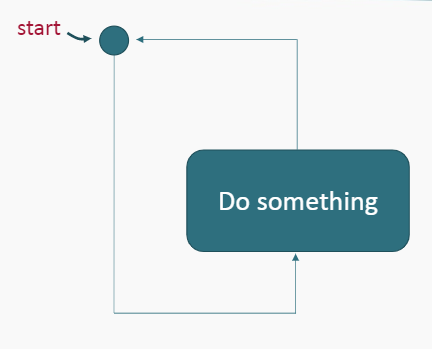
Processing: Loops

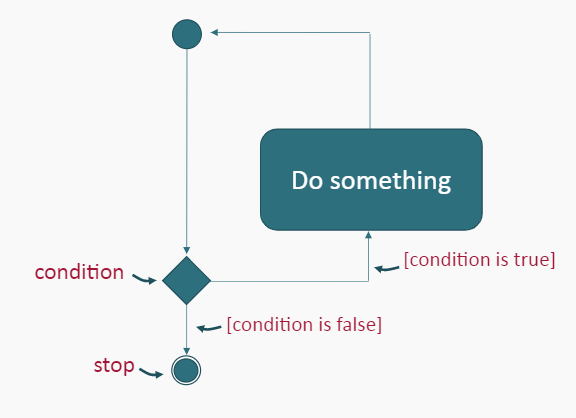
CS20S

St. Boniface Diocesan High School

Loops:

Loops help us do things over and over and over.

This loop will “*Do Something”* forever. This is called an **infinite loop**. It will crash your program. How can we stop it? We need a conditional statement / Boolean expression to get it to stop.

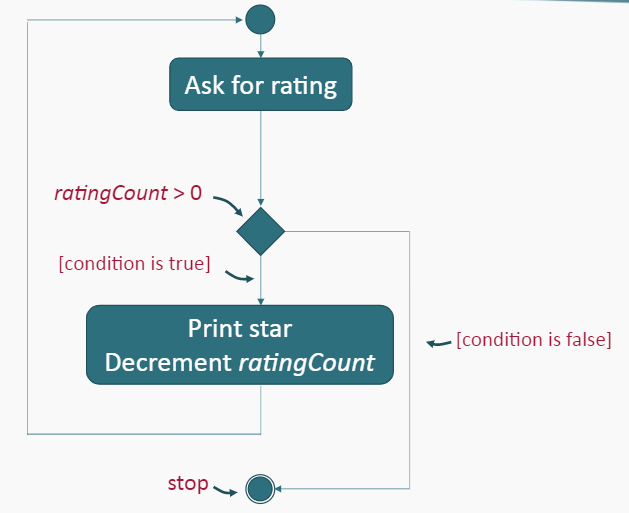


The first type of loop is a *pre-test loop*. In this case, the condition is tested before the code within the loop block is run for the first time.

For example:

Create a flowchart for a program that asks the user for a rating between 1 and 5, then print the number of stars representing the rating.

Solution:

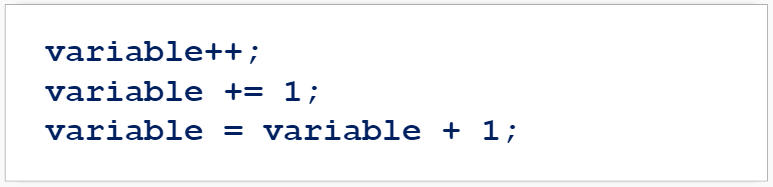


Sentinel Values

* A Sentinel Value is a special value used to terminate a loop.
* You typically choose a sentinel value as something that is not legitimate data value while the loop is iterating.
* In the loop that asks the user for a correct password, the sentinel value would be the value of the correct password This is the value which causes the loop to terminate.

