Gretel Rajamoney

February 17, 2021

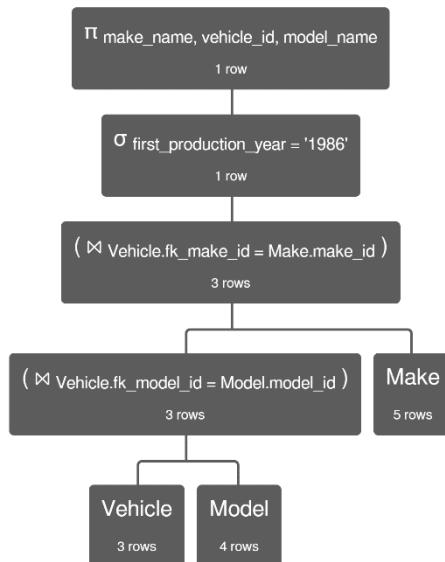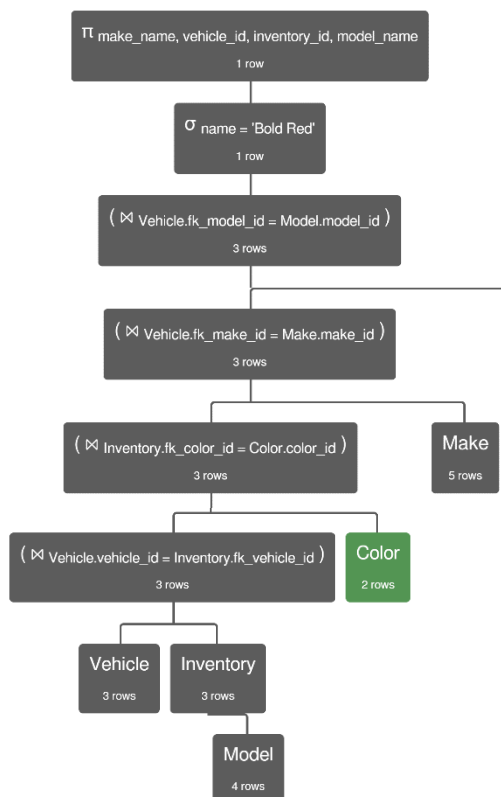# Relational Algebra Assignment

1.

π make_name, vehicle_id, model_name $(\sigma$ first_production_year = '1986' $(((\text{Vehicle}) \bowtie$ Vehicle.fk_model_id = Model.model_id $(\text{Model})) \bowtie$ Vehicle.fk_make_id = Make.make_id $(\text{Make})))$

Make.make_name	Vehicle.vehicle_id	Model.model_name
'BMW'	2	'Focus'

2.

π make_name, vehicle_id, inventory_id, model_name $(\sigma$ name = 'Bold Red' $(((((\text{Vehicle}) \bowtie$ Vehicle.vehicle_id = Inventory.fk_vehicle_id $(\text{Inventory})) \bowtie$ Inventory.fk_color_id = Color.color_id $(\text{Color})) \bowtie$ Vehicle.fk_make_id = Make.make_id $(\text{Make})) \bowtie$ Vehicle.fk_model_id = Model.model_id $(\text{Model})))$

ake.make_name	Vehicle.vehicle_id	Inventory.inventory_id	Model.model_nar
'BMW'	2	2	'Focus'

3.

