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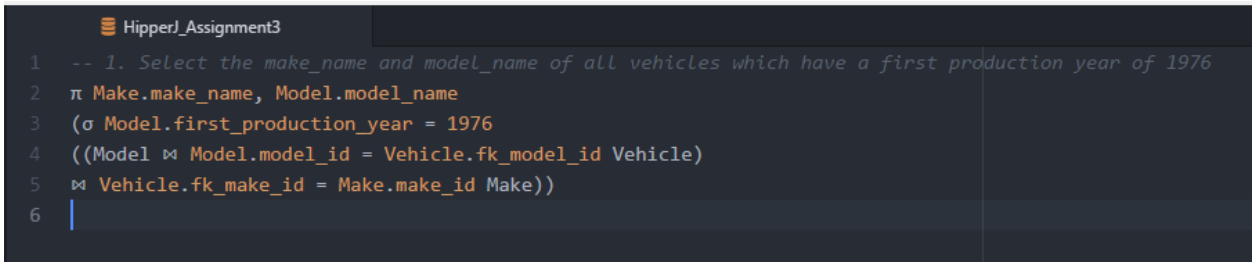
Assignment 3: Relational Algebra

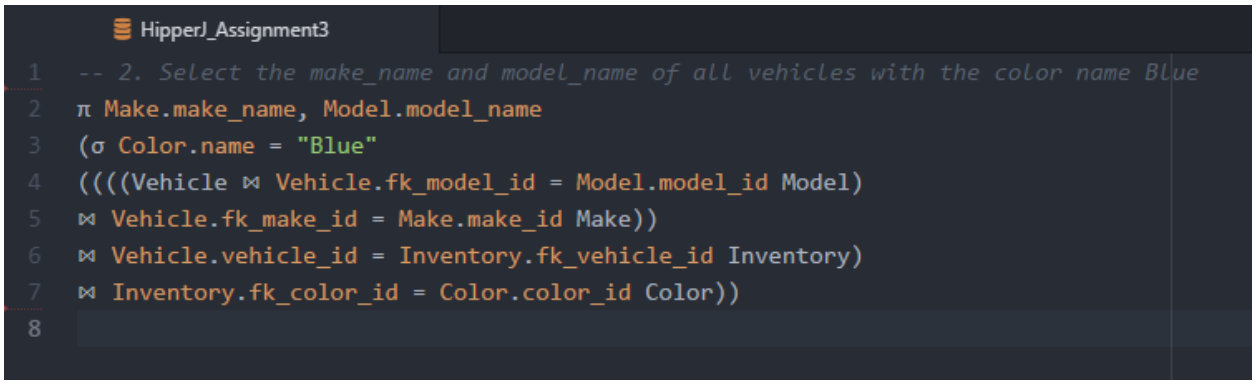
1. **Select the make_name and model_name of all vehicles which have a first production year of 1976**

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



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

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



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

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

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-- 3. Select the make_name, model_name and incentive amount for all vehicles with a dealer type incentive
π Make.make_name, Model.model_name, Incentive.amount
(σ Incentive.type = "dealer"
((((Model ⋈ Model.model_id = Vehicle.fk_model_id Vehicle)
⋈ Vehicle.fk_make_id = Make.make_id Make)
⋈ Vehicle.vehicle_id = Vehicle_Incentive.fk_vehicle_id Vehicle_Incentive)
⋈ Vehicle_Incentive.fk_incentive_id = Incentive.incentive_id Incentive))

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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;

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

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-- 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;
π Player.id, Team.name, City.name
(σ Player.score = 100
((Team ⋈ Team.id = Player.team_id Player)
⋈ Team.city_id = City.id City))

```

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

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