DBMS Assignment

Creating Sailors, Boats and Reserves Tables:

```
Enter password: **********
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 5
Server version: 5.5.16 MySQL Community Server (GPL)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| monaa624           |
| mysql              |
| performance_schema |
| shivathmika        |
| sonaa              |
| test               |
+--------------------+
7 rows in set (0.00 sec)

mysql> use Shivathmika;
Database changed
mysql> create table sailors(sid integer(15) primary key,sname char(20),rating integer(10),age real);
Query OK, 0 rows affected (0.02 sec)

mysql> create table boats(bid integer(10) primary key,bname varchar(20),color char(15));
Query OK, 0 rows affected (0.01 sec)

mysql> create table reserves(sid integer(15),bid integer(10),date date,foreign key(sid) references sailors(sid),foreign key(bid) references boats(bid));
Query OK, 0 rows affected (0.02 sec)
```

Inserting data into tables:

```
mysql> insert into sailors values(22,'Dustin',7,45),(29,'Brutus',1,33),(31,'Lubber',8,55.5),(32,'Andy',8,25.5),(58,'Rusty',10,35),(64,'Horatio',7,35),(71,'Z
orba',10,16),(74,'Horatio',9,35),(85,'Art',3,25.5),(95,'Bob',3,63.5);
Query OK, 10 rows affected (0.01 sec)
Records: 10  Duplicates: 0  Warnings: 0

mysql> select * from sailors;
+-----+---------+--------+------+
| sid | sname   | rating | age  |
+-----+---------+--------+------+
|  22 | Dustin  |      7 |   45 |
|  29 | Brutus  |      1 |   33 |
|  31 | Lubber  |      8 | 55.5 |
|  32 | Andy    |      8 | 25.5 |
|  58 | Rusty   |     10 |   35 |
|  64 | Horatio |      7 |   35 |
|  71 | Zorba   |     10 |   16 |
|  74 | Horatio |      9 |   35 |
|  85 | Art     |      3 | 25.5 |
|  95 | Bob     |      3 | 63.5 |
+-----+---------+--------+------+
10 rows in set (0.01 sec)

mysql> insert into boats values(101,'Interlake','blue'),(102,'Interlake','red'),(103,'Clipper','green'),(104,'Marine','red');
Query OK, 4 rows affected (0.01 sec)
Records: 4  Duplicates: 0  Warnings: 0

mysql> select * from boats;
+-----+-----------+-------+
| bid | bname     | color |
+-----+-----------+-------+
| 101 | Interlake | blue  |
| 102 | Interlake | red   |
| 103 | Clipper   | green |
| 104 | Marine    | red   |
+-----+-----------+-------+
4 rows in set (0.00 sec)
```

```
mysql> insert into reserves values(22,101,'1998-10-10'),(22,102,'1998-10-10'),(22,103,'1998-10-08'),(22,104,'1998-10-07'),(31,102,'1998-11-10'),(31,103,'199
8-11-06'),(31,104,'1998-11-12'),(64,101,'1998-09-05'),(64,102,'1998-09-08'),(74,103,'1998-09-08');
Query OK, 10 rows affected (0.01 sec)
Records: 10  Duplicates: 0  Warnings: 0

mysql> select * from reserves;
+------+------+------------+
| sid  | bid  | date       |
+------+------+------------+
|   22 |  101 | 1998-10-10 |
|   22 |  102 | 1998-10-10 |
|   22 |  103 | 1998-10-08 |
|   22 |  104 | 1998-10-07 |
|   31 |  102 | 1998-11-10 |
|   31 |  103 | 1998-11-06 |
|   31 |  104 | 1998-11-12 |
|   64 |  101 | 1998-09-05 |
|   64 |  102 | 1998-09-08 |
|   74 |  103 | 1998-09-08 |
+------+------+------------+
10 rows in set (0.00 sec)

mysql>
```

Problem 1:

Find the names of sailors who have reserved a red boat.

```
mysql> SELECT s.sname FROM sailors s JOIN reserves r ON r.sid=s.sid join boats b ON r.bid=b.bid where b.color='red';
+---------+
| sname   |
+---------+
| Dustin  |
| Dustin  |
| Lubber  |
| Lubber  |
| Horatio |
+---------+
5 rows in set (0.00 sec)
```

Problem 2:

Find the names of the Sailors who have reserved at least one boat.

```
mysql> SELECT DISTINCT Sailors.SNAME FROM Sailors JOIN Reserves ON Sailors.SID = Reserves.SID;
+---------+
| SNAME   |
+---------+
| Dustin  |
| Lubber  |
| Horatio |
+---------+
3 rows in set (0.00 sec)
```

Problem 3:

Compute increments for the ratings of persons who have sailed two different boats on the same day.

Problem 4:

Find the ages of sailors whose name begins and ends with B and has at least 3 characters.

```
mysql> SELECT sname, age  FROM sailors WHERE sname LIKE 'B%_%B';
+-------+------+
| sname | age  |
+-------+------+
| Bob   | 63.5 |
+-------+------+
1 row in set (0.00 sec)

mysql>
```

Problem 5:

Find the names of sailors who have reserved a red and a

green boat.

```
mysql> SELECT s.sname, b.color, s.sid  FROM sailors s JOIN reserves r ON r.sid=s.sid JOIN boats b ON r.bid=b.bid AND b.color='red'  WHERE r.sid IN( SELECT s
.sid  FROM sailors s JOIN reserves r ON r.sid=s.sid  JOIN boats b ON r.bid=b.bid WHERE b.color='green ');
+--------+-------+-----+
| sname  | color | sid |
+--------+-------+-----+
| Dustin | red   |  22 |
| Dustin | red   |  22 |
| Lubber | red   |  31 |
| Lubber | red   |  31 |
+--------+-------+-----+
4 rows in set (0.00 sec)
```

Problem 6:

Find the sids of all sailors who have reserved red boats but not green boats.

```
mysql> SELECT s.sname, b.color, s.sid FROM sailors s JOIN reserves r ON r.sid=s.sid JOIN boats b ON r.bid=b.bid AND b.color='red' WHERE r.sid NOT IN( SELECT
 s.sid  FROM sailors s JOIN reserves r ON r.sid=s.sid  JOIN boats b ON r.bid=b.bid   WHERE b.color='green');
+---------+-------+-----+
| sname   | color | sid |
+---------+-------+-----+
| Horatio | red   |  64 |
+---------+-------+-----+
1 row in set (0.00 sec)
```

Problem 7:

Find the sailors with the highest rating.

```
mysql> select distinct sname,max(rating) from sailors;
+--------+------------+
| sname  | max(rating) |
+--------+------------+
| Dustin |         10 |
+--------+------------+
1 row in set (0.00 sec)
```

Problem 8:

Find the name of the oldest sailor.

```
mysql> SELECT sname FROM (SELECT sname,max(age) FROM sailors) t1;
+---------+
| sname   |
+---------+
| Dustin |
+---------+
1 row in set (0.00 sec)
```

Problem 9:

Count the number of different sailor names.

```
ysql> SELECT COUNT(*) FROM (SELECT sname FROM sailors GROUP BY sname ) t1;
----------+
 COUNT(*) |
----------+
        9 |
----------+
 row in set (0.00 sec)
```

Method-2:

```
mysql> select count(distinct sname) as Distinct_Count from sailors;
+----------------+
| Distinct_Count |
+----------------+
|              9 |
+----------------+
1 row in set (0.01 sec)
```

Problem 10:

Find the no. of sailors who is eligible to vote for each rating level

```
mysql> SELECT COUNT(sname), rating FROM sailors WHERE age>18 group by rating;
+--------------+--------+
| COUNT(sname) | rating |
+--------------+--------+
|            1 |      1 |
|            2 |      3 |
|            2 |      7 |
|            2 |      8 |
|            1 |      9 |
|            1 |     10 |
+--------------+--------+
6 rows in set (0.00 sec)
```

