```
SQL> SELECT Ename, Job, Sal
  2  FROM Emp;

ENAME      JOB              SAL
---------- --------- ----------
ALLEN      SALESMAN        1600
WARD       SALESMAN        1250
MARTIN     SALESMAN        1250
BLAKE      MANAGER         2850
TURNER     SALESMAN        1500
JAMES      CLERK            950
SMITH      CLERK            800
JONES      MANAGER         2975
CLARK      MANAGER         2450
SCOTT      ANALYST         3000
KING       PRESIDENT       5000

ENAME      JOB              SAL
---------- --------- ----------
ADAMS      CLERK           1100
FORD       ANALYST         3000
MILLER     CLERK           1300

14 rows selected.

SQL> SELECT SUM(SAL) SALSUM
  2 FROM EMP;

    SALSUM
----------
     29025

SQL> SELECT ENAME
  2 FROM EMP;

ENAME
----------
ALLEN
WARD
MARTIN
BLAKE
TURNER
JAMES
SMITH
JONES
CLARK
SCOTT
KING

ENAME
----------
ADAMS
FORD
```

```
MILLER

14 rows selected.

SQL> SELECT ENAME, SUM(SAL) SALSUM
  2  FROM EMP;
SELECT ENAME, SUM(SAL) SALSUM
       *
ERROR at line 1:
ORA-00937: not a single-group group function


SQL> CL SCR

SQL> SELECT SUM(SAL) SALSUM, AVG(SAL) SALAVG
  2  FROM EMP;

    SALSUM     SALAVG
---------- ----------
     29025 2073.21429

SQL> ED
Wrote file afiedt.buf

  1 SELECT SUM(ALL SAL) SALSUM, AVG(ALL SAL) SALAVG
  2* FROM EMP
SQL> /

    SALSUM     SALAVG
---------- ----------
     29025 2073.21429

SQL> ED
Wrote file afiedt.buf

  1 SELECT SUM(DISTINCT SAL) SALSUM, AVG(ALL SAL) SALAVG
  2* FROM EMP
SQL> /

    SALSUM     SALAVG
---------- ----------
     24775 2073.21429

SQL> ED
Wrote file afiedt.buf

  1  SELECT SUM(DISTINCT SAL) SALSUM, AVG(DISTINCT SAL) SALAVG
  2* FROM EMP
SQL> /

    SALSUM     SALAVG
---------- ----------
     24775 2064.58333
```

```
SQL> SELECT SUM(COMM) COMMSUM, AVG(COMM) COMMAVG
  2  FROM EMP;

   COMMSUM    COMMAVG
---------- ----------
      2200        550

SQL> ED
Wrote file afiedt.buf

  1  SELECT SUM(DISTINCT COMM) COMMSUM, AVG(DISTINCT COMM) COMMAVG
  2* FROM EMP
SQL> /

   COMMSUM    COMMAVG
---------- ----------
      2200        550

SQL> SELECT AVG(NVL(COMM,0)) COMMAVG
  2  FROM EMP;

   COMMAVG
----------
157.142857

SQL> SELECT
  2  SUM(SAL) SALSUM,
  3  AVG(SAL) SALAVG,
  4  SUM(COMM) COMMSUM,
  5  AVG(COMM) COMMAVG
  6  FROM EMP;

    SALSUM     SALAVG    COMMSUM    COMMAVG
---------- ---------- ---------- ----------
     29025 2073.21429       2200        550

SQL> ED
Wrote file afiedt.buf

  1  SELECT
  2  TO_CHAR(SUM(SAL),'9G999D99') SALSUM,
  3  TO_CHAR(AVG(SAL),'9G999D99') SALAVG,
  4  TO_CHAR(SUM(COMM),'9G999D99') COMMSUM,
  5  TO_CHAR(AVG(COMM),'9G999D99') COMMAVG
  6* FROM EMP
SQL> /

SALSUM    SALAVG    COMMSUM   COMMAVG
--------- --------- --------- ---------
######### 2,073.21  2,200.00 550.00

SQL> ED
```

```
Wrote file afiedt.buf

  1  SELECT
  2  TO_CHAR(SUM(SAL),'99G999D99') SALSUM,
  3  TO_CHAR(AVG(SAL),'9G999D99') SALAVG,
  4  TO_CHAR(SUM(COMM),'9G999D99') COMMSUM,
  5  TO_CHAR(AVG(COMM),'9G999D99') COMMAVG
  6* FROM EMP
SQL> /

SALSUM      SALAVG     COMMSUM    COMMAVG
------------- ------------ ---------- ----------
 29,025.00  2,073.21  2,200.00 550.00

SQL> ED
Wrote file afiedt.buf

  1  SELECT
  2  TO_CHAR(SUM(SAL),'099G999D99') SALSUM,
  3  TO_CHAR(AVG(SAL),'09G999D99') SALAVG,
  4  TO_CHAR(SUM(COMM),'09G999D99') COMMSUM,
  5  TO_CHAR(AVG(COMM),'09G999D99') COMMAVG
  6* FROM EMP
SQL> /

