CHAPTER 8

FUNCTIONS

Functions – it is a re-usable program that returns a value.

There are 2 types,

- Pre – defined
- User defined

Pre – defined

→ GROUP functions
→ CHARACTER functions
→ NUMERIC functions
→ DATE functions
→ SPECIAL functions

These are used both in SQL and PL / SQL. PL – Procedural Language (it"s a extension to SQL, can contain IF statements, loops, exceptions, OOPs, etc ..)

User – defined
Used only in PL / SQL and we will not study it here.

We have already learnt about GROUP functions.

Now, let us study the various CHARACTER functions.

CHARACTER functions

a) Upper
b) Lower
c) Length

For ex :-

```
SQL> select upper ('oracle'), lower ('ORacLE')
  2  from dual ;

UPPER( LOWER(
------ ------
ORACLE oracle

SQL> select ename, lower(ename) from emp ;

ENAME      LOWER(ENAM
---------- ----------
SMITH      smith
ALLEN      allen
WARD       ward
JONES      jones
MARTIN     martin
BLAKE      blake
CLARK      clark
SCOTT      scott
KING       king
TURNER     turner
ADAMS      adams
JAMES      james
FORD       ford
MILLER     miller

14 rows selected.
```

In the 1st query, we see something called as dual.

Dual – is a dummy table which is used for performing some independent operations which will not depend on any of the existing tables.

For ex,

1)

```
SQL> select sysdate from dual ;

SYSDATE
---------
09-APR-11
```

This gives the system date.

2)

```
SQL> select 100 + 200 from dual ;

   100+200
----------
       300

SQL> select 100 + 200 " ADDITION "
  2  from dual ;

 ADDITION
----------
       300
```

3)

```
SQL> select ename, sal + 100 from emp ;

ENAME          SAL+100
---------- ----------
SMITH             900
ALLEN            1700
WARD             1350
JONES            3075
MARTIN           1350
BLAKE            2950
CLARK            2550
SCOTT            3100
KING             5100
TURNER           1600
ADAMS            1200
JAMES            1050
FORD             3100
MILLER           1400

14 rows selected.
```

We use dual – when the data is not present in any of the existing tables. Then we use dual.

Length – it returns the length of a given string.

For
ex, 1)

```
SQL> select length ('oracle') from dual ;

LENGTH('ORACLE')
----------------
               6
```

2)

```
SQL> select ename, length(ename) from emp ;
```

```
ENAME      LENGTH(ENAME)
---------- -------------
SMITH                  5
ALLEN                  5
WARD                   4
JONES                  5
MARTIN                 6
BLAKE                  5
CLARK                  5
SCOTT                  5
KING                   4
TURNER                 6
ADAMS                  5
JAMES                  5
FORD                   4
MILLER                 6

14 rows selected.
```

3) Display all the employees whose name & job is having exactly 5 characters

```
SQL> select * from emp
  2  where length(ename) =5
  3  and length(job) =5 ;

     EMPNO ENAME      JOB              MGR HIREDATE          SAL       COMM     DEPTNO
---------- ---------- --------- ---------- --------- ---------- ---------- ----------
      7369 SMITH      CLERK            7902 17-DEC-80        800                    20
      7876 ADAMS      CLERK            7788 23-MAY-87       1100                    20
      7900 JAMES      CLERK            7698 03-DEC-81        950                    30
```

REPLACE

It replaces the old value with a new value in the given string.

For ex,

```
SQL> select replace ('oracle','a','p') from dual ;

REPLAC
------
orpcle
```

Here, a – is the old value to be replaced with p – which is the new value.

```
SQL> select ename, replace(ename, 'A', 'B')
  2  from emp ;
```

This query replaces all the names which has „A" in it with „B".

