Join Operations in Oracle

1. The purpose of a join is to combine the data across tables.
2. A join is actually performed by the where clause which combines the specified rows of tables.
3. If a join involves in more than two tables then Oracle joins first two tables based on the joins condition and then compares the result with the next table and so on.

https://rextester.com/l/oracle_online_compiler
https://livesql.oracle.com/

All types of Join operations are:

1. Equi Join
2. Non-Equi Join
3. Self Join
4. Natural Join
5. Cross Join
6. Outer Join
    a. Left outer
    b. Right outer
    c. Full outer
7. Inner Join

Creating Tables:

```
drop table department;
create table department (deptno number, dname varchar2(15), loc varchar2(10));
insert into department values(10,'Inventory','Hyderabad');
insert into department values(20,'Finance','Bangalore');
insert into department values(30,'HR','Mumbai');
insert into department values(50,'IT','Delhi');
describe department;
select * from department;
```

	DEPTNO	DNAME	LOC
1	10	Inventory	Hyderabad
2	20	Finance	Bangalore
3	30	HR	Mumbai
4	50	IT	Delhi

```
drop table employee;
create table employee (empno number, ename varchar2(15), job varchar2(10), mgr
number, deptno number);
insert into employee values(111,'Saketh','Analyst',444,10);
insert into employee values(222,'Sudha','Clerk',333,20);
insert into employee values(333,'Jagan','Manager',111,10);
insert into employee values(444,'Madhu','Engineer',222,40);
describe employee;
select * from employee;
```

	EMPNO	ENAME	JOB	MGR	DEPTNO
1	111	Saketh	Analyst	444	10
2	222	Sudha	Clerk	333	20
3	333	Jagan	Manager	111	10
4	444	Madhu	Engineer	222	40

1. **Equi Join**

A join which contains an equal to '=' operator in the joins condition.

```
select * from employee e, department d where e.deptno = d.deptno;
```

	EMPNO	ENAME	JOB	MGR	DEPTNO	DEPTNO	DNAME	LOC
1	333	Jagan	Manager	111	10	10	Inventory	Hyderabad
2	111	Saketh	Analyst	444	10	10	Inventory	Hyderabad
3	222	Sudha	Clerk	333	20	20	Finance	Bangalore

Using clause

```
select * from employee e join department d using(deptno);
```

	DEPTNO	EMPNO	ENAME	JOB	MGR	DNAME	LOC
1	10	333	Jagan	Manager	111	Inventory	Hyderabad
2	10	111	Saketh	Analyst	444	Inventory	Hyderabad
3	20	222	Sudha	Clerk	333	Finance	Bangalore

On clause

```
select * from employee e join department d on(e.deptno = d.deptno);
```

	EMPNO	ENAME	JOB	MGR	DEPTNO	DEPTNO	DNAME	LOC
1	333	Jagan	Manager	111	10	10	Inventory	Hyderabad
2	111	Saketh	Analyst	444	10	10	Inventory	Hyderabad
3	222	Sudha	Clerk	333	20	20	Finance	Bangalore

2. **Non-Equi Join**

A join which contains an operator other than equal to '=' in the joins condition.

```
select * from employee e, department d where e.deptno > d.deptno;
```

	EMPNO	ENAME	JOB	MGR	DEPTNO	DEPTNO	DNAME	LOC
1	444	Madhu	Engineer	222	40	30	HR	Mumbai
2	444	Madhu	Engineer	222	40	20	Finance	Bangalore
3	444	Madhu	Engineer	222	40	10	Inventory	Hyderabad
4	222	Sudha	Clerk	333	20	10	Inventory	Hyderabad

Or
select * from employee e join department d on(e.deptno > d.deptno);

3. **Self Join**

Joining the table itself is called self join.

```
select * from employee e1, employee e2 where e1.empno = e2.mgr;
```

	EMPNO	ENAME	JOB	MGR	DEPTNO	EMPNO	ENAME	JOB	MGR	DEPTNO
1	444	Madhu	Engineer	222	40	111	Saketh	Analyst	444	10
2	333	Jagan	Manager	111	10	222	Sudha	Clerk	333	20
3	111	Saketh	Analyst	444	10	333	Jagan	Manager	111	10

4	222	Sudha	Clerk	333	20	444	Madhu	Engineer	222	40

4. Natural Join

Natural join compares all the common columns.

```
select * from employee natural join department;
```

	DEPTNO	EMPNO	ENAME	JOB	MGR	DNAME	LOC
1	10	333	Jagan	Manager	111	Inventory	Hyderabad
2	10	111	Saketh	Analyst	444	Inventory	Hyderabad
3	20	222	Sudha	Clerk	333	Finance	Bangalore

Note – Output of the query is same as we did in equi-join with the query –

```
select * from employee e join department d using(deptno);
```

5. Cross Join

This will give the cross product.

```
select * from employee cross join department;
```

	EMPNO	ENAME	JOB	MGR	DEPTNO	DEPTNO	DNAME	LOC
1	111	Saketh	Analyst	444	10	10	Inventory	Hyderabad
2	111	Saketh	Analyst	444	10	20	Finance	Bangalore
3	111	Saketh	Analyst	444	10	30	HR	Mumbai
4	111	Saketh	Analyst	444	10	50	IT	Delhi
5	222	Sudha	Clerk	333	20	10	Inventory	Hyderabad
6	222	Sudha	Clerk	333	20	20	Finance	Bangalore
7	222	Sudha	Clerk	333	20	30	HR	Mumbai
8	222	Sudha	Clerk	333	20	50	IT	Delhi
9	333	Jagan	Manager	111	10	10	Inventory	Hyderabad
10	333	Jagan	Manager	111	10	20	Finance	Bangalore
11	333	Jagan	Manager	111	10	30	HR	Mumbai
12	333	Jagan	Manager	111	10	50	IT	Delhi
13	444	Madhu	Engineer	222	40	10	Inventory	Hyderabad
14	444	Madhu	Engineer	222	40	20	Finance	Bangalore
15	444	Madhu	Engineer	222	40	30	HR	Mumbai
16	444	Madhu	Engineer	222	40	50	IT	Delhi

Same output as
select * from employee, department;

6. Outer Join

Outer join gives the non-matching records along with matching records.

