DEPARTMENT OF COMPUTER SYSTEMS ENGINEERING
MEHRAN UNIVERSITY OF ENGINEERING & TECHNOLOGY, JAMSHORO
Database Management Systems (4th Semester) 18CS
Lab Experiment 13

Roll No: **Date of Conduct:**

Submission Date: **Grade Obtained:**

Problem Recognition (0.3)	Completeness & accuracy (0.4)	Timeliness (0.3)	Score (1.0)

Objective: To create and use Cursors in PL/SQL

Tools: MYSQL Oracle.

Introduction:

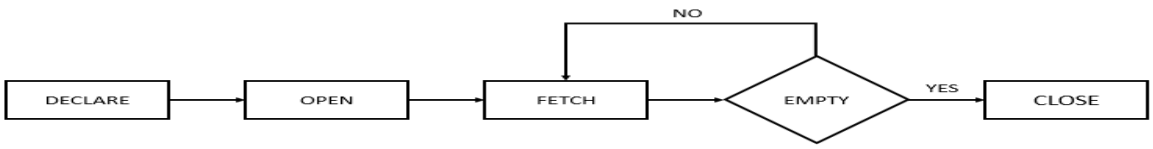
Cursors : A **cursor** is a pointer to this context area. PL/SQL controls the context area through a cursor. A cursor holds the rows (one or more) returned by a SQL statement. The set of rows the cursor holds is referred to as the **active set**.

You can name a cursor so that it could be referred to in a program to fetch and process the rows returned by the SQL statement, one at a time. There are two types of cursors.

- Implicit cursors
- Explicit cursors

Implicit cursors: Whenever Oracle executes an SQL statement such as SELECT INTO, INSERT, UPDATE, and DELETE, it automatically creates an implicit cursor.
Oracle internally manages the whole execution cycle of implicit cursors and reveals only the cursor's information and statuses such as SQL%ROWCOUNT, SQL%ISOPEN, SQL%FOUND, and SQL%NOTFOUND.
The implicit cursor is not elegant when the query returns zero or multiple rows which cause NO_DATA_FOUND or TOO_MANY_ROWS exception respectively.

Explicit cursors: An explicit cursor is an SELECT statement declared explicitly in the declaration section of the current block or a package specification.
For an explicit cursor, you have control over its execution cycle from OPEN, FETCH, and CLOSE.
Oracle defines an execution cycle that executes an SQL statement and associates a cursor with it. The following illustration shows the execution cycle of an explicit cursor



Explicit Cursor Attributes:

A cursor has four attributes to which you can reference in the following format: `cursor_name%attribute` (where cursor_name is the name of the explicit cursor)

1. **%ISOPEN:**

   This attribute is TRUE if the cursor is open or FALSE if it is not.

2. **%FOUND:**

   This attribute has four values:

   - NULL before the first fetch
   - TRUE if a record was fetched successfully
   - FALSE if no row returned
   - INVALID_CURSOR if the cursor is not opened

3. **%NOTFOUND:**

   This attribute has four values:

   - NULL before the first fetch
   - FALSE if a record was fetched successfully
   - TRUE if no row returned
   - INVALID_CURSOR if the cursor is not opened

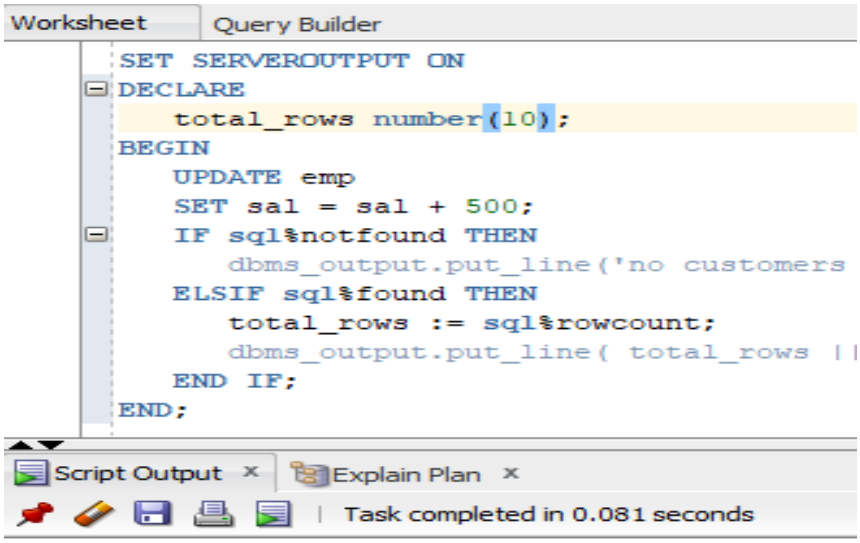
4. **%ROWCOUNT:**

   The %ROWCOUNT attribute returns the number of rows fetched from the cursor. If the cursor is not opened, this attribute returns INVALID_CURSOR.

