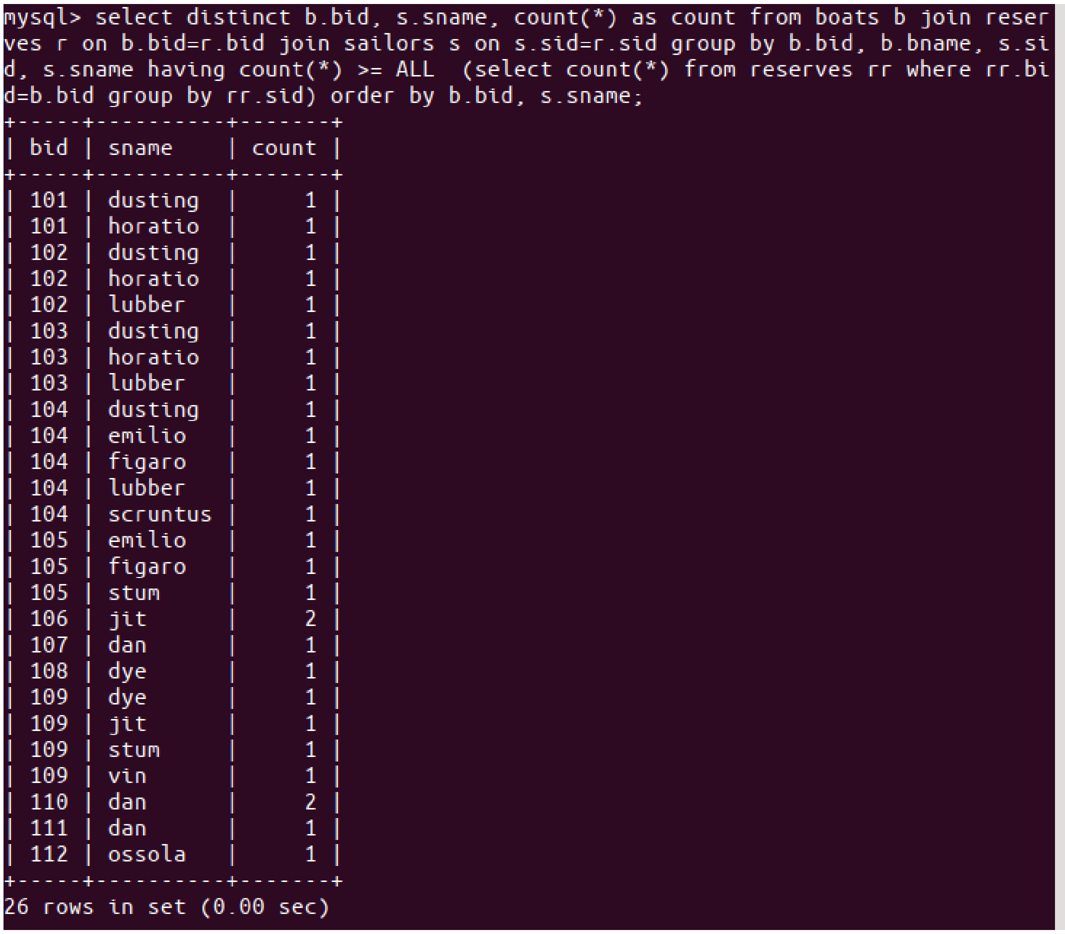
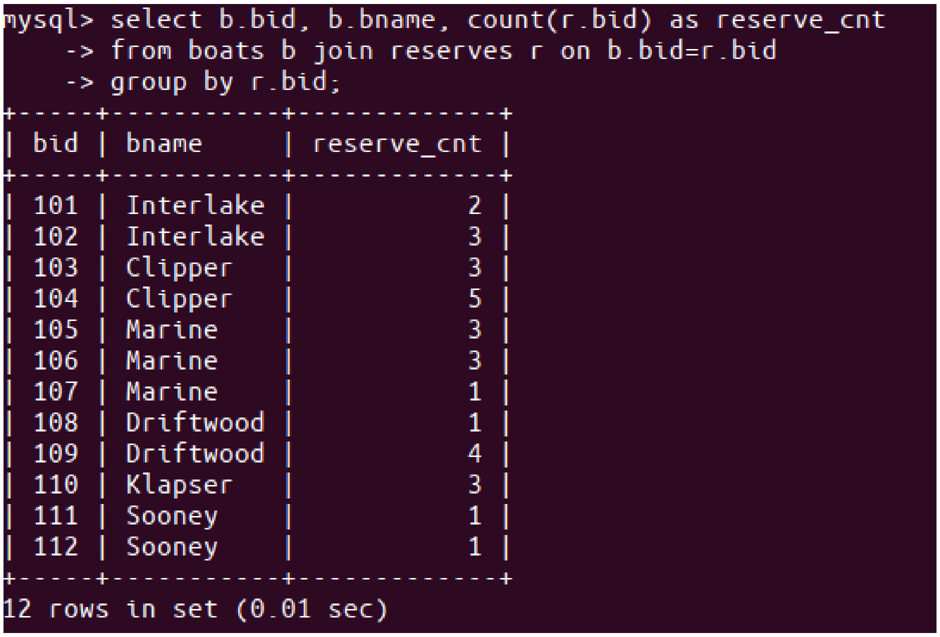
Part 1