SALSUM       SALAVG      COMMSUM     COMMAVG
--------------- ---------- ---------- -----------
 029,025.00  02,073.21  02,200.00  00,550.00

SQL> ED
Wrote file afiedt.buf

  1  SELECT
  2  TO_CHAR(SUM(SAL),'099G999D99') SALSUM,
  3  TO_CHAR(AVG(SAL),'099G999D99') SALAVG,
  4  TO_CHAR(SUM(COMM),'099G999D99') COMMSUM,
  5  TO_CHAR(AVG(COMM),'099G999D99') COMMAVG
  6* FROM EMP
SQL> /

SALSUM      SALAVG       COMMSUM     COMMAVG
------------- ---------- --------------- ---------------
 029,025.00  002,073.21  002,200.00  000,550.00

SQL> CL SCR

SQL> SELECT
  2  MAX(SAL) SALMAC,
  3  MIN(SAL) SALMIN,
  4  MAX(COMM) SALMAX,
  5  MIN(COMM) COMMMIN
  6  FROM EMP;
```

```
     SALMAC      SALMIN      SALMAX     COMMMIN
----------- ---------- ---------- ----------
       5000         800        1400           0

SQL> SELECT MAX(ENAME) MAXNAME, MIN(ENAME) MINNAME
  2 FROM EMP;

MAXNAME    MINNAME
---------- ----------
WARD       ADAMS

SQL> SELECT MAX(HIREDATE) MAXHIREDATE, MIN(HIREDATE) MINHIREDATE FROM
EMP;

MAXHIREDA MINHIREDA
--------- ---------
23-MAY-87 17-DEC-80

SQL> SELECT MAX(HIREDATE) MAXHIREDATE,
  2  MIN(HIREDATE) MINHIREDATE,
  3  MAX(HIREDATE)-MIN(HIREDATE) NDAYS
  4  FROM EMP;

MAXHIREDA MINHIREDA      NDAYS
--------- --------- ----------
23-MAY-87 17-DEC-80       2348

SQL> SELECT MAX(HIREDATE) MAXHIREDATE,
  2  MIN(HIREDATE) MINHIREDATE,
  3  (MAX(HIREDATE)-MIN(HIREDATE))/365 NYEARS
  4  FROM EMP;

MAXHIREDA MINHIREDA     NYEARS
--------- --------- ----------
23-MAY-87 17-DEC-80 6.43287671

SQL> SELECT MAX(HIREDATE) MAXHIREDATE,
  2  MIN(HIREDATE) MINHIREDATE,
  3  TRUNC(MONTHS_BETWEEN(MAX(HIREDATE),MIN(HIREDATE))/12) NYEARSS
  4  FROM EMP;

MAXHIREDA MINHIREDA    NYEARSS
--------- --------- ----------
23-MAY-87 17-DEC-80          6

SQL> SELECT COUNT(*) FROM EMP;


      COUNT(*)
------------------
         14

SQL> SELECT
  2  COUNT(ENAME) ENAMECOUNT,
  3  COUNT(DISTINCT ENAME)
  4  FROM EMP;
```

```
ENAMECOUNT COUNT(DISTINCTENAME)
-------------
-----------14 -------------------------14

SQL> SELECT
  2  COUNT(ENAME) ENAMECOUNT,
  3  COUNT(COMM) COMMCOUNT
  4  FROM EMP;

ENAMECOUNT  COMMCOUNT
------------- -------------
         14           4

SQL> SELECT
  2  COUNT(EMPNO) EMPNOCOUNT,
  3  COUNT(MGR) MGRCOUNT,
  4  COUNT(DISTINCT MGR) DISMGRCNT
  5  FROM EMP;

EMPNOCOUNT   MGRCOUNT  DISMGRCNT
------------------ ------------------ ------------------
         14          13           6

SQL> --Applying GROUP BY Clause--
SQL> SELECT DEPTNO FROM
  2  EMP
  3  GROUP BY DEPTNO
  4 ORDER BY DEPTNO;

    DEPTNO
-------------
         10
         20
         30

SQL> SELECT DISTINCT DEPTNO FROM EMP
  2 ORDER BY DEPTNO;

    DEPTNO
-------------
         10
         20
         30
```

```
SQL> SELECT JOB
  2  FROM EMP
  3  GROUP BY JOB
  4  /

JOB
-----------
SALESMAN
CLERK
PRESIDENT
MANAGER
ANALYST

SQL> SELECT MGR FROM EMP
  2  GROUP BY MGR;

       MGR
-------------
      7839

      7782
      7698
      7902
      7566
      7788

7 rows selected.

SQL> SELECT MGR FROM EMP
  2  WHERE MGR IS NOT NULL
  3  GROUP BY MGR;

       MGR
-------------
      7839
      7782
      7698
      7902
      7566
      7788

6 rows selected.

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

HIRE
-----
1987
1980
1982
```

```
1981

SQL> SELECT
  2  TO_CHAR(HIREDATE,'MONTH') HIREDATE
  3  FROM EMP
  4  GROUP BY TO_CHAR(HIREDATE,'MONTH');

