |               |

| Variables         |           |           |           |                      |              |                       |
|-------------------|-----------|-----------|-----------|----------------------|--------------|-----------------------|
| Vehicle_Type_Code | Fuel_Cost | GTE_Miles | GTE_Years | Maintenance_Per_Mile | Depreciation | Equal_Carbon_Emission |
|                   |           |           |           |                      |              |                       |

Each of the relations in our database are already in BCNF. Since there is only one key attribute, each other attribute is dependent only on it. Additionally, there are not any transitive functional dependencies that need to be removed. Lastly, there is no possibility of redundancy in the relations, so it is in BCNF.

### 3. VIEWS

Main view- has 3 main attributes that we will be using in our analysis: initial cost, fuel type, and field cost

```
CREATE VIEW mainview AS
```

```
    SELECT fuel_cost, initial_cost, fuel_type, Vehicle_Type_Code
    FROM Vehicle_Types
```

Second view- We are planning to have a “click here to learn more” where it takes us to the information about the individual vehicle

```
CREATE VIEW vehicleInfo AS
```

```
    SELECT *
    FROM Vehicle
    WHERE make=enteredMake AND model=enteredModel
```

### 4. SQL QUERIES

We are finding the vehicles that match the make and model of what the user has inputted.  
We then join the selected vehicles with the vehicle\_type relation to get the relevant cost-benefit attributes for those vehicles

```
CREATE TABLE selectedVehicles (  
    Make varchar(255)  
    Model varchar(255)  
    Vehicle_Type_Code(255)  
)
```

```
INSERT INTO selectedVehicles(  
    SELECT make=enteredMake and model=enteredModel  
    FROM Vehicle  
    GROUP BY Vehicle_Type_Code  
)  
SELECT fuel_cost, initial_cost, fuel_type  
FROM selectedVehicles v JOIN mainview m  
ON v.Vehicle_Type_Code = m.Vehicle_Type_Code
```