

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 \bowtie Model.model_id = Vehicle.fk_model_id Vehicle)
 \bowtie Vehicle.fk_make_id = Make.make_id Make))

```
HipplerJ_Assignment3
1  -- 1. Select the make_name and model_name of all vehicles which have a first production year of 1976
2   $\pi$  Make.make_name, Model.model_name
3  ( $\sigma$  Model.first_production_year = 1976
4  ((Model  $\bowtie$  Model.model_id = Vehicle.fk_model_id Vehicle)
5   $\bowtie$  Vehicle.fk_make_id = Make.make_id Make))
6  |
```

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 \bowtie Vehicle.fk_model_id = Model.model_id Model)
 \bowtie Vehicle.fk_make_id = Make.make_id Make))
 \bowtie Vehicle.vehicle_id = Inventory.fk_vehicle_id Inventory)
 \bowtie Inventory.fk_color_id = Color.color_id Color))

```
HipplerJ_Assignment3
1  -- 2. Select the make_name and model_name of all vehicles with the color name Blue
2   $\pi$  Make.make_name, Model.model_name
3  ( $\sigma$  Color.name = "Blue"
4  (((Vehicle  $\bowtie$  Vehicle.fk_model_id = Model.model_id Model)
5   $\bowtie$  Vehicle.fk_make_id = Make.make_id Make))
6   $\bowtie$  Vehicle.vehicle_id = Inventory.fk_vehicle_id Inventory)
7   $\bowtie$  Inventory.fk_color_id = Color.color_id Color))
8  |
```

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
 $(\sigma \text{ Incentive.type} = \text{"dealer"})$
 $(((((\text{Model} \bowtie \text{Model.model_id} = \text{Vehicle.fk_model_id} \text{ Vehicle})$
 $\bowtie \text{Vehicle.fk_make_id} = \text{Make.make_id} \text{ Make})$
 $\bowtie \text{Vehicle.vehicle_id} = \text{Vehicle_Incentive.fk_vehicle_id} \text{ Vehicle_Incentive})$
 $\bowtie \text{Vehicle_Incentive.fk_incentive_id} = \text{Incentive.incentive_id} \text{ Incentive}))$

```

HipplerJ_Assignment3
1  -- 3. Select the make_name, model_name and incentive amount for all vehicles with a dealer type incentive
2   $\pi$  Make.make_name, Model.model_name, Incentive.amount
3   $(\sigma \text{ Incentive.type} = \text{"dealer"})$ 
4   $(((((\text{Model} \bowtie \text{Model.model\_id} = \text{Vehicle.fk\_model\_id} \text{ Vehicle})$ 
5   $\bowtie \text{Vehicle.fk\_make\_id} = \text{Make.make\_id} \text{ Make})$ 
6   $\bowtie \text{Vehicle.vehicle\_id} = \text{Vehicle\_Incentive.fk\_vehicle\_id} \text{ Vehicle\_Incentive})$ 
7   $\bowtie \text{Vehicle\_Incentive.fk\_incentive\_id} = \text{Incentive.incentive\_id} \text{ Incentive}))$ 
8  |

```

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
 $(\sigma \text{ Player.score} = 100)$
 $((\text{Team} \bowtie \text{Team.id} = \text{Player.team_id} \text{ Player})$
 $\bowtie \text{Team.city_id} = \text{City.id} \text{ City}))$

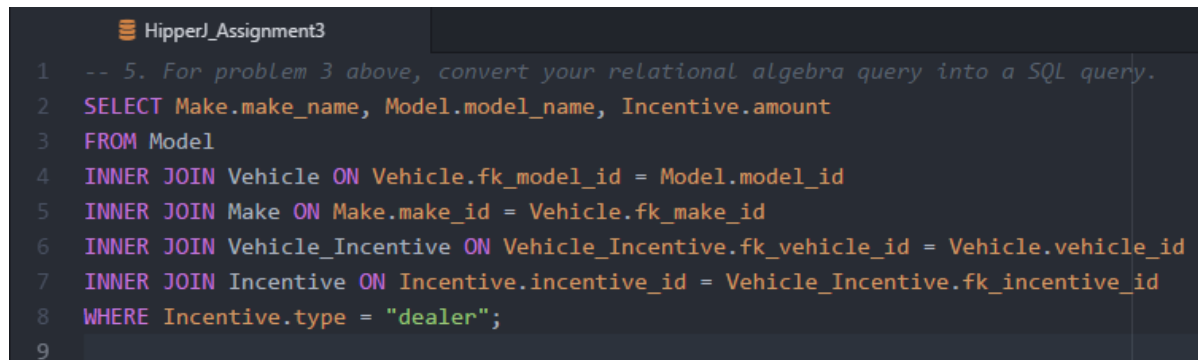
```

HipplerJ_Assignment3
1  -- 4. Convert the following query to relational algebra
2  -- SELECT Player.id, Team.name, City.name FROM Player
3  -- INNER JOIN Team ON Player.team_id = Team.id
4  -- INNER JOIN City ON Team.city_id = City.id
5  -- WHERE Player.score = 100;
6   $\pi$  Player.id, Team.name, City.name
7   $(\sigma \text{ Player.score} = 100)$ 
8   $((\text{Team} \bowtie \text{Team.id} = \text{Player.team\_id} \text{ Player})$ 
9   $\bowtie \text{Team.city\_id} = \text{City.id} \text{ City}))$ 
10 |

```

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";
```



```
HipplerJ_Assignment3
1  -- 5. For problem 3 above, convert your relational algebra query into a SQL query.
2  SELECT Make.make_name, Model.model_name, Incentive.amount
3  FROM Model
4  INNER JOIN Vehicle ON Vehicle.fk_model_id = Model.model_id
5  INNER JOIN Make ON Make.make_id = Vehicle.fk_make_id
6  INNER JOIN Vehicle_Incentive ON Vehicle_Incentive.fk_vehicle_id = Vehicle.vehicle_id
7  INNER JOIN Incentive ON Incentive.incentive_id = Vehicle_Incentive.fk_incentive_id
8  WHERE Incentive.type = "dealer";
9
```