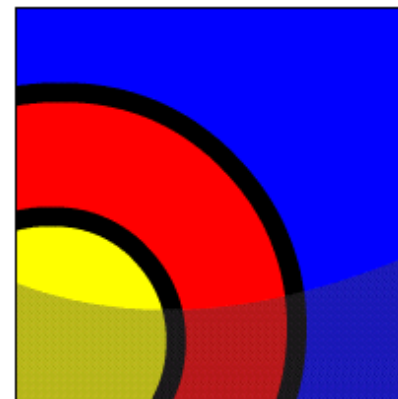# Using Scalar Data Types

What Will I Learn?

In this lesson, you will learn how to:

- Declare and use scalar data types

- Define guidelines for declaring and initializing PL/SQL variables

- Identify the benefits of anchoring data types with the `%TYPE` attribute
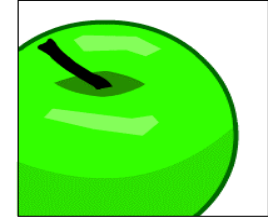
Why Learn It?

Most of the variables you define and use in PL/SQL have scalar data types.

A variable can have an explicit data type, such as `VARCHAR2`, or it can automatically have the same data type as a table column in the database. You will learn the benefits of basing some variables on table columns.

Tell Me/Show Me

Declaring Character Variables

Character data types include CHAR, VARCHAR2, and LONG.

```
DECLARE
  v_emp_job          VARCHAR2(9);
  v_order_no         VARCHAR2(6);
  v_product_id       VARCHAR2(10);
  v_rpt_body_part    LONG;
…
```

Tell Me/Show Me

Declaring Number Variables

Number data types include NUMBER, PLS_INTEGER, BINARY_INTEGER, and BINARY_FLOAT. In the syntax, CONSTANT constrains the variable so that its value cannot change. Constants must be initialized.

INTEGER is an alias for NUMBER(38,0).

```
DECLARE
  v_dept_total_sal   NUMBER(9,2) := 0;
  v_count_loop        INTEGER := 0;
  c_tax_rate          CONSTANT NUMBER(3,2) := 8.25;
  …
```

Tell Me/Show Me

Declaring Date Variables

Date data types include DATE, TIMESTAMP, and TIMESTAMP WITH TIMEZONE.

```
DECLARE
  v_orderdate          DATE := SYSDATE + 7;
  v_natl_holiday       DATE;
  v_web_sign_on_date   TIMESTAMP;
…
```

Tell Me/Show Me

Declaring Boolean Variables

Boolean is a data type that stores one of the three possible values used for logical calculations: TRUE, FALSE, or NULL.

```
DECLARE
  v_valid             BOOLEAN NOT NULL := TRUE;
  v_is_found          BOOLEAN := FALSE;
  v_underage          BOOLEAN;
…
```

Tell Me/Show Me

Declaring Boolean Variables

- Only the values `TRUE`, `FALSE`, and `NULL` can be assigned to a Boolean variable.
- Conditional expressions use the logical operators `AND` and `OR`, and the operator `NOT` to check the variable values.
- The variables always yield `TRUE`, `FALSE`, or `NULL`.
- You can use arithmetic, character, and date expressions to return a Boolean value.

Tell Me/Show Me

Guidelines for Declaring and Initializing PL/SQL Variables

- Use meaningful names and follow naming conventions.

- Declare one identifier per line for better readability, code maintenance, and easier commenting.

- Use the `NOT NULL` constraint when the variable must hold a value.

- Avoid using column names as identifiers.

```
DECLARE
  country_id   CHAR(2);
BEGIN
  SELECT country_id
   INTO country_id
   FROM countries
   WHERE country_name = 'Canada';
END;
```

Tell Me/Show Me

Anchoring Variables with the `%TYPE` Attribute

Rather than hard-coding the data type and precision of a variable, you can use the `%TYPE` attribute to declare a variable according to another previously declared variable or database column.

