```
SQL> SELECT
  2  E.Ename EmpName,
  3  E.Job EmpJob,
  4  D.Staff Staff
  5  FROM Emp E,
  6  (
  7  SELECT Deptno, COUNT(*) Staff
  8  FROM Emp
  9  GROUP BY Deptno
 10  ) D
 11  WHERE E.Deptno = D.Deptno;

EMPNAME    EMPJOB         STAFF
---------- --------- ----------
JAMES      CLERK              6
SMITH      CLERK              5
ALLEN      SALESMAN           6
WARD       SALESMAN           6
JONES      MANAGER            5
MARTIN     SALESMAN           6
BLAKE      MANAGER            6
CLARK      MANAGER            3
SCOTT      ANALYST            5
KING       PRESIDENT          3
TURNER     SALESMAN           6

EMPNAME    EMPJOB         STAFF
---------- --------- ----------
ADAMS      CLERK              5
FORD       ANALYST            5
MILLER     CLERK              3

14 rows selected.

SQL> WITH Staff AS
  2  (
  3  SELECT Deptno, COUNT(*) Staff
  4  FROM Emp
  5  GROUP BY Deptno
  6  )
  7  SELECT
  8  E.Ename EmpName,
  9  E.Job EmpJob,
 10  D.Staff Staff
 11  FROM Emp E, Staff D
 12  WHERE E.Deptno = D.Deptno;

EMPNAME    EMPJOB         STAFF
---------- --------- ----------
JAMES      CLERK              6
SMITH      CLERK              5
ALLEN      SALESMAN           6
WARD       SALESMAN           6
JONES      MANAGER            5
```

```
MARTIN     SALESMAN            6
BLAKE      MANAGER             6
CLARK      MANAGER             3
SCOTT      ANALYST             5
KING       PRESIDENT           3
TURNER     SALESMAN            6

EMPNAME    EMPJOB          STAFF
---------- --------- ----------
ADAMS      CLERK               5
FORD       ANALYST             5
MILLER     CLERK               3

14 rows selected.

SQL> SET AUTOTRACE ON EXPLAIN
SQL> SELECT
  2  E.Ename EmpName,
  3  E.Job EmpJob,
  4  D.Staff Staff
  5  FROM Emp E,
  6  (
  7  SELECT Deptno, COUNT(*) Staff
  8  FROM Emp
  9  GROUP BY Deptno
 10  ) D
 11  WHERE E.Deptno = D.Deptno;

EMPNAME    EMPJOB          STAFF
---------- --------- ----------
JAMES      CLERK               6
SMITH      CLERK               5
ALLEN      SALESMAN            6
WARD       SALESMAN            6
JONES      MANAGER             5
MARTIN     SALESMAN            6
BLAKE      MANAGER             6
CLARK      MANAGER             3
SCOTT      ANALYST             5
KING       PRESIDENT           3
TURNER     SALESMAN            6

EMPNAME    EMPJOB          STAFF
---------- --------- ----------
ADAMS      CLERK               5
FORD       ANALYST             5
MILLER     CLERK               3

14 rows selected.


Execution Plan
----------------------------------------------------------
Plan hash value: 269884559
```

```
-------------------------------------------------------------------------------
| Id  | Operation            | Name | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------------
|   0 | SELECT STATEMENT     |      |    15 |   645 |     8  (25)| 00:00:01 |
|*  1 |  HASH JOIN           |      |    15 |   645 |     8  (25)| 00:00:01 |
|   2 |   VIEW               |      |     3 |    78 |     4  (25)| 00:00:01 |
|   3 |    HASH GROUP BY     |      |     3 |     9 |     4  (25)| 00:00:01 |
|   4 |     TABLE ACCESS FULL| EMP  |    14 |    42 |     3   (0)| 00:00:01 |
|   5 |   TABLE ACCESS FULL  | EMP  |    14 |   238 |     3   (0)| 00:00:01 |
-------------------------------------------------------------------------------

Predicate Information (identified by operation id):
---------------------------------------------------

   1 - access("E"."DEPTNO"="D"."DEPTNO")

SQL> WITH Staff AS
  2  (
  3  SELECT Deptno, COUNT(*) Staff
  4  FROM Emp
  5  GROUP BY Deptno
  6  )
  7  SELECT
  8  E.Ename EmpName,
  9  E.Job EmpJob,
 10  D.Staff Staff
 11  FROM Emp E, Staff D
 12  WHERE E.Deptno = D.Deptno;

EMPNAME    EMPJOB         STAFF
---------- --------- ----------
JAMES      CLERK              6
SMITH      CLERK              5
ALLEN      SALESMAN           6
WARD       SALESMAN           6
JONES      MANAGER            5
MARTIN     SALESMAN           6
BLAKE      MANAGER            6
CLARK      MANAGER            3
SCOTT      ANALYST            5
KING       PRESIDENT          3
TURNER     SALESMAN           6

EMPNAME    EMPJOB         STAFF
---------- --------- ----------
ADAMS      CLERK              5
FORD       ANALYST            5
MILLER     CLERK              3

14 rows selected.