1.Select, for each boat, the sailor who made the highest number of reservations for that boat.



```
mysql> select distinct b.bid, s.sname, count(*) as count from boats b join reser
ves r on b.bid=r.bid join sailors s on s.sid=r.sid group by b.bid, b.bname, s.si
d, s.sname having count(*) >= ALL  (select count(*) from reserves rr where rr.bi
d=b.bid group by rr.sid) order by b.bid, s.sname;
+-----+---------+-------+
| bid | sname   | count |
+-----+---------+-------+
| 101 | dusting |     1 |
| 101 | horatio |     1 |
| 102 | dusting |     1 |
| 102 | horatio |     1 |
| 102 | lubber  |     1 |
| 103 | dusting |     1 |
| 103 | horatio |     1 |
| 103 | lubber  |     1 |
| 104 | dusting |     1 |
| 104 | emilio  |     1 |
| 104 | figaro  |     1 |
| 104 | lubber  |     1 |
| 104 | scruntus |    1 |
| 105 | emilio  |     1 |
| 105 | figaro  |     1 |
| 105 | stum    |     1 |
| 106 | jit     |     2 |
| 107 | dan     |     1 |
| 108 | dye     |     1 |
| 109 | dye     |     1 |
| 109 | jit     |     1 |
| 109 | stum    |     1 |
| 109 | vin     |     1 |
| 110 | dan     |     2 |
| 111 | dan     |     1 |
| 112 | ossola  |     1 |
+-----+---------+-------+
26 rows in set (0.00 sec)
```

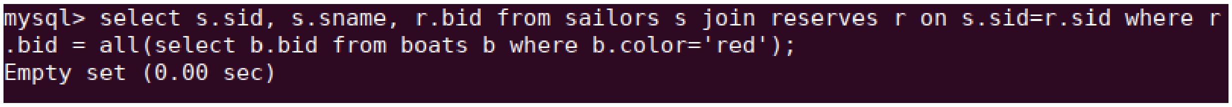
2.List, for every boat, the number of times it has been reserved, excluding those boats that have never been reserved (list the id and the name).



```
mysql> select b.bid, b.bname, count(r.bid) as reserve_cnt
    -> from boats b join reserves r on b.bid=r.bid
    -> group by r.bid;
+-----+-----------+-------------+
| bid | bname     | reserve_cnt |
+-----+-----------+-------------+
| 101 | Interlake |           2 |
| 102 | Interlake |           3 |
| 103 | Clipper   |           3 |
| 104 | Clipper   |           5 |
| 105 | Marine    |           3 |
| 106 | Marine    |           3 |
| 107 | Marine    |           1 |
| 108 | Driftwood |           1 |
| 109 | Driftwood |           4 |
| 110 | Klapser   |           3 |
| 111 | Sooney    |           1 |
| 112 | Sooney    |           1 |
+-----+-----------+-------------+
12 rows in set (0.01 sec)
```

3.List those sailors who have reserved every red boat (list the id and the name).

