

# Accumulator and Counter

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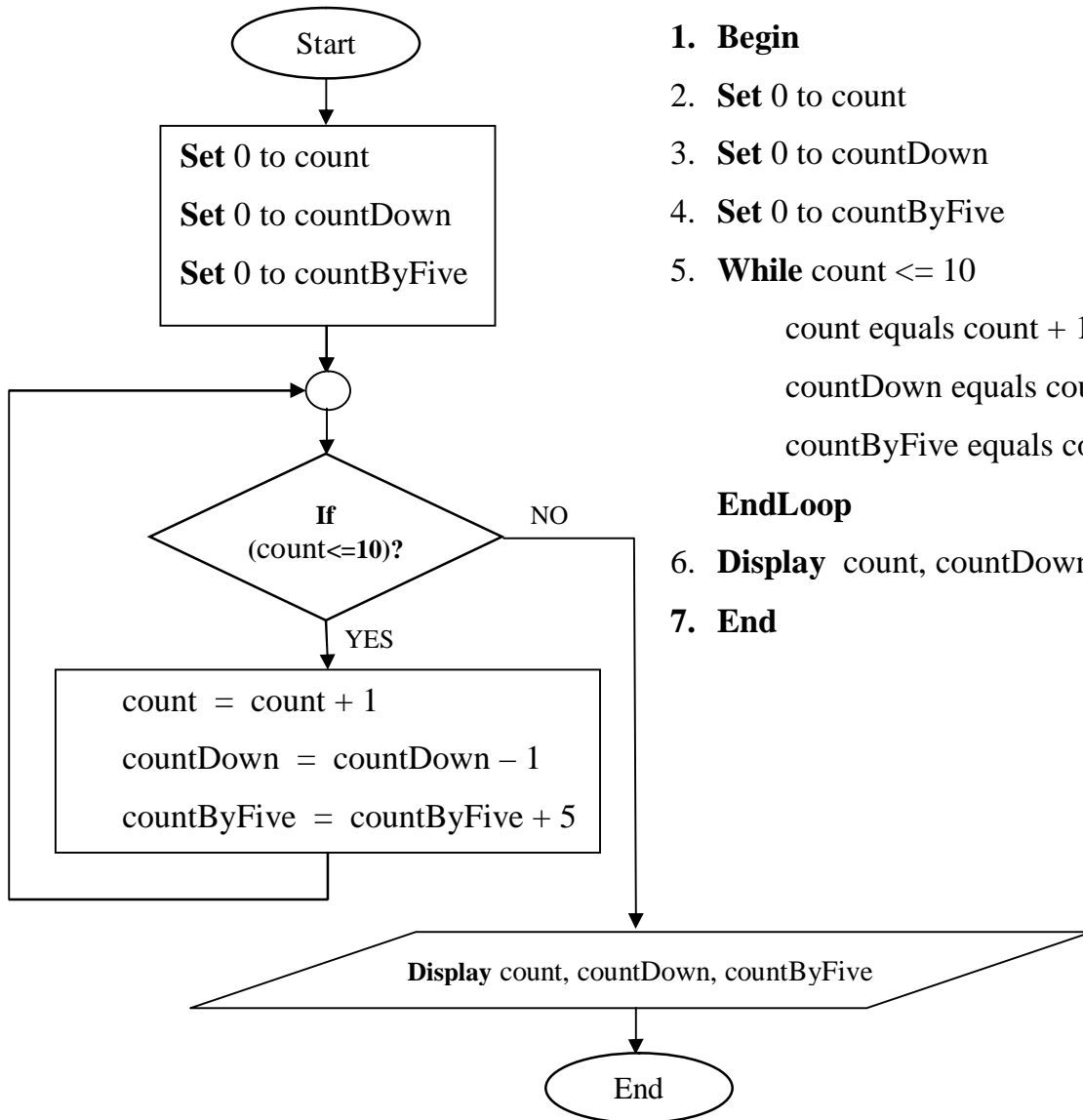
## Introduction

- ❖ We have two common operations served by repetition structures:
  - Counting operations
  - Accumulating operations.

## Counting

- ❖ The counting is a very important operation in programming. We will count to:
  - perform calculations (i.e. averaging numbers)
  - Count to determine if we need to keep on looping in a while, do..while block.
- ❖ Counting is accomplished in logic by defining a variable and adding or subtracting a value to/from the variable during each repetition loop.
  - If you add to the counter on each loop, the counter value increases (incrementing).
  - If we subtract on each loop, we count down (decrementing) with the counter.
- ❖ We can count by ones or by larger numbers.
- ❖ The counting activity in a program is accomplished by defining and initializing a variable and placing that variable inside the loop.
- ❖ With each repetition of the loop, a value is added to the counter to increment or a value is subtracted from the counter to decrement.

