1. Find all employees who work under same manager as jones manager. And earn sal > Millers salary

```
Select *
From emp
Where mgr=(select mgr
                From emp
                Where ename='JONES')
                and sal > (select sal
                        From emp
                        Where ename='Miller')
```

Empno	Ename	Sal	mgr	deptno
1000	Anil	20000	2000	10
2000	Revati	30000	3000	20
3000	Rajesh	25000	2000	10
4000	Ashu	25000	3000	10
5000	Rajan	10000	2000	20

Empno	Ename	Sal	mgr	deptno
1000	Anil	20000	2000	10
2000	Revati	30000	3000	20
3000	Rajesh	25000	2000	10
4000	Ashu	25000	3000	10
5000	Rajan	10000	2000	20

1. Display all employees with sal = maximum sal of all employees who are working under same manager

```
Select *
From emp e
Where sal =(select max(sal) from emp d where d.mgr=e.mgr)
```

2. display all employees with sal =min salary in the department in which he/she works

```
select *
from emp e
where  sal = (select min(sal) from emp d where
d.deptno=e.deptno)
```

2. Display all employees whose sal > avg salary of the dept in which employee works

```
Select *

From emp e

Where sal >(Select avg(sal) from emp d where d.deptno=e.deptno)
```

Exists and not exists

Exists is an operator

- returns true if child query returns 1 or more rows.
- returns false if child query returns no rows.

Not Exists is an operator

- returns false if child query returns 1 or more rows.
- returns true if child query returns no rows.

Empno	Ename	Sal	mgr	deptno
1000	Anil	20000	2000	10
2000	Revati	30000	3000	20
3000	Rajesh	25000	2000	10
4000	Ashu	25000	3000	10
5000	Rajan	10000	2000	

Dept

deptno	dname	location
10	HR	Pune
20	Purchase	Chennai
30	Accounts	Mumbai

Select *

From dept d

Where not exists (select * from emp e where e.deptno=d.deptno)

1. find all employees under whom some employees are working

```
select *
 -> from emp e
 -> where exists(select *
 -> from emp m
 -> where m.mgr=e.empno);
```

2. find all customers who have not bought any vehicle.

```
select * from customer c
   -> where not exists(select * from vehicle v where
v.custid=c.cid)
   -> ;
```

3. Find all rooms which are available.

```
select *
   -> from room r
```

```
-> where not exists(select *
-> from course c
-> where c.rid=r.rid);
```

Joins in mysql

- Use joins only if you need data in the output from more than one table
- Joins are very inefficient in terms of time and memory usage, hence avoid joins as much as possible

Joins are of 2 type

1. Inner join

   Will display all the rows which matches the given join condition
   In inner join if n tables are there then use n-1 join conditions

   a. Self join
      i. When you need to combine one table with itself then it is self join
   b. Equi join
      i. If the join condition uses = operator, then it is called as equi join
   c. Non equi join
      i. If the join condition uses any other operator, other than =, then it is called as non equi join
   d.

2. Outer join

   - Will display all the rows which matches the given join condition and also the non-matching rows
   - In outer join if n tables are there then use n-1 join conditions

   a. Left outer join
      If you want matching and non-matching rows from left side table then use left outer join

   b. Right outer join

      If you want matching and non-matching rows from right side table then use right outer join

   c. Full outer join

      If you want matching and non-matching rows from both side table then use full outer join

Empno	Ename	Sal	mgr	deptno
1000	Anil	20000	2000	10

2000	Revati	30000	3000	20
3000	Rajesh	25000	2000	10
4000	Ashu	25000	3000	10
5000	Rajan	10000	2000	20

deptno	dname	location
10	HR	Pune
20	Purchase	Chennai
30	Accounts	Mumbai

Cross join

Select *

From emp , dept

Empno	Ename	Sal	mgr	deptno	deptno	dname	dlocation
1000	Anil	20000	2000	10	10	HR	Pune
1000	Anil	20000	2000	10	20	Purchase	Chennai
1000	Anil	20000	2000	10	30	Accounts	Mumbai
2000	Revati	30000	3000	20	10	HR	Pune
2000	Revati	30000	3000	20	20	Purchase	Chennai
2000	Revati	30000	3000	20	30	Accounts	Mumbai
3000	Rajesh	25000	2000	10	10	HR	Pune
3000	Rajesh	25000	2000	10	20	Purchase	Chennai

