DATABASE SYSTEMS

JOINS

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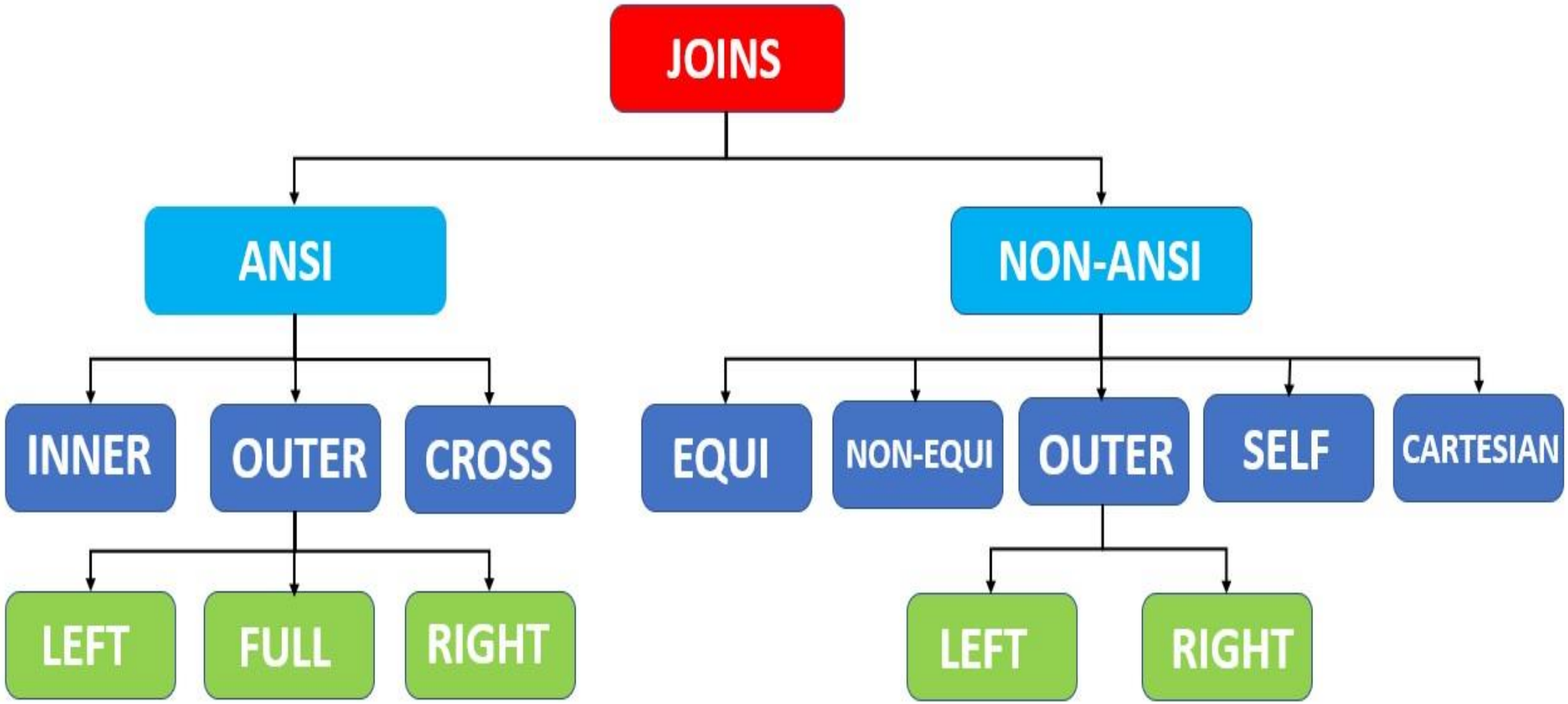
JOINS

- A join is a query that combines rows from two or more tables or views.
- Oracle Database performs a join whenever multiple tables appear in the FROM clause of the query. The select list of the query can select any columns from any of these tables.
- In order to form a join between multiple tables we need a JOIN CONDITION.
- The number of JOIN CONDITIONS depends upon the number of tables to be joined, i.e. to JOIN **n** tables one needs **n-1** JOIN CONDITIONS.
- Most join queries contain at least one join condition, either in the FROM clause or in the WHERE clause.
- The join condition compares two columns, each from a different table. To execute a join, Oracle Database combines pairs of rows, each containing one row from each table, for which the join condition evaluates to TRUE.
- The columns in the join conditions need not to appear in the select list.


