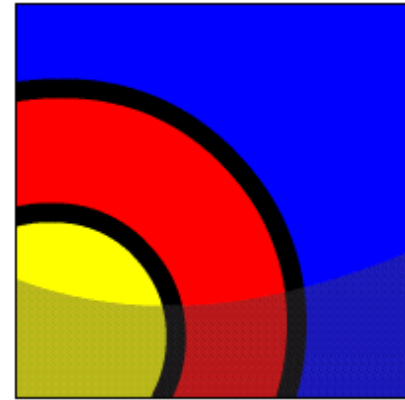# Iterative Control: Basic Loops

What Will I Learn?

In this lesson, you will learn to:

- Describe the need for `LOOP` statements in PL/SQL

- Recognize different types of `LOOP` statements

- Create PL/SQL containing a basic loop and an `EXIT` statement

- Create PL/SQL containing a basic loop and an `EXIT` statement with conditional termination

Why Learn It?

Looping constructs are the second type of control structure. Loops are mainly used to execute statements repeatedly until an `EXIT` condition is reached.

PL/SQL provides three ways to structure loops to repeat a statement or a sequence of statements multiple times. These are basic loops, `FOR` loops, and `WHILE` loops.

This lesson introduces the three loop types and discusses basic loops in greater detail.
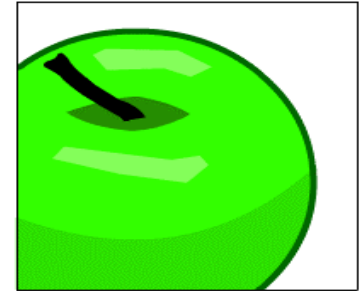
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Iterative Control: `LOOP` Statements

Loops repeat a statement or a sequence of statements multiple times.

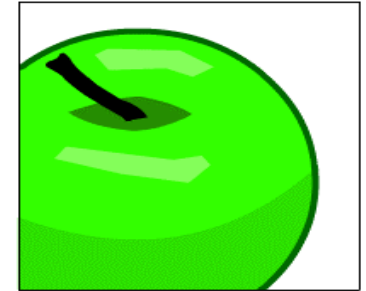PL/SQL provides the following types of loops:

- Basic loops that perform repetitive actions without overall conditions
- `FOR` loops that perform iterative actions based on a counter
- `WHILE` loops that perform repetitive actions based on a condition

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Basic Loops

The simplest form of a `LOOP` statement is the basic (or infinite) loop, which encloses a sequence of statements between the keywords `LOOP` and `END LOOP`. Use the basic loop when the statements inside the loop must execute at least once.
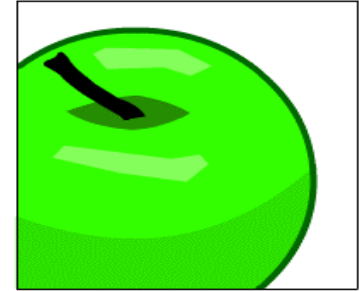
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Basic Loops

Each time the flow of execution reaches the `END LOOP` statement, control is returned to the corresponding `LOOP` statement above it. A basic loop allows the execution of its statements at least once, even if the `EXIT` condition is already met upon entering the loop. Without the `EXIT` statement, the loop would be infinite.
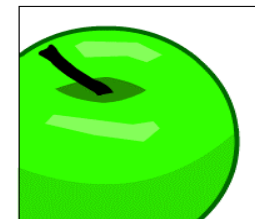
Syntax:

```
LOOP
   statement1;

   . . .

   EXIT [WHEN condition];
END LOOP;
```

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Basic Loops

In this example, three new location IDs for the country code of CA and the city of Montreal are inserted.
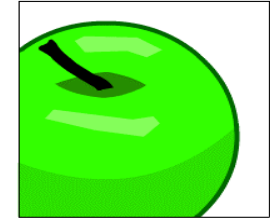
```
DECLARE
  v_countryid     locations.country_id%TYPE := 'CA';
  v_loc_id        locations.location_id%TYPE;
  v_counter       NUMBER(2) := 1;
  v_new_city      locations.city%TYPE := 'Montreal';
BEGIN
  SELECT MAX(location_id) INTO v_loc_id FROM locations
    WHERE country_id = v_countryid;
  LOOP
    INSERT INTO locations(location_id, city, country_id)
    VALUES((v_loc_id + v_counter), v_new_city, v_countryid);
    v_counter := v_counter + 1;
    EXIT WHEN v_counter > 3;
  END LOOP;
END;
```

