

Lab 4

Exercise 1

Consider following schema:

Suppliers (sid : integer, sname : string, address: string)

Parts (pid : integer, pname : string, color: string)

Catalog (sid : integer, pid : integer, cost: real)

Convert the following statements to relation algebra

1. Find the names of suppliers who supply some red part.
2. Find the sids of suppliers who supply some red or green part.
3. Find the sids of suppliers who supply some red part or are at 221 Packer Street.
4. Find the sids of suppliers who supply some red part and some green part.
5. Find the sids of suppliers who supply every part.
6. Find the sids of suppliers who supply every red part.
7. Find the sids of suppliers who supply every red or green part.
8. Find the sids of suppliers who supply every red part or supply every green part.
9. Find pairs of sids such that the supplier with the first sid charges more for some part than the supplier with the second sid.
10. Find the pids of parts supplied by at least two different suppliers.

SUPPLIERS

sid	sname	address
integer	string	string

PARTS

pid	pname	color
integer	string	string

CATALOG

sid	pid	cost
integer	integer	real

1. $\Pi_{\text{name}} (\Pi_{\text{name}} (\sigma_{\text{color} = \text{'red'}} (\text{Parts})) \bowtie \text{Catalog})$
2. $\Pi_{\text{sid}} (\Pi_{\text{pid}} (\sigma_{\text{color} = \text{'red'}} \vee \text{color} = \text{'green'}} (\text{Parts})) \bowtie \text{Catalog})$
3. $\Pi_{\text{sid}} ((\sigma_{\text{color} = \text{'red'}} (\text{Parts})) \bowtie \text{Catalog}) \vee \Pi_{\text{address}} (\text{Supplier}))$
4. $\Pi_{\text{sid}} (\text{Catalog} \bowtie \Pi_{\text{pid}} (\sigma_{\text{color} = \text{'red'}} (\text{Parts}))) \wedge \Pi_{\text{sid}} (\text{Catalog} \bowtie \Pi_{\text{pid}} (\sigma_{\text{color} = \text{'green'}} (\text{Parts})))$
5. $\Pi_{\text{sid}} (\text{Catalog} \div \Pi_{\text{pid}} (\text{Catalog}))$
6. $\Pi_{\text{sid}} (\text{Catalog} \div \Pi_{\text{pid}} (\text{Catalog} \bowtie \Pi_{\text{pid}} (\sigma_{\text{color} = \text{'red'}} (\text{Parts}))))$
7. $\Pi_{\text{sid}} (\text{Catalog} \div \Pi_{\text{pid}} (\text{Catalog} \bowtie \Pi_{\text{pid}} (\sigma_{\text{color} = \text{'red'}} \vee \text{color} = \text{'green'}} (\text{Parts}))))$
8. $\Pi_{\text{sid}} (\text{Catalog} \div \Pi_{\text{pid}} (\text{Catalog} \bowtie \Pi_{\text{pid}} (\sigma_{\text{color} = \text{'red'}} (\text{Parts})))) \vee \Pi_{\text{sid}} (\text{Catalog} \div \Pi_{\text{pid}} (\text{Catalog} \bowtie \Pi_{\text{pid}} (\sigma_{\text{color} = \text{'green'}} (\text{Parts}))))$
9. steps:
 - a. $\rho(R1, C)$
 - b. $\rho(R2, C)$
 - c. $\Pi_{R1.\text{sid}, R2.\text{sid}} (\sigma_{R1.\text{pid} = R2.\text{pid} \wedge R1.\text{cid} \neq R2.\text{cid} \wedge R1.\text{cost} > R2.\text{cost}} (R1 \bowtie R2))$
10. steps:
 - a. $\rho(R1, C)$
 - b. $\rho(R2, C)$
 - c. $\Pi_{R1.\text{pid}} (\sigma_{R1.\text{pid} = R2.\text{pid} \wedge R1.\text{cid} \neq R2.\text{cid}} (R1 \times R2))$

Exercise 2

1. Find names of suppliers who supply red parts cheaper than 100
2. Find names of suppliers who supply red and green parts cheaper than 100
3. Find sid of suppliers who supply red and green parts cheaper than 100
4. Find names of suppliers who supply red and green parts cheaper than 100