EXPERIMENT – 1

Write SQL queries to CREATE TABLES for various databases using DDL commands like CREATE, ALTER, DROP, TRUNCATE).

AIM:

To write SQL queries to CREATE TABLES for various databases using DDL commands like CREATE, ALTER, DROP, TRUNCATE).

PROGRAM DESCRIPTION :

In this lab, we successfully practice how to write SQL queries to CREATE TABLES for various databases using DDL commands like CREATE, ALTER, DROP, TRUNCATE).

In SQL DDL commands are used to define the structure of the table. The DDL Commands as shown in the following Tables.

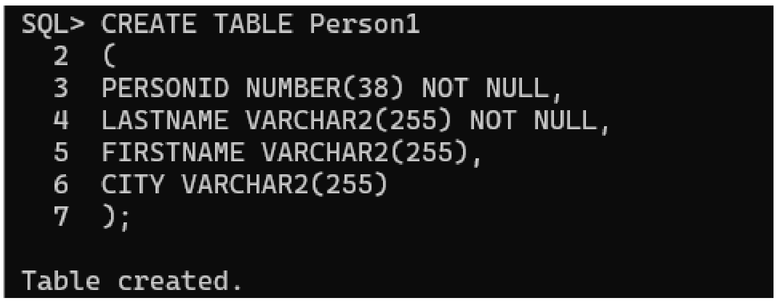
CREATE TABLE:

Creates a table with specified constraints.

SYNTAX:

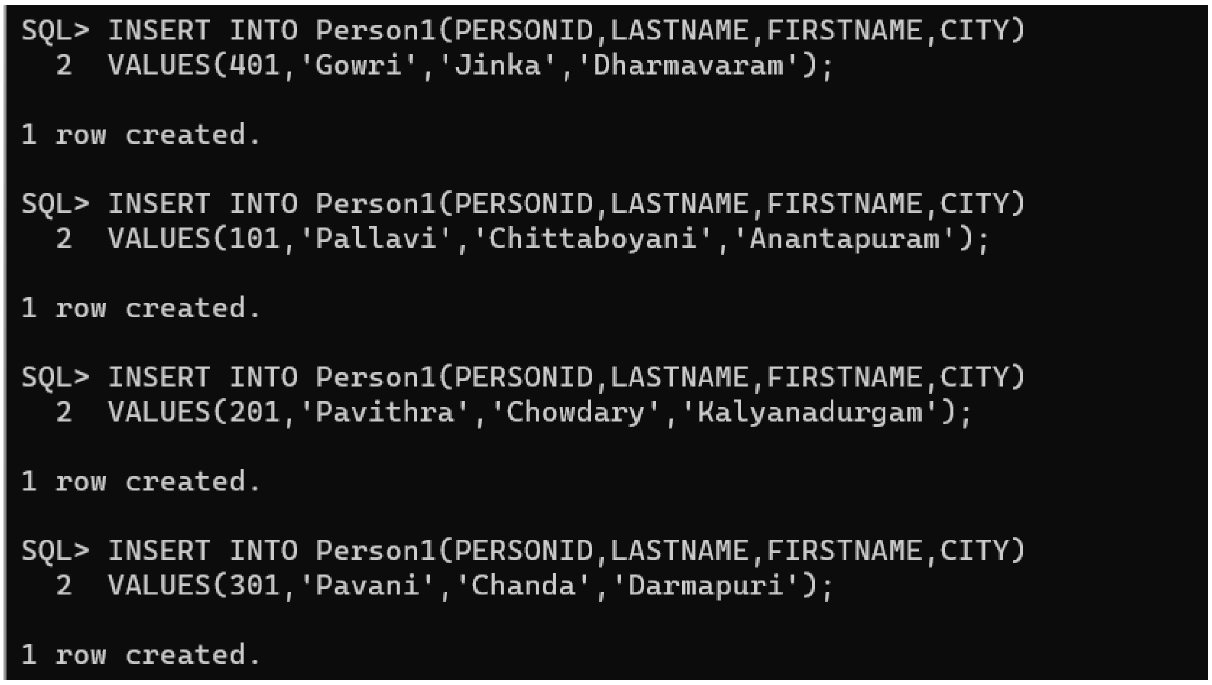
```
CREATE TABLE tablename (
column1 data_ type [constraint] [,
column2 data_ type [constraint] ] [,
PRIMARY KEY (column1 [, column2]) ] [,
FOREIGN KEY (column1 [, column2]) REFERENCES tablename]
[,CONSTRAINT constraint]);
```

PERSON TABLE :



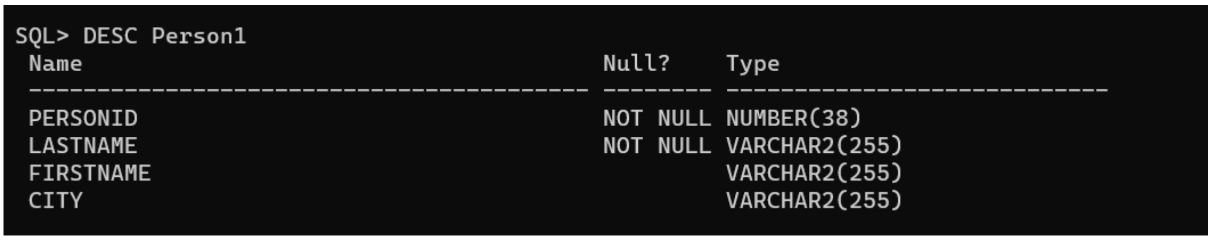
```
SQL> CREATE TABLE Person1
     (
     PERSONID NUMBER(38) NOT NULL,
     LASTNAME VARCHAR2(255) NOT NULL,
     FIRSTNAME VARCHAR2(255),
     CITY VARCHAR2(255)
     );

Table created.
```

INSERT INTO:



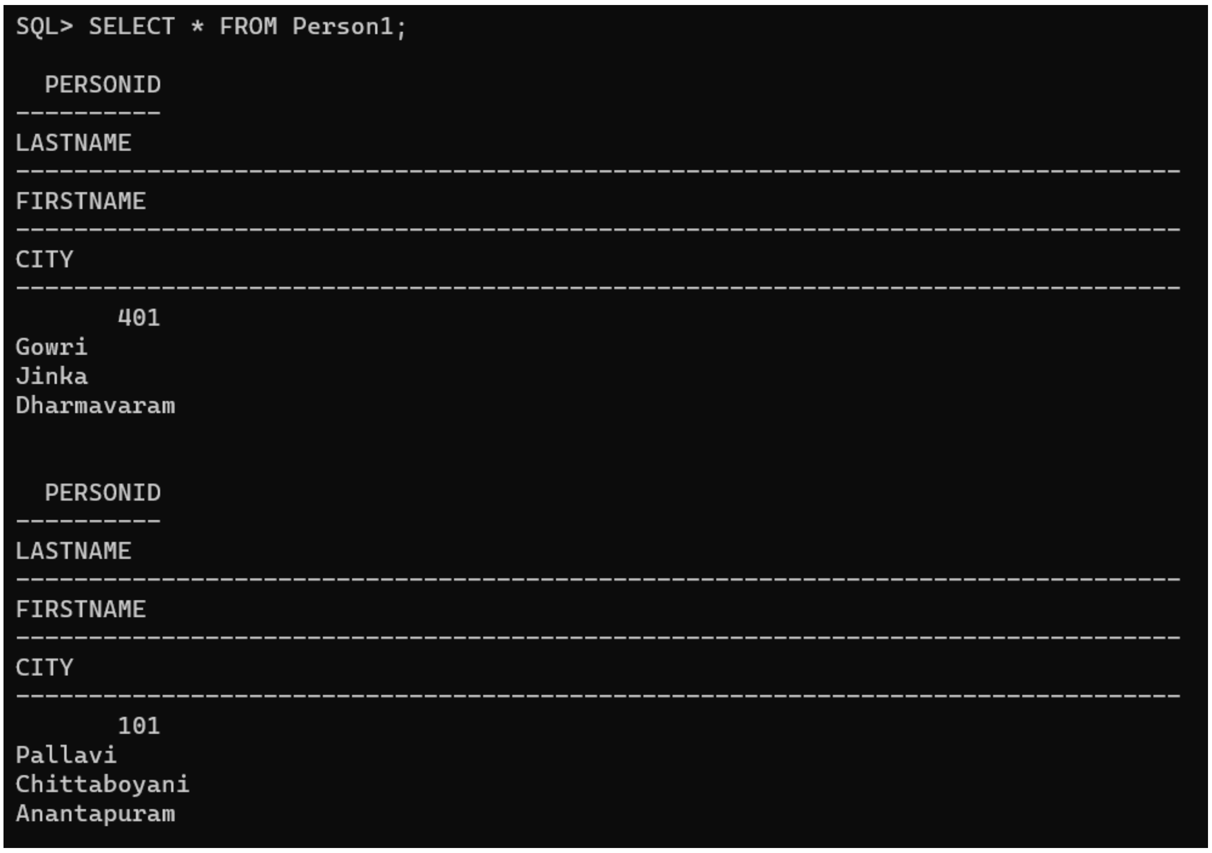
```
SQL> INSERT INTO Person1(PERSONID,LASTNAME,FIRSTNAME,CITY)
     VALUES(401,'Gowri','Jinka','Dharmavaram');

1 row created.

SQL> INSERT INTO Person1(PERSONID,LASTNAME,FIRSTNAME,CITY)
     VALUES(101,'Pallavi','Chittaboyani','Anantapuram');

1 row created.

SQL> INSERT INTO Person1(PERSONID,LASTNAME,FIRSTNAME,CITY)
     VALUES(201,'Pavithra','Chowdary','Kalyanadurgam');

1 row created.

SQL> INSERT INTO Person1(PERSONID,LASTNAME,FIRSTNAME,CITY)
     VALUES(301,'Pavani','Chanda','Darmapuri');

1 row created.
```

DESC PERSON:

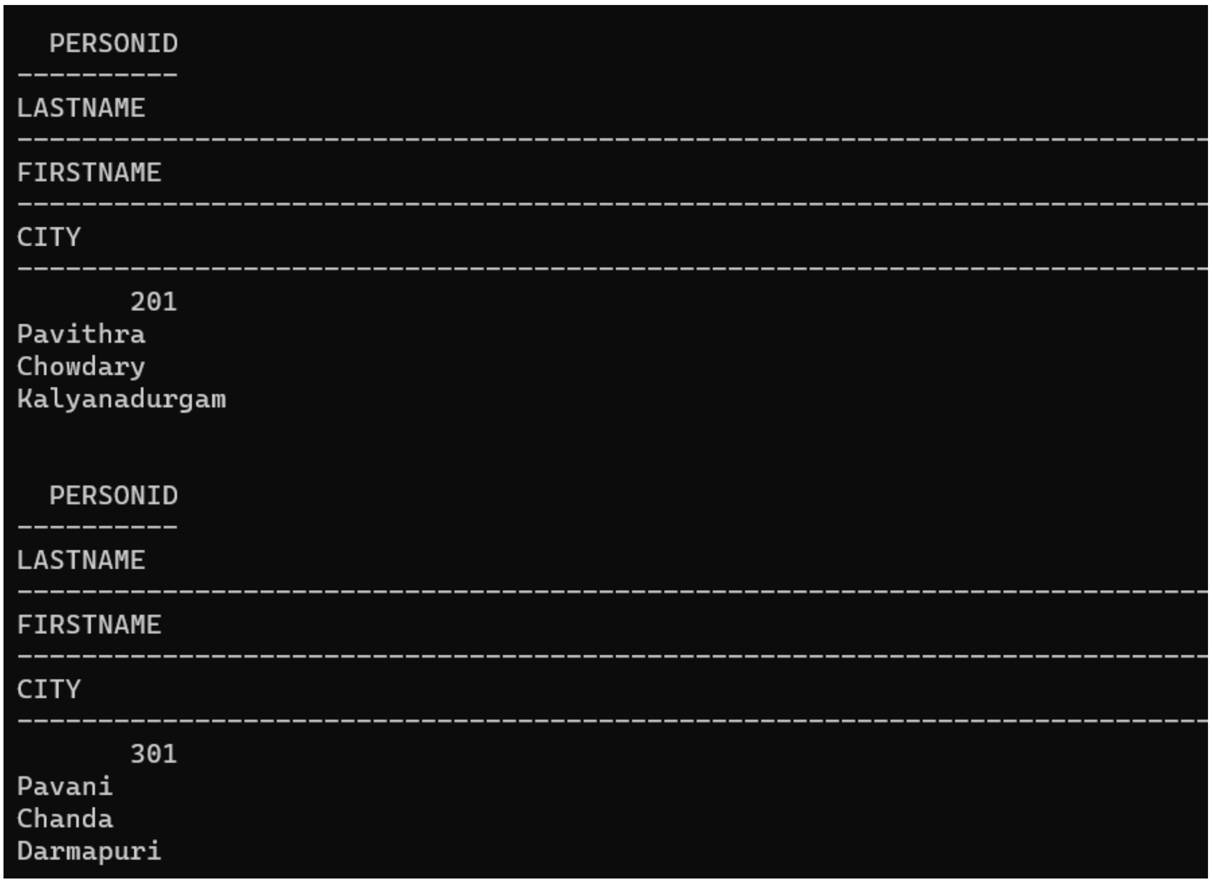


```
SQL> DESC Person1
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 PERSONID                                  NOT NULL NUMBER(38)
 LASTNAME                                  NOT NULL VARCHAR2(255)
 FIRSTNAME                                          VARCHAR2(255)
 CITY                                               VARCHAR2(255)
```

SELECT :



```
SQL> SELECT * FROM Person1;

  PERSONID
----------
LASTNAME
--------------------------------------------------------------------------------
FIRSTNAME
--------------------------------------------------------------------------------
CITY
--------------------------------------------------------------------------------
       401
Gowri
Jinka
Dharmavaram


  PERSONID
----------
LASTNAME
--------------------------------------------------------------------------------
FIRSTNAME
--------------------------------------------------------------------------------
CITY
--------------------------------------------------------------------------------
       101
Pallavi
Chittaboyani
Anantapuram
```



```
  PERSONID
----------
LASTNAME
--------------------------------------------------------------------------------
FIRSTNAME
--------------------------------------------------------------------------------
CITY
--------------------------------------------------------------------------------
       201
Pavithra
Chowdary
Kalyanadurgam


  PERSONID
----------
LASTNAME
--------------------------------------------------------------------------------
FIRSTNAME
--------------------------------------------------------------------------------
CITY
--------------------------------------------------------------------------------
       301
Pavani
Chanda
Darmapuri
```

ALTER TABLE:

Used to add or modify table details like column names and data types, column constraints.

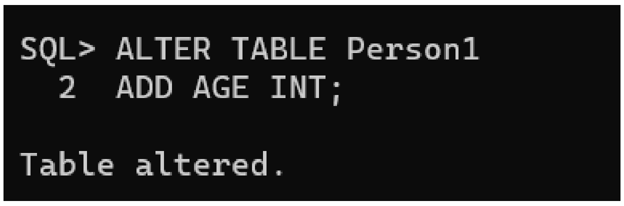
SYNTAX:

ALTER TABLE tablename

{ADD | MODIFY} (column_name data_type [{ ADD|MODIFY }

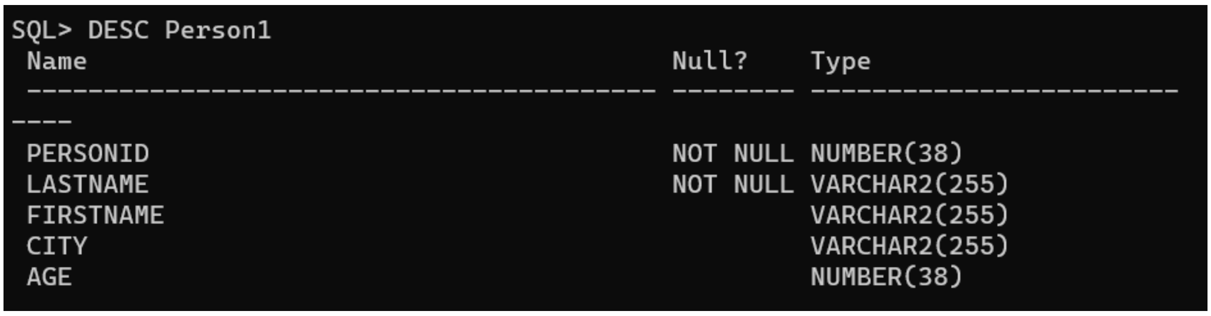
Column_name data_type]);

EXAMPLE:



```
SQL> ALTER TABLE Person1
  2  ADD AGE INT;

Table altered.
```

DESC Person1:



```
SQL> DESC Person1
 Name                                      Null?    Type
 ----------------------------------------- -------- ------------------------
----
 PERSONID                                  NOT NULL NUMBER(38)
 LASTNAME                                  NOT NULL VARCHAR2(255)
 FIRSTNAME                                          VARCHAR2(255)
 CITY                                               VARCHAR2(255)
 AGE                                                NUMBER(38)
```

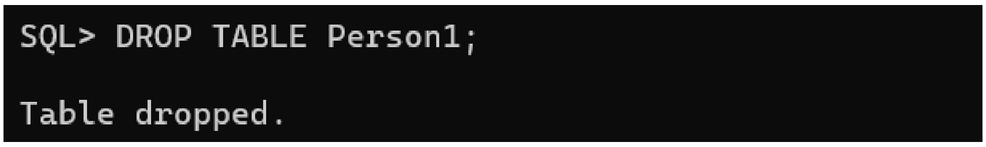
DROP TABLE:

Deletes the specified table.

SYNTAX:

DROP TABLE table_name;

EXAMPLE:



```
SQL> DROP TABLE Person1;

Table dropped.
```

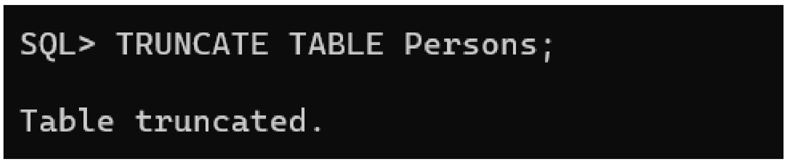
TRUNCATE TABLE:

To remove all rows in a specified table.

SYNTAX:

TRUNCATE TABLE table_name;

EXAMPLE:



```
SQL> TRUNCATE TABLE Persons;

Table truncated.
```

CONCLUSION:

In this lab, we successfully practice how to write SQL queries to CREATE TABLES for various databases using DDL commands like CREATE, ALTER, DROP, TRUNCATE).

EXPERIMENT-2

TO MANIPULATE TABLE S for various databases using DML commands

AIM:

To write the SQL queries to MANIPULATE TABLES for various databases using DML commands like INSERT, SELECT, UPDATE, DELETE).

PROGRAM DESCRIPTION :

In this lab, we learnt how to write the SQL queries to MANIPULATE TABLES for various databases using DML commands like INSERT, SELECT, UPDATE, DELETE).

INSERT COMMAND:

It is used to add values to a table.

SYNTAX:

```
INSERT INTO tablename
VALUES (value1,value2,...,valuen);
INSERT INTO tablename (column1, column2,...,column)
VALUES (value1, value2,...,valuen);
```

SELECT COMMAND:

The SELECT command used to list the contents of a table.

SYNTAX:

```
SELECT columnlist
FROM tablelist
[WHERE conditionlist]
[GROUP BY columnlist]
[HAVING conditionlist]
[ORDER BY columnlist [ASC|DESC]];
```

UPDATE COMMAND:

The update command used to modify the contents of specified table.

SYNTAX:

UPDATE tablename
SET column_name = value[,
Column_name = value]
[WHERE condition_lsit];

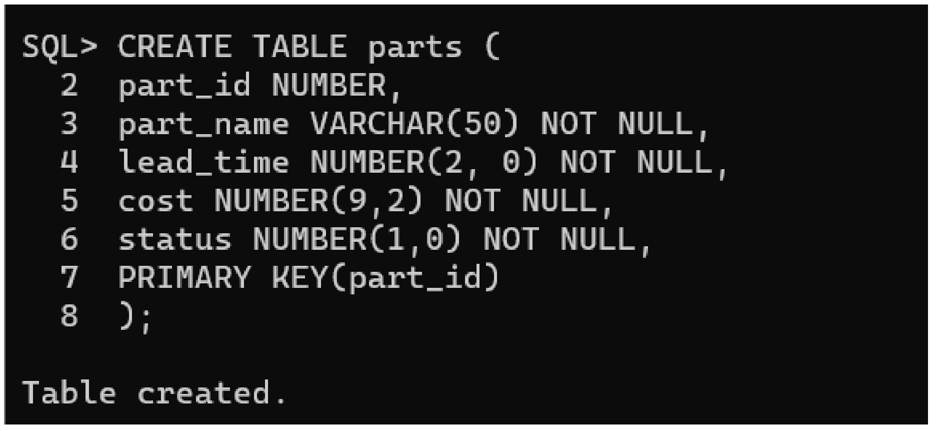
DELETE COMMAND:

To delete all rows or specified rows in a table.

SYNTAX:

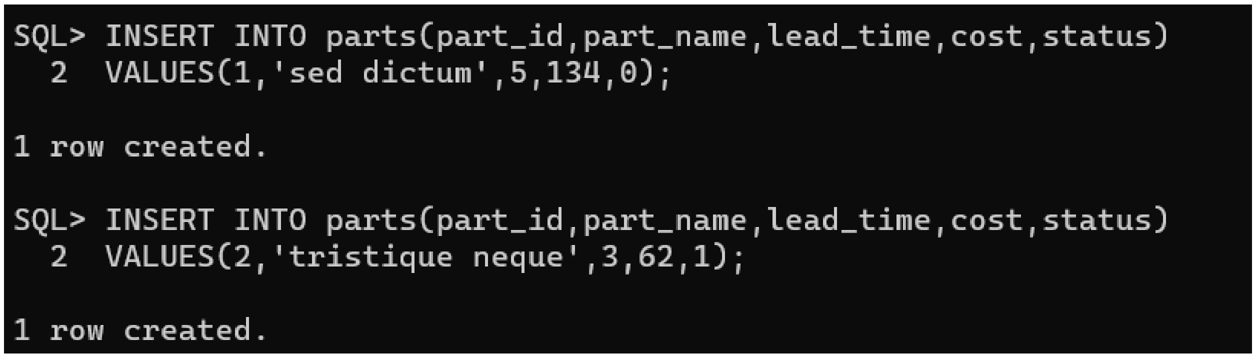
DELETE FROM tablename [WHERE condition_ list];

PARTS TABLE:

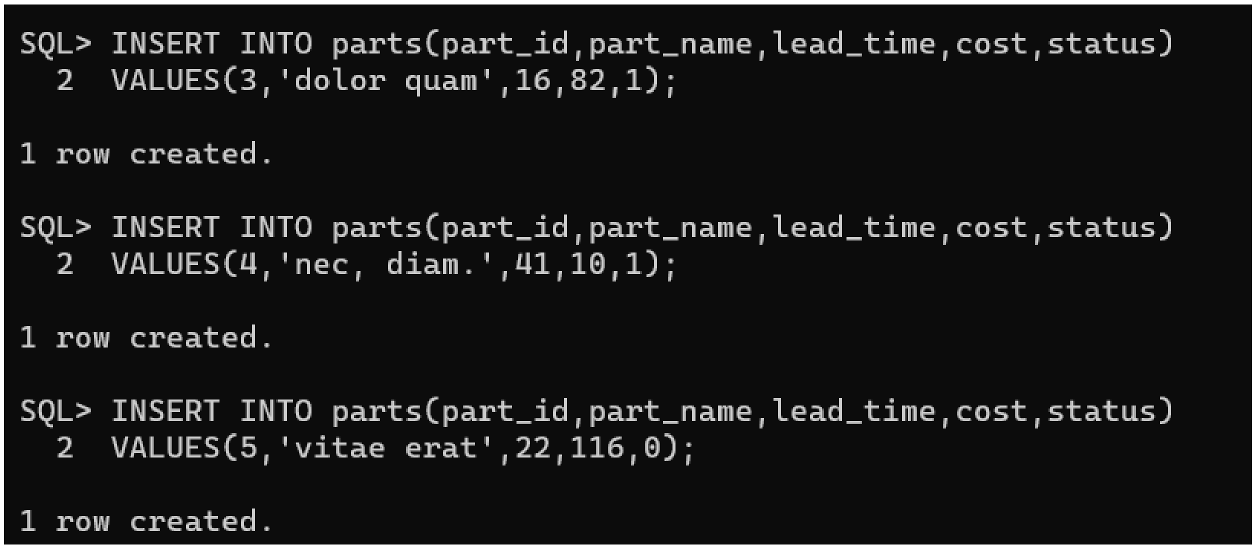


```
SQL> CREATE TABLE parts (
  2  part_id NUMBER,
  3  part_name VARCHAR(50) NOT NULL,
  4  lead_time NUMBER(2, 0) NOT NULL,
  5  cost NUMBER(9,2) NOT NULL,
  6  status NUMBER(1,0) NOT NULL,
  7  PRIMARY KEY(part_id)
  8  );

Table created.
```

EXAMPLE ON INSERT:



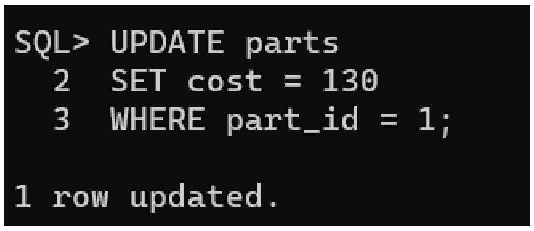
```
SQL> INSERT INTO parts(part_id,part_name,lead_time,cost,status)
  2  VALUES(1,'sed dictum',5,134,0);

1 row created.

SQL> INSERT INTO parts(part_id,part_name,lead_time,cost,status)
  2  VALUES(2,'tristique neque',3,62,1);

1 row created.
```



```
SQL> INSERT INTO parts(part_id,part_name,lead_time,cost,status)
  2  VALUES(3,'dolor quam',16,82,1);

1 row created.

SQL> INSERT INTO parts(part_id,part_name,lead_time,cost,status)
  2  VALUES(4,'nec, diam.',41,10,1);

1 row created.

SQL> INSERT INTO parts(part_id,part_name,lead_time,cost,status)
  2  VALUES(5,'vitae erat',22,116,0);

1 row created.
```

Oracle UPDATE – update multiple columns of a single row

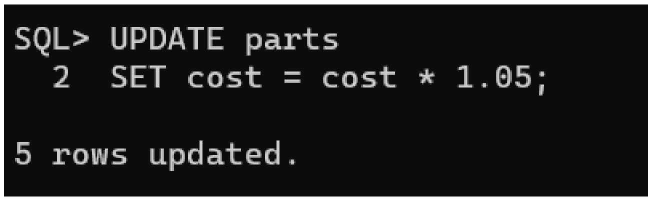
EXAMPLE :



```
SQL> UPDATE parts
  2  SET cost = 130
  3  WHERE part_id = 1;

1 row updated.
```

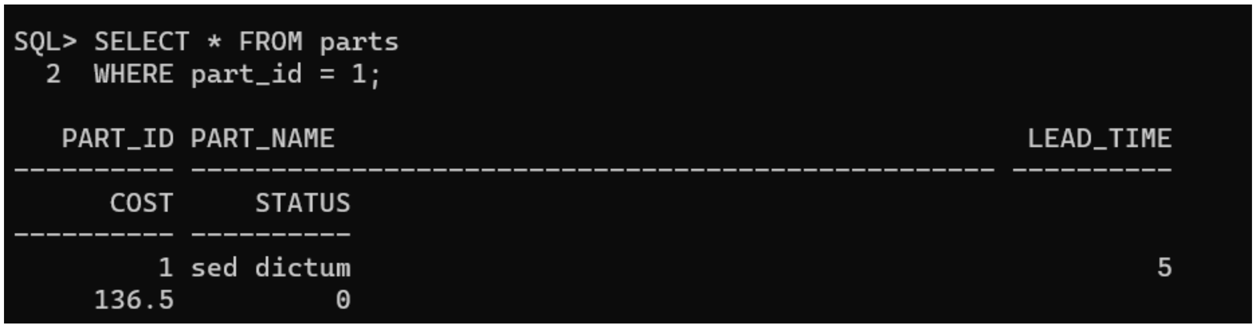
Oracle UPDATE – update multiple rows example

EXAMPLE:

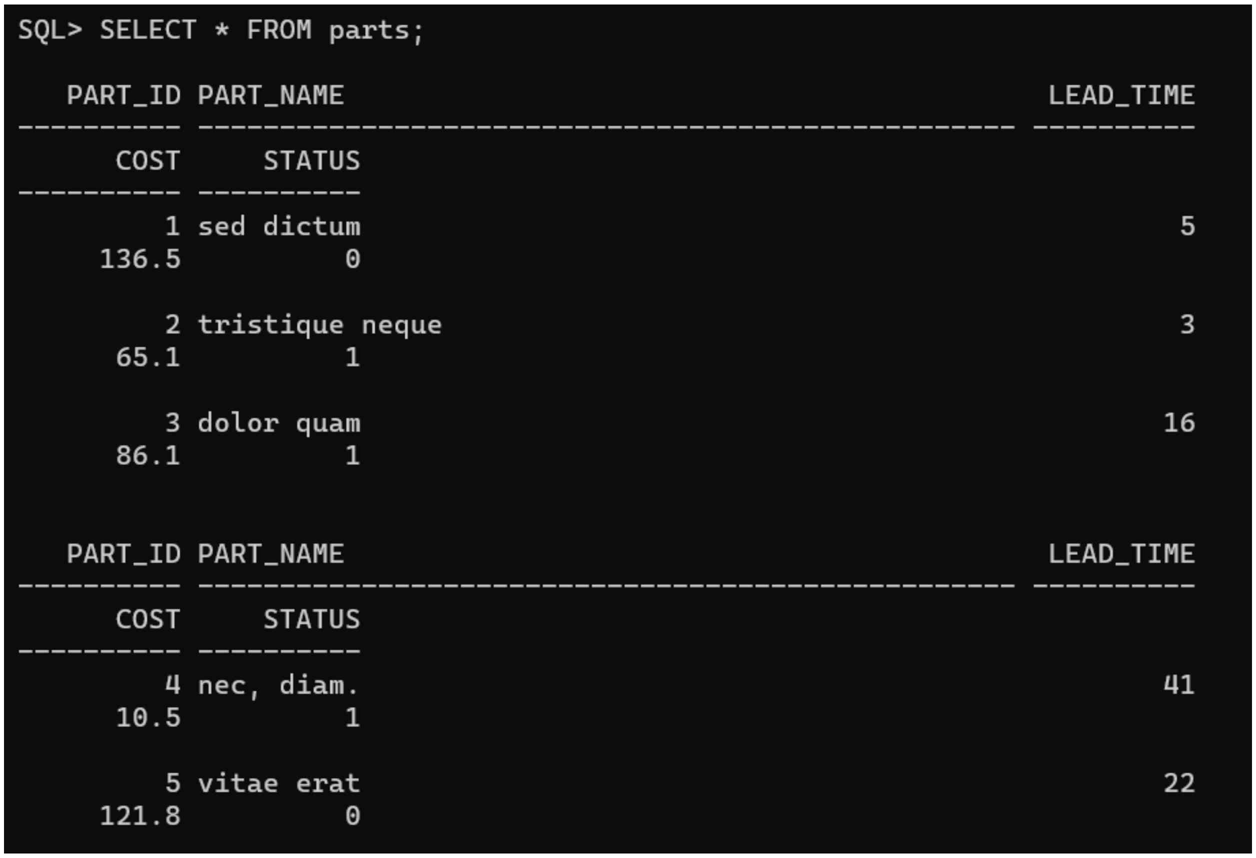


```
SQL> UPDATE parts
  2  SET cost = cost * 1.05;

5 rows updated.
```

EXAMPLE ON SELECT:

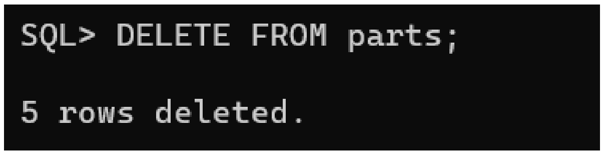


```
SQL> SELECT * FROM parts
  2  WHERE part_id = 1;

   PART_ID PART_NAME                                          LEAD_TIME
---------- -------------------------------------------------- ----------
      COST     STATUS
---------- ----------
         1 sed dictum                                                  5
     136.5          0
```



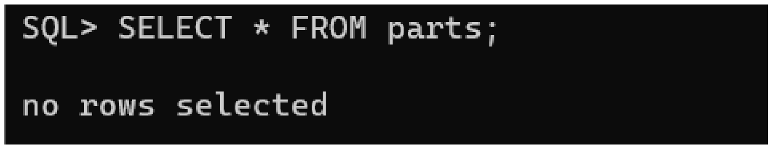
```
SQL> SELECT * FROM parts;

   PART_ID PART_NAME                                          LEAD_TIME
---------- -------------------------------------------------- ----------
      COST     STATUS
---------- ----------
         1 sed dictum                                                  5
     136.5          0

         2 tristique neque                                             3
      65.1          1

         3 dolor quam                                                 16
      86.1          1


   PART_ID PART_NAME                                          LEAD_TIME
---------- -------------------------------------------------- ----------
      COST     STATUS
---------- ----------
         4 nec, diam.                                                 41
      10.5          1

         5 vitae erat                                                 22
     121.8          0
```

EXAMPLE ON DELETE:



```
SQL> DELETE FROM parts;

5 rows deleted.
```

SELECT:



```
SQL> SELECT * FROM parts;

no rows selected
```

CONCLUSION:

In this lab, we successfully practice how to write sql queries MANIPULATE TABLES for various databases using DML commands like INSERT, SELECT, UPDATE, DELETE).