HIREDATE
------------
FEBRUARY
JANUARY
APRIL
JUNE
NOVEMBER
DECEMBER
SEPTEMBER
MAY

8 rows selected.

SQL> SELECT DEPTNO,JOB
  2  FROM EMP
  3  GROUP BY DEPTNO
  4  /
SELECT DEPTNO,JOB
              *
ERROR at line 1:
ORA-00979: not a GROUP BY expression


SQL> SELECT DEPTNO,JOB
  2  FROM EMP
  3  GROUP BY DEPTNO,JOB
  4 ORDER BY DEPTNO;

    DEPTNO JOB
---------- ------------
        10 CLERK
        10 MANAGER
        10 PRESIDENT
        20 ANALYST
        20 CLERK
        20 MANAGER
        30 CLERK
        30 MANAGER
        30 SALESMAN

9 rows selected.

SQL> SELECT
  2  TO_CHAR(HIREDATE,'MONTH') MONTHS
  3  FROM EMP
  4  GROUP BY TO_CHAR(HIREDATE,'MONTH')
```

```
  5  ORDER BY TO_CHAR(HIREDATE,'MM');
ORDER BY TO_CHAR(HIREDATE,'MM')
                 *
ERROR at line 5:
ORA-00979: not a GROUP BY expression


SQL> ED
Wrote file afiedt.buf

  1  SELECT
  2  TO_CHAR(HIREDATE,'MONTH') MONTHS
  3  FROM EMP
  4  GROUP BY TO_CHAR(HIREDATE,'MONTH')
  5* ORDER BY TO_CHAR(HIREDATE,'MONTH')
SQL> /

MONTHS
------------
APRIL
DECEMBER
FEBRUARY
JANUARY
JUNE
MAY
NOVEMBER
SEPTEMBER

8 rows selected.

SQL> SELECT DEPTNO, JOB
  2  FROM EMP
  3 ORDER BY DEPTNO;

    DEPTNO JOB
---------- ------------
        10 PRESIDENT
        10 MANAGER
        10 CLERK
        20 CLERK
        20 ANALYST
        20 CLERK
        20 ANALYST
        20 MANAGER
        30 SALESMAN
        30 SALESMAN
        30 SALESMAN

    DEPTNO JOB
---------- ------------
        30 CLERK
        30 SALESMAN
        30 MANAGER
```

```
14 rows selected.

SQL> SELECT DEPTNO, JOB
  2  FROM EMP
  3 ORDER BY HIREDATE;

    DEPTNO JOB
---------- ------------
        20 CLERK
        30 SALESMAN
        30 SALESMAN
        20 MANAGER
        30 MANAGER
        10 MANAGER
        30 SALESMAN
        30 SALESMAN
        10 PRESIDENT
        20 ANALYST
        30 CLERK

    DEPTNO JOB
---------- ------------
        10 CLERK
        20 ANALYST
        20 CLERK

14 rows selected.

SQL> SELECT
  2  TO_CHAR(HIREDATE,'MM') SEQNO,
  3  TO_CHAR(HIREDATE,'MONTH') MONTHS
  4  FROM EMP
  5  GROUP BY
  6  TO_CHAR(HIREDATE,'MM'),
  7  TO_CHAR(HIREDATE,'MONTH')
  8  ORDER BY
  9  TO_CHAR(HIREDATE,'MM'),
 10  TO_CHAR(HIREDATE,'MONTH');

SE MONTHS
-- ---------
01 JANUARY
02 FEBRUARY
04 APRIL
05 MAY
06 JUNE
09 SEPTEMBER
11 NOVEMBER
12 DECEMBER

8 rows selected.
```

```
SQL> --Retriving Aggregations With Respect to the Groups of Data--
SQL> --Group Wise Aggregations--
SQL> SELECT DEPTNO, SAL
  2  FROM EMP
  3  ORDER BY DEPTNO;

    DEPTNO        SAL
---------- ----------
        10       5000
        10       2450
        10       1300
        20        800
        20       3000
        20       1100
        20       3000
        20       2975
        30       1250
        30       1600
        30       1250

    DEPTNO        SAL
---------- ----------
        30        950
        30       1500
        30       2850

14 rows selected.

SQL> SELECT DEPTNO, SUM(SAL) SALSUM
  2  FROM EMP
  3  ORDER BY DEPTNO;
SELECT DEPTNO, SUM(SAL) SALSUM
       *
ERROR at line 1:
ORA-00937: not a single-group group function


SQL> --Rule01: Along With Group Functional Column Single Row Column
Should Not be in The Projection.
SQL> ED
Wrote file afiedt.buf

  1  SELECT DEPTNO, SUM(SAL) SALSUM
  2  FROM EMP
  3  GROUP BY DEPTNO
  4* ORDER BY DEPTNO
SQL> /

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

