Using Joins

Objectives

- Discuss on join
- Equi & Non-equi joins
- Cartesian Products.
- Self join
- Outer joins.

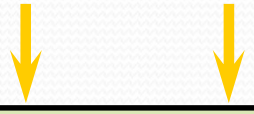
Data from Multiple Tables

EMP

EMPNO	ENAME	...	DEPTNO
7839	KING	...	10
7698	BLAKE	...	30
...			
7934	MILLER	...	10

DEPT

DEPTNO	DNAME	LOC
10	ACCOUNTING	NEW YORK
20	RESEARCH	DALLAS
30	SALES	CHICAGO
40	OPERATIONS	BOSTON



EMPNO	DEPTNO	LOC
7839	10	NEW YORK
7698	30	CHICAGO
7782	10	NEW YORK
7566	20	DALLAS
7654	30	CHICAGO
7499	30	CHICAGO

...

14 rows selected.

What Is a Join?

- A JOIN Basically involves more than one Table to interact with.

```
SELECT   table1.column, table2.column
FROM     table1, table2
WHERE    table1.column1 = table2.column2;
```

- Where clause specifies the JOIN Condition.
- Ambiguous Column names are identified by the Table name.

Cartesian Product

- A Cartesian product is formed when:
  - A Join Condition is completely omitted
  - All rows in the first table are joined to all rows in the second table

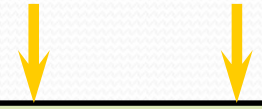
Cartesian Product

EMP (14 rows)

```
 EMPNO ENAME   ...  DEPTNO
------ -----   ...  ------
  7839 KING    ...      10
  7698 BLAKE   ...      30
   ...
  7934 MILLER  ...      10
```

DEPT (4 rows)

```
DEPTNO DNAME          LOC
------ ---------- --------
    10 ACCOUNTING NEW YORK
    20 RESEARCH   DALLAS
    30 SALES      CHICAGO
    40 OPERATIONS BOSTON
```



"Cartesian product: 14*4=56 rows"

```
ENAME      DNAME
------     ----------
KING       ACCOUNTING
BLAKE      ACCOUNTING
...
KING       RESEARCH
BLAKE      RESEARCH
...
56 rows selected.
```

Types of Joins

- **Equi Join**
- **Non Equi Join**
- **Self Join**
- **Outer join**

What Is an Equijoin?

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.

What Is an Equijoin?

EMP

EMPNO	ENAME	DEPTNO
7839	KING	10
7698	BLAKE	30
7782	CLARK	10
7566	JONES	20
7654	MARTIN	30
7499	ALLEN	30
7844	TURNER	30
7900	JAMES	30
7521	WARD	30
7902	FORD	20
7369	SMITH	20

...
14 rows selected.

DEPT

DEPTNO	DNAME	LOC
10	ACCOUNTING	NEW YORK
30	SALES	CHICAGO
10	ACCOUNTING	NEW YORK
20	RESEARCH	DALLAS
30	SALES	CHICAGO
30	SALES	CHICAGO
30	SALES	CHICAGO
30	SALES	CHICAGO
30	SALES	CHICAGO
20	RESEARCH	DALLAS
20	RESEARCH	DALLAS

...
14 rows selected.

Retrieving Rows: Equijoin

```
SQL> SELECT   emp.empno, emp.ename, emp.deptno,
  2           dept.deptno, dept.loc
  3   FROM    emp, dept
  4   WHERE   emp.deptno=dept.deptno;
```

```
EMPNO ENAME   DEPTNO DEPTNO LOC
----- ------ ------ ------ ----------
 7839 KING       10     10 NEW YORK
 7698 BLAKE      30     30 CHICAGO
 7782 CLARK      10     10 NEW YORK
 7566 JONES      20     20 DALLAS
...
14 rows selected.
```

Using Table Aliases

- Simplify queries by using table aliases.

```
SQL> SELECT emp.empno, emp.ename, emp.deptno,
  2         dept.deptno, dept.loc
  3  FROM   emp, dept
  4  WHERE  emp.deptno=dept.deptno;
```

```
SQL> SELECT e.empno, e.ename, e.deptno,
  2         d.deptno, d.loc
  3  FROM   emp e, dept d
  4  WHERE  e.deptno=d.deptno;
```

Joining More Than Two Tables

CUSTOMER

NAME	CUSTID
JOCKSPORTS	100
TKB SPORT SHOP	101
VOLLYRITE	102
JUST TENNIS	103
K+T SPORTS	105
SHAPE UP	106
WOMENS SPORTS	107
...	...