EXPERIMENT -3

AIM:

To Implement view-level design using CREATE VIEW, ALTER VIEW and DELETE VIEW DDL commands.

Program Description:

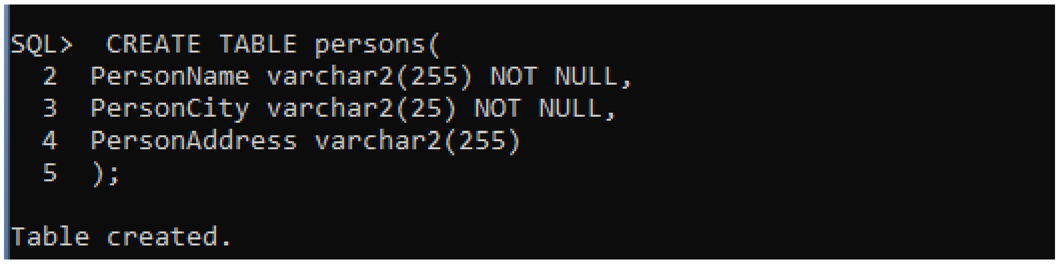
In this lab, we study the high-level design implementation of databases by using various view commands like create view, alter view and delete view.

A relation that is not part of a logical model, but it is made visible to a user as a virtual relation, is called a view. Therefore, view is referred as virtual relation.

CREATE TABLE syntax:

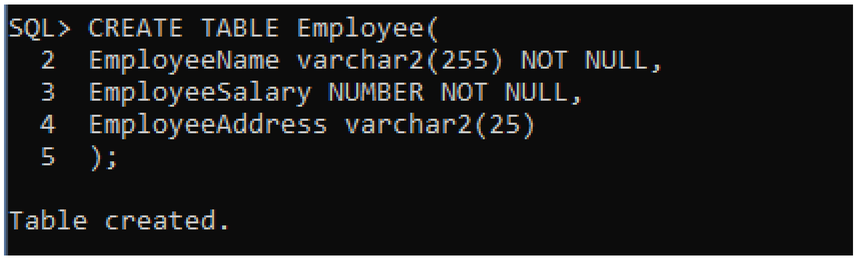
```
CREATE TABLE table_name (
    column1 datatype,
    column2 datatype,
    column3 datatype,
   ....
);
```

EXAMPLE-1:



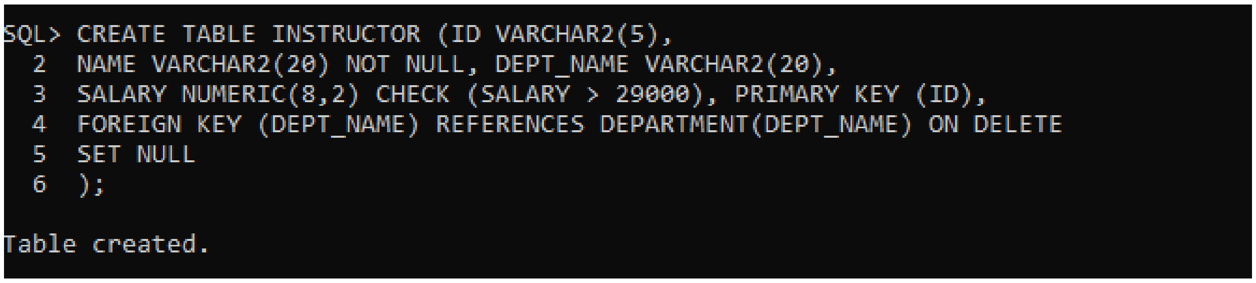
```
SQL>  CREATE TABLE persons(
  2  PersonName varchar2(255) NOT NULL,
  3  PersonCity varchar2(25) NOT NULL,
  4  PersonAddress varchar2(255)
  5  );

Table created.
```

EXAMPLE -2:



```
SQL> CREATE TABLE Employee(
  2  EmployeeName varchar2(255) NOT NULL,
  3  EmployeeSalary NUMBER NOT NULL,
  4  EmployeeAddress varchar2(25)
  5  );

Table created.
```

EXAMPLE-3



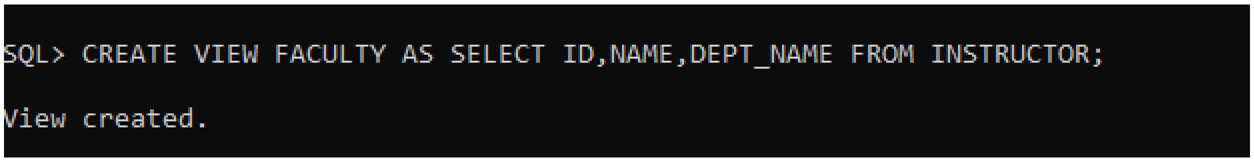
```
SQL> CREATE TABLE INSTRUCTOR (ID VARCHAR2(5),
  2  NAME VARCHAR2(20) NOT NULL, DEPT_NAME VARCHAR2(20),
  3  SALARY NUMERIC(8,2) CHECK (SALARY > 29000), PRIMARY KEY (ID),
  4  FOREIGN KEY (DEPT_NAME) REFERENCES DEPARTMENT(DEPT_NAME) ON DELETE
  5  SET NULL
  6  );

Table created.
```

CREATE VIEW Syntax:

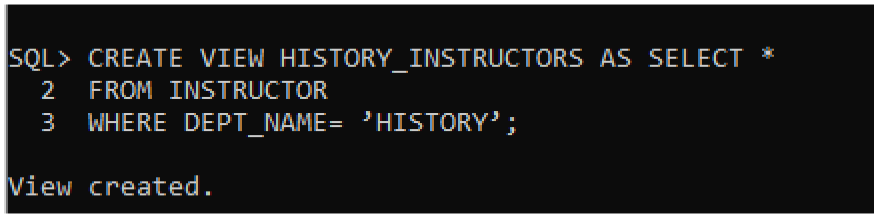
View syntax:

CREATE VIEW VIEW_NAME AS <QUERY EXPRESSION>

EXAMPLE:



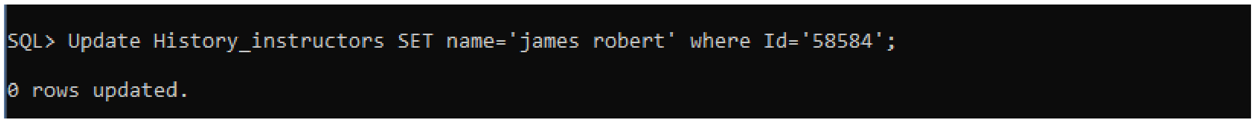
```
SQL> CREATE VIEW FACULTY AS SELECT ID,NAME,DEPT_NAME FROM INSTRUCTOR;

View created.
```



```
SQL> CREATE VIEW HISTORY_INSTRUCTORS AS SELECT *
  2  FROM INSTRUCTOR
  3  WHERE DEPT_NAME= 'HISTORY';

View created.
```

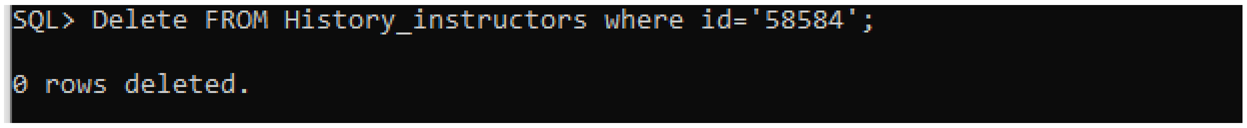
UPDATE :

EXAMPLE:



```
SQL> Update History_instructors SET name='james robert' where Id='58584';

0 rows updated.
```

DELETE:



```
SQL> Delete FROM History_instructors where id='58584';

0 rows deleted.
```

CONCLUSION:

In this Lab, We practice how to create view ,alter view , delete view

EXPERIMENT - 4

WRITE SQL QUERIES TO PERFORM RELATIONAL OPERATIONS [i.e., UNION, UNION ALL, MINUS, INTERSECTION, CROSS JOIN, NATURAL JOIN].

AIM :

To write SQL queries to perform relational operations like UNION, UNION ALL, MINUS,INTERSECTION, CROSS JOIN,NATURAL JOIN.

PROGRAM DESCRIPTION:

In this lab, we study the implementation of RELATIONAL OPERATIONS.

RELATIONAL OPERAIONS are:

1.UNION

2.UNION ALL

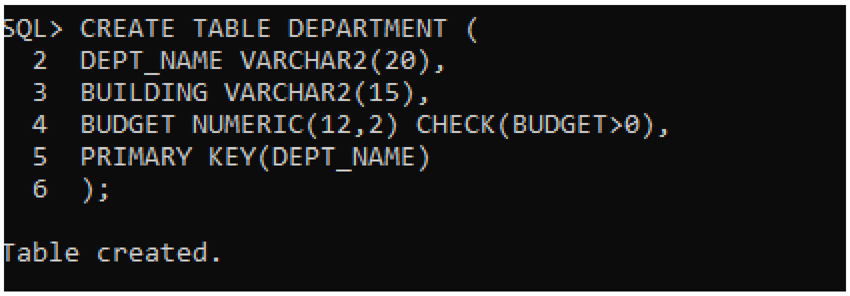
3.MINUS

4.INTERSECTION

5.CROSS JOIN

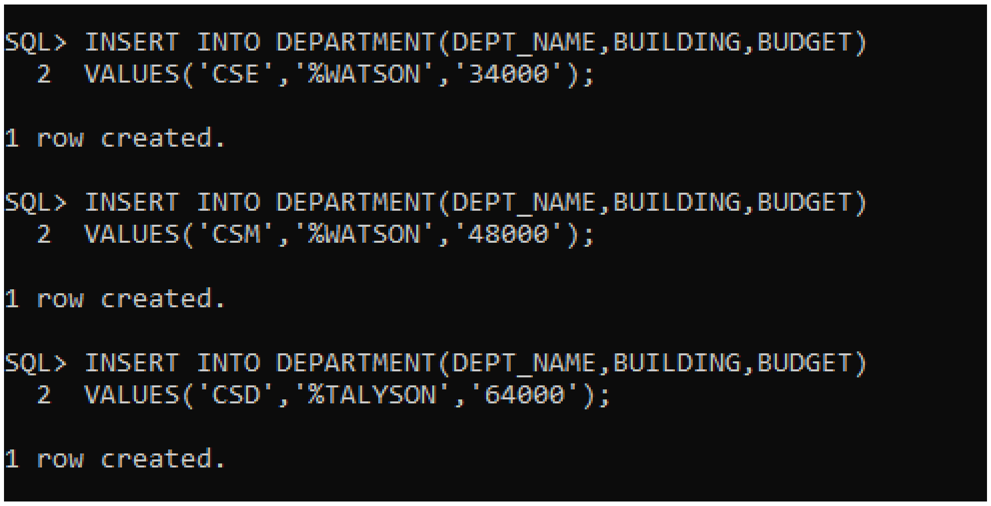
6.NATURAL JOIN

DEPARTMENT TABLE :

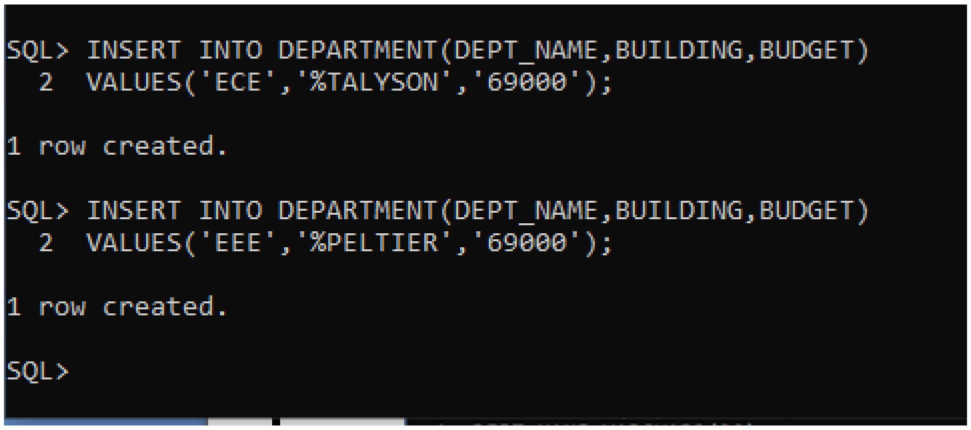


```
SQL> CREATE TABLE DEPARTMENT (
     DEPT_NAME VARCHAR2(20),
     BUILDING VARCHAR2(15),
     BUDGET NUMERIC(12,2) CHECK(BUDGET>0),
     PRIMARY KEY(DEPT_NAME)
     );

Table created.
```

INSERT INTO :

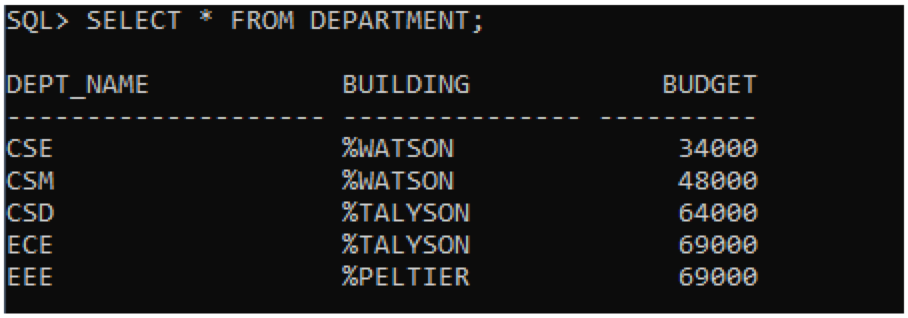


```
SQL> INSERT INTO DEPARTMENT(DEPT_NAME,BUILDING,BUDGET)
     VALUES('CSE','%WATSON','34000');

1 row created.

SQL> INSERT INTO DEPARTMENT(DEPT_NAME,BUILDING,BUDGET)
     VALUES('CSM','%WATSON','48000');

1 row created.

SQL> INSERT INTO DEPARTMENT(DEPT_NAME,BUILDING,BUDGET)
     VALUES('CSD','%TALYSON','64000');

1 row created.
```



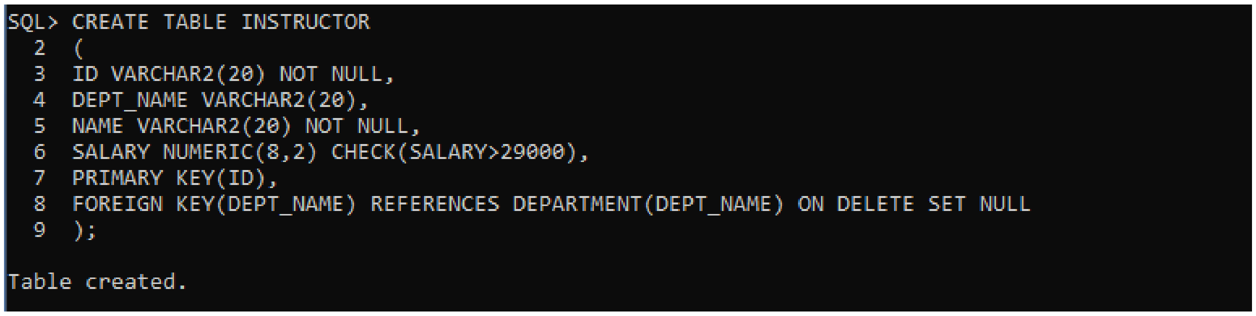
```
SQL> INSERT INTO DEPARTMENT(DEPT_NAME,BUILDING,BUDGET)
     VALUES('ECE','%TALYSON','69000');

1 row created.

SQL> INSERT INTO DEPARTMENT(DEPT_NAME,BUILDING,BUDGET)
     VALUES('EEE','%PELTIER','69000');

1 row created.

SQL>
```

SELECT :



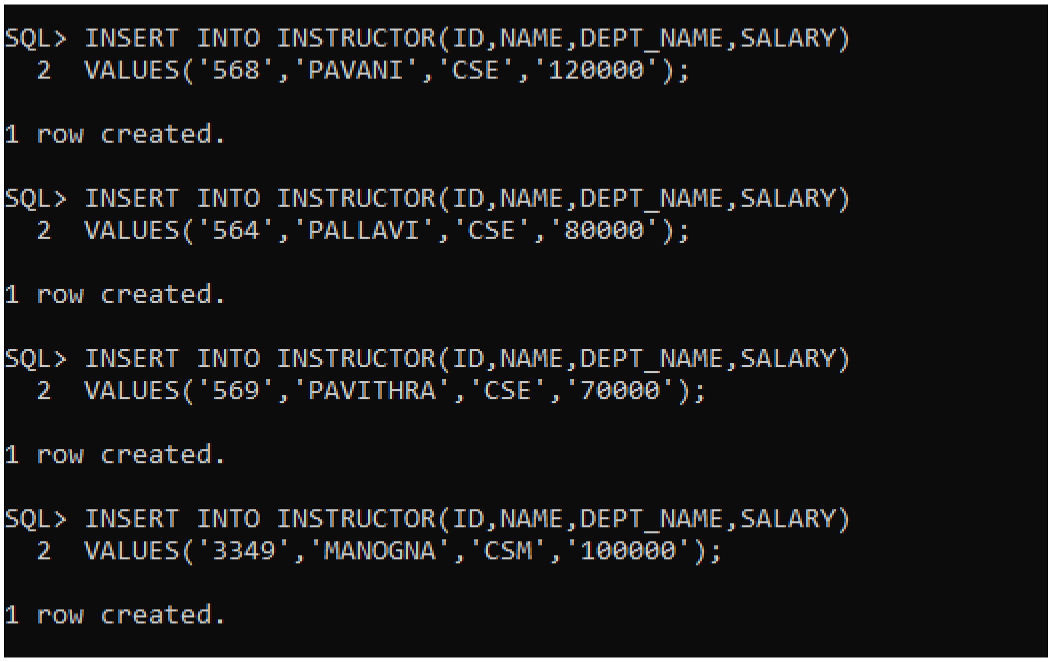
```
SQL> SELECT * FROM DEPARTMENT;

DEPT_NAME            BUILDING            BUDGET
-------------------- --------------- ----------
CSE                  %WATSON              34000
CSM                  %WATSON              48000
CSD                  %TALYSON             64000
ECE                  %TALYSON             69000
EEE                  %PELTIER             69000
```

INSTRUCTOR TABLE :

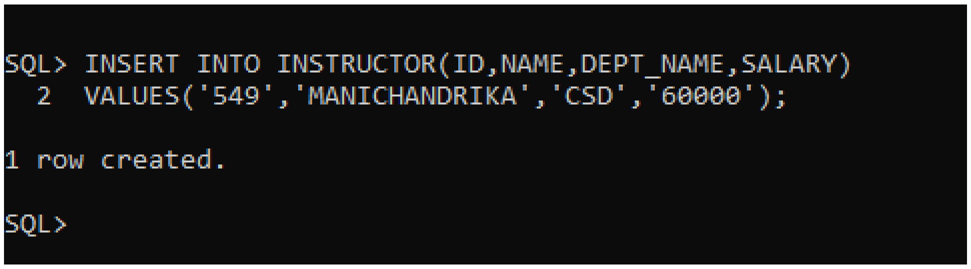


```
SQL> CREATE TABLE INSTRUCTOR
(
ID VARCHAR2(20) NOT NULL,
DEPT_NAME VARCHAR2(20),
NAME VARCHAR2(20) NOT NULL,
SALARY NUMERIC(8,2) CHECK(SALARY>29000),
PRIMARY KEY(ID),
FOREIGN KEY(DEPT_NAME) REFERENCES DEPARTMENT(DEPT_NAME) ON DELETE SET NULL
);

Table created.
```

INSERT INTO :

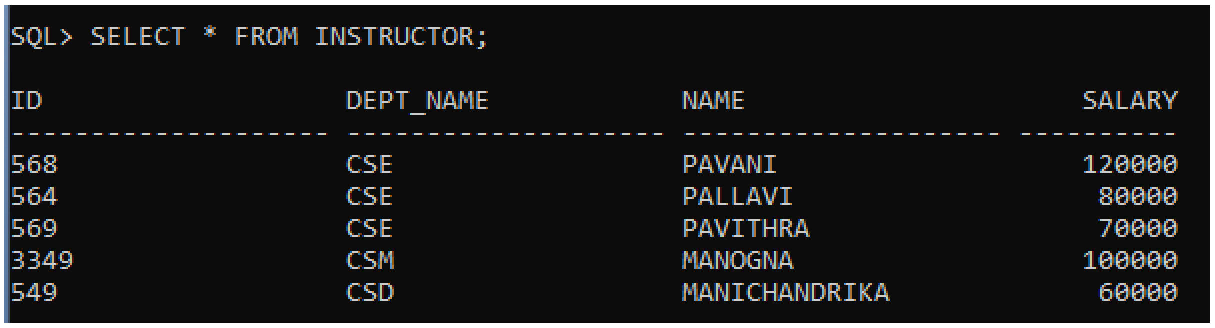


```
SQL> INSERT INTO INSTRUCTOR(ID,NAME,DEPT_NAME,SALARY)
VALUES('568','PAVANI','CSE','120000');

1 row created.

SQL> INSERT INTO INSTRUCTOR(ID,NAME,DEPT_NAME,SALARY)
VALUES('564','PALLAVI','CSE','80000');

1 row created.

SQL> INSERT INTO INSTRUCTOR(ID,NAME,DEPT_NAME,SALARY)
VALUES('569','PAVITHRA','CSE','70000');

1 row created.

SQL> INSERT INTO INSTRUCTOR(ID,NAME,DEPT_NAME,SALARY)
VALUES('3349','MANOGNA','CSM','100000');

1 row created.
```



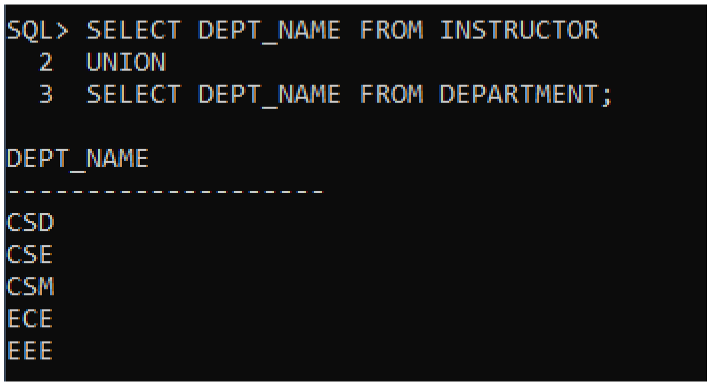
```
SQL> INSERT INTO INSTRUCTOR(ID,NAME,DEPT_NAME,SALARY)
  2  VALUES('549','MANICHANDRIKA','CSD','60000');

1 row created.

SQL>
```

SELECT :

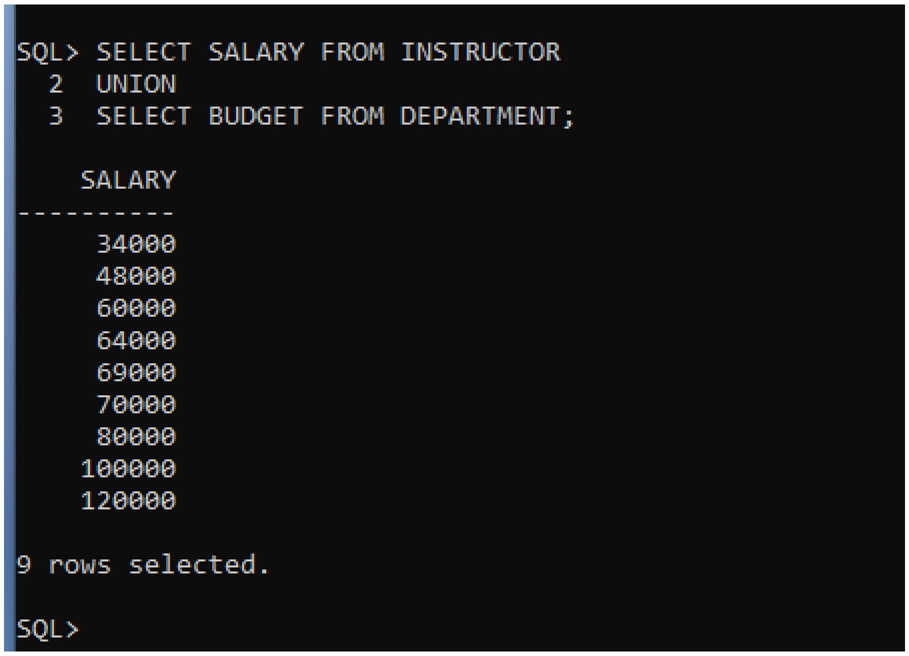


```
SQL> SELECT * FROM INSTRUCTOR;

ID                   DEPT_NAME            NAME                     SALARY
-------------------- -------------------- -------------------- ----------
568                  CSE                  PAVANI                   120000
564                  CSE                  PALLAVI                   80000
569                  CSE                  PAVITHRA                  70000
3349                 CSM                  MANOGNA                  100000
549                  CSD                  MANICHANDRIKA             60000
```

UNION :

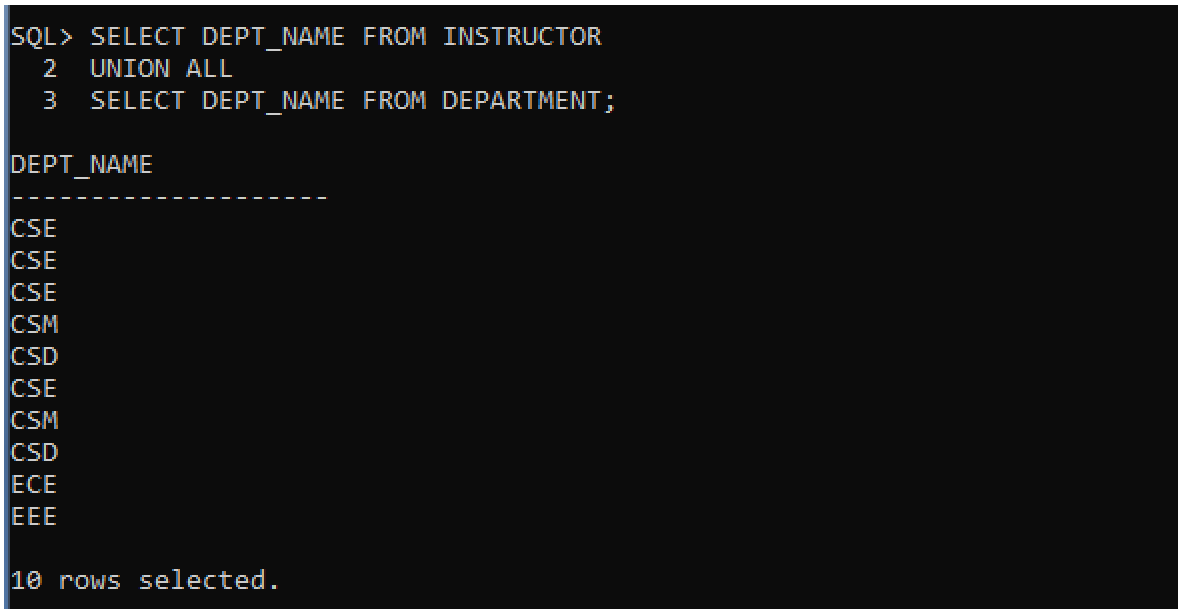


```
SQL> SELECT DEPT_NAME FROM INSTRUCTOR
  2  UNION
  3  SELECT DEPT_NAME FROM DEPARTMENT;

DEPT_NAME
--------------------
CSD
CSE
CSM
ECE
EEE
```



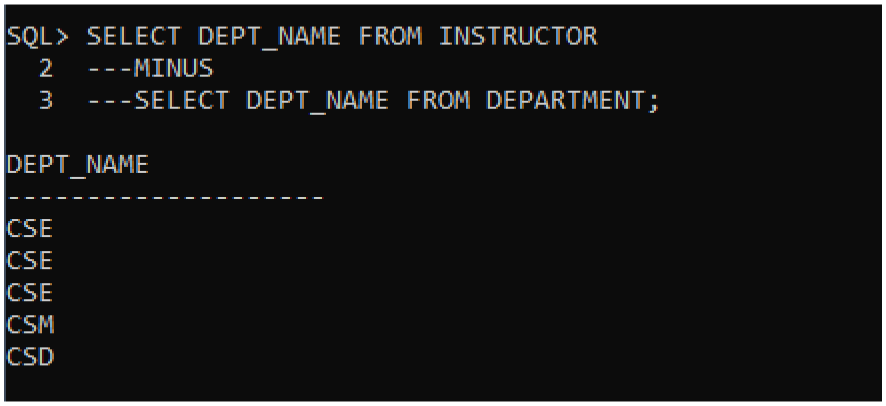
```
SQL> SELECT SALARY FROM INSTRUCTOR
  2  UNION
  3  SELECT BUDGET FROM DEPARTMENT;

    SALARY
----------
     34000
     48000
     60000
     64000
     69000
     70000
     80000
    100000
    120000

9 rows selected.

SQL>
```

UNION ALL :

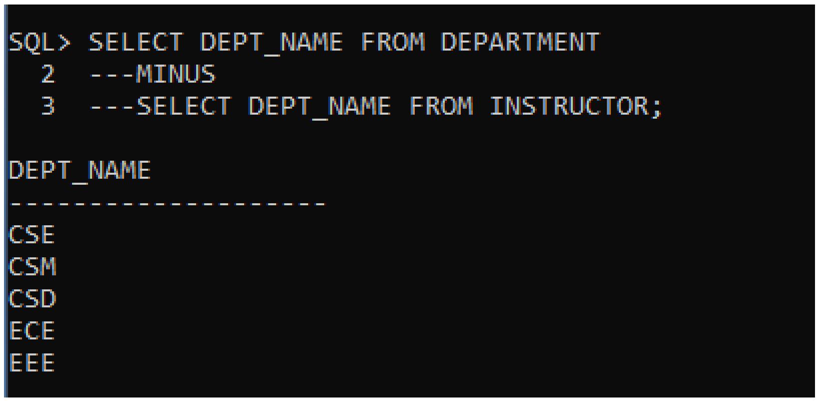


```
SQL> SELECT DEPT_NAME FROM INSTRUCTOR
  2  UNION ALL
  3  SELECT DEPT_NAME FROM DEPARTMENT;

DEPT_NAME
--------------------
CSE
CSE
CSE
CSM
CSD
CSE
CSM
CSD
ECE
EEE

10 rows selected.
```

