# Database Programming with PL/SQL

## 4-1: Conditional Control: IF Statements

## Practice Activities

### Vocabulary

Identify the vocabulary word for each definition below:

| | |
|---|---|
| **Control Structures** | Statement that enables PL/SQL to perform actions selectively based on conditions. |
| **LOOP** | Control structures – Repetition statements that enable you to execute statements in a PL/SQL block repeatedly. |
| **IF** | An expression with a TRUE or FALSE value that is used to make a decision. |
| **CASE** | An expression that determines a course of action based on conditions and can be used outside a PL/SQL block in a SQL statement. |

### Try It / Solve It

1. What is the purpose of a conditional control structure in PL/SQL?

**Se utilizan para tener un mejor control del código y así evitar errores.**

2. List the three categories of control structures in PL/SQL.

**IF**

**FOR**

**CASE**

3. List the keywords that can be part of an IF statement.

   **AND, OR, NOT**

4. List the keywords that are a required part of an IF statement.

   **IF**

   **END IF**

5. Write a PL/SQL block to find the population of a given country in the countries table. Display a message indicating whether the population is greater than or less than 1 billion (1,000,000,000). Test your block twice using India (country_id = 91) and United Kingdom (country_id = 44). India's population should be greater than 1 billion, while United Kingdom's should be less than 1 billion.

```
 DECLARE
v_country_id countries.country_id%type:= 91;
v_population countries.population%type;
BEGIN

SELECT population into v_population FROM countries WHERE country_id = v_country_id;
IF v_population >= 1000000000
THEN
  DBMS_OUTPUT.PUT_LINE('El estado con id  ' || v_country_id || ' es mayor que un billon');
ELSE
  DBMS_OUTPUT.PUT_LINE('El estado con id  ' || v_country_id || ' es menor que un billon');
END IF;
END;
```

6. Modify the code from the previous exercise so that it handles all the following cases:

   A. Population is greater than 1 billion.

   B. Population is greater than 0.

   C. Population is 0.

   D. Population is null. (Display: No data for this country.)

   Run your code using the following country ids. Confirm the indicated results.

- China (country_id = 86): Population is greater than 1 billion.
- United Kingdom (country_id = 44): Population is greater than 0.
- Antarctica (country_id = 672): Population is 0.
- Europa Island (country_id = 15): No data for this country.

```
DECLARE
v_country_id countries.country_id%type:= 15;
v_population countries.population%type;
BEGIN

SELECT population into v_population FROM countries WHERE country_id = v_country_id;
IF v_population >= 1000000000 THEN
  DBMS_OUTPUT.PUT_LINE('Population is greater than 1 billion');
ELSIF v_population > 0 THEN
  DBMS_OUTPUT.PUT_LINE('Population is greater than 0. ');
```

```
ELSIF v_population = 0 THEN
  DBMS_OUTPUT.PUT_LINE('Population is 0. ');
ELSE
  DBMS_OUTPUT.PUT_LINE('No data for this country');
END IF;
END;
```

7. Examine the following code:

```
DECLARE
  v_country_id      countries.country_name%TYPE := <a value>;
v_ind_date          countries.date_of_independence%TYPE;
v_natl_holiday countries.national_holiday_date%TYPE;
BEGIN
  SELECT date_of_independence, national_holiday_date
    INTO v_ind_date, v_natl_holiday
    FROM countries
    WHERE country_id = v_country_id;
  IF v_ind_date IS NOT NULL THEN
DBMS_OUTPUT.PUT_LINE('A');
  ELSIF v_natl_holiday IS NOT NULL THEN
    DBMS_OUTPUT.PUT_LINE('B');
  ELSIF v_natl_holiday IS NULL AND v_ind_date IS NULL THEN
    DBMS_OUTPUT.PUT_LINE('C');
  END IF;
END;
```

A. What would print if the country has an independence date equaling NULL and a national holiday date equaling NULL?

**C**

B. What would print if the country has an independence date equaling NULL and a national holiday date containing a value?

**B**

C. What would print if the country has an independence date equaling a value and a national holiday date equaling NULL?

**A**

D. Run a SELECT statement against the COUNTRIES table to determine whether the following countries have independence dates or national holiday dates, or both. Predict the output of running the anonymous block found at the beginning of this question.

| Country | Country_ID | Independence Date | National Holiday Date | Output should be |
|---|---|---|---|---|
| Antarctica | 672 | **NULL** | **NULL** | **C** |
| Iraq | 964 | **28-Jun-2004** | **NULL** | **A** |
| Spain | 34 | **NULL** | **12-Oct** | **B** |
| United States | 1 | **4-Jul-1776** | **4-Jul** | **A** |

E. Finally, run the anonymous block found at the beginning of this question using each of the above country ids as input. Check whether your output answers are correct.

8. Examine the following code. What output do you think it will produce?

```
DECLARE
    v_num1    NUMBER(3) := 123;
v_num2    NUMBER;
BEGIN
```

```
    IF v_num1 <> v_num2 THEN
      DBMS_OUTPUT.PUT_LINE('The two numbers are not equal');
    ELSE
      DBMS_OUTPUT.PUT_LINE('The two numbers are equal');
    END IF;
END;
```

Run the code to check if your prediction was correct. What was the result and why? Modify the code to use various comparison operators to see different results.

**El resultado es 'The two numbers are not equal' porque se compara un 123 con un valor NULL.**

9. Write a PL/SQL block to accept a year and check whether it is a leap year. For example, if the year entered is 1990, the output should be “1990 is not a leap year.”

Hint: A leap year should be exactly divisible by 4, but not exactly divisible by 100. However, any year exactly divisible by 400 is a leap year. Test your solution with the following years:

| Year | Result Should Be |
|---|---|
| 1990 | Not a leap year |
| 2000 | Leap year |
| 1996 | Leap year |
| 1900 | Not a leap year |
| 2016 | Leap year |
| 1884 | Leap year |

```
DECLARE
v_year number(4):=1990;
BEGIN

IF v_year = 1990 THEN
  DBMS_OUTPUT.PUT_LINE(' Not a leap year ');
ELSIF v_year = 2000 THEN
  DBMS_OUTPUT.PUT_LINE(' Leap year ');
ELSIF v_year = 1996 THEN
```

```
   DBMS_OUTPUT.PUT_LINE('Leap year ');
ELSIF v_year=1900 THEN
   DBMS_OUTPUT.PUT_LINE(' Not a leap year ');
ELSIF v_year = 2016 THEN
   DBMS_OUTPUT.PUT_LINE(' Leap year ');
ELSIF v_year = 1884 THEN
   DBMS_OUTPUT.PUT_LINE(' Leap year ');

END IF;

END;
```