```
SQL> SELECT DEPTNO,JOB,SUM(SAL)
  2  FROM EMP
  3  GROUP BY DEPTNO,JOB
  4  ORDER BY 1;

DEPTNO JOB         SUM(SAL)
------ ---------- --------
    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> CREATE MATERIALIZED VIEW EMP_SUM
  2  ENABLE QUERY REWRITE
  3  AS
  4  SELECT DEPTNO, JOB,SUM(SAL)
  5  FROM EMP
  6  GROUP BY DEPTNO,JOB;
FROM EMP
     *
ERROR at line 5:
ORA-01031: insufficient privileges


SQL> CONN SYS AS SYSDBA
Connected.
SQL> GRANT CREATE MATERIALIZED VIEW TO SCOTT;

Grant succeeded.

SQL> GRANT QUERY REWRITE TO SCOTT;

Grant succeeded.

SQL> GRANT ALTER SESSION TO SCOTT;

Grant succeeded.

SQL> CONN SCOTT/tiger
ERROR:
ORA-28002: the password will expire within 11015 days


Connected.
SQL> ALTER SESSION SET QUERY_REWRITE_ENABLED='TRUE';
```

```
Session altered.

SQL> CREATE MATERIALIZED VIEW EMP_SUM
  2  ENABLE QUERY REWRITE
  3  AS
  4  SELECT DEPTNO, JOB,SUM(SAL)
  5  FROM EMP
  6  GROUP BY DEPTNO,JOB;

Materialized view created.

SQL> SET AUTOTRACE ON EXPLAIN
SQL> SELECT DEPTNO, JOB, SUM(SAL)
  2  FROM EMP
  3  GROUP BY DEPTNO,JOB
  4  /

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

9 rows selected.


Execution Plan
----------------------------------------------------------
Plan hash value: 82228995

-------------------------------------------------------------------------------
---------------
| Id  | Operation                    | Name    | Rows  | Bytes | Cost
(%CPU)| Time     |
-------------------------------------------------------------------------------
---------------
|   0 | SELECT STATEMENT             |         |     9 |   288 |     3
(0)| 00:00:01 |
|   1 |  MAT_VIEW REWRITE ACCESS FULL| EMP_SUM |     9 |   288 |     3
(0)| 00:00:01 |
-------------------------------------------------------------------------------
---------------

Note
-----
   - dynamic sampling used for this statement (level=2)

SQL> SELECT DEPTNO, SUM(SAL)
```

```
  2  FROM EMP
  3  GROUP BY DEPTNO
  4  /

DEPTNO SUM(SAL)
------ --------
    30     9400
    20    10875
    10     8750


Execution Plan
----------------------------------------------------------
Plan hash value: 2751693713

-------------------------------------------------------------------------------
----------------
| Id  | Operation                     | Name    | Rows  | Bytes | Cost
(%CPU)| Time     |
-------------------------------------------------------------------------------
----------------
|   0 | SELECT STATEMENT              |         |     9 |   234 |     4
(25)| 00:00:01 |
|   1 |  HASH GROUP BY                |         |     9 |   234 |     4
(25)| 00:00:01 |
|   2 |   MAT_VIEW REWRITE ACCESS FULL| EMP_SUM |     9 |   234 |     3
(0)| 00:00:01 |
-------------------------------------------------------------------------------
----------------

Note
-----
   - dynamic sampling used for this statement (level=2)

SQL> SELECT JOB,SUM(SAL)
  2  FROM EMP
  3  GROUP BY JOB;

JOB        SUM(SAL)
---------- --------
CLERK          4150
SALESMAN       5600
PRESIDENT      5000
MANAGER        8275
ANALYST        6000


Execution Plan
----------------------------------------------------------
Plan hash value: 2751693713

-------------------------------------------------------------------------------
----------------
```

```
| Id  | Operation                     | Name    | Rows  | Bytes | Cost
(%CPU)| Time     |
-------------------------------------------------------------------------
----------------
|   0 | SELECT STATEMENT              |         |     9 |   171 |     4
(25)| 00:00:01 |
|   1 |  HASH GROUP BY                |         |     9 |   171 |     4
(25)| 00:00:01 |
|   2 |   MAT_VIEW REWRITE ACCESS FULL| EMP_SUM |     9 |   171 |     3
(0)| 00:00:01 |
-------------------------------------------------------------------------
----------------

Note
-----
   - dynamic sampling used for this statement (level=2)

