Sailer

S#	Name	Age
S1	Smith	20
S2	Jones	30
S3	Blake	25
S4	*Lastname*	20
S5	Adams	30

Boat

B#	Name	Color
B1	Freedom	Blue
B2	Paradise	Green
B3	Miracle	Red
B4	Splendor	Yellow

Reservation

S#	B#	Day
S1	B1	1-Jan-15
S1	B2	2-Jan-16
S1	B3	3-Feb-17
S1	B4	4-Feb-18
S2	B1	5-Mar-16
S2	B2	6-Mar-17
S2	B3	7-Apr-18
S3	B1	8-May-17
S3	B2	9-Jul-17
S4	B1	10-Sep-17

Part 1 - Total 30: 3marks each

1) Get name of boat that "Lastname" reserves:

DRC> {BN | (**exists** S#, B#) (Sailer(S#, "Lastname", _) and
Reservation(S#, B#, _) and Boat(B#, BN,_))};

2) Get sailer names for sailers who reserve Paradise:

DRC> {SN | (**exists** S#, B#) (Boat(B#, "Paradise",_) and
Reservation(S#, B#, _) and Sailer(S#, SN,_))}

3) Get sailer names for sailers who do not reserve any boat:

DRC> {SN |(**exists** S#)(Sailer(S#, SN, _) and not Reservation(
S#, _, _)) };

4) Get all pairs of sailer names such that the sailers concerned reserve at least one same boat:

DRC> {(SN1, SN2) |(**exists** S1#, S2#,B#)(Sailer(S1#, SN1, _)
and Sailer(S2#, SN2, _) and Reservation(S1#, B#, _) and
Reservation(S2#, B#, _) and S1#<>S2#)};

5) Get sailer names for sailers who reserve all boats:

DRC> {SN| (**exists** S#)(Sailer(S#, SN, _) and
(**forall** B#)(Boat(B#, _, _) and Reservation(S#, B#, _)))}

6) Get sailer names for sailers who reserve all boats except Splendor:

DRC> {SN | (**exists** S#)(Sailer(S#, SN, _) and
(**forall** B#) (exists BN) (Boat(B#, BN, _) and
(BN = "Splendor" and not Reservation (S#, B#, _))
or
(BN != "Splendor" and Reservation (S#, B#, _))
))};

7) Get sailer names for sailers who reserve all boats that "Lastname" reserves:

```
DRC> { SN |  (exits S#, S'# ) (
    Sailer(S#, SN, _) and SN != "Lastname"
    and Sailer (S'#, "Lastname", _)
    and (forall B#) (
            Boat(B#, _ , _) and
             (
             Reservation(S'#, B#,_ ) and Reservation(S#, B#, _ )
             or
             not Reservation (S'#, B#,_)
             )
          )
  )};
```

8) Get sailer names for sailers who reserve only the boats that "Lastname" reserves:

```
DRC> { SN |  (exits S#, S'# ) (Sailer(S#, SN,_) and SN !=
          "Lastname" and Sailer(S'#, "Lastname", _) and
          (forall B#)(Boat(B#, _ , _) and
            (Reservation (S'#, B#,_) and Reservation (S#, B#, _)
             or
             not Reservation (S'#, B#,_ ) and
             not Reservation (S#, B#, _)
             )
          ))};
```

9) Get sailer names and the number of boats they reserve:

DRC> {SN, COUNT(B#)| (**exists** S#) (Sailer(S#, SN,_) and
Reservation(S#, B#, _))};

10) Get sailer names for sailers who reserve more than two boats:

DRC>{SN | (**exists** S#, B1, B2, B3) (Sailer(S#, SN, _) and
Reservation(S#, B1, _) and Reservation(S#, B2, _) and
Reservation(S#, B3, _) and B1!=B2 and B1!=B3 and
B2 != B3)};

==========

DRC> T(SN, Count) = {SN, count(B#) | (**exists** B#)
(Sailer(S#, SN, _) and
Reservation(S#, B#, _))};

DRC> {SN | (**exists** count) (T(SN, count) and count > 2)};

Part 2 – (1) screenshots are not given. --- 0 mark

(2) – query and corresponding results are not in one screenshot. --- 0 mark

(3) – query has syntax errors. --- 0 mark

(4) – With (1) - (3) satisfied, query logic is wrong. --- get 2 marks each question.