Execution Plan
```

```
-----------------------------------------------------
Plan hash value: 269884559

-------------------------------------------------------------------------------
| Id  | Operation            | Name | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------------
|   0 | SELECT STATEMENT     |      |    15 |   645 |     8  (25)| 00:00:01 |
|*  1 |  HASH JOIN           |      |    15 |   645 |     8  (25)| 00:00:01 |
|   2 |   VIEW               |      |     3 |    78 |     4  (25)| 00:00:01 |
|   3 |    HASH GROUP BY     |      |     3 |     9 |     4  (25)| 00:00:01 |
|   4 |     TABLE ACCESS FULL| EMP  |    14 |    42 |     3   (0)| 00:00:01 |
|   5 |   TABLE ACCESS FULL  | EMP  |    14 |   238 |     3   (0)| 00:00:01 |
-------------------------------------------------------------------------------

Predicate Information (identified by operation id):
---------------------------------------------------

   1 - access("E"."DEPTNO"="D"."DEPTNO")

SQL> SELECT
  2  E.Ename EmpName,
  3  DE.Staff EmpDeptCount,
  4  M.Ename MGRName,
  5  DM.Staff MGRDeptCount
  6  FROM Emp E,
  7  (
  8  SELECT Deptno, COUNT(*) Staff
  9  FROM Emp
 10  GROUP BY Deptno
 11  ) DE, Emp M,
 12  (
 13  SELECT Deptno, COUNT(*) Staff
 14  FROM Emp
 15  GROUP BY Deptno
 16  ) DM
 17  WHERE E.Deptno = DE.Deptno
 18  AND E.MGR = M.Empno
 19  AND M.Deptno = DM.Deptno;

EMPNAME    EMPDEPTCOUNT MGRNAME    MGRDEPTCOUNT
---------- ------------ ---------- ------------
WARD                  6 BLAKE                 6
MARTIN                6 BLAKE                 6
ALLEN                 6 BLAKE                 6
TURNER                6 BLAKE                 6
JAMES                 6 BLAKE                 6
FORD                  5 JONES                 5
SCOTT                 5 JONES                 5
ADAMS                 5 SCOTT                 5
SMITH                 5 FORD                  5
MILLER                3 CLARK                 3
CLARK                 3 KING                  3

EMPNAME    EMPDEPTCOUNT MGRNAME    MGRDEPTCOUNT
```

```
---------- ------------ ---------- ------------
JONES                 5 KING                 3
BLAKE                 6 KING                 3

13 rows selected.


Execution Plan
----------------------------------------------------------
Plan hash value: 4043297436

-------------------------------------------------------------------------------
---------

| Id  | Operation                     | Name    | Rows  | Bytes | Cost (%CPU)| T
ime     |

-------------------------------------------------------------------------------
---------

|   0 | SELECT STATEMENT              |         |    15 |  1170 |    15  (27)| 0
0:00:01 |

|*  1 |  HASH JOIN                    |         |    15 |  1170 |    15  (27)| 0
0:00:01 |

|*  2 |   HASH JOIN                   |         |    14 |   728 |    11  (28)| 0
0:00:01 |

|   3 |    MERGE JOIN                 |         |    13 |   338 |     6  (17)| 0
0:00:01 |

|   4 |     TABLE ACCESS BY INDEX ROWID| EMP    |    14 |   182 |     2   (0)| 0
0:00:01 |

|   5 |      INDEX FULL SCAN          | PK_EMP  |    14 |       |     1   (0)| 0
0:00:01 |

|*  6 |     SORT JOIN                 |         |    13 |   169 |     4  (25)| 0
0:00:01 |

|*  7 |      TABLE ACCESS FULL        | EMP     |    13 |   169 |     3   (0)| 0
0:00:01 |

|   8 |    VIEW                       |         |     3 |    78 |     4  (25)| 0
0:00:01 |

|   9 |     HASH GROUP BY             |         |     3 |     9 |     4  (25)| 0
0:00:01 |

|  10 |      TABLE ACCESS FULL        | EMP     |    14 |    42 |     3   (0)| 0
0:00:01 |

|  11 |   VIEW                        |         |     3 |    78 |     4  (25)| 0
```

```
0:00:01 |

|  12 |    HASH GROUP BY               |        |     3 |     9 |     4  (25)| 0
0:00:01 |

|  13 |     TABLE ACCESS FULL          | EMP    |    14 |    42 |     3   (0)| 0
0:00:01 |

--------------------------------------------------------------------------------
---------


Predicate Information (identified by operation id):
---------------------------------------------------