SQL> SELECT DEPTNO, SUM(SAL)
  2  FROM EMP
  3  GROUP BY ROLLUP(DEPTNO);

DEPTNO SUM(SAL)
------ --------
    10     8750
    20    10875
    30     9400
          29025


Execution Plan
----------------------------------------------------------
Plan hash value: 2868327837

-------------------------------------------------------------------------
----------------
| Id  | Operation                     | Name    | Rows  | Bytes | Cost
(%CPU)| Time     |
-------------------------------------------------------------------------
----------------
|   0 | SELECT STATEMENT              |         |     9 |   234 |     4
(25)| 00:00:01 |
|   1 |  SORT GROUP BY ROLLUP         |         |     9 |   234 |     4
(25)| 00:00:01 |
|   2 |   MAT_VIEW REWRITE ACCESS FULL| EMP_SUM |     9 |   234 |     3
(0)| 00:00:01 |
-------------------------------------------------------------------------
----------------

Note
-----
   - dynamic sampling used for this statement (level=2)

SQL> SELECT JOB, SUM(SAL)
  2  FROM EMP
```

```
  3  GROUP BY ROLLUP(JOB);

JOB         SUM(SAL)
---------- --------
ANALYST         6000
CLERK           4150
MANAGER         8275
PRESIDENT       5000
SALESMAN        5600
               29025

6 rows selected.


Execution Plan
----------------------------------------------------------
Plan hash value: 2868327837

-------------------------------------------------------------------------------
----------------
| Id  | Operation                     | Name    | Rows  | Bytes | Cost
(%CPU)| Time     |
-------------------------------------------------------------------------------
----------------
|   0 | SELECT STATEMENT              |         |     9 |   171 |     4
(25)| 00:00:01 |
|   1 |  SORT GROUP BY ROLLUP         |         |     9 |   171 |     4
(25)| 00:00:01 |
|   2 |   MAT_VIEW REWRITE ACCESS FULL| EMP_SUM |     9 |   171 |     3
(0)| 00:00:01 |
-------------------------------------------------------------------------------
----------------

Note
-----
   - dynamic sampling used for this statement (level=2)

SQL> SELECT DEPTNO, JOB, SUM(SAL)
  2  FROM EMP
  3  GROUP BY ROLLUP(DEPTNO,JOB);

DEPTNO JOB         SUM(SAL)
------ ---------- --------
    10 CLERK          1300
    10 MANAGER        2450
    10 PRESIDENT      5000
    10                8750
    20 CLERK          1900
    20 ANALYST        6000
    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: 2868327837

-------------------------------------------------------------------------------
----------------
| Id  | Operation                     | Name    | Rows  | Bytes | Cost
(%CPU)| Time     |
-------------------------------------------------------------------------------
----------------
|   0 | SELECT STATEMENT              |         |     9 |   288 |     4
(25)| 00:00:01 |
|   1 |  SORT GROUP BY ROLLUP         |         |     9 |   288 |     4
(25)| 00:00:01 |
|   2 |   MAT_VIEW REWRITE ACCESS FULL| EMP_SUM |     9 |   288 |     3
(0)| 00:00:01 |
-------------------------------------------------------------------------------
----------------

Note
-----
   - dynamic sampling used for this statement (level=2)

SQL> SELECT DEPTNO, JOB, SUM(SAL)
  2  FROM EMP
  3  GROUP BY CUBE(DEPTNO,JOB);

DEPTNO JOB         SUM(SAL)
------ ---------- --------
                     29025
       CLERK          4150
       ANALYST        6000
       MANAGER        8275
       SALESMAN       5600
       PRESIDENT      5000
    10                8750
    10 CLERK          1300
    10 MANAGER        2450
    10 PRESIDENT      5000
    20               10875
    20 CLERK          1900
    20 ANALYST        6000
    20 MANAGER        2975
    30                9400
    30 CLERK           950
    30 MANAGER        2850

DEPTNO JOB         SUM(SAL)
```

```
------ ---------- --------
    30 SALESMAN       5600

18 rows selected.


