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:

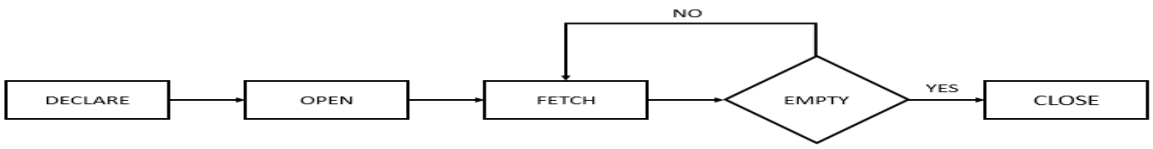
Cursors : A **cursor** is a pointer to this context area. PL/SQL controls the context area through a cursor. A cursor holds the rows (one or more) returned by a SQL statement. The set of rows the cursor holds is referred to as the **active set**.

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:

```
DECLARE
  mgr_no NUMBER(6) := 7839;
BEGIN
  DELETE FROM employee WHERE mgr = mgr_no;
  DBMS_OUTPUT.PUT_LINE
    ('Number of employees deleted: ' || TO_CHAR(SQL%ROWCOUNT));
END;
/
SET SERVEROUTPUT ON;
-----18CS31------
```

Script Output | Task completed in 0.108 seconds

```
Number of employees deleted: 3


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:

Worksheet | Query Builder

```
DECLARE
    z_employee emp%ROWTYPE;
BEGIN
    SELECT * INTO   z_employee -- INTO clause always notifies only single row can be fetch
    FROM   employee WHERE  empno = 7839;

    dbms_output.Put_line('Employee Details :   ID:' ||z_employee.empno
                         ||'  Name: ' ||z_employee.ename
                         ||'  Salary:  ' ||z_employee.sal
                         ||'  Hire date:  ' ||z_employee.hiredate
                         ||'  DEPTNO:  ' ||z_employee.deptno);
END;
/
SET SERVEROUTPUT ON;
-----18CS31------
```

Script Output | Task completed in 0.203 seconds

```
Employee Details :   ID:7839  Name: KING  Salary:  5000  Hire date:  17-NOV-81  DEPTNO:  10


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,JOB_ID,COMM
            HIREDATE,SAL,DEPTNO
      FROM   employee;
    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('Employee Details :   ID:' ||r_emp_info.empno
                        ||'  Name: ' ||r_emp_info.ename||'  JOB ID:  ' ||r_emp_info.JOB_ID
                        ||'  Hire date:  ' ||r_emp_info.hiredate
                        ||'  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;
END;
/
SET SERVEROUTPUT ON;
-----18CS31------
```

Script Output

Task completed in 0.096 seconds

```
Employee Details :   ID:7839  Name: KING  JOB ID:  PRESIDENT  Hire date:    Salary:  5000  DEPTNO:  10
Employee Details :   ID:7698  Name: BLAKE  JOB ID:  MANAGER  Hire date:    Salary:  2850  DEPTNO:  30
Employee Details :   ID:7782  Name: CLARK  JOB ID:  MANAGER  Hire date:    Salary:  2450  DEPTNO:  10
Employee Details :   ID:7566  Name: JONES  JOB ID:  MANAGER  Hire date:    Salary:  2975  DEPTNO:  20
Employee Details :   ID:7722  Name: SCOTT  JOB ID:  ANALYST  Hire date:    Salary:  3000  DEPTNO:  20
Employee Details :   ID:7902  Name: FORD  JOB ID:  ANALYST  Hire date:    Salary:  3000  DEPTNO:  20
Employee Details :   ID:7369  Name: SMITH  JOB ID:  CLERK  Hire date:    Salary:  800  DEPTNO:  20
Employee Details :   ID:7499  Name: ALLEN  JOB ID:  SALESMAN  Hire date:  300  Salary:  1600  DEPTNO:  30
Employee Details :   ID:7521  Name: WARD  JOB ID:  SALESMAN  Hire date:  500  Salary:  1250  DEPTNO:  30
Employee Details :   ID:7654  Name: MARTIN  JOB ID:  SALESMAN  Hire date:  1400  Salary:  1250  DEPTNO:  30
Employee Details :   ID:7844  Name: TURNER  JOB ID:  SALESMAN  Hire date:  0  Salary:  1500  DEPTNO:  30
Employee Details :   ID:7876  Name: ADAMS  JOB ID:  CLERK  Hire date:    Salary:  1100  DEPTNO:  20
Employee Details :   ID:7900  Name: JAMES  JOB ID:  CLERK  Hire date:    Salary:  950  DEPTNO:  30
Employee Details :   ID:7934  Name: MILLER  JOB ID:  CLERK  Hire date:    Salary:  1300  DEPTNO:  10
Total number of rows : 14
```

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 empno,ename,SAL,DEPTNO
      FROM   employee 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('Employee Details :   ID:' ||r_emp_info.empno
                        ||'  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;
END;
/
SET SERVEROUTPUT ON;
-----18CS31------
```

Script Output

Task completed in 0.124 seconds

```
Employee Details :   ID:7698  Name: BLAKE  Salary:  2850  DEPTNO:  30
Employee Details :   ID:7499  Name: ALLEN  Salary:  1600  DEPTNO:  30
Employee Details :   ID:7521  Name: WARD  Salary:  1250  DEPTNO:  30
Employee Details :   ID:7654  Name: MARTIN  Salary:  1250  DEPTNO:  30
Employee Details :   ID:7844  Name: TURNER  Salary:  1500  DEPTNO:  30
Employee Details :   ID:7900  Name: JAMES  Salary:  950  DEPTNO:  30
Total number of rows : 6
```