JOINS
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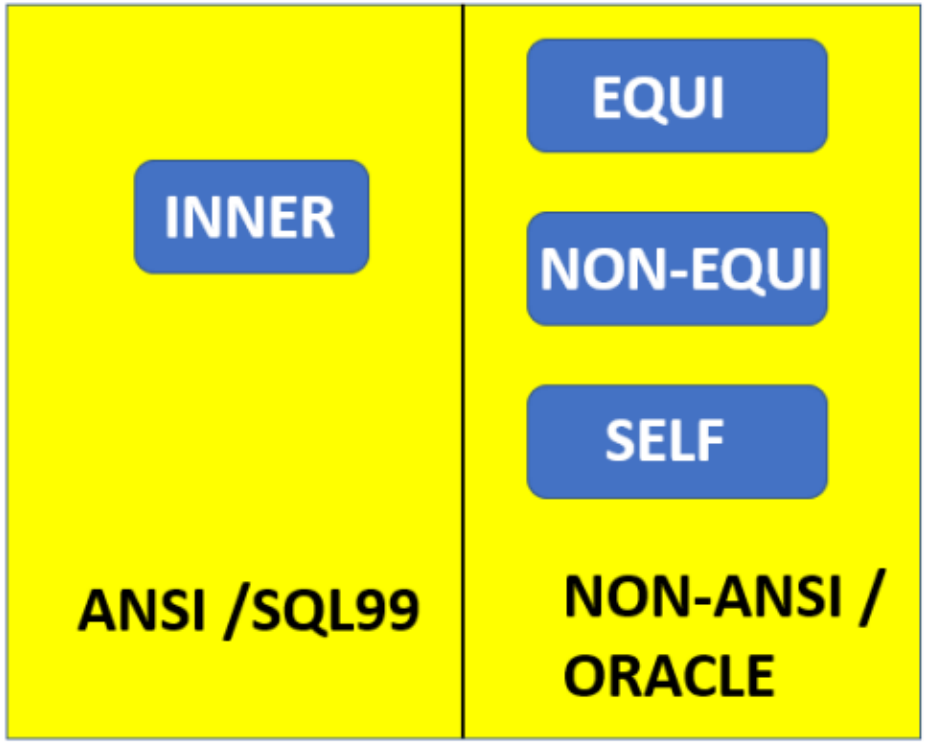
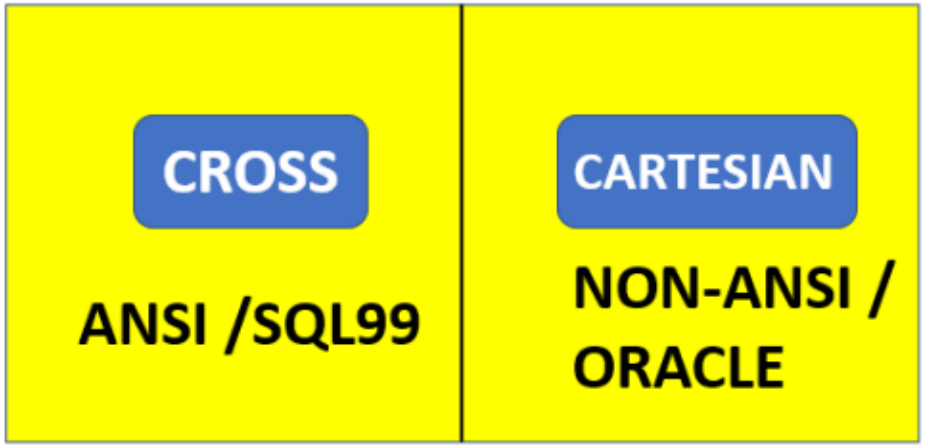
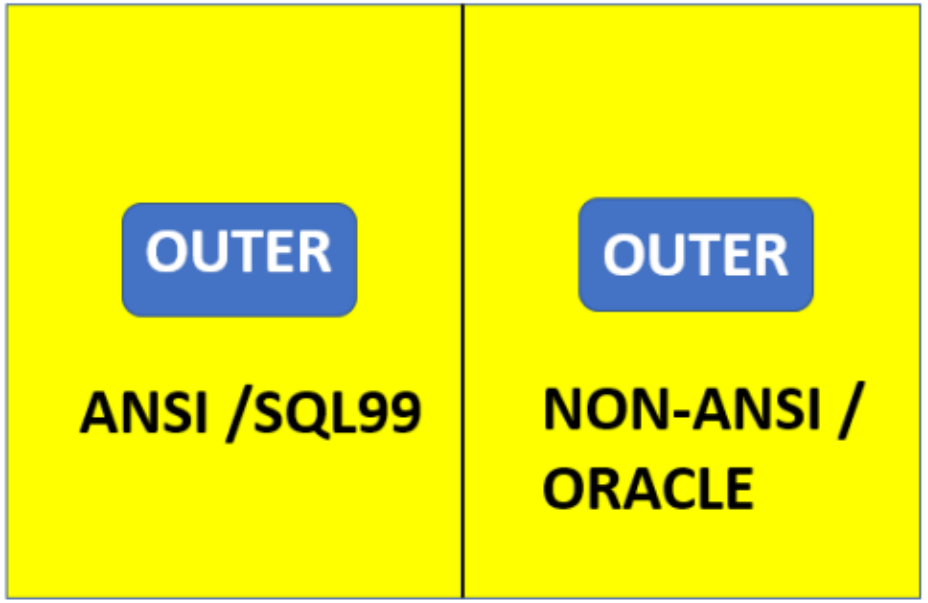