MINUS :

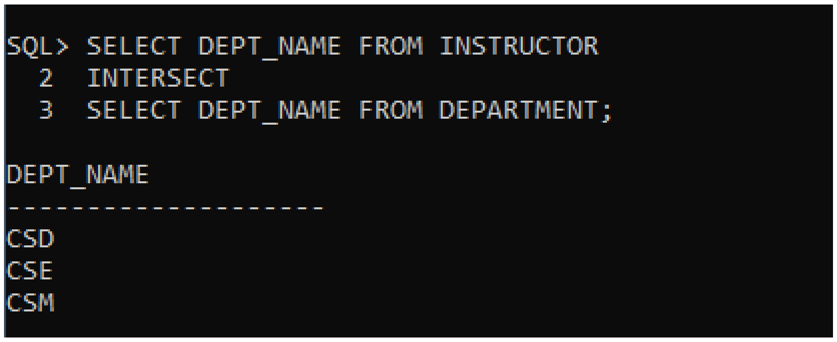


```
SQL> SELECT DEPT_NAME FROM INSTRUCTOR
  2  ---MINUS
  3  ---SELECT DEPT_NAME FROM DEPARTMENT;

DEPT_NAME
--------------------
CSE
CSE
CSE
CSM
CSD
```



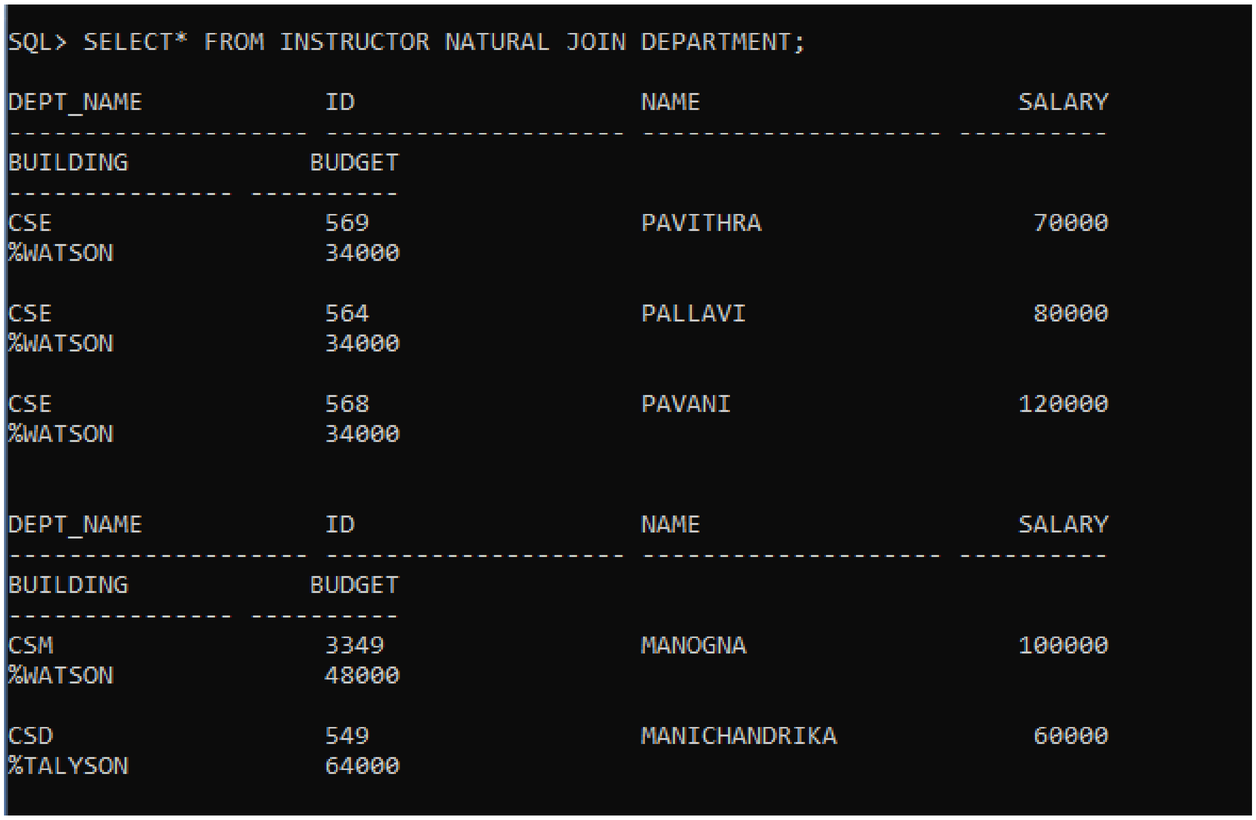
```
SQL> SELECT DEPT_NAME FROM DEPARTMENT
  2  ---MINUS
  3  ---SELECT DEPT_NAME FROM INSTRUCTOR;

DEPT_NAME
--------------------
CSE
CSM
CSD
ECE
EEE
```

INTERSECTION :



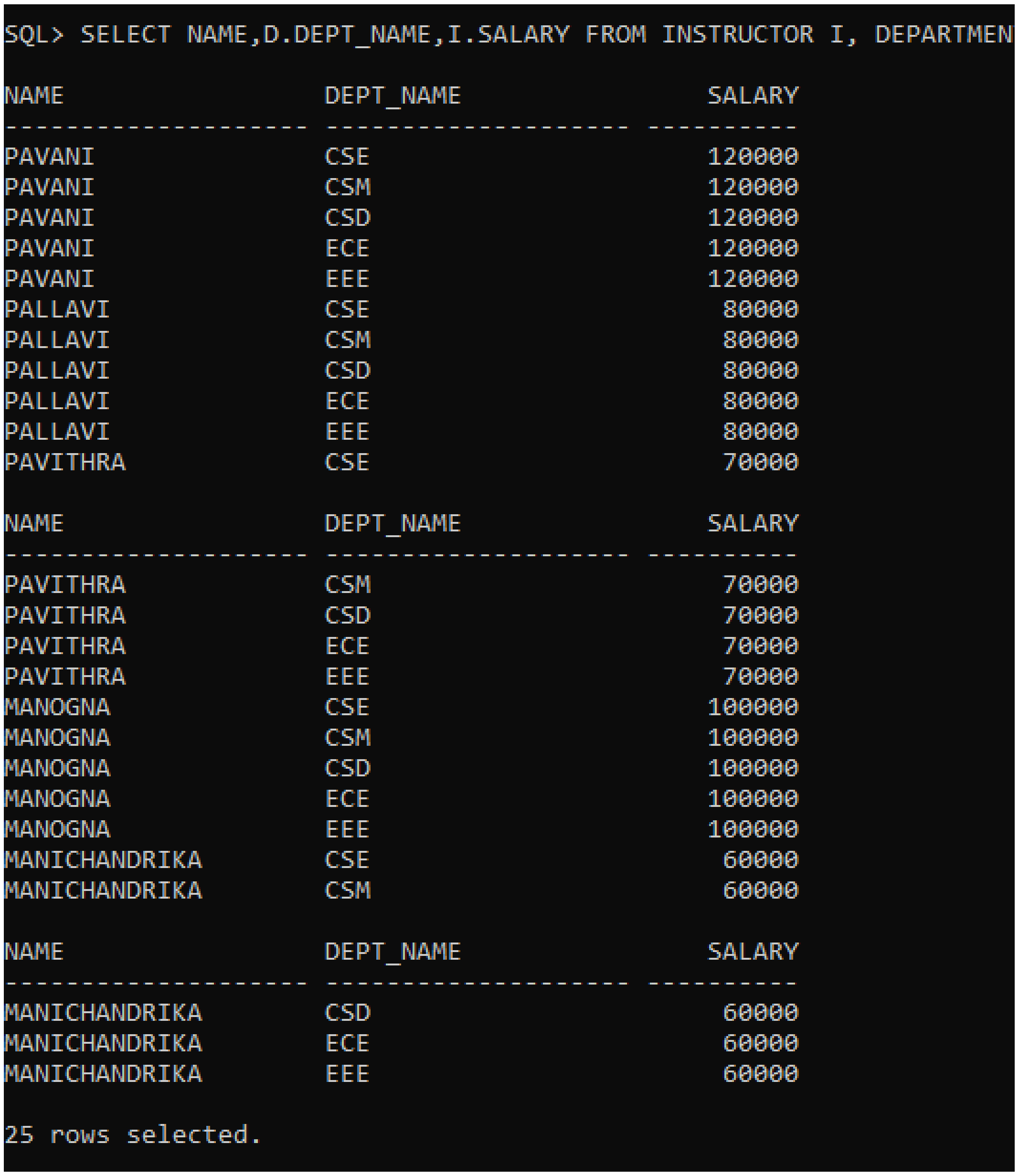
```
SQL> SELECT DEPT_NAME FROM INSTRUCTOR
  2  INTERSECT
  3  SELECT DEPT_NAME FROM DEPARTMENT;

DEPT_NAME
--------------------
CSD
CSE
CSM
```

NATURAL JOIN :



```
SQL> SELECT* FROM INSTRUCTOR NATURAL JOIN DEPARTMENT;

DEPT_NAME            ID                   NAME                     SALARY
-------------------- -------------------- -------------------- ----------
BUILDING            BUDGET
--------------- ----------
CSE                  569                  PAVITHRA                  70000
%WATSON              34000

CSE                  564                  PALLAVI                   80000
%WATSON              34000

CSE                  568                  PAVANI                   120000
%WATSON              34000


DEPT_NAME            ID                   NAME                     SALARY
-------------------- -------------------- -------------------- ----------
BUILDING            BUDGET
--------------- ----------
CSM                  3349                 MANOGNA                  100000
%WATSON              48000

CSD                  549                  MANICHANDRIKA             60000
%TALYSON             64000
```

CROSS JOIN :



```
SQL> SELECT NAME,D.DEPT_NAME,I.SALARY FROM INSTRUCTOR I, DEPARTMEN

NAME                 DEPT_NAME                SALARY
-------------------- -------------------- ----------
PAVANI               CSE                      120000
PAVANI               CSM                      120000
PAVANI               CSD                      120000
PAVANI               ECE                      120000
PAVANI               EEE                      120000
PALLAVI              CSE                       80000
PALLAVI              CSM                       80000
PALLAVI              CSD                       80000
PALLAVI              ECE                       80000
PALLAVI              EEE                       80000
PAVITHRA             CSE                       70000

NAME                 DEPT_NAME                SALARY
-------------------- -------------------- ----------
PAVITHRA             CSM                       70000
PAVITHRA             CSD                       70000
PAVITHRA             ECE                       70000
PAVITHRA             EEE                       70000
MANOGNA              CSE                      100000
MANOGNA              CSM                      100000
MANOGNA              CSD                      100000
MANOGNA              ECE                      100000
MANOGNA              EEE                      100000
MANICHANDRIKA        CSE                       60000
MANICHANDRIKA        CSM                       60000

NAME                 DEPT_NAME                SALARY
-------------------- -------------------- ----------
MANICHANDRIKA        CSD                       60000
MANICHANDRIKA        ECE                       60000
MANICHANDRIKA        EEE                       60000

25 rows selected.
```

CONCLUSION :

In this lab,we practice RELATIONAL SET OPERATIONS like UNION,UNION ALL,MINUS,INTERSECTION CROSS JOIN,NATURAL JOIN, and we learnt syntaxes of Relational Operations.

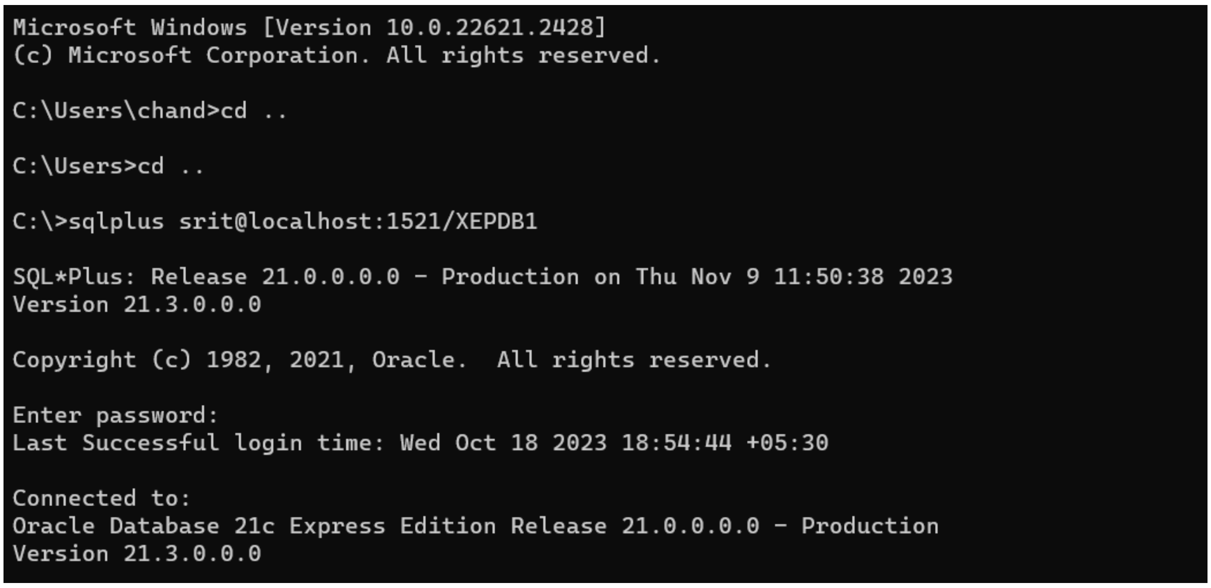
EXPERIMENT – 5

Write SQL queries to perform AGGREGATE OPERATIONS (i.e. SUM, COUNT, AVG, MIN, MAX).

AIM : To write SQL queries to perform Aggregate operations like sum,avg,max,min,count.

Program Description :
Aggregate functions are functions that take a collection (a set or multiset) of
values as input and return a single value. SQL offers five built-in Aggregate Functions:
• Average: avg
• Minimum: min
• Maximum: max
• Total: sum
• Count: count

The input to sum and avg must be a collection of numbers, but the other operators can operate on collections of nonnumeric data types, such as strings, as well.



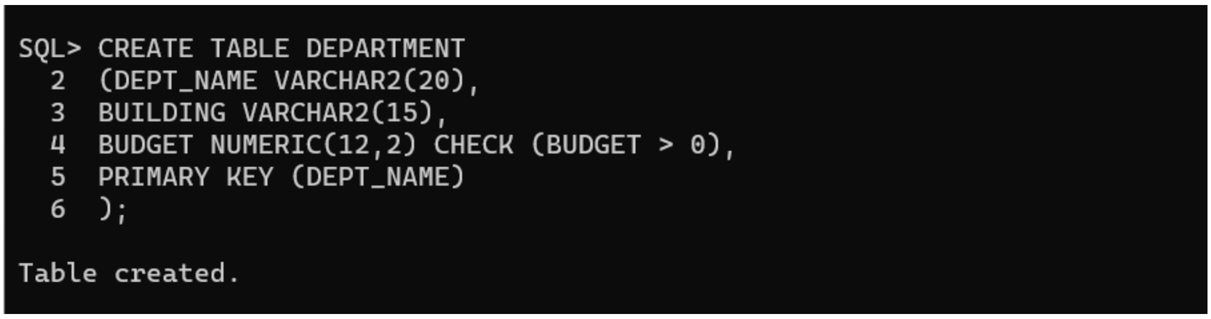
```
Microsoft Windows [Version 10.0.22621.2428]
(c) Microsoft Corporation. All rights reserved.

C:\Users\chand>cd ..

C:\Users>cd ..

C:\>sqlplus srit@localhost:1521/XEPDB1

SQL*Plus: Release 21.0.0.0.0 - Production on Thu Nov 9 11:50:38 2023
Version 21.3.0.0.0

Copyright (c) 1982, 2021, Oracle.  All rights reserved.

Enter password:
Last Successful login time: Wed Oct 18 2023 18:54:44 +05:30

Connected to:
Oracle Database 21c Express Edition Release 21.0.0.0.0 - Production
Version 21.3.0.0.0
```

CREATE TABLE SYNTAX :

```
CREATE TABLE table_name (
    column1 datatype,
    column2 datatype,
    column3 datatype,
     ....
   );
```

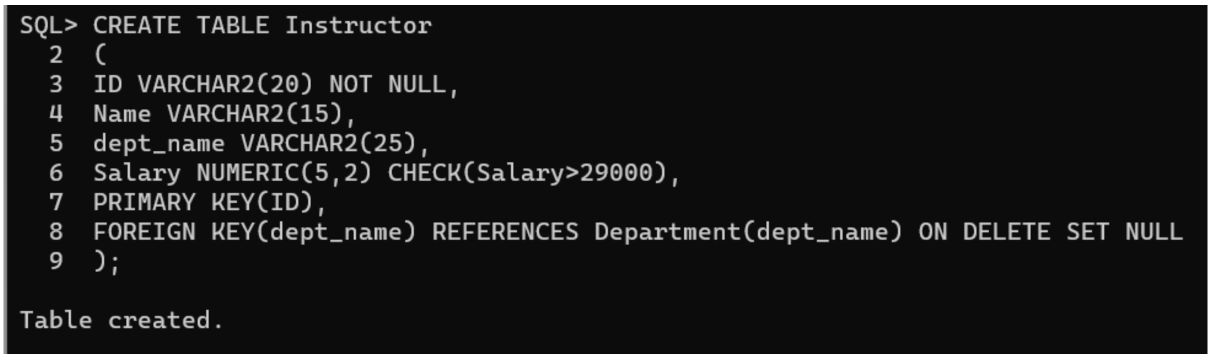
CREATE TABLE EXAMPLE :

INSTRUCTOR TABLE:



```
SQL> CREATE TABLE DEPARTMENT
(DEPT_NAME VARCHAR2(20),
BUILDING VARCHAR2(15),
BUDGET NUMERIC(12,2) CHECK (BUDGET > 0),
PRIMARY KEY (DEPT_NAME)
);

Table created.
```

DEPARTMENT TABLE:

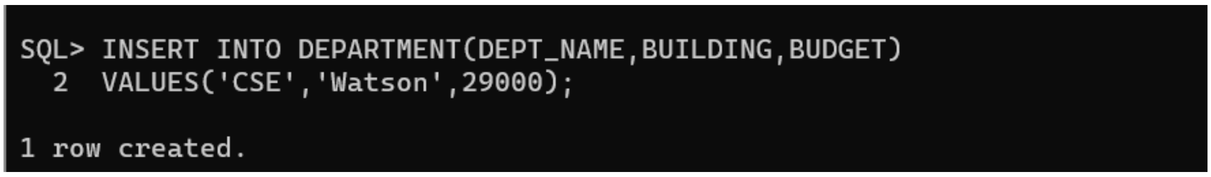


```
SQL> CREATE TABLE Instructor
(
ID VARCHAR2(20) NOT NULL,
Name VARCHAR2(15),
dept_name VARCHAR2(25),
Salary NUMERIC(5,2) CHECK(Salary>29000),
PRIMARY KEY(ID),
FOREIGN KEY(dept_name) REFERENCES Department(dept_name) ON DELETE SET NULL
);

Table created.
```

INSERT INTO SYNTAX:

```
INSERT INTO table_name (column1, column2, column3, ...)
VALUES (value1, value2, value3, ...);
```

INSERT INTO EXAMPLE:

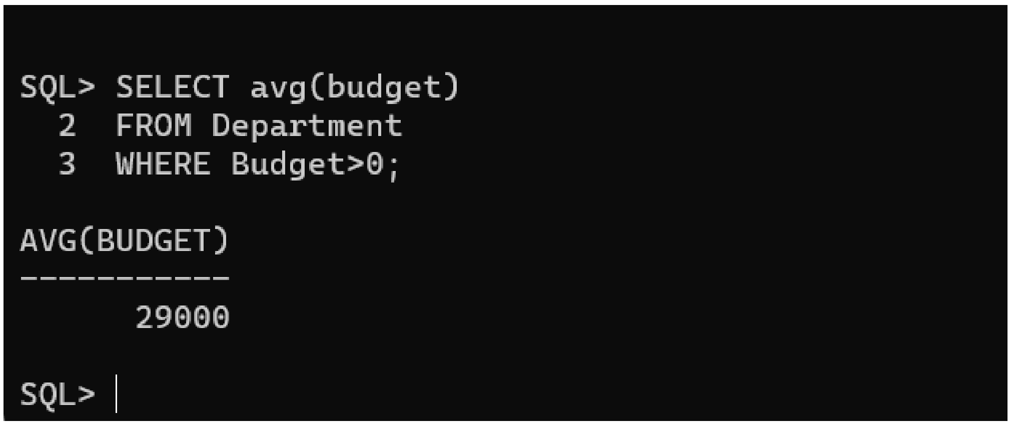


```
SQL> INSERT INTO DEPARTMENT(DEPT_NAME,BUILDING,BUDGET)
VALUES('CSE','Watson',29000);

1 row created.
```

AVERAGE : The AVG() function returns the average value of a numeric column.

AVERAGE SYNTAX :

```
SELECT AVG(column_name)
FROM table_name
WHERE condition;
```



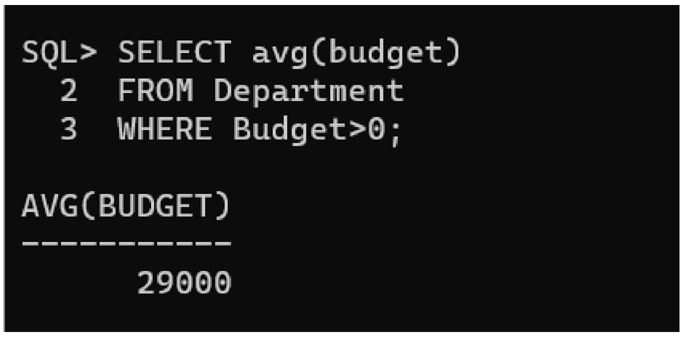
```
SQL> SELECT avg(budget)
  2  FROM Department
  3  WHERE Budget>0;

AVG(BUDGET)
-----------
      29000

SQL>
```

SUM : The SUM() function returns the total sum of a numeric column.

SUM SYNTAX :

```
SELECT SUM(column_name)
FROM table_name
WHERE condition;
```

SUM EXAMPLE :



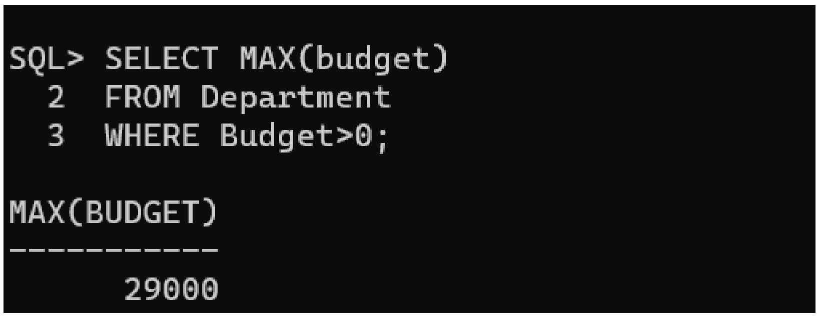
```
SQL> SELECT avg(budget)
  2  FROM Department
  3  WHERE Budget>0;

AVG(BUDGET)
-----------
      29000
```

MAXIMUM : The MAX() function returns the largest value of the selected column.

MAX SYNTAX :

```
SELECT MAX(column_name)
FROM table_name
WHERE condition;
```

MAX EXAMPLE :



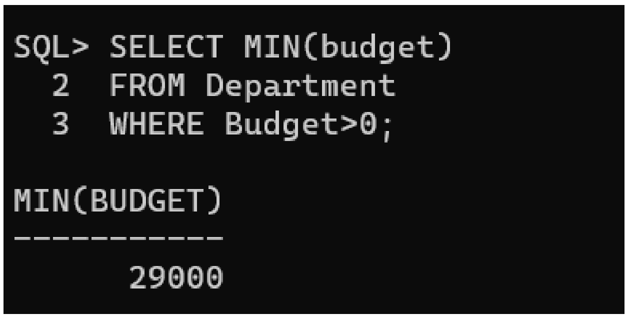
```
SQL> SELECT MAX(budget)
  2  FROM Department
  3  WHERE Budget>0;

MAX(BUDGET)
-----------
      29000
```

MINIMUM : The `MIN()` function returns the smallest value of the selected column.

MIN SYNTAX :

```
SELECT MIN(column_name)
FROM table_name
WHERE condition;
```

MIN EXAMPLE:



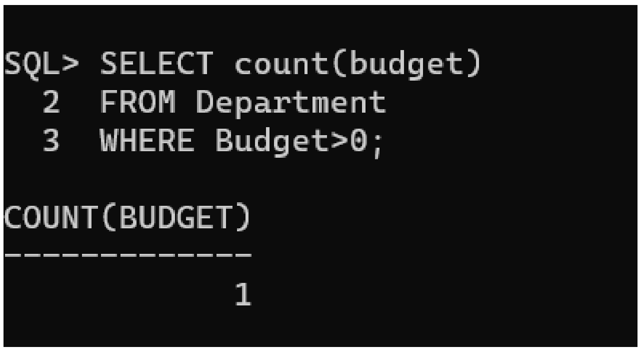
```
SQL> SELECT MIN(budget)
  2  FROM Department
  3  WHERE Budget>0;

MIN(BUDGET)
-----------
      29000
```

COUNT : The `COUNT()` function returns the number of rows that matches a specified criterion.

COUNT SYNTAX :

```
SELECT COUNT(column_name)
FROM table_name
WHERE condition;
```

COUNT EXAMPLE :



```
SQL> SELECT count(budget)
  2  FROM Department
  3  WHERE Budget>0;

COUNT(BUDGET)
-------------
            1
```

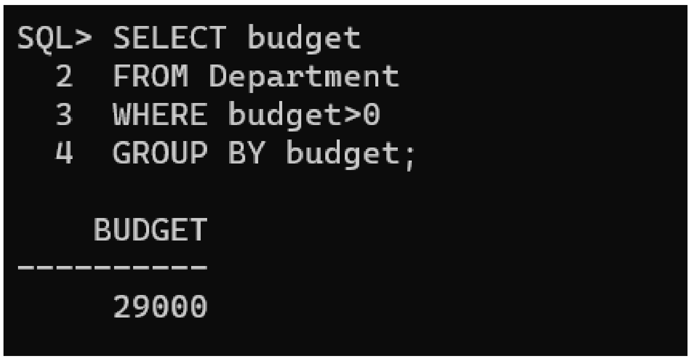
GROUP BY : The `GROUP BY` statement groups rows that have the same values into summary rows, like "find the number of customers in each country".

The `GROUP BY` statement is often used with aggregate functions (`COUNT()`, `MAX()`, `MIN()`, `SUM()`, `AVG()`) to group the result-set by one or more columns.

GROUP BY SYNTAX :

```
SELECT column_name(s)
FROM table_name
WHERE condition
GROUP BY column_name(s)
ORDER BY column_name(s);
```

GROUP BY EXAMPLE :



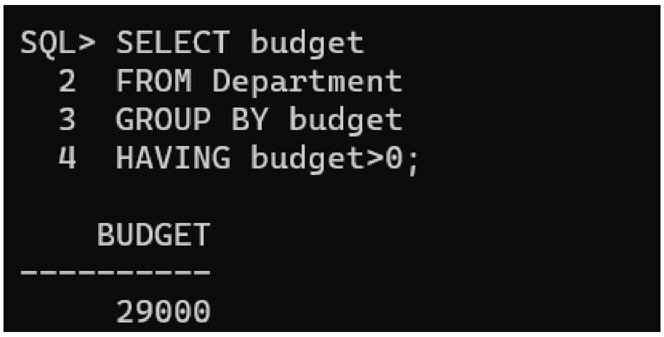
```
SQL> SELECT budget
  2  FROM Department
  3  WHERE budget>0
  4  GROUP BY budget;

    BUDGET
----------
     29000
```

HAVING : The HAVING clause was added to SQL because the WHERE keyword cannot be used with aggregate functions.

HAVING SYNTAX :

```
SELECT column_name(s)
FROM table_name
GROUP BY column_name(s)
HAVING condition;
```

HAVING EXAMPLE :



```
SQL> SELECT budget
  2  FROM Department
  3  GROUP BY budget
  4  HAVING budget>0;

    BUDGET
----------
     29000
```

CONCLUSION :

We successfully practice aggregrate functions like sum,avg,max,min,count.

N.PAVITHRA 224G1A0569 DATE :03-10-2023

EXPERIMENT - 6

Write SQL queries to perform JOIN OPERATIONS like (CONDITIONAL JOIN, EQUI JOIN, LEFT OUTER JOIN, RIGHT OUTER JOIN, FULL OUTER JOIN)

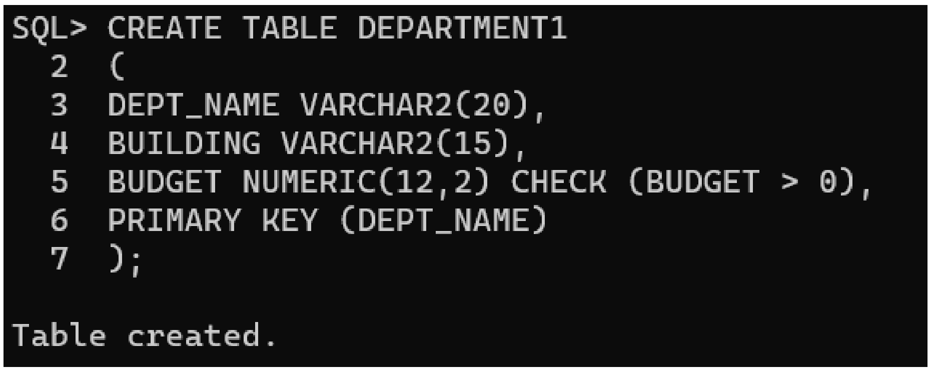
AIM:

To write SQL queries to perform JOIN OPERATIONS like (CONDITIONAL JOIN, EQUI JOIN, LEFT OUTER JOIN, RIGHT OUTER JOIN, FULL OUTER JOIN)

PROGRAM DESCRIPTION:

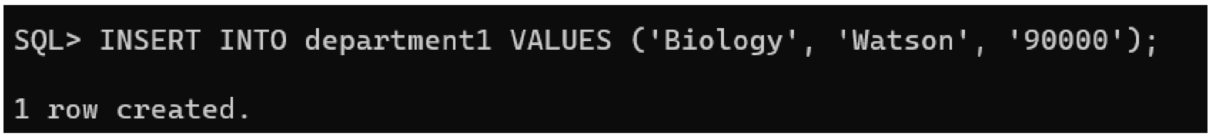
In this lab, we successfully practice how to write SQL queries to perform JOIN OPERATIONS like CONDITIONAL JOIN, EQUI JOIN, LEFT OUTER JOIN, RIGHT OUTER JOIN, FULL OUTER JOIN.

