

1. Names of suppliers who supply some red part.

$$\pi_{\text{name}} (\sigma_{\text{color}="red"}(\text{Parts}) \bowtie \text{Catalog} \bowtie \text{Suppliers})$$

2. IDs of Suppliers who supply some red or green part.

$$\pi_{\text{sid}} (\sigma_{\text{color}="red"}(\text{Parts}) \cup \sigma_{\text{color}="green"}(\text{Parts}) \bowtie \text{Catalog})$$

3. IDs of suppliers who supply some red part or are based at 21 George Street

$$\pi_{\text{sid}} ((\sigma_{\text{color}="red"}(\text{Parts}) \bowtie \text{Catalog}) \cup (\sigma_{\text{address}="21 George Street"}(\text{Suppliers}) \bowtie \text{Catalog}))$$

4. Names of suppliers who supply some red part or are based at 21 George Street.

$$\pi_{\text{name}} ((\sigma_{\text{color}="red"}(\text{Parts}) \bowtie \text{Catalog} \bowtie \text{Suppliers}) \cup (\sigma_{\text{address}="21 George Street"}(\text{Suppliers}) \bowtie \text{Catalog} \bowtie \text{Parts}))$$

5. IDs of suppliers who supply some red parts and some green part

$$\pi_{\text{sid}} (\sigma_{\text{color}="red"}(\text{Parts}) \cap \sigma_{\text{color}="green"}(\text{Parts}) \bowtie \text{Catalog})$$

6. Pairs of IDs such that supplier with first ID charges more for some part than supplier with second ID

$$C_1 = \text{Catalog}, C_2 = \text{Catalog}$$

$$\pi_{C_1.\text{sid}, C_2.\text{sid}} (C_1 \bowtie_{C_1.\text{cost} > C_2.\text{cost}} C_2)$$

7. IDs of suppliers who supply only red parts.

$$\pi_{\text{sid}} (\sigma_{\text{color}="red"}(\text{Parts}) \bowtie \text{Catalog} - \sigma_{\text{color} \neq "red"}(\text{Parts}) \bowtie \text{Catalog})$$

8. IDs of suppliers who supply all parts

$$\pi_{\text{sid}}(\text{Catalog}) - \pi_{\text{sid}} ((\pi_{\text{sid}}(\text{Catalog}) \times \pi_{\text{pid}}(\text{Parts})) - \pi_{\text{sid}, \text{pid}}(\text{Catalog}))$$



1. Names of all suppliers who have red parts under 100 dollars
2. Names of all suppliers who have red parts under 100 dollars
3. Names of suppliers who have <sup>both</sup> red and green parts both under 100 dollars
4. IDs of suppliers who have <sup>both</sup> red and green parts under 100 dollars
5. Same as 3