Method-2:

```
mysql> SELECT COUNT(sname) as SailorCount_RatingLevel, rating FROM sailors WHERE age>18 group by rating;
+------------------------+--------+
| SailorCount_RatingLevel | rating |
+------------------------+--------+
|                      1 |      1 |
|                      2 |      3 |
|                      2 |      7 |
|                      2 |      8 |
|                      1 |      9 |
|                      1 |     10 |
+------------------------+--------+
6 rows in set (0.00 sec)
```

SQL Queries On Sailors Schema

1. **If boat Number is 103.Then find the names of sailors?**

```
mysql> select s.sname from sailors s,reserves r where s.sid=r.sid and r.bid=103;
+---------+
| sname   |
+---------+
| Dustin  |
| Lubber  |
| Horatio |
+---------+
3 rows in set (0.01 sec)
```

2. Find the names of sailors who have never reserved boat number 103.

```
mysql> select s.sname from sailors s where s.sid not in (select r.sid from reserves r where r.bid=103);
+---------+
| sname   |
+---------+
| Brutus  |
| Andy    |
| Rusty   |
| Horatio |
| Zorba   |
| Art     |
| Bob     |
+---------+
7 rows in set (0.01 sec)
```

3. Red boats are reserved, Find the names of Sailors?

```
mysql> select sname from sailors s,boats b,reserves r where s.sid=r.sid and b.bid=r.bid and b.color='red';
+---------+
| sname   |
+---------+
| Dustin  |
| Dustin  |
| Lubber  |
| Lubber  |
| Horatio |
+---------+
5 rows in set (0.00 sec)
```

4. What is the color of the boat reversed by Lubber?

```
mysql> select b.color from boats b,sailors s,reserves r where s.sid=r.sid and b.bid=r.bid and s.sname='Lubber';
+-------+
| color |
+-------+
| red   |
| green |
| red   |
+-------+
3 rows in set (0.00 sec)
```

5. Find the names of sailors who have reserved both a red and a green boat?

6. Find the names of sailors who have reserved a red but not a green boat?

7. Find the sids of sailors with age over 20 who have not reserved a red boat.

```
mysql> select s.sid,s.sname from sailors s,boats b,reserves r where s.sid=r.sid and b.bid=r.bid and s.age>20 and b.color!='red';
+-----+---------+
| sid | sname   |
+-----+---------+
|  22 | Dustin  |
|  22 | Dustin  |
|  31 | Lubber  |
|  64 | Horatio |
|  74 | Horatio |
+-----+---------+
5 rows in set (0.00 sec)
```

8. Find the names of sailors who have reserved at least two different boats.

```
mysql> select s.sid,s.sname from sailors s where s.sid in (select s.sid from sailors s,boats b,reserves r where s.sid=r.sid and b.bid=r.bid group by s.sid h
aving COUNT(b.bid)>1);
+-----+---------+
| sid | sname   |
+-----+---------+
|  22 | Dustin  |
|  31 | Lubber  |
|  64 | Horatio |
+-----+---------+
3 rows in set (0.01 sec)
```

9. Write an SQL Query to find the sailors who reserved all the boats?

```
mysql> select s.sid,s.sname from sailors s where not exists (select b.bid from boats b where not exists (select r.bid from reserves r where r.bid=b.bid and
r.sid=s.sid));
+-----+--------+
| sid | sname  |
+-----+--------+
|  22 | Dustin |
+-----+--------+
1 row in set (0.00 sec)
```

10. Write a SQL Query to Find the ages of Sailors whose name begins and end with b and have at least three characters?

```
mysql> select s.sid,s.age from sailors s where s.sname like 'B_%b';
+-----+------+
| sid | age  |
+-----+------+
|  95 | 63.5 |
+-----+------+
1 row in set (0.00 sec)
```