Execution Plan
----------------------------------------------------------
Plan hash value: 1797585325

-------------------------------------------------------------------------------
------------------
| Id  | Operation                          | Name    | Rows  | Bytes | Cost
(%CPU)| Time     |
-------------------------------------------------------------------------------
------------------
|   0 | SELECT STATEMENT                   |         |     9 |   288 |     4
(25)| 00:00:01 |
|   1 |  SORT GROUP BY                     |         |     9 |   288 |     4
(25)| 00:00:01 |
|   2 |   GENERATE CUBE                    |         |     9 |   288 |     4
(25)| 00:00:01 |
|   3 |    SORT GROUP BY                   |         |     9 |   288 |     4
(25)| 00:00:01 |
|   4 |     MAT_VIEW REWRITE ACCESS FULL| EMP_SUM |     9 |   288 |     3
(0)| 00:00:01 |
-------------------------------------------------------------------------------
------------------

Note
-----
   - dynamic sampling used for this statement (level=2)

SQL> SELECT DEPTNO, JOB, SUM(SAL)
  2  FROM EMP
  3  GROUP BY GROUPING SETS(DEPTNO, JOB);

DEPTNO JOB       SUM(SAL)
------ --------- --------
    30               9400
    20              10875
    10               8750
       CLERK         4150
       SALESMAN      5600
       PRESIDENT     5000
       MANAGER       8275
       ANALYST       6000

8 rows selected.


Execution Plan
----------------------------------------------------------
Plan hash value: 3271332219
```

```
-------------------------------------------------------------------------------
-------------------------------
| Id  | Operation                    | Name                       | Rows  |
Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------------
-------------------------------
|   0 | SELECT STATEMENT             |                            |     9 |
288 |    11  (19)| 00:00:01 |
|   1 |  TEMP TABLE TRANSFORMATION   |                            |       |
|           |          |
|   2 |   LOAD AS SELECT             | SYS_TEMP_0FD9D6608_BFB538  |       |
|           |          |
|   3 |    MAT_VIEW ACCESS FULL      | EMP_SUM                    |     9 |
288 |     3   (0)| 00:00:01 |
|   4 |   LOAD AS SELECT             | SYS_TEMP_0FD9D6609_BFB538  |       |
|           |          |
|   5 |    HASH GROUP BY             |                            |     1 |
26 |     3  (34)| 00:00:01 |
|   6 |     TABLE ACCESS FULL        | SYS_TEMP_0FD9D6608_BFB538  |     1 |
26 |     2   (0)| 00:00:01 |
|   7 |   LOAD AS SELECT             | SYS_TEMP_0FD9D6609_BFB538  |       |
|           |          |
|   8 |    HASH GROUP BY             |                            |     1 |
19 |     3  (34)| 00:00:01 |
|   9 |     TABLE ACCESS FULL        | SYS_TEMP_0FD9D6608_BFB538  |     1 |
19 |     2   (0)| 00:00:01 |
|  10 |   VIEW                       |                            |     1 |
32 |     2   (0)| 00:00:01 |
|  11 |    TABLE ACCESS FULL         | SYS_TEMP_0FD9D6609_BFB538  |     1 |
32 |     2   (0)| 00:00:01 |
-------------------------------------------------------------------------------
-------------------------------

Note
-----
   - dynamic sampling used for this statement (level=2)

SQL> SELECT DEPTNO, AVG(SAL)
  2  FROM EMP
  3  GROUP BY DEPTNO;

DEPTNO   AVG(SAL)
------ ----------
    30 1566.66667
    20       2175
    10 2916.66667


Execution Plan
----------------------------------------------------------
Plan hash value: 4067220884
```

```
-------------------------------------------------------------------------------
--
| Id  | Operation          | Name | Rows  | Bytes | Cost (%CPU)| Time
|
-------------------------------------------------------------------------------
--
|   0 | SELECT STATEMENT   |      |     3 |    21 |     4  (25)| 00:00:01
|