An inner join (sometimes called a simple join) is a join of two or more tables that returns only those rows that satisfy the join condition.

An outer join extends the result of a simple join. An outer join returns all rows that satisfy the join condition and also returns some or all of those rows from one table for which no rows from the other satisfy the join condition.



JOIN METHODS

- SQL/99 : The standard to which all RDBMS vendors strive to comply
- SQL/99 support started with Oracle 9i in 2001

1. **TRADITIONAL METHOD** - Traditional Syntax (Oracle Approach).
2. **JOIN METHOD** - ANSI Syntax (SQL/99 JOIN Approach).

CARTESIAN / CROSS JOIN

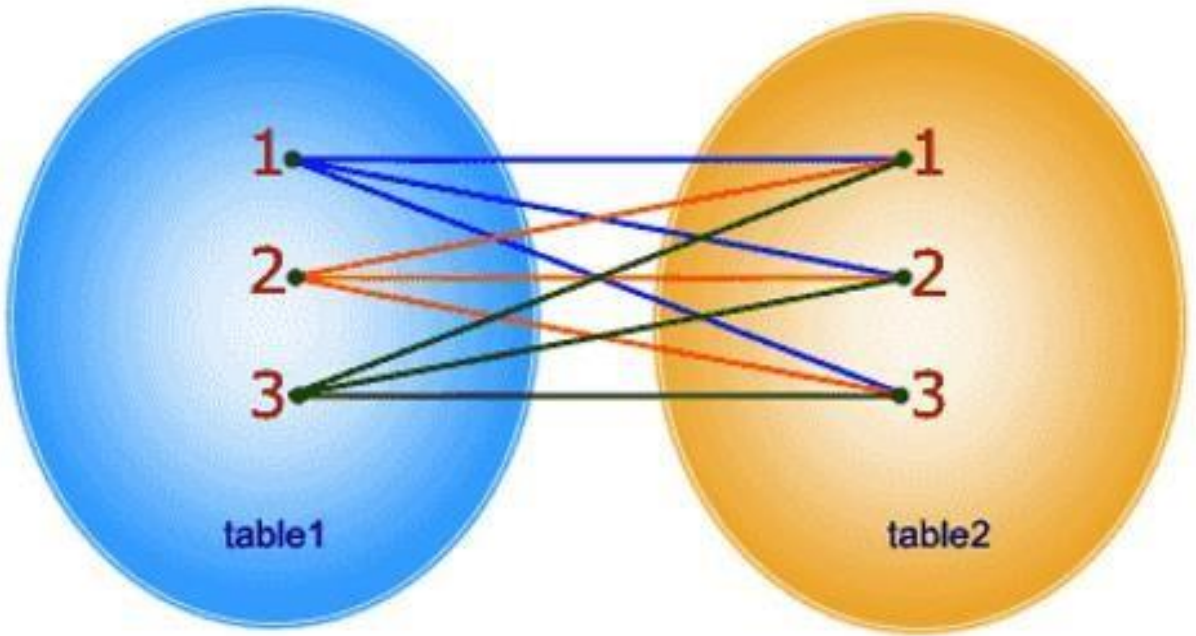
- If two tables in a join query have no join condition or are joined using CROSS JOIN keyword, then Oracle Database returns their Cartesian product.