(5) – Above are all satisfied. --- 5 marks each.

Part 2. Several possible solutions are given.

1. Get name of boat that "*Lastname*" reserves.

```
SQL> --- Q1 Get name of boat that 'Lastname' reserves. ---
SQL> SELECT B.name
  2  FROM Sailer S, Reservation R, Boat B
  3  WHERE S.S# = R.S# and R.B# = B.B# and S.name = 'Lastname';

NAME
--------------------
Freedom

SQL>
SQL> SELECT Boat.name
  2  FROM (Sailer  NATURAL JOIN Reservation ) JOIN Boat USING (B#)
  3  WHERE Sailer.name = 'Lastname';

NAME
--------------------
Freedom
```

2. Get sailer names for sailers who reserve Paradise using *EXISTS*.

```
SQL> --- Q2. Get sailer names for sailers who reserve Paradise using EXISTS.---
SQL> SELECT S.name
  2  FROM Sailer S
  3  WHERE EXISTS (SELECT * FROM Boat B NATURAL JOIN Reservation R
  4           WHERE R.S# = S.S# and B.name='Paradise');

NAME
--------------------
Smith
Jones
Blake
```

3. Get sailer names for sailers who reserve Paradise using *IN*

```
SQL> --- Q3. Get sailer names for sailers who reserve Paradise using IN ---
SQL> SELECT name
  2  FROM Sailer
  3  WHERE S# IN (SELECT R.S# FROM Boat B NATURAL JOIN Reservation R
  4           WHERE B.name='Paradise');

NAME
--------------------
Smith
Jones
Blake
```

4. Get sailer names for sailers who reserve Paradise using a flat query.

```
SQL> --- Q4. Get sailer names for sailers who reserve Paradise using a flat query
SQL> SELECT S.name
  2  FROM Sailer S,     Boat B NATURAL JOIN Reservation R
  3  WHERE R.S# = S.S# and B.name='Paradise';

NAME
--------------------
Smith
Jones
Blake
```

5. Get sailer names for sailers who do not reserve any boat.

```
SQL> --- Q5. Get sailer names for sailers who do not reserve any boat. ---
SQL> SELECT S.name
  2  FROM Sailer S
  3  WHERE NOT EXISTS (SELECT * FROM Reservation R WHERE R.S# = S.S#);

NAME
--------------------
Adams
```

6. Get the names of the boats that Jones reserves but "*Lastname*" does not reserve using *MINUS*

```
SQL> --- Q6. Get the names of the boats that Jones reserves but 'Lastname' does not
SQL> SELECT B.name
  2  FROM Boat B NATURAL JOIN Reservation R Join Sailer S USING (S#)
  3  WHERE S.name = 'Jones'
  4  MINUS
  5  SELECT B.name
  6  FROM Boat B NATURAL JOIN Reservation R Join Sailer S USING (S#)
  7  WHERE S.name = 'Lastname';

NAME
--------------------
Miracle
Paradise
```

7. Get all pairs of sailer names such that the sailers concerned reserve at least one same boat.

```
SQL> --- Q7. Get all pairs of sailer names such that the sailers concerned reserve at least one
SQL> SELECT DISTINCT S1.name, S2.name
  2  FROM Sailer S1 NATURAL JOIN Reservation R1, Sailer S2 NATURAL JOIN Reservation R2
  3  WHERE R1.B# = R2.B# and S1.name != S2.name;

NAME                 NAME
-------------------- --------------------
Lastname             Smith
Jones                Blake
Blake                Smith
Lastname             Blake
Jones                Lastname
Lastname             Jones
Smith                Blake
Jones                Smith
Blake                Lastname
Smith                Lastname
Smith                Jones

NAME                 NAME
-------------------- --------------------
Blake                Jones

12 rows selected.
```

8. Get sailer names for sailers who reserve all boats.

```
SQL> --- Q8. Get sailer names for sailers who reserve all boats. ---
SQL> SELECT S.name
  2  FROM Sailer S
  3  WHERE NOT EXISTS (SELECT * FROM Boat B
  4           WHERE NOT EXISTS (SELECT * FROM Reservation R
  5                    WHERE S.S# = R.S# and B.B# = R.B# ) ) ;

NAME
--------------------
Smith
```

