PRACTICAL NO: 1 IMPLEMENTATION OF REFERENTIAL

Aim:

To Implement the Referential Integrity.

Procedure:

→Creating a Master table **(course)**

```
SQL> create table course
  2  (cno number(5) primary key,
  3  cname varchar2(20));
Table created.
```

```
SQL> desc course;
 Name                                      Null?                    Type
 ----------------------------------------- -------- ----------------------------
 CNO                                       NOT NULL                 NUMBER(5)
 CNAME                                                              VARCHAR2(20)
```

```
SQL> insert into course values(&cno,'&cname');
Enter value for cno: 1001
Enter value for cname: BSC
old   1: insert into course values(&cno,'&cname')
new   1: insert into course values(1001,'BSC')
1 row created.
```

```
SQL> /
Enter value for cno: 1002
Enter value for cname: BCOM
old   1: insert into course values(&cno,'&cname')
new   1: insert into course values(1002,'BCOM')
1 row created.

SQL> /
Enter value for cno: 1003
Enter value for cname: BCA
old   1: insert into course values(&cno,'&cname')
new   1: insert into course values(1003,'BCA')
1 row created.

SQL> /
Enter value for cno: 1004
Enter value for cname: BA
old   1: insert into course values(&cno,'&cname')
new   1: insert into course values(1004,'BA')
1 row created.
SQL> commit;
Commit complete.
```

```
SQL> select * from course;

      CNO     CNAME
---------   -------------------
     1001     BSC
     1002     BCOM
     1003     BCA
     1004     BA
```

→Creating a Child table **(student)**

```
SQL> create table student
  2  (sno number(5) primary key,
  3  sname varchar2(30),
  4  dob date,
  5  cno number(5) references course(cno));
Table created.

SQL> desc student;
 Name                                      Null?                    Type
 ----------------------------------------- -------- ----------------------------
 SNO                                       NOT NULL                 NUMBER(5)
```

SNAME	VARCHAR2(30)
DOB	DATE
CNO	NUMBER(5)

```
SQL> insert into student values(&sno,'&sname','&dob',&cno);
Enter value for sno: 1
Enter value for sname: Bhanu
Enter value for dob: 10-jan-1995
Enter value for cno: 1001
old   1: insert into student values(&sno,'&sname','&dob',&cno)
new   1: insert into student values(1,'Bhanu','10-jan-1995',1001)
1 row created.

SQL> /
Enter value for sno: 2
Enter value for sname: Swathi
Enter value for dob: 26-Aug-1998
Enter value for cno: 1002
old   1: insert into student values(&sno,'&sname','&dob',&cno)
new   1: insert into student values(2,'Swathi','26-Aug-1998',1002)
1 row created.
```

```
SQL> /
Enter value for sno: 3
Enter value for sname: Mahesh
Enter value for dob: 12-Apr-1999
Enter value for cno: 1003
old   1: insert into student values(&sno,'&sname','&dob',&cno)
new   1: insert into student values(3,'Mahesh','12-Apr-1999',1003)
1 row created.


SQL> /
Enter value for sno: 4
Enter value for sname: Aahil
Enter value for dob: 08-Oct-2000
Enter value for cno: 1004
old   1: insert into student values(&sno,'&sname','&dob',&cno)
new   1: insert into student values(4,'Aahil','08-Oct-2000',1004)
1 row created.


SQL> commit;
Commit complete.
```

Output:

SQL> select * from student;

SNO	SNAME	DOB	CNO
1	Bhanu	10-JAN-95	1001
2	Swathi	26-AUG-98	1002
3	Mahesh	12-APR-99	1003
4	Aahil	08-OCT-00	1004

PRACTICAL NO: 2 IMPLEMENTATION OF AGGREGATE FUNCTIONS

Aim:

To Implement the aggregate functions.

Procedure:

SQL provides the various Built-in functions like shown below table:

SNO.	BUILT-IN FUNCTION	USE
1	COUNT	to count the number of rows of the relation
2	MAX	to find the maximum value of the attribute (column)
3	MIN	to find the minimum value of the attribute
4	SUM	to find the sum of values of the attribute provided the data type of the attribute is number.
5	AVG	to find the average of n values, ignoring null values.

Now let us try to view the table PERSON and the contents of the table PERSON as Shown in Fig. 4.11.

Fig. 4.11. PERSON table

From this figure, it is clear that the number of rows of the table is six.