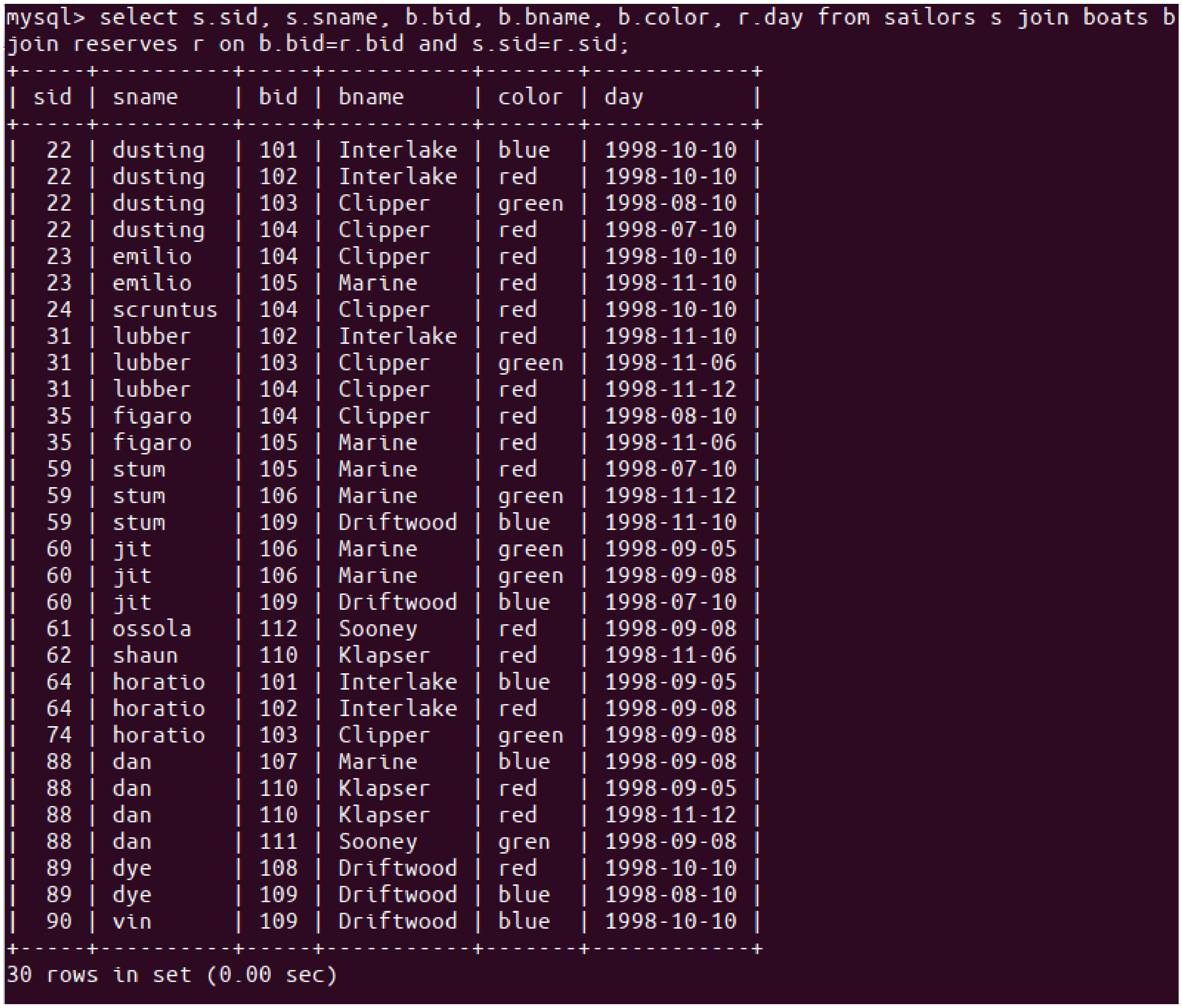
None having reservations to all 6 red boats



```
mysql> select s.sid, s.sname, r.bid from sailors s join reserves r on s.sid=r.sid where r
.bid = all(select b.bid from boats b where b.color='red');
Empty set (0.00 sec)
```

