

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;
```

Boat name	Sailor name	# of reservations
Interlake	horatio	1
Interlake	horatio	1
Clipper	horatio	1
Clipper	dusting	1
Marine	figaro	1
Marine	stum	2
Marine	dan	1
Driftwood	dye	1
Driftwood	vin	1
Klapser	dan	2
Sooney	dan	1
Sooney	ossola	1

12 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

1 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
23	emilio
24	scruntus
35	figaro
61	ossola
62	shaun

5 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	# of reservations
104	Clipper	5

1 row in set (0.00 sec)

```

6)
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 |
+-----+-----+
|          60 | jit         |
|          74 | horatio     |
|          90 | vin         |
+-----+-----+
3 rows in set (0.00 sec)

```

```

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

```

```

+-----+-----+
| Average age |
+-----+-----+
|      35.0000 |
+-----+-----+
1 row in set (0.00 sec)

```

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.