Accumulators

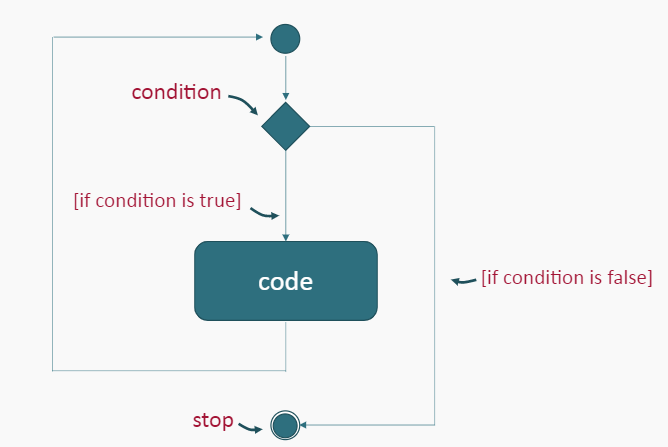
* An Accumulator is a variable that accumulates the values of data in a program. Accumulators are typically used for counting and totaling.
* Accumulators can be incremented with any of the following statements:



While Loop

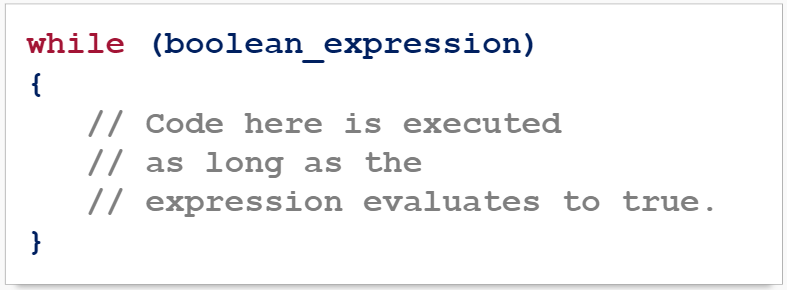
A ***While Loop*** is a pre-test loop.

* In a **pre-test** loop, conditions of the loop are tested before the code is run.
* In a **While Loop**, a statement or statements are repeated **while** a condition is **true**.
* The loop stops when the condition evaluates to **false.**



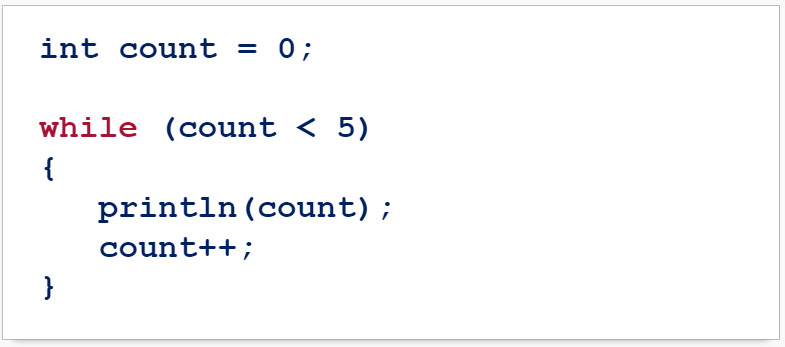
|  |
| --- |
| NOTE: A single execution of a loop is called an iteration |

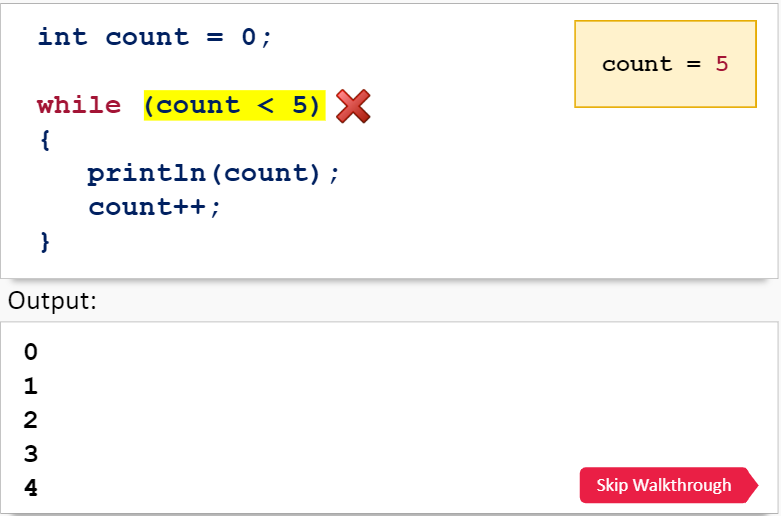
While Loop Syntax:

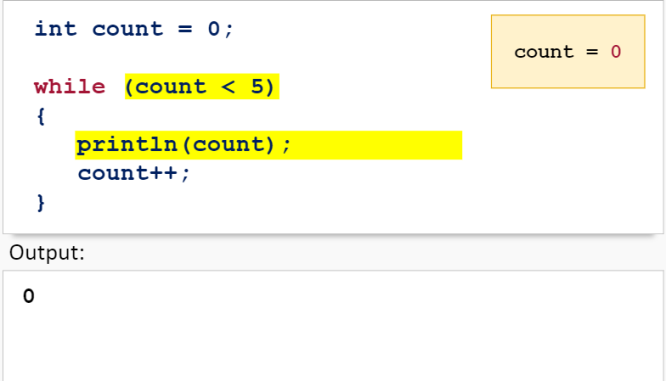


Example:

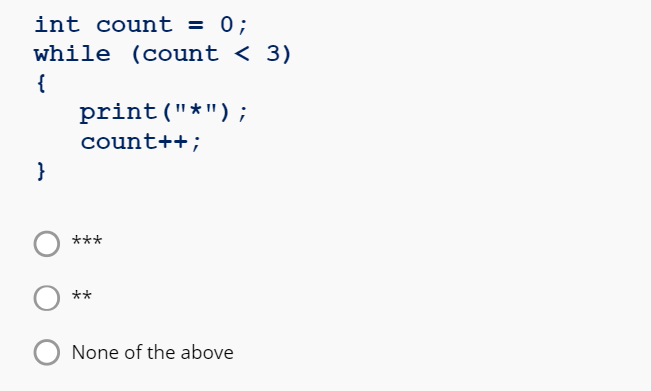
What is the output of this code? (Code uploaded to github)



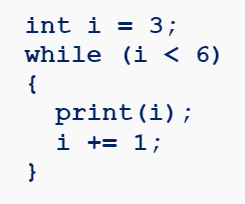
Walking Through the While Loop:



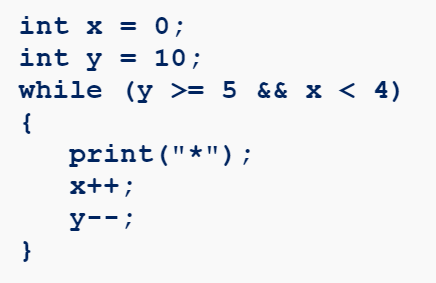
What is the output to this code?



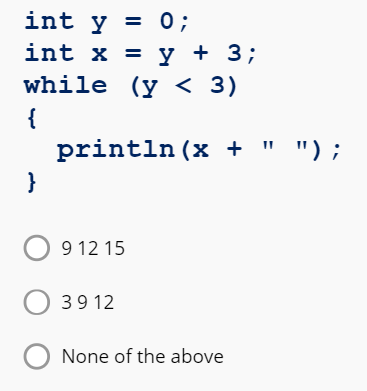
What is the ouput to this code?



What is the ouput to this code?



What is the ouput to this code?



|  |
| --- |
| TRY IT YOURSELF |

Create a sketch that displays stars for any given rating.

This sketch must:

1. Ask the user for a rating between 1 and 5.

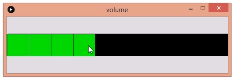
(Remember to parse the input to an integer)

1. Use a while loop so that for each number of the rating, print out a star symbol or image.

For example: if the user inputs a rating of 2, your program should output: \*\*

|  |
| --- |
| TRY IT YOURSELF |

Create a sketch that uses loops, if statements and images to create a tug of war game that looks similar to this:



**While Loop Exercises**

1. Using a while loop print the following pattern.

|  |
| --- |
| 1  1 2  1 2 3  1 2 3 4  1 2 3 4 5 |

1. Accept a number (integer) from the user and calculate the sum between 1 and that number.
2. Ask the user for a number (integer) and create a multiplication table (1 to 12) for that number.
3. Display the first 10 Fibonacci numbers.

(Hint: the Fibonacci number start with to 1’s, the next term is calculated by adding the 2 previous numbers. (1 + 1 =2, 1 + 2 = 3, 2 + 3 = 5…))