   1 - access("M"."DEPTNO"="DM"."DEPTNO")
   2 - access("E"."DEPTNO"="DE"."DEPTNO")
   6 - access("E"."MGR"="M"."EMPNO")
       filter("E"."MGR"="M"."EMPNO")
   7 - filter("E"."MGR" IS NOT NULL)

SQL> WITH Staff AS
  2  (
  3  SELECT Deptno, COUNT(*) Staff
  4  FROM Emp
  5  GROUP BY Deptno
  6  )
  7  SELECT
  8  E.Ename EmpName,
  9  DE.Staff EmpDeptCount,
 10  M.Ename MGRName,
 11  DM.Staff MGRDeptCount
 12  FROM Emp E, Staff DE, Emp M, Staff DM
 13  WHERE E.Deptno = DE.Deptno
 14  AND E.MGR = M.Empno
 15  AND M.Deptno = DM.Deptno;

EMPNAME    EMPDEPTCOUNT MGRNAME    MGRDEPTCOUNT
---------- ------------ ---------- ------------
WARD                  6 BLAKE                 6
MARTIN                6 BLAKE                 6
ALLEN                 6 BLAKE                 6
TURNER                6 BLAKE                 6
JAMES                 6 BLAKE                 6
FORD                  5 JONES                 5
SCOTT                 5 JONES                 5
ADAMS                 5 SCOTT                 5
SMITH                 5 FORD                  5
MILLER                3 CLARK                 3
CLARK                 3 KING                  3

EMPNAME    EMPDEPTCOUNT MGRNAME    MGRDEPTCOUNT
---------- ------------ ---------- ------------
JONES                 5 KING                  3
```

```
BLAKE                  6 KING                  3

13 rows selected.


Execution Plan
----------------------------------------------------------
Plan hash value: 4258454394

-------------------------------------------------------------------------------
-----------------------------

| Id  | Operation                          | Name                       | Rows  | By
tes | Cost (%CPU)| Time     |

-------------------------------------------------------------------------------
-----------------------------

|   0 | SELECT STATEMENT                   |                            |     1 |
 78 |    15  (20)| 00:00:01 |

|   1 |  TEMP TABLE TRANSFORMATION         |                            |       |
    |            |          |

|   2 |   LOAD AS SELECT                   | SYS_TEMP_0FD9D6603_C1E299 |       |
    |            |          |

|   3 |    HASH GROUP BY                   |                            |     3 |
  9 |     4  (25)| 00:00:01 |

|   4 |     TABLE ACCESS FULL              | EMP                        |    14 |
 42 |     3   (0)| 00:00:01 |

|*  5 |   HASH JOIN                        |                            |     1 |
 78 |    11  (19)| 00:00:01 |

|*  6 |    HASH JOIN                       |                            |     4 |
208 |     9  (23)| 00:00:01 |

|   7 |     MERGE JOIN                     |                            |    13 |
338 |     6  (17)| 00:00:01 |

|   8 |      TABLE ACCESS BY INDEX ROWID| EMP                        |    14 |
182 |     2   (0)| 00:00:01 |

|   9 |       INDEX FULL SCAN              | PK_EMP                     |    14 |
    |     1   (0)| 00:00:01 |

|* 10 |     SORT JOIN                      |                            |    13 |
169 |     4  (25)| 00:00:01 |

|* 11 |       TABLE ACCESS FULL            | EMP                        |    13 |
169 |     3   (0)| 00:00:01 |
```

```
|  12 |     VIEW                       |                            |     3 |
 78 |     2   (0)| 00:00:01 |

|  13 |      TABLE ACCESS FULL         | SYS_TEMP_0FD9D6603_C1E299 |     3 |
  9 |     2   (0)| 00:00:01 |

|  14 |    VIEW                        |                            |     3 |
 78 |     2   (0)| 00:00:01 |

|  15 |     TABLE ACCESS FULL          | SYS_TEMP_0FD9D6603_C1E299 |     3 |
  9 |     2   (0)| 00:00:01 |

--------------------------------------------------------------------------------
------------------------------


Predicate Information (identified by operation id):
---------------------------------------------------

   5 - access("M"."DEPTNO"="DM"."DEPTNO")
   6 - access("E"."DEPTNO"="DE"."DEPTNO")
  10 - access("E"."MGR"="M"."EMPNO")
       filter("E"."MGR"="M"."EMPNO")
  11 - filter("E"."MGR" IS NOT NULL)

SQL> SET AUTOTRACE OFF EXPLAIN
SQL> --COALESCE Function--
SQL> SELECT
