SQL Problem Sheet 1

1. Access the Data Dictionary and display the names of all of the tables which you own.

2. Describe the Structure of the EMP Table.
   It contains 8 columes of diff char val33ues and some intergers with 14 rows/tuples

3. List all of the information in all of the fields in the EMP table.
   ```
   Select * from EMP
   ```

4. List the name and number of all the departments in the DEPT table.
   ```
   SELECT DNAME, DEPTNO FROM dept;
   ```

5. Add a record containing a new department number (50), name (PENSIONS) and location (CHICAGO) into the DEPT table.
   ```
   Insert into dept values (50,'PENSIONS','CHICAGO');
   ```

6. Add a record containing a new department number (60) and department name (CONTRACTS) into the DEPT table.
   ```
   Insert into dept values (60,'CONTRACTS','');
   ```

7. List all of the information in the EMP table for those employees who are in department number 30.
   ```
   SELECT * FROM emp where DEPTNO = 30
   ```

8. Retrieve all of the information in the EMP table from those employees who are MANAGERs and who earn more than £2500 per year.
   ```
   SELECT * FROM emp where MGR is NOT NULL and SAL > 2500
   ```

9. List the name, job and department number of all of those employees who are managers and who are not in department number 30.
   Hint : !=
   ```
   SELECT ENAME, JOB, DEPTNO FROM emp WHERE MGR is not NULL and DEPTNO != 30
   ```

10. List the name and salary of all the employees in the EMP table who earn between £1200 and £1400
    Hint : BETWEEN A and B
    ```
    SELECT ENAME, SAL FROM emp WHERE SAL BETWEEN 1200 and 1400
    ```

11. List all of the information in DEPT about those departments whose number is either 10 or 30.
    Hint : IN (10,30)
    ```
    SELECT * FROM dept WHERE DEPTNO IN(10,30)
    ```

12. List the names of all employees who have R as the third letter in their name.
    Hint : Like '_ _ R %'
    ```
    SELECT ENAME from emp WHERE ENAME like ('__r%')
    ```

SQL Problem Sheet 2

1. List the salaries, jobs, and names of the employees who are in department 30. Display the rows in salary order.
   ```
   SELECT SAL, JOB, ENAME from emp WHERE DEPTNO = 30 ORDER BY SAL
   ```

2. List the job, salary and employee name of all those employees in the emp table. Display the rows in job order and then in descending salary order.
   Hint : Order by
   Hint : Desc
   ```
   SELECT JOB, SAL, ENAME from emp ORDER BY JOB, SAL DESC
   ```

3. Get a listing of the distinct jobs in the emp table.
   Hint : Distinct
   ```
   select DISTINCT JOB FROM emp
   ```

4. Get the employee name and department number of all employees called ADAMS.
   ```
   SELECT ENAME, DEPTNO from emp where ENAME = 'Adams'
   ```

5. Get the location of department number 20.
   ```
   SELECT LOC FROM dept WHERE DEPTNO = 20
   ```

6. Get the employee name and department location of the employee called ADAMS.
   Hint : emp.deptno = dept.deptno
   ```
   SELECT emp.ENAME, dept.LOC
   FROM emp, dept WHERE emp.DEPTNO = dept.DEPTNO AND ENAME = 'ADAMS'
   ```

7. Get the employee name and total salary of all employees who are salesmen.
   Hint : Sal + Comm
   ```
   SELECT ENAME, SAL+ISNULL(COMM,0) FROM emp WHERE JOB = 'SALESMAN'
   If you need to add two col's where null is present in one use the following to change it to 0:
   SELECT ENAME, SAL+IFNULL(COMM,0) FROM emp
   ```

8. Get the name, job and hiredate of all employees in department 20 and display the hiredate in the form : DY DD MON YYYY.
   Hint : to_char(hiredate,'....')hiredate - where the format you require follows the first hiredate.
   Pick a MySQL date formate construct!! Note hiredate is a string so you need to convert this to a date format. STR_TO_DATE needs to know what format the date is in text and include any special char like (-) from the string!!!
   ```
   SELECT ENAME, JOB, date_format(STR_TO_DATE(HIREDATE,'%d-%b-%y'), '%a      %D      %b %Y') FROM emp WHERE DEPTNO = 20
   ```
9. Get the employee number, employee name, job, department number and department location of all employees..
   ```
   SELECT emp.EMPNO, emp.ENAME, emp.job, emp.DEPTNO, dept.LOC FROM emp, dept where emp.DEPTNO = dept.DEPTNO
   ```
   Did you get an error?. What caused the error?