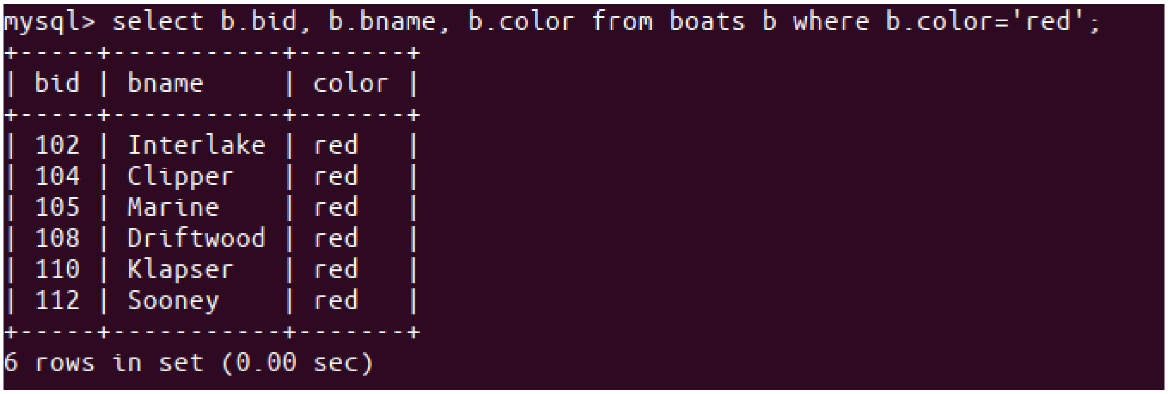
Check:

>> all reservations, with sailors and boats shown



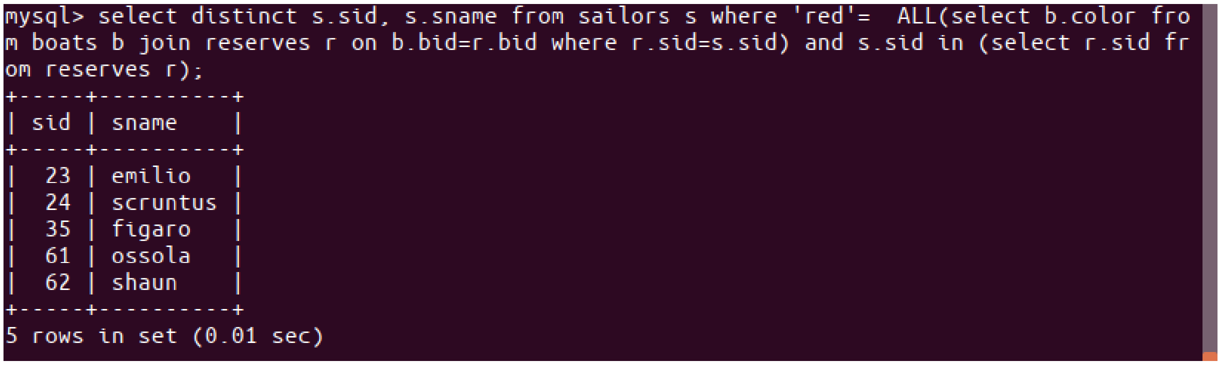
```
mysql> select s.sid, s.sname, b.bid, b.bname, b.color, r.day from sailors s join boats b
join reserves r on b.bid=r.bid and s.sid=r.sid;
+-----+----------+-----+-----------+-------+------------+
| sid | sname    | bid | bname     | color | day        |
+-----+----------+-----+-----------+-------+------------+
|  22 | dusting  | 101 | Interlake | blue  | 1998-10-10 |
|  22 | dusting  | 102 | Interlake | red   | 1998-10-10 |
|  22 | dusting  | 103 | Clipper   | green | 1998-08-10 |
|  22 | dusting  | 104 | Clipper   | red   | 1998-07-10 |
|  23 | emilio   | 104 | Clipper   | red   | 1998-10-10 |
|  23 | emilio   | 105 | Marine    | red   | 1998-11-10 |
|  24 | scruntus | 104 | Clipper   | red   | 1998-10-10 |
|  31 | lubber   | 102 | Interlake | red   | 1998-11-10 |
|  31 | lubber   | 103 | Clipper   | green | 1998-11-06 |
|  31 | lubber   | 104 | Clipper   | red   | 1998-11-12 |
|  35 | figaro   | 104 | Clipper   | red   | 1998-08-10 |
|  35 | figaro   | 105 | Marine    | red   | 1998-11-06 |
|  59 | stum     | 105 | Marine    | red   | 1998-07-10 |
|  59 | stum     | 106 | Marine    | green | 1998-11-12 |
|  59 | stum     | 109 | Driftwood | blue  | 1998-11-10 |
|  60 | jit      | 106 | Marine    | green | 1998-09-05 |
|  60 | jit      | 106 | Marine    | green | 1998-09-08 |
|  60 | jit      | 109 | Driftwood | blue  | 1998-07-10 |
|  61 | ossola   | 112 | Sooney    | red   | 1998-09-08 |
|  62 | shaun    | 110 | Klapser   | red   | 1998-11-06 |
|  64 | horatio  | 101 | Interlake | blue  | 1998-09-05 |
|  64 | horatio  | 102 | Interlake | red   | 1998-09-08 |
|  74 | horatio  | 103 | Clipper   | green | 1998-09-08 |
|  88 | dan      | 107 | Marine    | blue  | 1998-09-08 |
|  88 | dan      | 110 | Klapser   | red   | 1998-09-05 |
|  88 | dan      | 110 | Klapser   | red   | 1998-11-12 |
|  88 | dan      | 111 | Sooney    | gren  | 1998-09-08 |
|  89 | dye      | 108 | Driftwood | red   | 1998-10-10 |
|  89 | dye      | 109 | Driftwood | blue  | 1998-08-10 |
|  90 | vin      | 109 | Driftwood | blue  | 1998-10-10 |
+-----+----------+-----+-----------+-------+------------+
30 rows in set (0.00 sec)
```