- Oracle combines each row of one table with each row of the other.
- A Cartesian product always generates many rows and is rarely useful. For example, the Cartesian product of two tables, each with 100 rows, has 10,000 rows.
- Always include a join condition unless you specifically need a Cartesian product.
- If a query joins three or more tables and you do not specify a join condition

  for a specific pair, then the optimizer may choose a join order that avoids

  producing an intermediate Cartesian product.

CROSS	CARTESIAN
ANSI /SQL99	NON-ANSI / ORACLE



In CROSS JOIN, each row from 1st table joins with all the rows of another table.
If 1st table contain x rows and y rows in 2nd one the result set will be x * y rows.

JOIN METHOD - ANSI Syntax (SQL/99 JOIN Approach)

CROSS JOIN - JOIN METHOD

```
SELECT * I [ DISTINCT I UNIQUE] (column_ name [ AS alias ] ,arithmetic expr)
FROM    table _ name  [,.....]
```

```
SELECT ename ,dname
FROM   emp CROSS JOIN dept ;
```

14 * 4 = 56 rows

```
SELECT ename, dname FROM emp CROSS JOIN dept ;
```

Results | Script Output | Explain | Autotrace | DBMS Output

Results:

	ENAME	DNAME
1	SMITH	ACCOUNTING
2	ALLEN	ACCOUNTING
3	WARD	ACCOUNTING
4	JONES	ACCOUNTING
5	MARTIN	ACCOUNTING
6	BLAKE	ACCOUNTING
7	CLARK	ACCOUNTING
8	SCOTT	ACCOUNTING
9	KING	ACCOUNTING
10	TURNER	ACCOUNTING
11	ADAMS	ACCOUNTING
12	JAMES	ACCOUNTING
13	FORD	ACCOUNTING
14	MILLER	ACCOUNTING
15	SMITH	RESEARCH
16	ALLEN	RESEARCH
17	WARD	RESEARCH
18	JONES	RESEARCH
19	MARTIN	RESEARCH
20	BLAKE	RESEARCH

CROSS	CARTESIAN
ANSI /SQL99	NON-ANSI / ORACLE

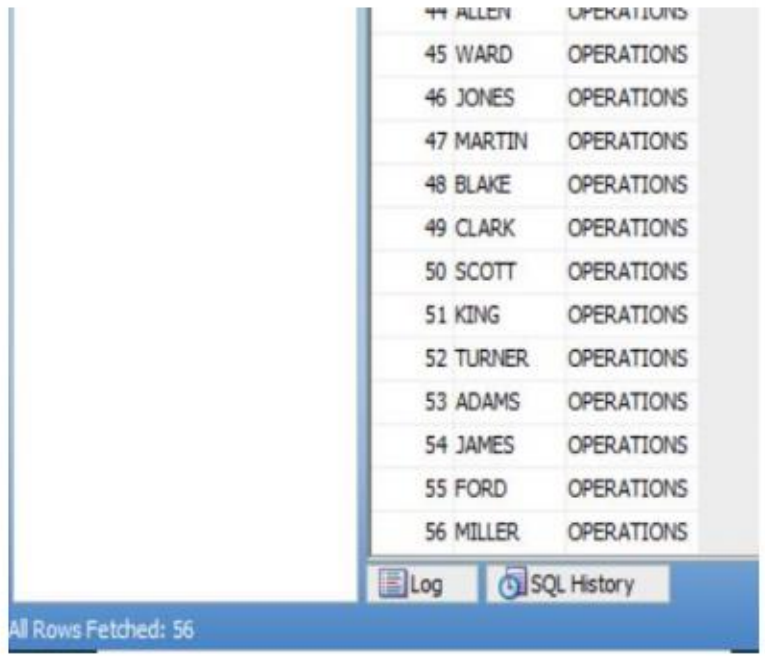
TRADITIONAL METHOD - Traditional Syntax (Oracle Approach).

