

# Databases

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## 1 Exercise I

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

$$\Pi_{sname}((\sigma_{color='red'}(Part) \bowtie Catalog) \bowtie Supplier)$$

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

$$\Pi_{sid}(\sigma_{color='red' \vee color='green'}(Part) \bowtie Catalog)$$

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

$$\Pi_{sid}(\sigma_{color='red'}(Part) \bowtie Catalog) \cup \Pi_{sid}(\sigma_{address='221PackerStreet'}(Supplier))$$

4. Find the *sids* of suppliers who supply **every part**.

$$\Pi_{sid}(Catalog / \Pi_{pid}(Catalog))$$

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

$$\Pi_{sid}(Catalog / \Pi_{pid}(\sigma_{color='red'}(P) \bowtie C))$$

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

$$\Pi_{sid}(Catalog / \Pi_{pid}(\sigma_{color='red' \vee color='green'}(P) \bowtie C))$$

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

$$\Pi_{sid}(Catalog / \Pi_{pid}(\sigma_{color='red'}(P) \bowtie C)) \cup \Pi_{sid}(Catalog / \Pi_{pid}(\sigma_{color='green'}(P) \bowtie C))$$

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

$$\begin{aligned} & \rho(C_1, Catalog) \\ & \rho(C_2, Catalog) \\ & \Pi_{C_1.pid, C_2.sid}(Categories \bowtie \sigma_{C_1.pid=C_2.pid \wedge C_1.cost > C_2.cost}(C_2)) \end{aligned}$$

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

$$\begin{aligned} & \rho(C_1, Catalog) \\ & \rho(C_2, Catalog) \\ & \Pi_{C_1.pid}(\sigma_{C_1.pid \neq C_2.pid \wedge C_1.sid \neq C_2.sid}(C_1 \times C_2)) \end{aligned}$$

## 2 Exercise II

1. Find the *names* of suppliers who supply **red parts with cost under 100**.
2. Find the *names* of suppliers who supply **red and greed parts with cost under 100**.
3. Find the *sids* of suppliers who supply **red and green parts with cost under 100**.
4. Find the *names* of suppliers who supply **red and greed parts with cost under 100**.