>> all red boats



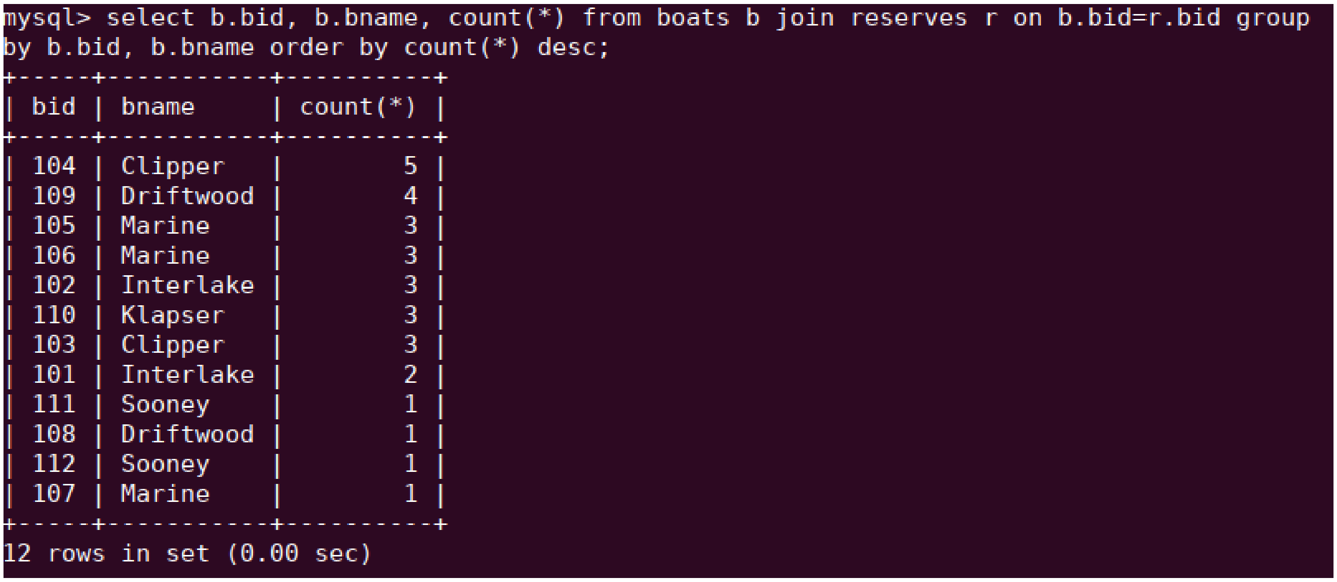
```
mysql> select b.bid, b.bname, b.color from boats b where b.color='red';
+-----+-----------+-------+
| bid | bname     | color |
+-----+-----------+-------+
| 102 | Interlake | red   |
| 104 | Clipper   | red   |
| 105 | Marine    | red   |
| 108 | Driftwood | red   |
| 110 | Klapser   | red   |
| 112 | Sooney    | red   |
+-----+-----------+-------+
6 rows in set (0.00 sec)
```

4.List those sailors who have reserved only red boats.