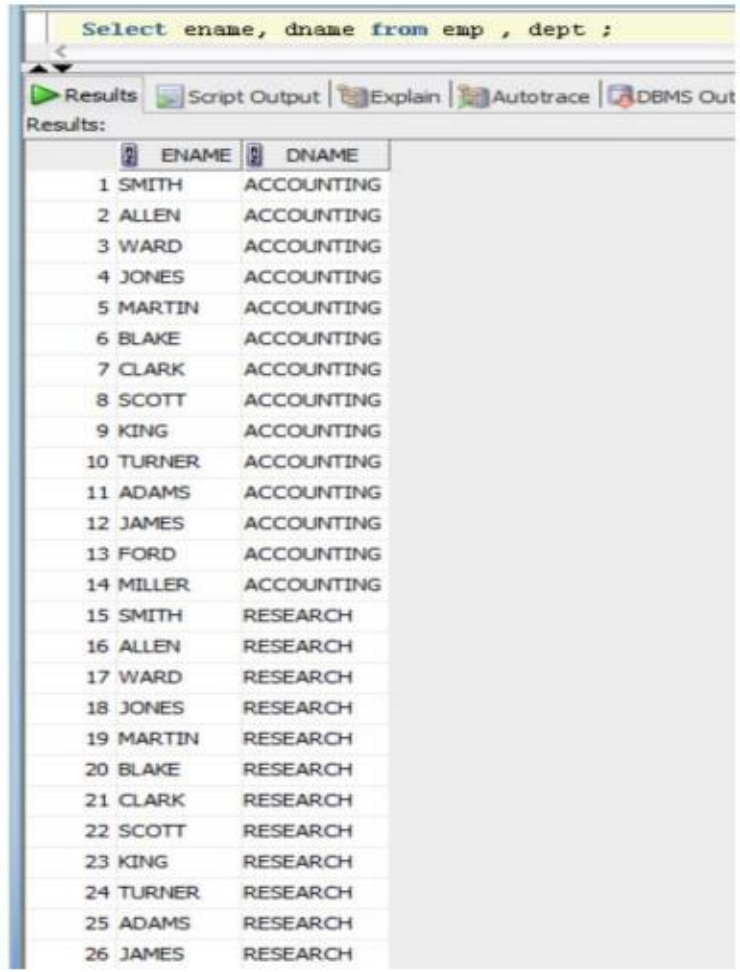
CARTESIAN JOIN - TRADITIONAL METHOD

```
SELECT * I [ DISTINCT I UNIQUE] (column_ name [ AS alias ] ,arithmetic expr)
FROM    table _ name  [,.....]
```

```
SELECT ename ,dname
FROM   emp,dept ;
```

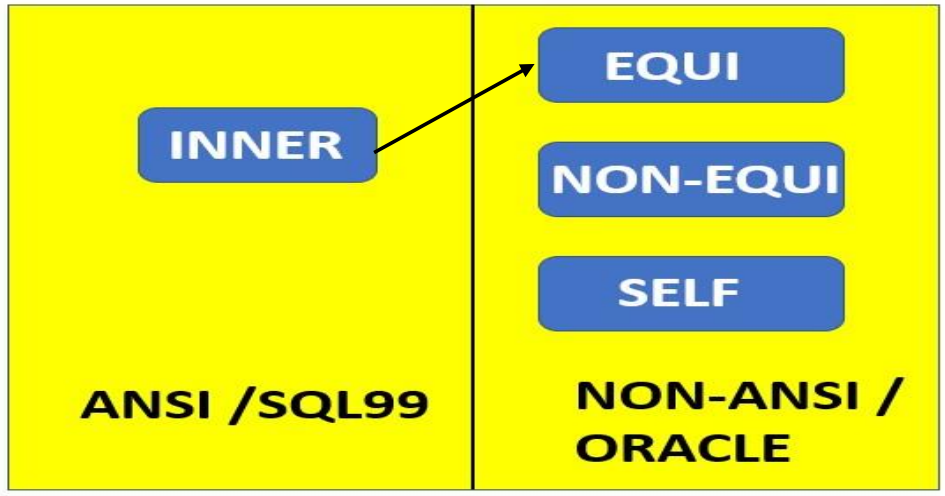
14 * 4 = 56 rows





EQUI / INNER JOIN

- An EQUIJOIN is a join with a join condition containing an equality operator.
- An EQUIJOIN combines rows that have equivalent values for the specified columns.
- INNER JOIN is also an equijoin, or equality join between equals.
- An INNER JOIN matches on one or a set of columns values from one table:
- When one table is involved, an INNER JOIN creates an intersection between two copies of a single table (typically done with two different column names. **(SELF JOIN)**
- When two or more tables are involved, an INNER JOIN creates an intersection between the tables based on designated column names. **(EQUI JOIN)**



TRADITIONAL METHOD - Traditional Syntax (Oracle Approach).