Lab Task

1. **Write a program in PL/SQL to find the number of rows effected using SQL%ROWCOUNT attributes of an implicit cursor.**

Task:

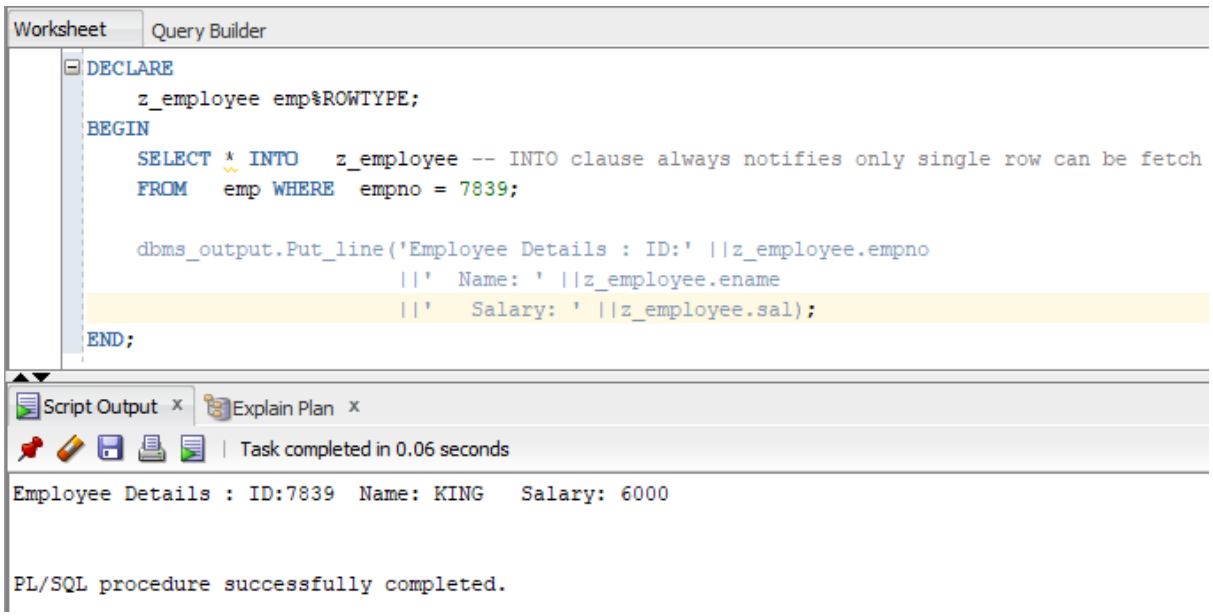



```
14 customers selected


PL/SQL procedure successfully completed.
```

2. **Write a program in PL/SQL to display detail information for the employee of ID 7839 from the employees' table.**

Task:




```
Employee Details : ID:7839  Name: KING   Salary: 6000


PL/SQL procedure successfully completed.
```

3. Write a program in PL/SQL to display detail information of all employees from employees table using explicit cursor.

Task:

```
DECLARE
    CURSOR z_emp_info IS
      SELECT empno,ename,sal
      FROM   emp;
    r_emp_info z_emp_info%ROWTYPE;
BEGIN
    OPEN z_emp_info;
    LOOP
        FETCH z_emp_info INTO r_emp_info;
        EXIT WHEN z_emp_info%NOTFOUND;
        dbms_output.Put_line('Employees Information:: '
                             ||'  ID: '
                             ||r_emp_info.empno
                             ||'  Name: '
                             ||r_emp_info.ename
                             ||' SALARY '
                             ||r_emp_info.sal);
    END LOOP;
    dbms_output.Put_line('Total number of rows : '||z_emp_info%rowcount);
    CLOSE z_emp_info;
END;
```

Script Output | Explain Plan

Task completed in 0.078 seconds

```
Employees Information::   ID: 7839  Name: KING SALARY 6000
Employees Information::   ID: 7698  Name: BLAKE SALARY 3850
Employees Information::   ID: 7782  Name: CLARK SALARY 3450
Employees Information::   ID: 7566  Name: JONES SALARY 3975
Employees Information::   ID: 7722  Name: SCOTT SALARY 4000
Employees Information::   ID: 7902  Name: FORD SALARY 4000
Employees Information::   ID: 7369  Name: SMITH SALARY 1800
Employees Information::   ID: 7499  Name: ALLEN SALARY 2600
Employees Information::   ID: 7521  Name: WARD SALARY 2250
Employees Information::   ID: 7654  Name: MARTIN SALARY 2250
Employees Information::   ID: 7844  Name: TURNER SALARY 2500
Employees Information::   ID: 7876  Name: ADAMS SALARY 2100
Employees Information::   ID: 7900  Name: JAMES SALARY 1950
Employees Information::   ID: 7934  Name: MILLER SALARY 2300
Total number of rows : 14


PL/SQL procedure successfully completed.
```

4. **Write a PL/SQL block that uses explicit cursors to retrieve employees one by one and displays the name and salary of those employees currently working in deptno 30.**

Task:

```
DECLARE
    CURSOR z_emp_info IS
      SELECT deptno,ename,sal
      FROM   emp where deptno=30;
    r_emp_info z_emp_info%ROWTYPE;
BEGIN
    OPEN z_emp_info;
    LOOP
        FETCH z_emp_info INTO r_emp_info;
        EXIT WHEN z_emp_info%NOTFOUND;
        dbms_output.Put_line('Name: '||r_emp_info.ename
                             ||'  SALARY: ' ||r_emp_info.sal||
                             '  DEPTNO: ' ||r_emp_info.deptno);
    END LOOP;
    dbms_output.Put_line('Total number of rows : '||z_emp_info%rowcount);
    CLOSE z_emp_info;
```

Script Output x | Explain Plan x

Task completed in 0.077 seconds

```
Name: BLAKE  SALARY: 3850  DEPTNO: 30
Name: ALLEN  SALARY: 2600  DEPTNO: 30
Name: WARD  SALARY: 2250  DEPTNO: 30
Name: MARTIN  SALARY: 2250  DEPTNO: 30
Name: TURNER  SALARY: 2500  DEPTNO: 30
Name: JAMES  SALARY: 1950  DEPTNO: 30
Total number of rows : 6


PL/SQL procedure successfully completed.
```