  2  Empno, Ename, Sal, Comm,
  3  COALESCE(Empno, Sal, Comm) COALESCE
  4  FROM Emp;

     EMPNO ENAME             SAL       COMM   COALESCE
---------- ---------- ---------- ---------- ----------
      7900 JAMES             950                  7900
      7369 SMITH             800                  7369
      7499 ALLEN            1600        300       7499
      7521 WARD             1250        500       7521
      7566 JONES            2975                  7566
      7654 MARTIN           1250       1400       7654
      7698 BLAKE            2850                  7698
      7782 CLARK            2450                  7782
      7788 SCOTT            3000                  7788
      7839 KING             5000                  7839
      7844 TURNER           1500          0       7844

     EMPNO ENAME             SAL       COMM   COALESCE
---------- ---------- ---------- ---------- ----------
      7876 ADAMS            1100                  7876
      7902 FORD             3000                  7902
      7934 MILLER           1300                  7934

14 rows selected.
```

```
SQL> SELECT
  2  Empno, Ename, Sal, Comm,
  3  COALESCE(Comm, Comm + 500,  Sal, Empno) COALESCE
  4  FROM Emp;

     EMPNO ENAME             SAL       COMM   COALESCE
---------- ---------- ---------- ---------- ----------
      7900 JAMES             950                   950
      7369 SMITH             800                   800
      7499 ALLEN            1600        300        300
      7521 WARD             1250        500        500
      7566 JONES            2975                  2975
      7654 MARTIN           1250       1400       1400
      7698 BLAKE            2850                  2850
      7782 CLARK            2450                  2450
      7788 SCOTT            3000                  3000
      7839 KING             5000                  5000
      7844 TURNER           1500          0          0

     EMPNO ENAME             SAL       COMM   COALESCE
---------- ---------- ---------- ---------- ----------
      7876 ADAMS            1100                  1100
      7902 FORD             3000                  3000
      7934 MILLER           1300                  1300

14 rows selected.

SQL> ED
Wrote file afiedt.buf

  1  SELECT
  2  Empno, Ename, Sal, Comm,
  3  COALESCE(Comm, NVL(Comm,0) + 500,  Sal, Empno) COALESCE
  4* FROM Emp
SQL> /

     EMPNO ENAME             SAL       COMM   COALESCE
---------- ---------- ---------- ---------- ----------
      7900 JAMES             950                   500
      7369 SMITH             800                   500
      7499 ALLEN            1600        300        300
      7521 WARD             1250        500        500
      7566 JONES            2975                   500
      7654 MARTIN           1250       1400       1400
      7698 BLAKE            2850                   500
      7782 CLARK            2450                   500
      7788 SCOTT            3000                   500
      7839 KING             5000                   500
      7844 TURNER           1500          0          0

     EMPNO ENAME             SAL       COMM   COALESCE
---------- ---------- ---------- ---------- ----------
      7876 ADAMS            1100                   500
      7902 FORD             3000                   500
```

```
      7934 MILLER          1300                    500

14 rows selected.

SQL> CREATE TABLE Null_Test
  2  (
  3  Test_ID  NUMBER(4),
  4  Col_Val1  VARCHAR2 (10) ,
  5  Col_Val2  VARCHAR2 (10) ,
  6  Col_Val3  VARCHAR2 (10) ,
  7  Col_Val4  VARCHAR2 (10) ,
  8  Col_Val5  VARCHAR2 (10)
  9  );

Table created.

SQL> INSERT ALL
  2  INTO Null_Test
  3  VALUES (100, 'FIRST', 'SECOND', 'THIRD', 'FORTH', 'FIFTH')
  4  INTO Null_Test
  5  VALUES (101, NULL, 'SECOND', 'THIRD', 'FORTH', 'FIFTH')
  6  INTO Null_Test
  7  VALUES (102, NULL, NULL, 'THIRD', 'FORTH', 'FIFTH')
  8  INTO Null_Test
  9  VALUES (103, NULL, NULL, NULL, 'FORTH', 'FIFTH')
 10  INTO Null_Test
 11  VALUES (104, NULL, NULL, 'THIRD', 'FORTH', 'FIFTH')
 12  SELECT *
 13  FROM DUAL;

5 rows created.

