

Relational algebra

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

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

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

Find the names of suppliers who supply some red part.

$$\pi_{\text{sname}} \left(\sigma_{\text{sid} \in \pi_{\text{sid}} \left(\sigma_{\text{pid} \in \pi_{\text{pid}} \left(\sigma_{\text{color}=\text{red}} (\text{Parts}) \right) (\text{Catalog}) \right)} (\text{Suppliers}) \right)$$

Find the sids of suppliers who supply some red or green part.

$$\pi_{\text{sid}} \left(\sigma_{\text{pid} \in \pi_{\text{pid}} \left(\sigma_{\text{color} \in \{\text{green}, \text{red}\}} (\text{Parts}) \right) (\text{Catalog}) \right)$$

Find the sids of suppliers who supply some red part or are at 221 Packer Street.

$$\pi_{\text{sid}} \left(\sigma_{\text{sid} \in \pi_{\text{sid}} \left(\sigma_{\text{pid} \in \pi_{\text{pid}} \left(\sigma_{\text{color}=\text{red}} (\text{Parts}) \right) (\text{Catalog}) \right)} (\text{Suppliers}) \right) \cup \sigma_{\text{address} = \text{221 Packer Street}} (\text{Suppliers})$$

Find the sids of suppliers who supply some red part and some green part.

$$\pi_{sid}(\sigma_{pid \in \pi_{pid}(\sigma_{color=red}(Parts))}(Catalog))$$

$$\pi_{sid}(\sigma_{pid \in \pi_{pid}(\sigma_{color=green}(Parts))}(Catalog))$$

Find the sids of suppliers who supply every part.

$$(\pi_{sid, pid}(Catalog)) \% (\pi_{pid}(Parts))$$

Find the sids of suppliers who supply every red part.

$$(\pi_{sid, pid}(Catalog)) \% (\pi_{pid}(\sigma_{color=red}(Parts)))$$

Find the sids of suppliers who supply every red or green part.

$$(\pi_{sid, pid}(Catalog)) \% (\pi_{pid}(\sigma_{color \in \{red, green\}}(Parts)))$$

Find the sids of suppliers who supply every red part or supply every green part.

$$(\pi_{sid, pid}(Catalog)) \% (\pi_{pid}(\sigma_{color=red}(Parts)))$$

$$\cup$$
$$(\pi_{sid, pid}(Catalog)) \% (\pi_{pid}(\sigma_{color=green}(Parts)))$$

Find pairs of sids such that the supplier with the first sid charges more for some part than the supplier with the second sid.

p Catalog $\rightarrow C1$

p Catalog $\rightarrow C2$

$\Pi_{C1.sid, C2.sid} (\sigma_{C1.pid=C2.pid \wedge C1.sid \neq C2.sid \wedge C1.cost > C2.cost} (C1 \times C2))$

Find the pids of parts supplied by at least two different suppliers.

p Catalog $\rightarrow C1$

p Catalog $\rightarrow C2$

$\Pi_{C1.pid} (\sigma_{C1.pid=C2.pid \wedge C1.sid \neq C2.sid} (C1 \times C2))$