Relational Algebra

In this assignment you will be writing ***relational algebra*** (not SQL) queries to select various sets of data. Attached is a schema of a auto dealership database.

Vehicle - The base class for types of vehicles to be sold.

Make - The brand of vehicle. (e.g. BMW, Ford etc)

Model – The specific model (2 Series, Focus etc). First production year is the first year that model was ever made

Vehicle_Incentive – A relationship table between Vehicles and Incentives. Keeps track of when the incentive for that vehicle expires.

Incentive – Discounts and other deals. Type includes things like Factory or Dealer depending who is offering the incentive.

Inventory - The actual stock of vehicles in the lot. The price is the MSRP for that specific vehicle.

Color – The potential colors cars can come in. The name is the name given by the factory (Taffeta white). The code is the hex representation of that color (e.g. #FFFAFA)

Questions

1. Select the make_name and model_name of all vehicles which have a first production year of 1976

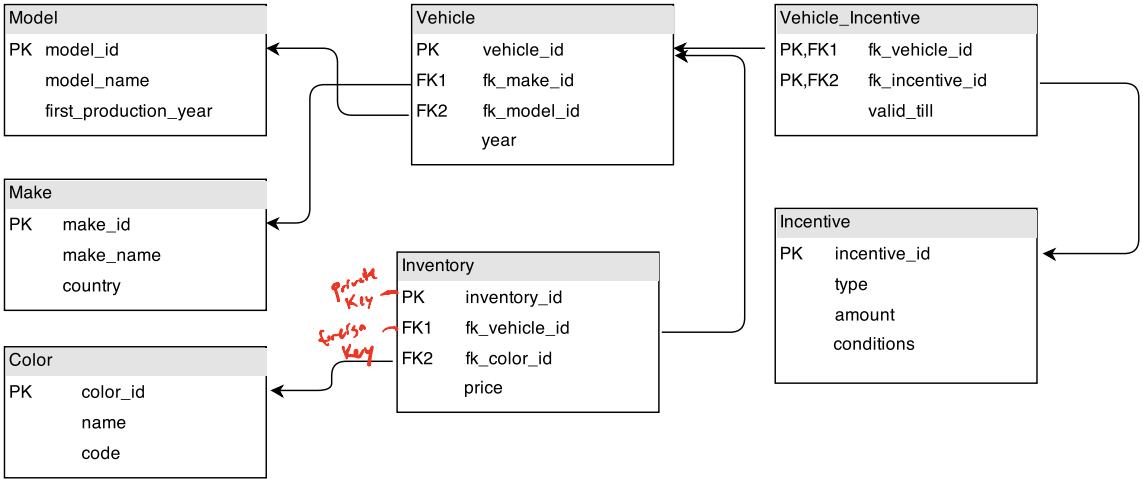
2. Select the make_name and model_name of all vehicles with the color name Blue

3. Select the make_name, model_name and incentive amount for all vehicles with a dealer type incentive

4. Convert the following query to relational algebra

```
SELECT Player.id, Team.name, City.name FROM Player
INNER JOIN Team ON Player.team_id = Team.id
INNER JOIN City ON Team.city_id = City.id
WHERE Player.score = 100;
```

5. For problem 3 above, convert your relational algebra query into a SQL query.


Model
PK model_id
model_name
first_production_year
Vehicle
PK vehicle_id
FK1 fk_make_id
FK2 fk_model_id
year
Vehicle_Incentive
PK,FK1 fk_vehicle_id
PK,FK2 fk_incentive_id
valid_till
Make
PK make_id
make_name
country
Inventory
PK inventory_id
FK1 fk_vehicle_id
FK2 fk_color_id
price
Incentive
PK incentive_id
type
amount
conditions
Color
PK color_id
name
code

1. π Model.first_production_year = 1976 (σ Make.make_name, Model.model_name (
Make ⋈ Make.make_id =Vehicle.fk_make_id Vehicle ⋈ Vehicle.fk_model_id = Model.model_id Model))

2. π Color.name = "Blue" (σ Make.make_name, Model.model_name (
(Make ⋈ Make.make_id =Vehicle.fk_make_id Vehicle ⋈ Vehicle.fk_model_id = Model.model_id Model)
⋈ Vehicle.vehicle_id = Inventory.fk_vehicle_id Inventory ⋈ Inventory.fk_color_id = Color.color_id Color))

3. π Incentive.type = "dealer" (σ Make.make_name, Model.model_name, Incentive.amount (
(Make ⋈ Make.make_id =Vehicle.fk_make_id Vehicle ⋈ Vehicle.fk_model_id = Model.model_id Model) ⋈ Vehicle.vehicle_id =
Vehicle_Incentive.fk_vehicle_id Vehicle_Incentive ⋈ Vehicle_Incentive.fk_incentive_id = Incentive.incentive_id Incentive)

4: π Player.score = 100 (σ Player.id, Team.name, City.name (Player ⋈ Player.team_id = yeam.id Team ⋈ Team.city_id = City.id City))

5:
```
SELECT Make.make_name, Model.model_name, Incentive.amount FROM Incentive
    INNER JOIN Vehicle_Incentive ON Vehicle_Incentive.fk_incentive_id = Incentive.incentive_id
    INNER JOIN Vehicle ON Vehicle.vehicle_id = Vehicle_Incentive.fk_vehicle_id
    INNER JOIN Model ON Vehicle.fk_model_id = Model.model_id
    INNER JOIN Make ON Make.make_id =Vehicle.fk_make_id
    WHERE Incentive.type = dealer;
```