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Interacting with the Oracle Server

ORACLE®

Objectives

After completing this lesson, you should be able to do the following:

- Write a successful SELECT statement in PL/SQL
- Declare the datatype and size of a PL/SQL variable dynamically
- Write DML statements in PL/SQL
- Control transactions in PL/SQL
- Determine the outcome of SQL DML statements

SQL Statements in PL/SQL

- Extract a row of data from the database by using the SELECT command. Only a single set of values can be returned.
- Make changes to rows in the database by using DML commands.
- Control a transaction with the COMMIT, ROLLBACK, or SAVEPOINT command.
- Determine DML outcome with implicit cursors.

SELECT Statements in PL/SQL

Retrieve data from the database with SELECT.

Syntax

```
SELECT select_list
INTO    {variable_name[, variable_name]...
        | record_name}
FROM    table
WHERE   condition;
```

SELECT Statements in PL/SQL

INTO clause is required.

Example

```
DECLARE
   v_deptno    NUMBER(2);
   v_loc       VARCHAR2(15);
BEGIN
   SELECT      deptno, loc
     INTO      v_deptno, v_loc
   FROM        dept
   WHERE       dname = 'SALES';
...
END;
```

Retrieving Data in PL/SQL

Retrieve the order date and the ship date for the specified order.

Example

```
DECLARE
  v_orderdate   ord.orderdate%TYPE;
  v_shipdate    ord.shipdate%TYPE;
BEGIN
  SELECT   orderdate, shipdate
    INTO   v_orderdate, v_shipdate
  FROM     ord
  WHERE    id = 157;
       ...
END;
```

Retrieving Data in PL/SQL

Return the sum of the salaries for all employees in the specified department.

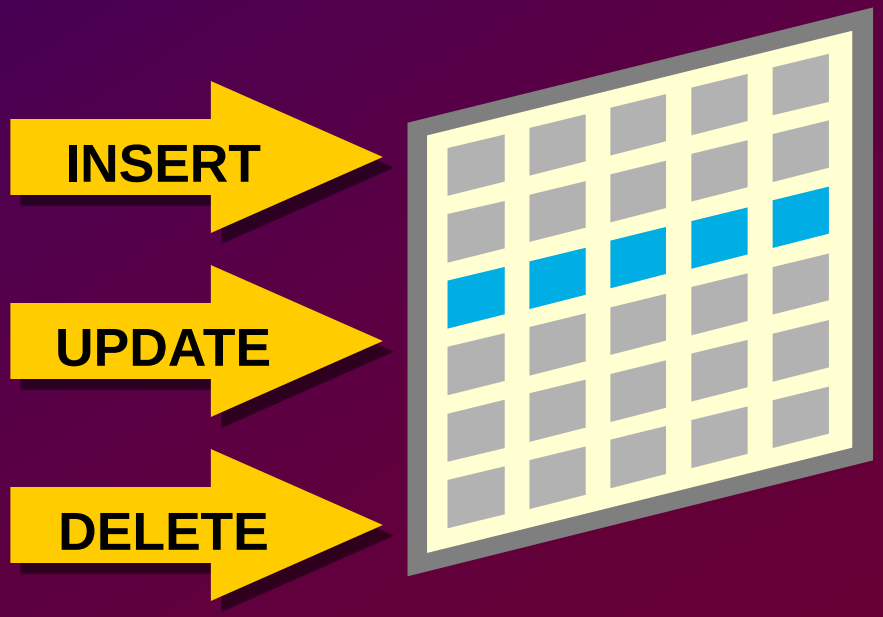
Example

```
DECLARE
  v_sum_sal    emp.sal%TYPE;
  v_deptno     NUMBER NOT NULL := 10;
BEGIN
  SELECT       SUM(sal)   -- group function
    INTO       v_sum_sal
  FROM         emp
  WHERE        deptno = v_deptno;
END;
```

Manipulating Data Using PL/SQL

Make changes to database tables by using DML commands:

- INSERT
- UPDATE
- DELETE



Inserting Data

Add new employee information to the emp table.