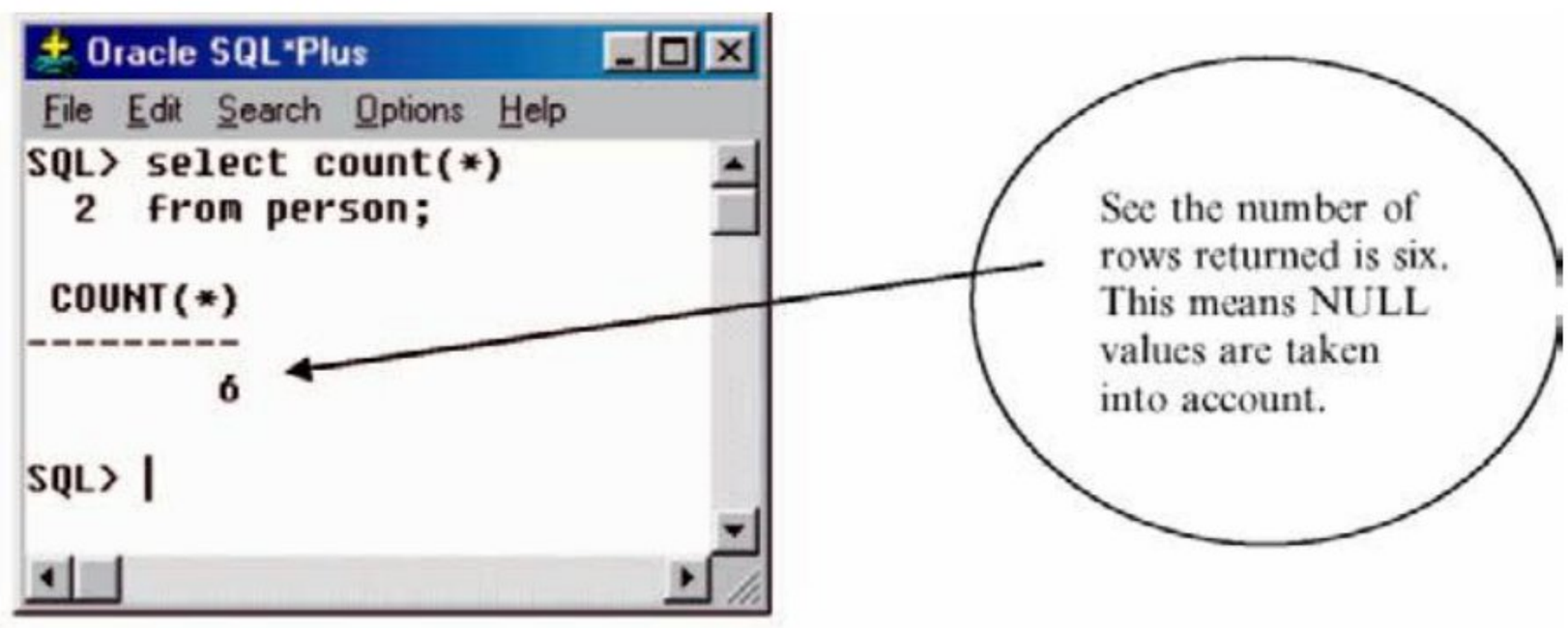
COUNT COMMAND:

Now let us use the COUNT (*) function to view the number of rows of the relation PERSON. The SQL command and the corresponding output are shown in Fig. 4.12.

The syntax of this function is given by:

SELECT COUNT (attribute name) FROM table name;

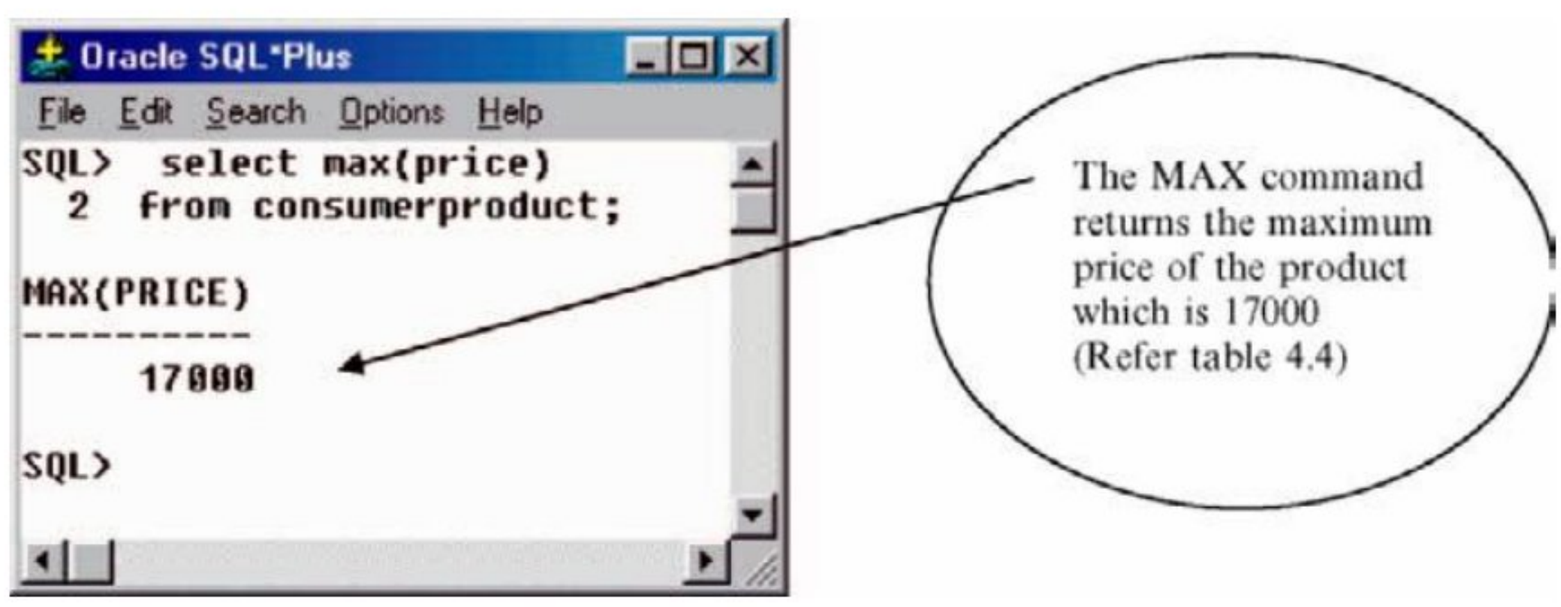
Example:



MAX Command

The MAX command stands for maximum value. The MAX command returns the maximum value of an attribute. The syntax of MAX command is:

SELECT MAX (attribute name) FROM table name;

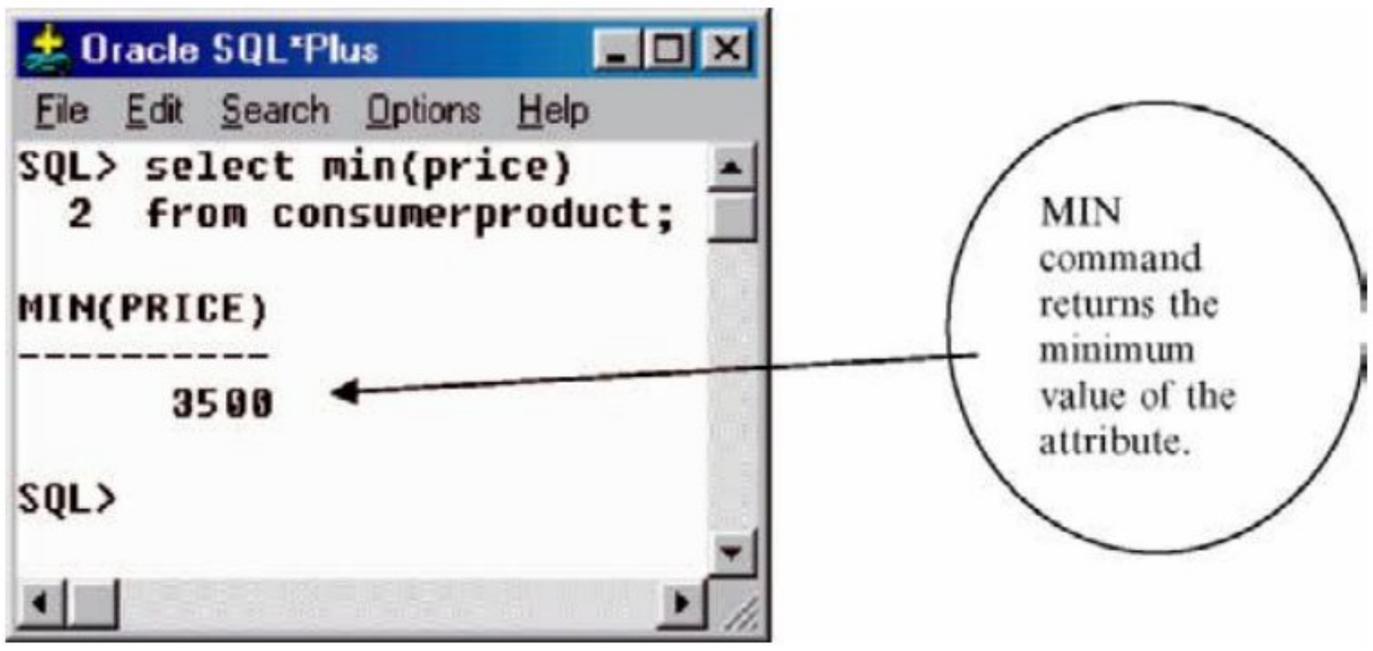


MIN Command

The MIN command is used to return the minimum value of an attribute. The syntax of MIN command is same as MAX command.