DEPARTMENT TABLE:



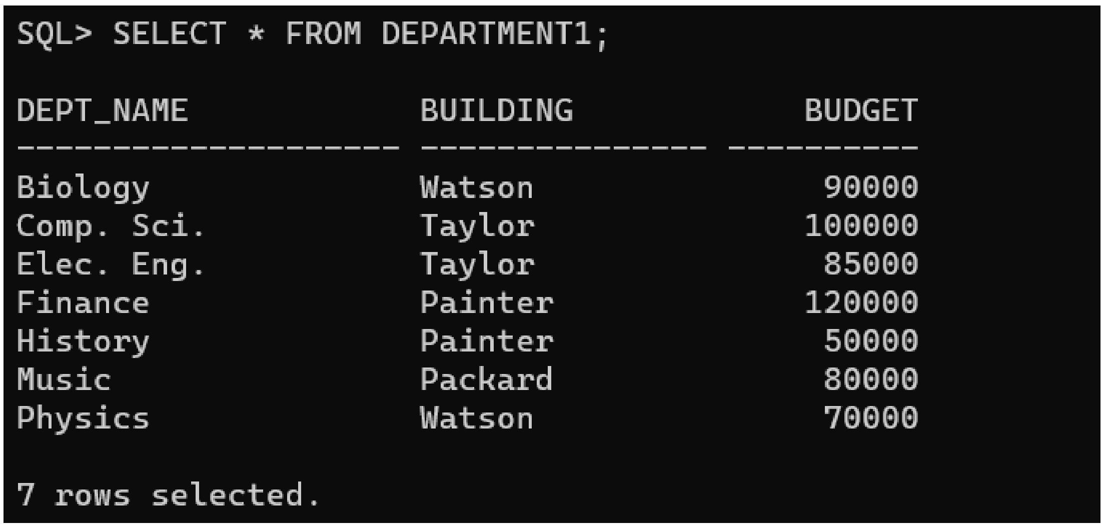
```
SQL> CREATE TABLE DEPARTMENT1
  (
  DEPT_NAME VARCHAR2(20),
  BUILDING VARCHAR2(15),
  BUDGET NUMERIC(12,2) CHECK (BUDGET > 0),
  PRIMARY KEY (DEPT_NAME)
  );

Table created.
```

INSERT INTO:



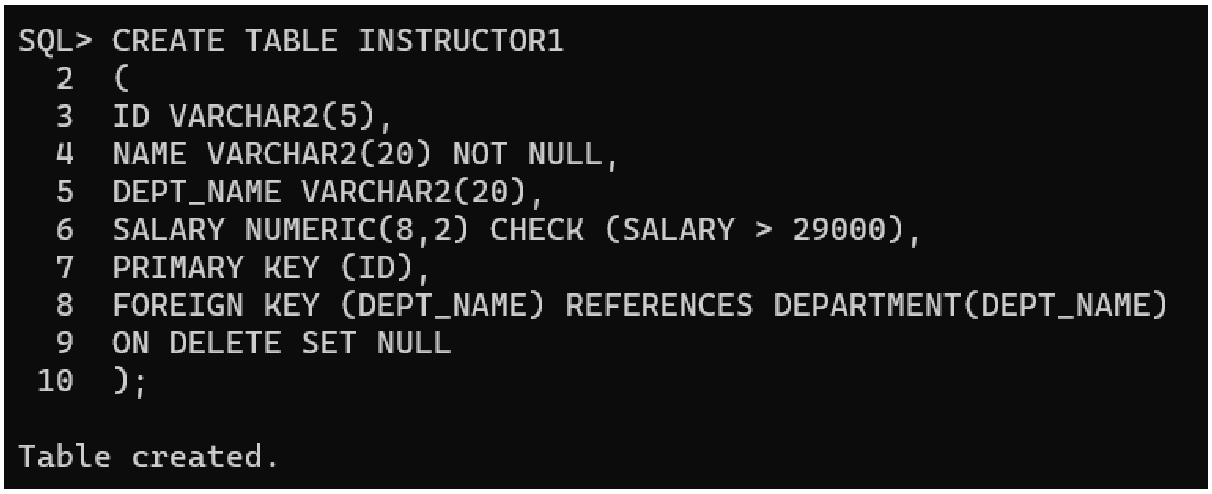
```
SQL> INSERT INTO department1 VALUES ('Biology', 'Watson', '90000');

1 row created.
```

SELECT:



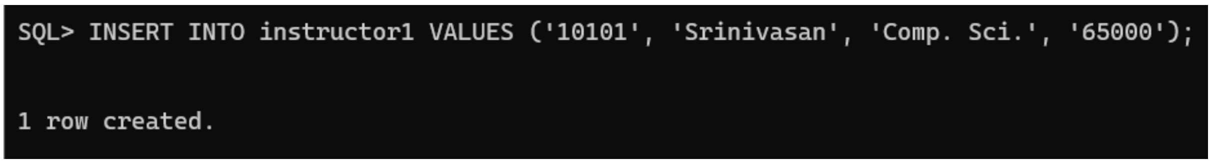
```
SQL> SELECT * FROM DEPARTMENT1;

DEPT_NAME            BUILDING             BUDGET
-------------------- --------------- ----------
Biology              Watson               90000
Comp. Sci.           Taylor              100000
Elec. Eng.           Taylor               85000
Finance              Painter             120000
History              Painter              50000
Music                Packard              80000
Physics              Watson               70000

7 rows selected.
```

INSTRUCTOR TABLE:



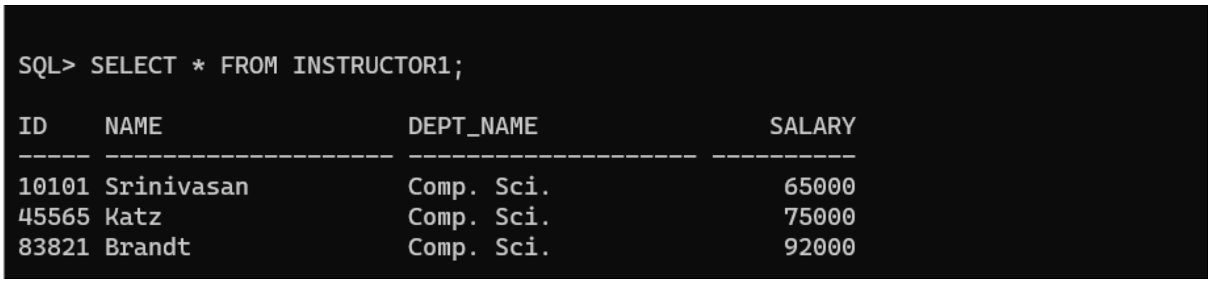
```
SQL> CREATE TABLE INSTRUCTOR1
  2  (
  3  ID VARCHAR2(5),
  4  NAME VARCHAR2(20) NOT NULL,
  5  DEPT_NAME VARCHAR2(20),
  6  SALARY NUMERIC(8,2) CHECK (SALARY > 29000),
  7  PRIMARY KEY (ID),
  8  FOREIGN KEY (DEPT_NAME) REFERENCES DEPARTMENT(DEPT_NAME)
  9  ON DELETE SET NULL
 10  );

Table created.
```

INSERT INTO:



```
SQL> INSERT INTO instructor1 VALUES ('10101', 'Srinivasan', 'Comp. Sci.', '65000');


1 row created.
```

SELECT:



```
SQL> SELECT * FROM INSTRUCTOR1;

ID    NAME                 DEPT_NAME                SALARY
----- -------------------- -------------------- ----------
10101 Srinivasan           Comp. Sci.                65000
45565 Katz                 Comp. Sci.                75000
83821 Brandt               Comp. Sci.                92000
```

N.PAVITHRA 224G1A0569 DATE :03-10-2023

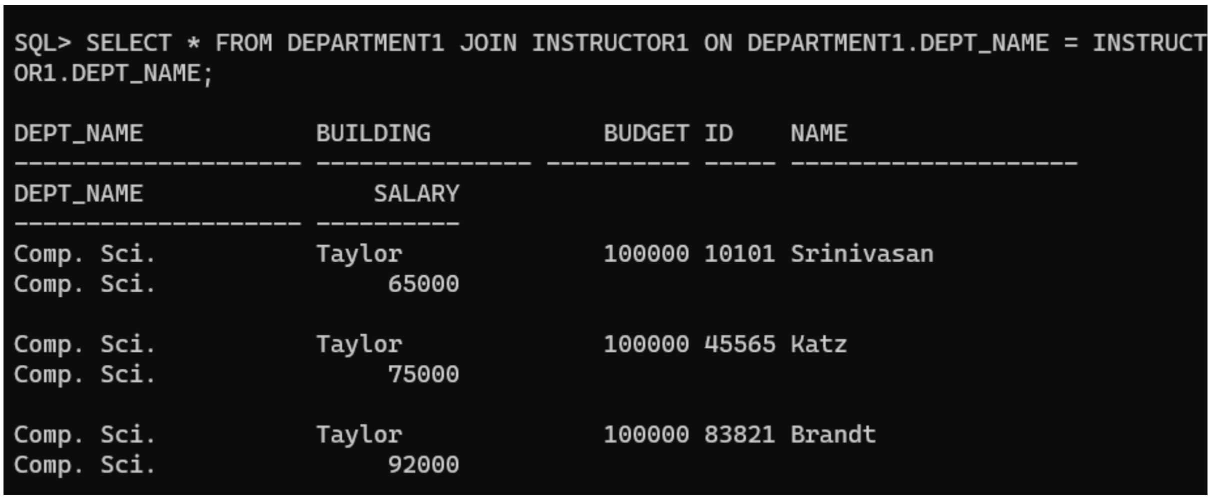
CONDITIONAL JOIN:

A conditional column join is a fancy way to let us join to a single column and to two (or more) columns in a single query.

SYNTAX:

SELECT *
FROM table1
JOIN table2 ON table1.column_name = table2.column_name;
WHERE table2.column name IS NULL;

EXAMPLE:



```
SQL> SELECT * FROM DEPARTMENT1 JOIN INSTRUCTOR1 ON DEPARTMENT1.DEPT_NAME = INSTRUCT
OR1.DEPT_NAME;

DEPT_NAME            BUILDING            BUDGET ID    NAME
-------------------- --------------- ---------- ----- --------------------
DEPT_NAME                SALARY
-------------------- ----------
Comp. Sci.           Taylor              100000 10101 Srinivasan
Comp. Sci.                65000

Comp. Sci.           Taylor              100000 45565 Katz
Comp. Sci.                75000

Comp. Sci.           Taylor              100000 83821 Brandt
Comp. Sci.                92000
```

EQUI JOIN:

EQUI JOIN creates a JOIN for equality or matching column(s) values of the relative tables. EQUI JOIN also create JOIN by using JOIN with ON and then providing the names of the columns with their relative tables to check equality using equal sign (=).

SYNTAX:

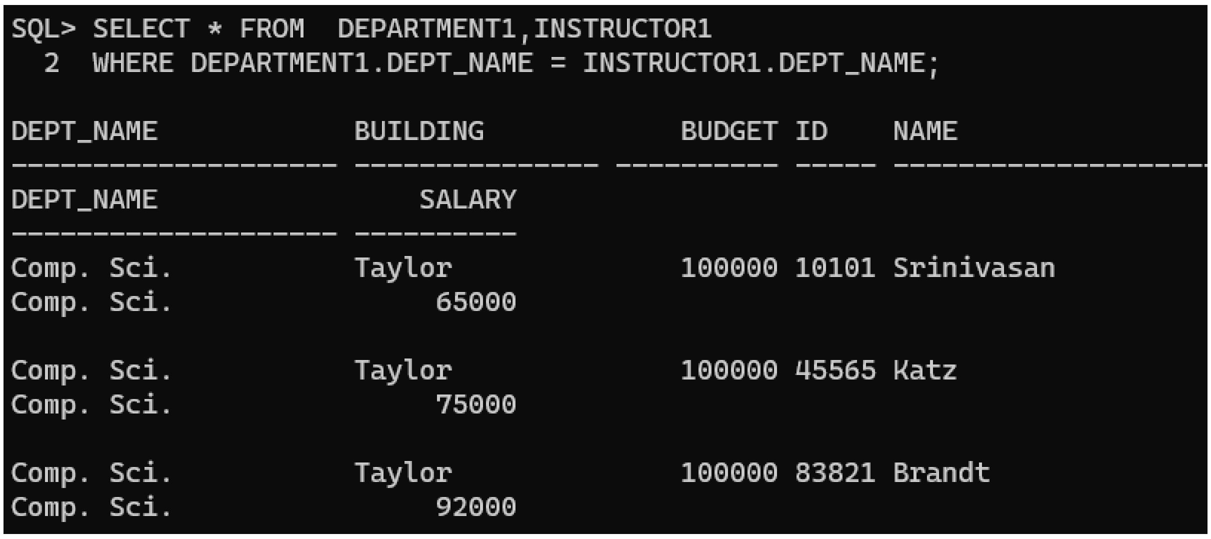
SELECT column_list

FROM table1, table2....

WHERE table1.column_name =

table2.column_name;

EXAMPLE:



```
SQL> SELECT * FROM  DEPARTMENT1,INSTRUCTOR1
  2  WHERE DEPARTMENT1.DEPT_NAME = INSTRUCTOR1.DEPT_NAME;

DEPT_NAME            BUILDING            BUDGET ID    NAME
-------------------- --------------- ---------- ----- --------------------
DEPT_NAME                SALARY
-------------------- ----------
Comp. Sci.           Taylor              100000 10101 Srinivasan
Comp. Sci.                65000

Comp. Sci.           Taylor              100000 45565 Katz
Comp. Sci.                75000

Comp. Sci.           Taylor              100000 83821 Brandt
Comp. Sci.                92000
```

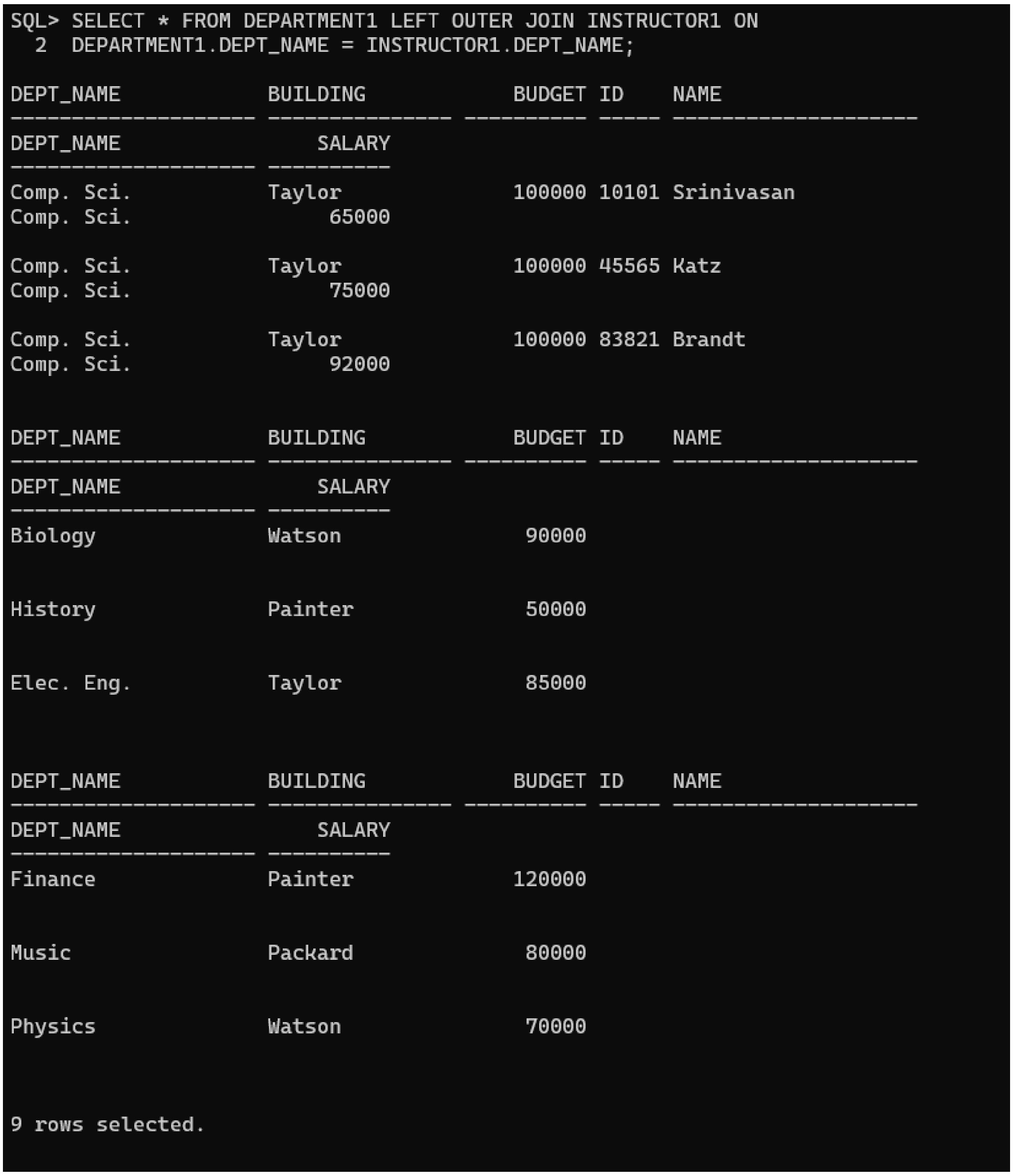
LEFT OUTER JOIN:

The `LEFT OUTER JOIN` keyword returns all records from the left table (table1), and the matching records from the right table (table2). The result is 0 records from the right side, if there is no match.

SYNTAX:

```
SELECT column_name(s)
FROM table1
LEFT JOIN table2
ON table1.column_name = table2.column_name;
```

EXAMPLE:



```
SQL> SELECT * FROM DEPARTMENT1 LEFT OUTER JOIN INSTRUCTOR1 ON
  2  DEPARTMENT1.DEPT_NAME = INSTRUCTOR1.DEPT_NAME;

DEPT_NAME            BUILDING            BUDGET ID    NAME
-------------------- --------------- ---------- ----- --------------------
DEPT_NAME                SALARY
-------------------- ----------
Comp. Sci.           Taylor              100000 10101 Srinivasan
Comp. Sci.                65000

Comp. Sci.           Taylor              100000 45565 Katz
Comp. Sci.                75000

Comp. Sci.           Taylor              100000 83821 Brandt
Comp. Sci.                92000


DEPT_NAME            BUILDING            BUDGET ID    NAME
-------------------- --------------- ---------- ----- --------------------
DEPT_NAME                SALARY
-------------------- ----------
Biology              Watson               90000


History              Painter              50000


Elec. Eng.           Taylor               85000



DEPT_NAME            BUILDING            BUDGET ID    NAME
-------------------- --------------- ---------- ----- --------------------
DEPT_NAME                SALARY
-------------------- ----------
Finance              Painter             120000


Music                Packard              80000


Physics              Watson               70000



9 rows selected.
```

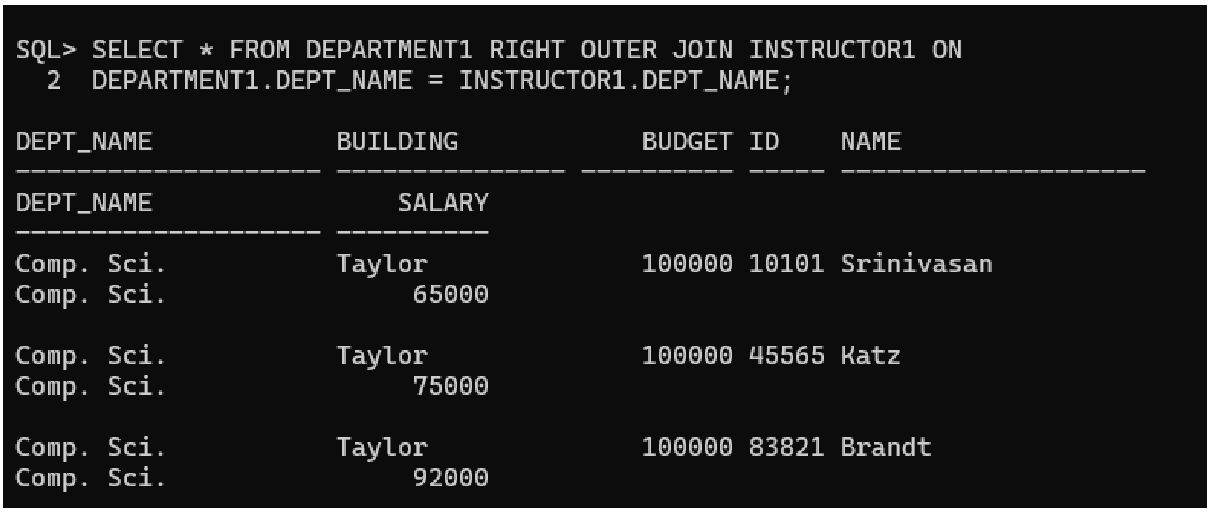
RIGHT OUTER JOIN:

The RIGHT OUTER JOIN keyword returns all records from the right table (table2), and the matching records from the left table (table1). The result is 0 records from the left side, if there is no match.

SYNTAX:

SELECT *column_name(s)*
FROM *table1*
RIGHT JOIN *table2*
ON *table1.column_name* = *table2.column_name*;

EXAMPLE:



```
SQL> SELECT * FROM DEPARTMENT1 RIGHT OUTER JOIN INSTRUCTOR1 ON
  2  DEPARTMENT1.DEPT_NAME = INSTRUCTOR1.DEPT_NAME;

DEPT_NAME            BUILDING            BUDGET ID    NAME
-------------------- --------------- ---------- ----- --------------------
DEPT_NAME                SALARY
-------------------- ----------
Comp. Sci.           Taylor              100000 10101 Srinivasan
Comp. Sci.                65000

Comp. Sci.           Taylor              100000 45565 Katz
Comp. Sci.                75000

Comp. Sci.           Taylor              100000 83821 Brandt
Comp. Sci.                92000
```

FULL OUTER JOIN:

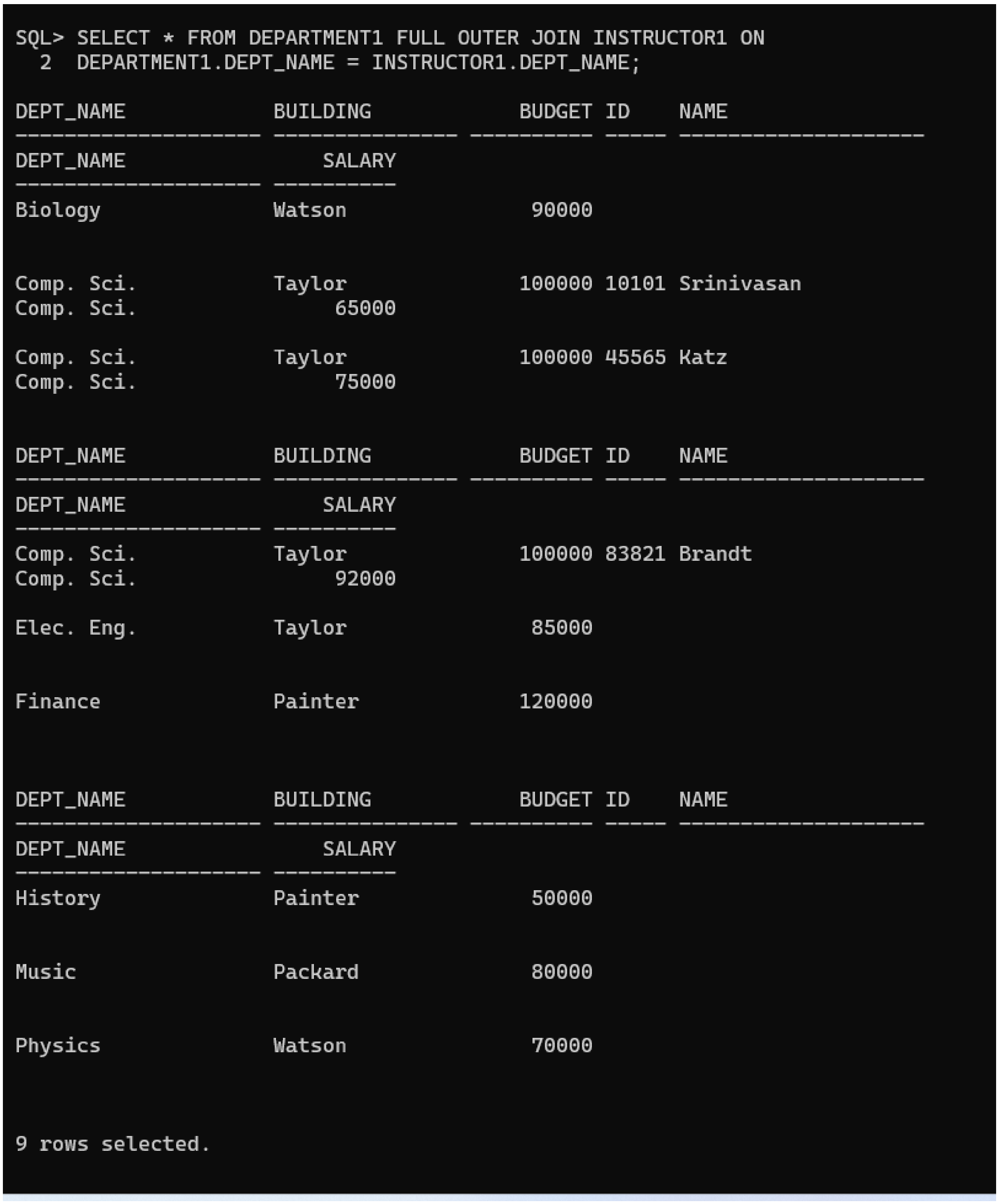
1.The FULL OUTER JOIN keyword returns all records when there is a match in left (table1) or right (table2) table records.

2.FULL OUTER JOIN and FULL JOIN are the same.

SYNTAX:

SELECT *column_name(s)*
FROM *table1*
FULL OUTER JOIN *table2*
ON *table1.column_name* = *table2.column_name*
WHERE *condition*;

EXAMPLE:



```
SQL> SELECT * FROM DEPARTMENT1 FULL OUTER JOIN INSTRUCTOR1 ON
  2  DEPARTMENT1.DEPT_NAME = INSTRUCTOR1.DEPT_NAME;

DEPT_NAME            BUILDING            BUDGET ID    NAME
-------------------- --------------- ---------- ----- --------------------
DEPT_NAME                SALARY
-------------------- ----------
Biology              Watson               90000


Comp. Sci.           Taylor              100000 10101 Srinivasan
Comp. Sci.                65000

Comp. Sci.           Taylor              100000 45565 Katz
Comp. Sci.                75000


DEPT_NAME            BUILDING            BUDGET ID    NAME
-------------------- --------------- ---------- ----- --------------------
DEPT_NAME                SALARY
-------------------- ----------
Comp. Sci.           Taylor              100000 83821 Brandt
Comp. Sci.                92000

Elec. Eng.           Taylor               85000


Finance              Painter             120000



DEPT_NAME            BUILDING            BUDGET ID    NAME
-------------------- --------------- ---------- ----- --------------------
DEPT_NAME                SALARY
-------------------- ----------
History              Painter              50000


Music                Packard              80000


Physics              Watson               70000



9 rows selected.
```

CONCLUSION:

In this lab, we successfully practice how to write SQL Queries to perform JOIN OPERATIONS like CONDITIONAL JOIN, EQUI JOIN, LEFT OUTER JOIN, RIGHT OUTER JOIN, FULL OUTER JOIN.

EXPERIMENT -7

Write SQL queries to perform AGGREGATE OPERATIONS (i.e. SUM, COUNT, AVG, MIN, MAX).

AIM:

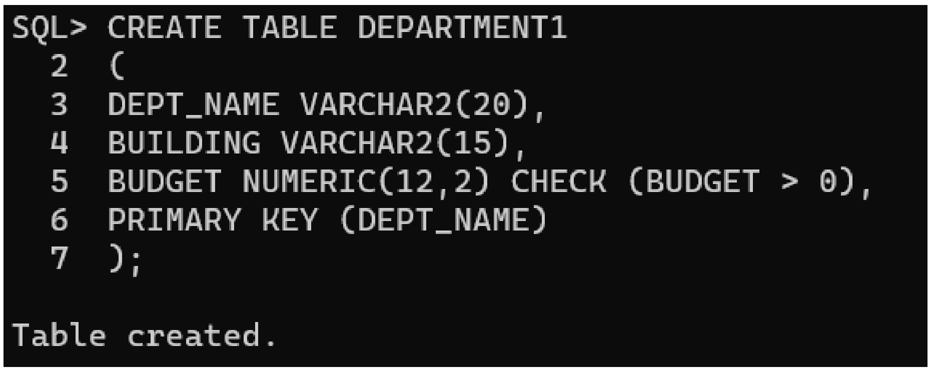
To write SQL queries to perform AGGREGATE OPERATIONS like SUM, COUNT, AVG, MIN, MAX.

PROGRAM DESCRIPTION:

In this lab, we practice how to write SQL queries to perform AGGREGATE OPERATIONS like SUM, COUNT, AVG, MIN, MAX.

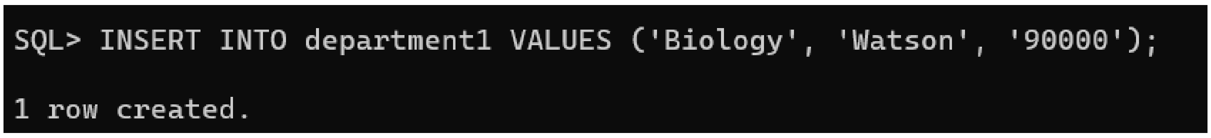
An aggregate function performs a calculation on a set of values, and returns a single value.