9 rows selected.

ORD

CUSTID	ORDID
101	610
102	611
104	612
106	601
102	602
106	604
106	605
...	

21 rows s

ITEM

ORDID	ITEMID
610	3
611	1
612	1
601	1
602	1
...	

64 rows selected.

Non-Equijoins

- An non-equijoin is a join with a join condition containing an non-equality operator.

- An non-equijoin combines rows that have non-equivalent values for the specified columns.

Non-Equijoins

EMP

EMPNO	ENAME	SAL
7839	KING	5000
7698	BLAKE	2850
7782	CLARK	2450
7566	JONES	2975
7654	MARTIN	1250
7499	ALLEN	1600
7844	TURNER	1500
7900	JAMES	950

...
14 rows selected.

SALGRADE

GRADE	LOSAL	HISAL
1	700	1200
2	1201	1400
3	1401	2000
4	2001	3000
5	3001	9999

"salary in the EMP table is between low salary and high salary in the SALGRADE table"

Retrieving Rows:Non-Equijoin

```
SQL>   SELECT    e.ename, e.sal, s.grade
   2   FROM      emp e, salgrade s
   3   WHERE     e.sal
   4   BETWEEN   s.losal AND s.hisal;
```

```
ENAME             SAL      GRADE
---------- ---------- ----------
JAMES             950          1
SMITH             800          1
ADAMS            1100          1
...
14 rows selected.
```

Self Joins

- A self join is a join of a table to itself. This table appears twice in the FROM clause and is followed by table aliases that qualify column names in the join condition.

- To perform a self join, Oracle combines and returns rows of the table that satisfy the join condition.

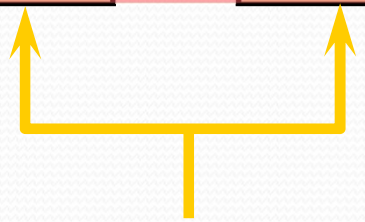
Self Joins

EMP (WORKER)

EMPNO	ENAME	MGR
7839	KING	
7698	BLAKE	7839
7782	CLARK	7839
7566	JONES	7839
7654	MARTIN	7698
7499	ALLEN	7698

EMP (MANAGER)

EMPNO	ENAME
7839	KING
7839	KING
7839	KING
7698	BLAKE
7698	BLAKE



"MGR in the WORKER table is equal to EMPNO in the MANAGER table"

Joining a Table to Itself

```
SQL> SELECT worker.ename||' works for '||manager.ename
  2  FROM   emp worker, emp manager
  3  WHERE  worker.mgr = manager.empno;
```

```
WORKER.ENAME||'WORKSFOR'||MANAG
------------------------------
BLAKE works for KING
CLARK works for KING
JONES works for KING
MARTIN works for BLAKE
...
13 rows selected.
```

Outer Joins

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

Outer Joins

EMP

ENAME	DEPTNO
KING	10
BLAKE	30
CLARK	10
JONES	20
...	

DEPT

DEPTNO	DNAME
10	ACCOUNTING
30	SALES
10	ACCOUNTING
20	RESEARCH
...	
40	OPERATIONS

No employee in the OPERATIONS department

Outer Joins

- To see **also the** rows that do not usually meet the join condition.

- Outer join operator is the plus sign (+).

```
SELECT table.column, table.column
FROM   table1, table2
WHERE  table1.column(+) = table2.column;
```

```
SELECT table.column, table.column
FROM   table1, table2
WHERE  table1.column = table2.column(+);
```

Using Outer Joins

```
SQL> SELECT   e.ename, d.deptno, d.dname
  2  FROM     emp e, dept d
  3  WHERE    e.deptno(+) = d.deptno
  4  ORDER BY e.deptno;
```

```
ENAME          DEPTNO DNAME
---------- --------- -------------
KING               10 ACCOUNTING
CLARK              10 ACCOUNTING
...
                   40 OPERATIONS
15 rows selected.
```

Summary

- Combining data from multiple tables
- Different types of joins
- Using table aliases
- Self joins
- Outer joins