Let us see the output as shown below,

```
ENAME      REPLACE(EN
---------- ----------
SMITH      SMITH
ALLEN      BLLEN
WARD       WBRD
JONES      JONES
MARTIN     MBRTIN
BLAKE      BLBKE
CLARK      CLBRK
SCOTT      SCOTT
KING       KING
TURNER     TURNER
ADAMS      BDBMS

ENAME      REPLACE(EN
---------- ----------
JAMES      JBMES
FORD       FORD
MILLER     MILLER

14 rows selected.
```

nothing w/p spec

```
SQL> select ename, replace (ename, 'A', NULL)
  2  from emp ;

ENAME      REPLACE(EN
---------- ----------
SMITH      SMITH
ALLEN      LLEN
WARD       WRD
JONES      JONES
MARTIN     MRTIN
BLAKE      BLKE
CLARK      CLRK
SCOTT      SCOTT
KING       KING
TURNER     TURNER
ADAMS      DMS

ENAME      REPLACE(EN
---------- ----------
JAMES      JMES
FORD       FORD
MILLER     MILLER

14 rows selected.
```

SUBSTR

This is called substring.

It extracts „n" characters from x(th) position of a given string.

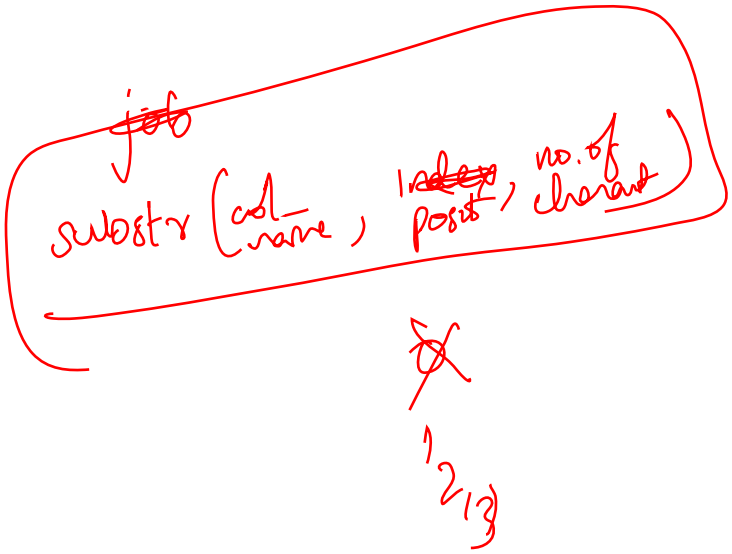
For ex,

```
SQL> select job,
  2  substr (job,1,3) "1 - 3",
  3  substr (job,2,4) "2 - 4",
  4  substr (job,3) "3 - n",
  5  substr (job, -4) "last"
  6  from emp ;

JOB       1 - 2 -  3 - n   last
--------- --- ---- ------- ----
CLERK     CLE LERK ERK     LERK
SALESMAN  SAL ALES LESMAN  SMAN
SALESMAN  SAL ALES LESMAN  SMAN
MANAGER   MAN ANAG NAGER   AGER
SALESMAN  SAL ALES LESMAN  SMAN
MANAGER   MAN ANAG NAGER   AGER
MANAGER   MAN ANAG NAGER   AGER
ANALYST   ANA NALY ALYST   LYST
PRESIDENT PRE RESI ESIDENT DENT
SALESMAN  SAL ALES LESMAN  SMAN
CLERK     CLE LERK ERK     LERK

JOB       1 - 2 -  3 - n   last
--------- --- ---- ------- ----
CLERK     CLE LERK ERK     LERK
ANALYST   ANA NALY ALYST   LYST
CLERK     CLE LERK ERK     LERK

14 rows selected.
```



Here , **(job, „1" , „3")** – means from job – extract from 1st position , 3 characters.

1) **Display the employees whose job starts with „man"**

```
SQL> select * from emp
  2  where substr (job,1,3) = 'MAN';

     EMPNO ENAME      JOB              MGR HIREDATE         SAL       COMM     DEPTNO
---------- ---------- --------- ---------- --------- ---------- ---------- ----------
      7566 JONES      MANAGER          7839 02-APR-81       2975                    20
      7698 BLAKE      MANAGER          7839 01-MAY-81       2850                    30
      7782 CLARK      MANAGER          7839 09-JUN-81       2450                    10
```

