

# Find names of sailors who've reserved boat #103

Sailors (sid, sname, rating, age)

Reserves (sid, bid, day)

Boats (bid, bname, color)

Solution 1:  $\pi_{sname}((\sigma_{bid=103} Reserves) \bowtie Sailors)$

Solution 2:  $\rho(Temp1, \sigma_{bid=103} Reserves)$

$\rho(Temp2, Temp1 \bowtie Sailors)$

$\pi_{sname}(Temp2)$

Solution 3:  $\pi_{sname}(\sigma_{bid=103}(Reserves \bowtie Sailors))$

# Find names of sailors who've reserved a red boat

Sailors (sid, sname, rating, age)

Reserves (sid, bid, day)

Boats (bid, bname, color)

- Join relations?
  - Sailor, Reserves, Boats (for color)

$$\pi_{sname}((\sigma_{color='red'}Boats) \bowtie Reserves \bowtie Sailors)$$

A more efficient solution:

$$\pi_{sname}(\pi_{sid}((\pi_{bid} \sigma_{color='red'}Boats) \bowtie Res)) \bowtie Sailors)$$

**A query optimizer can find the most efficient solution!**

## Find sailors who've reserved a red or a green boat

- Identify all red or green boats, then
- find sailors who've reserved one of these boats:

$$\rho(\text{Tempboats}, (\sigma_{color='red' \vee color='green'} \text{Boats}))$$
$$\pi_{sname}(\text{Tempboats} \bowtie \text{Reserves} \bowtie \text{Sailors})$$

- Can also define Tempboats using union! (How?)
- What happens if  $\vee$  is replaced by  $\wedge$  in this query?

## Find sailors who've reserved a red and a green boat

1. Identify
  - sailors who've reserved red boats
  - sailors who've reserved green boats
2. Then find the intersection (*sid* is a key for Sailors):

$$\rho(Tempred, \pi_{sid}((\sigma_{color='red'}Boats) \bowtie Reserves))$$
$$\rho(Tempgreen, \pi_{sid}((\sigma_{color='green'}Boats) \bowtie Reserves))$$
$$\pi_{sname}((Tempred \cap Tempgreen) \bowtie Sailors)$$

## Find the names of sailors who've reserved all boats

Sailors (sid, sname, rating, age)

Reserves (sid, bid, day)

Boats (bid, bname, color)

- Uses division; schemas of the input relations to / must be carefully chosen:

$$\rho (Tempsids, (\pi_{sid, bid} Reserves) / (\pi_{bid} Boats))$$
$$\pi_{sname} (Tempsids \bowtie Sailors)$$

- To find sailors who've reserved all '470' boats:

$$\dots / \pi_{bid} (\sigma_{bname='470'} Boats)$$