

Relational Algebraic Expression for Some of the Queries in Lab 3.1

The following queries are based on the *Supplier* database that you have created in Labwork 2:

3. Get the color and city values of those parts that are not stored in Paris and with a weight of at least 10 tons (Oops, grams).

A solution: This is a pretty easy one, since only one relation (table) is involved.

- RA Expression:

$$\pi_{\{COLOR,CITY\}}(\sigma_{CITY \neq 'Paris' \wedge WEIGHT \geq 10} Part)$$

- SQL query:

```
Select Color, City
From Part
Where City <> 'Paris' AND Weight >= 10;
```

4. Get supplier names for suppliers who supply part P2.

A solution: We have to get Supplier's Id from the `SupplyPart` table for those who supply 'P2', then join the resulting table with the `Supplier` table to get their names by applying another projection.

- RA Expression:

$$\pi_{Name}(Supplier \bowtie_{SupplierID=SupplierId} (\pi_{\{SupplierId\}}(\sigma_{PartId='P2'} SupplyPart)))$$

- SQL query

```
Select S.Name
From Supplier S, SupplyPart SP
Where SP.ID='P2' AND S.SupplierID=SP.SupplierID;
```

5. Get supplier names for suppliers who supply at least one red part.

A solution: This time, we have to get the Id of the red parts from the `Part` table, find out who supplies them by jointing the `SupplierPart` table, finally join with the `Supplier` table to get the names.

- RA Expression:

$\pi_{Name}(Supplier \bowtie_{SupplierID=SupplierId} (\pi_{SupplierId}(SupplyPart \bowtie_{PartId=PartId} (\pi_{PartId}(\sigma_{COLOR='red'}Part))))))$

- SQL query

```
Select S.Name  
From Supplier S, Part P, SupplyPart SP  
Where S.SupplierID=SP.SupplierID AND SP.PartID=P.PartID AND Part.Color='Red';
```