DEPARTMENT TABLE:



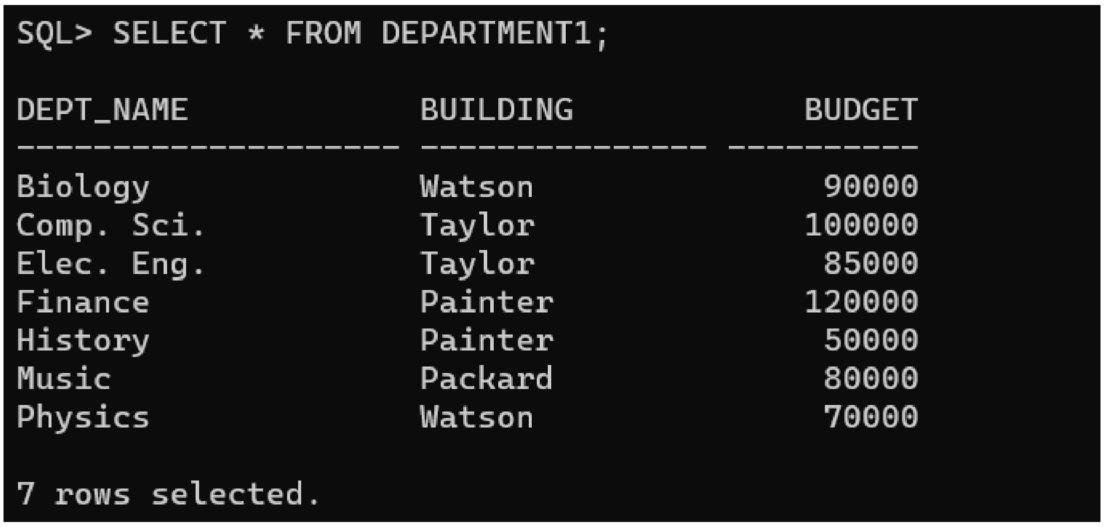
```
SQL> CREATE TABLE DEPARTMENT1
     (
     DEPT_NAME VARCHAR2(20),
     BUILDING VARCHAR2(15),
     BUDGET NUMERIC(12,2) CHECK (BUDGET > 0),
     PRIMARY KEY (DEPT_NAME)
     );

Table created.
```

INSERT INTO:



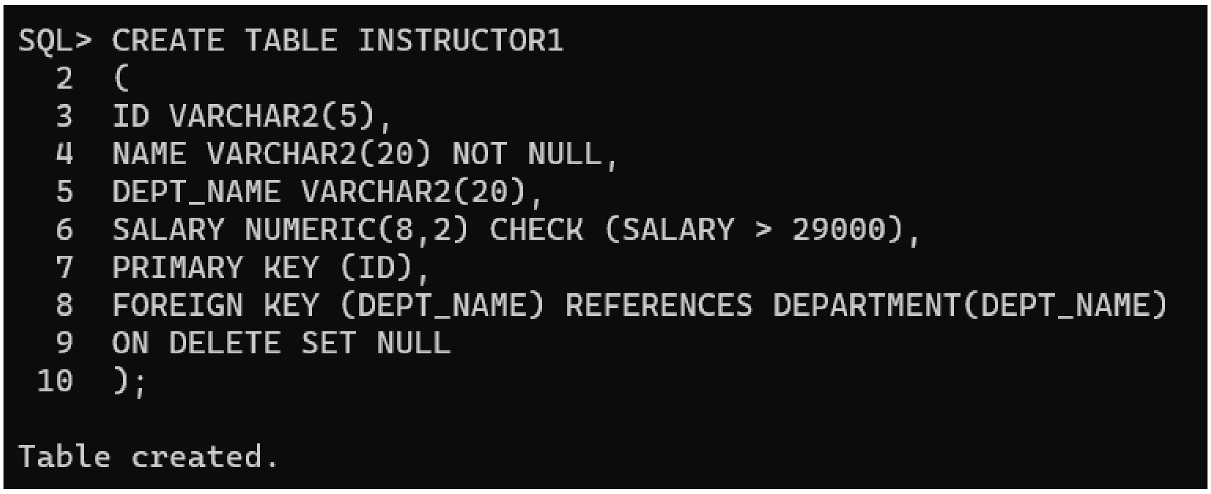
```
SQL> INSERT INTO department1 VALUES ('Biology', 'Watson', '90000');

1 row created.
```

SELECT:



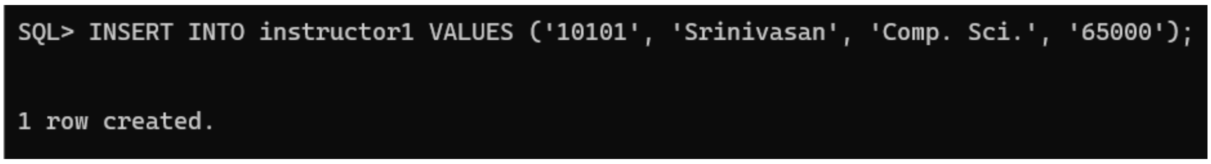
```
SQL> SELECT * FROM DEPARTMENT1;

DEPT_NAME            BUILDING            BUDGET
-------------------- --------------- ----------
Biology              Watson               90000
Comp. Sci.           Taylor              100000
Elec. Eng.           Taylor               85000
Finance              Painter             120000
History              Painter              50000
Music                Packard              80000
Physics              Watson               70000

7 rows selected.
```

INSTRUCTOR TABLE:



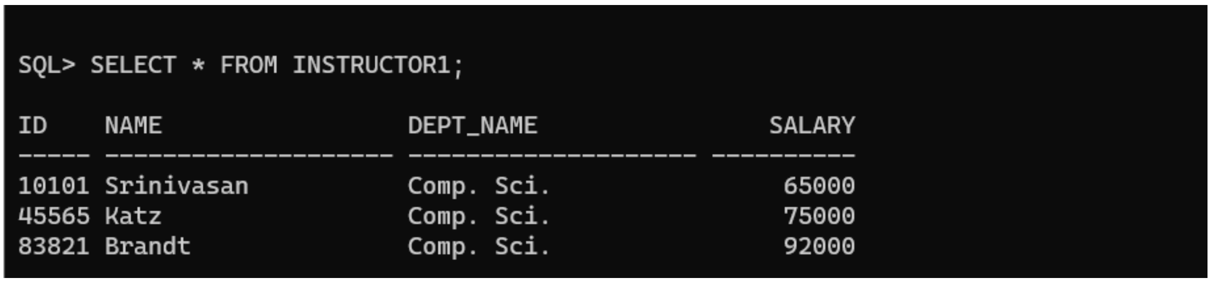
```
SQL> CREATE TABLE INSTRUCTOR1
(
ID VARCHAR2(5),
NAME VARCHAR2(20) NOT NULL,
DEPT_NAME VARCHAR2(20),
SALARY NUMERIC(8,2) CHECK (SALARY > 29000),
PRIMARY KEY (ID),
FOREIGN KEY (DEPT_NAME) REFERENCES DEPARTMENT(DEPT_NAME)
ON DELETE SET NULL
);

Table created.
```

INSERT INTO:



```
SQL> INSERT INTO instructor1 VALUES ('10101', 'Srinivasan', 'Comp. Sci.', '65000');


1 row created.
```

SELECT:



```
SQL> SELECT * FROM INSTRUCTOR1;

ID    NAME                 DEPT_NAME                SALARY
----- -------------------- -------------------- ----------
10101 Srinivasan           Comp. Sci.                65000
45565 Katz                 Comp. Sci.                75000
83821 Brandt               Comp. Sci.                92000
```

SUM () FU NCTION:

The `Sum()` function returns the total sum of a numeric column.

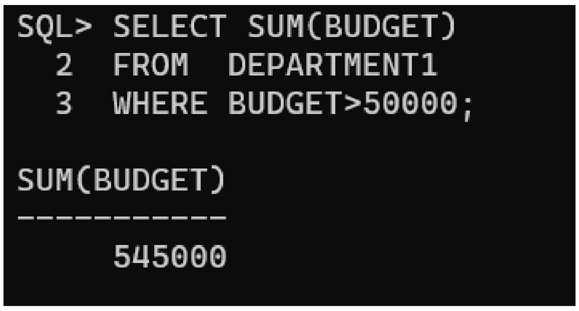
Syntax:

SELECT SUM(Column_ name)

FROM table_ name

WHERE condition;

EXAMPLE:



```
SQL> SELECT SUM(BUDGET)
  2  FROM  DEPARTMENT1
  3  WHERE BUDGET>50000;

SUM(BUDGET)
-----------
     545000
```

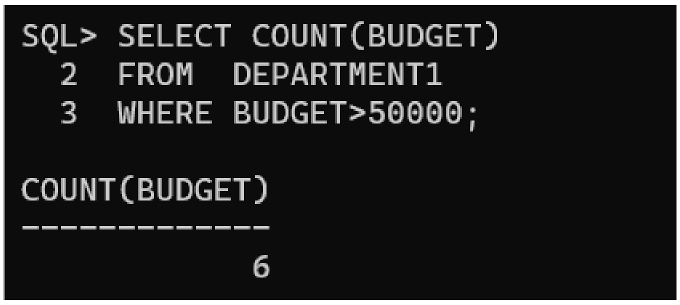
COUNT () FUNCTION:

The `COUNT()` function returns the number of rows that matches a specified criterion.

SYNTAX:

SELECT COUNT(*column_name*)
FROM *table_name*
WHERE *condition*;

EXAMPLE:



```
SQL> SELECT COUNT(BUDGET)
  2  FROM  DEPARTMENT1
  3  WHERE BUDGET>50000;

COUNT(BUDGET)
-------------
            6
```

AVG FUNCTION:

AVG () computes the average of a set of values by dividing the sum of those values by the count of nonnull values.

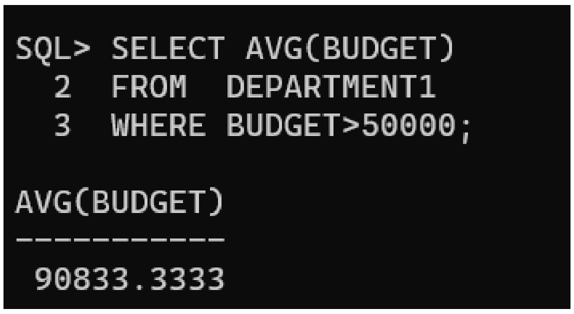
SYNTAX:

SELECT AVG(Column_ name)

FROM table_ name

WHERE condition;

EXAMPLE:



```
SQL> SELECT AVG(BUDGET)
  2  FROM  DEPARTMENT1
  3  WHERE BUDGET>50000;

AVG(BUDGET)
-----------
 90833.3333
```

MAX FUNCTION:

The MAX() function returns the largest value of the selected column.

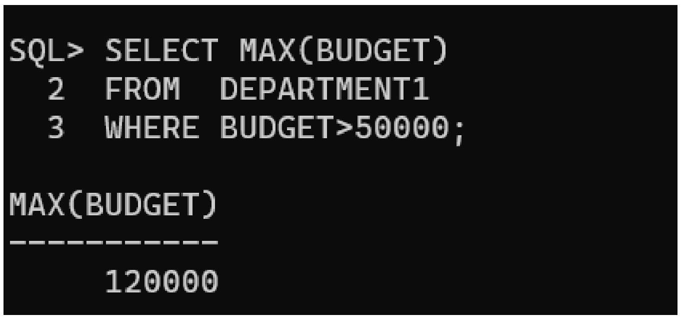
SYNTAX:

SELECT MAX (Column_ name)

FROM table_ name

WHERE condition;

EXAMPLE:



```
SQL> SELECT MAX(BUDGET)
  2  FROM  DEPARTMENT1
  3  WHERE BUDGET>50000;

MAX(BUDGET)
-----------
     120000
```

MIN FUCTION:

The `MIN()` function returns the smallest value of the selected column.

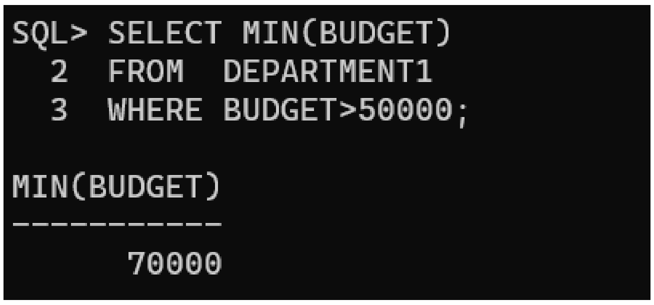
SYNTAX:

SELECT MIN(column_ name)

FROM table_ name

WHERE condition;

EXAMPLE:



```
SQL> SELECT MIN(BUDGET)
  2  FROM  DEPARTMENT1
  3  WHERE BUDGET>50000;

MIN(BUDGET)
-----------
      70000
```

CONCLUSION:

In this lab, we   successfully practice how to write SQL queries to perform AGGREGATE OPERATIONS like SUM, COUNT, AVG, MIN, MAX.

EXPERIMENT – 8

Write SQL queries to perform ORACLE BUILT-IN FUNCTIONS (i.e. DATE, TIME).

AIM:

To write a SQL queries to perform ORACLE BUILT-IN FUNCTIONS like DATE, TIME.

PROGRAM DESCRIPTION:

In this lab, we practice how to write a SQLqueries to perform ORACLE BUILT-IN FUNCTIONS like DATE, TIME.

Built-in Functions

1.Character Functions

*Case-conversion functions

- UPPER
- LOWER
- INIT CAP

*Character manipulation functions

- SUBSTR
- LENGTH
- REPLACE
- INSTR
- RPAD
- LPAD
- CONCAT
- TRIM
  - i) LTRIM
  - ii) RTRIM
  - iii)

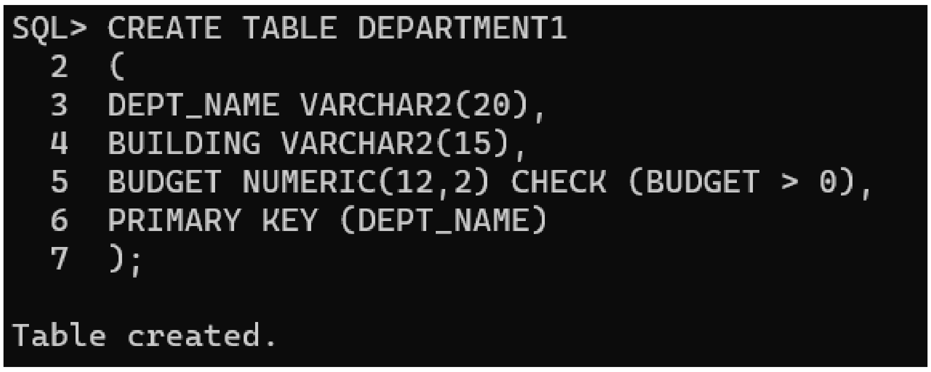
2.Number Functions

- ROUND
- TRUNC
- MOD

3.DATE functions

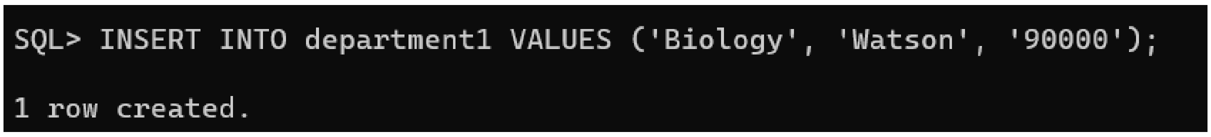
- SYSDATE
- MONTHS_BETWEEN
- ADD_MONTHS
- NEXT_DAY
- LAST_DAY
- ROUND(DATE)
- TRUNCATE(DATE)

DEPARTMENT TABLE:



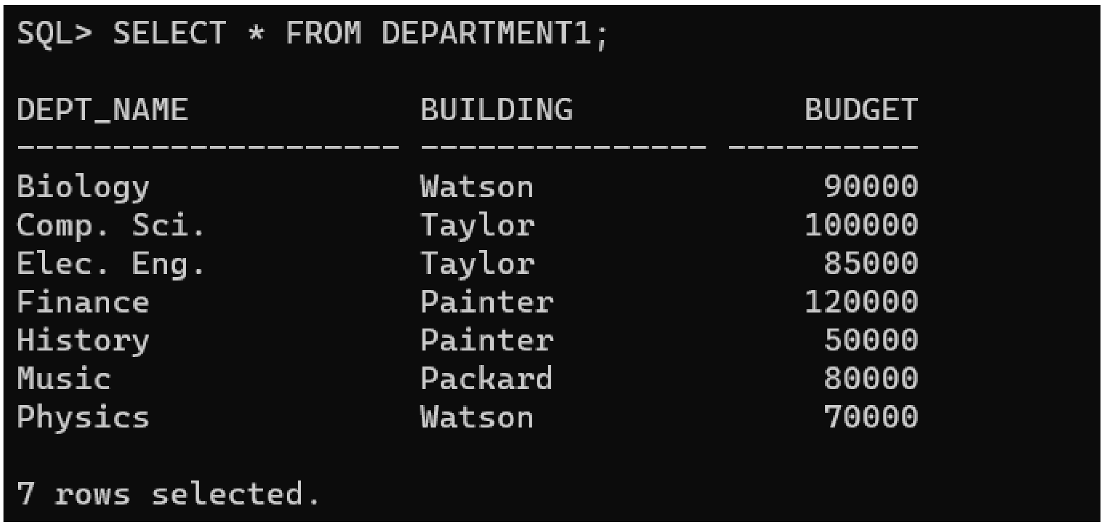
```
SQL> CREATE TABLE DEPARTMENT1
  2  (
  3  DEPT_NAME VARCHAR2(20),
  4  BUILDING VARCHAR2(15),
  5  BUDGET NUMERIC(12,2) CHECK (BUDGET > 0),
  6  PRIMARY KEY (DEPT_NAME)
  7  );

Table created.
```

INSERT INTO:



```
SQL> INSERT INTO department1 VALUES ('Biology', 'Watson', '90000');

1 row created.
```

SELECT:



```
SQL> SELECT * FROM DEPARTMENT1;

DEPT_NAME            BUILDING            BUDGET
-------------------- --------------- ----------
Biology              Watson               90000
Comp. Sci.           Taylor              100000
Elec. Eng.           Taylor               85000
Finance              Painter             120000
History              Painter              50000
Music                Packard              80000
Physics              Watson               70000

7 rows selected.
```

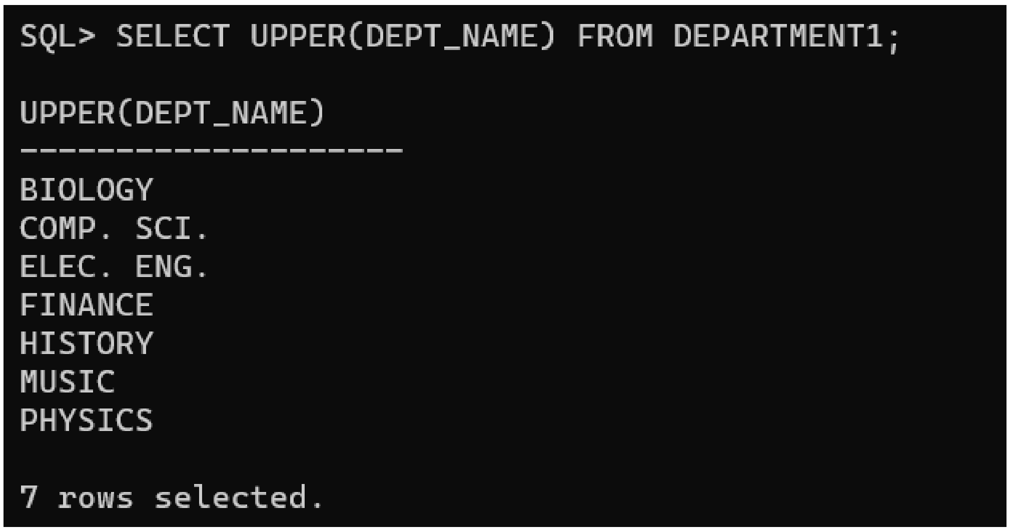
CASE CONVERSION FUNCTIONS:

UPPER:

Syntax:

UPPER(*text*)

EXAMPLE:



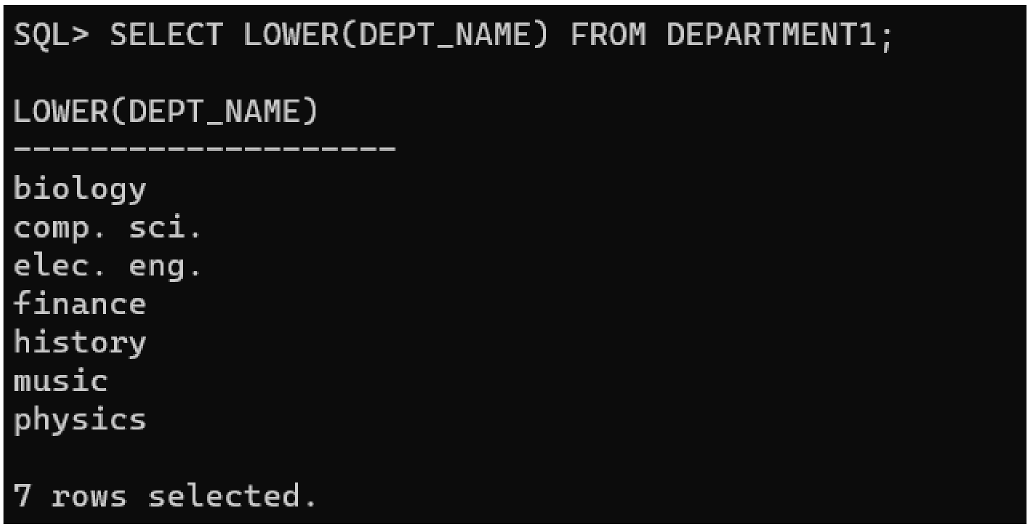
```
SQL> SELECT UPPER(DEPT_NAME) FROM DEPARTMENT1;

UPPER(DEPT_NAME)
--------------------
BIOLOGY
COMP. SCI.
ELEC. ENG.
FINANCE
HISTORY
MUSIC
PHYSICS

7 rows selected.
```

LOWER:SL

SYNTAX:

LOWER (*text*)

EXAMPLE:



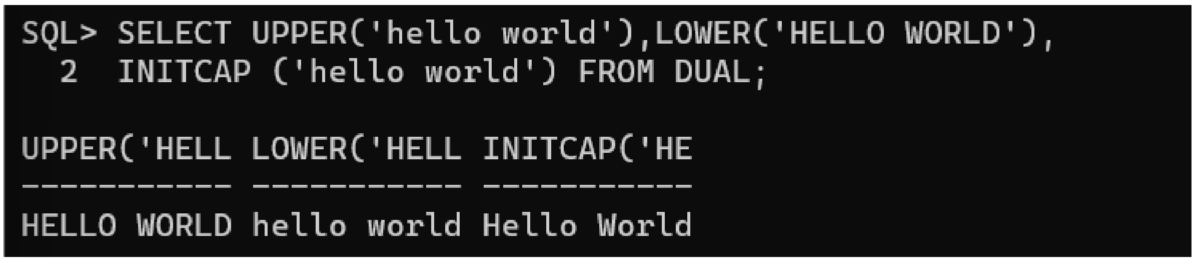
```
SQL> SELECT LOWER(DEPT_NAME) FROM DEPARTMENT1;

LOWER(DEPT_NAME)
--------------------
biology
comp. sci.
elec. eng.
finance
history
music
physics

7 rows selected.
```

INIT CAP:

SYNTAX:

INITCAP (string)

EXAMPLE:



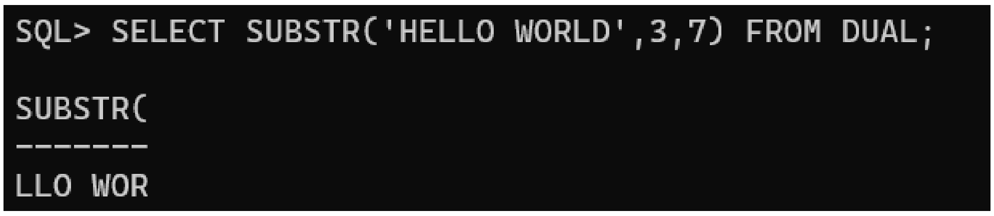
```
SQL> SELECT UPPER('hello world'),LOWER('HELLO WORLD'),
  2  INITCAP ('hello world') FROM DUAL;

UPPER('HELL LOWER('HELL INITCAP('HE
----------- ----------- -----------
HELLO WORLD hello world Hello World
```

CHARACTER MANIPULATION FUNCTION:

SUBSTR:

SUBSTRING (*string*, *start*, *length*)

EXAMPLE:



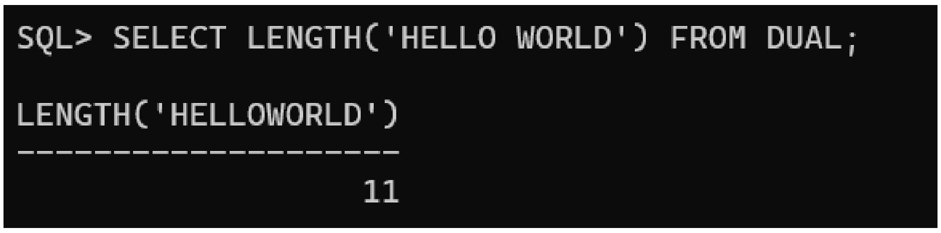
```
SQL> SELECT SUBSTR('HELLO WORLD',3,7) FROM DUAL;

SUBSTR(
-------
LLO WOR
```

LENGTH:

SYNTAX:

LENGTH (*string*)

EXAMPLE:



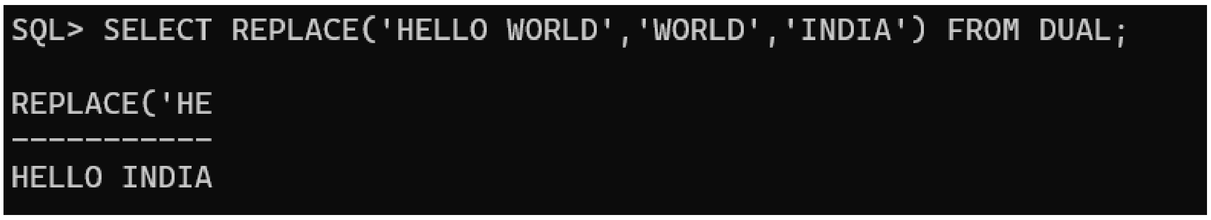
```
SQL> SELECT LENGTH('HELLO WORLD') FROM DUAL;

LENGTH('HELLOWORLD')
--------------------
                  11
```

REPLACE:

SYNTAX:

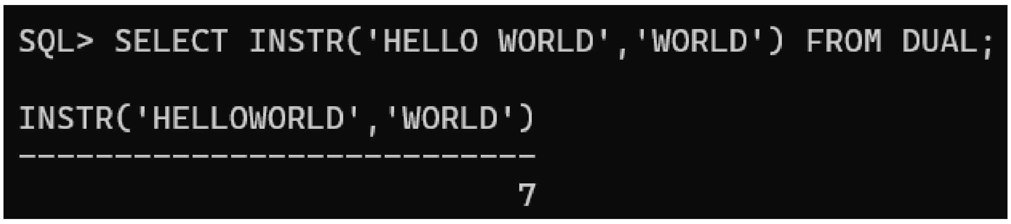
REPLACE (*string*, *old_ string*, *new_ string*)

EXAMPLE:



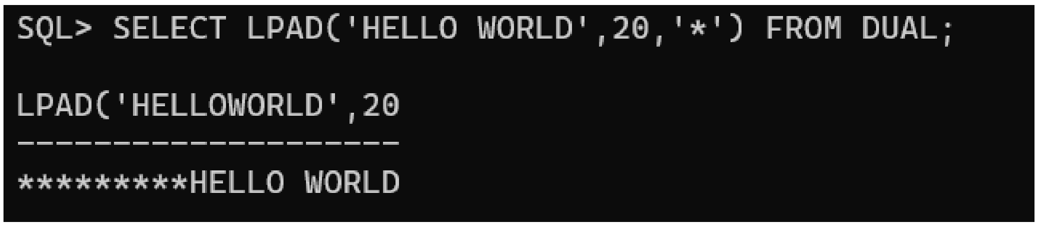
```
SQL> SELECT REPLACE('HELLO WORLD','WORLD','INDIA') FROM DUAL;

REPLACE('HE
-----------
HELLO INDIA
```

INSTR:



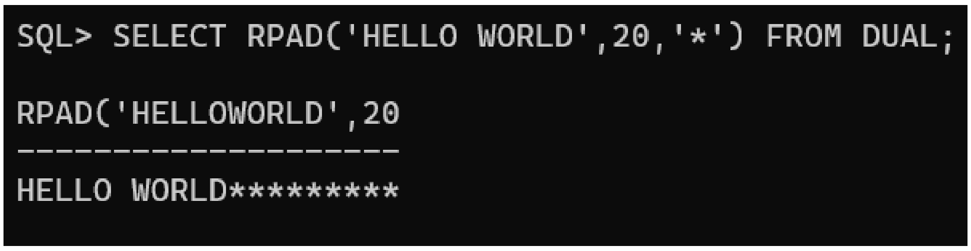
```
SQL> SELECT INSTR('HELLO WORLD','WORLD') FROM DUAL;

INSTR('HELLOWORLD','WORLD')
---------------------------
                          7
```

LPAD:



```
SQL> SELECT LPAD('HELLO WORLD',20,'*') FROM DUAL;

LPAD('HELLOWORLD',20
--------------------
*********HELLO WORLD
```

RPAD:



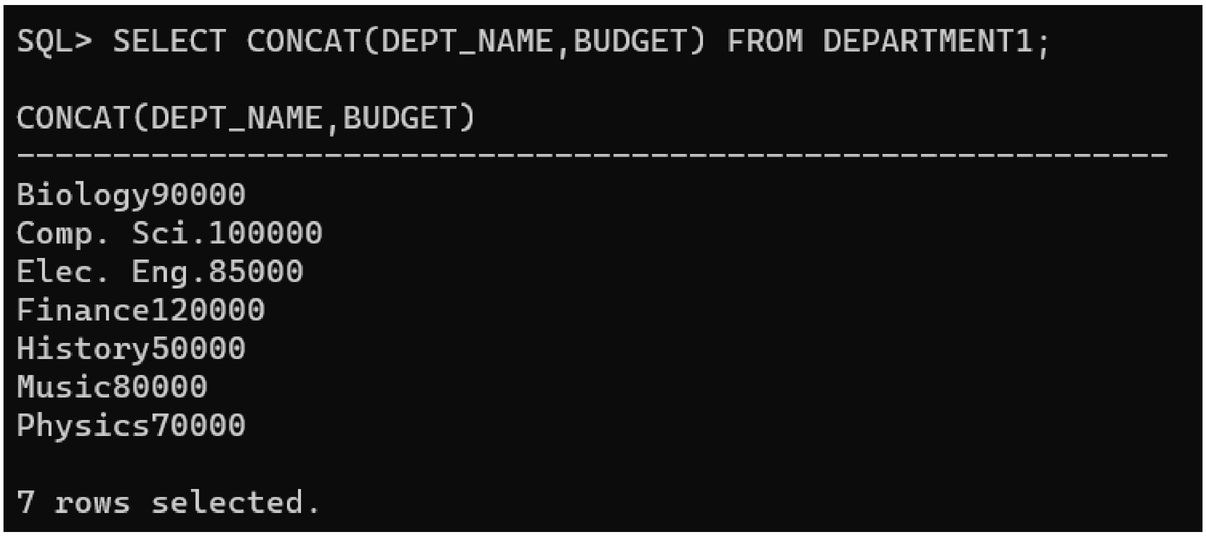
```
SQL> SELECT RPAD('HELLO WORLD',20,'*') FROM DUAL;

RPAD('HELLOWORLD',20
--------------------
HELLO WORLD*********
```

CONCAT:

SYNTAX:

CONCAT (*string1*, *string2*, ..., *string_ n*)

EXAMPLE:



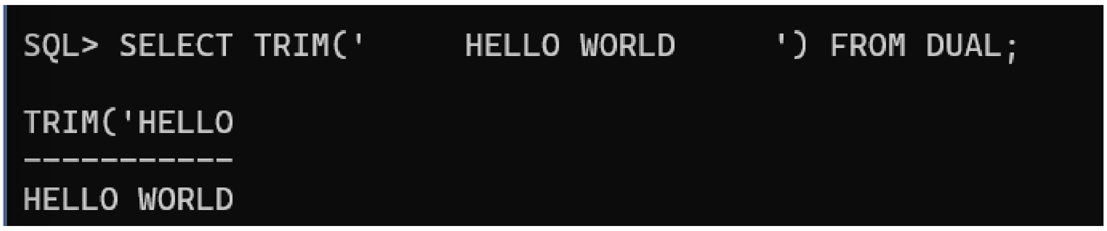
```
SQL> SELECT CONCAT(DEPT_NAME,BUDGET) FROM DEPARTMENT1;

CONCAT(DEPT_NAME,BUDGET)
------------------------------------------------------------
Biology90000
Comp. Sci.100000
Elec. Eng.85000
Finance120000
History50000
Music80000
Physics70000

7 rows selected.
```

TRIM:

SYNTAX:

TRIM ([*characters* FROM] *string*)

EXAMPLE:



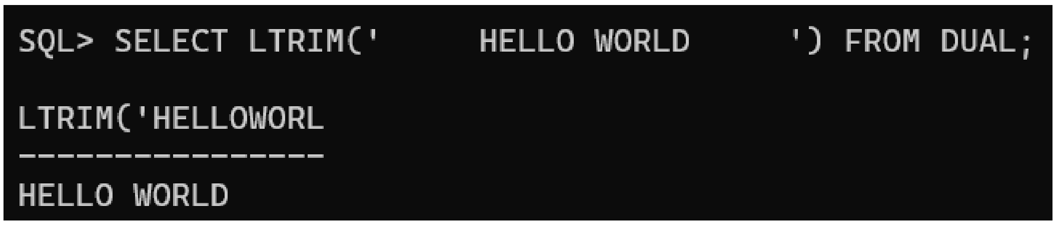
```
SQL> SELECT TRIM('     HELLO WORLD     ') FROM DUAL;

TRIM('HELLO
-----------
HELLO WORLD
```

LTRIM:

SYNTAX:

LTRIM (*string*)

EXAMPLE:



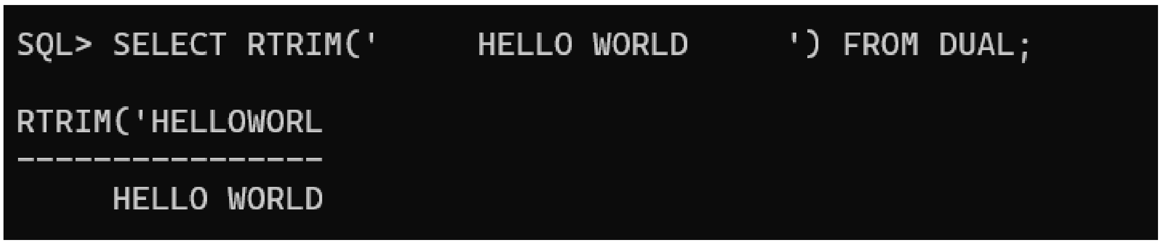
```
SQL> SELECT LTRIM('     HELLO WORLD     ') FROM DUAL;

LTRIM('HELLOWORL
----------------
HELLO WORLD
```