π make_name, model_name, inventory_id, amount
0 rows

σ type = 'company'
0 rows

(⋈ Vehicle.fk_model_id = Model.model_id)
3 rows

(⋈ Vehicle.fk_make_id = Make.make_id)
3 rows

(⋈ Vehicle_Incentive.fk_incentive_id = Incentive.incentive_id)
3 rows

(⋈ Vehicle.vehicle_id = Vehicle_Incentive.fk_vehicle_id)
3 rows

(⋈ Vehicle.vehicle_id = Inventory.fk_vehicle_id)
3 rows

Vehicle_Incentive
2 rows

Vehicle
3 rows

Inventory
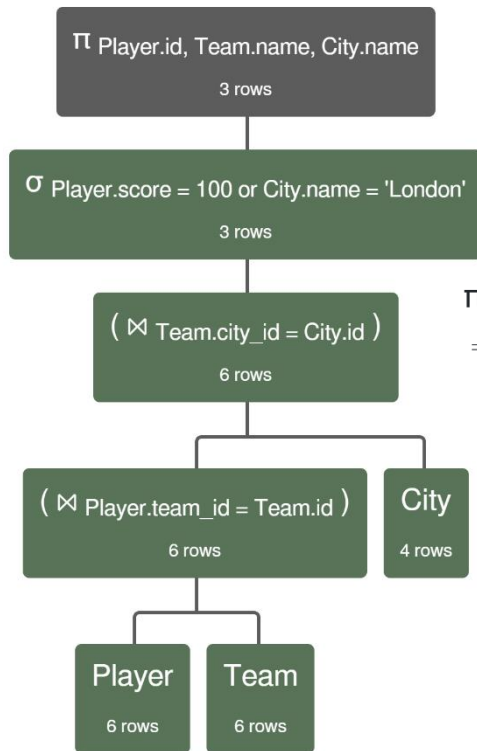3 rows

Incentive
2 rows

Make
5 rows
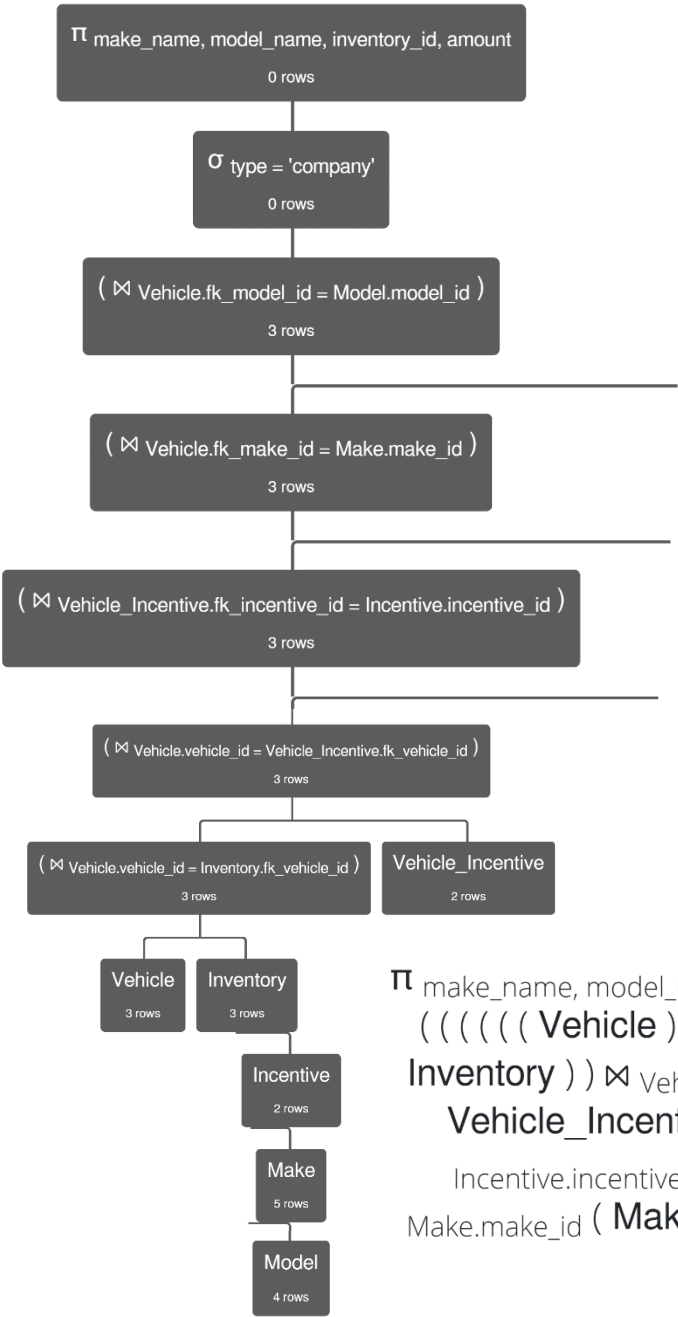
Model
4 rows

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

Make.make_name	Model.model_name	Inventory.inventory_id	Incentive.amount

4.