Syntax of MIN Command is

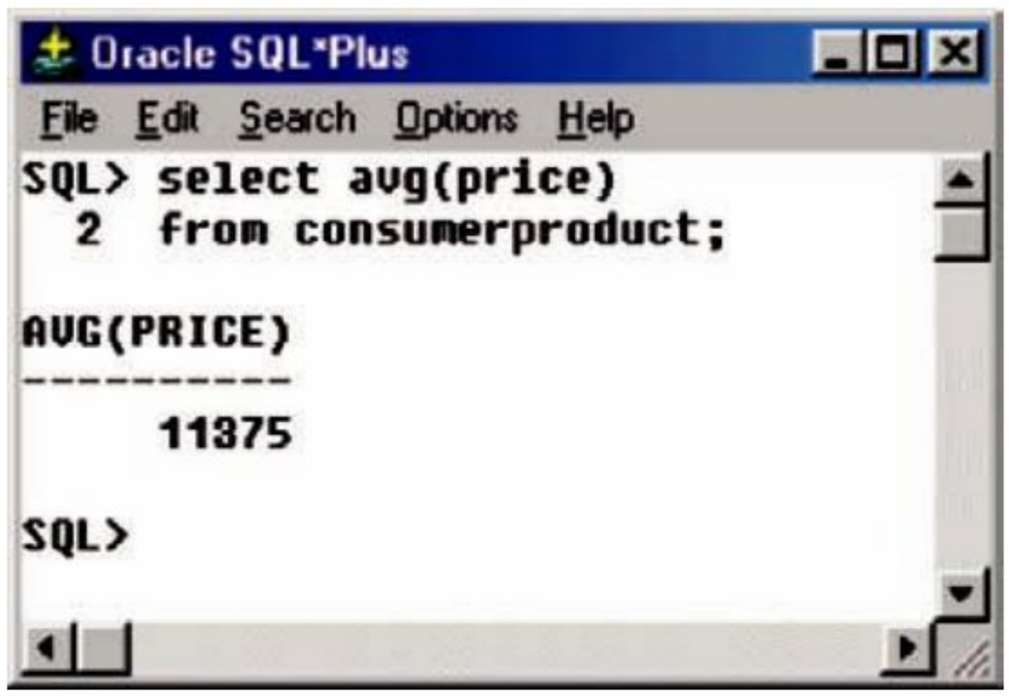
SELECT MIN (attribute name) FROM table name;



AVG Command

The AVG command is used to get the average value of an attribute. The syntax of AVG command is:

SELECT AVG (attribute name) FROM table name;



Practical No: 3	DEMONSTRATION ON JOINS

Aim:

To Implement the joins concept.

Procedure:

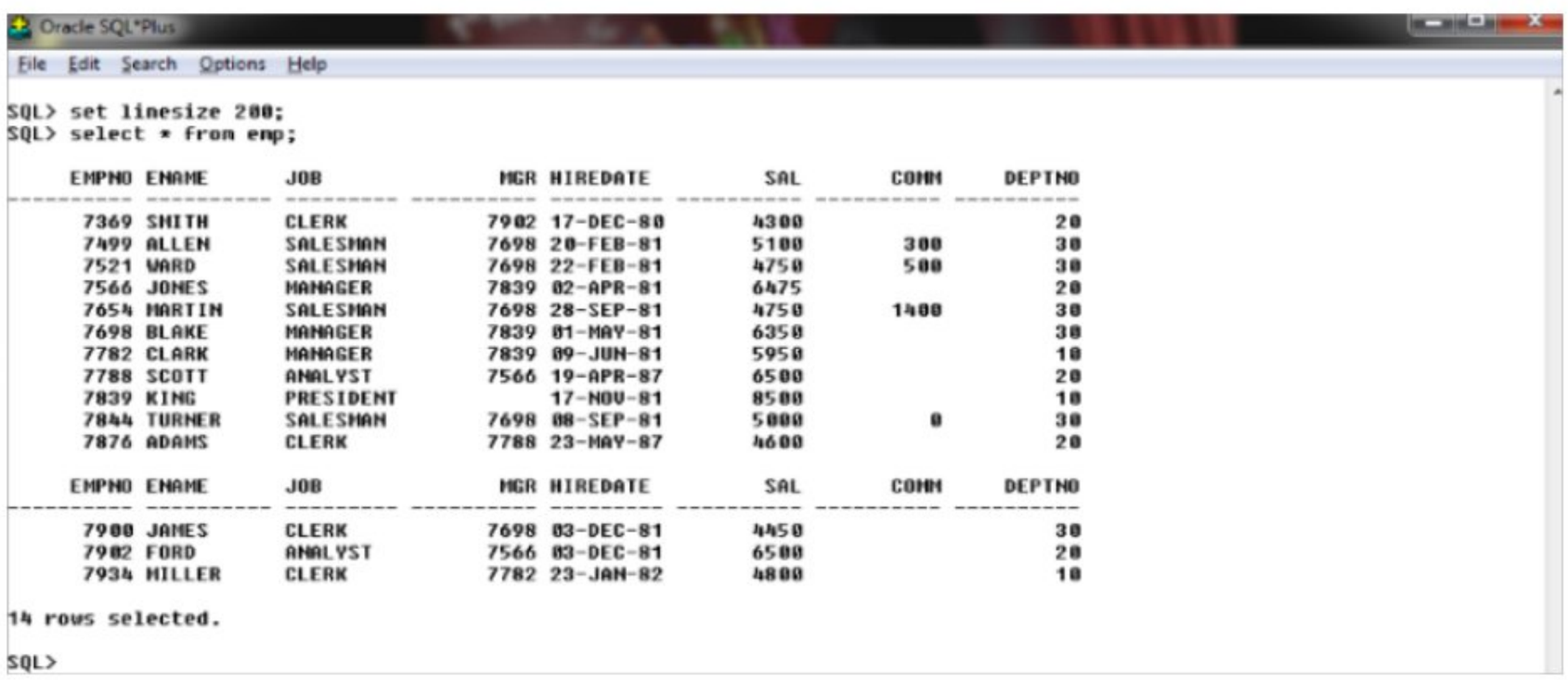
Syntax for joining tables is:

select table1.column,table2.column,.....tablen.column,
from table1,table2.....tablen
where table1.column1=table2.column2;

→Equi join:

Consider the following tables:

Table: EMP



```
Oracle SQL*Plus
File  Edit  Search  Options  Help

SQL> set linesize 200;
SQL> select * from emp;

     EMPNO ENAME      JOB              MGR HIREDATE         SAL       COMM     DEPTNO
---------- ---------- --------- ---------- --------- ---------- ---------- ----------
      7369 SMITH      CLERK           7902 17-DEC-80       4300                    20
      7499 ALLEN      SALESMAN        7698 20-FEB-81       5100        300         30
      7521 WARD       SALESMAN        7698 22-FEB-81       4750        500         30
      7566 JONES      MANAGER         7839 02-APR-81       6475                    20
      7654 MARTIN     SALESMAN        7698 28-SEP-81       4750       1400         30
      7698 BLAKE      MANAGER         7839 01-MAY-81       6350                    30
      7782 CLARK      MANAGER         7839 09-JUN-81       5950                    10
      7788 SCOTT      ANALYST         7566 19-APR-87       6500                    20
      7839 KING       PRESIDENT            17-NOV-81       8500                    10
      7844 TURNER     SALESMAN        7698 08-SEP-81       5000          0         30
      7876 ADAMS      CLERK           7788 23-MAY-87       4600                    20

     EMPNO ENAME      JOB              MGR HIREDATE         SAL       COMM     DEPTNO
---------- ---------- --------- ---------- --------- ---------- ---------- ----------
      7900 JAMES      CLERK           7698 03-DEC-81       4450                    30
      7902 FORD       ANALYST         7566 03-DEC-81       6500                    20
      7934 MILLER     CLERK           7782 23-JAN-82       4800                    10

14 rows selected.

SQL>
```

Table: DEPT

```
Oracle SQL*Plus
File  Edit  Search  Options  Help
SQL> select * from dept;

    DEPTNO DNAME          LOC
---------- -------------- -------------
        10 ACCOUNTING     NEW YORK
        20 RESEARCH       DALLAS
        30 SALES          CHICAGO
        40 OPERATIONS     BOSTON

SQL> |
```

→To perform the Equi join as follows:

```
Oracle SQL*Plus
File  Edit  Search  Options  Help
SQL> select empno,ename,emp.deptno,dname
  2  from emp,dept
  3  where emp.deptno = dept.deptno;

     EMPNO ENAME          DEPTNO DNAME
---------- ---------- ---------- --------------
      7782 CLARK              10 ACCOUNTING
      7839 KING               10 ACCOUNTING
      7934 MILLER             10 ACCOUNTING
      7566 JONES              20 RESEARCH
      7902 FORD               20 RESEARCH
      7876 ADAMS              20 RESEARCH
      7369 SMITH              20 RESEARCH
      7788 SCOTT              20 RESEARCH
      7521 WARD               30 SALES
      7844 TURNER             30 SALES
      7499 ALLEN              30 SALES

     EMPNO ENAME          DEPTNO DNAME
---------- ---------- ---------- --------------
      7900 JAMES              30 SALES
      7698 BLAKE              30 SALES
      7654 MARTIN             30 SALES

14 rows selected.

SQL> |
```

→ To perform the left outer join as follows:

```
SQL> select empno,ename,emp.deptno,dname,loc
  2  from emp,dept
  3  where emp.deptno(+) = dept.deptno;

     EMPNO ENAME          DEPTNO DNAME          LOC
---------- ---------- ---------- -------------- -------------
      7782 CLARK              10 ACCOUNTING     NEW YORK
      7839 KING               10 ACCOUNTING     NEW YORK
      7934 MILLER             10 ACCOUNTING     NEW YORK
      7566 JONES              20 RESEARCH       DALLAS
      7902 FORD               20 RESEARCH       DALLAS
      7876 ADAMS              20 RESEARCH       DALLAS
      7369 SMITH              20 RESEARCH       DALLAS
      7788 SCOTT              20 RESEARCH       DALLAS
      7521 WARD               30 SALES          CHICAGO
      7844 TURNER             30 SALES          CHICAGO
      7499 ALLEN              30 SALES          CHICAGO

     EMPNO ENAME          DEPTNO DNAME          LOC
---------- ---------- ---------- -------------- -------------
      7900 JAMES              30 SALES          CHICAGO
      7698 BLAKE              30 SALES          CHICAGO
      7654 MARTIN             30 SALES          CHICAGO
                                 OPERATIONS     BOSTON

15 rows selected.

SQL>
```