RTRIM:

SYNTAX:

RTRIM (*string*)

EXAMPLE:



```
SQL> SELECT RTRIM('     HELLO WORLD     ') FROM DUAL;

RTRIM('HELLOWORL
----------------
     HELLO WORLD
```

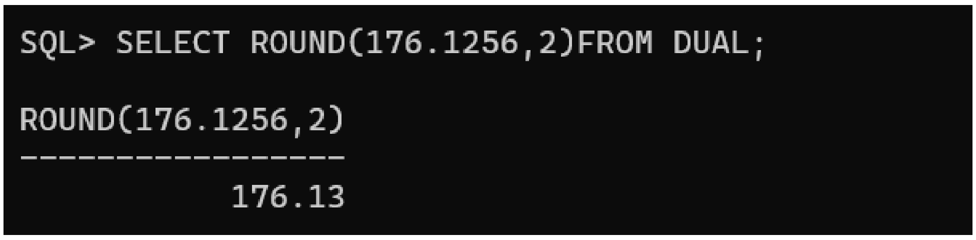
NUMBER FUNCTIONS:

ROUND:

Syntax:

ROUND (*number, decimals*)

EXAMPLE:



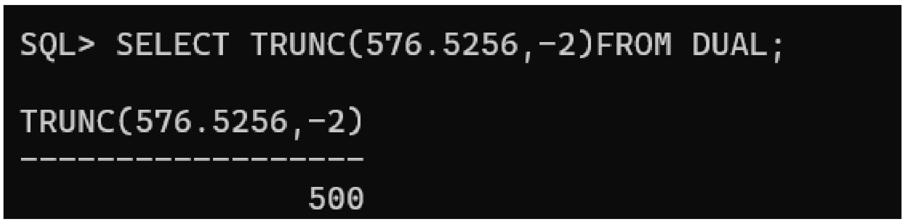
```
SQL> SELECT ROUND(176.1256,2)FROM DUAL;

ROUND(176.1256,2)
-----------------
           176.13
```

TRUNC:

SYNTAX:

TRUNCATE (*number, decimals*)

EXAMPLE:



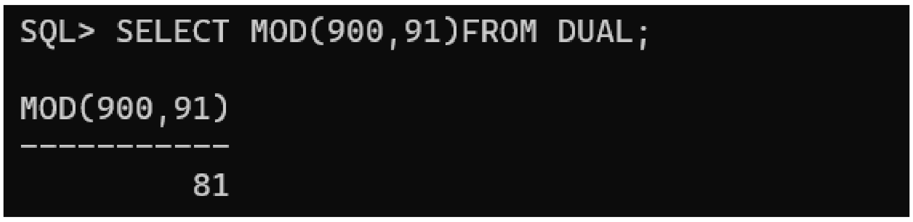
```
SQL> SELECT TRUNC(576.5256,-2)FROM DUAL;

TRUNC(576.5256,-2)
------------------
               500
```

MOD:

SYNTAX:

MOD (*x*, *y*)

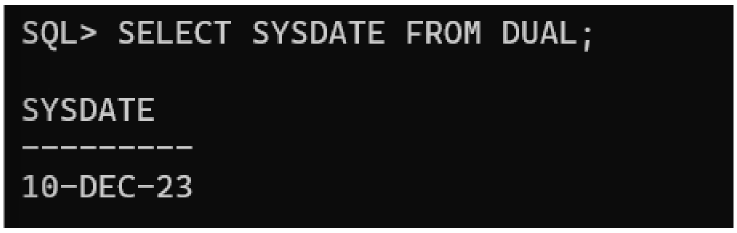
EXAMPLE:



```
SQL> SELECT MOD(900,91)FROM DUAL;

MOD(900,91)
-----------
         81
```

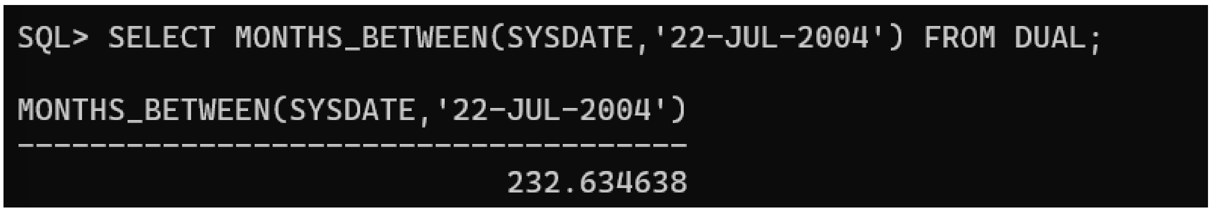
DATE FUNCTIONS:

SYSDATE:



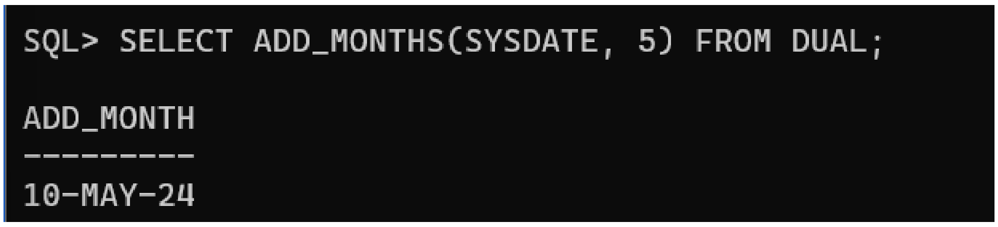
```
SQL> SELECT SYSDATE FROM DUAL;

SYSDATE
---------
10-DEC-23
```

MONTHS_BETWEEN



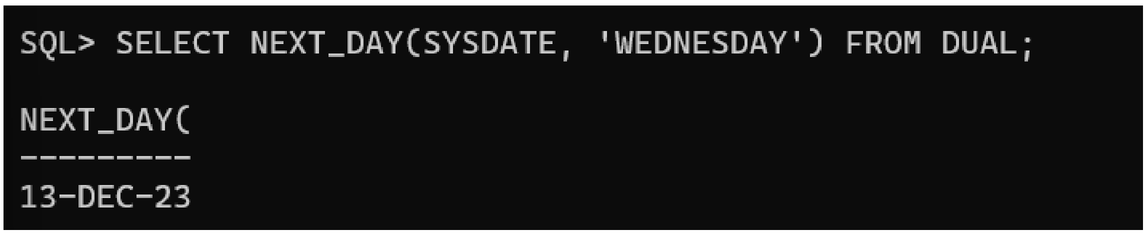
```
SQL> SELECT MONTHS_BETWEEN(SYSDATE,'22-JUL-2004') FROM DUAL;

MONTHS_BETWEEN(SYSDATE,'22-JUL-2004')
-------------------------------------
                           232.634638
```

ADD_MONTHS



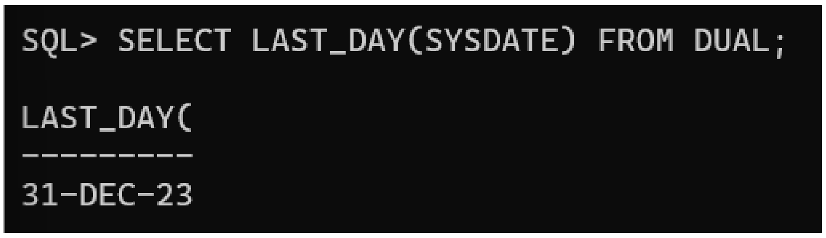
```
SQL> SELECT ADD_MONTHS(SYSDATE, 5) FROM DUAL;

ADD_MONTH
---------
10-MAY-24
```

NEXT_DAY



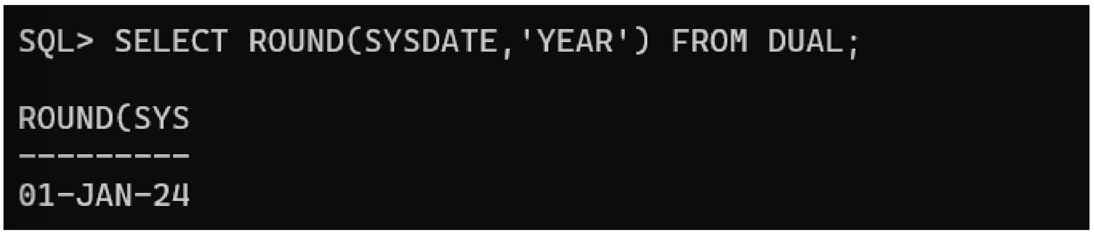
```
SQL> SELECT NEXT_DAY(SYSDATE, 'WEDNESDAY') FROM DUAL;

NEXT_DAY(
---------
13-DEC-23
```

LAST_DAY



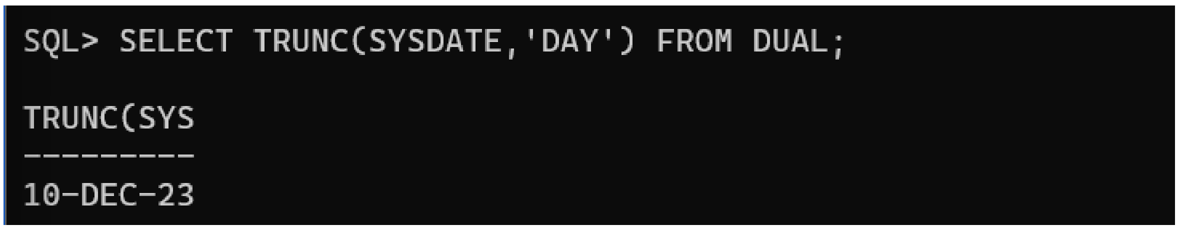
```
SQL> SELECT LAST_DAY(SYSDATE) FROM DUAL;

LAST_DAY(
---------
31-DEC-23
```

ROUND(DATE)



```
SQL> SELECT ROUND(SYSDATE,'YEAR') FROM DUAL;

ROUND(SYS
---------
01-JAN-24
```

TRUNCATE(DATE)



```
SQL> SELECT TRUNC(SYSDATE,'DAY') FROM DUAL;

TRUNC(SYS
---------
10-DEC-23
```

CONCLUSION:

In this lab, we successfully practice how to write a SQLqueries to perform ORACLE BUILT-IN FUNCTIONS like DATE, TIME.

EXPERIMENT – 9

Write SQL queries to perform KEY CONSTRAINTS (i.e. PRIMARY KEY, FOREIGN KEY, UNIQUE NOT NULL, CHECK, DEFAULT).

AIM:

To write SQL queries to perform KEY CONSTRAINTS (i.e. PRIMARY KEY, FOREIGN KEY, UNIQUE NOT NULL, CHECK, DEFAULT).

PROGRAM DESCRIPTION:

In this lab, we successfully practice how to write SQL queries to perform KEY CONSTRAINTS like PRIMARY KEY, FOREIGN KEY, UNIQUE NOT NULL, CHECK, DEFAULT.

CONSTRAINTS:

SQL constraints are used to specify rules for the data in a table.

Types of SQL Constraints:

1. NOT NULL - Ensures that a column cannot have a NULL value
2. UNIQUE - Ensures that all values in a column are different
3. PRIMARY KEY - A combination of a NOT NULL and UNIQUE. Uniquely identifies each

   row in a table
4. FOREIGN KEY - Uniquely identifies a row/record in another table
5. CHECK - Ensures that all values in a column satisfies a specific condition
6. DEFAULT - Sets a default value for a column when no value is specified.

First APPLY CONSTRIANT USING CREATE Statement.

Second, DROP the Constraint

third, verify the constraint is working or not using insert statement;

Fourth, make a note of error occurred in observation

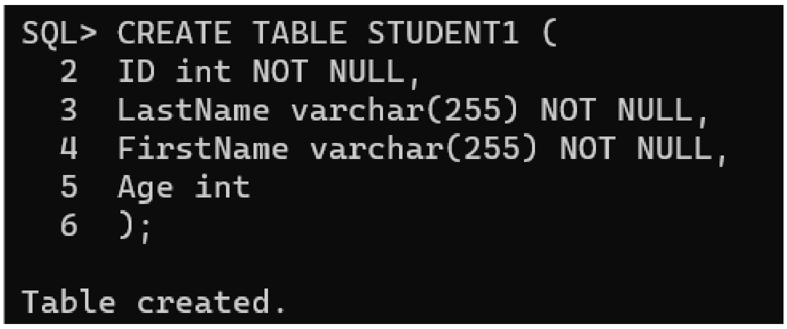
After Verification Drop the table to define other Constraints on the same relation-name

NOT NULL Constraint Example:

SYNTAX:

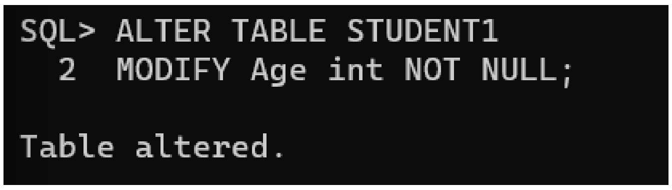
```
SELECT column_ names
FROM table_ name
WHERE column_ name IS NOT NULL;
```

EXAMPLE:



```
SQL> CREATE TABLE STUDENT1 (
  2  ID int NOT NULL,
  3  LastName varchar(255) NOT NULL,
  4  FirstName varchar(255) NOT NULL,
  5  Age int
  6  );

Table created.
```

ALTER:

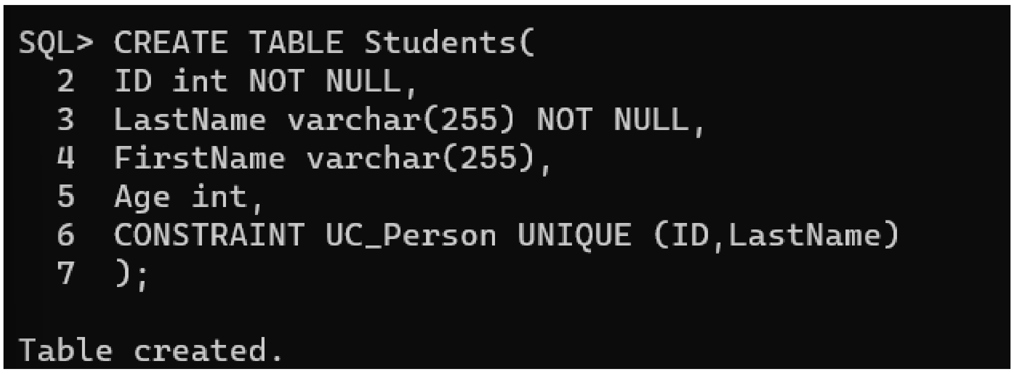


```
SQL> ALTER TABLE STUDENT1
  2  MODIFY Age int NOT NULL;

Table altered.
```

UNIQUE CONSTRAINT EXAMPLE:

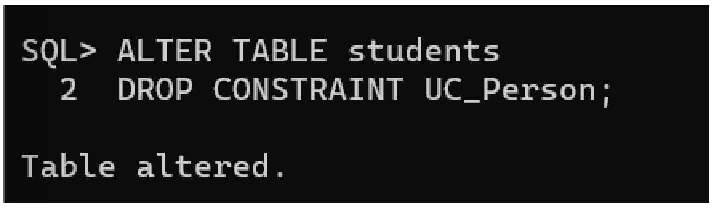
The `UNIQUE` constraint ensures that all values in a column are different.

EXAMPLE:



```
SQL> CREATE TABLE Students(
  2  ID int NOT NULL,
  3  LastName varchar(255) NOT NULL,
  4  FirstName varchar(255),
  5  Age int,
  6  CONSTRAINT UC_Person UNIQUE (ID,LastName)
  7  );

Table created.
```

ALTER:



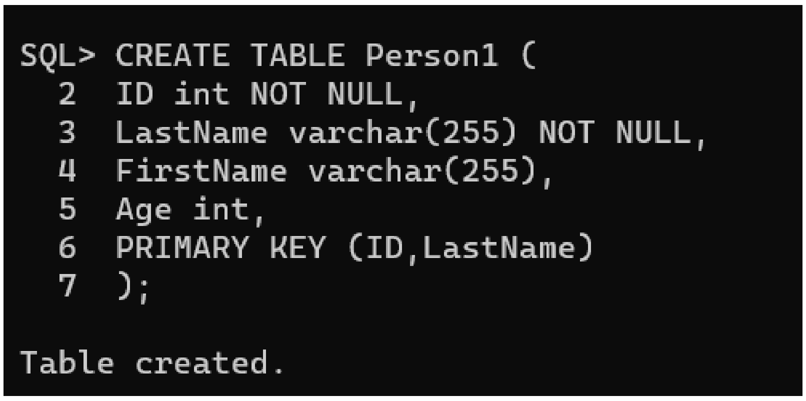
```
SQL> ALTER TABLE students
  2  DROP CONSTRAINT UC_Person;

Table altered.
```

PRIMARY KEY CONSTRAINT Example:

The PRIMARY KEY constraint uniquely identifies each record in a table.

Primary keys must contain UNIQUE values, and cannot contain NULL values.

EXAMPLE:



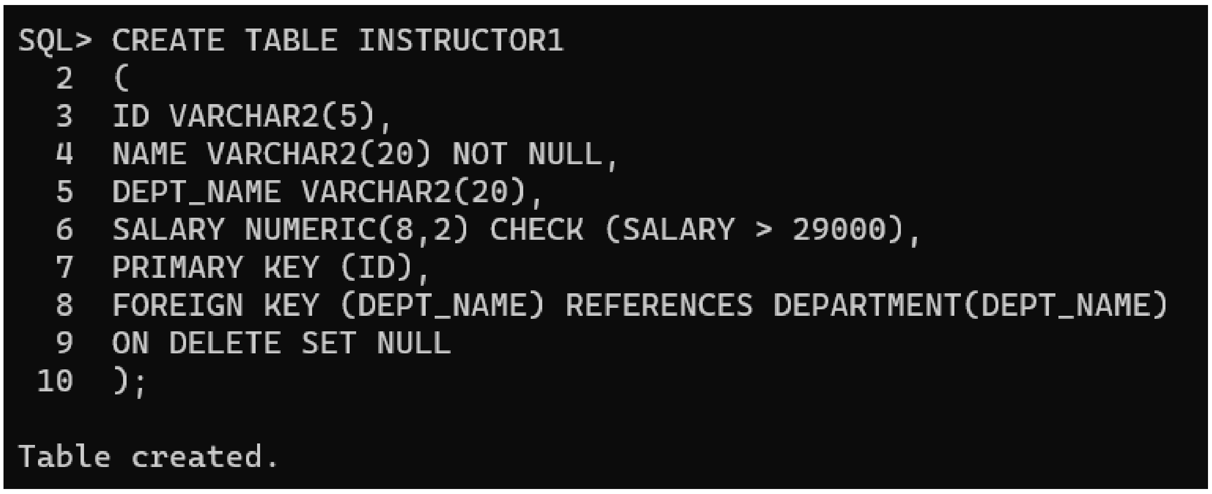
```
SQL> CREATE TABLE Person1 (
  2  ID int NOT NULL,
  3  LastName varchar(255) NOT NULL,
  4  FirstName varchar(255),
  5  Age int,
  6  PRIMARY KEY (ID,LastName)
  7  );

Table created.
```

FORIEGN KEY CONSTRAINTS Example:

The `FOREIGN KEY` constraint is used to prevent actions that would destroy links between tables.

A `FOREIGN KEY` is a field (or collection of fields) in one table, that refers to the PRIMARY KEY in another table.

EXAMPLE:

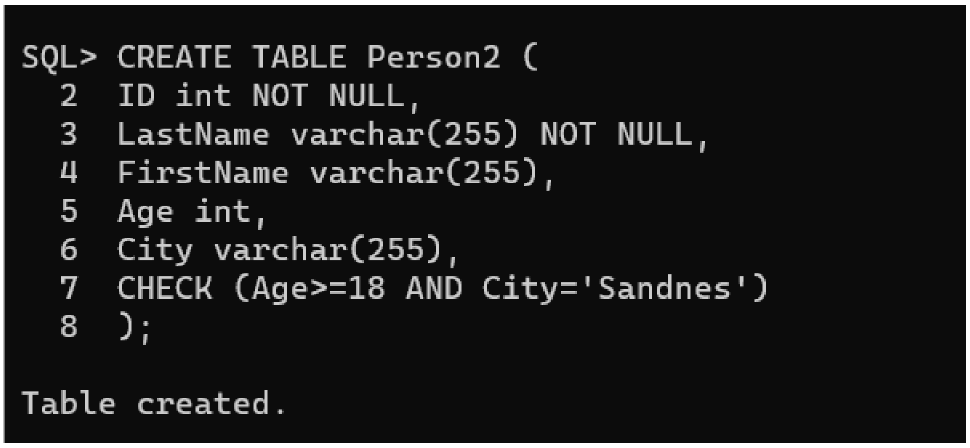


```
SQL> CREATE TABLE INSTRUCTOR1
  2  (
  3  ID VARCHAR2(5),
  4  NAME VARCHAR2(20) NOT NULL,
  5  DEPT_NAME VARCHAR2(20),
  6  SALARY NUMERIC(8,2) CHECK (SALARY > 29000),
  7  PRIMARY KEY (ID),
  8  FOREIGN KEY (DEPT_NAME) REFERENCES DEPARTMENT(DEPT_NAME)
  9  ON DELETE SET NULL
 10  );

Table created.
```

CHECK CONSTRAINTS Example:

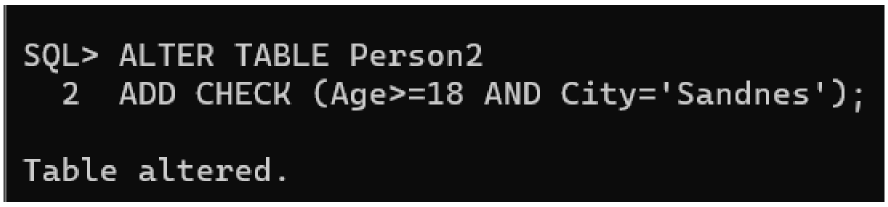
The CHECK constraint is used to limit the value range that can be placed in a column.

EXAMPLE:



```
SQL> CREATE TABLE Person2 (
  2  ID int NOT NULL,
  3  LastName varchar(255) NOT NULL,
  4  FirstName varchar(255),
  5  Age int,
  6  City varchar(255),
  7  CHECK (Age>=18 AND City='Sandnes')
  8  );

Table created.
```

ALTER:



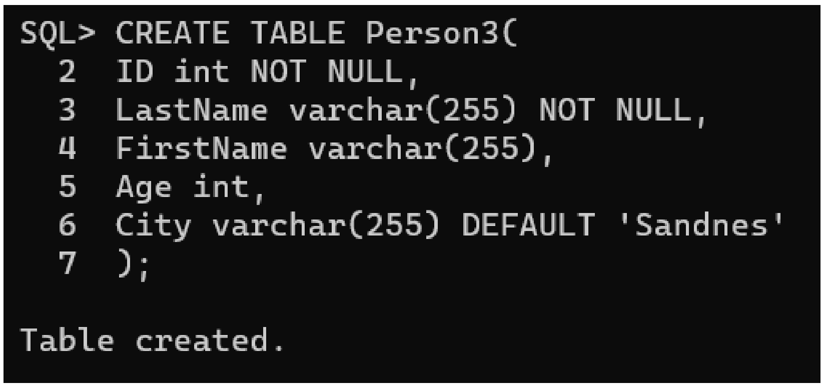
```
SQL> ALTER TABLE Person2
  2  ADD CHECK (Age>=18 AND City='Sandnes');

Table altered.
```

DEFAULT CONSTRAINTS Example:

The DEFAULT constraint is used to set a default value for a column.

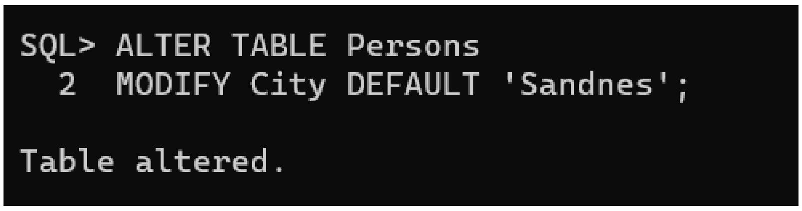
The default value will be added to all new records, if no other value is specified

EXAMPLE:



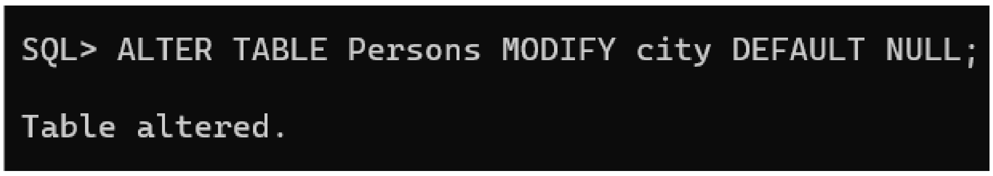
```
SQL> CREATE TABLE Person3(
  2  ID int NOT NULL,
  3  LastName varchar(255) NOT NULL,
  4  FirstName varchar(255),
  5  Age int,
  6  City varchar(255) DEFAULT 'Sandnes'
  7  );

Table created.
```

ALTER:



```
SQL> ALTER TABLE Persons
  2  MODIFY City DEFAULT 'Sandnes';

Table altered.
```

Drop cannot be dropped, So make it null value to remove default



```
SQL> ALTER TABLE Persons MODIFY city DEFAULT NULL;

Table altered.
```

CONCLUSION;

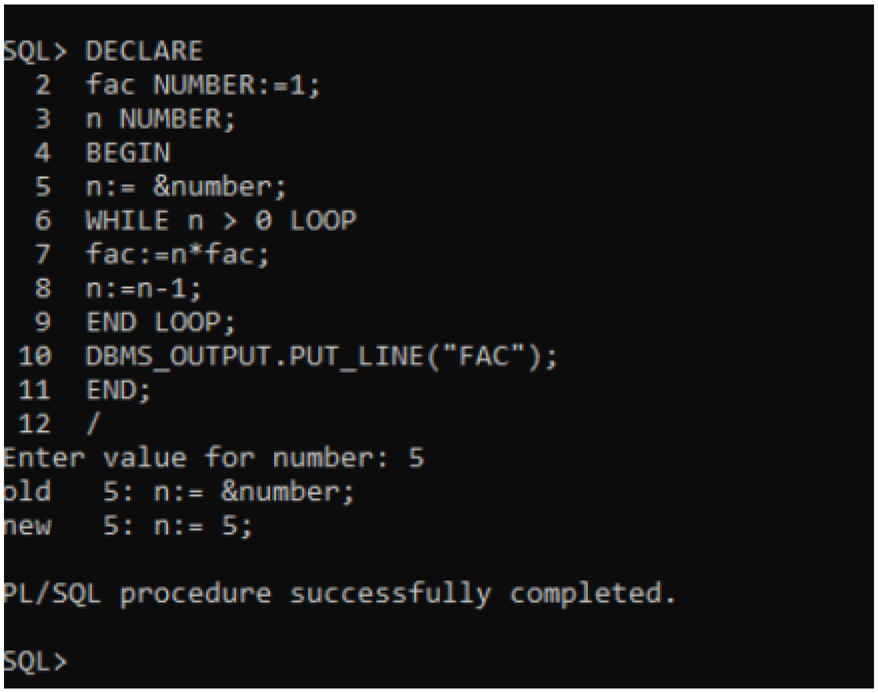
In this lab, we successfully practice how to write SQL queries to perform KEY CONSTRAINTS like PRIMARY KEY, FOREIGN KEY, UNIQUE NOT NULL, CHECK, DEFAULT.

EXPERIMENT-10

10. WRITE SQL PROGRAM FOR CALCULATING THE FACTORIAL OF A GIVEN NUMBER.

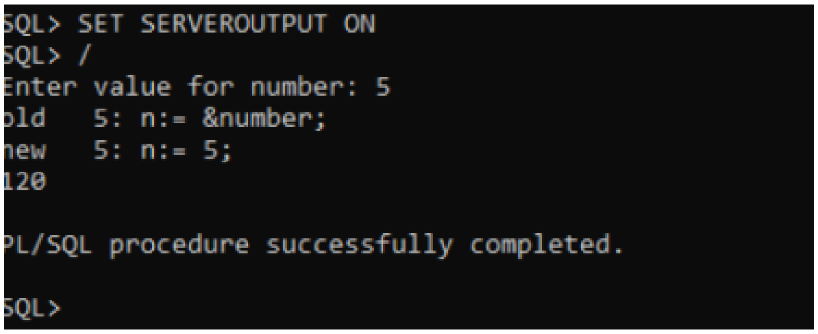
AIM : To write a pl/sql program for calculating the factorial of a given number.

Program :

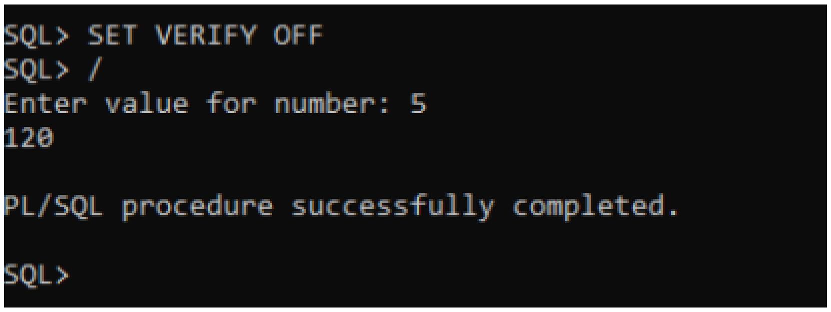


```
SQL> DECLARE
fac NUMBER:=1;
n NUMBER;
BEGIN
n:= &number;
WHILE n > 0 LOOP
fac:=n*fac;
n:=n-1;
END LOOP;
DBMS_OUTPUT.PUT_LINE("FAC");
END;
/
Enter value for number: 5
old   5: n:= &number;
new   5: n:= 5;

PL/SQL procedure successfully completed.

SQL>
```

OUTPUT:



```
SQL> SET SERVEROUTPUT ON
SQL> /
Enter value for number: 5
old   5: n:= &number;
new   5: n:= 5;
120

PL/SQL procedure successfully completed.

SQL>
```



```
SQL> SET VERIFY OFF
SQL> /
Enter value for number: 5
120

PL/SQL procedure successfully completed.

SQL>
```

CONCLUSION : **In this lab, -we successfully practice how to write a PL/SQL program for calculations the factorial of a given number.**

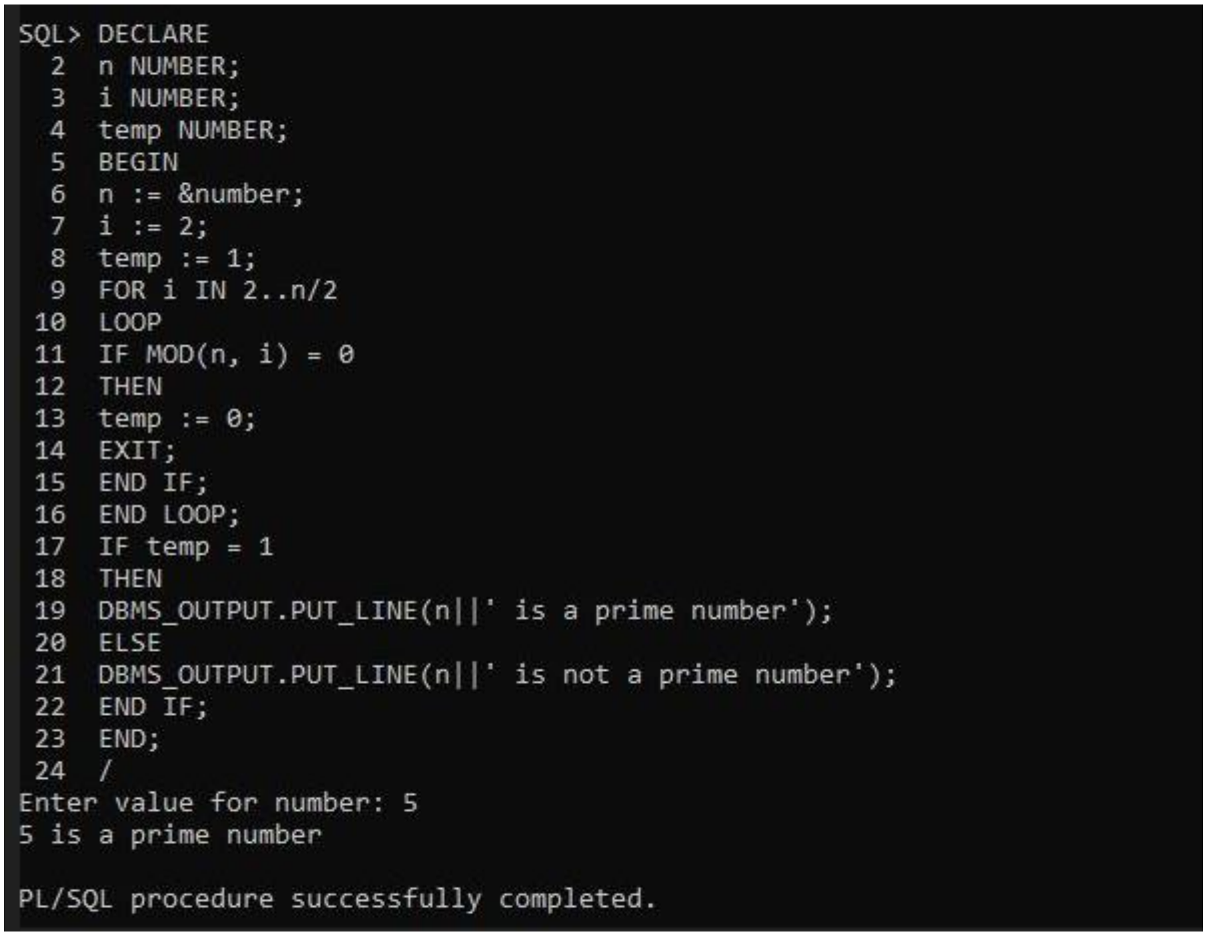
N. Pavithra **224G1A0569** **30-11-2023**

EXPERIMENT -11

Write PL/SQL program for finding the given number or not.