π Player.id, Team.name, City.name
3 rows

σ Player.score = 100 or City.name = 'London'
3 rows

($\bowtie$ Team.city_id = City.id)
6 rows

($\bowtie$ Player.team_id = Team.id)
6 rows

City
4 rows

Player
6 rows

Team
6 rows

π Player.id, Team.name, City.name (σ Player.score = 100 or City.name = 'London' (((Player) $\bowtie$ Player.team_id = Team.id (Team)) $\bowtie$ Team.city_id = City.id (City)))
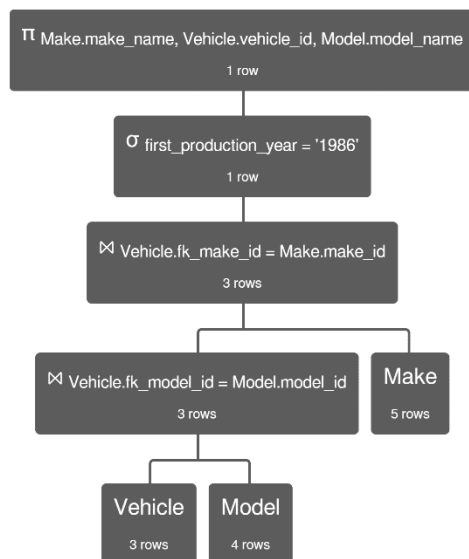
Player.id	Team.name	City.name
1	'Team1'	'London'
3	'Team1'	'London'
4	'Team2'	'St Petersburg'

5.

```
1 select Make.make_name, Vehicle.vehicle_id, Model.model_name from Vehicle
2 inner join Model on Vehicle.fk_model_id = Model.model_id
3 inner join Make on Vehicle.fk_make_id = Make.make_id
4 where first_production_year = '1986';
```

π Make.make_name, Vehicle.vehicle_id, Model.model_name
1 row

σ first_production_year = '1986'
1 row

$\bowtie$ Vehicle.fk_make_id = Make.make_id
3 rows

$\bowtie$ Vehicle.fk_model_id = Model.model_id
3 rows

Make
5 rows

Vehicle
3 rows

Model
4 rows

π Make.make_name, Vehicle.vehicle_id, Model.model_name σ first_production_year = '1986' ((Vehicle $\bowtie$ Vehicle.fk_model_id = Model.model_id Model) $\bowtie$ Vehicle.fk_make_id = Make.make_id Make)
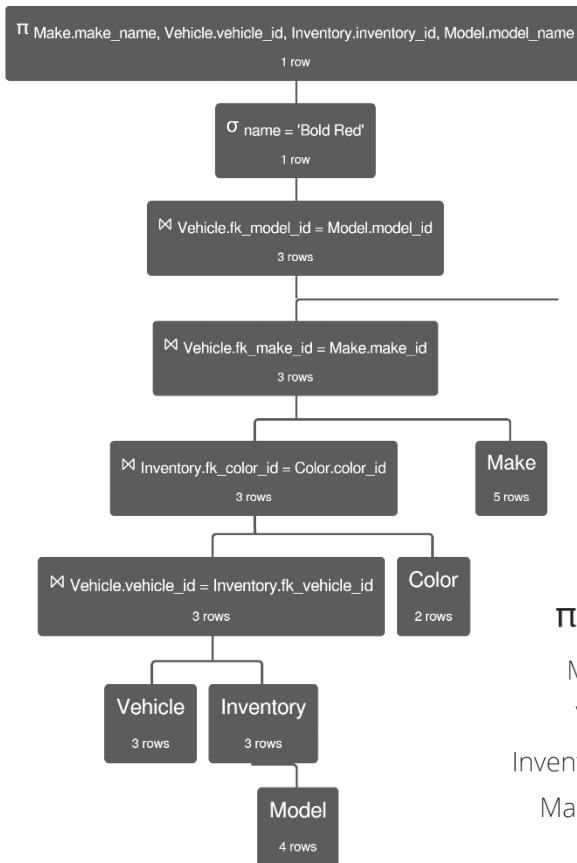
Make.make_name	Vehicle.vehicle_id	Model.model_name
'BMW'	2	'Focus'