9. Get sailer names for sailers who reserve all boats except Splendor.

```
SQL> --- Q9. Get sailer names for sailers who reserve all boats except Splendor. ---
SQL> SELECT S.name
  2  FROM Sailer S
  3  WHERE NOT EXISTS (SELECT * FROM Boat B
  4          WHERE (B.name = 'Splendor' OR NOT EXISTS (SELECT * FROM Reservation R
  5                  WHERE S.S# = R.S# and B.B# = R.B# ))
  6          AND (B.name != 'Splendor' OR EXISTS (SELECT * FROM Reservation R
  7                  WHERE S.S# = R.S# and B.B# = R.B# )) ) ;

NAME
--------------------
Jones

SQL>
SQL> SELECT S.name
  2  FROM Sailer S
  3  WHERE NOT EXISTS (SELECT * FROM Boat B
  4          WHERE (B.name = 'Splendor' AND EXISTS (SELECT * FROM Reservation R
  5                  WHERE S.S# = R.S# and B.B# = R.B# ))
  6          OR (B.name != 'Splendor' AND NOT EXISTS (SELECT * FROM Reservation R
  7                  WHERE S.S# = R.S# and B.B# = R.B# )) ) ;

NAME
--------------------
Jones

SQL>
SQL> SELECT S.name
  2  FROM Sailer S
  3  WHERE NOT EXISTS (SELECT * FROM Boat B
  4          WHERE EXISTS (SELECT * FROM Reservation R
  5                  WHERE S.S# = R.S# and B.B# = R.B# AND B.name = 'Splendor' )
  6          OR NOT EXISTS (SELECT * FROM Reservation R
  7                  WHERE (S.S# = R.S# and B.B# = R.B# ) OR B.name = 'Splendor') ) ;

NAME
--------------------
Jones
```

10. Get sailer names for sailers who reserve all boats that *Lastname* reserves.

```
SQL>
SQL> --- Q10. Get sailer names for sailers who reserve all boats that Lastname reserves.---
SQL> SELECT S1.name FROM Sailer S1
  2  WHERE S1.name !='Lastname' and
  3       EXISTS(SELECT * from Sailer S WHERE S.name ='Lastname' and
  4           NOT EXISTS(SELECT * FROM Boat B
  5               WHERE EXISTS(SELECT * FROM Reservation R WHERE S.S#=R.S# and B.B#=R.B#)
  6                   and
  7           NOT EXISTS(SELECT * FROM Reservation R, Reservation R1
  8                   WHERE S.S#=R.S# and R.B#=B.B# and R1.S#=S1.S# and R1.B#=B.B#)));

NAME
--------------------
Smith
Jones
Blake

SQL>
SQL> ---- Event A: lastname reserves the boat ---
SQL> ---- Event B: sailer reserves the boat. ---
SQL> ---- Forall boats ((A and B) OR neg A) ---
SQL>
SQL> ---- solution 1: Not exists boats (neg (A and B) AND (neg neg A)) ---
SQL> SELECT S1.name FROM Sailer S1, Sailer S
  2  WHERE S.name ='Lastname' and
  3  NOT EXISTS(SELECT * FROM Boat B
  4       WHERE EXISTS(SELECT * FROM Reservation R WHERE S.S#=R.S# and B.B#=R.B#)
  5          and
  6          NOT EXISTS(SELECT * FROM Reservation R, Reservation R1
  7                  WHERE S.S#=R.S# and R.B#=B.B# and R1.S#=S1.S# and R1.B#=B.B#));

NAME
--------------------
Smith
Jones
Blake
Lastname

SQL>
SQL> ---- solution 2: Not exists boats (neg A OR neg B) AND (neg neg A)) ---
SQL> SELECT S1.name FROM Sailer S1, Sailer S
  2  WHERE S.name ='Lastname' and
  3  NOT EXISTS(SELECT * FROM Boat B
  4       WHERE EXISTS(SELECT * FROM Reservation R WHERE S.S#=R.S# and B.B#=R.B#)
  5          and
  6          (NOT EXISTS(SELECT * FROM Reservation R
  7                  WHERE S.S#=R.S# and R.B#=B.B# )
  8          OR NOT EXISTS(SELECT * FROM Reservation R1
  9                  WHERE R1.S#=S1.S# and R1.B#=B.B#))
 10  );

NAME
--------------------
Smith
Jones
Blake
Lastname
```

```
SQL> ---- solution 3: Not exists boats (neg B AND A) ---
SQL> SELECT S1.name FROM Sailer S1, Sailer S
  2  WHERE S.name ='Lastname' and
  3  NOT EXISTS(SELECT * FROM Boat B
  4        WHERE EXISTS(SELECT * FROM Reservation R WHERE S.S#=R.S# and B.B#=R.B#)
  5           and
  6           NOT EXISTS(SELECT * FROM Reservation R1
  7                   WHERE R1.S#=S1.S# and R1.B#=B.B#));

NAME
--------------------
Smith
Jones
Blake
Lastname
```

```
SQL> select S1.Name from Sailer S1
  2  where S1.Name != 'Lastname' and
  3          not exists(select B.B# from Sailer S, Boat B, Reservation R
  4                  where S.Name = 'Lastname' and S.S# = R.S# and R.B# = B.B#
  5                  minus
  6                  select B.B# from Boat B, Reservation R where S1.S# = R.S# and R.B# = B.B#);

NAME
--------------------
Smith
Jones
Blake
```