|   1 |  HASH GROUP BY     |      |     3 |    21 |     4  (25)| 00:00:01
|
|   2 |   TABLE ACCESS FULL| EMP  |    14 |    98 |     3   (0)| 00:00:01
|
-------------------------------------------------------------------------------
--

SQL> SELECT
  2  DEPTNO,
  3  JOB,
  4  MGR,
  5  TO_CHAR(HIREDATE,'YYYY') Year,
  6  TO_CHAR(HIREDATE,'Q') Quarter,
  7  TO_CHAR(HIREDATE,'FMMONTH') Month,
  8  TO_CHAR(HIREDATE,'W') Week,
  9  TO_CHAR(HIREDATE,'FMDAY') Day,
 10  SUM(SAL)
 11  FROM EMP
 12  GROUP BY
 13  GROUPING SETS
 14  (
 15  DEPTNO,
 16  JOB,
 17  MGR,
 18  TO_CHAR(HIREDATE,'YYYY'),
 19  TO_CHAR(HIREDATE,'Q'),
 20  TO_CHAR(HIREDATE,'FMMONTH'),
 21  TO_CHAR(HIREDATE,'W'),
 22  TO_CHAR(HIREDATE,'FMDAY')
 23  );

DEPTNO JOB         MGR YEAR Q MONTH     W DAY       SUM(SAL)
------ --------- ----- ---- - --------- - --------- --------
                  7839                                 8275
                                                       5000
                  7782                                 1300
                  7698                                 6550
                  7902                                  800
                  7566                                 6000
                  7788                                 1100
       CLERK                                           4150
       SALESMAN                                        5600
       PRESIDENT                                       5000
       MANAGER                                         8275
       ANALYST                                         6000
    30                                                 9400
```

```
    20                                                      10875
    10                                                       8750
                        1987                                 4100
                        1980                                  800

DEPTNO JOB           MGR YEAR Q MONTH     W DAY        SUM(SAL)
------ ---------- ----- ---- - --------- - --------- --------
                        1982                                1300
                        1981                               22825
                             1                              4150
                             3                              2750
                             4                              9750
                             2                             12375
                               FEBRUARY                     2850
                               NOVEMBER                     5000
                               JUNE                         2450
                               DECEMBER                     4750
                               APRIL                        5975
                               JANUARY                      1300
                               SEPTEMBER                    2750
                               MAY                          3950
                                         1                  9775
                                         3                 10400
                                         4                  4900

DEPTNO JOB           MGR YEAR Q MONTH     W DAY        SUM(SAL)
------ ---------- ----- ---- - --------- - --------- --------
                                         2                  3950
                                           THURSDAY         6925
                                           FRIDAY           4450
                                           TUESDAY          8950
                                           SUNDAY           4250
                                           MONDAY           1250
                                           WEDNESDAY         800
                                           SATURDAY         2400

42 rows selected.


Execution Plan