6.

```
1  select Make.make_name, Vehicle.vehicle_id, Inventory.inventory_id,
   Model.model_name from Vehicle
2  inner join Inventory on Vehicle.vehicle_id = Inventory.fk_vehicle_id
3  inner join Color on Inventory.fk_color_id = Color.color_id
4  inner join Make on Vehicle.fk_make_id = Make.make_id
5  inner join Model on Vehicle.fk_model_id = Model.model_id
6  where name = 'Bold Red';
```

π Make.make_name, Vehicle.vehicle_id, Inventory.inventory_id, Model.model_name
1 row

σ name = 'Bold Red'
1 row

⋈ Vehicle.fk_model_id = Model.model_id
3 rows

⋈ Vehicle.fk_make_id = Make.make_id
3 rows

⋈ Inventory.fk_color_id = Color.color_id
3 rows

Make
5 rows

⋈ Vehicle.vehicle_id = Inventory.fk_vehicle_id
3 rows

Color
2 rows

Vehicle
3 rows

Inventory
3 rows

Model
4 rows

π Make.make_name, Vehicle.vehicle_id, Inventory.inventory_id, Model.model_name σ name = 'Bold Red' ((((Vehicle ⋈ Vehicle.vehicle_id = Inventory.fk_vehicle_id Inventory) ⋈ Inventory.fk_color_id = Color.color_id Color) ⋈ Vehicle.fk_make_id = Make.make_id Make) ⋈ Vehicle.fk_model_id = Model.model_id Model)
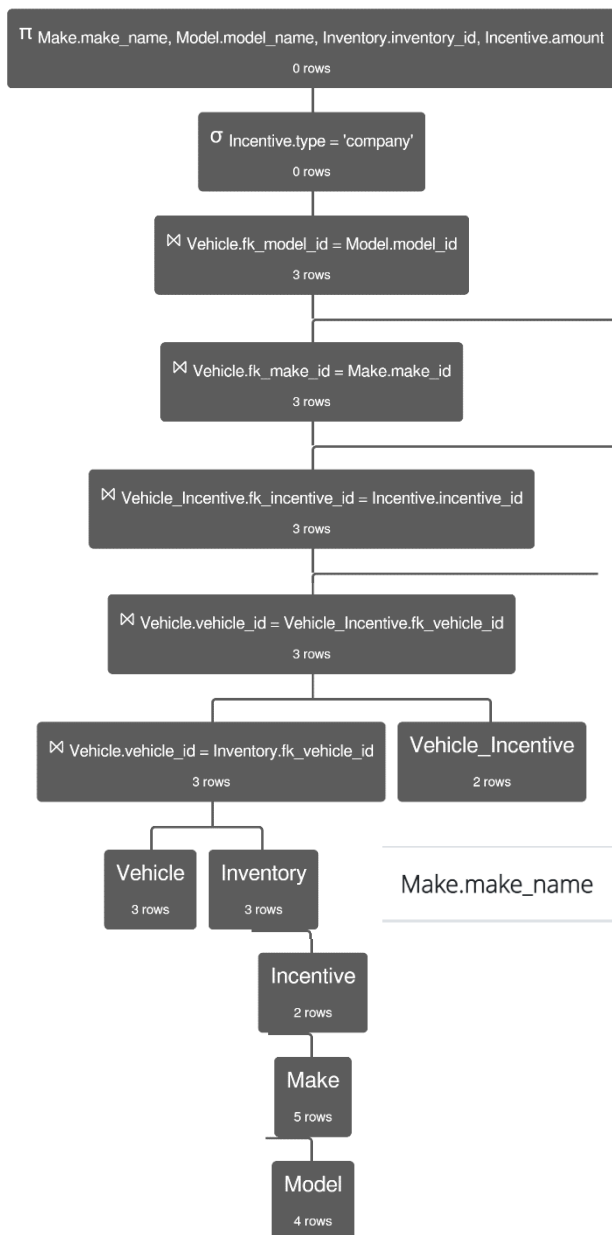
Make.make_name	Vehicle.vehicle_id	Inventory.inventory_id	Model.model_name
'BMW'	2	2	'Focus'

```sql
1  select Make.make_name, Model.model_name, Inventory.inventory_id,
   Incentive.amount from Vehicle
2  inner join Inventory on Vehicle.vehicle_id = Inventory.fk_vehicle_id
3  inner join Vehicle_Incentive on Vehicle.vehicle_id =
   Vehicle_Incentive.fk_vehicle_id
4  inner join Incentive on Vehicle_Incentive.fk_incentive_id =
   Incentive.incentive_id
5  inner join Make on Vehicle.fk_make_id = Make.make_id
6  inner join Model on Vehicle.fk_model_id = Model.model_id
7  where Incentive.type = 'company';
```
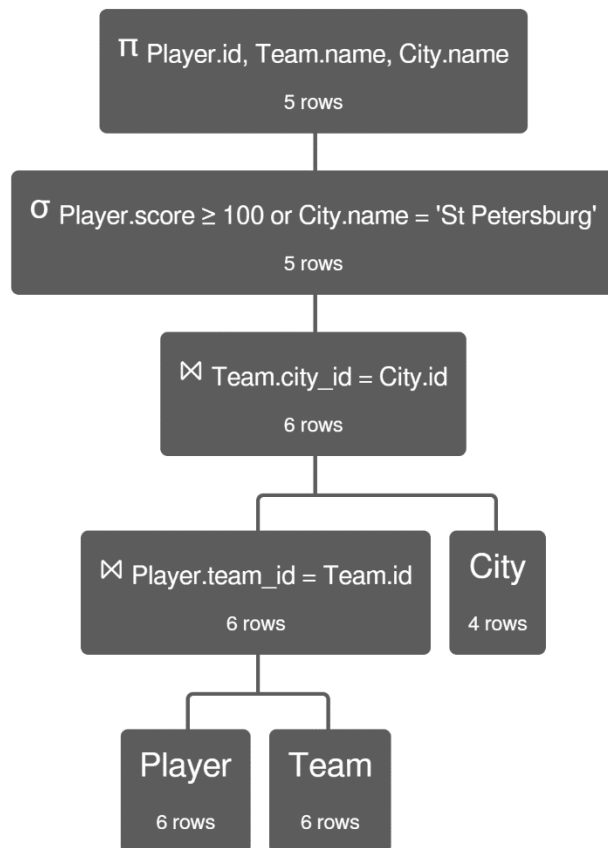