```
SQL> --Rul02: If Single Row Column is in Projection Along with Group
Functional Column, Then The Single Row Column Should Be Part of The Group
By Clause in order to Balance The Granularity.
SQL> SELECT SUM(SAL) SALSUM
  2  FROM EMP
  3 WHERE DEPTNO = 10;

    SALSUM
-----------
      8750

SQL> ED
Wrote file afiedt.buf

  1  SELECT SUM(SAL) SALSUM
  2  FROM EMP
  3* WHERE DEPTNO = 20
SQL> /

    SALSUM
-----------
     10875

SQL> ED
Wrote file afiedt.buf

  1  SELECT SUM(SAL) SALSUM
  2  FROM EMP
  3* WHERE DEPTNO = 30
SQL> /

    SALSUM
-----------
      9400

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

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

SQL> SELECT JOB, SUM(SAL)
  2  FROM EMP;
SELECT JOB, SUM(SAL)
       *
ERROR at line 1:
```

```
ORA-00937: not a single-group group function


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

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

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

HIRE SALSUM
------ --------------
1987       4100
1980        800
1982       1300
1981      22825

SQL> SELECT DEPTNO,SUM(SAL) SALSUM, AVG(SAL) SALAVG, MAX(SAL) SALMAX,
MIN(SAL) SALMIN, COUNT(*) STAFF
  2  FROM EMP
  3* GROUP BY DEPTNO
SQL> /

    DEPTNO     SALSUM     SALAVG     SALMAX     SALMIN      STAFF
---------- ---------- ---------- ---------- ---------- ----------
        30       9400 1566.66667       2850        950          6
        20      10875       2175       3000        800          5
        10       8750 2916.66667       5000       1300          3

SQL> ED
Wrote file afiedt.buf

  1  SELECT JOB,SUM(SAL) SALSUM, AVG(SAL) SALAVG, MAX(SAL) SALMAX,
MIN(SAL) SALMIN, COUNT(*) STAFF
  2  FROM EMP
  3* GROUP BY JOB
SQL> /

JOB           SALSUM     SALAVG     SALMAX     SALMIN      STAFF
------------------ ---------- ---------- ---------- ---------- ----------
SALESMAN         5600       1400       1600       1250          4
CLERK            4150     1037.5       1300        800          4
```

```
PRESIDENT       5000       5000       5000       5000          1
MANAGER         8275 2758.33333       2975       2450          3
ANALYST         6000       3000       3000       3000          2

SQL> ED
Wrote file afiedt.buf

  1  SELECT TO_CHAR(HIREDATE,'YYYY') HireYear,SUM(SAL) SALSUM, AVG(SAL)
SALAVG, MAX(SAL) SALMAX, MIN(SAL) SALMIN, COUNT(*) STAFF
  2  FROM EMP
  3* GROUP BY TO_CHAR(HIREDATE,'YYYY')
SQL> /

HIRE     SALSUM     SALAVG     SALMAX     SALMIN      STAFF
-------- ---------- ---------- ---------- ---------- ----------
1987        4100       2050       3000       1100          2
1980         800        800        800        800          1
1982        1300       1300       1300       1300          1
1981       22825     2282.5       5000        950         10



SQL> --Groups Within Groups Aggregations--
SQL> --Aggregations With Respect to Multiple Single Row Columns--
SQL> SELECT DEPTNO, SUM(SAL) SALSUM
  2  FROM EMP
  3 GROUP BY DEPTNO;

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

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

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

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> ED
Wrote file afiedt.buf

  1  SELECT
  2  DEPTNO,
  3  JOB,
  4  TO_CHAR(HIREDATE,'YYYY') HireYear,
  5  SUM(SAL) SALSUM
  6  FROM EMP
  7  GROUP BY
  8  DEPTNO,
  9  JOB,
 10  TO_CHAR(HIREDATE,'YYYY')
 11* ORDER BY DEPTNO
SQL> /

    DEPTNO JOB       HIRE      SALSUM
---------- ---------- --------- ----------
        10 CLERK     1982        1300
        10 MANAGER   1981        2450
        10 PRESIDENT 1981        5000
        20 ANALYST   1981        3000
        20 ANALYST   1987        3000
        20 CLERK     1980         800
        20 CLERK     1987        1100
        20 MANAGER   1981        2975
        30 CLERK     1981         950
        30 MANAGER   1981        2850
        30 SALESMAN  1981        5600

11 rows selected.

