```
SQL> SET LINESIZE 120
SQL> SET PAGESIZE 20
SQL> SELECT Deptno,SUM(Sal) SalSum
  2  FROM Emp
  3  GROUP BY Deptno;

    DEPTNO     SALSUM
---------- ----------
        30       9400
        20      10875
        10       8750

SQL>
SQL> SELECT SUM(Sal) OrgSal
  2  FROM Emp;

    ORGSAL
----------
     29025

SQL>
SQL> SELECT Deptno,SUM(Sal) SalSum,OrgSal
  2  FROM Emp,
  3  (
  4  SELECT SUM(Sal) OrgSal FROM Emp
  5  )
  6  GROUP BY Deptno,OrgSal;

    DEPTNO     SALSUM     ORGSAL
---------- ---------- ----------
        10       8750      29025
        20      10875      29025
        30       9400      29025

SQL>
SQL> SELECT Deptno,SUM(Sal),
  2  (
  3  SELECT SUM(Sal) FROM Emp
  4  ) ORGSal
  5  FROM Emp
  6  GROUP BY Deptno;

    DEPTNO   SUM(SAL)     ORGSAL
---------- ---------- ----------
        30       8450      29025
        20      10875      29025
        10       9400      29025

SQL>
SQL> SELECT Deptno,SUM(Sal) SalSUM
  2  FROM Emp
  3  GROUP BY Deptno
  4  UNION
  5  SELECT NULL,SUM(Sal)
```

```
  6  FROM Emp;

    DEPTNO     SALSUM
---------- ----------
        10       8750
        20      10875
        30       9400
                29025

SQL> SELECT Deptno, SUM(Sal)SalSum
  2  FROM Emp
  3  GROUP BY ROLLUP(Deptno);

    DEPTNO     SALSUM
---------- ----------
        10       8750
        20      10875
        30       9400
                29025


SQL> SELECT Job, SUM(Sal) SalSum
  2  FROM Emp
  3  GROUP BY ROLLUP(Job);

JOB           SALSUM
--------- ----------
ANALYST         6000
CLERK           4150
MANAGER         8275
PRESIDENT       5000
SALESMAN        5600
               29025

6 rows selected.

SQL> SELECT Job, AVG(Sal) SalAvg
  2  FROM Emp
  3  GROUP BY ROLLUP(Job);

JOB          SALAVG
--------- ----------
ANALYST         3000
CLERK         1037.5
MANAGER   2758.33333
PRESIDENT       5000
SALESMAN        1400
          2073.21429

6 rows selected.

SQL> ED
Wrote file afiedt.buf
```

```
  1  SELECT Job, TRUNC(AVG(Sal), 2) SalAvg
  2  FROM Emp
  3* GROUP BY ROLLUP(Job)
SQL> /

JOB           SALAVG
--------- ----------
ANALYST         3000
CLERK         1037.5
MANAGER      2758.33
PRESIDENT       5000
SALESMAN        1400
             2073.21

6 rows selected.

SQL> SELECT Deptno,Job,SUM(Sal) SalSum
  2  FROM Emp
  3  GROUP BY Deptno,Job
  4  ORDER BY Deptno;

    DEPTNO JOB           SALSUM
---------- --------- ----------
        10 CLERK           1300
        10 MANAGER         2450
        10 PRESIDENT       5000
        20 ANALYST         6000
        20 CLERK           1900
        20 MANAGER         2975
        30 CLERK            950
        30 MANAGER         2850
        30 SALESMAN        5600

9 rows selected.

SQL> SELECT Deptno,Job,SUM(Sal) SalSum
  2  FROM Emp
  3  GROUP BY ROLLUP(Deptno,Job)
  4  ORDER BY Deptno;

    DEPTNO JOB           SALSUM
---------- --------- ----------
        10 CLERK           1300
        10 MANAGER         2450
        10 PRESIDENT       5000
        10                 8750
        20 ANALYST         6000
        20 CLERK           1900
        20 MANAGER         2975
        20                10875
        30 CLERK            950
        30 MANAGER         2850
        30 SALESMAN        5600
        30                 9400
```

```
                          29025

13 rows selected.

SQL> SELECT Deptno, Job, SUM(Sal) SalSum
  2  FROM Emp
  3  GROUP BY Deptno, Job
  4  UNION
  5  SELECT Deptno, NULL, SUM(Sal)
  6  FROM Emp
  7  GROUP BY Deptno
  8  UNION
  9  SELECT NULL, NULL, SUM(Sal)
 10  FROM Emp;

    DEPTNO JOB           SALSUM
---------- --------- ----------
        10 CLERK           1300
        10 MANAGER         2450
        10 PRESIDENT       5000
        10                 8750
        20 ANALYST         6000
        20 CLERK           1900
        20 MANAGER         2975
        20                10875
        30 CLERK            950
        30 MANAGER         2850
        30 SALESMAN        5600
        30                 9400
                          29025

13 rows selected.