11. Get sailer names for sailers who reserve only the boats that *Lastname* reserves.

```
SQL> --- Q11. Get sailer names for sailers who reserve only the boats that Lastname reserves
SQL> SELECT S1.name FROM Sailer S1
  2  WHERE S1.name !='Lastname' and
  3  EXISTS(SELECT * from Sailer S WHERE S.name ='Lastname' and
  4      NOT EXISTS(SELECT * FROM Boat B
  5                 WHERE EXISTS(SELECT * FROM Reservation R
  6                  WHERE (S.S#=R.S# and B.B#=R.B#) OR (S1.S# = R.S# and B.B# = R.B#))
  7                  and
  8          NOT EXISTS (SELECT * FROM Reservation R, Reservation R1
  9                  WHERE S.S#=R.S# and R.B#=B.B# and R1.S#=S1.S# and R1.B#=B.B#)));

no rows selected

SQL>
SQL> ---- Event A: Sailer reserves the boat ---
SQL> ---- Event B: Lastname reserves the boat. ---
SQL> ---- Forall boats ( (neg A and neg B) OR (A and B)) ---
SQL>
SQL> ----sulotion1: Not exists boat ((A OR B) AND NOT (A and B))---
SQL> SELECT S1.name
  2  FROM Sailer S1, Sailer S
  3  WHERE S.name ='Lastname' and
  4     NOT EXISTS(SELECT * FROM Boat B
  5                WHERE EXISTS(SELECT * FROM Reservation R
  6                   WHERE (S.S#=R.S# and B.B#=R.B#) OR (S1.S# = R.S# and B.B# = R.B#))
  7                   and
  8          NOT EXISTS(SELECT * FROM Reservation R, Reservation R1
  9                   WHERE S.S#=R.S# and R.B#=B.B# and R1.S#=S1.S# and R1.B#=B.B#));

NAME
--------------------
Lastname

SQL>
SQL> ---- Solution2: Not exists boat ((A OR B) AND (neg A OR neg B)) ---
SQL> SELECT S1.name
  2  FROM Sailer S1, Sailer S
  3  WHERE S.name ='Lastname' and
  4     NOT EXISTS(SELECT * FROM Boat B
  5                WHERE EXISTS(SELECT * FROM Reservation R
  6                   WHERE (S.S#=R.S# and B.B#=R.B#) OR (S1.S# = R.S# and B.B# = R.B#))
  7                   and
  8           (NOT EXISTS(SELECT * FROM Reservation R
  9                   WHERE S.S#=R.S# and R.B#=B.B#)
 10          OR
 11          NOT EXISTS(SELECT * FROM Reservation R1
 12                  WHERE R1.S#=S1.S# and R1.B#=B.B#)));

NAME
--------------------
Lastname
```

```
SQL> ---- Solution3 : Not exists boat ((A and neg B) OR (neg A and B)) ----
SQL> SELECT S1.name
  2  FROM Sailer S1, Sailer S
  3  WHERE S.name ='Lastname' and
  4     NOT EXISTS(SELECT * FROM Boat B
  5                WHERE EXISTS(SELECT * FROM Reservation R
  6                   WHERE (S.S#=R.S# and B.B#=R.B#))
  7                   AND
  8                   NOT EXISTS(SELECT * FROM Reservation R1
  9                   WHERE R1.S#=S1.S# and R1.B#=B.B#)
 10                   OR
 11                   (NOT EXISTS(SELECT * FROM Reservation R
 12                   WHERE S.S#=R.S# and R.B#=B.B#)
 13                   AND
 14                   EXISTS(SELECT * FROM Reservation R1
 15                   WHERE R1.S#=S1.S# and R1.B#=B.B#)));

NAME
--------------------
Lastname
```