→ To Perform the Right outer join as follows:

```
SQL> select empno,ename,emp.deptno,dname,loc
  2  from emp,dept
  3  where emp.deptno = dept.deptno(+);

     EMPNO ENAME          DEPTNO DNAME          LOC
---------- ---------- ---------- -------------- -------------
      7934 MILLER             10 ACCOUNTING     NEW YORK
      7839 KING               10 ACCOUNTING     NEW YORK
      7782 CLARK              10 ACCOUNTING     NEW YORK
      7902 FORD               20 RESEARCH       DALLAS
      7876 ADAMS              20 RESEARCH       DALLAS
      7788 SCOTT              20 RESEARCH       DALLAS
      7566 JONES              20 RESEARCH       DALLAS
      7369 SMITH              20 RESEARCH       DALLAS
      7900 JAMES              30 SALES          CHICAGO
      7844 TURNER             30 SALES          CHICAGO
      7698 BLAKE              30 SALES          CHICAGO

     EMPNO ENAME          DEPTNO DNAME          LOC
---------- ---------- ---------- -------------- -------------
      7654 MARTIN             30 SALES          CHICAGO
      7521 WARD               30 SALES          CHICAGO
      7499 ALLEN              30 SALES          CHICAGO

14 rows selected.

SQL>
```

PRACTICAL NO: 4	DEMONSTRATION ON CONTROL STRUCTURES

Aim:

To Implement the Control Structures.

Procedure:

→Conditional Control

IF-THEN

SYNTAX: IF condition THEN

Sequence of statements;

END IF;

HINT:	SQL> SET SERVEROUTPUT ON;

/*Program to find a person is major or not using if statement*/

```
declare
age number;
begin
age:=&age;
if age>=18 then
dbms_output.put_line('You are a Major');
end if;
end;
/
```

Output:

```
Enter value for age: 19
old   4: age:=&age;
new   4: age:=19;
You  are a Major
PL/SQL procedure successfully completed.
```

IF-THEN-ELSE

SYNTAX:

```
IF condition THEN
 Sequence of statements1;
ELSE
Sequence of statements2;
END IF;
```

/*Program to find a person is major or minor using if-else statement*/

```
declare
age number;
begin
age:=&age;
if age>=18 then
dbms_output.put_line('You are a Major');
else
dbms_output.put_line('You are a Minor');
end if;
end;
/
```

Output:

```
Enter value for age: 20
old   4: age:=&age;
new   4: age:=20;
You are a Major
PL/SQL procedure successfully completed.
```

→ Iterative Control

WHILE-LOOP

SYNTAX:

```
WHILE condition LOOP
    Sequence of statements;
    END LOOP;
```

/*Program to demonstrate the use of while loop*/

```
DECLARE
        a number(2) := 10;
BEGIN
        WHILE a < 20 LOOP
                dbms_output.put_line('value of a: ' || a);
                a := a + 1;
        END LOOP;
END;
```

Output:

```
value of a: 10
value of a: 11
value of a: 12
value of a: 13
value of a: 14
value of a: 15
value of a: 16
value of a: 17
value of a: 18
value of a: 19
PL/SQL procedure successfully completed.
```

FOR-LOOP

SYNTAX:

FOR counter IN lower limit.. Higher limit LOOP

Sequence of statements;

END LOOP;

/* Program to print the table of a given number using for loop*/

```
DECLARE
        n number;
        i number;
        p number;
BEGIN
        n:=&n;
        for i in 1..10
        loop
                p:=n*i;
        dbms_output.put_line(n ||' X '|| i ||' = '||p);
        end loop;
END;
/
```

Output:

```
Enter value for n: 10
old   6:  n:=&n;
new   6:  n:=10;
10 X 1 = 10
```

10 X 2 = 20

10 X 3 = 30

10 X 4 = 40

10 X 5 = 50

10 X 6 = 60

10 X 7 = 70

10 X 8 = 80

10 X 9 = 90

10 X 10 = 100

PL/SQL procedure successfully completed.