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Basic Loops

The `EXIT` Statement

You can use the `EXIT` statement to terminate a loop. The control passes to the next statement after the `END LOOP` statement. You can issue `EXIT` either as an action within an `IF` statement or as a stand-alone statement within the loop.

```
DECLARE
  v_counter NUMBER := 1;
BEGIN
  LOOP
    DBMS_OUTPUT.PUT_LINE('The square of '
                ||v_counter||' is: '|| POWER(v_counter,2));
    v_counter := v_counter + 1;
    IF v_counter > 10 THEN
      EXIT;
    END IF;
  END LOOP;
END;
```
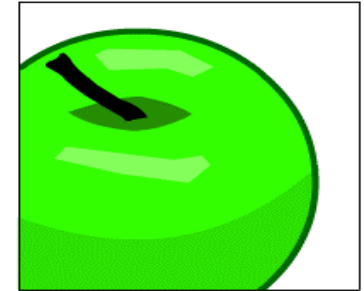
Tell Me/Show Me

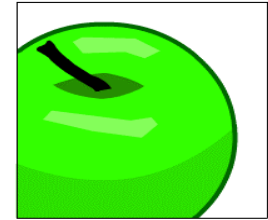**Basic Loops**

The EXIT Statement (continued)

- The EXIT statement must be placed inside a loop.

- If the EXIT condition is placed at the top of the loop (before any of the other executable statements) and that condition is initially true, then the loop exits and the other statements in the loop never execute.

- A basic loop can contain multiple EXIT statements, but you should have only one EXIT point.

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Basic Loops

The `EXIT WHEN` Statement

Use the `WHEN` clause to allow conditional termination of the loop. When the `EXIT` statement is encountered, the condition in the `WHEN` clause is evaluated. If the condition yields `TRUE`, then the loop ends and control passes to the next statement after the loop.

```
DECLARE
  v_counter NUMBER := 1;
BEGIN
  LOOP
    DBMS_OUTPUT.PUT_LINE('The square of '
               ||v_counter||' is: '|| POWER(v_counter,2));
    v_counter :=v_counter + 1;
    EXIT WHEN v_counter > 10;
  END LOOP;
END;
```
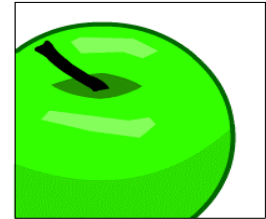
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Terminology

Key terms used in this lesson include:
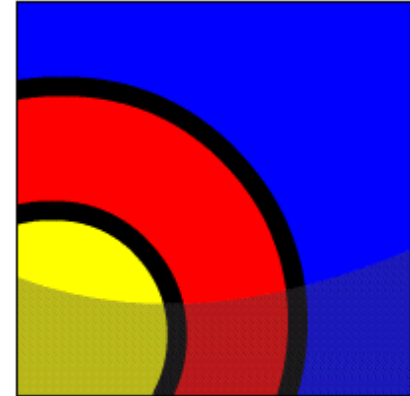
Basic (Infinite) loop

EXIT

◉ **Summary**

In this lesson, you learned to:

- Describe the need for `LOOP` statements in PL/SQL

- Recognize different types of `LOOP` statements

- Create PL/SQL containing a basic loop and an `EXIT` statement

- Create PL/SQL containing a basic loop and an `EXIT` statement with conditional termination

Try It/Solve It

The exercises in this lesson cover the following topics:

- Describing the need for `LOOP` statements in PL/SQL

- Identifying different types of `LOOP` statements

- Using basic loops with `EXIT` conditions

- Using basic loops with `EXIT` `WHEN` conditions