SQL> SELECT * FROM Null_Test;

   TEST_ID COL_VAL1   COL_VAL2   COL_VAL3   COL_VAL4   COL_VAL5
---------- ---------- ---------- ---------- ---------- ----------
       100 FIRST      SECOND     THIRD      FORTH      FIFTH
       101            SECOND     THIRD      FORTH      FIFTH
       102                       THIRD      FORTH      FIFTH
       103                                  FORTH      FIFTH
       104                       THIRD      FORTH      FIFTH

SQL> SELECT
  2  TEST_ID,
  3  COALESCE (Col_Val1, Col_Val2, Col_Val3,Col_Val4,Col_Val5) AS RESULT
  4  FROM Null_Test
  5  ORDER BY TEST_ID;

   TEST_ID RESULT
---------- ----------
       100 FIRST
       101 SECOND
       102 THIRD
       103 FORTH
```

```
       104 THIRD

SQL> --SYSTIMESTAMP Function--
SQL> SELECT SYSTIMESTAMP FROM DUAL;

SYSTIMESTAMP
---------------------------------------------------------------------------
25-JAN-24 02.42.04.412000 PM +05:30

SQL> DESC EMP;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 EMPNO                                     NOT NULL NUMBER(4)
 ENAME                                              VARCHAR2(10)
 JOB                                                VARCHAR2(9)
 MGR                                                NUMBER(4)
 HIREDATE                                           DATE
 SAL                                                NUMBER(7,2)
 COMM                                               NUMBER(7,2)
 DEPTNO                                             NUMBER(2)

SQL> SELECT
  2  EXTRACT(YEAR FROM HIREDATE) YEAR
  3  FROM EMP;

      YEAR
----------
      1981
      1980
      1981
      1981
      1981
      1981
      1981
      1981
      1981
      1987
      1981
      1981

      YEAR
----------
      1987
      1981
      1982

14 rows selected.

SQL> SELECT
  2  EXTRACT(YEAR FROM SYSTIMESTAMP) YEAR,
  3  EXTRACT(MONTH FROM SYSTIMESTAMP) MONTH,
  4  EXTRACT(DAY FROM SYSTIMESTAMP) DAY,
  5  EXTRACT(HOUR FROM SYSTIMESTAMP) HR,
  6  EXTRACT(MINUTE FROM SYSTIMESTAMP) MNT,
  7  EXTRACT(SECOND FROM SYSTIMESTAMP) SEC
```

```
  8  FROM DUAL;

      YEAR      MONTH        DAY         HR        MNT        SEC
---------- ---------- ---------- ---------- ---------- ----------
      2024          1         25          9         15     38.096

SQL> SELECT DB_TIMEZONE FROM DUAL;
SELECT DB_TIMEZONE FROM DUAL
       *
ERROR at line 1:
ORA-00904: "DB_TIMEZONE": invalid identifier


SQL> SELECT DBTIMEZONE FROM DUAL;

DBTIME
------
+00:00

SQL> SELECT
  2  Ename,
  3  Job,
  4  Sal,
  5  EXTRACT(YEAR FROM HireDate) YEAR,
  6  EXTRACT(MONTH FROM HireDate) MONTH,
  7  EXTRACT(DAY FROM HireDate) DAY,
  8  EXTRACT(HOUR FROM HireDate) HR,
  9  EXTRACT(MINUTE FROM HireDate) MNT,
 10  EXTRACT(SECOND FROM HireDate) SEC
 11  FROM Emp;
EXTRACT(SECOND FROM HireDate) SEC
                   *
ERROR at line 10:
ORA-30076: invalid extract field for extract source


SQL> SELECT
  2  Ename,
  3  Job,
  4  Sal,
  5  EXTRACT(YEAR FROM HireDate) YEAR,
  6  EXTRACT(MONTH FROM HireDate) MONTH,
  7  EXTRACT(DAY FROM HireDate) DAY
  8  FROM Emp;


ENAME      JOB              SAL       YEAR      MONTH        DAY
---------- --------- ---------- ---------- ---------- ----------
JAMES      CLERK            950       1981         12          3
SMITH      CLERK            800       1980         12         17
ALLEN      SALESMAN        1600       1981          2         20
WARD       SALESMAN        1250       1981          2         22
JONES      MANAGER         2975       1981          4          2
```

```
MARTIN     SALESMAN        1250       1981          9         28
BLAKE      MANAGER         2850       1981          5          1
CLARK      MANAGER         2450       1981          6          9
SCOTT      ANALYST         3000       1987          4         19
KING       PRESIDENT       5000       1981         11         17
TURNER     SALESMAN        1500       1981          9          8

ENAME      JOB               SAL       YEAR      MONTH        DAY
---------- --------- ---------- ---------- ---------- ----------
ADAMS      CLERK           1100       1987          5         23
FORD       ANALYST         3000       1981         12          3
MILLER     CLERK           1300       1982          1         23

14 rows selected.