Practical No: 5	DEMONSTRATION ON CURSORS

Aim:

To Create the Electricity Bill Calculation Using Cursors

Procedure:

→Creation of Table **(ebill):**

```
SQL> create table ebill(name varchar2(10),
  2  address varchar2(20),
  3  city varchar2(20),
  4  unit number(10));

Table created.

SQL> insert into ebill values(
    '&name',
    '&address',
    '&city',
```

```
    '&unit');

Enter value for name: Madhu
old   2: '&name',
new   2: 'Madhu',
Enter value for address: Iskon Road
old   3: '&address',
new   3: 'Iskon Road',
Enter value for city: Tirupathi
old   4: '&city',
new   4: 'Tirupathi',
Enter value for unit: 100
old   5: '&unit')
new   5: '100')

1 row created.

SQL> /
Enter value for name: Riyaz
old   2: '&name',
new   2: 'Riyaz',
Enter value for address: VRC CENTRE
old   3: '&address',
new   3: 'VRC CENTRE',
Enter value for city: NELLORE
old   4: '&city',
new   4: 'NELLORE',
Enter value for unit: 200
old   5: '&unit')
new   5: '200')
1 row created.

SQL> /
Enter value for name: LAKSHMI
old   2: '&name',
new   2: 'LAKSHMI',
Enter value for address: NEHRU STREET
old   3: '&address',
```

```
new   3: 'NEHRU STREET',
Enter value for city: VIZAQ
old   4: '&city',
new   4: 'VIZAQ',
Enter value for unit: 300
old   5: '&unit')
new   5: '300')
1 row created.

SQL> /
Enter value for name: RAMA RAO
old   2: '&name',
new   2: 'RAMA RAO',
Enter value for address: BANJARA HILLS
old   3: '&address',
new   3: 'BANJARA HILLS',
Enter value for city: HYDERABAD
old   4: '&city',
new   4: 'HYDERABAD',
Enter value for unit: 400
old   5: '&unit')
new   5: '400')

1 row created.

SQL> COMMIT;

Commit complete.


SQL> SELECT * FROM EBILL;


NAME          ADDRESS                    CITY                 UNIT
----------    --------------------       --------------------  ----------
Madhu         Iskon Road                 Tirupathi            100
Riyaz         VRC CENTRE                 NELLORE              200
LAKSHMI             NEHRU STREET         VIZAQ                300
```

```
RAMA RAO        BANJARA HILLS        HYDERABAD        400

SQL> set serveroutput on;


SQL> declare
    cursor c is select * from ebill;
    b bill %ROWTYPE;
    begin
     open c;
     dbms_output.put_line('Name     Address     City   Unit   Amount');
     dbms_output.put_line('<=====================================>');
    loop
     fetch c into b;
    if(c % notfound) then
   exit;
   else
    if(b.unit<=100) then
     dbms_output.put_line(b.name||' '||b.address||' '
   ||b.city||' '||b.unit||' '||b.unit*1);
     elsif(b.unit>100 and b.unit<=200) then
     dbms_output.put_line(b.name||' '||b.address||' '
    ||b.city||' '||b.unit||' '||b.unit*2);
     elsif(b.unit>200 and b.unit<=300) then
```

```
dbms_output.put_line(b.name||' '||b.address||' '
||b.city||' '||b.unit||' '||b.unit*3);
 elsif(b.unit>300 and b.unit<=400) then
 dbms_output.put_line(b.name||' '||b.address||' '
||b.city||' '||b.unit||' '||b.unit*4);
 else
 dbms_output.put_line(b.name||' '||b.address||' '
||b.city||' '||b.unit||' '||b.unit*5);
 end if;
  end if;
 end loop;
close c;
 end;
/
```

Output:

```
Name            Address            city        Unit        Amount
<==================================================================
==>
Madhu           Iskon Road              Tirupathi   100         100
Riyaz           VRC CENTRE              NELLORE     200         400
LAKSHMI         NEHRU STREET   VIZAQ        300         900
```

RAMA RAO	BANJARA HILLS HYDERABAD	400	1600

PL/SQL procedure successfully completed.

Practical No: 6	DEMONSTRATION ON FUNCTIONS IN PL/SQL

Aim:

To implement the functions in PL/SQL.

Procedure:

The General Syntax of Creating the Function is:

```
CREATE [OR REPLACE] FUNCTION function_name
[(parameter_name [IN | OUT | IN OUT] type [, ...])]
RETURN return_datatype
{IS | AS}
BEGIN
    < function_body>
END
[function_name];
```

/* Program to find the Sum of two numbers using Function */

```
SQL> create or replace function sump (a number, b number)
return number is
r number;
Begin
        r:=a+b;
        return(r);
End;
/
Function created.
/* function Execution */
declare
n1 number;
n2 number;
s number;
begin
n1:=&n1;
n2:=&n2;
s:=sump(n1,n2);
dbms_output.put_line(' The Sum of two numbers are='||s);
end;
/
```

```
Enter value for n1: 25
old   6: n1:=&n1;
new   6: n1:=25;
Enter value for n2: 75
old   7: n2:=&n2;
new   7: n2:=75;
The Sum of two numbers are=100

PL/SQL procedure successfully completed.
```

Practical No: 7 DEMONSTRATION ON PACKAGES IN PL/SQL

Aim:

To Implement the Packages in PL/SQL.

