RELATIONAL ALGEBRA: EXAMPLES

CS 564- Spring 2018

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EXAMPLE DB: SAILORS

Sailors (sid, sname, rating, age)

Reserves (sid, bid, day)

Boats (bid, bname, color)
**Example DB: Sailors**

**Q1:** What are the names of the sailors who have reserved boat with name “100”?

\[
\pi_{\text{sname}} \\
\Join \\
\sigma_{\text{bname}=100} \\
\Join \\
\pi_{\text{sname}}
\]

\[\text{Sailors} \Join \text{Reserves} \Join \text{Boats}\]
**Example DB: Sailors**

**Q2:** What are the names of the sailors who have reserved a red boat?

```sql
\pi_{sname} (\sigma_{color=\text{red}} (\text{Reserves} \bowtie \text{Sailors}))
```
**Example DB: Sailors**

**Q3:** What are the names of the sailors who have reserved a green or red boat?

\[
\pi_{\text{snname}}
\]

\[
\bowtie
\]

\[
\text{Sailors}
\]

\[
\bowtie
\]

\[
\text{Reserves}
\]

\[
\sigma_{\text{color}=\text{red} \lor \text{color}=\text{green}}
\]

\[
\text{Boats}
\]
**Example DB: Sailors**

**Q4:** What are the names of the sailors who have reserved a *green and red* boat?

- \( \pi_{\text{sid}, \text{name}} \)
- \( \sigma_{\text{color} = \text{green}} \) and \( \sigma_{\text{color} = \text{red}} \)
**Example DB: Sailors**

**Q5**: Find the names of the sailors who have reserved all boats with name “470”.

```
pi_{sname} 

⋈ 

pi_{sid,bid} 

σ_{name=470} 

pi_{bid} 

Sailors 

Reserves 

Boats 
```
**Example DB: Products**

Product (pid, name, price, category, maker-cid)

Purchase (buyer-ssn, seller-ssn, store, pid)

Company (cid, name, country)

Person (ssn, name, phone, city)
Q6: Find the phone numbers of the people who have bought iPads from Fred (the salesman).
**EXAMPLE DB: PRODUCTS**

**Q7:** Find the names and phone numbers of the people who have bought products from the USA.
**Example DB: Products**

**Q8:** Find the names of the people who have bought products *only* from the USA.
**Example DB: Products**

**Q9:** Find the names of the people who have bought products from the USA but not from Greece.
Q10: Find the names of the people who have bought products from the USA and live in Madison.
**Example DB: Flights**

City (cid, name, population)

Flight (fid, length, start-city, end-city, aid)

Airline (aid, name, profit)
**Example DB: Flights**

**Q11**: Find the flight ids for flights that start in a city with id “MSN” and end in a city with id “LON”.

\[
\begin{align*}
\pi_{fid} \\
\sigma_{cid=LO} \\
\bowtie_{cid=end\text{-}city} \\
\sigma_{cid=MSN} \\
\bowtie_{cid=start\text{-}city} \\
\bowtie_{cid=LO} \\
\sigma_{cid=LO} \\
\bowtie_{cid=end\text{-}city} \\
\pi_{fid}
\end{align*}
\]
**Example DB: Flights**

**Q12:** Find the names of the cities that have a flight for **every** airline with profit more than 0.