SQL> ALTER TABLE EMP
  2  MODIFY
  3  (
  4  HIREDATE TIMESTAMP
  5* )
SQL> /

Table altered.

SQL> DESC EMP;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 EMPNO                                     NOT NULL NUMBER(4)
 ENAME                                              VARCHAR2(10)
 JOB                                                VARCHAR2(9)
 MGR                                                NUMBER(4)
 HIREDATE                                           TIMESTAMP(6)
 SAL                                                NUMBER(7,2)
 COMM                                               NUMBER(7,2)
 DEPTNO                                             NUMBER(2)

SQL> COL YEAR FORMAT 9999
SQL> COL MONTH FORMAT 99
SQL> COL DAY FORMAT 99
SQL> COL HR FORMAT 99
SQL> SELECT
  2  Ename,
  3  Job,
  4  Sal,
  5  EXTRACT(YEAR FROM HireDate) YEAR,
  6  EXTRACT(MONTH FROM HireDate) MONTH,
  7  EXTRACT(DAY FROM HireDate) DAY,
  8  EXTRACT(HOUR FROM HireDate) HR,
  9  EXTRACT(MINUTE FROM HireDate) MNT,
 10  EXTRACT(SECOND FROM HireDate) SEC
 11* FROM Emp

ENAME      JOB               SAL  YEAR MONTH DAY  HR        MNT        SEC
---------- --------- ---------- ----- ----- --- --- ---------- ----------
```

```
JAMES      CLERK            950  1981    12   3   0          0          0
SMITH      CLERK            800  1980    12  17   0          0          0
ALLEN      SALESMAN        1600  1981     2  20   0          0          0
WARD       SALESMAN        1250  1981     2  22   0          0          0
JONES      MANAGER         2975  1981     4   2   0          0          0
MARTIN     SALESMAN        1250  1981     9  28   0          0          0
BLAKE      MANAGER         2850  1981     5   1   0          0          0
CLARK      MANAGER         2450  1981     6   9   0          0          0
SCOTT      ANALYST         3000  1987     4  19   0          0          0
KING       PRESIDENT       5000  1981    11  17   0          0          0
TURNER     SALESMAN        1500  1981     9   8   0          0          0

ENAME      JOB                SAL  YEAR MONTH DAY  HR        MNT        SEC
---------- --------- ---------- ----- ----- --- --- ---------- ----------
ADAMS      CLERK            1100  1987     5  23   0          0          0
FORD       ANALYST          3000  1981    12   3   0          0          0
MILLER     CLERK            1300  1982     1  23   0          0          0

14 rows selected.