2) **Display the employees whose job ends with „man"**

```
SQL> select * from emp
  2  where substr (job,-3) = 'MAN' ;
```

```
     EMPNO ENAME      JOB              MGR HIREDATE         SAL       COMM     DEPTNO
---------- ---------- --------- ---------- --------- ---------- ---------- ----------
      7499 ALLEN      SALESMAN         7698 20-FEB-81       1600        300         30
      7521 WARD       SALESMAN         7698 22-FEB-81       1250        500         30
      7654 MARTIN     SALESMAN         7698 28-SEP-81       1250       1400         30
      7844 TURNER     SALESMAN         7698 08-SEP-81       1500          0         30
```

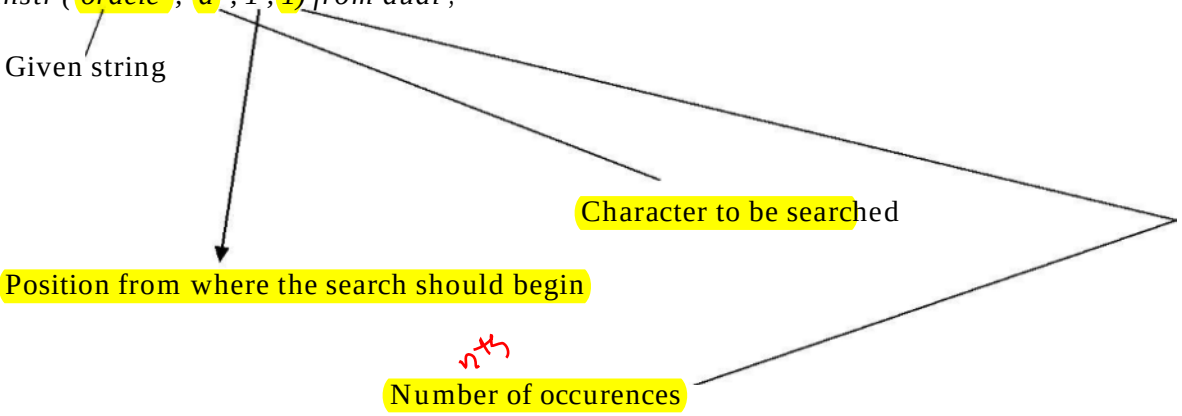
INSTR

This is also called as instring.

It returns position of a given character in a given string.

For ex,

Select instr ('oracle', 'a' , 1 , 1) from dual ;




```
SQL> select instr ('oraclea','a',1,1),
  2         instr ('oraclea','a',1,2),
  3         instr ('oraclea','a')
  4  from dual ;

INSTR('ORACLEA','A',1,1) INSTR('ORACLEA','A',1,2) INSTR('ORACLEA','A')
------------------------ ------------------------ --------------------
                       3                        7                    3
```

Display all the employees **whose name is having „L"**

within a word

```
SQL> select * from emp
  2  where instr (ename,'L',1,1) >0 ;

     EMPNO ENAME      JOB              MGR HIREDATE         SAL       COMM     DEPTNO
---------- ---------- --------- ---------- --------- ---------- ---------- ----------
      7499 ALLEN      SALESMAN         7698 20-FEB-81       1600        300         30
      7698 BLAKE      MANAGER          7839 01-MAY-81       2850                    30
      7782 CLARK      MANAGER          7839 09-JUN-81       2450                    10
      7934 MILLER     CLERK            7782 23-JAN-82       1300                    10
```

List the employees whose job is having atleast 2 A's in it

```
SQL> select * from emp
  2  where instr(job,'A',1,2) >=2;

     EMPNO ENAME      JOB              MGR HIREDATE         SAL       COMM     DEPTNO
---------- ---------- --------- ---------- --------- ---------- ---------- ----------
      7499 ALLEN      SALESMAN         7698 20-FEB-81       1600        300         30
      7521 WARD       SALESMAN         7698 22-FEB-81       1250        500         30
      7566 JONES      MANAGER          7839 02-APR-81       2975                    20
      7654 MARTIN     SALESMAN         7698 28-SEP-81       1250       1400         30
      7698 BLAKE      MANAGER          7839 01-MAY-81       2850                    30
      7782 CLARK      MANAGER          7839 09-JUN-81       2450                    10
      7788 SCOTT      ANALYST          7566 19-APR-87       3000                    20
      7844 TURNER     SALESMAN         7698 08-SEP-81       1500          0         30
      7902 FORD       ANALYST          7566 03-DEC-81       3000                    20

9 rows selected.
```

CONCAT

It concatenates any two values or columns.