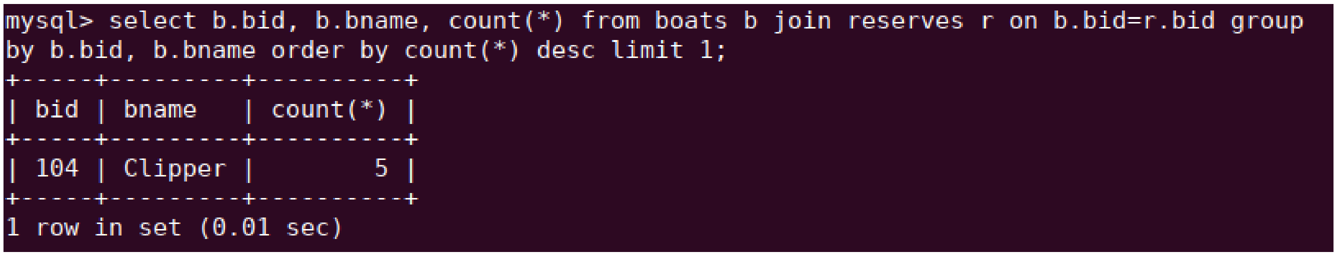


```
mysql> select distinct s.sid, s.sname from sailors s where 'red'=  ALL(select b.color fro
m boats b join reserves r on b.bid=r.bid where r.sid=s.sid) and s.sid in (select r.sid fr
om reserves r);
+-----+----------+
| sid | sname    |
+-----+----------+
|  23 | emilio   |
|  24 | scruntus |
|  35 | figaro   |
|  61 | ossola   |
|  62 | shaun    |
+-----+----------+
5 rows in set (0.01 sec)
```

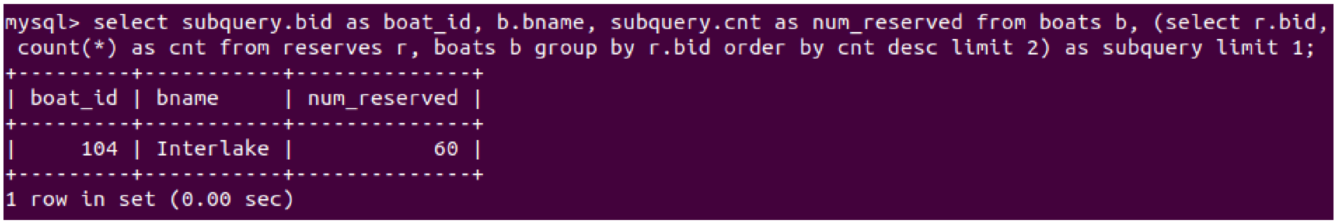
5.For which boat are there the most reservations?



```
mysql> select b.bid, b.bname, count(*) from boats b join reserves r on b.bid=r.bid group
by b.bid, b.bname order by count(*) desc;
+-----+-----------+----------+
| bid | bname     | count(*) |
+-----+-----------+----------+
| 104 | Clipper   |        5 |
| 109 | Driftwood |        4 |
| 105 | Marine    |        3 |
| 106 | Marine    |        3 |
| 102 | Interlake |        3 |
| 110 | Klapser   |        3 |
| 103 | Clipper   |        3 |
| 101 | Interlake |        2 |
| 111 | Sooney    |        1 |
| 108 | Driftwood |        1 |
| 112 | Sooney    |        1 |
| 107 | Marine    |        1 |
+-----+-----------+----------+
12 rows in set (0.00 sec)
```

