R1

sid	bid	day
22	101	10/10/96
58	103	11/12/96

B1

bid	bname	color
101	tiger	red
103	lion	green
105	hero	blue

S1

sid	sname	rating	age
22	dustin	7	45.0
31	lubber	8	55.5
58	rusty	10	35.0

S2

sid	sname	rating	age
28	yuppy	9	35.0
31	lubber	8	55.5
44	guppy	5	35.0
58	rusty	10	35.0

1.How to find names of sailors who have reserved boat #103 and reserved only one time?

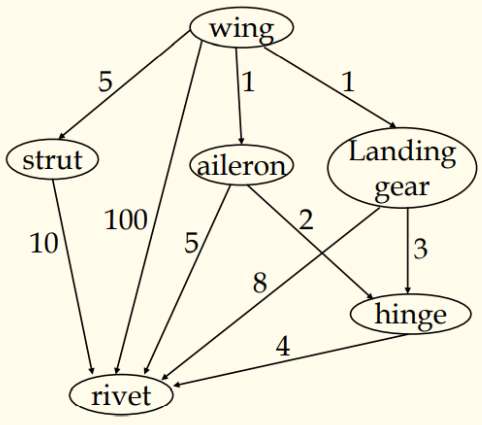
2.How to find name of the oldest sailor who reserved "tiger" boat?

3.How to find the name of boats which have been reserved more than two times. (Note: you should use operator: COUNT)

- A classical "parts searching problem"

Components

Part	Subpart	QTY
wing	strut	5
wing	aileron	1
wing	landing gear	1
wing	rivet	100
strut	rivet	10
aileron	hinge	2
aileron	rivet	5
landing gear	hinge	3
landing gear	rivet	8
hinge	rivet	4



Directed acyclic graph, which assures the recursion can be stopped

4. Find all subparts and their total quantity needed to assemble a wing.

5. Find the number of rivets used in each subpart (except rivets).

1.How to find names of sailors who have reserved boat #103 and reserved only one time?

```
SELECT S.sname
FROM Sailors AS S
WHERE exists
(Select *
from Reserves R1
where R1.bid =103 AND R1.sid = S.sid AND
NOT exists
(select *
from Reserves R2
where R2.bid = 103 AND R2.sid = R1.sid AND R1.day <> R2.day) );
```

2.How to find name of the oldest sailor who reserved “tiger” boat?

```
SELECT sname
FROM (SELECT B.bid, max(S.age) AS m FROM Sailors AS S, Reserves AS
R, Boats AS B
WHERE S.sid = R.sid
AND R.bid = B.bid
AND B.bname = "Tiger"
GROUP BY B.bid) AS A, Sailors AS S2, Reserves AS R2
WHERE A.bid = R2.bid and S2.age = A.m and S2.sid = R2.sid;
```

3.How to find the name of boats which have been reserved more than two times. (Note: you should use operator: COUNT)

```
SELECT bname
FROM Boats
WHERE bid in
(select bid
from Reserves
group by bid
having count(*)>2);
```

4. Find all subparts and their total quantity needed to assemble a wing.

```
WITH wingpart (subpart, qty) AS
((SELECT subpart, qty
FROM components
WHERE part=‘wing’)
UNION ALL
(SELECT c.subpart, w.qty*c.qty
FROM wingpart w, components c
WHERE w.subpart=c.part))
SELECT subpart, sum(qty) AS qty
FROM wingpart
Group BY subpart ;
```

5. Find the number of rivets used in each part (except rivets).

```
WITH wingpart (part, qty) AS
((SELECT part, qty
FROM components
WHERE subpart=‘rivet’)
UNION ALL
(SELECT c.part, w.qty*c.qty
FROM wingpart w, components c
WHERE w.part=c.subpart))
SELECT part, sum(qty) AS qty
FROM wingpart
Group BY part ;
```