Find names of sailors who’ve reserved boat #103

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

Solution 2:
\[ \rho(\text{Temp}1, \sigma_{\text{bid}=103}(\text{Reserves})) \]
\[ \rho(\text{Temp}2, \text{Temp}1 \bowtie \text{Sailors}) \]
\[ \pi_{\text{sname}}(\text{Temp}2) \]

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

\[ \rho (\pi_{sname}(\sigma_{\text{color}='red' \lor \text{color}='green'} \text{Boats})) \]

- 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

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

\[ \rho (\text{Tempsids}, (\pi_{\text{sid, bid}} \text{Reserves}) / (\pi_{\text{bid}} \text{Boats})) \]

\[ \pi_{\text{sname}} (\text{Tempsids} \bowtie \text{Sailors}) \]

- To find sailors who’ve reserved all ‘470’ boats:

\[ \ldots / \pi_{\text{bid}} (\sigma_{\text{bname} = '470'} \text{Boats}) \]