

SEEM3550 Fundamentals of Information System

Tutorial 1 Exercise

(Made by Zijin Feng, zjfeng@se.cuhk.edu.hk)

R	<u>sid</u>	<u>bid</u>	<u>day</u>	S	<u>sid</u>	sname	rating	age	B	<u>bid</u>	bname	color	
	22	103	10/10/96		22	Bob	7	45.0		101	Sun	red	
	31	101	11/12/96		31	Alice	8	55.5		102	Moon	yellow	
	22	102	11/12/96		58	Peter	10	35.0		103	Mars	green	
	22	101	10/10/96		Sailor					Boat			
	58	103	11/12/96										
	Reservation												

$S(\underline{sid}, \underline{sname}, rating, age)$

$B(\underline{bid}, \underline{bname}, color)$

$R(\underline{sid}, \underline{bid}, \underline{day})$

1. Find the name and ratings of each sailor
2. Find the names of sailors over the age of 40
3. Find the names of sailors who have reserved boat 103
4. Find the names of sailors who have reserved a red boat
5. Find the names of sailors who have reserved a red boat or a green boat
6. Find the names of sailors who have reserved a red boat and a green boat
7. Find the names of sailors who've reserved at least 1 boats
8. Find the names of sailors who've reserved at least 2 boats
9. Find the sids of sailors with age over 20 who have not reserved a red boat

Answers:

1.

$\pi_{\text{sname, rating}}(S)$

2.

$\pi_{\text{sname}}(\sigma_{\text{age} > 40}(S))$

3.

- Solution 1:

$\pi_{\text{sname}}(\sigma_{\text{bid} = 103}(R \bowtie S))$

- Solution 2 (more efficient)

$\pi_{\text{sname}}((\sigma_{\text{bid} = 103} R) \bowtie S)$

4.

- Solution 1:

$\pi_{\text{sname}}((\sigma_{\text{color} = \text{'red'}} B) \bowtie R \bowtie S)$

- Solution 2 (more efficient)

$\pi_{\text{sname}}(\pi_{\text{sid}}((\pi_{\text{bid}} \sigma_{\text{color} = \text{'red'}} B) \bowtie R) \bowtie S)$

5.

- Solution:

$\pi_{\text{sname}}(\sigma_{\text{color} = \text{'red'}} \text{ or } \text{color} = \text{'green'}} B \bowtie R \bowtie S)$

6.

- Solution:

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

A ship cannot have TWO colors at the same time

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

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

7.

- Solution:

$$\pi_{sname}(\mathbf{Sailor} \bowtie \mathbf{Reserves})$$

8.

- Solution:

$$\pi_{sid}(\sigma_{age > 40} \mathbf{Sailors}) - \pi_{sid}((\sigma_{color='red'} \mathbf{Boats}) \bowtie \mathbf{Reserves})$$

References:

<http://courses.cs.vt.edu/~cs4604/Fall08/lectures/lecture03.pdf>

<http://math.hws.edu/bridgeman/courses/343/f18/inclass/SQL-1-solutions.pdf>

<https://www.cs.ubc.ca/~laks/cpsc304/RA-Datalog-Tutorial%20-%20Sol.pdf>