10. Get the maximum salary paid in each department.
    Hint : Use group by and max(sal)
    ```
    SELECT max(sal) , dname from emp, dept WHERE emp.DEPTNO = dept.DEPTNO group BY dname
    ```

SQL Problem Sheet 3

1. Get the number of employees in each job in each department in the company. Also list the department they are in, the job title, the sum of the salaries of each employee type in each department, the average salary of each employee type in each department, and show the information grouped by department name and job.
   Hint : Use sum(sal), count(*), avg(sal) and group by.
   Note : Count(*) counts the number of rows in each group as defined by the 'group by' command.
   Note : Sum and Avg work the groups of rows as defined by the 'group by' command.
   ```
   SELECT emp.JOB, dept.DNAME, sum(emp.SAL), avg(emp.SAL), count(*) FROM emp,dept whe
   re emp.DEPTNO = dept.DEPTNO GROUP BY DNAME, JOB
   ```

2. Show the same information as query 1 does but only show the groups having at least two employees.
   Hint : Having count(*)
   ```
   SELECT emp.JOB, dept.DNAME, sum(emp.SAL), avg(emp.SAL), count(*) FROM emp,dept WHE
   RE emp.DEPTNO = dept.DEPTNO GROUP BY DNAME, JOB HAVING count(*)>1
   ```

3. List the names and jobs for all of the employees having the same job as JONES.
   Hint : Use a subquery.
   ```
   SELECT ename, job FROM emp where job =/(in) (SELECT job FROM emp where ENAME = "JO
   NES")
   ```

4. List the name and salary of each employee who earns more than the average of all of the employees salaries.
   Hint : Use a subquery and the avg function.
   ```
   SELECT ename, sal from emp where sal > (SELECT avg(sal) from emp)
   ```

5. Update the emp table to give all clerk's a £100 increase in salary.
   ```
   update emp set sal = sal+100 where job = "CLERK"
   ```

6. Using a single command, create a table called promotion with fields called ename, job, salary, and comm, then copy the corresponding data from the fields in the emp table into the promotion table for all those employee whose commission is more than one quarter of their salary.
   Hint : See handout on Miscellaneous SQL Commands.
   ```
   CREATE TABLE promotion AS (SELECT ename,job,sal,comm FROM emp where comm > .25 * s
   al)
   ```

7. Delete all records in the dept table which have a department number of 50 and then view the contents of the table to ensure that the operation has been completed correctly.
   ```
   delete from dept where DEPTNO = 50
   ```

8. Create a view called emp10 with the empno, ename, and job data for department 10. When you create the view give it the check option.
   ```
   create view emp10 AS (select EMPNO,ename,job from emp where DEPTNO = 10 with check
   option;)
   ```

9. Insert the following information into the EMP10 view
   20 BAILEY MANAGER
   Note : Can you see the reason for the problem ? There is no constrant setup where deptno value.

10. List all of the data in view emp10.
    ```
    select * from emp10
    ```

SQL Problem Sheet 4

1. Create a table called proj with the following fields :
   projno numeric 3 long not null
   pname character 5 long
   budget numeric 7 long with 2 decimal places
```
create table proj ( projno int(3) not null, pname char(5), budget decimal(7,2))
```

2. Insert into proj the following data
   101 ALPHA 96000
   102 BETA 82000
   103 GAMMA 15000
```
insert into proj values (101,'ALPHA',96000)# 1 row affected.
insert into proj values (102,'BETA',82000)# 1 row affected.
insert into proj values (103,'GAMMA',15000)# 1 row affected.
```

3. View the data in proj.
```
SELECT * FROM `proj`
```

4. Give the emp table a column called projno and describe the table. The proj field should have the same type and size as in the proj table.
```
ALTER TABLE emp ADD projno int(3)
```

5. Assign everyone in department 20 and every salesman to project 101 and view the emp table.
```
update emp set projno = 101 where deptno = 20 or job = 'SALESMAN'
```