SQL> SET AUTOTRACE ON EXPLAIN
SQL> SELECT Deptno,Job,SUM(Sal) SalSum
  2  FROM Emp
  3  GROUP BY ROLLUP(Deptno,Job)
  4  ORDER BY Deptno;

    DEPTNO JOB           SALSUM
---------- --------- ----------
        10 CLERK           1300
        10 MANAGER         2450
        10 PRESIDENT       5000
        10                 8750
        20 ANALYST         6000
        20 CLERK           1900
        20 MANAGER         2975
        20                10875
        30 CLERK            950
        30 MANAGER         2850
        30 SALESMAN        5600
        30                 9400
                          29025
```

```
13 rows selected.


Execution Plan
----------------------------------------------------------
Plan hash value: 52302870

-------------------------------------------------------------------------------
----
| Id  | Operation            | Name | Rows  | Bytes | Cost (%CPU)| Time
|
-------------------------------------------------------------------------------
----
|   0 | SELECT STATEMENT     |      |    11 |   165 |     4  (25)|
00:00:01 |
|   1 |  SORT GROUP BY ROLLUP|      |    11 |   165 |     4  (25)|
00:00:01 |
|   2 |   TABLE ACCESS FULL  | EMP  |    14 |   210 |     3   (0)|
00:00:01 |
-------------------------------------------------------------------------------
----

SQL> SELECT Deptno, Job, SUM(Sal) SalSum
  2  FROM Emp
  3  GROUP BY Deptno, Job
  4  UNION
  5  SELECT Deptno, NULL, SUM(Sal)
  6  FROM Emp
  7  GROUP BY Deptno
  8  UNION
  9  SELECT NULL, NULL, SUM(Sal)
 10  FROM Emp;

    DEPTNO JOB         SALSUM
---------- --------- ---------
        10 CLERK          1300
        10 MANAGER        2450
        10 PRESIDENT      5000
        10                8750
        20 ANALYST        6000
        20 CLERK          1900
        20 MANAGER        2975
        20               10875
        30 CLERK           950
        30 MANAGER        2850
        30 SALESMAN       5600
        30                9400
                         29025

13 rows selected.


Execution Plan
```

```
-------------------------------------------------------------
Plan hash value: 3412076862

-------------------------------------------------------------------------------
----
| Id  | Operation            | Name | Rows  | Bytes | Cost (%CPU)| Time
|
-------------------------------------------------------------------------------
----
|   0 | SELECT STATEMENT     |      |    15 |   190 |    14  (79)|
00:00:01 |
|   1 |  SORT UNIQUE         |      |    15 |   190 |    14  (79)|
00:00:01 |
|   2 |   UNION-ALL          |      |       |       |            |
|
|   3 |    HASH GROUP BY     |      |    11 |   165 |     5  (40)|
00:00:01 |
|   4 |     TABLE ACCESS FULL| EMP  |    14 |   210 |     3   (0)|
00:00:01 |
|   5 |    HASH GROUP BY     |      |     3 |    21 |     5  (40)|
00:00:01 |
|   6 |     TABLE ACCESS FULL| EMP  |    14 |    98 |     3   (0)|
00:00:01 |
|   7 |    SORT AGGREGATE    |      |     1 |     4 |     4  (25)|
00:00:01 |
|   8 |     TABLE ACCESS FULL| EMP  |    14 |    56 |     3   (0)|
00:00:01 |
-------------------------------------------------------------------------------
----

SQL> SET AUTOTRACE OFF EXPLAIN
SQL> SELECT Deptno,Job,SUM(Sal) SalSum
  2  FROM Emp
  3  GROUP BY ROLLUP(Job, Deptno)
  4  ORDER BY Deptno;

    DEPTNO JOB          SALSUM
---------- --------- ----------
        10 CLERK           1300
        10 PRESIDENT       5000
        10 MANAGER         2450
        20 CLERK           1900
        20 MANAGER         2975
        20 ANALYST         6000
        30 CLERK            950
        30 SALESMAN        5600
        30 MANAGER         2850
           MANAGER         8275
           CLERK           4150
           SALESMAN        5600
           ANALYST         6000
                          29025
           PRESIDENT       5000
```

```
15 rows selected.