Procedure:

→Defining Package Specification Syntax:

```
CREATE [OR REPLACE] PACKAGE package_name     IS | AS
        [variable_declaration ...]
        [PROCEDURE [Schema..] procedure_name
                [ (parameter {IN,OUT,IN OUT} datatype [,parameter]) ]
        ]
        [FUNCTION [Schema..] function_name
                [ (parameter {IN,OUT,IN OUT} datatype [,parameter]) ]
                RETURN return_datatype;
        ]
END [package_name];
```

→Creating Package Body Syntax:

```
CREATE [OR REPLACE] PACKAGE BODY package_name
   IS | AS
   [private_variable_declaration ...]
        BEGIN
                [initialization_statement]
                [PROCEDURE [Schema..] procedure_name
                        [ (parameter [,parameter]) ]
                        IS | AS
                                variable declarations;
                        BEGIN
                                statement(s);
                        EXCEPTION
                                WHEN ...
                        END


                [FUNCTION  [Schema..] function_name
                                [ (parameter [,parameter]) ]
                                RETURN return_datatype;
                        IS | AS
                                variable declarations;
                        BEGIN
                                statement(s);
                        EXCEPTION
                                WHEN ...
                        END

        END;
        /
```

/* Program to Demonstration of Statistical Functions using Packages.*/

```
SQL> create or replace package stat_fn as

        procedure sump(a number, b number,c number);
```

```
procedure avgp(a number,b number, c number);
end stat_fn;
/
```

Package created.

```
SQL> create or replace package body stat_fn is
    procedure sump(a number,b number,c number)is
    d number;
    begin
    d:=a+b+c;
    dbms_output.put_line('The Sum of given numbers are ='||d);
    end sump;

    procedure avgp(a number,b number,c number) is
    d number;
    e number;
    begin
    d:=a+b+c;
    e:=d/3;
    dbms_output.put_line('The Average of given numbers are ='||e);
    end avgp;
end stat_fn;
```

```
/
Package body created.

SQL> set serveroutput on;

SQL> /* Calling the Procedure's */
SQL>   declare
        n1 number;
        n2 number;
        n3 number;
        begin
         n1:=&n1;
         n2:=&n2;
        n3:=&n3;
        stat_fn.sump(n1,n2,n3);
        stat_fn.avgp(n1,n2 ,n3);
        end;
        /
```

Output:

```
Enter value for n1: 10
old   6:     n1:=&n1;
new   6:     n1:=10;
```

```
Enter value for n2: 20
old   7:     n2:=&n2;
new   7:     n2:=20;
Enter value for n3: 30
old   8:     n3:=&n3;
new   8:     n3:=30;
The Sum of given numbers are =60
The Average of given numbers are =30

PL/SQL procedure successfully completed.
```

Practical No: 8 DEMONSTRATION ON TRIGGERS IN PL/SQL

Aim:

To Implement the Triggers in PL/SQL.

Procedure:

The General Syntax to Create the Triggers as:

```
CREATE [OR REPLACE] TRIGGER trigger_name
        BEFORE | AFTER
        [INSERT, UPDATE, DELETE [COLUMN NAME..]
        ON table_name

        Referencing [ OLD AS OLD | NEW AS NEW ]
        FOR EACH ROW | FOR EACH STATEMENT [ WHEN Condition ]

DECLARE
  [declaration_section
```

```
            variable declarations;
            constant declarations;
   ]

BEGIN
        [executable_section
                PL/SQL execute/subprogram body
   ]

EXCEPTION
   [exception_section
                PL/SQL Exception block
   ]

END;
```

```
SQL> Create table student(

   rollno number(5),

    name varchar(20),

    m1 number(3),

    m2 number(3),

    m3 number(3),

    tot number(3),

    avg number(3),

    result varchar(10));

    Table created.
```

```
SQL> create or replace trigger t1 before insert on student
    for each row
    begin
    :new.tot:=:new.m1+:new.m2+:new.m3;
    :new.avg:=:new.tot/3;
    if(:new.m1>=35 and :new.m2>=35 and :new.m3>=35) then
    :new.result:='pass';


  else
    :new.result:='Fail';
   end if;
   end;
  /
```

Trigger created.

```
SQL> insert into student values(101,'Goutham',67,89,99,'','','');
```

1 row created.

```
SQL> insert into student values(102,'Swaroop',85,79,99,'','');

1 row created.


SQL> insert into student values(103,'Chandini',89,99,99,'','');

1 row created.


SQL> insert into student values(104,'Dwaraka',23,45,33,'','');

1 row created.


SQL> commit;

Commit complete.
```

Output:

```
SQL> set linesize 200;

SQL> select * from student;


 ROLLNO   NAME          M1         M2         M3         TOT        AVG   RESULT
-------- -------------------- ---------- ---------- ---------- ---------- ---------- ----------
    101        Goutham         67         89         99        255         85          pass
```

102	Swaroop	85	79	99	263	88	pass
103	Chandini	89	99	99	287	96	pass
104	Dwaraka	23	45	33	101	34	Fail