**Example (1):**



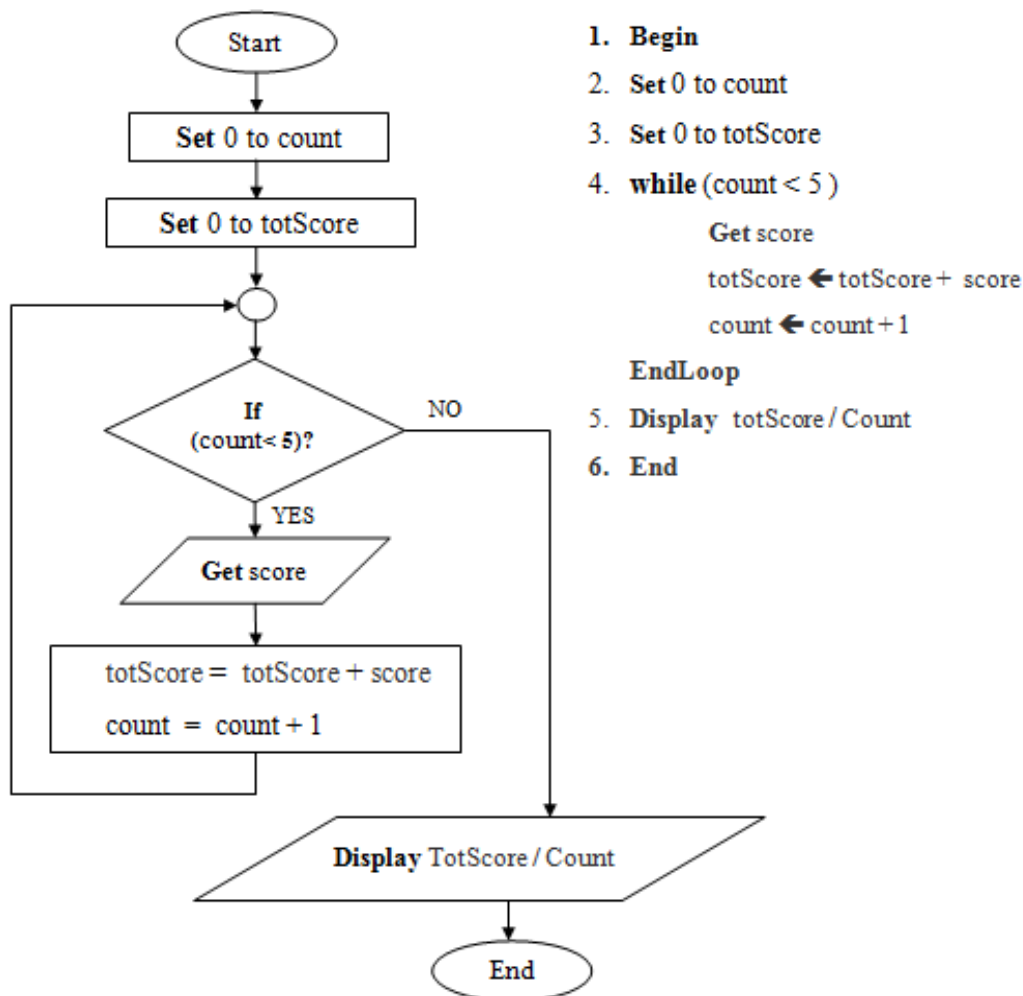
1. **Begin**
2. **Set** 0 to count
3. **Set** 0 to countDown
4. **Set** 0 to countByFive
5. **While** count <= 10  
    count equals count + 1  
    countDown equals countDown - 1  
    countByFive equals countByFive + 5  
**EndLoop**
6. **Display** count, countDown, countByFive
7. **End**

**❖ Example (2):**

Write pseudo code and draw flowchart to Count the number of four items weighting over 20 kg.

## Accumulating

- ❖ Accumulating is also a popular operation used in program logic.
- ❖ With accumulation, and accumulator variable is designated to accumulate numbers in a variable.
- ❖ The statements necessary to perform accumulation look very similar to the counting statements.
- ❖ Instead of incrementing a counter variable by a set number, we will be taking some value or identifier and add this to the accumulator variable on each repetition.
- ❖ The effect is that the accumulator variable grows (summarizes) on each pass of the loop.
- ❖ In the following pseudo code and flow chart example, we use a counter and accumulator variables to calculate a test average of five test scores.



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**Homework number (5) delivered next week:**

- 1) Write a pseudo code and flowchart to display the multiplication table for number four.
- 2) Modify question (1) to display the multiplication table for number entered by the user.