π Make.make_name, Model.model_name, Inventory.inventory_id, Incentive.amount σ Incentive.type = 'company' (((((Vehicle ⋈ Vehicle.vehicle_id = Inventory.fk_vehicle_id Inventory) ⋈ Vehicle.vehicle_id = Vehicle_Incentive.fk_vehicle_id Vehicle_Incentive) ⋈ Vehicle_Incentive.fk_incentive_id = Incentive.incentive_id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

Make.make_name	Model.model_name	Inventory.inventory_id	Incentive.amount

8.

```
1  select Player.id, Team.name, City.name from Player
2  inner join Team on Player.team_id = Team.id
3  inner join City on Team.city_id = City.id
4  where Player.score >= 100 or City.name = 'St Petersburg';
```

π Player.id, Team.name, City.name

5 rows

σ Player.score ≥ 100 or City.name = 'St Petersburg'

5 rows

⋈ Team.city_id = City.id

6 rows

⋈ Player.team_id = Team.id

6 rows

City

4 rows

Player

6 rows

Team

6 rows

Player.id	Team.name	City.name
1	'Team1'	'London'
2	'Team2'	'St Petersburg'
4	'Team2'	'St Petersburg'
5	'Team3'	'Ontario'
6	'Team4'	'St Petersburg'

π Player.id, Team.name, City.name σ Player.score ≥ 100 or City.name = 'St Petersburg' ((Player ⋈ Player.team_id = Team.id Team) ⋈ Team.city_id = City.id City)