It is represented by - | |

For ex,

```
SQL> select ename ||' Works as '||job 'statement' from emp ;

statement
------------------------------
SMITH Works as CLERK
ALLEN Works as SALESMAN
WARD Works as SALESMAN
JONES Works as MANAGER
MARTIN Works as SALESMAN
BLAKE Works as MANAGER
CLARK Works as MANAGER
SCOTT Works as ANALYST
KING Works as PRESIDENT
TURNER Works as SALESMAN
ADAMS Works as CLERK
JAMES Works as CLERK
FORD Works as ANALYST
MILLER Works as CLERK

14 rows selected.
```

NUMERIC FUNCTIONS

1) Mod :- it returns the remainder when 1 number is divided by the other.

```
SQL> select mod(7,2) "REM", 7/2 "QUO" from dual ;

       REM        QUO
---------- ----------
         1        3.5
```

Display the employees earning odd numbered salaries.

```
SQL> select * from emp
  2  where mod(sal,2)<>0;

     EMPNO ENAME      JOB              MGR HIREDATE          SAL       COMM     DEPTNO
---------- ---------- --------- ---------- --------- ---------- ---------- ----------
      7566 JONES      MANAGER         7839 02-APR-81       2975                    20
```

Round

It rounds off a given number to the nearest decimal place.

Trunc

It truncates the given number to the given decimal place. Truncate does not do any rounding.

For ex,

```
SQL> select round(34.76,1),
  2         trunc(34.76,1)
  3  from dual ;

ROUND(34.76,1) TRUNC(34.76,1)
-------------- --------------
          34.8           34.7
```

Here, „1" indicates the number of positions.

DATE FUNCTIONS

1) Sysdate

Stands for System date.

It returns both date & time, but by default – only date is displayed. The default format is,

dd – mon – yy

```
SQL> select sysdate from dual;

SYSDATE
---------
10-APR-11
```

2) Systimestamp

Introduced from Oracle 9i Returns date, time and timezone.

```
SQL> select systimestamp from dual
  2  /

SYSTIMESTAMP
---------------------------------------------------------------------------
10-APR-11 06.49.08.914000 AM +05:30
```

Here, .914000 – gives the fraction of millisecond which keeps changing as shown below,

```
SQL> select systimestamp from dual
  2  /

SYSTIMESTAMP
---------------------------------------------------------------------------
10-APR-11 06.49.08.914000 AM +05:30

SQL> /

SYSTIMESTAMP
---------------------------------------------------------------------------
10-APR-11 06.50.25.614000 AM +05:30

SQL> /

SYSTIMESTAMP
---------------------------------------------------------------------------
10-APR-11 06.50.26.726000 AM +05:30

SQL> /

SYSTIMESTAMP
---------------------------------------------------------------------------
10-APR-11 06.50.27.697000 AM +05:30

SQL> /

SYSTIMESTAMP
---------------------------------------------------------------------------
10-APR-11 06.50.29.109000 AM +05:30
```

In interview – if they ask you – " *which function contains fractions of a second* " OR "*how to see the system time* " – then answer is "SYSTIMESTAMP".

SPECIAL FUNCTIONS

1) TO – CHAR
Used for displaying the date in different formats.

