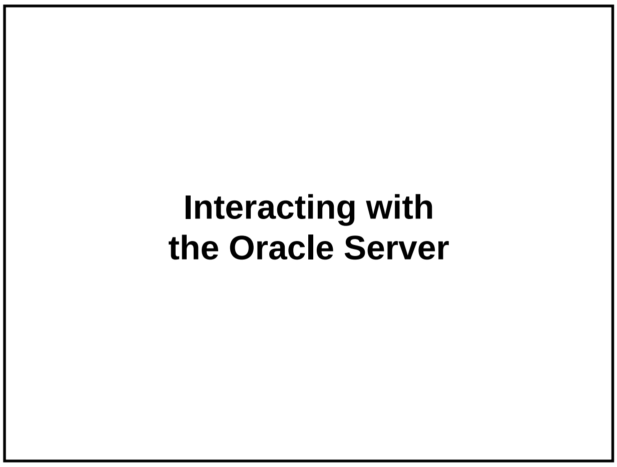
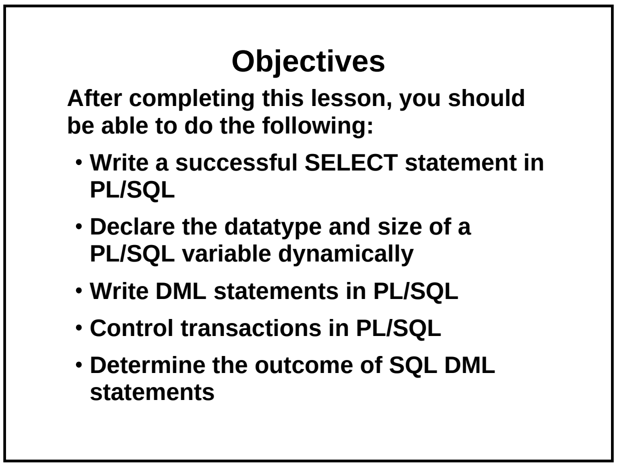


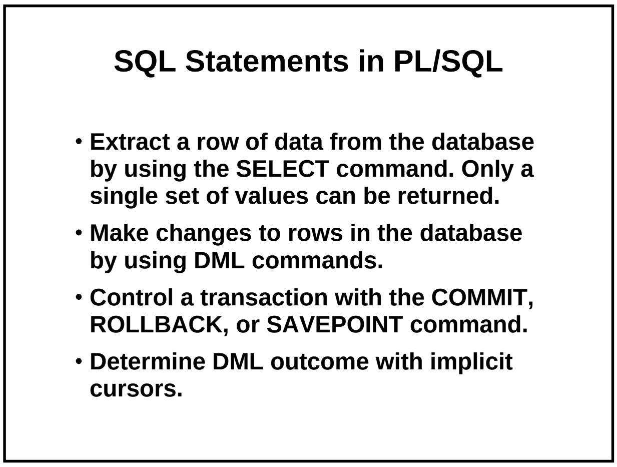
Interacting with the Oracle Server



Objectives

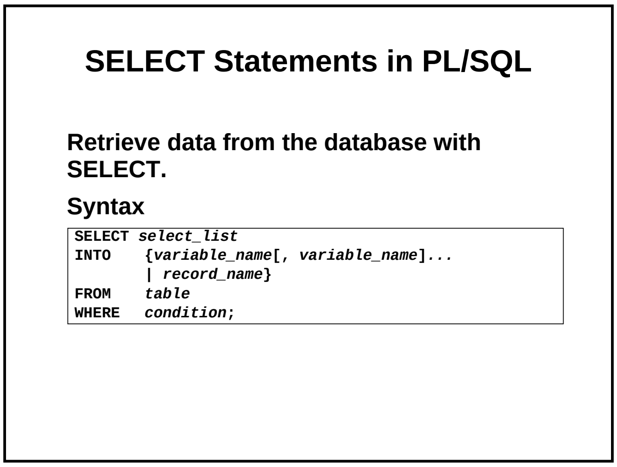
After completing this lesson, you should be able to do the following:

- 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.

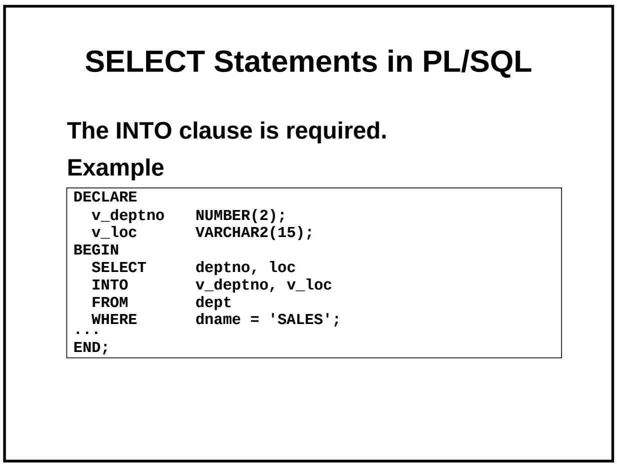


SELECT Statements in PL/SQL

Retrieve data from the database with SELECT.

Syntax

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

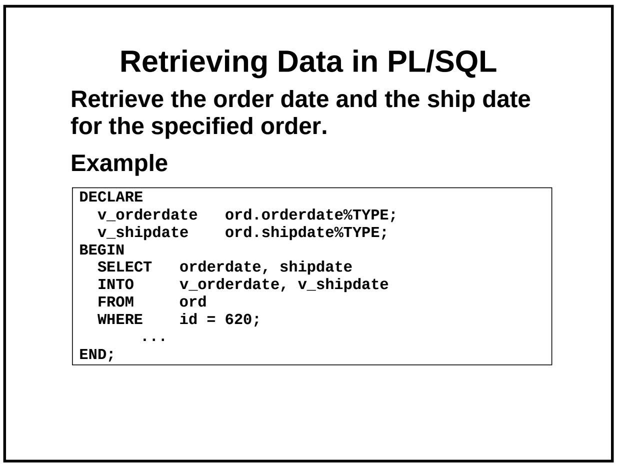


SELECT Statements in PL/SQL

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.

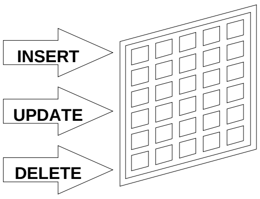
Example

```
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

```
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$_{XX}$
- 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
```

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 programmer.