AIM: To write a PL/SQL program for finding the given number is prime or not.

Program :



```
SQL> DECLARE
n NUMBER;
i NUMBER;
temp NUMBER;
BEGIN
n := &number;
i := 2;
temp := 1;
FOR i IN 2..n/2
LOOP
IF MOD(n, i) = 0
THEN
temp := 0;
EXIT;
END IF;
END LOOP;
IF temp = 1
THEN
DBMS_OUTPUT.PUT_LINE(n||' is a prime number');
ELSE
DBMS_OUTPUT.PUT_LINE(n||' is not a prime number');
END IF;
END;
/
Enter value for number: 5
5 is a prime number

PL/SQL procedure successfully completed.
```

OUTPUT : PL/SQL Procedure successfully completed

SQL > SET SERVEROUTPUT ON

SQL>/

ENTER VALUE FOR NUMBER:5

```
5 is a prime number.

PL/SQL procedure successfully completed.
```

CONCLUSION :

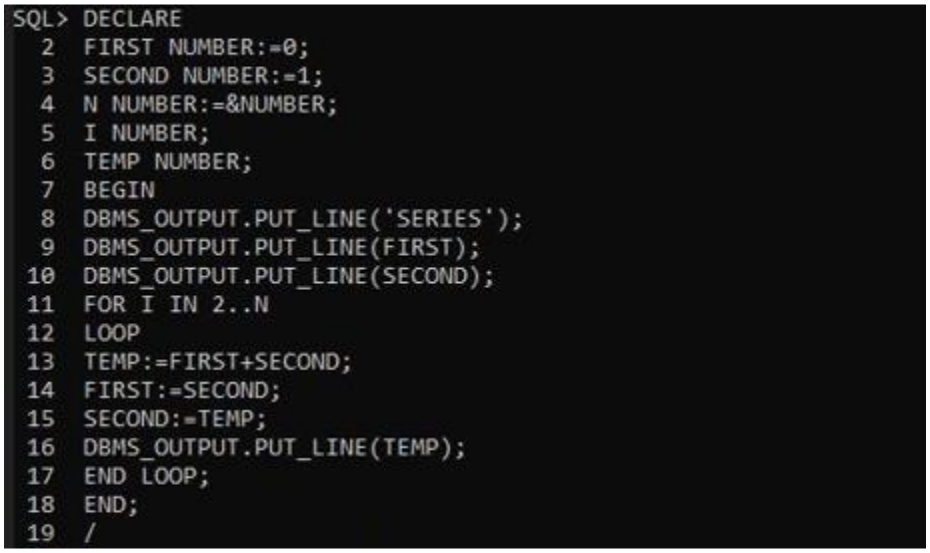
In this lab, we successfully practiced how to write PL/SQL program for finding the given number is prime number or not.

EXPERIMENT – 12

Write a PL/SQL program for displaying the Fibonacci series up to an integer.

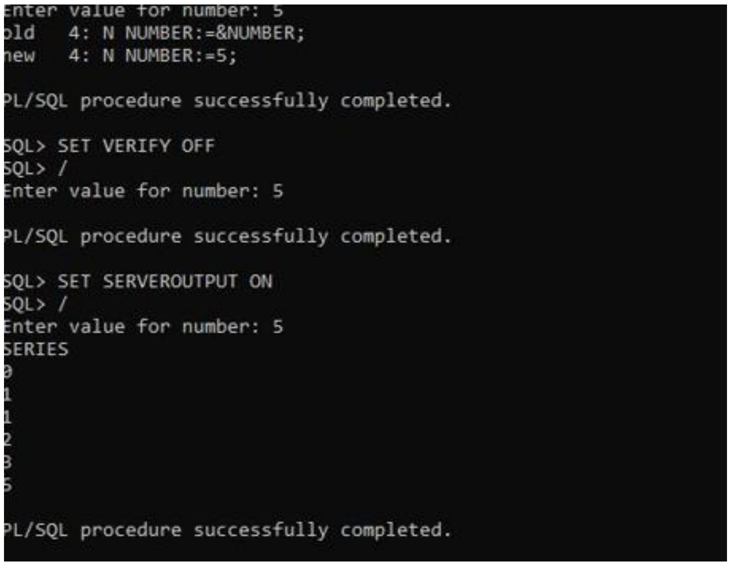
AIM : To write a PL/SQL program for finding the Fibonacci series up to an integer.

Program :



```
SQL> DECLARE
FIRST NUMBER:=0;
SECOND NUMBER:=1;
N NUMBER:=&NUMBER;
I NUMBER;
TEMP NUMBER;
BEGIN
DBMS_OUTPUT.PUT_LINE('SERIES');
DBMS_OUTPUT.PUT_LINE(FIRST);
DBMS_OUTPUT.PUT_LINE(SECOND);
FOR I IN 2..N
LOOP
TEMP:=FIRST+SECOND;
FIRST:=SECOND;
SECOND:=TEMP;
DBMS_OUTPUT.PUT_LINE(TEMP);
END LOOP;
END;
/
```

OUTPUT :



```
nter value for number: 5
ld   4: N NUMBER:=&NUMBER;
ew   4: N NUMBER:=5;

L/SQL procedure successfully completed.

QL> SET VERIFY OFF
QL> /
nter value for number: 5

L/SQL procedure successfully completed.

QL> SET SERVEROUTPUT ON
QL> /
nter value for number: 5
ERIES
0
1
1
2
3
5

L/SQL procedure successfully completed.
```

CONCLUSION : In this lab, we successfully practice PL/SQL program for displaying the Fibonacci series up to an integer.

EXPERIMENT – 13

Write PL/SQL program to implement Stored Procedure on table.

AIM:

To write PL/SQL program to implement Stored Procedure on table.

PROGRAM DESCRIPTION :

1. In this lab, we practice how to write PL/SQL program to implement Stored Procedure on table.
2. The PL/SQL stored procedure or simply a procedure is a PL/SQL block which performs one or more specific tasks. It is just like procedures in other programming languages.
3. The procedure contains a header and a body.
4. Header: The header contains the name of the procedure and the parameters or variable passed to the procedure.
5. Body: The body contains a declaration section, execution section and exception section similar to a general PL/SQL block.

How to pass parameters in procedure:

IN parameters: The IN parameter can be referenced by the procedure or function. The value of the parameter cannot be overwritten by the procedure or the function.

OUT parameters: The OUT parameter cannot be referenced by the procedure or function, but the value of the parameter can be overwritten by the procedure or function.

INOUT parameters: The INOUT parameter can be referenced by the procedure or function and the value of the parameter can be overwritten by the procedure or function.

SYNTAX:

CREATE [OR REPLACE] PROCEDURE procedure _name

[(parameter [,parameter])]

(IS | AS)

[declaration_ section]

BEGIN

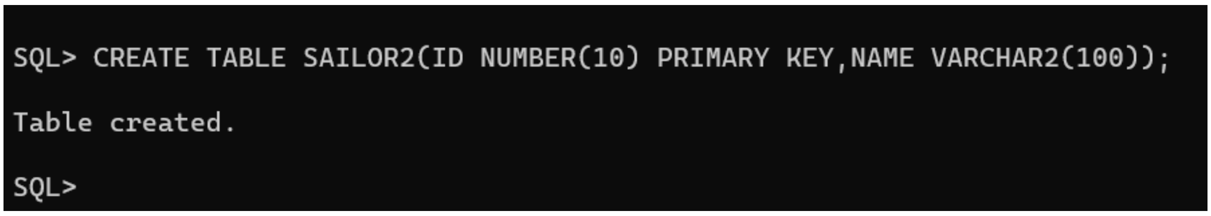
executable_ section

[EXCEPTION

exception_ section]

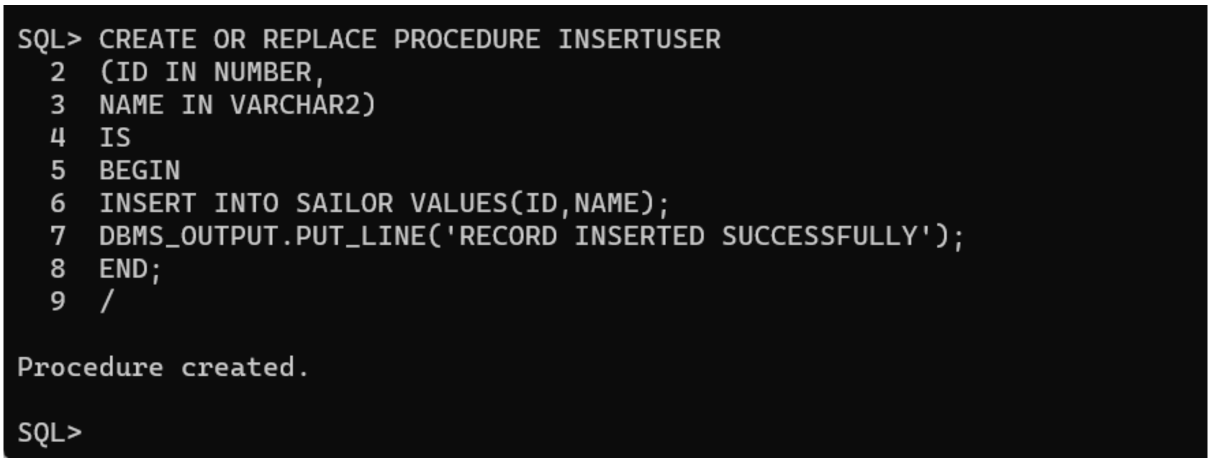
END [procedure_ name];

EXAMPLE:



```
SQL> CREATE TABLE SAILOR2(ID NUMBER(10) PRIMARY KEY,NAME VARCHAR2(100));

Table created.

SQL>
```

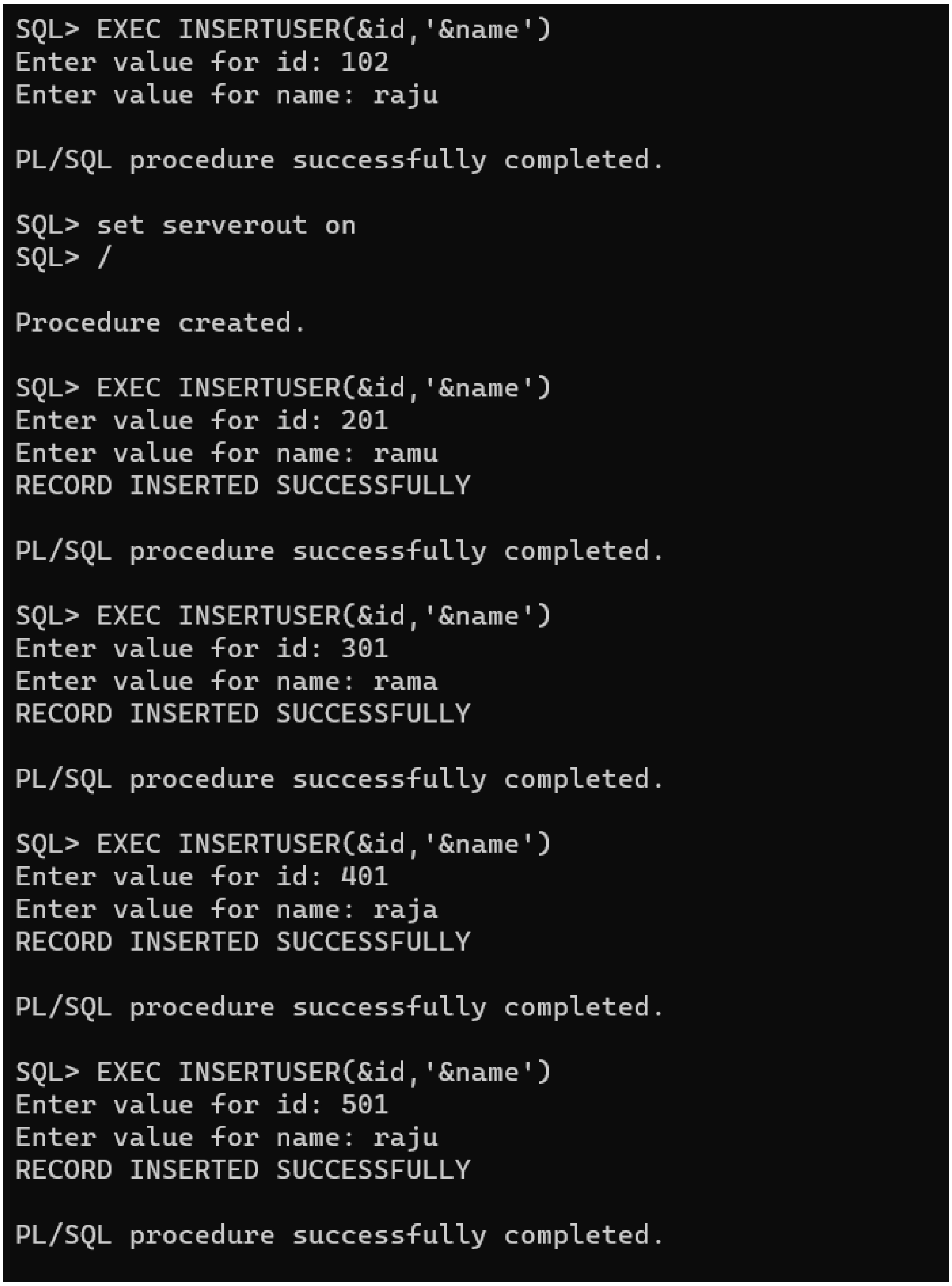
REPLACE PROCEDURE:



```
SQL> CREATE OR REPLACE PROCEDURE INSERTUSER
  2  (ID IN NUMBER,
  3  NAME IN VARCHAR2)
  4  IS
  5  BEGIN
  6  INSERT INTO SAILOR VALUES(ID,NAME);
  7  DBMS_OUTPUT.PUT_LINE('RECORD INSERTED SUCCESSFULLY');
  8  END;
  9  /

Procedure created.

SQL>
```

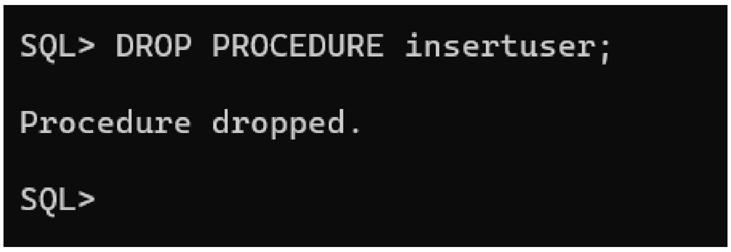
EXECUTION

PROCEDURE:



```
SQL> EXEC INSERTUSER(&id,'&name')
Enter value for id: 102
Enter value for name: raju

PL/SQL procedure successfully completed.

SQL> set serverout on
SQL> /

Procedure created.

SQL> EXEC INSERTUSER(&id,'&name')
Enter value for id: 201
Enter value for name: ramu
RECORD INSERTED SUCCESSFULLY

PL/SQL procedure successfully completed.

SQL> EXEC INSERTUSER(&id,'&name')
Enter value for id: 301
Enter value for name: rama
RECORD INSERTED SUCCESSFULLY

PL/SQL procedure successfully completed.

SQL> EXEC INSERTUSER(&id,'&name')
Enter value for id: 401
Enter value for name: raja
RECORD INSERTED SUCCESSFULLY

PL/SQL procedure successfully completed.

SQL> EXEC INSERTUSER(&id,'&name')
Enter value for id: 501
Enter value for name: raju
RECORD INSERTED SUCCESSFULLY

PL/SQL procedure successfully completed.
```

DROP PROCEDURE:



```
SQL> DROP PROCEDURE insertuser;

Procedure dropped.

SQL>
```

CONCLUSION:

In this lab, we successfully practice how to write PL/SQL program to implement Stored Procedure on table.

EXPERIMENT – 14

Write PL/SQL program to implement Stored Function on table.

AIM :

To write PL/SQL program to implement Stored Function on table.

PROGRAM DESCRIPTION :

In this lab, we learnt how to write PL/SQL program to implement Stored Function on table.

PL/SQL Function

6. The PL/SQL Function is very similar to PL/SQL Procedure.
7. The main difference between procedure and a function is, a function must always return a value, and on the other hand a procedure may or may not return a value.
8. Except this, all the other things of PL/SQL procedure
9. are true for PL/SQL function too.

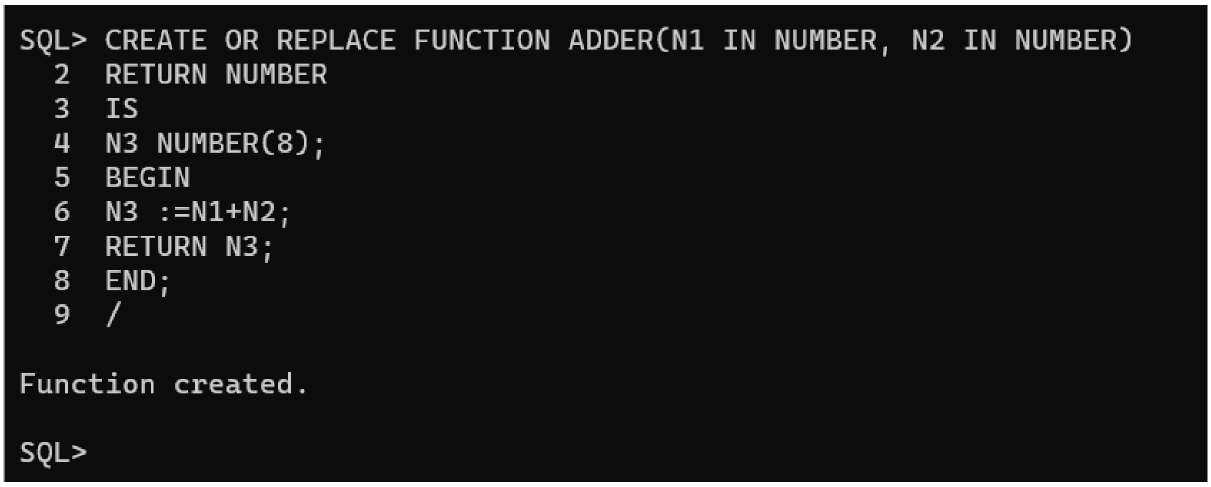
SYNTAX:

```
CREATE [OR REPLACE] FUNCTION function_ name
[ (parameter [,parameter]) ]
RETURN return _ datatype
(IS | AS)
[declaration_section]
BEGIN
executable_section
[EXCEPTION
exception_section]
END [procedure_name];
```

IRRECURSIVE FUNCTION:

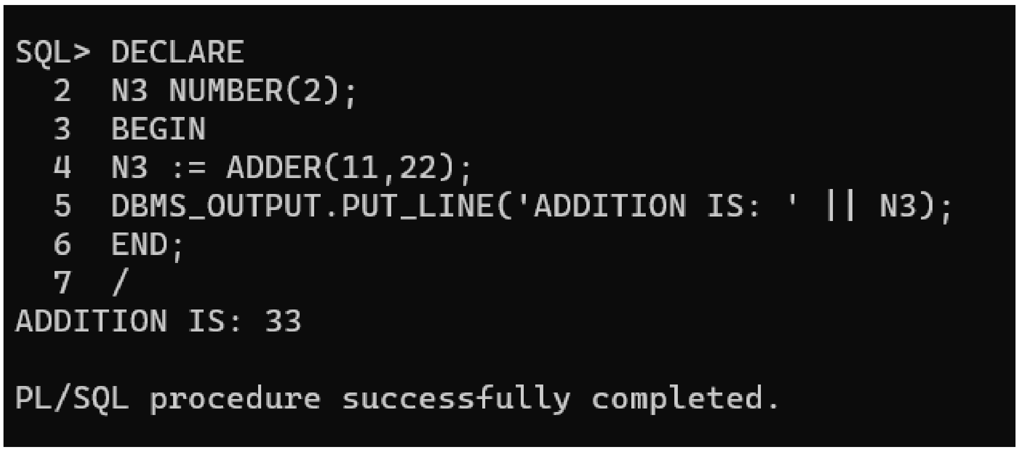
Irrecursive function is a function which does not calls itself.

EXAMPLE:



```
SQL> CREATE OR REPLACE FUNCTION ADDER(N1 IN NUMBER, N2 IN NUMBER)
     RETURN NUMBER
     IS
     N3 NUMBER(8);
     BEGIN
     N3 :=N1+N2;
     RETURN N3;
     END;
     /

Function created.

SQL>
```

Execution Procedure:



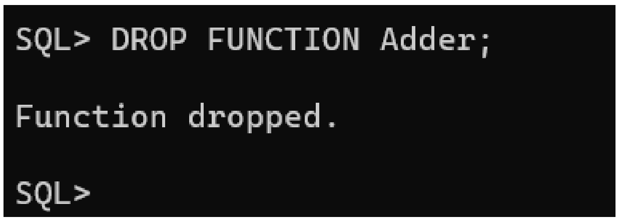
```
SQL> DECLARE
     N3 NUMBER(2);
     BEGIN
     N3 := ADDER(11,22);
     DBMS_OUTPUT.PUT_LINE('ADDITION IS: ' || N3);
     END;
     /
ADDITION IS: 33

PL/SQL procedure successfully completed.
```

DROP FUNCTION

SYNTAX:

DROP FUNCTION Func_name;

EG:

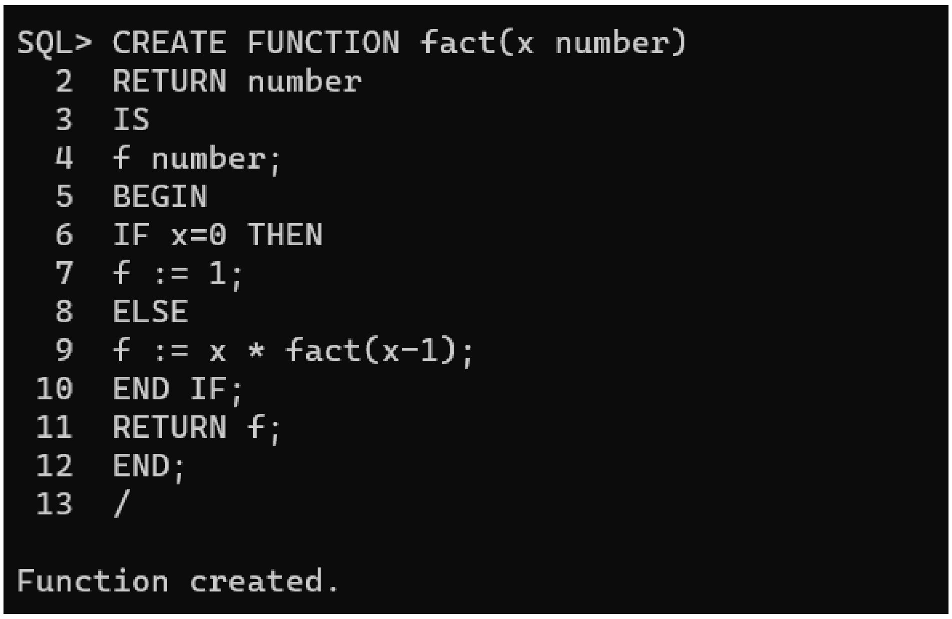


```
SQL> DROP FUNCTION Adder;

Function dropped.

SQL>
```

Recursive function:

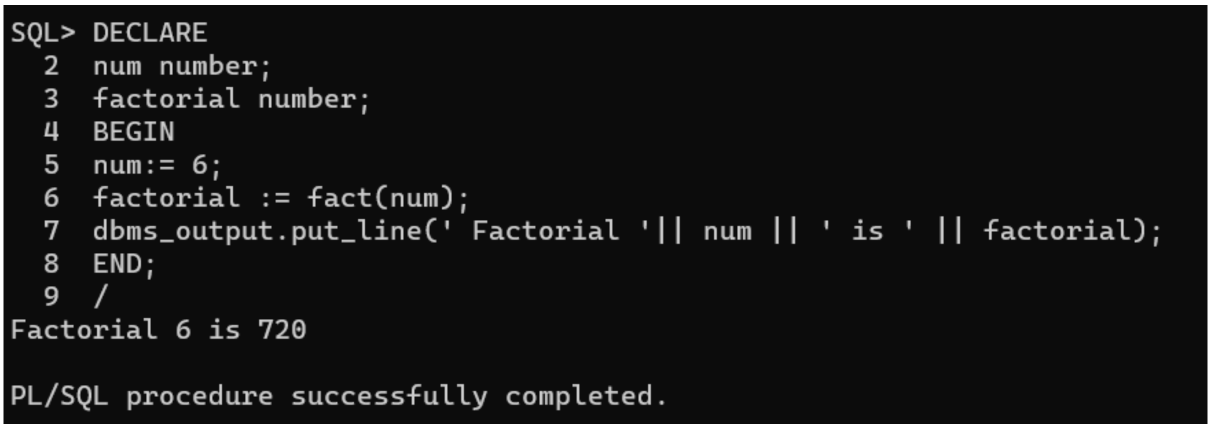
Recursive function is a **function** which either calls itself

EXAMPLE



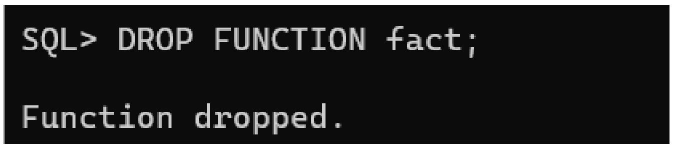
```
SQL> CREATE FUNCTION fact(x number)
RETURN number
IS
f number;
BEGIN
IF x=0 THEN
f := 1;
ELSE
f := x * fact(x-1);
END IF;
RETURN f;
END;
/

Function created.
```

Execution Procedure:



```
SQL> DECLARE
num number;
factorial number;
BEGIN
num:= 6;
factorial := fact(num);
dbms_output.put_line(' Factorial '|| num || ' is ' || factorial);
END;
/
Factorial 6 is 720

PL/SQL procedure successfully completed.
```

DROP FUNCTION



```
SQL> DROP FUNCTION fact;

Function dropped.
```

CONCCLUSION:

In this lab, we successfully practice how to write PL/SQL program to implement Stored Function on table.

N. Pavithra I224G1A0569 DATE : 07-12-2023

EXPERIMENT – 15

Write PL/SQL program to implement Trigger on table.

AIM:

To write PL/SQL program to implement Trigger on table.

PROGRAM DESCRIPTION:

In this lab, we practice how to write PL/SQL program to implement Trigger on table.

Trigger is invoked by Oracle engine automatically whenever a specified event occurs. Trigger is stored into database and invoked repeatedly, when specific condition match. Triggers are stored programs, which are automatically executed or fired when some event occurs. Triggers are written to be executed in response to any of the following events.

1.A database manipulation (DML) statement (DELETE, INSERT, or UPDATE).

2.A database definition (DDL) statement (CREATE, ALTER, or DROP).

3.A database operation (SERVERERROR, LOGON, LOGOFF, STARTUP, or SHUTDOWN).

SYNTAX:

```
CREATE [OR REPLACE ] TRIGGER TRIGGER_NAME
{BEFORE | AFTER | INSTEAD OF }
{INSERT [OR] | UPDATE [OR] | DELETE}
[OF COL_NAME]
ON TABLE_NAME
[REFERENCING OLD AS O NEW AS N]
[FOR EACH ROW]
WHEN (CONDITION)
DECLARE
DECLARATION-STATEMENTS
BEGIN
```

EXECUTABLE-STATEMENTS

EXCEPTION

EXCEPTION-HANDLING-STATEMENTS

END;

CREATE [OR REPLACE] TRIGGER Trigger_ name:

It creates or replaces an existing trigger with the trigger_ name.

{BEFORE | AFTER | INSTEAD OF} :

This specifies when the trigger would be executed. The INSTEAD OF clause is used for

creating trigger on a view.

{INSERT [OR] | UPDATE [OR] | DELETE}:

This specifies the DML operation.

[OF col_ name]:

This specifies the column name that would be updated.

[ON table_ name]:

This specifies the name of the table associated with the trigger.

[REFERENCING OLD AS o NEW AS n]:

This allows you to refer new and old values for various DML statements, like INSERT,

UPDATE, and DELETE.

[FOR EACH ROW]:

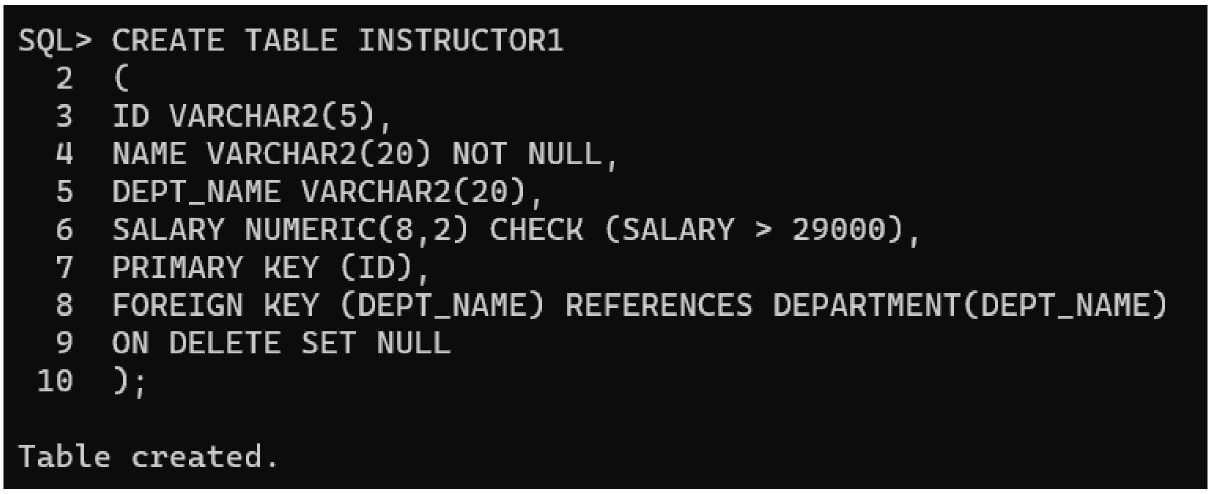
This specifies a row level trigger, i.e., the trigger would be executed for each row being affected. Otherwise the trigger will execute just once when the SQL statement is executed, which is called a table level trigger.