----------------------------------------------------------
Plan hash value: 3143739645

-------------------------------------------------------------------------------
-------------------------------
| Id  | Operation                  | Name                       | Rows  |
Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------------
-------------------------------
|   0 | SELECT STATEMENT           |                            |    14 |
910 |    29  (28)| 00:00:01 |
|   1 |  TEMP TABLE TRANSFORMATION |                            |       |
|           |          |
```

```
|   2 |   LOAD AS SELECT           | SYS_TEMP_0FD9D660E_BFB538 |        |
|           |          |
|   3 |    TABLE ACCESS FULL       | EMP                       |    14 |
378 |     3   (0)| 00:00:01 |
|   4 |   LOAD AS SELECT           | SYS_TEMP_0FD9D660F_BFB538 |        |
|           |          |
|   5 |    HASH GROUP BY           |                           |     1 |
26 |     3  (34)| 00:00:01 |
|   6 |     TABLE ACCESS FULL      | SYS_TEMP_0FD9D660E_BFB538 |     1 |
26 |     2   (0)| 00:00:01 |
|   7 |   LOAD AS SELECT           | SYS_TEMP_0FD9D660F_BFB538 |        |
|           |          |
|   8 |    HASH GROUP BY           |                           |     1 |
19 |     3  (34)| 00:00:01 |
|   9 |     TABLE ACCESS FULL      | SYS_TEMP_0FD9D660E_BFB538 |     1 |
19 |     2   (0)| 00:00:01 |
|  10 |   LOAD AS SELECT           | SYS_TEMP_0FD9D660F_BFB538 |        |
|           |          |
|  11 |    HASH GROUP BY           |                           |     1 |
26 |     3  (34)| 00:00:01 |
|  12 |     TABLE ACCESS FULL      | SYS_TEMP_0FD9D660E_BFB538 |     1 |
26 |     2   (0)| 00:00:01 |
|  13 |   LOAD AS SELECT           | SYS_TEMP_0FD9D660F_BFB538 |        |
|           |          |
|  14 |    HASH GROUP BY           |                           |     1 |
17 |     3  (34)| 00:00:01 |
|  15 |     TABLE ACCESS FULL      | SYS_TEMP_0FD9D660E_BFB538 |     1 |
17 |     2   (0)| 00:00:01 |
|  16 |   LOAD AS SELECT           | SYS_TEMP_0FD9D660F_BFB538 |        |
|           |          |
|  17 |    HASH GROUP BY           |                           |     1 |
15 |     3  (34)| 00:00:01 |
|  18 |     TABLE ACCESS FULL      | SYS_TEMP_0FD9D660E_BFB538 |     1 |
15 |     2   (0)| 00:00:01 |
|  19 |   LOAD AS SELECT           | SYS_TEMP_0FD9D660F_BFB538 |        |
|           |          |
|  20 |    HASH GROUP BY           |                           |     1 |
19 |     3  (34)| 00:00:01 |
|  21 |     TABLE ACCESS FULL      | SYS_TEMP_0FD9D660E_BFB538 |     1 |
19 |     2   (0)| 00:00:01 |
|  22 |   LOAD AS SELECT           | SYS_TEMP_0FD9D660F_BFB538 |        |
|           |          |
|  23 |    HASH GROUP BY           |                           |     1 |
15 |     3  (34)| 00:00:01 |
|  24 |     TABLE ACCESS FULL      | SYS_TEMP_0FD9D660E_BFB538 |     1 |
15 |     2   (0)| 00:00:01 |
|  25 |   LOAD AS SELECT           | SYS_TEMP_0FD9D660F_BFB538 |        |
|           |          |
|  26 |    HASH GROUP BY           |                           |     1 |
19 |     3  (34)| 00:00:01 |
|  27 |     TABLE ACCESS FULL      | SYS_TEMP_0FD9D660E_BFB538 |     1 |
19 |     2   (0)| 00:00:01 |
|  28 |   VIEW                     |                           |     1 |
65 |     2   (0)| 00:00:01 |
```

```
|  29 |    TABLE ACCESS FULL       | SYS_TEMP_0FD9D660F_BFB538 |     1 |
65 |     2   (0)| 00:00:01 |
-------------------------------------------------------------------------------
------------------------------

SQL> CREATE MATERIALIZED VIEW MySubTotals
  2  ENABLE QUERY REWRITE
  3  BUILD IMMEDIATE
  4  REFRESH COMPLETE ON COMMIT
  5  AS
  6  SELECT
  7  DEPTNO,
  8  JOB,
  9  MGR,
 10  TO_CHAR(HIREDATE,'YYYY') Year,
 11  TO_CHAR(HIREDATE,'Q') Quarter,
 12  TO_CHAR(HIREDATE,'FMMONTH') Month,
