SQL Commands

SQL was originally devised in 1970s as a language for relational databases and has since become the industry standard language for relational systems. With SQL, a database user can create and delete data held in a relation, enforce the relational integrity rules, manipulate data and can generate different queries from it. Though it is relationally a complete language, it is not a computationally complete language like C.

There are three basic types of SQL command.

1. **Data Definition Language (DDL) – These commands define the contents of a relational database in terms of tables and views. They are used to create objects in a Database, such as Tables, Views and Index. The commands under DDL are CREATE, ALTER, DROP etc.**

2. **Data Manipulation Language (DML) – These commands are used to insert, retrieve, update and delete data held in tables and views. They include simple facilities for processing the data held in tables and views. The commands under DML are SELECT, INSERT, UPDATE, DELETE etc.**

3. **Data Control Language (DCL) – These are used for controlling access to tables and views. A portion of SQL that allows definition of a security mechanism, protecting data from unauthorized access. Commands under DCL are GRANT, REVOKE etc.**

Tables: Tables are a collection of related rows and Columns, describing some business processing entity such as DEPARTMENTS, EMPLOYEES etc.

Views: **Views are a logical subset of a table. To a user, they look like a table, but they are only images or description of a table and do not store any physical data.**

Index: **Indexes are pointers to specific rows in a table. They are logically ordered by the value of a key.**

Q1. Create a table DEPARTMENT with attributes DEPT_CODE, DEPT_NAME and FLOOR.

DEPARTMENT (D_code#, D_name, Floor),

where the Dept_name should be in the list (Accounts, Research, Sales, Operations).

```
SQL> create table DEPARTMENT
  2  (
  3  d_code number(2) primary key,
  4  d_name varchar2(10) not null
  5  unique check(d_name in ('Accounts','Research','Sales','Operations')),
  6  floor number(1) not null
  7  );

Table created.

SQL> desc department
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------
 D_CODE                                    NOT NULL NUMBER(2)
 D_NAME                                    NOT NULL VARCHAR2(10)
 FLOOR                                     NOT NULL NUMBER(1)

SQL>
```

Q2. Create a table EMPLOYEE as follows:
EMPLOYEE (E_code#, E_name, Desig, Basic, D_code^)

```
SQL> create table employee
  2  (
  3  e_code number(3) primary key,
  4  e_name varchar2(20) not null,
  5  desig varchar2(10),
  6  basic number(6,2) default 0,
  7  d_code number(2) references department(d_code)
  8  );

Table created.

SQL> desc employee
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------
 E_CODE                                    NOT NULL NUMBER(3)
 E_NAME                                    NOT NULL VARCHAR2(20)
 DESIG                                              VARCHAR2(10)
 BASIC                                              NUMBER(6,2)
 D_CODE                                             NUMBER(2)

SQL>
```

Q3. Modify the size of the attribute E_name to 15, in the table “Employee”:

```
SQL>
SQL> alter table employee
  2  modify e_name varchar(15);

Table altered.

SQL> desc employee
 Name                                      Null?    Type
 ----------------------------------------- -------- -----------------
 E_CODE                                    NOT NULL NUMBER(3)
 E_NAME                                    NOT NULL VARCHAR2(15)
 DESIG                                              VARCHAR2(10)
 BASIC                                              NUMBER(6,2)
 D_CODE                                             NUMBER(2)
```

Q4. Add some tuples in both the above tables.

```
SQL> insert into department
  2  values(10,'Accounts',1);

1 row created.

SQL> insert into department
  2  values(20,'Research',3);

1 row created.


SQL> select * from department;

 D_CODE     D_NAME     FLOOR
---------- ---------- ----------
      10    Accounts    1
      20    Research    3
SQL>

SQL> insert into employee
  2  values(101,'Soma Maity','Manager',8500,10);

1 row created.

SQL> insert into employee
  2  values(102,'Minima Khatun','G.Manager',9800,20);

1 row created.

SQL> insert into employee
  2  values(103,'Sanjay Khan','Clerk',2500,20);

1 row created.

SQL>
```