3000	Rajesh	25000	2000	10	30	Accounts	Mumbai
4000	Ashu	25000	3000	10	10	HR	Pune
4000	Ashu	25000	3000	10	20	Purchase	Chennai
4000	Ashu	25000	3000	10	30	Accounts	Mumbai
5000	Rajan	10000	2000	20	10	HR	Pune
5000	Rajan	10000	2000	20	20	Purchase	Chennai
5000	Rajan	10000	2000	20	30	Accounts	Mumbai

Inner join------equi join
Select *
From emp,dept
Where emp.deptno=dept.deptno;

Empno	Ename	Sal	mgr	deptno	deptno	dname	dlocation
1000	Anil	20000	2000	10	10	HR	Pune
2000	Revati	30000	3000	20	20	Purchase	Chennai
3000	Rajesh	25000	2000	10	10	HR	Pune
4000	Ashu	25000	3000	10	10	HR	Pune
5000	Rajan	10000	2000	20	20	Purchase	Chennai

1. Display all employee name along with their manager names

```
select
e.empno,e.ename,e.mgr,m.empno
mgrno,m.ename mgrname
from emp e,emp m
where e.mgr=m.empno
```

New syntax

select e.empno,e.ename,e.mgr,m.empno mgrno,m.ename mgrname

-> from emp e inner join emp m on e.mgr=m.empno;

2. To display all employee's empno,ename,deptno,dname
   If the employee is working as CLERK
   Select empno,ename,dept.deptno,dname
   From emp,dept
   Where emp.deptno=dept.deptno and emp.job='CLERK';

   New syntax
   Select empno,ename,d.deptno,dname
   From emp e inner join dept d on e.deptno=d.deptno
   Where e.job='CLERK';

3. List all the courses course number, name and room name if capacity of the course is > 100 or room is at 1st floor
4. To display all courses for which rooms are assigned, also display all rooms which are available and also display courses for which no rooms are assigned

select cid,cname,r.rid,r.rname

-> from course c left join room r

-> on c.rid=r.rid

-> union

-> select cid,cname,r.rid,r.rname

-> from course c right join room r

-> on c.rid=r.rid

5. To display all rooms which are not assigned for any couse and also display all courses for which no rooms are assigned.

select cid,cname,r.rid,r.rname

-> from course c left join room r

-> on c.rid=r.rid

-> where r.rname is null

-> union

-> select cid,cname,r.rid,r.rname

-> from course c right join room r

-> on c.rid=r.rid

```
   -> where c.cname is null;
+------+-------+------+-------+
| cid  | cname | rid  | rname |
+------+-------+------+-------+
|  101 | DBDA  | NULL | NULL  |
|  102 | DTISS | NULL | NULL  |
| NULL | NULL  |    2 | Mogra |
| NULL | NULL  |    3 | Rose  |
+------+-------+------+-------+
```

Server(serverid, ram,processor,adminid,licensekey)
Admin(adminid,name,mobile,email)
Software(sname,licensekey,amtpaid)

1. Display serverid, adminname, sofwarename
   Also display all admins which are not assigned to any server
   Also display softwares which are not installed on any server.

   Select serverid,adminid,null
   From server s right join admin a on s.adminid=a.adminid
   union
   Select serverid,null,sname
   From server sr right join software sf on sr.licensekey=sf.licencekey

   This full join is performance inefficient

   Select serverid,adminid,sname
   From server s right join admin a on s.adminid=a.adminid
   Right join software sf on s.licensekey=sf.licencekey;
   union
   Select serverid,adminid,sname
   From server s right join admin a on s.adminid=a.adminid
   Left join software sf on s.licensekey=sf.licencekey;

2. Display serverid, admin name ,mobile and email for all servers. Also display all admin names who are not assigned for any server
   Select s.serverid,a.name,a.mobile,a.email
   From admin a left join server s
   On a.adminid=s.adminid;

3. Display serverid, admin name ,mobile and email for all servers.

```
Select serverid, name, mobile, email
From server s inner join admin a on s.adminid=a.adminid;
```

4. Find all software which are installed on some server.

```
Select *
From software sf
Where exists (select *
                        From server sr
                         Where sr.licensekey=sf.licensekey)
```

5. Display all employees empno, ename, department name and grade

```
 select empno,ename,dname,grade
   -> from emp e inner join dept d on e.deptno=d.deptno
   -> inner join salgrade s on e.sal between s.losal and
s.hisal;
```

Old syntax

```
select empno,ename,dname,grade
   -> from emp e,dept d,salgrade s
   -> where e.deptno=d.deptno and e.sal between s.losal
and s.hisal;
```