WHEN (condition):

This provides a condition for rows for which the trigger would fire. This clause is valid only for row level triggers.

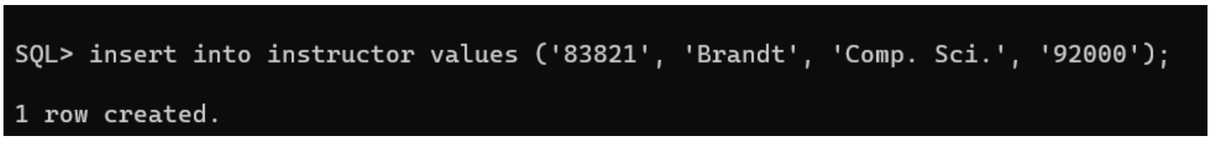
PL/SQl Trigger Example:

Instructor Table



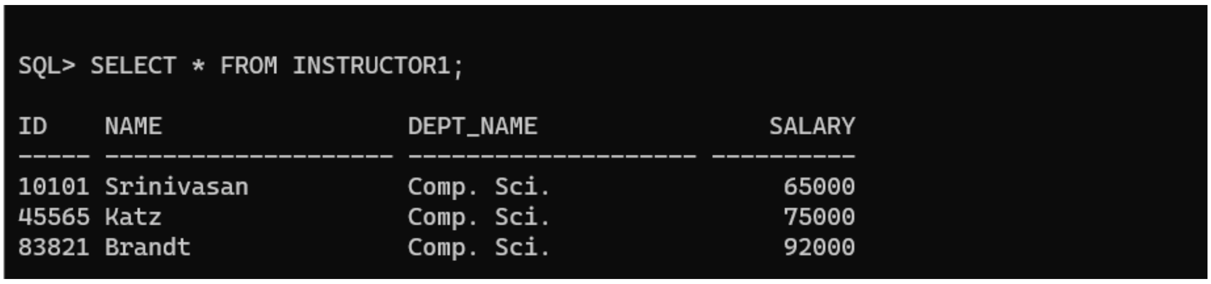
```
SQL> CREATE TABLE INSTRUCTOR1
     (
     ID VARCHAR2(5),
     NAME VARCHAR2(20) NOT NULL,
     DEPT_NAME VARCHAR2(20),
     SALARY NUMERIC(8,2) CHECK (SALARY > 29000),
     PRIMARY KEY (ID),
     FOREIGN KEY (DEPT_NAME) REFERENCES DEPARTMENT(DEPT_NAME)
     ON DELETE SET NULL
     );

Table created.
```

INSTANCES OF INSTRUCTOR TABLE



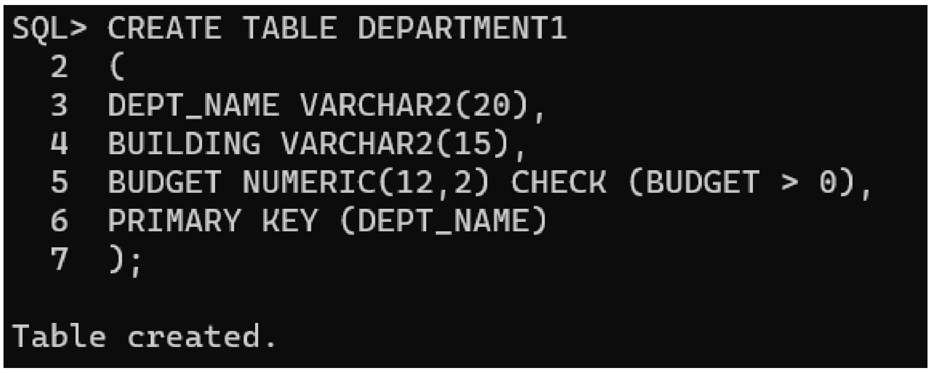
```
SQL> insert into instructor values ('83821', 'Brandt', 'Comp. Sci.', '92000');

1 row created.
```

SELECT:



```
SQL> SELECT * FROM INSTRUCTOR1;

ID    NAME                 DEPT_NAME                SALARY
----- -------------------- -------------------- ----------
10101 Srinivasan           Comp. Sci.                65000
45565 Katz                 Comp. Sci.                75000
83821 Brandt               Comp. Sci.                92000
```

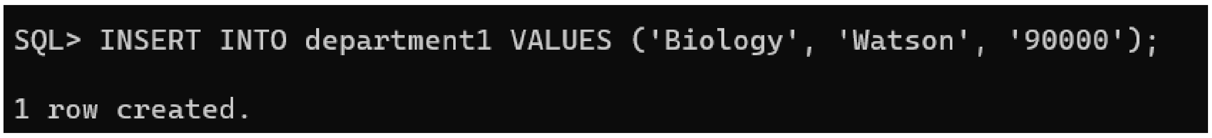
DEPARTMENT TABLE:



```
SQL> CREATE TABLE DEPARTMENT1
     (
     DEPT_NAME VARCHAR2(20),
     BUILDING VARCHAR2(15),
     BUDGET NUMERIC(12,2) CHECK (BUDGET > 0),
     PRIMARY KEY (DEPT_NAME)
     );

Table created.
```

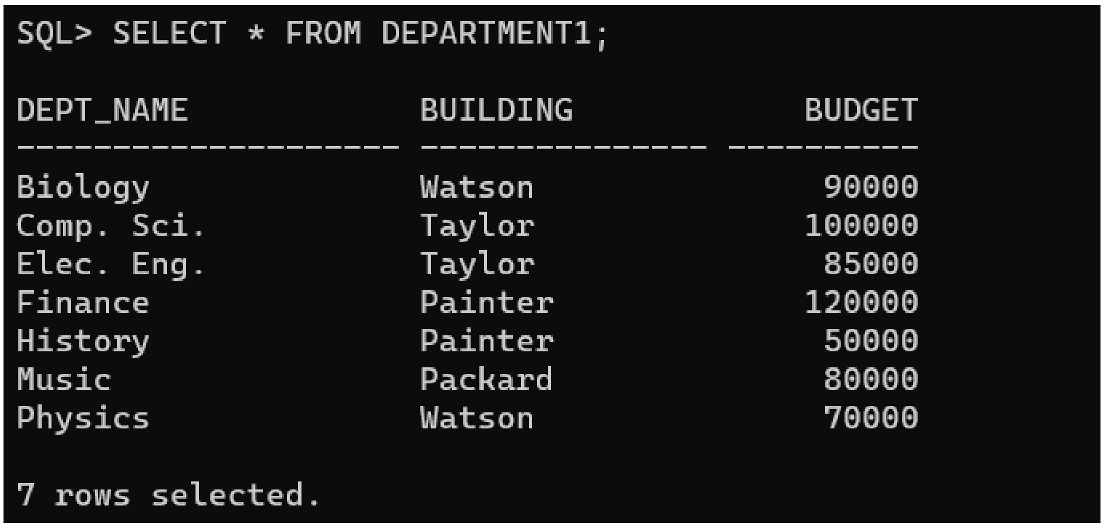
N. Pavithra I224G1A0569 DATE : 07-12-2023

INSTANCES OF DEPARTMENT TABLE:



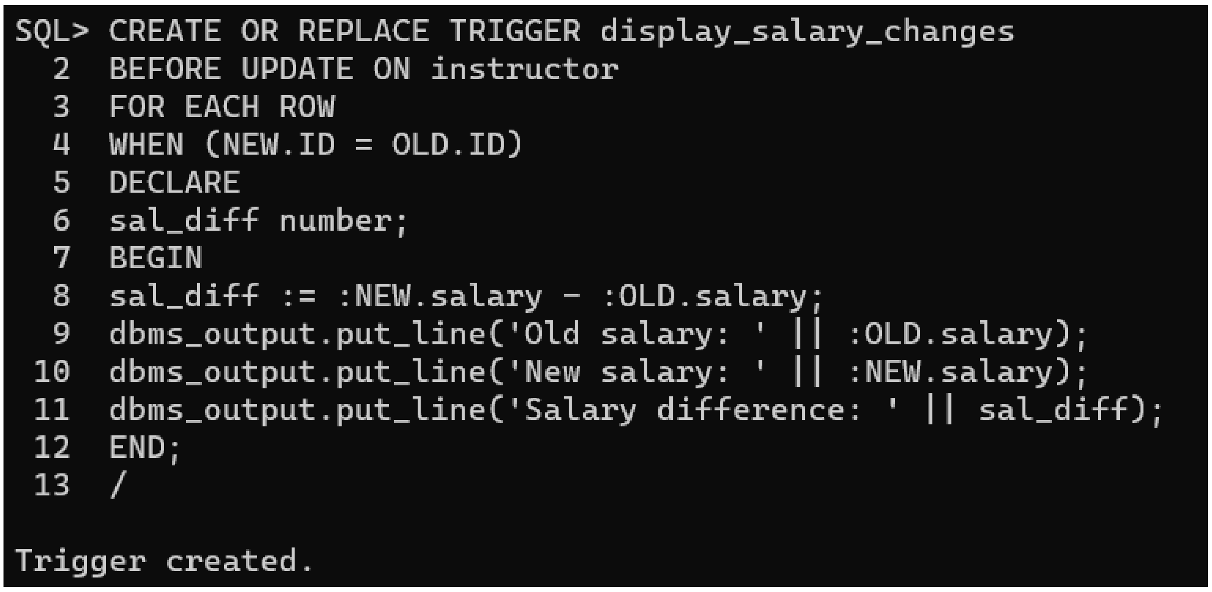
```
SQL> INSERT INTO department1 VALUES ('Biology', 'Watson', '90000');

1 row created.
```

SELECT:



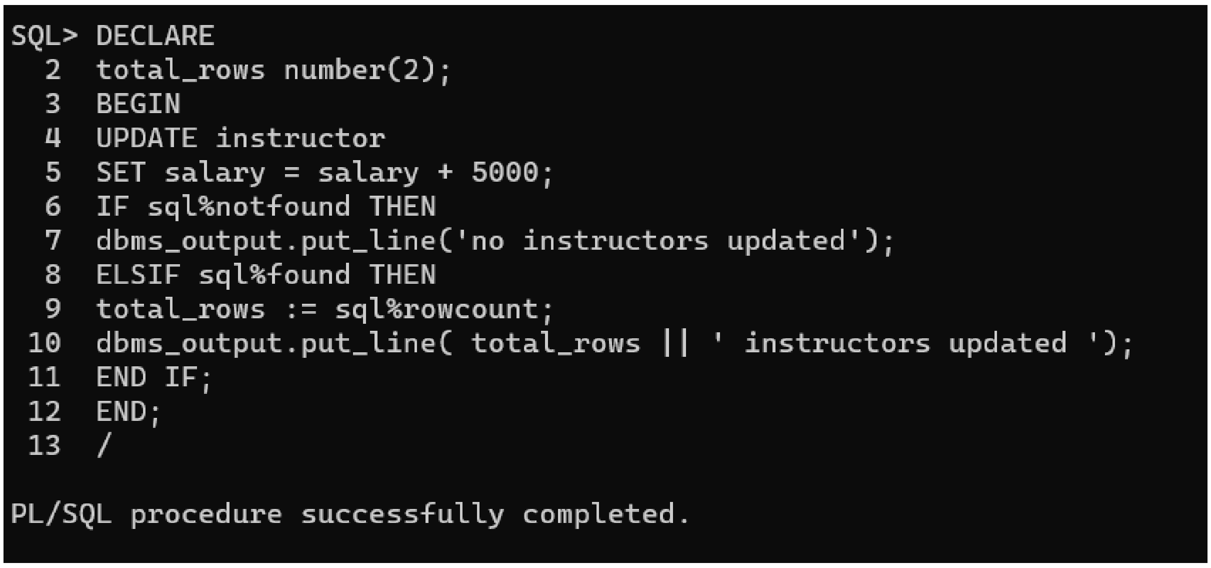
```
SQL> SELECT * FROM DEPARTMENT1;

DEPT_NAME            BUILDING            BUDGET
-------------------- --------------- ----------
Biology              Watson               90000
Comp. Sci.           Taylor              100000
Elec. Eng.           Taylor               85000
Finance              Painter             120000
History              Painter              50000
Music                Packard              80000
Physics              Watson               70000

7 rows selected.
```

An example to create Trigger:



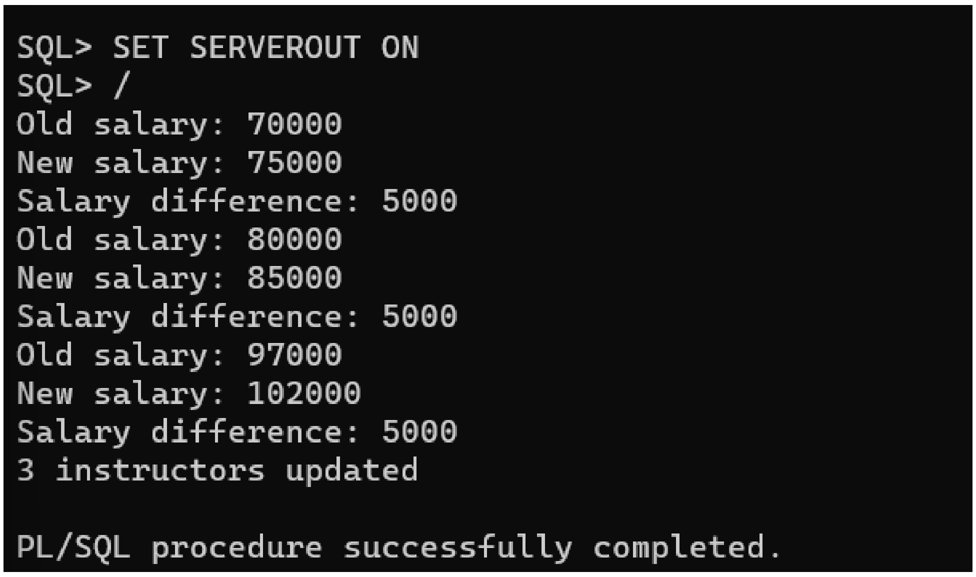
```
SQL> CREATE OR REPLACE TRIGGER display_salary_changes
     BEFORE UPDATE ON instructor
     FOR EACH ROW
     WHEN (NEW.ID = OLD.ID)
     DECLARE
     sal_diff number;
     BEGIN
     sal_diff := :NEW.salary - :OLD.salary;
     dbms_output.put_line('Old salary: ' || :OLD.salary);
     dbms_output.put_line('New salary: ' || :NEW.salary);
     dbms_output.put_line('Salary difference: ' || sal_diff);
     END;
     /

Trigger created.
```

A PL/SQL Procedure to execute a trigger



```
SQL> DECLARE
total_rows number(2);
BEGIN
UPDATE instructor
SET salary = salary + 5000;
IF sql%notfound THEN
dbms_output.put_line('no instructors updated');
ELSIF sql%found THEN
total_rows := sql%rowcount;
dbms_output.put_line( total_rows || ' instructors updated ');
END IF;
END;
/

PL/SQL procedure successfully completed.
```

OUTPUT:



```
SQL> SET SERVEROUT ON
SQL> /
Old salary: 70000
New salary: 75000
Salary difference: 5000
Old salary: 80000
New salary: 85000
Salary difference: 5000
Old salary: 97000
New salary: 102000
Salary difference: 5000
3 instructors updated

PL/SQL procedure successfully completed.
```

SQL%FOUND, SQL%NOTFOUND, and SQL%ROWCOUNT are PL/SQL attributes that can be used to determine the effect of an SQL statement.

The SQL%FOUND attribute has a Boolean value that returns TRUE if at least one row was affected by an INSERT, UPDATE, or DELETE statement, or if a SELECT INTO statement retrieved one row.

The SQL%NOTFOUND attribute has a Boolean value that returns TRUE if no rows were affected by an INSERT, UPDATE, or DELETE statement, or if a SELECT INTO statement did not retrieve a row.

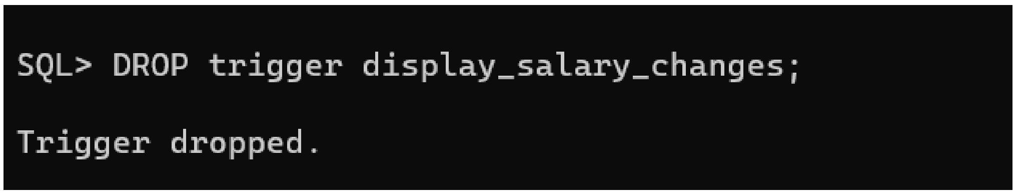
The SQL%ROWCOUNT attribute has an integer value that represents the number of rows that were affected by an INSERT, UPDATE, or DELETE statement.

DROP the Trigger

Syntax:

DROP trigger trigger _ name;

EXAMPLE:



```
SQL> DROP trigger display_salary_changes;

Trigger dropped.
```

CONCLUSION:

In this lab, we successfully practice how to write PL/SQL program to implement Trigger on table.

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EXPERIMENT – 16

Write PL/SQL program to implement Cursor on table.

AIM:

To write PL/SQL program to implement Cursor on table.

PROGRAM DESCRIPTION:

In this lab, we practice how to write PL/SQL program to implement Cursor on table.

When an SQL statement is processed, Oracle creates a memory area known as context area. A cursor is a pointer to this context area. It contains all information needed for processing the statement. In PL/SQL, the context area is controlled by Cursor. A cursor contains information on a select statement and the rows of data accessed by it.

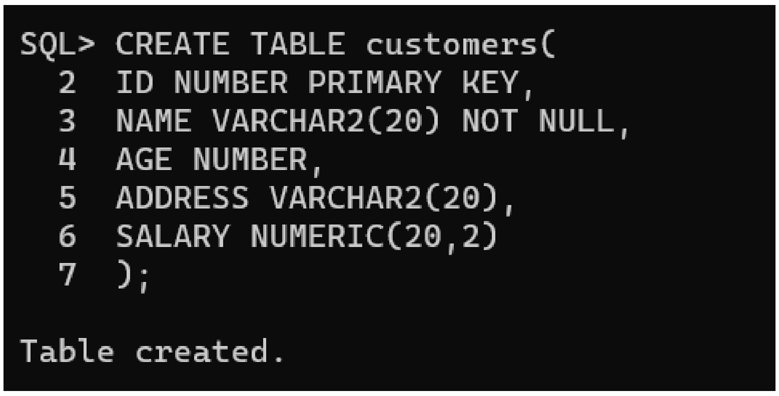
Types of Cursor

1. Implicit cursor

2. Explicit cursor

The implicit cursors are automatically generated by Oracle while an SQL statement is executed, if you don't use an explicit cursor for the statement.

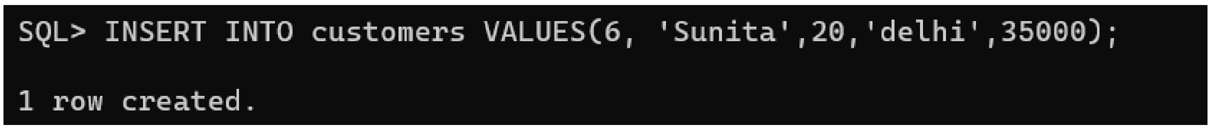
Table Creation:



```
SQL> CREATE TABLE customers(
  2  ID NUMBER PRIMARY KEY,
  3  NAME VARCHAR2(20) NOT NULL,
  4  AGE NUMBER,
  5  ADDRESS VARCHAR2(20),
  6  SALARY NUMERIC(20,2)
  7  );

Table created.
```

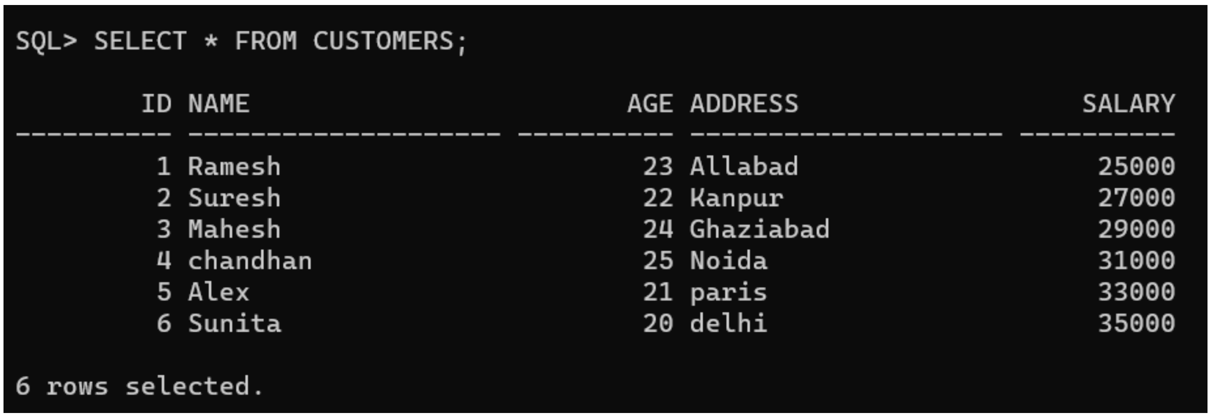
Instances of Customers:



```
SQL> INSERT INTO customers VALUES(6, 'Sunita',20,'delhi',35000);

1 row created.
```

SELECT:



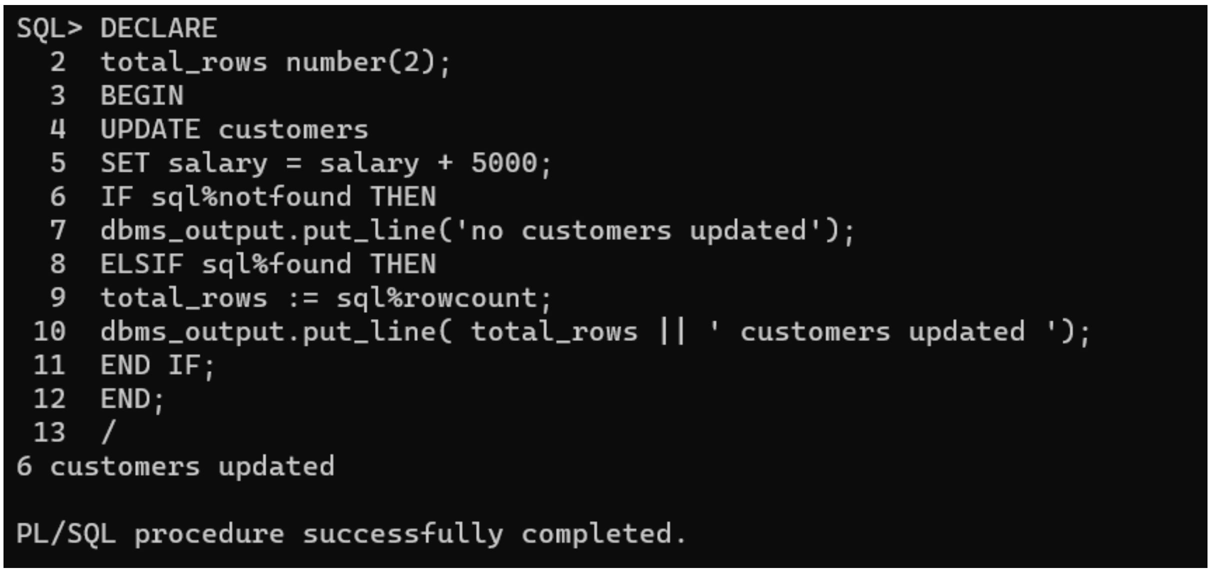
```
SQL> SELECT * FROM CUSTOMERS;

        ID NAME                                  AGE ADDRESS                  SALARY
---------- -------------------- ---------- -------------------- ----------
         1 Ramesh                                 23 Allabad                   25000
         2 Suresh                                 22 Kanpur                    27000
         3 Mahesh                                 24 Ghaziabad                 29000
         4 chandhan                               25 Noida                     31000
         5 Alex                                   21 paris                     33000
         6 Sunita                                 20 delhi                     35000

6 rows selected.
```

Create update procedure

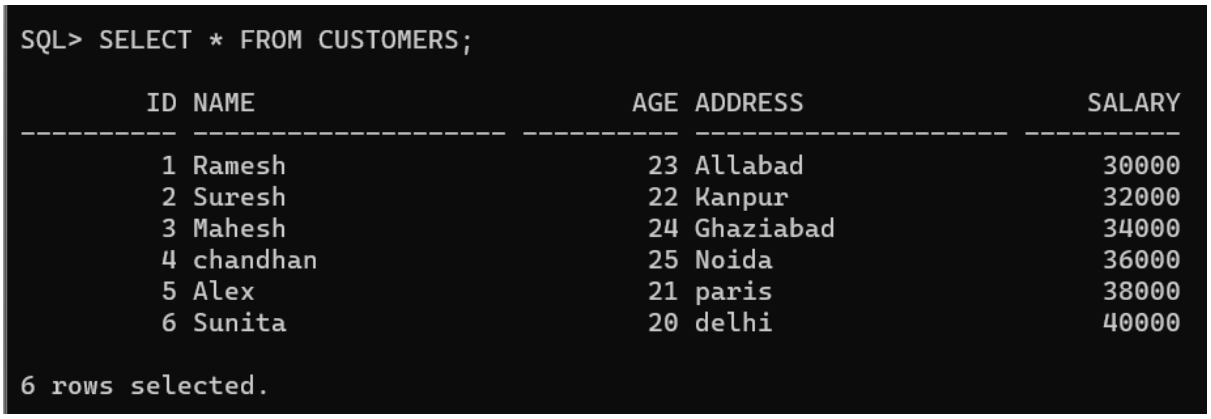
Create procedure:



```
SQL> DECLARE
total_rows number(2);
BEGIN
UPDATE customers
SET salary = salary + 5000;
IF sql%notfound THEN
dbms_output.put_line('no customers updated');
ELSIF sql%found THEN
total_rows := sql%rowcount;
dbms_output.put_line( total_rows || ' customers updated ');
END IF;
END;
/
6 customers updated

PL/SQL procedure successfully completed.
```

SELECT:



```
SQL> SELECT * FROM CUSTOMERS;

        ID NAME                                  AGE ADDRESS                  SALARY
---------- -------------------- ---------- -------------------- ----------
         1 Ramesh                                 23 Allabad                   30000
         2 Suresh                                 22 Kanpur                    32000
         3 Mahesh                                 24 Ghaziabad                 34000
         4 chandhan                               25 Noida                     36000
         5 Alex                                   21 paris                     38000
         6 Sunita                                 20 delhi                     40000

6 rows selected.
```

PL/SQL Explicit Cursors

The Explicit cursors are defined by the programmers to gain more control over the context area. These cursors should be defined in the declaration section of the PL/SQL block. It is created on a SELECT statement which returns more than one row.

SYNTAX:

CURSOR cursor_ name IS select_ statement;

Steps:

You must follow these steps while working with an explicit cursor.

1. Declare the cursor to initialize in the memory.
2. Open the cursor to allocate memory.
3. Fetch the cursor to retrieve data.
4. Close the cursor to release allocated memory.

1) Declare the cursor:

SYNTAX:

CURSOR cursor _ name IS select_ statement;

2) Open the cursor:

It is used to allocate memory for the cursor and make it easy to fetch the rows returned by the SQL statements into it.

SYNTAX:

OPEN cursor_ name;

3) Fetch the cursor:

It is used to access one row at a time. You can fetch rows from the above opened cursor as follows:

SYNTAX:

FETCH cursor_ name INTO variable _ list;

4) Close the cursor:

It is used to release the allocated memory. The following syntax is used to close the above opened cursors.

SYNTAX:

Close cursor_ name;

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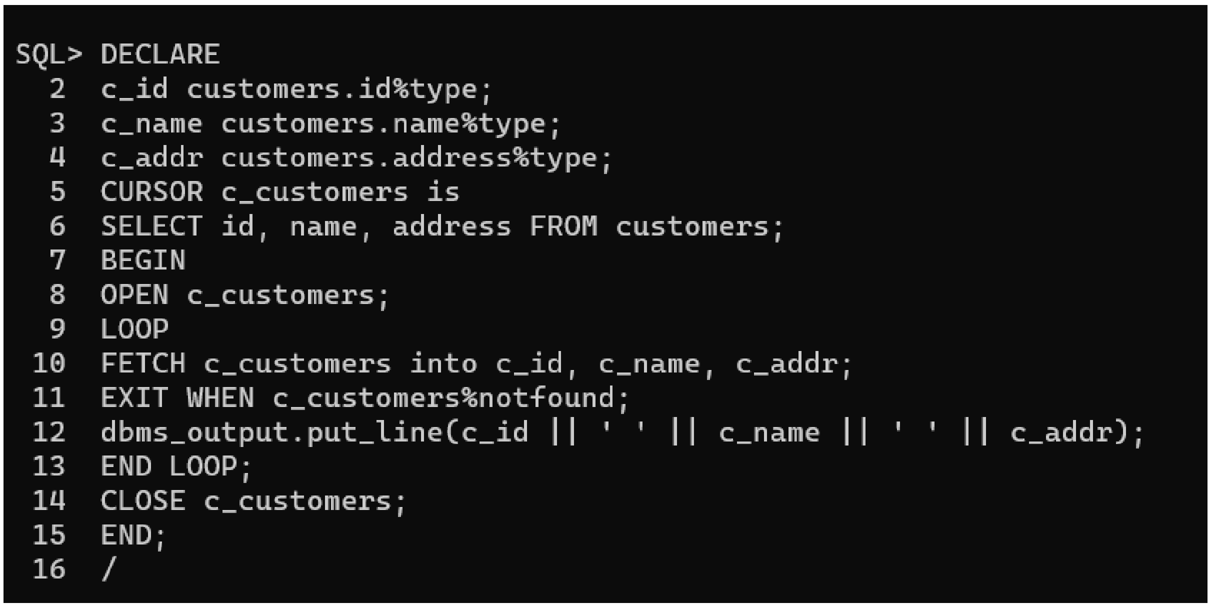
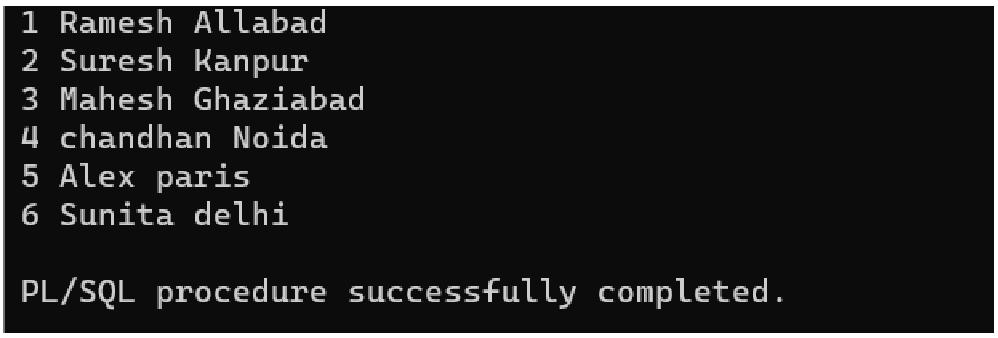
PL/SQL Program using Explicit Cursors



```
SQL> DECLARE
c_id customers.id%type;
c_name customers.name%type;
c_addr customers.address%type;
CURSOR c_customers is
SELECT id, name, address FROM customers;
BEGIN
OPEN c_customers;
LOOP
FETCH c_customers into c_id, c_name, c_addr;
EXIT WHEN c_customers%notfound;
dbms_output.put_line(c_id || ' ' || c_name || ' ' || c_addr);
END LOOP;
CLOSE c_customers;
END;
/
```

OUTPUT:



```
1 Ramesh Allabad
2 Suresh Kanpur
3 Mahesh Ghaziabad
4 chandhan Noida
5 Alex paris
6 Sunita delhi

PL/SQL procedure successfully completed.
```