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

The 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 = 620;
       ...
END;
```

Retrieving Data in PL/SQL

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

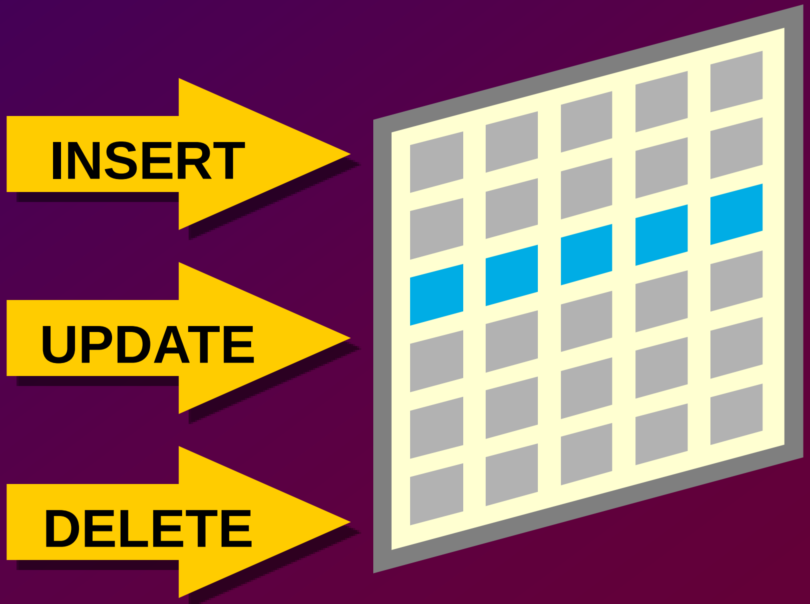
Example

```
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

```
BEGIN
    INSERT INTO emp(empno, ename, job, deptno)
    VALUES(empno_sequence.NEXTVAL, '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 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
   orderdate              ord.orderdate%TYPE;
   shipdate               ord.shipdate%TYPE;
   ordid                  ord.ordid%TYPE := 601;
BEGIN
   SELECT orderdate, shipdate
   INTO   orderdate, shipdate
   FROM   ord
   WHERE  ordid = ordid;
END;
SQL> /
DECLARE
*
ERROR at line 1:
ORA-01422: exact fetch returns more than requested
number of rows
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 VARCHAR2(30)
DECLARE
  v_ordid  NUMBER := 605;
BEGIN
  DELETE FROM  item
  WHERE        ordid = v_ordid;
  :rows_deleted := (SQL%ROWCOUNT ||
                          ' rows deleted.');
END;
/
PRINT rows_deleted
```