11. find sid's of sailors who've reserved a red or a green boat

```
mysql> select s.sname from sailors s,reserves r,boats b where s.sid=r.sid and b.bid=r.bid and(b.color='red' or b.color='green');
+---------+
| sname   |
+---------+
| Dustin  |
| Dustin  |
| Dustin  |
| Lubber  |
| Lubber  |
| Lubber  |
| Horatio |
| Horatio |
+---------+
8 rows in set (0.00 sec)
```

12. Find sailors who have reserved all boats.

```
mysql> SELECT S.sname FROM Sailors S WHERE NOT EXISTS (SELECT B.bid FROM Boats B WHERE NOT EXISTS ( SELECT R.bid FROM Reserves R WHERE R.bid=B.bid AND R.sid
=S.sid));
+--------+
| sname  |
+--------+
| Dustin |
+--------+
1 row in set (0.00 sec)
```

SQL's Aggregate Operators

1. How many instances in the sailor relation?

```
mysql> select count(*) from sailors;
+----------+
| count(*) |
+----------+
|       10 |
+----------+
1 row in set (0.00 sec)
```

```
mysql> select count(*) as SailorsInstances_Count from sailors;
+-----------------------+
| SailorsInstances_Count |
+-----------------------+
|                    10 |
+-----------------------+
1 row in set (0.00 sec)
```

2.Average age of Sailors with a rating of 10?

```
mysql> SELECT AVG(S.age) FROM Sailors S WHERE S.rating=10;
+-------------+
| AVG(S.age) |
+-------------+
|       25.5 |
+-------------+
1 row in set (0.01 sec)
```

```
mysql> SELECT AVG(S.age) as Avg_Age FROM Sailors S WHERE S.rating=10;
+---------+
| Avg_Age |
+---------+
|    25.5 |
+---------+
1 row in set (0.00 sec)
```

3. Names of all Sailors who have achieved the maximum rating

```
mysql> SELECT S.sname FROM Sailors S WHERE S.rating=(SELECT MAX(S2.rating) FROM Sailors S2);
+-------+
| sname |
+-------+
| Rusty |
| Zorba |
+-------+
2 rows in set (0.00 sec)
```

4. How many distinct ratings for Sailors less than 40 years of age?

```
mysql> SELECT COUNT(distinct S.rating) as Distinct_Rating_Count FROM Sailors S, Reserves R WHERE S.sid = R.sid AND S.age < 40;
+---------------------+
| Distinct_Rating_Count |
+---------------------+
|                   2 |
+---------------------+
1 row in set (0.00 sec)
```

5. How many reservations were made by Sailors less than 40 years old?

```
mysql> SELECT COUNT(*) AS num_reservations FROM Reserves R JOIN Sailors S ON R.sid = S.sid WHERE S.age < 40;
+----------------+
| num_reservations |
+----------------+
|              3 |
+----------------+
1 row in set (0.00 sec)
```

6. Find name and age of the oldest sailor(s)?

```
mysql> SELECT S.sname, MAX(S.age) as Maximum_age FROM Sailors S;
+--------+-------------+
| sname  | Maximum_age |
+--------+-------------+
| Dustin |        63.5 |
+--------+-------------+
1 row in set (0.00 sec)
```

```
mysql> SELECT S.sname, S.age FROM Sailors S WHERE S.age = (SELECT MAX(S2.age) FROM Sailors S2);
+------+------+
| sname | age  |
+------+------+
| Bob   | 63.5 |
+------+------+
1 row in set (0.00 sec)
```

```
mysql> SELECT S.sname, S.age FROM Sailors S WHERE (SELECT MAX(S2.age) FROM Sailors S2) = S.age;
+-------+------+
| sname | age  |
+-------+------+
| Bob   | 63.5 |
+-------+------+
1 row in set (0.00 sec)
```

.