SQL> SELECT
  2  DEPTNO,
  3  JOB,
  4  TO_CHAR(HIREDATE,'YYYY') HIREDATE,
  5  TO_CHAR(HIREDATE,'Q') Quarter,
  6  SUM(SAL) SALSUM
  7  FROM EMP
```

```
  8  GROUP BY
  9  DEPTNO,
 10  JOB,
 11  TO_CHAR(HIREDATE,'YYYY'),
 12  TO_CHAR(HIREDATE,'Q')
 13  ORDER BY DEPTNO,JOB;

    DEPTNO JOB       HIRE Q     SALSUM
---------- --------- ------- - ----------
        10 CLERK     1982 1        1300
        10 MANAGER   1981 2        2450
        10 PRESIDENT 1981 4        5000
        20 ANALYST   1981 4        3000
        20 ANALYST   1987 2        3000
        20 CLERK     1980 4         800
        20 CLERK     1987 2        1100
        20 MANAGER   1981 2        2975
        30 CLERK     1981 4         950
        30 MANAGER   1981 2        2850
        30 SALESMAN  1981 1        2850

    DEPTNO JOB       HIRE Q     SALSUM
---------- --------- ------- - ----------
        30 SALESMAN  1981 3        2750

12 rows selected.

SQL> SELECT
  2  DEPTNO,
  3  JOB,
  4  TO_CHAR(HIREDATE,'YYYY') HireYear,
  5  TO_CHAR(HIREDATE,'Q') Quarter,
  6  TO_CHAR(HIREDATE,'MONTH') Month,
  7  SUM(SAL) SALSUM
  8  FROM EMP
  9  GROUP BY
 10  DEPTNO,
 11  JOB,
 12  TO_CHAR(HIREDATE,'YYYY'),
 13  TO_CHAR(HIREDATE,'Q'),
 14  TO_CHAR(HIREDATE,'MONTH')
 15  ORDER BY DEPTNO,3,JOB;

    DEPTNO JOB       HIRE Q MONTH          SALSUM
---------- --------- ---- - ------------ ----------
        10 MANAGER   1981 2 JUNE             2450
        10 PRESIDENT 1981 4 NOVEMBER         5000
        10 CLERK     1982 1 JANUARY          1300
        20 CLERK     1980 4 DECEMBER          800
        20 ANALYST   1981 4 DECEMBER         3000
        20 MANAGER   1981 2 APRIL            2975
        20 ANALYST   1987 2 APRIL            3000
        20 CLERK     1987 2 MAY              1100
```

```
        30 CLERK     1981 4 DECEMBER          950
        30 MANAGER   1981 2 MAY              2850
        30 SALESMAN  1981 1 FEBRUARY         2850

    DEPTNO JOB       HIRE Q MONTH          SALSUM
---------- ---------- ---- - ---------- ----------
        30 SALESMAN  1981 3 SEPTEMBER        2750

12 rows selected.

SQL> SELECT
  2  DEPTNO,
  3  JOB,
  4  TO_CHAR(HIREDATE,'YYYY') HireYear,
  5  TO_CHAR(HIREDATE,'Q') Quarter,
  6  TO_CHAR(HIREDATE,'MONTH') Month,
  7  TO_CHAR(HIREDATE,'W') MonthWeek,
  8  SUM(SAL) SalSum
  9  FROM EMP
 10  GROUP BY
 11  DEPTNO,
 12  JOB,
 13  TO_CHAR(HIREDATE,'YYYY'),
 14  TO_CHAR(HIREDATE,'Q'),
 15  TO_CHAR(HIREDATE,'MONTH'),
 16  TO_CHAR(HIREDATE,'W')
 17  ORDER BY DEPTNO,JOB;

    DEPTNO JOB       HIRE Q MONTH      M     SALSUM
---------- ---------- ---- - ---------- - ----------
        10 CLERK     1982 1 JANUARY    4       1300
        10 MANAGER   1981 2 JUNE       2       2450
        10 PRESIDENT 1981 4 NOVEMBER   3       5000
        20 ANALYST   1981 4 DECEMBER   1       3000
        20 ANALYST   1987 2 APRIL      3       3000
        20 CLERK     1980 4 DECEMBER   3        800
        20 CLERK     1987 2 MAY        4       1100
        20 MANAGER   1981 2 APRIL      1       2975
        30 CLERK     1981 4 DECEMBER   1        950
        30 MANAGER   1981 2 MAY        1       2850
        30 SALESMAN  1981 1 FEBRUARY   3       1600

    DEPTNO JOB       HIRE Q MONTH      M     SALSUM
---------- ---------- ---- - ---------- - ----------
        30 SALESMAN  1981 1 FEBRUARY   4       1250
        30 SALESMAN  1981 3 SEPTEMBER  2       1500
        30 SALESMAN  1981 3 SEPTEMBER  4       1250

14 rows selected.