For ex,

```
SQL> select to_char(sysdate, 'mm/dd/yyyy') from dual ;

TO_CHAR(SY
----------
04/10/2011

SQL> select to_char (sysdate, 'day, dd-month')from dual ;

TO_CHAR(SYSDATE,'DAY,DD
-----------------------
sunday   , 10-april
```

```
SQL> select ename, to_char(hiredate, 'mm/dd/yyyy') from emp;

ENAME      TO_CHAR(HI
---------- ----------
SMITH      12/17/1980
ALLEN      02/20/1981
WARD       02/22/1981
JONES      04/02/1981
MARTIN     09/28/1981
BLAKE      05/01/1981
CLARK      06/09/1981
SCOTT      04/19/1987
KING       11/17/1981
TURNER     09/08/1981
ADAMS      05/23/1987
JAMES      12/03/1981
FORD       12/03/1981
MILLER     01/23/1982

14 rows selected.
```

```
SQL> select to_char(sysdate,'mm-yyyy hh:mi:ss') from dual ;

TO_CHAR(SYSDATE,
----------------
04-2011 06:56:30
```

Now, let us see how to add 5 hrs to the existing time,

```
SQL> select to_char(sysdate + (5/24),'hh:mi') from dual ;

TO_CH
-----
11:59

SQL> select systimestamp from dual;

SYSTIMESTAMP
---------------------------------------------------------------------------
10-APR-11 06.59.44.909000 AM +05:30
```

We can see that 5 hrs has been added to the current time.

NVL

It substitutes a value for a null.

For ex,

```
SQL> select ename,sal,comm,sal+NVL(comm,0) "total Sal" from emp;

ENAME             SAL       COMM  total Sal
---------- ---------- ---------- ----------
SMITH             800                   800
ALLEN            1600        300       1900
WARD             1250        500       1750
JONES            2975                  2975
MARTIN           1250       1400       2650
BLAKE            2850                  2850
CLARK            2450                  2450
SCOTT            3000                  3000
KING             5000                  5000
TURNER           1500          0       1500
ADAMS            1100                  1100
JAMES             950                   950
FORD             3000                  3000
MILLER           1300                  1300

14 rows selected.
```

The above query means – if the employee has commission, then add sal + comm. To get total salary – else add 0 to the sal and display total salary.

DECODE

It works like „if – then – else" statement.

For ex,

```
SQL> select ename,job,
  2  decode (job,'CLERK','C','SALESMAN','S','O')
  3  from emp;

ENAME      JOB       D
---------- --------- -
SMITH      CLERK     C
ALLEN      SALESMAN  S
WARD       SALESMAN  S
JONES      MANAGER   O
MARTIN     SALESMAN  S
BLAKE      MANAGER   O
CLARK      MANAGER   O
SCOTT      ANALYST   O
KING       PRESIDENT O
TURNER     SALESMAN  S
ADAMS      CLERK     C
JAMES      CLERK     C
FORD       ANALYST   O
MILLER     CLERK     C

14 rows selected.
```

The above query states that – in job, if clerk is there, replace with C – else if salesman is there, replace it with S – else replace with „O".

Display employee name, job, salary and commission. If the commission is NULL, then display -100

```
SQL> select ename, job, sal, NVL(comm, -100) from emp ;

ENAME      JOB              SAL NVL(COMM,-100)
---------- --------- ---------- --------------
SMITH      CLERK             800           -100
ALLEN      SALESMAN         1600            300
WARD       SALESMAN         1250            500
JONES      MANAGER          2975           -100
MARTIN     SALESMAN         1250           1400
BLAKE      MANAGER          2850           -100
CLARK      MANAGER          2450           -100
SCOTT      ANALYST          3000           -100
KING       PRESIDENT        5000           -100
TURNER     SALESMAN         1500              0
ADAMS      CLERK            1100           -100

ENAME      JOB              SAL NVL(COMM,-100)
---------- --------- ---------- --------------
JAMES      CLERK             950           -100
FORD       ANALYST          3000           -100
MILLER     CLERK            1300           -100

14 rows selected.
```

Display all employees whose name is having exactly 1 „L" in it

```
SQL> select * from emp
  2  where instr (ename, 'L',1,1) >0
  3  and instr (ename, 'L',1,2) =0;

     EMPNO ENAME      JOB              MGR HIREDATE         SAL       COMM     DEPTNO
---------- ---------- --------- ---------- --------- ---------- ---------- ----------
      7698 BLAKE      MANAGER         7839 01-MAY-81       2850                    30
      7782 CLARK      MANAGER         7839 09-JUN-81       2450                    10
```