SQL> SELECT
  2  TO_CHAR(HireDate,'YYYY') YEAR,
  3  SUM(Sal) SalSum
  4  FROM Emp
  5  GROUP BY ROLLUP(TO_CHAR(HireDate,'YYYY'))
  6  ORDER BY TO_CHAR(HireDate,'YYYY');

YEAR     SALSUM
---- ----------
1980        800
1981      22825
1982       1300
1987       4100
          29025

SQL> SELECT Deptno,Job,SUM(Sal) SalSum
  2  FROM Emp
  3  GROUP BY Deptno,ROLLUP(Job)
  4  ORDER BY Deptno;

    DEPTNO JOB           SALSUM
---------- --------- ----------
        10 CLERK           1300
        10 MANAGER         2450
        10 PRESIDENT       5000
        10                 8750
        20 ANALYST         6000
        20 CLERK           1900
        20 MANAGER         2975
        20                10875
        30 CLERK            950
        30 MANAGER         2850
        30 SALESMAN        5600
        30                 9400

12 rows selected.

SQL> SELECT Deptno,Job,SUM(Sal) SalSum
  2  FROM Emp
  3  GROUP BY ROLLUP(Deptno),Job
  4  ORDER BY Deptno;

    DEPTNO JOB           SALSUM
---------- --------- ----------
        10 CLERK           1300
        10 MANAGER         2450
        10 PRESIDENT       5000
        20 CLERK           1900
        20 ANALYST         6000
        20 MANAGER         2975
        30 MANAGER         2850
        30 CLERK            950
```

```
        30 SALESMAN        5600
           MANAGER         8275
           SALESMAN        5600
           CLERK           4150
           ANALYST         6000
           PRESIDENT       5000

14 rows selected.

SQL> SELECT Deptno,
  2  SUM(Sal) SalSum,
  3  TRUNC(AVG(Sal),2) SalAvg,
  4  MAX(Sal) SalMax,
  5  MIN(Sal) SalMin,
  6  COUNT(*) Staff
  7  FROM Emp
  8  GROUP BY ROLLUP(Deptno)
  9  ORDER BY Deptno;

    DEPTNO     SALSUM     SALAVG     SALMAX     SALMIN      STAFF
---------- ---------- ---------- ---------- ---------- ----------
        10       8750    2916.66       5000       1300          3
        20      10875       2175       3000        800          5
        30       9400    1566.66       2850        950          6
                29025    2073.21       5000        800         14

SQL> ED
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  1  SELECT NVL(TO_CHAR(Deptno),'All Departments') Deptno,
  2  SUM(Sal) SalSum,
  3  TRUNC(AVG(Sal),2) SalAvg,
  4  MAX(Sal) SalMax,
  5  MIN(Sal) SalMin,
  6  COUNT(*) Staff
  7  FROM Emp
  8  GROUP BY ROLLUP(Deptno)
  9* ORDER BY Deptno
SQL> /

DEPTNO                                        SALSUM     SALAVG     SALMAX
SALMIN      STAFF
---------------------------------------- ---------- ---------- ----------
---------- ----------
10                                             8750    2916.66       5000
1300          3
20                                            10875       2175       3000
800          5
30                                             9400    1566.66       2850
950          6
All Departments                               29025    2073.21       5000
800         14

SQL> COL Deptno FOR A16
```

```
SQL> R
  1  SELECT NVL(TO_CHAR(Deptno),'All Departments') Deptno,
  2  SUM(Sal) SalSum,
  3  TRUNC(AVG(Sal),2) SalAvg,
  4  MAX(Sal) SalMax,
  5  MIN(Sal) SalMin,
  6  COUNT(*) Staff
  7  FROM Emp
  8  GROUP BY ROLLUP(Deptno)
  9* ORDER BY Deptno

DEPTNO               SALSUM     SALAVG     SALMAX     SALMIN      STAFF
---------------- ---------- ---------- ---------- ---------- ----------
10                     8750    2916.66       5000       1300          3
20                    10875       2175       3000        800          5
30                     9400    1566.66       2850        950          6
All Departments       29025    2073.21       5000        800         14

SQL> --CUBE Function--
SQL> SELECT Deptno,Job,SUM(Sal) SalSum
  2  FROM Emp
  3  GROUP BY CUBE(Deptno,Job)
  4  ORDER BY Deptno;

    DEPTNO JOB           SALSUM
---------- --------- ----------
########## CLERK           1300
########## MANAGER         2450
########## PRESIDENT       5000
##########                 8750
########## ANALYST         6000
########## CLERK           1900
########## MANAGER         2975
##########                10875
########## CLERK            950
########## MANAGER         2850
########## SALESMAN        5600
##########                 9400
           ANALYST         6000
           CLERK           4150
           MANAGER         8275
           PRESIDENT       5000
           SALESMAN        5600

    DEPTNO JOB           SALSUM
---------- --------- ----------
                          29025

18 rows selected.