Q5. Show all the tuples in the table “Employee”

```
SQL> select * from employee;

   E_CODE      E_NAME               DESIG          BASIC     D_CODE
----------     ---------------      ---------      --------- ----------
      101      Soma Maity           Manager         8500       10
      102      Minima Khatun        G.Manager       9800       20
      103      Sanjay Khan          Clerk           2500       20
      104      Sunil Singh          Peon            1500       20
      105      Ashish Ray           Clerk           4000       10
      106      Kamal Adhikary       Cashier         6000       20
      107      Susoma Sen           Reception       5000       30

7 rows selected.

SQL>
```

Q6. List the employees with e_number 101,103,105 and 106

```
SQL> select e_code,e_name
  2  from employee
  3  where e_code in(101,103,105,106);

   E_CODE      E_NAME
----------     ---------------
      101      Soma Maity
      103      Sanjay Khan
      105      Ashish Ray
      106      Kamal Adhikary

SQL>
```

Q7. List all the clerks, working in department number 20.

```
SQL> select e_name,desig,d_code
  2  from employee
  3  where desig='Clerk' and d_code=20;

E_NAME         DESIG         D_CODE
-------------- ---------- ----------
Sanjay Khan    Clerk           20

SQL>
```

Q8. List the name of employees, whose designation is “clerk” and not belonging to Department number 20.

```
SQL> select e_name,desig,d_code
  2  from employee
  3  where desig='Clerk' and d_code!=20;

E_NAME         DESIG         D_CODE
-------------- ---------- ----------
Sanjay Khan     Clerk            20

SQL>
```

Q9. List the different designations available in the EMPLOYEE table.

```
SQL> select distinct desig
  2  from employee;

DESIG
----------
Manager
Clerk
G.Manager
Reception
Cashier
Peon

6 rows selected.

SQL>
```

Q10. List the names of employees whose name starts with ‘S’

```
SQL> select e_name
  2  from employee
  3  where e_name like 'S%';

E_NAME
---------------
Soma Maity
Sanjay Khan
Sunil Singh
Susoma Sen

SQL>
```

Q11. List the names, salary, PF, HRA, DA and Gross of all employees in the EMPLOYEE table.

HRA = 15% of Basic, DA=15% of Basic, PF = 10% of Basic.

The result should be in descending order of GROSS.

```
SQL> select e_name, basic,
  2  basic*0.1 "PF",
  3  basic*0.15 "DA",
  4  basic*0.15 "HRA",
  5  basic+basic*0.15+basic*0.15-basic*0.1 "GROSS"
  6  from employee
  7  order by GROSS desc;
```

E_NAME	BASIC	PF	DA	HRA	GROSS
Minima Khatun	9800	980	1470	1470	11760
Soma Maity	8500	850	1275	1275	10200
Kamal Adhikary	6000	600	900	900	7200
Susoma Sen	5000	500	750	750	6000
Ashish Ray	4000	400	600	600	4800
Sanjay Khan	2500	250	375	375	3000
Sunil Singh	1500	150	225	225	1800

7 rows selected.

Q12. List the average Salary and number of Employees in each Department.

```
SQL> select d_code,count(d_code),avg(basic)
  2  from employee
  3  group by d_code;

   D_CODE      COUNT(D_CODE)       AVG(BASIC)
----------          -------------           ----------
       30                    1                    5000
       20                    4                    4950
       10                    2                    6250

SQL>
```

Q13. List the average salary of those departments where there are more than one employee.

```
SQL> select d_code,count(e_code),avg(basic)
  2  from employee
  3  group by d_code
  4  having count(e_code)>1;

   D_CODE      COUNT(E_CODE)       AVG(BASIC)
   ----------          -------------           ----------
       20                    4                    4950
       10                    2                    6250

SQL>
```

Q14. List the Employee name, designation and Department name of those employees whose designation is Clerk.

```
SQL> select e_code,e_name,desig,d_name
  2  from employee,department
  3  where employee.d_code=department.d_code and desig='Clerk';

   E_CODE      E_NAME         DESIG          D_NAME
----------     ---------------  ----------     ----------
      103      Sanjay Khan    Clerk          Research
      105      Ashish Ray     Clerk          Accounts

SQL>
```