## Part 1

```
1)
select b.bname as 'Boat name', s.sname as 'Sailor name', max(c)
as 'Number of reservations'
from (
        select r.sid, r.bid, count(sid) as c
        from reserves as r
        group by r.sid, r.bid
        order by r.bid
        ) agg
inner join sailors as s
on agg.sid = s.sid
inner join boats as b
on agg.bid = b.bid
group by agg.bid;
```

```
Sailor name
                            # of
Boat name
                                  reservations
Interlake
             horatio
             horatio
             horatio
             dusting
              igaro
             stum
             dan
    twood
             dye
  iftwood
             vin
  apser
             dan
             ossola
 rows in set (0.00 sec)
```

```
2)
select b.bid as 'Boat ID', b.bname as 'Boat name', count(r.bid)
as '# of reservations'
from reserves as r
inner join boats as b
on r.bid = b.bid
group by r.bid
order by r.bid;
```

```
| Boat ID | Boat name | # of reservations |
| 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 (0.00 sec)
```

```
3)
select red.sid as 'Sailor Id', s.sname as 'Sailor name',
count(red.bid)
from (select r.sid, r.bid
     from reserves as r
     inner join boats as b
     on r.bid = b.bid
     where b.color = 'red'
     group by r.sid, r.bid
     ) red
inner join sailors as s
on red.sid = s.sid
group by red.sid
having count(red.bid) = (select count(b.bid)
                         from boats as b
                         where b.color = 'red'
order by red.sid;
```

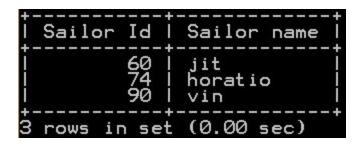
## Empty set (0.00 sec)

(After temporarily inserting a few records)

```
| Sailor Id | Sailor name |
| 22 | dusting |
| row in set (0.00 sec)
```

```
4)
select distinct s.sid as 'Sailor Id', s.sname as 'Sailor name'
from sailors as s
inner join reserves as r
on s.sid = r.sid
where s.sid NOT IN (select r.sid
                   from reserves as r
                   inner join boats as b
                   on r.bid = b.bid
                   where b.color <> 'red'
order by s.sid;
  Sailor Id | Sailor name
                 emilio
                 scruntus
  rows in set (0.00 sec)
5)
select b.bid as 'Boat ID', b.bname as 'Boat name', count(r.bid)
as '# of reservations'
from reserves as r
inner join boats as b
on r.bid = b.bid
group by r.bid
order by count(r.bid) desc
limit 1;
  Boat ID | Boat name
              Clipper
  row in set (0.00 sec)
```

order by s.sid;



7)
select avg(s.age) as 'Average age'
from sailors as s
where rating = 10;

## Part 3

Improvements to current database design:

- 1. Both 'sid' and 'bid' in Reserves must be foreign keys linked to Sailors and Boats, respectively.
- 2. Instead of the age of the sailor, which must be updated each year, their date of birth must be recorded. The age can be obtained by subtracting their date of birth with the current date.

- 3. There is no mechanism to compute or update a sailor's rating. A 'rating' field should be added to reserves that describes how well the sailor cared for the boat. The 'rating' field in Sailors should be changed to 'average rating' that is updated each time that sailor rents a boat.
- 4. Sailors can be asked to provide additional information like their government ID and contact number.
- 5. In order to help with maintenance a 'condition' field should be added to Reserves that describes the condition a boat was returned in.
- 6. In order to improve safety '# of rents', 'last maintenance' and 'year of manufacture' fields can be added to Boats.
- 7. A 'rent' field can be added to Boats to keep track of income.