SQL> --Display DeptWise Average Investments Only When Department's
Highest Investment Crosses 2900
SQL> SELECT
  2  DEPTNO,
  3  AVG(SAL) SALAVG
  4  FROM EMP
  5  WHERE MAX(SAL)>2900
  6  GROUP BY DEPTNO;
```

```
WHERE MAX(SAL)>2900
      *
ERROR at line 5:
ORA-00934: group function is not allowed here


SQL> --We Should not Write Conditions on Group Functional Columns in
WHERE Clause.
SQL> SELECT
  2  DEPTNO,
  3  AVG(SAL) SALAVG
  4  FROM EMP
  5  GROUP BY DEPTNO
  6  HAVING MAX(SAL)>2900
  7 ORDER BY DEPTNO;

    DEPTNO     SALAVG
---------- ----------
        10 2916.66667
        20       2175

SQL> --StepWise Execution of The Above Query
SQL> SELECT
  2  Deptno
  3 FROM Emp;

    DEPTNO
----------
        30
        30
        30
        30
        30
        30
        20
        20
        10
        20
        10
        20
        20
        10

14 rows selected.
```

```
SQL> SELECT
  2  Deptno
  3  FROM Emp
  4 GROUP BY Deptno;

    DEPTNO
----------
        30
        20
        10

SQL> SELECT
  2  Deptno,
  3  AVG(Sal) SalAvg
  4  FROM Emp
  5  GROUP BY Deptno
  6  ORDER BY Deptno;

    DEPTNO     SALAVG
---------- ----------
        10 2916.66667
        20       2175
        30 1566.66667

SQL> SELECT
  2  Deptno,
  3  MAX(Sal) SalMax
  4  FROM Emp
  5  GROUP BY Deptno
  6 ORDER BY Deptno;

    DEPTNO     SALMAX
---------- ----------
        10       5000
        20       3000
        30       2850

SQL> SELECT
  2  Deptno,
  3  AVG(Sal) SalAvg
  4  FROM Emp
  5  GROUP BY Deptno
  6 ORDER BY Deptno;

    DEPTNO     SALAVG
---------- ----------
        10 2916.66667
        20       2175
        30 1566.66667

SQL> ED
Wrote file afiedt.buf
```

```
  1  SELECT
  2  Deptno,
  3  AVG(Sal) SalAvg
  4  FROM Emp
  5  GROUP BY Deptno
  6  HAVING MAX(Sal) > 2900
  7* ORDER BY Deptno
SQL> /

    DEPTNO     SALAVG
---------- ----------
        10 2916.66667
        20       2175

SQL> --Display Designation Wise Total Investments Excluding "Salesman"
Only When Designationwise Total Investment is More Than 5000
SQL> SELECT
  2  JOB,
  3  SUM(SAL) SALSUM
  4  FROM EMP
  5  WHERE JOB NOT LIKE 'SALES%'
  6  GROUP BY JOB
  7  HAVING SUM(SAL) > 5000
  8  ORDER BY SUM(SAL);

JOB  SALSUM
--------- ----------
ANALYST         6000
MANAGER         8275

SQL> --Step Wise Execution of The Above Query
SQL> SELECT
  2  JOB
  3  FROM EMP;

JOB
---------
SALESMAN
SALESMAN
SALESMAN
MANAGER
SALESMAN
CLERK
CLERK
MANAGER
MANAGER
ANALYST
PRESIDENT
CLERK
ANALYST
CLERK
```

```
14 rows selected.

SQL> SELECT
  2  JOB
  3  FROM Emp
  4  WHERE Job NOT LIKE 'SALES%'
  5  /

JOB
-------------
MANAGER
CLERK
CLERK
MANAGER
MANAGER
ANALYST
PRESIDENT
CLERK
ANALYST
CLERK

10 rows selected.

SQL> ED
Wrote file afiedt.buf

  1  SELECT
  2  JOB
  3  FROM Emp
  4  WHERE Job NOT LIKE 'SALES%'
  5* GROUP BY JOB
SQL> /

JOB
-------------
CLERK
PRESIDENT
MANAGER
ANALYST

SQL> SELECT
  2  JOB,
  3  SUM(SAL) SALSUM
  4  FROM EMP
  5  WHERE JOB NOT LIKE 'SALES%'
  6  GROUP BY JOB
  7  HAVING SUM(SAL) > 5000
  8  ORDER BY SUM(SAL);