 13  TO_CHAR(HIREDATE,'W') Week,
 14  TO_CHAR(HIREDATE,'FMDAY') Day,
 15  SUM(SAL)
 16  FROM EMP
 17  GROUP BY
 18  GROUPING SETS
 19  (
 20  DEPTNO,
 21  JOB,
 22  MGR,
 23  TO_CHAR(HIREDATE,'YYYY'),
 24  TO_CHAR(HIREDATE,'Q'),
 25  TO_CHAR(HIREDATE,'FMMONTH'),
 26  TO_CHAR(HIREDATE,'W'),
 27  TO_CHAR(HIREDATE,'FMDAY')
 28  );
BUILD IMMEDIATE
*
ERROR at line 3:
ORA-00905: missing keyword


SQL> CREATE MATERIALIZED VIEW MySubTotals
  2  ENABLE QUERY REWRITE
  3  --BUILD IMMEDIATE
  4  REFRESH COMPLETE ON COMMIT
  5  AS
  6  SELECT
  7  DEPTNO,
  8  JOB,
  9  MGR,
 10  TO_CHAR(HIREDATE,'YYYY') Year,
 11  TO_CHAR(HIREDATE,'Q') Quarter,
 12  TO_CHAR(HIREDATE,'FMMONTH') Month,
 13  TO_CHAR(HIREDATE,'W') Week,
 14  TO_CHAR(HIREDATE,'FMDAY') Day,
 15  SUM(SAL)
```

```
 16  FROM EMP
 17  GROUP BY
 18  GROUPING SETS
 19  (
 20  DEPTNO,
 21  JOB,
 22  MGR,
 23  TO_CHAR(HIREDATE,'YYYY'),
 24  TO_CHAR(HIREDATE,'Q'),
 25  TO_CHAR(HIREDATE,'FMMONTH'),
 26  TO_CHAR(HIREDATE,'W'),
 27  TO_CHAR(HIREDATE,'FMDAY')
 28  );
REFRESH COMPLETE ON COMMIT
*
ERROR at line 4:
ORA-00905: missing keyword


SQL> CREATE MATERIALIZED VIEW MySubTotals
  2  ENABLE QUERY REWRITE
  3  --BUILD IMMEDIATE
  4  --REFRESH COMPLETE ON COMMIT
  5  AS
  6  SELECT
  7  DEPTNO,
  8  JOB,
  9  MGR,
 10  TO_CHAR(HIREDATE,'YYYY') Year,
 11  TO_CHAR(HIREDATE,'Q') Quarter,
 12  TO_CHAR(HIREDATE,'FMMONTH') Month,
 13  TO_CHAR(HIREDATE,'W') Week,
 14  TO_CHAR(HIREDATE,'FMDAY') Day,
 15  SUM(SAL)
 16  FROM EMP
 17  GROUP BY
 18  GROUPING SETS
 19  (
 20  DEPTNO,
 21  JOB,
 22  MGR,
 23  TO_CHAR(HIREDATE,'YYYY'),
 24  TO_CHAR(HIREDATE,'Q'),
 25  TO_CHAR(HIREDATE,'FMMONTH'),
 26  TO_CHAR(HIREDATE,'W'),
 27  TO_CHAR(HIREDATE,'FMDAY')
 28  );

Materialized view created.

SQL> SELECT
  2  DEPTNO,
  3  JOB,
  4  MGR,
```

```
  5  TO_CHAR(HIREDATE,'YYYY') Year,
  6  TO_CHAR(HIREDATE,'Q') Quarter,
  7  TO_CHAR(HIREDATE,'FMMONTH') Month,
  8  TO_CHAR(HIREDATE,'W') Week,
  9  TO_CHAR(HIREDATE,'FMDAY') Day,
 10  SUM(SAL)
 11  FROM EMP
 12  GROUP BY
 13  GROUPING SETS
 14  (
 15  DEPTNO,
 16  JOB,
 17  MGR,
 18  TO_CHAR(HIREDATE,'YYYY'),
 19  TO_CHAR(HIREDATE,'Q'),
 20  TO_CHAR(HIREDATE,'FMMONTH'),
 21  TO_CHAR(HIREDATE,'W'),
 22  TO_CHAR(HIREDATE,'FMDAY')
 23  );
```

DEPTNO	JOB	MGR	YEAR	Q	MONTH	W	DAY	SUM(SAL)
		7839						8275
								5000
		7782						1300
		7698						6550
		7902						800
		7566						6000
		7788						1100
	CLERK							4150
	SALESMAN							5600
	PRESIDENT							5000
	MANAGER							8275
	ANALYST							6000
30								9400
20								10875
10								8750
			1987					4100
			1980					800

DEPTNO	JOB	MGR	YEAR	Q	MONTH	W	DAY	SUM(SAL)
			1982					1300
			1981					22825
				1				4150
				3				2750
				4				9750
				2				12375
					FEBRUARY			2850
					NOVEMBER			5000
					JUNE			2450
					DECEMBER			4750
					APRIL			5975
					JANUARY			1300

```
                                SEPTEMBER                 2750
                                MAY                       3950
                                          1               9775
                                          3              10400
                                          4               4900

DEPTNO JOB          MGR YEAR Q MONTH     W DAY       SUM(SAL)
------ ---------- ----- ---- - --------- - --------- --------
                                          2               3950
                                            THURSDAY      6925
                                            FRIDAY        4450
                                            TUESDAY       8950
                                            SUNDAY        4250
                                            MONDAY        1250
                                            WEDNESDAY      800
                                            SATURDAY      2400

42 rows selected.


