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.

Lab 4
Artem Bulgakov
BS20-02

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

$$\Pi_{sname}\left(suppliers \underset{sid=sid}{\bowtie} \left(catalog \underset{pid=pid}{\bowtie} \sigma_{colon=red}(parts)\right)\right)$$

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

$$\Pi_{sid}\left(\overbrace{catalog}^{R1} \underset{R1.pid=R2.pid}{\bowtie} \underbrace{\left(\sigma_{colon=red \vee colon=green} parts\right)}_{R_2}\right)$$

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

$$\Pi_{sid}\left(\left(\sigma_{address=221\ Packer\ Street}(suppliers)\right) \cup \left(suppliers \bowtie \Pi_{sid}\left(catalog \bowtie \Pi_{pid}\left(\sigma_{colon=red} parts\right)\right)\right)\right)$$

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

$$\Pi_{sid}\left(catalog \underset{pid=pid}{\bowtie} \Pi_{pid}\left(\sigma_{colon=red} parts\right)\right) \cap \Pi_{sid}\left(catalog \underset{pid=pid}{\bowtie} \Pi_{pid}\left(\sigma_{colon=green} parts\right)\right)$$

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

$$\Pi_{sid}\left(catalog \div \Pi_{pid}(parts)\right)$$

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

$$\Pi_{sid}\left(catalog \div \Pi_{pid}\left(\sigma_{colon=red} parts\right)\right)$$

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

every part that is red or green -> all red and all green

$$\Pi_{sid}\left(\left(catalog \div \Pi_{pid}\left(\sigma_{colon=red} parts\right)\right) \cap \left(catalog \div \Pi_{pid}\left(\sigma_{colon=green} parts\right)\right)\right)$$

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

$$\Pi_{sid}\left(catalog \div \Pi_{pid}\left(\sigma_{color=red}(parts)\right) \cup \left(catalog \div \Pi_{pid}\left(\sigma_{color=green}\ parts\right)\right)\right)$$

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.

$R1 \leftarrow catalog$
$R2 \leftarrow catalog$

$$\Pi_{\substack{R1.sid,\\ R2.sid}}\left(R1 \bowtie_{R1.cost > R2.cost} R2\right)$$

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

$R1 \leftarrow catalog$
$R2 \leftarrow catalog$

$$\Pi_{pid}\left(R1 \bowtie_{\substack{R1.pid=R2.pid\\ R1.sid \neq R2.sid}} R2\right)$$

+ $\Pi_{sname}\left(\Pi_{sid}\left((\sigma_{color=red}Parts) \bowtie (\sigma_{cost<100}Catalog)\right) \bowtie Suppliers\right)$

Names of suppliers that sell some red parts cheaper than 100

+ $\left(\Pi_{sname}\left((\sigma_{color=red}Parts) \bowtie (\sigma_{cost<100}Catalog)\right) \bowtie Suppliers\right) \cap \left(\Pi_{sname}\left((\sigma_{color=green}Parts) \bowtie (\sigma_{cost<100}Catalog) \bowtie Suppliers\right)\right)$

Names of suppliers that sell some red parts and some green parts for less than 100

+ $\left(\Pi_{sid}\left((\sigma_{color=red}Parts) \bowtie (\sigma_{cost<100}Catalog) \bowtie Suppliers\right)\right) \cap \left(\Pi_{sid}\left((\sigma_{color=green}Parts) \bowtie (\sigma_{cost<100}Catalog) \bowtie Suppliers\right)\right)$

Sid's of suppliers that sell some red parts and some green parts cheaper than for 100

+ $\Pi_{sname}\left(\left(\Pi_{sid,\overset{sname}{\cancel{name}}}\left((\sigma_{color=red}Parts) \bowtie (\sigma_{cost<100}Catalog)\right) \bowtie Suppliers\right) \cap \left(\Pi_{sid,\overset{sname}{\cancel{name}}}\left((\sigma_{color=green}Parts) \bowtie (\sigma_{cost<100}Catalog) \bowtie Suppliers\right)\right)\right)$

Names of suppliers that sell some red parts and some green parts for less than 100