JOB  SALSUM
------------- ----------
ANALYST         6000
```

```
MANAGER         8275

SQL> --Display Dept Wise Least And Highest Investments Only For Clerks
And When The Dept's Least Investment is Below 1000
SQL> SELECT
  2  DEPTNO,
  3  MIN(SAL) SALSUM,
  4  MAX(SAL) SALSUM
  5  FROM EMP
  6  WHERE JOB='CLERK'
  7  GROUP BY DEPTNO
  8 HAVING MIN(SAL) < 1000;

    DEPTNO     SALSUM     SALSUM
---------- ---------- ----------
        30        950        950
        20        800       1100

SQL> SELECT DEPTNO
  2  .
SQL> --Display Dept Wise Total Investments Only When The No. of Employees
are More Than 3
SQL> SELECT
  2  DEPTNO,
  3  SUM(SAL) SALSUM
  4  FROM EMP
  5  GROUP BY DEPTNO
  6  HAVING COUNT(*) > 3
  7 ORDER BY DEPTNO;

    DEPTNO     SALSUM
---------- ----------
        20      10875
        30       9400

SQL> --Step Wise Execution of the Above Query
SQL> SELECT
  2  Deptno
  3 FROM Emp;

    DEPTNO
----------
        30
        30
        30
        30
        30
        30
        20
        20
        10
        20
        10
```

```
        20
        20
        10

14 rows selected.

SQL> SELECT
  2  Deptno
  3  FROM Emp
  4 GROUP BY Deptno;

    DEPTNO
----------
        30
        20
        10

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

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

SQL> SELECT
  2  Deptno,
  3  COUNT(*) Staff
  4  FROM Emp
  5  GROUP BY DEPTNO
  6 ORDER BY Deptno;

    DEPTNO      STAFF
---------- ----------
        10          3
        20          5
        30          6

SQL> SELECT
  2  DEPTNO,
  3  SUM(SAL) SALSUM
  4  FROM EMP
  5  GROUP BY DEPTNO
  6  HAVING COUNT(*) > 3
  7 ORDER BY DEPTNO;

    DEPTNO     SALSUM
---------- ----------
        20      10875
        30       9400
```

```
SQL> --Display Dept And Designation Wise Total Investments Only When Dept
wise Job Wise Average Investments Are More Than 2500
SQL> SELECT
  2  DEPTNO,
  3  JOB,
  4  SUM(SAL) SALSUM,
  5  AVG(SAL) SALAVG
  6  FROM EMP
  7  GROUP BY DEPTNO, JOB
  8  HAVING AVG(SAL) > 2500;

    DEPTNO JOB           SALSUM     SALAVG
---------- --------- ---------- ----------
        20 MANAGER         2975       2975
        10 PRESIDENT       5000       5000
        30 MANAGER         2850       2850
        20 ANALYST         6000       3000

SQL> SELECT
  2  DEPTNO,
  3  JOB,
  4  SUM(SAL) SALSUM,
  5  AVG(SAL) SALAVG
  6  FROM EMP
  7  GROUP BY DEPTNO, JOB
  8 HAVING AVG(SAL) > 2500 AND SUM(SAL) > 2850;

    DEPTNO JOB           SALSUM     SALAVG
---------- --------- ---------- ----------
        20 MANAGER         2975       2975
        10 PRESIDENT       5000       5000
        20 ANALYST         6000       3000

SQL> SELECT
  2  DEPTNO,
  3  JOB,
  4  SUM(SAL) SALSUM,
  5  AVG(SAL) SALAVG
  6  FROM EMP
  7  GROUP BY DEPTNO, JOB
  8  HAVING AVG(SAL)  BETWEEN 3000 AND 5000 AND SUM(SAL) > 2850;

    DEPTNO JOB           SALSUM     SALAVG
---------- --------- ---------- ----------
        10 PRESIDENT       5000       5000
        20 ANALYST         6000       3000

SQL> SELECT
  2  DEPTNO,
  3  JOB,
  4  SUM(SAL) SALSUM,
  5  AVG(SAL) SALAVG
```

```
  6  FROM EMP
  7  GROUP BY DEPTNO,JOB
  8  HAVING AVG(SAL)  BETWEEN 3000 AND 5000
  9  AND SUM(SAL) > 2850
 10  AND COUNT(*) > 1;


DEPTNO       JOB          SALSUM     SALAVG
---------- ------------ ---------- ----------
        20 ANALYST          6000     3000

SQL> ----------------------------------------
SQL> --NESTING OF GROUP FUNCTIONS
SQL> ----------------------------------------
SQL> SELECT
  2  DEPTNO,
  3  SUM(SAL) SALSUM
  4  FROM EMP
  5 GROUP BY DEPTNO;

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

SQL> --Display The Highest Total Investment of The Departments
SQL> SELECT
  2  DEPTNO,
  3  MAX(SUM(SAL)) SALSUMMAX
  4  FROM EMP
  5  GROUP BY DEPTNO
  6  ORDER BY DEPTNO;
DEPTNO,
*
ERROR at line 2:
ORA-00937: not a single-group group function