6 a. Outer Join - Left outer

This will display all the matching records and the records which are in left hand side table those that are not in right hand side table.

```
select * from employee e left outer join department d on (e.deptno = d.deptno);
```

Or

```
select * from employee e, department d where e.deptno = d.deptno(+);
```

	EMPNO	ENAME	JOB	MGR	DEPTNO	DEPTNO	DNAME	LOC
1	333	Jagan	Manager	111	10	10	Inventory	Hyderabad
2	111	Saketh	Analyst	444	10	10	Inventory	Hyderabad
3	222	Sudha	Clerk	333	20	20	Finance	Bangalore
4	444	Madhu	Engineer	222	40	*NULL*	*NULL*	*NULL*

6 b. Outer Join - Right outer

This will display all the matching records and the records which are in right hand side table those that are not in left hand side table.

```
select * from employee e right outer join department d on (e.deptno = d.deptno);
```

	EMPNO	ENAME	JOB	MGR	DEPTNO	DEPTNO	DNAME	LOC
1	111	Saketh	Analyst	444	10	10	Inventory	Hyderabad
2	222	Sudha	Clerk	333	20	20	Finance	Bangalore
3	333	Jagan	Manager	111	10	10	Inventory	Hyderabad
4	*NULL*	*NULL*	*NULL*	*NULL*	*NULL*	50	IT	Delhi
5	*NULL*	*NULL*	*NULL*	*NULL*	*NULL*	30	HR	Mumbai

Or

```
select * from employee e, department d where e.deptno(+) = d.deptno;
```

	EMPNO	ENAME	JOB	MGR	DEPTNO	DEPTNO	DNAME	LOC
1	111	Saketh	Analyst	444	10	10	Inventory	Hyderabad
2	222	Sudha	Clerk	333	20	20	Finance	Bangalore
3	333	Jagan	Manager	111	10	10	Inventory	Hyderabad
4	*NULL*	*NULL*	*NULL*	*NULL*	*NULL*	50	IT	Delhi
5	*NULL*	*NULL*	*NULL*	*NULL*	*NULL*	30	HR	Mumbai

6 c. Outer Join - Full outer

This will display all the matching records and the non-matching records from both tables.

```
select * from employee e full outer join department d on (e.deptno = d.deptno);
```

	EMPNO	ENAME	JOB	MGR	DEPTNO	DEPTNO	DNAME	LOC
1	333	Jagan	Manager	111	10	10	Inventory	Hyderabad
2	111	Saketh	Analyst	444	10	10	Inventory	Hyderabad
3	222	Sudha	Clerk	333	20	20	Finance	Bangalore
4	*NULL*	*NULL*	*NULL*	*NULL*	*NULL*	30	HR	Mumbai
5	*NULL*	*NULL*	*NULL*	*NULL*	*NULL*	50	IT	Delhi
6	444	Madhu	Engineer	222	40	*NULL*	*NULL*	*NULL*

7. Inner Join

This will display all the records that have matched.

```
select * from employee inner join department using (deptno);
```

	DEPTNO	EMPNO	ENAME	JOB	MGR	DNAME	LOC
1	10	333	Jagan	Manager	111	Inventory	Hyderabad
2	10	111	Saketh	Analyst	444	Inventory	Hyderabad
3	20	222	Sudha	Clerk	333	Finance	Bangalore

Note – Output of the query is same as we did in equi-join with the query –

```
select * from employee join department using(deptno);
```

and natural join with the query –

```
select * from employee natural join department;
```

```
drop table department;
create table department (deptno number, dname varchar2(15), loc varchar2(10));
insert into department values(10,'Inventory','Hyderabad');
insert into department values(20,'Finance','Bangalore');
insert into department values(30,'HR','Mumbai');
insert into department values(50,'IT','Delhi');
describe department;
select * from department;

drop table employee;
create table employee (empno number, ename varchar2(15), job varchar2(10), mgr
number, deptno number);
insert into employee values(111,'Saketh','Analyst',444,10);
insert into employee values(222,'Sudha','Clerk',333,20);
insert into employee values(333,'Jagan','Manager',111,10);
insert into employee values(444,'Madhu','Engineer',222,40);
describe employee;
select * from employee;

select * from employee e, department d where e.deptno = d.deptno;
select * from employee e join department d using(deptno);
select * from employee e join department d on(e.deptno = d.deptno);
select * from employee e, department d where e.deptno > d.deptno;
select * from employee e1, employee e2 where e1.empno = e2.mgr;
select * from employee natural join department;
select * from employee cross join department;
select * from employee e left outer join department d on (e.deptno = d.deptno);
select * from employee e, department d where e.deptno = d.deptno(+);
select * from employee e right outer join department d on (e.deptno = d.deptno);
select * from employee e, department d where e.deptno(+) = d.deptno;
select * from employee e full outer join department d on (e.deptno = d.deptno);
select * from employee inner join department using (deptno);

drop table department;
drop table employee;
```