

Database Concepts

Exercise 10

- For each query on the given database instance: (i) show the result and (ii) translate it into a query that non-databasers would give and understand. Example: *SELECT Address FROM Inhabitant → Get the addresses of all inhabitants.*

- $\pi_{OID}(Line_item)$
- $\pi_{Name}(Dealer \bowtie Orders)$
- $\pi_{Did}(Dealer) - \pi_{Did}(offers)$
- $\pi_{Date}((\sigma_{Date < 01.03.2003}(Orders) \cup (\sigma_{Date > 01.05.2003}(Orders))))$
- $Customer \bowtie Orders \bowtie line_item \bowtie Product$
- $Customer - \pi_{Cid, Name}(Customer \bowtie Orders)$
- $(Customer \times Product) - \pi_{Cid, Name, Pid, Label}(Customer \bowtie Orders \bowtie line_item \bowtie Product)$
- $\pi_{Name, Name2}(\sigma_{Cid < Cid2}(\pi_{Cid, Name, Pid}(Customer \bowtie Orders \bowtie line_item) \bowtie \beta_{Cid \rightarrow Cid2, Name \rightarrow Name2}(\pi_{Cid, Name, Pid}(Customer \bowtie Orders \bowtie line_item))))$
- $\pi_{Did}(Dealer) - \pi_{Did}((\pi_{Did}(Dealer) \times \pi_{Pid}(line_item)) - offers)$
- $\pi_{Did}(Dealer) - \pi_{Did}((\pi_{Did}(Dealer) \times (\pi_{Pid}(line_item \bowtie Orders \bowtie (\sigma_{Cid=23}(Customer)))) - offers))$

- Formulate all queries from **task 1** in SQL.

- Express following queries using relational algebra!

- Get the names of all customers.
- Get all orders of customer Meier.
- List all products that have not been sold on 13.05.2003.
- List all products that dealer Schmidt sold to customer Schulze.
- Get all products that dealer Meier sold and customer Schulze bought.

Customer	
Cid	Name
13	M.Mueller
17	A.Meier
23	I.Schulze

Dealer	
Did	Name
5	G.Hals
7	P.Schmidt
11	E.Meier
13	E.Mueller

Product	
Pid	Label
45	Power adapter
57	Cat5 cable
67	Mainboard

offers	
Did	Pid
5	45
5	57
7	67
7	45
11	57
5	67
11	67

Orders			
Oid	Did	Date	Cid
3	7	01.12.2002	17
5	11	27.04.2003	23
7	5	13.05.2003	17
10	5	01.09.2003	13

line_item		
Oid	Pid	Amount
3	45	1
3	67	5
5	67	1
7	57	3
7	67	2
10	45	2
10	57	5
10	67	3

4. Calculate following division: $R \div R_1, R \div R_2, R \div R_3$ using following relations!

R

Name	Product
Meier	Tea
Meier	Coffee
Meier	Wine
Mueller	Wine
Schmidt	Beer
Schmidt	Wine
West	Tea
West	Coffee

R_1

Product
Tea
Coffee

R_2

Product
Wine

R_3

Product
Wine
Beer

Good Luck!