

1. Select the make\_name and model\_name of all vehicles which have a first production year of 1976.

$$\pi_{\text{Make.make\_name, Model.model\_name}}(\sigma_{\text{Vehicle.year}=1976}(\text{Model} \bowtie_{\text{Model.model\_id}=\text{Vehicle.fk\_model\_id}} (\text{Make} \bowtie_{\text{Make.make\_id}=\text{Vehicle.fk\_make\_id}} \text{Vehicle})))$$

2. Select the make\_name and model\_name of all vehicles with the color name Blue.

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

3. Select the make\_name, model\_name, and incentive amount for all vehicles with a dealer type incentive.

$$\pi_{\text{Make.make\_name, Model.model\_name, Incentive.amount}}(\sigma_{\text{Incentive.type}=\text{dealer}}(\text{Incentive} \bowtie_{\text{Vehicle\_Incentive.fk\_incentive\_id}=\text{Incentive.incentive\_id}} (\text{Vehicle\_Incentive} \bowtie_{\text{Vehicle.vehicle\_id}=\text{Vehicle\_Incentive.fk\_vehicle\_id}} (\text{Model} \bowtie_{\text{Model.model\_id}=\text{Vehicle.fk\_model\_id}} (\text{Make} \bowtie_{\text{Make.make\_id}=\text{Vehicle.fk\_make\_id}} \text{Vehicle}))))))$$

4. Convert the following query to relational algebra.

$$\pi_{\text{Player.id, Team.name, City.name}} (\sigma_{\text{Player.score} = 100} (\text{City} \bowtie \text{Team.city\_id} = \text{City.id} (\text{Player} \bowtie \text{Player.team\_id} = \text{Team.id} \text{Team})))$$

5. Convert your relational algebra query from problem 3 into a SQL query.

```
SELECT Make.make_name, Model.model_name, Incentive.amount FROM
Make INNER JOIN Vehicle ON Make.make_id = Vehicle.fk_make_id
INNER JOIN Model ON Model.model_id = Vehicle.fk_model_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 = 'dealer'
```