JOIN

Merging of two or more tables horizontally is known as Joins
Q. Why do we need Join's?
➔ To retrieve the data from multiple tables we use join's.
When we have to retrieve the data from 2 tables then we perform join.

Note: - from clause is responsible to merge the table

Types of Join's

1. Cartesian join or cross join
2. Inner join or equi join
3. Outer join
    i. left outer join or left join
    ii. right outer join or right join
    iii. full outer join or full join
4. self join

1. Cartesian join or cross joins: -

If we join 2 tables, records from one table is merged with each and every records present in the other table is known as Cartesian join or cross join.

Ex. Let us consider 2 tables T1 and T2 with columns each and m, n as no. of rows respectively

T1

A1	**B1**
A	10
B	20
C	30

T2

A2	**B2**
B	200
C	300
D	400

If we perform a Cartesian join on table T1 and T2 the newly obtain table will have 4 columns and m X n no. of rows.

Note: -

1. Cartesian join has valid as well as invalid pairs.
2. Cartesian join as a universal set as it is having all the possible combinations.

T1 X T2 only when A2 = B

A1	B1	A2	B2
A	10	B	200
A	10	C	300
A	10	D	400
B	20	B	200
B	20	C	300
B	20	D	400
C	30	B	200
C	30	C	300
C	30	D	400

m X n = 3 X 3 = 9

Syntax for Cartesian join: -

1. ANSI syntax : -
   Select */column/expression
   From table1 cross join table2;

Eg. Select *

From T1 cross join T2;

2. Oracle syntax:-
   Select */column/expression
   From table1, table2,…..;

Eg. Select *

From T1, T2, T3,….;

For ex, let us consider the following query
Display employee name along with the department name

```
SQL> select A.ename, A.sal, B.dname
  2  from emp A, dept B ;
```

ENAME	SAL	DNAME
SMITH	800	ACCOUNTING
ALLEN	1600	ACCOUNTING
WARD	1250	ACCOUNTING
JONES	2975	ACCOUNTING
MARTIN	1250	ACCOUNTING
BLAKE	2850	ACCOUNTING
CLARK	2450	ACCOUNTING
SCOTT	3000	ACCOUNTING
KING	5000	ACCOUNTING
TURNER	1500	ACCOUNTING
ADAMS	1100	ACCOUNTING
JAMES	950	ACCOUNTING
FORD	3000	ACCOUNTING
MILLER	1300	ACCOUNTING
SMITH	800	RESEARCH
ALLEN	1600	RESEARCH
WARD	1250	RESEARCH
JONES	2975	RESEARCH
MARTIN	1250	RESEARCH
BLAKE	2850	RESEARCH
CLARK	2450	RESEARCH
SCOTT	3000	RESEARCH
KING	5000	RESEARCH
TURNER	1500	RESEARCH
ADAMS	1100	RESEARCH
JAMES	950	RESEARCH
FORD	3000	RESEARCH
MILLER	1300	RESEARCH
SMITH	800	SALES
ALLEN	1600	SALES
WARD	1250	SALES
JONES	2975	SALES
MARTIN	1250	SALES
BLAKE	2850	SALES

```
ENAME             SAL DNAME
---------- ---------- --------------
CLARK             2450 SALES
SCOTT             3000 SALES
KING              5000 SALES
TURNER            1500 SALES
ADAMS             1100 SALES
JAMES              950 SALES
FORD              3000 SALES
MILLER            1300 SALES
SMITH              800 OPERATIONS
ALLEN             1600 OPERATIONS
WARD              1250 OPERATIONS
JONES             2975 OPERATIONS
MARTIN            1250 OPERATIONS
BLAKE             2850 OPERATIONS
CLARK             2450 OPERATIONS
SCOTT             3000 OPERATIONS
KING              5000 OPERATIONS

SCOTT             3000 RESEARCH
KING              5000 RESEARCH
TURNER            1500 RESEARCH
ADAMS             1100 RESEARCH
JAMES              950 RESEARCH
FORD              3000 RESEARCH
MILLER            1300 RESEARCH
SMITH              800 SALES
ALLEN             1600 SALES
WARD              1250 SALES
JONES             2975 SALES
MARTIN            1250 SALES
BLAKE             2850 SALES

ENAME             SAL DNAME
---------- ---------- --------------
TURNER            1500 OPERATIONS
ADAMS             1100 OPERATIONS
JAMES              950 OPERATIONS
FORD              3000 OPERATIONS
MILLER            1300 OPERATIONS

56 rows selected.
```

From above – we can see that the above query returns 56 records – but we are expecting 14 records. This is because each and every record of employee table will be combined with each & every record of department table.