6. Assign everyone else to project 102 and view the emp table.
```
update emp set projno = 102 where projno is null
```

7. List the employee numbers, jobs, department numbers and project name's.
```
select emp.EMPNO, emp.job, emp.DEPTNO, proj.pname from emp,proj where emp.projno = p
roj.projno
```

8. Alter the width of the project budget field to 8 places including 2 decimal places.
```
ALTER TABLE proj modify budget decimal(8,2)
```

9. Change the budget for project 103 to 105000
```
update proj set budget = 105000 where projno = 103
```

10. View the employee, number, name, department number, department location, project name and project budget
```
Select emp.empno, emp.ename, emp.deptno, dept.loc, proj.pname,proj.budget from emp,d
ept,proj where emp.deptno = dept.deptno and emp.projno = proj.projno
```

SQL Problem Sheet 5

1. Create a view called PERSONNEL which contains employee names, jobs and project names.
```
Create view PERSONNEL as select emp.ename, emp.job, proj.pname from emp,proj where e
mp.projno = proj.projno
```

2. Using the PERSONNEL view, select the employee names, jobs and project names for all employees who are managers.
```
select ename,job,pname from personnel where job = 'manager'
```

3. Delete the PERSONNEL view
```
drop view personnel
```

4. Describe the contents of the user_tables data dictionary table. N/A

5. Using the user_tables table, display a list of the tables which you own. N/A

6. Give another user select rights on your emp table and have them try a select operation on it.N/A

7. Create a new view called emps with empno, ename, job, mgr, hiredate and deptno.
```
CREATE view emps as select EMPNO,ENAME,job,mgr,HIREDATE,DEPTNO from emp
```

8. Update the emp table, move the employee with the highest commission to department number 40, make him/her a manager and give him/her a pay raise of £1000.
Hint : Use a subquery and >= all as with the ALL and ANY slide on the SQL Commands Handout.
```
Update emp set deptno = 40, job = 'MANAGER', sal = sal + 1000 where comm >= ANY (s
elect max(comm) from (select comm from emp) AS y)
```

9. Get the employee name, department name and project name of all employees
```
SELECT emp.ENAME, dept.DNAME, proj.pname from emp, dept, proj where emp.DEPTNO = d
ept.DEPTNO and emp.projno = proj.projno.
```

10. Get the employee number, employee name, department number, department name, department location, project number, project name and project budget of all employees called ‘ADAMS’.
```
SELECT emp.EMPNO, emp.ENAME, emp.DEPTNO, dept.DNAME, dept.LOC, emp.projno, proj.pnam
e, proj.budget from emp, dept, proj where emp.DEPTNO = dept.DEPTNO and emp.projno =
proj.projno and emp.ENAME = 'ADAMS';
```

SQL Problem Sheet 6 (a) – SQL Integrity

(Create a table called emp2 with contents of emp)

Do Q's below on emp2

```
create TABLE EMP2 AS (SELECT * FROM emp)
```

1. Create a Primary Key on empno in the emp table. Call the Constraint pk_emp.

```
ALTER TABLE emp2 ADD CONSTRAINT pk_emp2 PRIMARY KEY (EMPNO)
```

2. Insert a record into emp with the following values:

   empno: 8000 ename: JONES job: CLERK mgr: 0
   hiredate: 12-DEC-99 sal: 1250 comm.: 0 deptno: 10
   projno: 101

```
INSERT into emp2 values (8000,'JONES','CLERK',0,'12-Dec-99',1250,0,10,101)
```

3. Insert a record into emp with the following values:

   empno: 8000 ename: SMITH job: MANAGER hiredate: 10-JAN-99 mgr: 1890
   sal: 1950 comm.: 0 deptno: 20 projno: 102

   What happens? Why did this happen.?

```
INSERT into emp2 values (8000,'SMITH','MANAGER',1890,'10-JAN-99',1950,0,20,102);
Error Duplicate entry for Primary key!!! "Empno"
```

4. Create a Primary Key on deptno in the dept table. Call the Constraint pk_dept.

```
ALTER TABLE `dept` DROP PRIMARY KEY, ADD constraint pk_dept PRIMARY KEY( `DEPTNO`)
```