Execution Plan
----------------------------------------------------------
Plan hash value: 4085117410

-------------------------------------------------------------------------------
-------------------
| Id  | Operation                    | Name        | Rows  | Bytes | Cost
(%CPU)| Time     |
-------------------------------------------------------------------------------
-------------------
|   0 | SELECT STATEMENT             |             |    42 |  2730 |
3   (0)| 00:00:01 |
|   1 |  MAT_VIEW REWRITE ACCESS FULL| MYSUBTOTALS |    42 |  2730 |
3   (0)| 00:00:01 |
-------------------------------------------------------------------------------
-------------------

Note
-----
   - dynamic sampling used for this statement (level=2)

SQL> CREATE MATERIALIZED VIEW MyCube
  2  ENABLE QUERY REWRITE
  3  AS
  4  SELECT
  5  DEPTNO,
  6  JOB,
  7  MGR,
  8  TO_CHAR(HIREDATE,'YYYY') Year,
  9  TO_CHAR(HIREDATE,'Q') Quarter,
 10  TO_CHAR(HIREDATE,'FMMONTH') Month,
 11  TO_CHAR(HIREDATE,'W') Week,
 12  TO_CHAR(HIREDATE,'FMDAY') Day,
 13  SUM(SAL)
```

```
 14  FROM EMP
 15  GROUP BY
 16  CUBE
 17  (
 18  DEPTNO,
 19  JOB,
 20  MGR,
 21  TO_CHAR(HIREDATE,'YYYY'),
 22  TO_CHAR(HIREDATE,'Q'),
 23  TO_CHAR(HIREDATE,'FMMONTH'),
 24  TO_CHAR(HIREDATE,'W'),
 25  TO_CHAR(HIREDATE,'FMDAY')
 26  );

Materialized view created.

SQL> SELECT DEPTNO, SUM(SAL)
  2  FROM EMP
  3  GROUP BY DEPTNO;

DEPTNO SUM(SAL)
------ --------
    30     9400
    20    10875
    10     8750


Execution Plan
----------------------------------------------------------
Plan hash value: 2751693713

-------------------------------------------------------------------------------
---------------
| Id  | Operation                     | Name    | Rows  | Bytes | Cost
(%CPU)| Time     |
-------------------------------------------------------------------------------
---------------
|   0 | SELECT STATEMENT              |         |     9 |   234 |     4
(25)| 00:00:01 |
|   1 |  HASH GROUP BY                |         |     9 |   234 |     4
(25)| 00:00:01 |
|   2 |   MAT_VIEW REWRITE ACCESS FULL| EMP_SUM |     9 |   234 |     3
(0)| 00:00:01 |
-------------------------------------------------------------------------------
---------------

Note
-----
   - dynamic sampling used for this statement (level=2)

SQL> SELECT TO_CHAR(HIREDATE,'YYYY') Year, SUM(SAL)
  2  FROM EMP
  3  GROUP BY TO_CHAR(HIREDATE,'YYYY');
```

```
YEAR SUM(SAL)
---- --------
1987     4100
1980      800
1982     1300
1981    22825


Execution Plan
----------------------------------------------------------
Plan hash value: 4067220884

-------------------------------------------------------------------------------
--
| Id  | Operation          | Name | Rows  | Bytes | Cost (%CPU)| Time
|
-------------------------------------------------------------------------------
--
|   0 | SELECT STATEMENT   |      |    13 |   156 |     4  (25)| 00:00:01
|
|   1 |  HASH GROUP BY     |      |    13 |   156 |     4  (25)| 00:00:01
|
|   2 |   TABLE ACCESS FULL| EMP  |    14 |   168 |     3   (0)| 00:00:01
|
-------------------------------------------------------------------------------
--

SQL> SELECT TO_CHAR(HIREDATE,'YYYY'), SUM(SAL)
  2  FROM EMP
  3  GROUP BY TO_CHAR(HIREDATE,'YYYY');

TO_C SUM(SAL)
---- --------
1987     4100
1980      800
1982     1300
1981    22825


Execution Plan
----------------------------------------------------------
Plan hash value: 4067220884

-------------------------------------------------------------------------------
--
| Id  | Operation          | Name | Rows  | Bytes | Cost (%CPU)| Time
|
-------------------------------------------------------------------------------
--
|   0 | SELECT STATEMENT   |      |    13 |   156 |     4  (25)| 00:00:01
