```
SQL> cl scr

SQL> SELECT SUM(Sal)
  2  FROM Emp;

  SUM(SAL)
----------
     29025

SQL> SELECT Deptno, SUM(Sal)
  2  FROM Emp
  3  GROUP BY ROLLUP(Deptno)
  4  HAVING GROUPING(Deptno) &GiveIDX;
Enter value for giveidx: = 0

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

SQL> /
Enter value for giveidx: = 0

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

SQL> /
Enter value for giveidx:  = 1

    DEPTNO   SUM(SAL)
---------- ----------
                 29025

SQL> /
Enter value for giveidx: IN(0, 1)

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

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

```
SQL> cl scr

SQL> CONN SYSTEM
Connected.
SQL> GRANT QUERY REWRITE
  2  TO SCOTT;

Grant succeeded.

SQL> GRANT
  2  CREATE MATERIALIZED VIEW
  3  TO SCOTT;

Grant succeeded.

SQL> GRANT ALTER SESSION
  2  TO SCOTT;

Grant succeeded.

SQL> CONN SCOTT/tiger
Connected.
SQL> ALTER SESSION
  2  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
  7  ORDER BY Deptno;

Materialized view created.

SQL> SELECT * FROM TAB;

TNAME                            TABTYPE  CLUSTERID
-------------------------------- -------- ----------
BONUS                            TABLE
CUSTOMER                         TABLE
DEPT                             TABLE
DUMMY                            TABLE
EMP                              TABLE
EMP_SUM                          TABLE
```

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

```
ITEM                          TABLE
ORD                           TABLE
PRICE                         TABLE
PRODUCT                       TABLE
SALES                         VIEW
SALGRADE                      TABLE
SKYESS_BULK_COLLECT_TEST      TABLE
SKYESS_EMPLOYEES              TABLE
SKYESS_FORALL_TEST            TABLE

15 rows selected.

SQL> SET AUTOTRACE ON EXPLAIN
SQL> cl scr

SQL> SELECT * FROM EMP_SUM;

    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.


Execution Plan
----------------------------------------------------------
Plan hash value: 2108572782


--------------------------------------------------------------------
-------
| Id | Operation              | Name     | Rows | Bytes | Cost (%CPU)|
Time    |
--------------------------------------------------------------------
-------
|  0 | SELECT STATEMENT       |          |    9 |   288 |     3   (0)|
00:00:01 |
|  1 |  MAT_VIEW 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 Deptno, Job
  4  ORDER BY Deptno;

    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.


Execution Plan
----------------------------------------------------------
Plan hash value: 825659509


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

Note
```

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

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 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 SUM(Sal)
  2   FROM Emp;

  SUM(SAL)
----------
     29025


Execution Plan
----------------------------------------------------------
Plan hash value: 4050022887


----------------------------------------------------------------------
----------------
| Id | Operation                    | Name    | Rows | Bytes | Cost
(%CPU)| Time      |
----------------------------------------------------------------------
----------------
|   0 | SELECT STATEMENT            |         |    1 |    13 |     3
(0)| 00:00:01 |
```

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

```
|   1 |   SORT AGGREGATE              |          |   1 |    13 |
|     |          |
|   2 |    MAT_VIEW REWRITE ACCESS FULL| EMP_SUM  |   9 |   117 |        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> ED
```

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

```
Wrote file afiedt.buf

  1  SELECT Job, SUM(Sal)
  2  FROM Emp
  3* GROUP BY ROLLUP(Job)
SQL> /

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> ED
Wrote file afiedt.buf

  1  SELECT Deptno, Job, SUM(Sal)
  2  FROM Emp
```

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

```
  3* GROUP BY ROLLUP(Deptno, Job)
SQL> /

    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> ED
Wrote file afiedt.buf
```

```
  1   SELECT Deptno, Job, SUM(Sal)
  2   FROM Emp
  3   GROUP BY CUBE(Deptno, Job)
  4*  ORDER BY Deptno
SQL> /

    DEPTNO JOB          SUM(SAL)
---------- --------- ----------
        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          SUM(SAL)
---------- --------- ----------
                         29025

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> ED
Wrote file afiedt.buf

  1  SELECT Deptno, Job, SUM(Sal)
  2  FROM Emp
  3  GROUP BY GROUPING SETS(Deptno, Job)
  4* ORDER BY Deptno
SQL> /

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

8 rows selected.


Execution Plan
----------------------------------------------------------
Plan hash value: 3591706503

------------------------------------------------------------------------
-------------------------------
| Id  | Operation                      | Name                | Rows  |
Bytes | Cost (%CPU)| Time     |
```

```
--------------------------------------------------------------------------
---------------------------------
|   0 | SELECT STATEMENT         |                             |  9 |
288 |    12  (25)| 00:00:01 |
|   1 |  TEMP TABLE TRANSFORMATION |                           |    |
|        |         |
|   2 |   LOAD AS SELECT         | SYS_TEMP_0FD9D6620_CAA88A |    |
|        |         |
|   3 |    MAT_VIEW ACCESS FULL  | EMP_SUM                     |  9 |
288 |    3   (0)| 00:00:01 |
|   4 |   LOAD AS SELECT         | SYS_TEMP_0FD9D6621_CAA88A |    |
|        |         |
|   5 |    HASH GROUP BY         |                             |  1 |
 26 |    3  (34)| 00:00:01 |
|   6 |     TABLE ACCESS FULL    | SYS_TEMP_0FD9D6620_CAA88A |  1 |
 26 |    2   (0)| 00:00:01 |
|   7 |   LOAD AS SELECT         | SYS_TEMP_0FD9D6621_CAA88A |    |
|        |         |
|   8 |    HASH GROUP BY         |                             |  1 |
 19 |    3  (34)| 00:00:01 |
|   9 |     TABLE ACCESS FULL    | SYS_TEMP_0FD9D6620_CAA88A |  1 |
 19 |    2   (0)| 00:00:01 |
|  10 |   SORT ORDER BY          |                             |  9 |
288 |    3  (34)| 00:00:01 |
|  11 |    VIEW                  |                             |  1 |
 32 |    2   (0)| 00:00:01 |
|  12 |     TABLE ACCESS FULL    | SYS_TEMP_0FD9D6621_CAA88A |  1 |
 32 |    2   (0)| 00:00:01 |
--------------------------------------------------------------------------
---------------------------------

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

SQL> ED
Wrote file afiedt.buf

  1  SELECT Deptno, Job, SUM(Sal)
  2  FROM Emp
  3* GROUP BY Job, ROLLUP(Deptno)
SQL> /

   DEPTNO JOB        SUM(SAL)
---------- --------- ----------
       10 CLERK          1300
       20 CLERK          1900
```

```
        30 CLERK            950
           CLERK           4150
        20 ANALYST         6000
           ANALYST         6000
        10 MANAGER         2450
        20 MANAGER         2975
        30 MANAGER         2850
           MANAGER         8275
        30 SALESMAN        5600
           SALESMAN        5600
        10 PRESIDENT       5000
           PRESIDENT       5000

14 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> ED
Wrote file afiedt.buf

  1  SELECT Deptno, Job, SUM(Sal)
  2  FROM Emp
  3* GROUP BY Deptno, ROLLUP(Job)
SQL> /
```

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

12 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
```