**SQL**

**SQL** stands for Structured Query Language. A language which is certified by ISO(International Standard Organization) and ANSI(American National Standard Institute) which is supported by almost all the database packages and used to create and maintain database.

**Types of SQL**

1. DDL(Data Definition Language)
2. DML(Data Manipulation Language)
3. TCL(Transaction Control Language)
4. DCL(Data Control Language)

**Data Definition Language**

It contains those SQL statements through which we can define alter or destroyed the structure of table. Commands – Create, Alter, Drop.

Create table student (roll number(3),name varchar2(10));

Alter table student add (city varchar2(1))

Alter table student modify (city varchar2(10))

Alter table student drop column city

Drop table student

**Data Manipulation Language**

**Commands –** Insert, Update, Delete, and Select.

Insert into student values (1,'NIRAJ','DHANBAD');

Insert into student (roll, name) values (2,'MUKESH');

Insert into student values (3,'JOY','BOKARO');

Insert into student values (4,'MOHAN','DELHI');

Insert into student values (5,'ROSHAN','PATNA');

Insert into student values (6,'ARYA','GOA');

Select \* from student;

ROLL NAME CITY

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1 NIRAJ DHANBAD

2 MUKESH

3 JOY BOKARO

4 MOHAN DELHI

5 ROSHAN PATNA

6 ARYA GOA

Update student set city='MUMBAI' where roll=2;

Select \* from student;

ROLL NAME CITY

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1 NIRAJ DHANBAD

2 MUKESH MUMBAI

3 JOY BOKARO

4 MOHAN DELHI

5 ROSHAN PATNA

6 ARYA GOA

Delete from student where roll=6;

Select roll, name from student;

ROLL NAME

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1 NIRAJ

2 MUKESH

3 JOY

4 MOHAN

5 ROSHAN

Select roll, name from student where roll<10 and city='DELHI';

ROLL NAME

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4 MOHAN

Select roll, name from student where roll<10 or city='DELHI';

ROLL NAME

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1 NIRAJ

2 MUKESH

3 JOY

4 MOHAN

5 ROSHAN

**Data Integrity Rule (DIR)**

Rules which are define to keep data integrated in a database celled data integrity rule having four types

1. Domain Integrity
2. Entity Integrity
3. Referential Integrity
4. Enterprise Integrity

**Domain Integrity**

It carries the rules which are related to the core values of the database with bothering to the other value like Data Type, Size, NULL, Not NULL, Default and Check.

**Entity Integrity**

Here the new value refers to the previous value like unique key and Primary key.

**Referential Integrity**

When column of a table referred data from the column of another table called referential integrity and the command is “references”. Ex

Create table student (roll number(3) primary key,name varchar2(10)not null,city varchar2(10) default 'Dhanbad');

Insert into student values (1,'UMESH','DHANBAD');

Insert into student values (2,'SUBHAM','RANCHI');

Insert into student values (3,'MONA','PATNA');

Insert into student values (4,'PREM','DELHI');

Insert into student values (5,'RUBY','GOA');

Select \* from student;

ROLL NAME CITY

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1 UMESH DHANBAD

2 SUBHAM RANCHI

3 MONA PATNA

4 PREM DELHI

5 RUBY GOA

SQL> create table exam(roll number(3) references student(roll),subject varchar2(10) check(subject in('CHE','PHY','MATH')),marks number(6,2) check(marks>=0 and marks<=100));

Insert into exam values (1,'CHE',78);

Insert into exam values (2,'MATH',89);

Insert into exam values (3,'PHY',90);

Insert into exam values (4,'CHE',80);

Insert into exam values (5,'MATH',92);

Select \* from exam;

ROLL SUBJECT MARKS

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1 CHE 78

2 MATH 89

3 PHY 90

4 CHE 80

5 MATH 92

**Order by clause**

We can sort the output of a query in the specific order on the basis of specific field. By default it sorts will in ascending order. For descending order the keyword is “desc”. For order by clause we can also specify the field sequence no. instead of field name. For Ex –

Select \* from emp order by sal;

EMPNO ENAME JOB MGR HIREDATE SAL COMM DEPTNO

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7369 SMITH CLERK 7902 13-JUN-93 800 20

7900 JAMES CLERK 7698 23-JUN-00 950 30

7876 ADAMS CLERK 7788 4-JUN-99 1100 20

7521 WARD SALESMAN 7698 26-MAR-96 1250 500 30

7654 MARTIN SALESMAN 7698 5-DEC-98 1250 1400 30

7934 MILLER CLERK 7782 21-JAN-00 1300 10

7844 TURNER SALESMAN 7698 4-JUN-95 1500 0 30

7499 ALLEN SALESMAN 7698 15-AUG-98 1600 300 30

7782 CLARK MANAGER 7839 14-MAY-93 2450 10

7698 BLAKE MANAGER 7839 11-JUN-92 2850 30

7566 JONES MANAGER 7839 31-OCT-95 2975 20

7788 SCOTT ANALYST 7566 5-MAR-96 3000 20

7902 FORD ANALYST 7566 5-DEC-97 3000 20

7839 KING PRESIDENT 9-JUN-90 5000 0 10

Select \* from emp order by sal desc;

