

Oracle 11g – PL SQL

Writing Executable Statements

Objectives

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

- PL/SQL Block Syntax and Guidelines
- Commenting the Code in PL/SQL
- Use built-in SQL functions in PL/SQL
- Describe when implicit conversions take place and when explicit conversions have to be dealt
- Write nested blocks and qualify variables with labels
- Write readable code with appropriate indentations

PL/SQL Block Syntax and Guidelines

Lexical Units in a PL/SQL Block

□ Lexical units:

- Are building blocks of any PL/SQL block
- Are sequences of characters including letters, numerals, tabs, spaces, returns, and symbols
- Can be classified as:
 - o Identifiers
 - o Delimiters
 - o Literals
 - o Comments

PL/SQL Block Syntax and Guidelines

Identifiers

- ☐ Can contain up to 30 characters
- ☐ Must begin with an alphabetic character
- ☐ Can contain numerals, dollar signs, underscores, and number signs
- ☐ Cannot contain characters such as hyphens, slashes, and spaces
- ☐ Should not have the same name as a database table column name
- ☐ Should not be reserved words



PL/SQL Block Syntax and Guidelines

Delimiters

Delimiters are simple or compound symbols that have special meaning to PL/SQL

Simple Symbols

| Symbol | Meaning |
|--------|-------------------------------|
| + | Addition operator |
| - | Subtraction/negation operator |
| * | Multiplication operator |
| / | Division operator |
| = | Relational operator |
| @ | Remote access indicator |
| ; | Statement terminator |

Compound Symbols

| Symbol | Meaning |
|--------|-------------------------------|
| <> | Relational operator |
| != | Relational operator |
| | Concatenation operator |
| -- | Single line comment indicator |
| / * | Beginning comment delimiter |
| * / | Ending comment delimiter |
| := | Assignment operator |

PL/SQL Block Syntax and Guidelines

- Literals:

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

```
name := 'Henderson';
```

- o Numbers can be simple values or scientific notation.

- Statements can continue over several lines.

- ❑ **A slash (/) runs the PL/SQL block in a script file or in some tools such as *iSQL*PLUS*.**

Commenting Code

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

□ Example

```
DECLARE
...
annual_sal NUMBER (9,2);
BEGIN    -- Begin the executable section

/* Compute the annual salary based on the
   monthly salary input from the user */
annual_sal := monthly_sal * 12;
END;    -- This is the end of the block
/
```

SQL Functions in PL/SQL

- Available in procedural statements:
 - o Single-row number
 - o Single-row character
 - o Data type conversion
 - o Date
 - o Timestamp
 - o GREATEST and LEAST
 - o Miscellaneous functions
- Not available in procedural statements:
 - o DECODE
 - o Group functions

SQL Functions in PL/SQL: Examples

- Get the length of a string:

```
desc_size INTEGER(5);  
prod_description VARCHAR2(70):='You can use this  
product with your radios for higher frequency';  
  
-- get the length of the string in prod_description  
desc_size:= LENGTH(prod_description);
```

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:

```
emp_name:= LOWER(emp_name);
```

Data Type Conversion

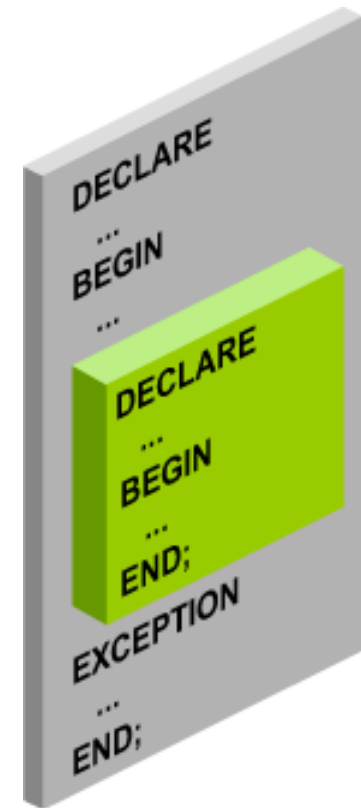
- Convert data to comparable data types
- Are of two types:
 - Implicit conversions
 - Explicit conversions
- Some conversion functions:
 - TO_CHAR
 - TO_DATE
 - TO_NUMBER
 - TO_TIMESTAMP