EQUIJOIN - TRADITIONAL METHOD

WITH TABLE ALIASES

```
SELECT e.ename, d.deptno , d.dname FROM emp e , dept d
WHERE e.deptno = d.deptno;
```

Results | Script Output | Explain | Autotrace | DBMS Output | OWA O

Results:

	ENAME	DEPTNO	DNAME
1	CLARK	10	ACCOUNTING
2	KING	10	ACCOUNTING
3	MILLER	10	ACCOUNTING
4	JONES	20	RESEARCH
5	FORD	20	RESEARCH
6	ADAMS	20	RESEARCH
7	SMITH	20	RESEARCH
8	SCOTT	20	RESEARCH
9	WARD	30	SALES
10	TURNER	30	SALES
11	ALLEN	30	SALES
12	JAMES	30	SALES
13	BLAKE	30	SALES
14	MARTIN	30	SALES

```
SELECT e.ename, e.deptno , d.dname FROM emp e , dept d
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7	SMITH	20	RESEARCH
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9	WARD	30	SALES
10	TURNER	30	SALES
11	ALLEN	30	SALES
12	JAMES	30	SALES
13	BLAKE	30	SALES
14	MARTIN	30	SALES

```
SELECT ename,dname FROM emp e , dept d
WHERE e.deptno = d.deptno;
```

Results | Script Output | Explain | Autotrace

Results:

	ENAME	DNAME
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8	SCOTT	RESEARCH
9	WARD	SALES
10	TURNER	SALES
11	ALLEN	SALES
12	JAMES	SALES
13	BLAKE	SALES
14	MARTIN	SALES

```
SELECT ename, deptno , dname FROM emp e , dept d
WHERE e.deptno = d.deptno;
```

Error encountered

An error was encountered performing the requested operation:

ORA-00918: column ambiguously defined
00918. 00000 - "column ambiguously defined"
*Cause:
*Action:
Vendor code 918Error at Line:1 Column:14

OK

TRADITIONAL METHOD - Traditional Syntax (Oracle Approach).

EQUIJOIN - TRADITIONAL METHOD

WITHOUT TABLE ALIASES

```
SELECT ename,dname FROM emp , dept
WHERE emp.deptno = dept.deptno;
```

Results | Script Output | Explain | Autotra

Results:

	ENAME	DNAME
1	CLARK	ACCOUNTING
2	KING	ACCOUNTING
3	MILLER	ACCOUNTING
4	JONES	RESEARCH
5	FORD	RESEARCH
6	ADAMS	RESEARCH
7	SMITH	RESEARCH
8	SCOTT	RESEARCH
9	WARD	SALES
10	TURNER	SALES
11	ALLEN	SALES
12	JAMES	SALES
13	BLAKE	SALES
14	MARTIN	SALES

```
SELECT ename,dname FROM emp e , dept d
WHERE emp.deptno = dept.deptno;
```

Error encountered

An error was encountered performing the requested operation:

ORA-00904: "DEPT"."DEPTNO": invalid identifier
00904. 00000 - "%s: invalid identifier"
*Cause:
*Action:
Vendor code 904Error at Line:2 Column:19

OK

```
SELECT ename, emp.deptno,dname FROM emp , dept
WHERE dept.deptno = emp.deptno;
```

Results | Script Output | Explain | Autotrace | DBMS Out

Results:

	ENAME	DEPTNO	DNAME
1	CLARK	10	ACCOUNTING
2	KING	10	ACCOUNTING
3	MILLER	10	ACCOUNTING
4	JONES	20	RESEARCH
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7	SMITH	20	RESEARCH
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11	ALLEN	30	SALES
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13	BLAKE	30	SALES
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FLAWED JOIN CONDITIONS