Find names of sailors who've reserved boat #103

Sailors (<u>sid</u>, sname, rating, age)
Reserves (<u>sid</u>, <u>bid</u>, <u>day</u>)
Boats (<u>bid</u>, 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 (<u>sid</u>, sname, rating, age)
Reserves (<u>sid</u>, <u>bid</u>, <u>day</u>)
Boats (<u>bid</u>, 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:

$$\rho \, (Tempboats, (\sigma_{color='red' \lor color='green'} \, Boats))$$

$$\pi_{sname}(Tempboats \bowtie Reserves \bowtie Sailors)$$

- Can also define Tempboats using union! (How?)

- What happens if $\lor$ is replaced by $\land$ 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 (<u>sid</u>, sname, rating, age)
Reserves (<u>sid</u>, <u>bid</u>, <u>day</u>)
Boats (<u>bid</u>, 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:

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