Thus, Cartesian join should not be used in real time scenarios.

The Cartesian join contains both correct and incorrect sets of data. We have to retain the correct ones & eliminate the incorrect ones by using the **inner join**.

3. **Inner join: -**

Inner join are also called as **equijoins**.
They return the matching records between the tables.
In the real time scenarios, this is the most frequently used Join.
We join two tables such that a record from one table is merged to a record from another table only when given condition is satisfied is known as inner join.

For ex, consider the query shown below,

```
Select A.ename, A.sal, B.dname
From emp A, dept B
Where A.deptno = B.deptno          - JOIN condition
And A.sal > 2000                   - FILTER condition
Order by A.sal ;
```

Let us see the output shown below,

```
SQL> Select A.ename, A.sal, B.dname
  2  From emp A, dept B
  3  Where A.deptno = B.deptno
  4  And A.sal > 2000
  5  Order by A.sal ;

ENAME             SAL DNAME
---------- ---------- --------------
CLARK            2450 ACCOUNTING
BLAKE            2850 SALES
JONES            2975 RESEARCH
FORD             3000 RESEARCH
SCOTT            3000 RESEARCH
KING             5000 ACCOUNTING

6 rows selected.
```

JOIN condition is mandatory for removing the Cartesian output.

Let us consider the following 2 scenarios shown below,

Scenario 1

A		
P	**Q**	**R**

B		
P	**S**	**T**

C		
P	**X**	**Y**

We want			
P	**Q**	**S**	**X**

The SQL query will be,

Select A.P, A.Q, B.S, C.X
From A, B, C
Where A.P = B.P
And A.P = C.P
} **Number of joins = 2**

Therefore, Number of JOINS = Number of tables - 1

Scenario 2

A		
P	**Q**	**R**

B			
P	**Q**	**S**	**T**

C		
P	**X**	**Y**

We want				
P	**Q**	**R**	**S**	**X**

The **SQL query is ,**

Select A.P, A.Q, A.R, B.S, C.X
From A, B, C
Where A.P = B.P
And A.Q = B.Q
And A.P = C.P ;

Number of Joins = 3

Therefore, Number of JOINS = Number of common columns

If there are no common columns, then reject it saying that the two tables can't be joined.

But there are some cases – where the 2 columns will be same but having different column names.
For ex – customerid & cid

ANSI Syntax:

```
Select *
From table1 inner join table 2
ON <join condition>
Where <filter condition>
```

Thus we, can see the changes ,

- In the 2nd line - ,(comma) has been replaced by the word 'join'
- In the 3rd line – 'where' has been replaced with 'on'

Note :

1. To perform inner join, join condition is mandatory
2. Join condition: - it is a condition which includes column from both the tables
3. Inner join is a sub set of Cartesian join or cross join
   Ex. Let us consider the table T1 And T2 we join T1 and T2 using the join condition
   T1.A1 = T2.A2
   The table obtained is as follows

A1	B1	A2	B2
B	20	B	200
C	30	C	300

Q. WAQTD Dept name, salary, comm of all the employees who are working in accounts or research dept. as a manager

ANSI
Select dname, sal, comm
From emp inner join dept
ON emp.deptno = dept.deptno
Where dname IN ('account','research') and job ='manager';

Select dname, sal, comm.
From emp, dept
Where emp.deptno=dept.deptno
And dname in ('account','research') and job ='manager';

Q. WAQTD dept name, ename, sal of all the employee whose name starts with A whose dept name ends with S and having the salary between 3000 and 5000

Dept Name, Ename, SAL
Condition
Ename starts with A and
Dname ends with S and
sal between 3000 and 5000

select detname, ename, sal
from emp, dept
where emp.deptno=dept.deptno and

Assignment

1) Display employee name and his department name for the employees whose name starts with 'S'

```
SQL> select A.ename, B.dname
  2  from emp A, dept B
  3  where A.deptno = B.deptno
  4  and A.ename not like 'S%' ;

ENAME      DNAME
---------- --------------
ALLEN      SALES
WARD       SALES
JONES      RESEARCH
MARTIN     SALES
BLAKE      SALES
CLARK      ACCOUNTING
KING       ACCOUNTING
TURNER     SALES
ADAMS      RESEARCH
JAMES      SALES
FORD       RESEARCH
MILLER     ACCOUNTING

12 rows selected.
```