SQL> COL YEAR FORMAT 9999
SQL> COL MONTH FORMAT 99
SQL> COL DAY FORMAT 99
SQL> COL HR FORMAT 99
SQL> col hiredate format a10
SQL> COL ENAME FORMAT A6
SQL> COL JOB FORMAT A10
SQL> COL HIREDATE FORMAT A28
SQL> SELECT
  2  Ename,
  3  Sal,
  4  HireDate,
  5  EXTRACT(YEAR FROM HireDate) YEAR,
  6  EXTRACT(MONTH FROM HireDate) MONTH,
  7  EXTRACT(DAY FROM HireDate) DAY,
  8  EXTRACT(HOUR FROM HireDate) HR,
  9  EXTRACT(MINUTE FROM HireDate) MNT,
 10  EXTRACT(SECOND FROM HireDate) SEC
 11* FROM Emp

ENAME    SAL HIREDATE                     YEAR MONTH DAY  HR MNT SEC
------ ----- ---------------------------- ----- ----- --- --- --- ---
JAMES    950 03-DEC-81 12.00.00.000000 AM  1981    12   3   0   0   0
SMITH    800 17-DEC-80 12.00.00.000000 AM  1980    12  17   0   0   0
ALLEN   1600 20-FEB-81 12.00.00.000000 AM  1981     2  20   0   0   0
WARD    1250 22-FEB-81 12.00.00.000000 AM  1981     2  22   0   0   0
JONES   2975 02-APR-81 12.00.00.000000 AM  1981     4   2   0   0   0
MARTIN  1250 28-SEP-81 12.00.00.000000 AM  1981     9  28   0   0   0
BLAKE   2850 01-MAY-81 12.00.00.000000 AM  1981     5   1   0   0   0
CLARK   2450 09-JUN-81 12.00.00.000000 AM  1981     6   9   0   0   0
SCOTT   3000 19-APR-87 12.00.00.000000 AM  1987     4  19   0   0   0
KING    5000 17-NOV-81 12.00.00.000000 AM  1981    11  17   0   0   0
TURNER  1500 08-SEP-81 12.00.00.000000 AM  1981     9   8   0   0   0
```

```
ENAME    SAL HIREDATE                         YEAR MONTH DAY  HR MNT SEC
------ ----- --------------------------- ----- ----- --- --- --- ---
ADAMS   1100 23-MAY-87 12.00.00.000000 AM  1987     5  23   0   0   0
FORD    3000 03-DEC-81 12.00.00.000000 AM  1981    12   3   0   0   0
MILLER  1300 23-JAN-82 12.00.00.000000 AM  1982     1  23   0   0   0

14 rows selected.

SQL> --LISTAGG Function--
SQL> SELECT Ename, Job, Sal, Deptno
  2  FROM Emp
  3  ORDER BY Deptno;

ENAME  JOB          SAL     DEPTNO
------ ---------- ----- ----------
KING   PRESIDENT   5000         10
MILLER CLERK       1300         10
CLARK  MANAGER     2450         10
FORD   ANALYST     3000         20
ADAMS  CLERK       1100         20
JONES  MANAGER     2975         20
SCOTT  ANALYST     3000         20
SMITH  CLERK        800         20
TURNER SALESMAN    1500         30
MARTIN SALESMAN    1250         30
WARD   SALESMAN    1250         30
ALLEN  SALESMAN    1600         30
JAMES  CLERK        950         30
BLAKE  MANAGER     2850         30

14 rows selected.

SQL> SELECT
  2  LISTAGG(Ename, ', ')
  3  WITHIN GROUP (ORDER BY Sal) "Ename_List"
  4  FROM Emp;

Ename_List
--------------------------------------------------------------------------------
SMITH, JAMES, ADAMS, MARTIN, WARD, MILLER, TURNER, ALLEN, CLARK, BLAKE, JONES, F
ORD, SCOTT, KING


SQL> ed
Wrote file afiedt.buf

  1  SELECT
  2  LISTAGG(Ename, ', ')
  3  WITHIN GROUP (ORDER BY Sal) "Ename_List"
  4  FROM Emp
  5* GROUP BY DEPTNO
```

```
SQL> /

Ename_List
--------------------------------------------------------------------------------
MILLER, CLARK, KING
SMITH, ADAMS, JONES, FORD, SCOTT
JAMES, MARTIN, WARD, TURNER, ALLEN, BLAKE

SQL> ED
Wrote file afiedt.buf

  1  SELECT
  2  Deptno,
  3  LISTAGG(Ename, ', ')
  4  WITHIN GROUP (ORDER BY Sal) "Ename_List"
  5  FROM Emp
  6* GROUP BY DEPTNO
SQL> /

    DEPTNO
----------
Ename_List
--------------------------------------------------------------------------------
        10
MILLER, CLARK, KING

        20
SMITH, ADAMS, JONES, FORD, SCOTT

        30
JAMES, MARTIN, WARD, TURNER, ALLEN, BLAKE


SQL> COL Ename_List FORMAT A40
SQL> r
  1  SELECT
  2  Deptno,
  3  LISTAGG(Ename, ', ')
  4  WITHIN GROUP (ORDER BY Sal) "Ename_List"
  5  FROM Emp
  6* GROUP BY DEPTNO

    DEPTNO Ename_List