SQL> --RDBMS RULE: Whenever Nesting of Group Functions Are in Projection,
Single Row Columns Should Not Be Part of The Projection But GROUP BY
Clause is Mandatory with one or More Columns.
SQL> ED
Wrote file afiedt.buf

  1  SELECT
  2  MAX(SUM(SAL)) SALSUMMAX
  3  FROM EMP
  4  GROUP BY DEPTNO
  5* ORDER BY DEPTNO
SQL> /

 SALSUMMAX
```

```
-------------
      10875

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

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

SQL>--Nesting of Group Functions--
SQL> --Display The Least Total Investment of The Departments
SQL> SELECT
  2  MIN(SUM(Sal)) SalSumMin
  3  FROM Emp
  4  GROUP BY Deptno;

 SALSUMMIN
-------------
       8750

SQL> --Display The Highest Average Investment of The Departments
SQL> SELECT
  2  MAX(SUM(Sal)) SalAvgMax
  3  FROM Emp
  4  GROUP BY
  5  .
SQL> ed
Wrote file afiedt.buf

  1  SELECT
  2  MAX(AVG(Sal)) SalAvgMax
  3  FROM Emp
  4* GROUP BY Deptno
SQL> /

 SALAVGMAX
-------------
2916.66667

SQL> --Display The Least Average Investment of The Departments
SQL> ED
Wrote file afiedt.buf

  1  SELECT
  2  MIN(AVG(Sal)) SalAvgMax
  3  FROM Emp
  4* GROUP BY Deptno
SQL> /
```

```
 SALAVGMAX
----------
1566.66667

SQL> --Display The Highest Total Investment of The Designations
SQL> SELECT
  2  MAX(SUM(Sal)) SalSumMax
  3  FROM Emp
  4  GROUP BY Job;

 SALSUMMAX
----------
      8275

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

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

SQL> --Display The Least Total Investment of The Designations
SQL> SELECT
  2  MIN(SUM(Sal)) SalSumMin
  3  FROM Emp
  4  GROUP BY Job;

 SALSUMMIN
----------
      4150

SQL> --Display The Highest Average Investment of The Designations
SQL> SELECT
  2  MAX(AVG(Sal)) SalAvgMax
  3  FROM Emp
  4  GROUP BY Job;

 SALAVGMAX
----------
      5000

SQL> --Display The Least Average Investment of The Designations
SQL> SELECT
  2  MIN(AVG(Sal)) SalAvgMax
  3  FROM Emp
  4  GROUP BY Job;
```

```
 SALAVGMAX
----------
    1037.5

SQL> --Note: Always See That Outer Functions Are Either Max or Min And
Inner Functions Are SUM, AVG.
SQL> SELECT
  2  SUM(SUM(Sal)) TotSal
  3  FROM Emp;
SUM(SUM(Sal)) TotSal
    *
ERROR at line 2:
ORA-00978: nested group function without GROUP BY


SQL> ED
Wrote file afiedt.buf

  1  SELECT
  2  SUM(SUM(Sal)) TotSal
  3  FROM Emp
  4* GROUP BY Deptno
SQL> /

    TOTSAL
----------
     29025

SQL> SELECT
  2  SUM(SAL) SALSUM
  3 FROM EMP;

    SALSUM
----------
     29025

SQL> --Misellanious Funtions (Single Row Functions)--
SQL> SELECT
  2  GREATEST('HARRY' , 'HARRIOT') GREATEST
  3  FROM DUAL;

GREAT
-----
HARRY

SQL> SELECT
  2  GREATEST(1000,2000,200) GREATEST
  3  FROM DUAL;

  GREATEST
----------
      2000
```

```
SQL> SELECT
  2  GREATEST('10-JUL-05','20-JUL-05') GREATEST
  3  FROM DUAL;

GREATEST
------------
20-JUL-05

SQL> SELECT
  2  GREATEST('10-AUG-05','20-JUL-05') GREATEST
  3  FROM DUAL;

GREATEST
------------
20-JUL-05

SQL> SELECT
  2  GREATEST(TO_DATE('10-AUG-05'),TO_DATE('20-JUL-05')) GREATEST
  3  FROM DUAL;

GREATEST
------------
10-AUG-05

SQL> SELECT
  2  LEAST('HARRY' , 'HARRIOT') LEAST
  3  FROM DUAL;

LEAST
----------
HARRIOT

SQL> SELECT
  2  LEAST(1000,2000,200) LEAST
  3 FROM DUAL;

     LEAST
----------
       200

SQL> SELECT UID,USER FROM DUAL;

       UID USER
---------- ------------------------------
        84 SCOTT

SQL>SPOOL OFF
```