The `%TYPE` attribute is most often used when the value stored in the variable is derived from a table in the database.

When you use the `%TYPE` attribute to declare a variable, you should prefix it with the database table and column name.

Tell Me/Show Me

%TYPE Attribute

Look at this database table and the PL/SQL block that uses it:

```
CREATE TABLE myemps (
    emp_name         VARCHAR2(6),
    emp_salary       NUMBER(6,2));


DECLARE
  v_emp_salary   NUMBER(6,2);
BEGIN
  SELECT emp_salary INTO v_emp_salary
    FROM myemps WHERE emp_name = 'Smith';
END;
```

This PL/SQL block stores the correct salary in the v_emp_salary variable. But what if the table column is altered later?

Tell Me/Show Me

`%TYPE` Attribute (continued)

The `%TYPE` attribute:

- Is used to automatically give a variable the same data type and size as:
    - A database column definition
    - Another declared variable
- Is prefixed with either of the following:
    - The database table and column
    - The name of the other declared variable

Tell Me/Show Me

Declaring Variables with the `%TYPE` Attribute

Syntax:

```
identifier      table.column_name%TYPE;
```

Examples:

```
...
  v_emp_lname       employees.last_name%TYPE;
  v_balance         NUMBER(7,2);
  v_min_balance     v_balance%TYPE := 1000;
...
```

Tell Me/Show Me

Advantages of the `%TYPE` Attribute

- You can avoid errors caused by data type mismatch or wrong precision.

- You need not change the variable declaration if the column definition changes. That is, if you have already declared some variables for a particular table without using the `%TYPE` attribute, then the PL/SQL block can return errors if the column for which the variable declared is altered.

- When you use the `%TYPE` attribute, PL/SQL determines the data type and size of the variable when the block is compiled. This ensures that such a variable is always compatible with the column that is used to populate it.

Tell Me/Show Me

%TYPE Attribute

Look again at the database table and the PL/SQL block:

```
CREATE TABLE myemps (

   emp_name          VARCHAR2(6),

   emp_salary        NUMBER(6,2));


DECLARE

   v_emp_salary    myemps.emp_salary%TYPE;

BEGIN

   SELECT emp_salary INTO v_emp_salary

   FROM myemps WHERE emp_name = 'Smith';

END;
```

Now the PL/SQL block continues to work correctly even if the column data type is altered later.
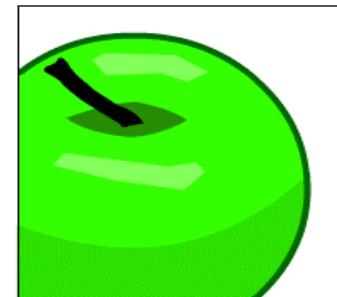
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Terminology

Key terms used in this lesson include:
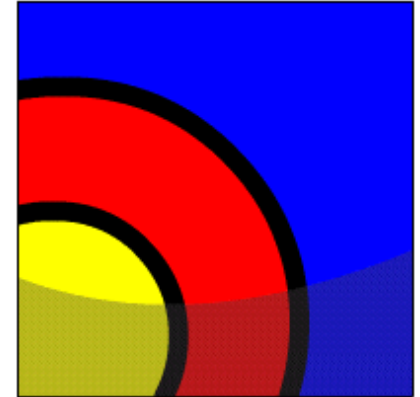
Boolean

%TYPE

Summary

In this lesson, you have learned how to:

- Declare and use scalar data types

- Define guidelines for declaring and initializing PL/SQL variables

- Identify the benefits of anchoring data types with the `%TYPE` attribute

Try It/Solve It

This practice covers the following topics:

- Declaring and using scalar data types (character, number, date, and Boolean)

- Defining guidelines for declaring and initializing PL/SQL variables

- Identifying the benefits of anchoring data types with the %TYPE attribute