---------- ----------------------------------------
        10 MILLER, CLARK, KING
        20 SMITH, ADAMS, JONES, FORD, SCOTT
        30 JAMES, MARTIN, WARD, TURNER, ALLEN, BLAK
           E


SQL> COL Ename_List FORMAT A41
SQL> R
  1  SELECT
  2  Deptno,
```

```
  3  LISTAGG(Ename, ', ')
  4  WITHIN GROUP (ORDER BY Sal) "Ename_List"
  5  FROM Emp
  6* GROUP BY DEPTNO

    DEPTNO Ename_List
---------- ----------------------------------------
        10 MILLER, CLARK, KING
        20 SMITH, ADAMS, JONES, FORD, SCOTT
        30 JAMES, MARTIN, WARD, TURNER, ALLEN, BLAKE

SQL> SELECT
  2  Deptno "Deptno",
  3  HireDate "HireDate",
  4  Ename "EmpName",
  5  LISTAGG(Ename, '; ')
  6  WITHIN GROUP (ORDER BY HireDate, Ename)
  7  OVER (PARTITION BY Deptno) AS "Ename_List"
  8  FROM Emp
  9  ORDER BY "Deptno", "HireDate", "EmpName";

    Deptno HireDate                     EmpName
---------- ---------------------------- ----------
Ename_List
----------------------------------------
        10 09-JUN-81 12.00.00.000000 AM CLARK
CLARK; KING; MILLER

        10 17-NOV-81 12.00.00.000000 AM KING
CLARK; KING; MILLER

        10 23-JAN-82 12.00.00.000000 AM MILLER
CLARK; KING; MILLER


    Deptno HireDate                     EmpName
---------- ---------------------------- ----------
Ename_List
----------------------------------------
        20 17-DEC-80 12.00.00.000000 AM SMITH
SMITH; JONES; FORD; SCOTT; ADAMS

        20 02-APR-81 12.00.00.000000 AM JONES
SMITH; JONES; FORD; SCOTT; ADAMS

        20 03-DEC-81 12.00.00.000000 AM FORD
SMITH; JONES; FORD; SCOTT; ADAMS


    Deptno HireDate                     EmpName
---------- ---------------------------- ----------
Ename_List
----------------------------------------
        20 19-APR-87 12.00.00.000000 AM SCOTT
```

```
SMITH; JONES; FORD; SCOTT; ADAMS

        20 23-MAY-87 12.00.00.000000 AM ADAMS
SMITH; JONES; FORD; SCOTT; ADAMS

        30 20-FEB-81 12.00.00.000000 AM ALLEN
ALLEN; WARD; BLAKE; TURNER; MARTIN; JAMES


    Deptno HireDate                     EmpName
---------- ---------------------------- ----------
Ename_List
----------------------------------------
        30 22-FEB-81 12.00.00.000000 AM WARD
ALLEN; WARD; BLAKE; TURNER; MARTIN; JAMES

        30 01-MAY-81 12.00.00.000000 AM BLAKE
ALLEN; WARD; BLAKE; TURNER; MARTIN; JAMES

        30 08-SEP-81 12.00.00.000000 AM TURNER
ALLEN; WARD; BLAKE; TURNER; MARTIN; JAMES


    Deptno HireDate                     EmpName
---------- ---------------------------- ----------
Ename_List
----------------------------------------
        30 28-SEP-81 12.00.00.000000 AM MARTIN
ALLEN; WARD; BLAKE; TURNER; MARTIN; JAMES

        30 03-DEC-81 12.00.00.000000 AM JAMES
ALLEN; WARD; BLAKE; TURNER; MARTIN; JAMES


14 rows selected.

SQL> CREATE TABLE  Cricket_Schedule
  2  (
  3  Team  VARCHAR2(20)
  4  );

Table created.

SQL> INSERT INTO Cricket_Schedule
  2  VALUES('India');

1 row created.

SQL> INSERT INTO Cricket_Schedule
  2  VALUES('Pakistan');

1 row created.

SQL> INSERT INTO Cricket_Schedule
```

```
  2  VALUES('Srilanka');

1 row created.

SQL> INSERT INTO Cricket_Schedule
  2  VALUES('Australia');

1 row created.

SQL> INSERT INTO Cricket_Schedule
  2  VALUES('Nepal');

1 row created.

SQL> SELECT * FROM Cricket_Schedule;

TEAM
--------------------
India
Pakistan
Srilanka
Australia
Nepal

SQL> select
  2  a.team || ' VS ' || b.team  Schedule
  3  from
  4  Cricket_Schedule a,
  5  Cricket_Schedule b
  6  where
  7         a.team < b.team;

SCHEDULE
----------------------------------------
Australia VS India
Australia VS Nepal
Australia VS Pakistan
Australia VS Srilanka
India VS Nepal
India VS Pakistan
India VS Srilanka
Nepal VS Pakistan
Nepal VS Srilanka
Pakistan VS Srilanka

10 rows selected.

SQL> SPOOL OFF
```