Data Type Conversion

- ① `date_of_joining DATE:= '02-Feb-2000';`
- ② `date_of_joining DATE:= 'February 02,2000';`
- ③ `date_of_joining DATE:= TO_DATE('February 02,2000','Month DD, YYYY');`

Nested Blocks

- PL/SQL blocks 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 identifier is that region of a program unit (block, subprogram, or package) from which you can reference the identifier.



Nested Blocks

Example

```
DECLARE
  outer_variable VARCHAR2(20):='GLOBAL VARIABLE';
BEGIN
  DECLARE
    inner_variable VARCHAR2(20):='LOCAL VARIABLE';
  BEGIN
    DBMS_OUTPUT.PUT_LINE(inner_variable);
    DBMS_OUTPUT.PUT_LINE(outer_variable);
  END;
  DBMS_OUTPUT.PUT_LINE(outer_variable);
END;
/
```

Variable Scope and Visibility

```
DECLARE
  father_name VARCHAR2(20):='Patrick';
  date_of_birth DATE:='20-Apr-1972';
BEGIN
  DECLARE
    child_name VARCHAR2(20):='Mike';
    date_of_birth DATE:='12-Dec-2002';
  BEGIN
    DBMS_OUTPUT.PUT_LINE('Father's Name: '||father_name);
    DBMS_OUTPUT.PUT_LINE('Date of Birth: '||date_of_birth);
    DBMS_OUTPUT.PUT_LINE('Child's Name: '||child_name);
    END;
  DBMS_OUTPUT.PUT_LINE('Date of Birth: '||date_of_birth);
END;
/
```

Qualify an Identifier

```
<<outer>>
DECLARE
  father_name VARCHAR2(20):='Patrick';
  date_of_birth DATE:='20-Apr-1972';
BEGIN
  DECLARE
    child_name VARCHAR2(20):='Mike';
    date_of_birth DATE:='12-Dec-2002';
  BEGIN
    DBMS_OUTPUT.PUT_LINE('Father's Name: '||father_name);
    DBMS_OUTPUT.PUT_LINE('Date of Birth: '
                          ||outer.date_of_birth);
    DBMS_OUTPUT.PUT_LINE('Child's Name: '||child_name);
    DBMS_OUTPUT.PUT_LINE('Date of Birth: '||date_of_birth);
  END;
END;
/`
```

Determining Variable Scope

```
<<outer>>
DECLARE
  sal      NUMBER(7,2) := 60000;
  comm     NUMBER(7,2) := sal * 0.20;
  message  VARCHAR2(255) := ' eligible for commission';
BEGIN
  DECLARE
    sal      NUMBER(7,2) := 50000;
    comm     NUMBER(7,2) := 0;
    total_comp NUMBER(7,2) := sal + comm;
  BEGIN
    message := 'CLERK not' || message;
    outer.comm := sal * 0.30;
  END;
  message := 'SALESMAN' || message;
END;
/
```

①



②



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 counter for a loop.

```
loop_count := loop_count + 1;
```

- Set the value of a Boolean flag.

```
good_sal := sal BETWEEN 50000 AND 150000;
```

- Validate whether an employee number contains a value.

```
valid := (empno IS NOT NULL);
```

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

Indenting Code

❑ For clarity, indent each level of code.

❑ Example:

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

```
DECLARE
  deptno          NUMBER(4);
  location_id     NUMBER(4);
BEGIN
  SELECT  department_id,
          location_id
  INTO    deptno,
          location_id
  FROM    departments
  WHERE   department_name
          = 'Sales';

  ...
END;
/
```