Relational Algebra Assignment

Name: Xiaoying Li
Gist: 9a02ecefab6c753b5f30cf1508817e2a

- **Q1**

$$\pi_{\text{Make.make\_name, Vehicle.vehicle\_id, Model.model\_name}} \left(\sigma_{\text{Model.first\_production\_year = '1986'}} \left(\left(\text{Vehicle} \bowtie_{\text{Vehicle.fk\_make\_id = Make.make\_id}} \text{Make} \right) \bowtie_{\text{Vehicle.fk\_model\_id = Model.model\_id}} \text{Model} \right) \right)$$

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

- **Q2**

$$\pi_{\text{Make.make\_name, Vehicle.vehicle\_id, Inventory.inventory\_id, Model.model\_name}} \left(\sigma_{\text{Color.name = 'Bold Red'}} \left(\left(\left(\left(\text{Vehicle} \bowtie_{\text{Vehicle.fk\_make\_id = Make.make\_id}} \text{Make} \right) \bowtie_{\text{Vehicle.fk\_model\_id = Model.model\_id}} \text{Model} \right) \bowtie_{\text{Vehicle.vehicle\_id = Inventory.fk\_vehicle\_id}} \text{Inventory} \right) \bowtie_{\text{Inventory.fk\_color\_id = Color.color\_id}} \text{Color} \right) \right)$$

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

- **Q3**

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

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

- **Q4**

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'

- **Q5**

SELECT Make.make_name, Vehicle.vehicle_id, Model.model_name FROM Vehicle
INNER JOIN Make ON Vehicle.fk_make_id = Make.make_id
INNER JOIN Model ON Vehicle.fk_model_id = Model.model_id
WHERE Model.first_production_year = '1986'

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

- **Q6**

SELECT Make.make_name, Vehicle.vehicle_id, Inventory.inventory_id, Model.model_name FROM Vehicle
INNER JOIN Make ON Vehicle.fk_make_id = Make.make_id
INNER JOIN Model ON Vehicle.fk_model_id = Model.model_id
INNER JOIN Inventory ON Vehicle.vehicle_id = Inventory.fk_vehicle_id
INNER JOIN Color ON Inventory.fk_color_id = Color.color_id
WHERE Color.name = 'Bold Red'

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

- **Q7**

SELECT Make.make_name, Model.model_name, Inventory.inventory_id, Incentive.amount FROM Vehicle
INNER JOIN Make ON Vehicle.fk_make_id = Make.make_id
INNER JOIN Model ON Vehicle.fk_model_id = Model.model_id
INNER JOIN Inventory ON Vehicle.vehicle_id = Inventory.fk_vehicle_id
INNER JOIN Vehicle_Incentive ON Vehicle.vehicle_id = Vehicle_Incentive.fk_vehicle_id
INNER JOIN Incentive ON Vehicle_Incentive.fk_incentive_id = Incentive.incentive_id
WHERE Incentive.type = 'company'

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

- **Q8**

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 OR City.name = 'London'

Player.id	Team.name	City.name
1	'Team1'	'London'
3	'Team1'	'London'
4	'Team2'	'St Petersburg'