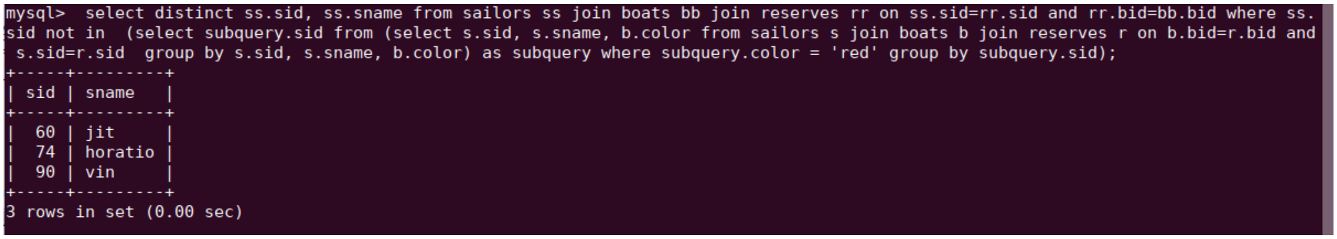


```
mysql> select b.bid, b.bname, count(*) from boats b join reserves r on b.bid=r.bid group
by b.bid, b.bname order by count(*) desc limit 1;
+-----+---------+----------+
| bid | bname   | count(*) |
+-----+---------+----------+
| 104 | Clipper |        5 |
+-----+---------+----------+
1 row in set (0.01 sec)
```



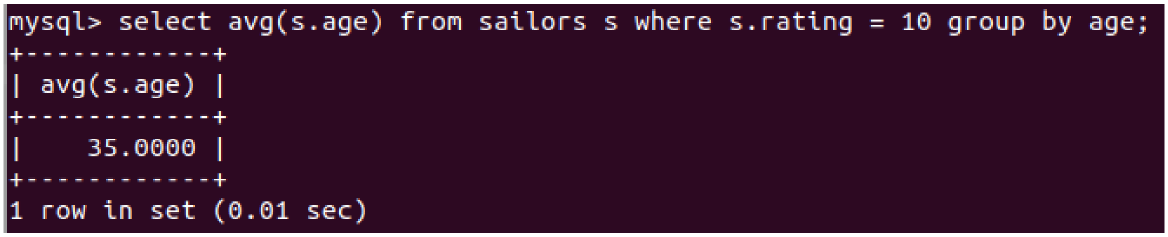
```
mysql> select subquery.bid as boat_id, b.bname, subquery.cnt as num_reserved from boats b, (select r.bid,
 count(*) as cnt from reserves r, boats b group by r.bid order by cnt desc limit 2) as subquery limit 1;
+---------+-----------+--------------+
| boat_id | bname     | num_reserved |
+---------+-----------+--------------+
|     104 | Interlake |           60 |
+---------+-----------+--------------+
1 row in set (0.00 sec)
```

6.Select all sailors who have never reserved a red boat.



```
mysql>  select distinct ss.sid, ss.sname from sailors ss join boats bb join reserves rr on ss.sid=rr.sid and rr.bid=bb.bid where ss.
sid not in  (select subquery.sid from (select s.sid, s.sname, b.color from sailors s join boats b join reserves r on b.bid=r.bid and
 s.sid=r.sid  group by s.sid, s.sname, b.color) as subquery where subquery.color = 'red' group by subquery.sid);
+-----+---------+
| sid | sname   |
+-----+---------+
|  60 | jit     |
|  74 | horatio |
|  90 | vin     |
+-----+---------+
3 rows in set (0.00 sec)
```

7.Find the average age of sailors with a rating of 10.



```
mysql> select avg(s.age) from sailors s where s.rating = 10 group by age;
+------------+
| avg(s.age) |
+------------+
|    35.0000 |
+------------+
1 row in set (0.01 sec)
```

Part 2

Represent the sailors and boats schema using an ORM - I prefer SQLAlchemy but students have the freedom to choose their own language and ORM. Show that it is fully functional by writing tests using the data from part 1 (writing the queries for the questions in Part 1) - I prefer pytest but students are have the freedom to choose their own testing framework.

Part 3

Students are hired as software consults for a small business boat rental that is experiencing a heavy influx of tourism in its area. This increase is hindering operations of the mom/pop shop that uses paper/pen for most tasks. Students should explore “inefficient processes” the business may have and propose ideas for improvements - in the form of a brief write-up. Expand the codebase from part 2 to include a few jobs, reports, integrity checks, and/or other processes that would be beneficial to the business. Use the data provided in part 1 and expand it to conduct tests and show functionality. Examples include, but are not limited to:

Bi weekly payment query
Monthly accounting manager
Daily inventory control
Inventory repair tracker (and cost analysis)

“Extra Credit”

Use a web code review platform so I can write comments for review. I should get a link to a review platform and be able to easily write comments - perhaps after linking with github or creating a free account. Ones that I have found good are codacy.com and reviewable.io. This will help prepare you for the final project and is highly recommended.