EMPNO ENAME JOB MGR HIREDATE SAL COMM DEPTNO

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7839 KING PRESIDENT 9-JUN-90 5000 0 10

7788 SCOTT ANALYST 7566 5-MAR-96 3000 20

7902 FORD ANALYST 7566 5-DEC-97 3000 20

7566 JONES MANAGER 7839 31-OCT-95 2975 20

7698 BLAKE MANAGER 7839 11-JUN-92 2850 30

7782 CLARK MANAGER 7839 14-MAY-93 2450 10

7499 ALLEN SALESMAN 7698 15-AUG-98 1600 300 30

7844 TURNER SALESMAN 7698 4-JUN-95 1500 0 30

7934 MILLER CLERK 7782 21-JAN-00 1300 10

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7521 WARD SALESMAN 7698 26-MAR-96 1250 500 30

7876 ADAMS CLERK 7788 4-JUN-99 1100 20

7900 JAMES CLERK 7698 23-JUN-00 950 30

7369 SMITH CLERK 7902 13-JUN-93 800 20

Select \* from emp order by 2;

EMPNO ENAME JOB MGR HIREDATE SAL COMM DEPTNO

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7876 ADAMS CLERK 7788 4-JUN-99 1100 20

7499 ALLEN SALESMAN 7698 15-AUG-98 1600 300 30

7698 BLAKE MANAGER 7839 11-JUN-92 2850 30

7782 CLARK MANAGER 7839 14-MAY-93 2450 10

7902 FORD ANALYST 7566 5-DEC-97 3000 20

7900 JAMES CLERK 7698 23-JUN-00 950 30

7566 JONES MANAGER 7839 31-OCT-95 2975 20

7839 KING PRESIDENT 9-JUN-90 5000 0 10

7654 MARTIN SALESMAN 7698 5-DEC-98 1250 1400 30

7934 MILLER CLERK 7782 21-JAN-00 1300 10

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7369 SMITH CLERK 7902 13-JUN-93 800 20

7844 TURNER SALESMAN 7698 4-JUN-95 1500 0 30

7521 WARD SALESMAN 7698 26-MAR-96 1250 500 30

The situation where “order by” as well as “where” both the clauses are used in the same table first will write “where” clause then “order by” clause. For Ex –

**Q. Display the details of employees of department no. 10 in ascending order on the basis of salary.**

**Ans:-**

Select \* from emp where deptno =10 order by sal;

EMPNO ENAME JOB MGR HIREDATE SAL COMM DEPTNO

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7934 MILLER CLERK 7782 21-JAN-00 1300 10

7782 CLARK MANAGER 7839 14-MAY-93 2450 10

7839 KING PRESIDENT 9-JUN-90 5000 0 10

**Group by**

By using group by clause we can combine the records on the basis of the common values of the specified field.

In group by query either we can display the column for which query is grouped or group by method can be display. Methods are max(), min(), count(), avg() and sum(). For Ex –

**Q. Display the average salary of each department.**

**Ans:-**

Select deptno,avg(sal) from emp group by deptno;

DEPTNO AVG(SAL)

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30 1566.66667

20 2175

10 2916.66667

While using group by if the condition specified for the column of the table then we use “where” clause which appears before “group by” clause. For Ex –

**Q. Display the total no. of employee for each department who are getting more than 2000 as salary.**

**Ans:-**

Select deptno, count(\*) from emp where sal>2000 group by deptno;

DEPTNO COUNT(\*)

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30 1

20 3

10 2

In a group by query if the condition specify for the group by method then we use “having” clause which appears after “group by” clause. For Ex –

**Q. Display the total no. of employees for those entire departments average salary for which is more than 2000.**

**Ans:-**

Select deptno,count(\*) from emp group by deptno having avg(sal)>2000;

DEPTNO COUNT(\*)

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20 5

10 3

**What if Analysis**

**Sub Query**

When output of a query is used as a virtual table is called sub query. For Ex –

**Q. Display the details of the higher salary.**

**Ans:-**

Select \* from (select \* from emp order by sal desc) where rownum<2;

EMPNO ENAME JOB MGR HIREDATE SAL COMM DEPTNO

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7839 KING PRESIDENT 9-JUN-90 5000 0 10

**Nested Query**

When output of a query is treated as input to another query is called nested query. For Ex –

**Q. Display the details of the higher salary.**

**Ans:-**

Select \* from emp where sal = (select max(sal) from emp);

EMPNO ENAME JOB MGR HIREDATE SAL COMM DEPTNO

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7839 KING PRESIDENT 9-JUN-90 5000 0 10