Example

```
DECLARE
  v_empno       emp.empno%TYPE;
BEGIN
  SELECT        empno_sequence.NEXTVAL
    INTO        v_empno
    FROM        dual;
  INSERT INTO   emp(empno, ename, job, deptno)
    VALUES(v_empno, 'HARDING', 'CLERK', 10);
END;
```

Updating Data

Increase the salary of all employees in the emp table who are Analysts.

Example

```
DECLARE
  v_sal_increase   emp.sal%TYPE := 2000;
BEGIN
  UPDATE      emp
    SET       sal = sal + v_sal_increase
    WHERE     job = 'ANALYST';
END;
```

Deleting Data

Delete rows that have belong to department 10 from the emp table.

Example

```
DECLARE
  v_deptno    emp.deptno%TYPE := 10;
BEGIN
  DELETE FROM emp
    WHERE deptno = v_deptno;
END;
```

Naming Conventions

- Use a naming convention to avoid ambiguity in the WHERE clause.
- Database columns and identifiers should have distinct names.
- Syntax errors can arise because PL/SQL checks the database first for a column in the table.

Naming Conventions

```
DECLARE
   order_date  ord.orderdate%TYPE;
   ship_date   ord.shipdate%TYPE;
   v_date DATE := SYSDATE;
BEGIN
   SELECT orderdate, shipdate
   INTO   order_date, ship_date
   FROM   ord
   WHERE  shipdate = v_date;
END;
SQL> /
DECLARE
*
ERROR at line 1:
ORA-01403: no data found
ORA-06512: at line 6
```

COMMIT and ROLLBACK Statements

- Initiate a transaction with the first DML command to follow a COMMIT or ROLLBACK.
- Use COMMIT and ROLLBACK SQL statements to terminate a transaction explicitly.

SQL Cursor

- A cursor is a private SQL work area.
- There are two types of cursors:
  - Implicit cursors
  - Explicit cursors
- The Oracle Server uses implicit cursors to parse and execute your SQL statements.
- Explicit cursors are explicitly declared by the programmer.

SQL Cursor Attributes

Using SQL cursor attributes, you can test the outcome of your SQL statements.

SQL%ROWCOUNT	Number of rows affected by the most recent SQL statement (an integer value).
SQL%FOUND	Boolean attribute that evaluates to TRUE if the most recent SQL statement affects one or more rows.
SQL%NOTFOUND	Boolean attribute that evaluates to TRUE if the most recent SQL statement does not affect any rows.
SQL%ISOPEN	Always evaluates to FALSE because PL/SQL closes implicit cursors immediately after they are executed.

SQL Cursor Attributes

Delete rows that have the specified order number from the ITEM table. Print the number of rows deleted.

Example

```
VARIABLE rows_deleted
DECLARE
  v_ordid  NUMBER := 605;
BEGIN
  DELETE FROM item
  WHERE   ordid = v_ordid;
          rows_deleted := SQL%ROWCOUNT
              ||' rows deleted.');
END;
PRINT rows_deleted
```

Summary

- Embed SQL in the PL/SQL block:
  - SELECT, INSERT, UPDATE, DELETE.
- Embed transaction control statements in a PL/SQL block:
  - COMMIT, ROLLBACK, SAVEPOINT.

Summary

- There are two cursor types: implicit and explicit.
- Implicit cursor attributes verify the outcome of DML statements:
  - SQL%ROWCOUNT
  - SQL%FOUND
  - SQL%NOTFOUND
  - SQL%ISOPEN
- Explicit cursors are defined by the user.

Practice Overview

- Creating a PL/SQL block to select data from a table
- Creating a PL/SQL block to insert data into a table
- Creating a PL/SQL block to update data in a table
- Creating a PL/SQL block to delete a record from a table