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Writing Executable Statements

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Objectives

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

- Recognize the significance of the executable section
- Write statements within the executable section
- Describe the rules of nested blocks
- Execute and test a PL/SQL block
- Use coding conventions

PL/SQL Block Syntax and Guidelines

- Statements can continue over several lines.
- Lexical units can be separated by spaces:
  - Delimiters
  - Identifiers
  - Literals
  - Comments

PL/SQL Block Syntax and Guidelines

Identifiers

- Can contain up to 30 characters
- Cannot contain reserved words unless enclosed in double quotation marks
- Must begin with an alphabetic character
- Should not have the same name as a database table column name

PL/SQL Block Syntax and Guidelines

Literals

- Character and date literals must be enclosed in single quotation marks.

```
v_ename := 'Henderson';
```

- Numbers can be simple values or scientific notation.

Commenting Code

- Prefix single-line comments with two dashes (- -).
- Place multi-line comments between the symbols /* and */.

Example

```
...
  v_sal NUMBER (9,2);
BEGIN
  /* Compute the annual salary based on the
     monthly salary input from the user */
  v_sal := v_sal * 12;
END; -- This is the end of the transaction
```

SQL Functions in PL/SQL

- Available:
  - Single-row number
  - Single-row character
  - Datatype conversion
  - Date

} Same as in SQL

- Not available:
  - GREATEST
  - LEAST
  - DECODE
  - Group functions

PL/SQL Functions

Examples

- Build the mailing list for a company.

```
v_mailing_address := v_name||CHR(10)||
       v_address||CHR(10)||v_state||
       CHR(10)||v_zip;
```

- Convert the employee name to lowercase.

```
v_ename          := LOWER(v_ename);
```

Datatype Conversion

- Convert data to comparable datatypes.
- Mixed datatypes can result in an error and affect performance.
- Conversion functions:
  - TO_CHAR
  - TO_DATE
  - TO_NUMBER

```
BEGIN
    SELECT TO_CHAR(hiredate,
'MON. DD, YYYY')
    FROM   emp;
END;
```

Datatype Conversion

This statement produces a compile error.

```
v_comment := USER||': '||SYSDATE;
```

To correct the error, the TO_CHAR conversion function is used.

```
v_comment := USER||': '||TO_CHAR(SYSDATE);
```

Nested Blocks and Variable Scope

- Statements can be nested wherever an executable statement is allowed.
- A nested block becomes a statement.
- An exception section can contain nested blocks.
- The scope of an object is the region of the program that can refer to the object.

Nested Blocks and Variable Scope

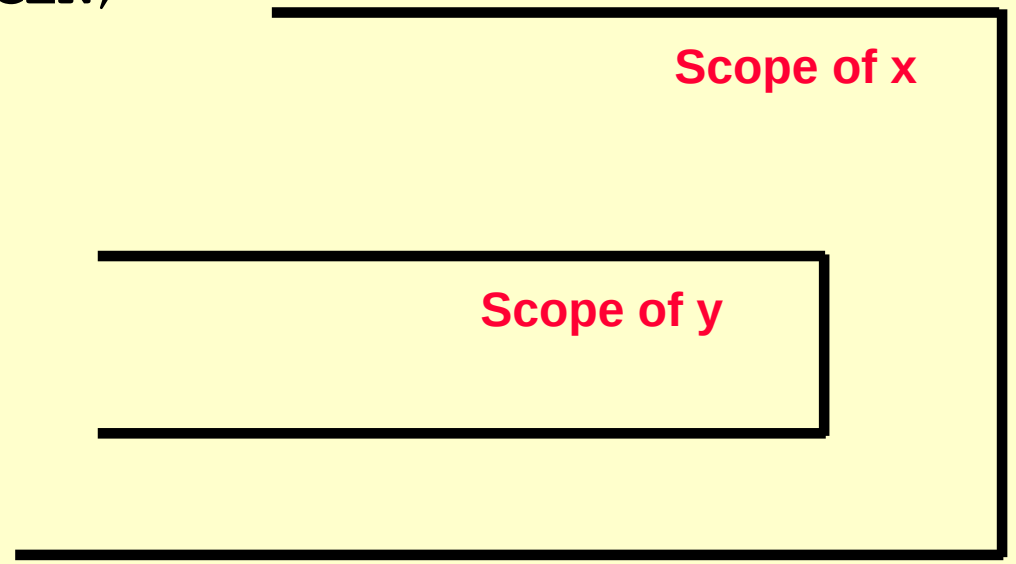
An identifier is visible in the regions in which you can reference the unqualified identifier:

- A block can look up to the enclosing block.
- A block cannot look down to enclosed blocks.

Nested Blocks and Variable Scope

Example

```
...
  x  BINARY_INTEGER;
BEGIN
  ...
  DECLARE
    y  NUMBER;
  BEGIN
    ...
  END;
  ...
END;
```



Operators in PL/SQL

- Logical
- Arithmetic
- Concatenation
- Parentheses to control order of operations
- Exponential operator (**)

} Same as in SQL

Operators in PL/SQL

Examples

- Increment the index for a loop.

```
v_count        := v_count + 1;
```

- Set the value of a Boolean flag.

```
v_equal        := (v_n1 = v_n2);
```

- Validate an employee number if it contains a value.

```
v_valid        := (v_empno IS NOT NULL);
```

Using Bind Variables

To reference a bind variable in PL/SQL, you must prefix its name with a colon (:).

Example

```
DECLARE
   v_sal       emp.sal%TYPE;
BEGIN
   SELECT      sal
   INTO        v_sal
   FROM        emp
   WHERE       empno = 7369;
  :salary      := v_sal;
END;
```

Programming Guidelines

Make code maintenance easier by:

- **Documenting code with comments**
- **Developing a case convention for the code**
- **Developing naming conventions for identifiers and other objects**
- **Enhancing readability by indenting**

Code Naming Conventions

Avoid ambiguity:

- The names of local variables and formal parameters take precedence over the names of database tables.
- The names of columns take precedence over the names of local variables.

Indenting Code

For clarity, indent each level of code.

Example

```
BEGIN
   IF x=0 THEN
      y=1;
   END IF;
END;
```

```
DECLARE
   v_detpno    NUMBER(2);
   v_location      VARCHAR2(13);
BEGIN
   SELECT   deptno,
            location
   INTO     v_deptno,
            v_location
   FROM     dept
   WHERE    dname = 'SALES';
...
END;
```

Determine Variable Scope

Class Exercise

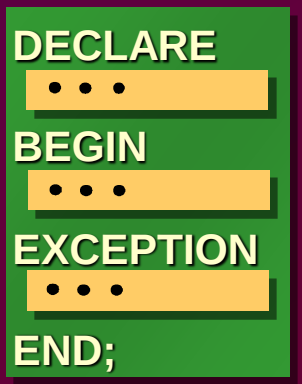
```
...
DECLARE
V_SAL           NUMBER(7,2) := 60000;
V_COMM          NUMBER(7,2) := V_SAL / .20;
V_MESSAGE       VARCHAR2(255) := ' eligible for commission';
BEGIN ...
```

```
DECLARE
  V_SAL              NUMBER(7,2) := 50000;
  V_COMM             NUMBER(7,2) := 0;
  V_TOTAL_COMP       NUMBER(7,2) := V_SAL + V_COMM;
BEGIN ...
  V_MESSAGE := 'CLERK not'||V_MESSAGE;
END;
```

```
   V_MESSAGE := 'SALESMAN'||V_MESSAGE;
END;
```

Summary

- PL/SQL block structure:
  - Nesting blocks and scoping rules
- PL/SQL programming:
  - Functions
  - Datatype conversions
  - Operators
  - Bind variables
  - Conventions and guidelines



Practice Overview

- Reviewing scoping and nesting rules
- Developing and testing PL/SQL blocks