12. Get sailer names and the number of boats they reserve.

```
SQL> --- Q12. Get sailer names and the number of boats they reserve. ---
SQL> SELECT name, count(*)
  2  FROM Sailer NATURAL JOIN Reservation
  3  GROUP BY name;

NAME                   COUNT(*)
-------------------- ----------
Smith                         4
Lastname                      1
Blake                         2
Jones                         3
```

13. Get sailer names for sailers who reserve more than two boats without using *HAVING.*

```
SQL> --- Q13. Get sailer names for sailers who reserve more than two boats without using HAVING. ---
SQL> SELECT DISTINCT name
  2  FROM Sailer NATURAL JOIN Reservation R1 JOIN Reservation R2 USING (S#)
  3                    JOIN Reservation R3 USING (S#)
  4  WHERE R1.B# != R2.B# and R1.B# != R3.B# and R2.B# != R3.B# ;

NAME
------------------
Smith
Jones
```

14. Get sailer names for sailers who reserve more than two boats using *HAVING.*

```
SQL> --- Q14. Get sailer names for sailers who reserve more than two boats using HAVING. ---
SQL> SELECT name
  2  FROM Sailer NATURAL JOIN Reservation
  3  GROUP BY name
  4  HAVING Count(*) > 2;

NAME
--------------------
Smith
Jones
```

15. Get complete information of each sailer such that when the sailer reserves a boat, list boat detail; when the sailer does not reserve any boat, just list the sailer information.

```
SQL> --- Q15. Get complete information of each sailer such that when the sailer reserves a boat, li
 the sailer information. ---
SQL>
SQL> SELECT *
  2  FROM Sailer LEFT JOIN (Reservation NATURAL JOIN Boat) USING (S#);

S# NAME                      AGE B# DAY                 NAME                 COLOR
-- -------------------- ---------- -- ------------------ -------------------- ----------
S1 Smith                        20 B1 01-JAN-15         Freedom              Blue
S1 Smith                        20 B2 02-JAN-16         Paradise             Green
S1 Smith                        20 B3 03-FEB-17         Miracle              Red
S1 Smith                        20 B4 04-FEB-18         Splendor             Yellow
S2 Jones                        30 B1 05-MAR-16         Freedom              Blue
S2 Jones                        30 B2 06-MAR-17         Paradise             Green
S2 Jones                        30 B3 07-APR-18         Miracle              Red
S3 Blake                        25 B1 08-MAY-17         Freedom              Blue
S3 Blake                        25 B2 09-JUL-17         Paradise             Green
S4 Lastname                     20 B1 10-SEP-17         Freedom              Blue
S5 Adams                        30

11 rows selected.
```

16. Get sailer names and the number of boats that the sailer reverses. If the sailer does not reserve any boat, leave it null.

```
SQL> --- Q16. Get sailer names and the number of boats that the sail
SQL>
SQL> SELECT name, COUNT(R.B#)
  2  FROM Sailer S LEFT JOIN Reservation R ON S.S# = R.S#
  3  GROUP BY name;

NAME                 COUNT(R.B#)
-------------------- -----------
Adams                          0
Smith                          4
Lastname                       1
Blake                          2
Jones                          3
```