Queries With GROUP BY and HAVING

1. Find the age of the youngest sailor for each rating level.

```
mysql> SELECT S.rating, MIN(S.age) AS minage FROM Sailors S GROUP BY S.rating;
+--------+--------+
| rating | minage |
+--------+--------+
|      1 |     33 |
|      3 |   25.5 |
|      7 |     35 |
|      8 |   25.5 |
|      9 |     35 |
|     10 |     16 |
+--------+--------+
6 rows in set (0.00 sec)
```

2. **Find age of the youngest sailor with age ≥ 18, for each rating with at least 2 such sailors.**

```
mysql> SELECT S.rating, MIN(S.age) AS minage FROM Sailors S WHERE S.age>=18 GROUP BY S.rating HAVING COUNT(*) > 1;
+--------+--------+
| rating | minage |
+--------+--------+
|      3 |   25.5 |
|      7 |     35 |
|      8 |   25.5 |
+--------+--------+
3 rows in set (0.00 sec)
```

3. **Find age of the youngest sailor with age ≥ 18, for each rating with atleast 2 such sailors and where every sailor is under 60.**

```
mysql> SELECT S.rating, MIN(S.age) AS minage FROM Sailors S WHERE S.age >= 18 AND S.age < 60 GROUP BY S.rating HAVING COUNT(*) >= 2;
+--------+--------+
| rating | minage |
+--------+--------+
|      7 |     35 |
|      8 |   25.5 |
+--------+--------+
2 rows in set (0.00 sec)
```

4. **Find age of the youngest sailor with age ≥ 18, for each rating with at least 2 sailors between 18 and 60.**

```
mysql> SELECT S.rating, MIN(S.age) AS minage FROM Sailors S WHERE S.age >= 18 AND S.age <= 60 GROUP BY S.rating HAVING COUNT(*) > 1;
+--------+--------+
| rating | minage |
+--------+--------+
|      7 |     35 |
|      8 |   25.5 |
+--------+--------+
2 rows in set (0.00 sec)
```

5. **For each red boat, find the number of reservations for this boat**

```
mysql> SELECT B.bid, COUNT(*) AS scount FROM Sailors S, Boats B, Reserves R WHERE S.sid = R.sid AND R.bid = B.bid AND B.color = 'red' GROUP BY B.bid;
+-----+--------+
| bid | scount |
+-----+--------+
| 102 |      3 |
| 104 |      2 |
+-----+--------+
2 rows in set (0.00 sec)
```

6. **Find age of the youngest sailor with age > 18, for each rating with at least 2 sailors (of any age);**

```
mysql> SELECT S.rating, MIN(S.age) AS minage FROM Sailors S WHERE S.age >= 18 GROUP BY S.rating HAVING (SELECT COUNT(*) FROM Sailors S2 WHERE S2.rating = S.
rating AND S2.age >= 18) > 1;
+--------+--------+
| rating | minage |
+--------+--------+
|      3 |   25.5 |
|      7 |     35 |
|      8 |   25.5 |
+--------+--------+
3 rows in set (0.00 sec)
```

7. **Find those ratings for which the average age is the minimum over all ratings;**

```
mysql> SELECT Temp.rating, Temp.avgage
    -> FROM (
    ->     SELECT S.rating, AVG(S.age) AS avgage
    ->     FROM Sailors S
    ->     GROUP BY S.rating
    -> ) AS Temp
    -> WHERE Temp.avgage = (
    ->     SELECT MIN(Temp.avgage)
    ->     FROM (
    ->         SELECT AVG(S.age) AS avgage
    ->         FROM Sailors S
    ->         GROUP BY S.rating
    ->     ) AS Temp
    -> );
+--------+--------+
| rating | avgage |
+--------+--------+
|     10 |   25.5 |
+--------+--------+
1 row in set (0.00 sec)
```

ORDER BY imposes sorting:

```
mysql> SELECT S.rating, MIN(S.age) AS minage FROM Sailors S WHERE S.age >= 18 GROUP BY S.rating ORDER BY S.rating ;
+--------+--------+
| rating | minage |
+--------+--------+
|      1 |     33 |
|      3 |   25.5 |
|      7 |     35 |
|      8 |   25.5 |
|      9 |     35 |
|     10 |     35 |
+--------+--------+
6 rows in set (0.00 sec)
```

V.Shivathmika
22K91A05Q8
DBMS ASSIGNMENT