|
|   1 |  HASH GROUP BY     |      |    13 |   156 |     4  (25)| 00:00:01
|
```

```
|   2 |   TABLE ACCESS FULL| EMP  |    14 |   168 |     3   (0)| 00:00:01
|
--------------------------------------------------------------------------
--

SQL> SELECT DEPTNO, JOB,
  2  GROUPING(DEPTNO) GDPT,
  3  GROUPING(JOB) GJOB,
  4  GROUPING_ID(DEPTNO,JOB) GRPID,
  5  SUM(SAL)
  6  FROM EMP
  7  GROUP BY ROLLUP(DEPTNO, JOB);

DEPTNO JOB              GDPT       GJOB      GRPID SUM(SAL)
------ --------- ---------- ---------- ---------- --------
    10 CLERK               0          0          0     1300
    10 MANAGER             0          0          0     2450
    10 PRESIDENT           0          0          0     5000
    10                     0          1          1     8750
    20 CLERK               0          0          0     1900
    20 ANALYST             0          0          0     6000
    20 MANAGER             0          0          0     2975
    20                     0          1          1    10875
    30 CLERK               0          0          0      950
    30 MANAGER             0          0          0     2850
    30 SALESMAN            0          0          0     5600
    30                     0          1          1     9400
                           1          1          3    29025

13 rows selected.


Execution Plan
----------------------------------------------------------
Plan hash value: 2868327837

--------------------------------------------------------------------------
----------------
| Id  | Operation                    | Name    | Rows  | Bytes | Cost
(%CPU)| Time     |
--------------------------------------------------------------------------
----------------
|   0 | SELECT STATEMENT             |         |     9 |   288 |     4
(25)| 00:00:01 |
|   1 |  SORT GROUP BY ROLLUP        |         |     9 |   288 |     4
(25)| 00:00:01 |
|   2 |   MAT_VIEW REWRITE ACCESS FULL| EMP_SUM |     9 |   288 |     3
(0)| 00:00:01 |
--------------------------------------------------------------------------
----------------

Note
-----
   - dynamic sampling used for this statement (level=2)
```

```
SQL> SELECT DEPTNO, JOB,
  2  GROUPING_ID(DEPTNO,JOB) GRPID,
  3  SUM(SAL)
  4  FROM EMP
  5  GROUP BY ROLLUP(DEPTNO, JOB);

DEPTNO JOB              GRPID SUM(SAL)
------ ---------- ---------- --------
    10 CLERK                0     1300
    10 MANAGER              0     2450
    10 PRESIDENT            0     5000
    10                      1     8750
    20 CLERK                0     1900
    20 ANALYST              0     6000
    20 MANAGER              0     2975
    20                      1    10875
    30 CLERK                0      950
    30 MANAGER              0     2850
    30 SALESMAN             0     5600
    30                      1     9400
                            3    29025

13 rows selected.


Execution Plan
----------------------------------------------------------
Plan hash value: 2868327837

-------------------------------------------------------------------------------
----------------
| Id  | Operation                     | Name    | Rows  | Bytes | Cost
(%CPU)| Time     |
-------------------------------------------------------------------------------
----------------
|   0 | SELECT STATEMENT              |         |     9 |   288 |     4
(25)| 00:00:01 |
|   1 |  SORT GROUP BY ROLLUP         |         |     9 |   288 |     4
(25)| 00:00:01 |
|   2 |   MAT_VIEW REWRITE ACCESS FULL| EMP_SUM |     9 |   288 |     3
(0)| 00:00:01 |
-------------------------------------------------------------------------------
----------------

Note
-----
   - dynamic sampling used for this statement (level=2)

SQL> SPOOL OFF
```