

Exercise 1

1. Find the names of suppliers who supply some red part.

$\pi_{sname}((\sigma_{color='Red'}(Parts) \bowtie Catalog) \bowtie Suppliers)$

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

$\pi_{sid}((\sigma_{color='Red'}(Parts) \cup \sigma_{color='Green'}(Parts)) \bowtie Catalog)$

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

$\pi_{sid}((\sigma_{color='Red'}(Parts) \bowtie Catalog) \bowtie Suppliers) \cup \pi_{sid}(\sigma_{street='221PackerStreet'}(Suppliers))$

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

$\pi_{sid}(\sigma_{color='Red'}(Parts) \bowtie Catalog) + \pi_{sid}(\sigma_{color='Green'}(Parts) \bowtie Catalog)$

5. Find the sids of suppliers who supply every part.

$R1 \leftarrow \pi_{sid,pid}(Catalog)$

$R2 \leftarrow \pi_{sid}(Suppliers) \times \pi_{pid}(Parts)$

$R3 \leftarrow \pi_{sid}(R2/R1)$

result $\leftarrow \pi_{sid}(Catalog)/R3$

6. Find the sids of suppliers who supply every red part.

$R1 \leftarrow \sigma_{color='Red'}(Parts)$

$R2 \leftarrow \pi_{sid}(Suppliers) \times \pi_{pid}(R1)$

$R3 \leftarrow \pi_{sid,pid}(Catalog)/R2$

result $\leftarrow \pi_{sid}(Catalog)/\pi_{sid}(R3)$

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

$R1 \leftarrow \sigma_{color='Red'}(Parts)$

$R2 \leftarrow \pi_{sid}(Suppliers) \times \pi_{pid}(R1)$

$R3 \leftarrow \pi_{sid,pid}(Catalog)/R2$

$EVERYRED \leftarrow \pi_{sid}(Catalog)/\pi_{sid}(R3)$

$GREEN \leftarrow \pi_{sid}((\sigma_{color='Green'}(Parts) \bowtie Catalog) \bowtie Suppliers)$

result $\leftarrow (EVERYRED) \cup (GREEN)$

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

$R1 \leftarrow \sigma_{color='Red'}(Parts)$

$R2 \leftarrow \pi_{sid}(Suppliers) \times \pi_{pid}(R1)$

$R3 \leftarrow \pi_{sid,pid}(Catalog)/R2$

$EVERYR \leftarrow \pi_{sid}(Catalog)/\pi_{sid}(R3)$

$G1 \leftarrow \sigma_{color='Green'}(Parts)$

$G2 \leftarrow \pi_{sid}(Suppliers) \times \pi_{pid}(G1)$

$G3 \leftarrow \pi_{sid,pid}(Catalog)/G2$

$EVERYG \leftarrow \pi_{sid}(Catalog)/\pi_{sid}(G3)$

result $\leftarrow (EVERYR) \cup (EVERYG)$

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.

$LeftSide \leftarrow \pi_{sid,pid,cost}(Catalog)$

$psid1 \rightarrow sid(LeftSide)$

$ppid1 \rightarrow pid(LeftSide)$

$pcost1 \rightarrow cost(LeftSide)$

$RightSide \leftarrow \pi_{sid,pid,cost}(Catalog)$

$psid2 \rightarrow sid(RightSide)$

$ppid2 \rightarrow pid(RightSide)$

$pcost2 \rightarrow cost(RightSide)$

$temp \leftarrow LeftSide \bowtie_{cost1 > cost2} RightSide$

result $\leftarrow \pi_{sid1,sid2}(temp)$

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

$p(R1, Catalog)$

$p(R2, Catalog)$

result $\leftarrow \pi_{pid}(\sigma_{R1.sid \neq R2.sid \text{ and } R1.pid = R2.pid}(R1 \times R2))$

Exercise 2

1. It computes the **snames** of the **Suppliers** who supplied **red Parts** with **cost** less than 100.
2. It computes the **snames** of **Suppliers** who supplied **red** and **green Parts** with the **cost** less than 100 for each part.
3. It computes the **sids** of **Suppliers** who supplied **red** and **green Parts** with **cost** less than 100 for each part
4. It computes the **snames** of Suppliers who supplied **red** and **green Parts** with the **cost** less than 100 for each part.