5. Create a Primary Key on projno in the proj table. Call the Constraint pk_proj.

```
ALTER TABLE proj add constraint pk_proj primary key(projno);
```

6. Create a Foreign Key on deptno in the emp table. It should reference the primary key in the dept table Call the Constraint fk_emp_dept.

```
ALTER TABLE emp2 add constraint fk_emp2_dept foreign key (DEPTNO) references dept(DE
PTNO)
```

7. Create a Foreign Key on projno in the emp table. It should reference the primary key in the proj table Call the Constraint fk_emp_proj.

```
ALTER TABLE emp2 add constraint fk_emp2_proj foreign key (projno) references proj (p
rojno)
```

8. Insert a record into emp with the following values:

   empno: 8010 ename: WALKER job: CLERK hiredate: 12-FEB-99 mgr: 0
   sal: 2250 comm.: 0 deptno: 10 projno: 102

```
INSERT INTO emp2 values (8010,'WALKER','CLERK',0,'12-FEB-99',2250,0,10,102)
```

9. Insert a record into emp with the following values:

   empno: 8012 ename: BAKER job: SALESMAN hiredate: 15-FEB-99 mgr: 0
   sal: 2050 comm.: 590 deptno: 90 projno: 102

   What happens? Why did this happen.?

```
INSERT INTO emp2 VALUES (8012,'BAKER','SALESMAN',0,'15-FEB-99',2050,590,90,102);
```

Falied due to foreign key contraint ref to dept. 90 does not exist in dept

10. Insert a record into dept with the following values:

    deptno: 90 dname: RandD loc: GALWAY

```
INSERT INTO dept VALUES (90,'RandD','GALWAY')
```

SQL Problem Sheet 6 (b) – SQL Integrity

(Use emp2 table)

1. Repeat action 9
   What happens? Why did this happen.?
   ```
   INSERT INTO emp2 VALUES (8012,'BAKER','SALESMAN',0,'15-FEB-99',2050,590,90,102);
   ```
   Now that the PK 90 is present in dept it can be entered as a fk in emp2

2. Insert a record into emp with the following values:
   empno: 8115 ename: FERRY job: ANALYST hiredate: 19-MAR-99 mgr: 0
   sal: 1950 comm.: 0 deptno: 20 projno: 104
   What happens? Why did this happen.?
   ```
   INSERT INTO emp2 values (8115,'FERRY','ANALYST',0,'19-MAR-99',1950,0,20,104);
   ```
   The PK 104 is not present in proj so it cannot be referenced as a fk in emp2

3. Insert a record into dept with the following values:
   projno: 104 pname: HEAT budget: 10000
   ```
   INSERT INTO proj values (104,'HEAT',10000)
   ```

4. Repeat action 11
   What happens? Why did this happen?
   Now that the PK 104 is present in proj it can be entered as a fk in emp2

5. Delete department number 90 in dept
   What happens? Why did this happen.? What do you have to do to be able to delete department number 90?
   ```
   DELETE FROM dept WHERE DEPTNO = 90;
   ```
   It cannot be removed as deptno is referenced in emp2. First the reference has to be deleted..ie the row/s in emp2 that have deptno 90 or the fk constraint in emp2 altogether!!

6. Access the data dictionary and retrieve your list of integrity constraints.N/A
   Hint: user_constraints table, don't forget to describe it first, its got lost of fields.

7. Drop the foreign-key integrity constraint between emp and proj.
   ```
   ALTER TABLE emp2 DROP FOREIGN KEY fk_emp2_proj
   ```

9. Create a constraint on sal in the emp table to ensure that the minimum salary must be over £500. Call the Constraint emp_sal_check.
   ```
   ALTER TABLE emp2 ADD CONSTRAINT SAL CHECK (Field > 500)
   ALTER TABLE emp2 add constraint sal_val check (sal>500)
   ```

9. Insert a record into emp with the following values:
   empno: 8502 ename: HEART job: ANALYST hiredate: 08-MAY-99 mgr: 0
   sal: 300 comm.: 0 deptno: 10 projno: 102
   What happens? Why did this happen.?
   ```
   INSERT INTO emp2 values (8502,'HEART','ANALYST',0,'08-MAY-99',300,0,10,102)
   ```