SQL> COL Deptno FOR 9999
SQL> R
  1  SELECT Deptno,Job,SUM(Sal) SalSum
  2  FROM Emp
```

```
  3  GROUP BY CUBE(Deptno,Job)
  4* ORDER BY Deptno

DEPTNO JOB           SALSUM
------ --------- ----------
    10 CLERK           1300
    10 MANAGER         2450
    10 PRESIDENT       5000
    10                 8750
    20 ANALYST         6000
    20 CLERK           1900
    20 MANAGER         2975
    20                10875
    30 CLERK            950
    30 MANAGER         2850
    30 SALESMAN        5600
    30                 9400
       ANALYST         6000
       CLERK           4150
       MANAGER         8275
       PRESIDENT       5000
       SALESMAN        5600

DEPTNO JOB           SALSUM
------ --------- ----------
                     29025

18 rows selected.

SQL> COL DEPTNO FORMAT 99
SQL> SELECT DEPTNO,
  2  GROUPING(DEPTNO) GRPID,
  3  SUM(SAL) SALSUM
  4  FROM EMP
  5  GROUP BY ROLLUP(DEPTNO);

DEPTNO      GRPID     SALSUM
------ ---------- ----------
    10          0       8750
    20          0      10875
    30          0       9400
                1      29025

SQL> SELECT
  2  DEPTNO,
  3  GROUPING(DEPTNO) DEPTGRPID,
  4  JOB,
  5  GROUPING(JOB) JOBGRPID,
  6  SUM(SAL) SALSUM
  7  FROM EMP
  8  GROUP BY ROLLUP(DEPTNO,JOB);

    DEPTNO  DEPTGRPID JOB         JOBGRPID     SALSUM
---------- ---------- --------- ---------- ----------
```

```
        10          0 CLERK               0       1300
        10          0 MANAGER             0       2450
        10          0 PRESIDENT           0       5000
        10          0                     1       8750
        20          0 CLERK               0       1900
        20          0 ANALYST             0       6000
        20          0 MANAGER             0       2975
        20          0                     1      10875
        30          0 CLERK               0        950
        30          0 MANAGER             0       2850
        30          0 SALESMAN            0       5600
        30          0                     1       9400
                    1                     1      29025

SQL> SELECT
  2  DEPTNO,
  3  GROUPING(DEPTNO) DEPTGRPID,
  4  JOB,
  5  GROUPING(JOB) JOBGRPID,
  6  SUM(SAL) SALSUM
  7  FROM EMP
  8  GROUP BY CUBE(DEPTNO,JOB);

    DEPTNO  DEPTGRPID JOB         JOBGRPID     SALSUM
---------- ---------- --------- ---------- ----------
                    1                     1      29025
                    1 CLERK               0       4150
                    1 ANALYST             0       6000
                    1 MANAGER             0       8275
                    1 SALESMAN            0       5600
                    1 PRESIDENT           0       5000
        10          0                     1       8750
        10          0 CLERK               0       1300
        10          0 MANAGER             0       2450
        10          0 PRESIDENT           0       5000
        20          0                     1      10875
        20          0 CLERK               0       1900
        20          0 ANALYST             0       6000
        20          0 MANAGER             0       2975
        30          0                     1       9400
        30          0 CLERK               0        950
        30          0 MANAGER             0       2850

    DEPTNO  DEPTGRPID JOB         JOBGRPID     SALSUM
---------- ---------- --------- ---------- ----------
        30          0 SALESMAN            0       5600

18 rows selected.

SQL> COL DEPTNO FORMAT A15
SQL> SELECT
  2  NVL(TO_CHAR(DEPTNO),'ALL DEPARTMENTS') DEPTNO,
  3  NVL(TO_CHAR(JOB),'ALL JOBS') JOB,
  4  SUM(SAL) SALSUM
```

```
  5  FROM EMP
  6  GROUP BY CUBE(DEPTNO,JOB)
  7  ORDER BY DEPTNO;

DEPTNO          JOB           SALSUM
--------------- --------- ----------
10              PRESIDENT       5000
10              MANAGER         2450
10              ALL JOBS        8750
10              CLERK           1300
20              MANAGER         2975
20              ANALYST         6000
20              CLERK           1900
20              ALL JOBS       10875
30              MANAGER         2850
30              SALESMAN        5600
30              CLERK            950
30              ALL JOBS        9400
ALL DEPARTMENTS CLERK           4150
ALL DEPARTMENTS ALL JOBS       29025
ALL DEPARTMENTS ANALYST         6000
ALL DEPARTMENTS MANAGER         8275
ALL DEPARTMENTS SALESMAN        5600

DEPTNO          JOB           SALSUM
--------------- --------- ----------
ALL DEPARTMENTS PRESIDENT       5000

18 rows selected.

SQL> SPOOL OFF
```