Prize answers from various lectures

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Lecture 4

1. The division operator A\B can be defined as follows:

$$\pi_x(A) - \pi_x((\pi_x(A) \times B) - A)$$

2. "Names of sailors who've reserved a red or a green"

$$\begin{array}{l}\text{let } T = \sigma_{colour=\text{"red"} \vee colour=\text{"green"}}(Boats)\\ \text{in}\\ \quad \pi_{sname}(T \bowtie Reserves \bowtie Sailors)\end{array}$$

3. "Names of sailors who've reserved a red and a green boat"

$$\begin{array}{l}\text{let } T_1 = \pi_{sid}\,(\sigma_{colour=\text{"red"}}(Boats) \bowtie Reserves)\\ \quad\;\; T_2 = \pi_{sid}\,(\sigma_{colour=\text{"green"}}(Boats) \bowtie Reserves)\\ \text{in}\\ \quad \pi_{sname}((T_1 \cap T_2) \bowtie Sailors)\end{array}$$

Lecture 5

1. "Names of sailors who've reserved at least two boats"

$$\begin{array}{l}\{<N> \mid \exists I,R,A.\ <I,N,R,A> \in Sailors \wedge\\ \quad \exists BI_1,BI_2,D_1,D_2.<I,BI_1,D_1> \in Reserves \wedge\\ \qquad\qquad <I,BI_2,D_2> \in Reserves \wedge\\ \qquad\qquad BI_1 \neq BI_2\ \}\end{array}$$

2. "Names of sailors who've reserved all the boats"

$$\begin{array}{l}\{<N> \mid \exists I,R,A.\ <I,N,R,A> \in Sailors \wedge\\ \quad \forall B,C.\ (\neg(<B,C> \in Boats) \vee\\ \qquad (\exists <SI,BI,D> \in Reserves.\\ \qquad\quad I=SI \wedge BI=B))\ \}\end{array}$$

Lecture 6

1. “Names of sailors who’ve reserved a red or a green boat”

```
SELECT S.sname
FROM   Sailors S, Reserves R, Boats B
WHERE  S.sid=R.sid AND R.bid=B.bid
       AND
      (B.colour="red" OR B.colour="green");
```

2. “Names of sailors who’ve reserved a red and a green boat”

```
SELECT S.sname
FROM   Sailors S, Reserves R1,
       Reserves R2, Boats B1, Boats B2
WHERE  S.sid=R1.sid AND R1.bid=B1.bid
       AND S.sid=R2.sid AND R2.bid=B2.bid
       AND B1.colour="red"
       AND B2.colour="green";
```