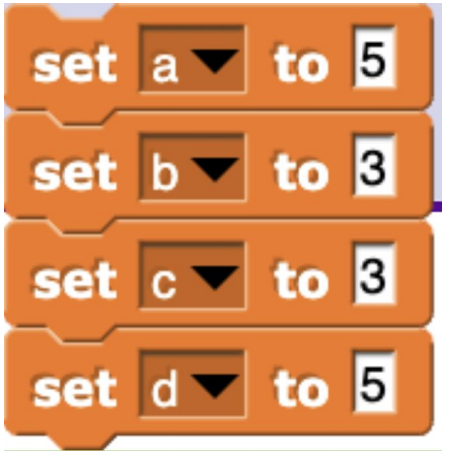
Q: What will the following expression evaluate to based on the given values?

iClicker

A. True

B. False



CPSC 100

Computational Thinking

Code Explanation + Tracing

Instructor: Parsa Rajabi
Department of Computer Science
University of British Columbia

Agenda

- Learning Goals
- Course Admin
- Intro to Programming [Continued]
  - Comparing Loops
  - Code Explanation [Activity]

Learning Goals

After this today's lecture, you should be able to:

- Identify and understand the differences between **different types of loops** (e.g. repeat, repeat until, for)
- **Trace** through code using sequences of instructions, variables, loops, and conditional statements in short programs
- **Describe in English** what a block of Snap! code does.
- **Evaluate** if a given snap code block correctly implements an algorithm.

Course Admin

Course Admin

- **Lab #4**
  - Due on Thursday, Feb 6 at 11:59pm
- **Lab #5** (Feb 12)
  - Drop-in; used for midterm + project help
- **Post-Class (PC) Quiz #3**
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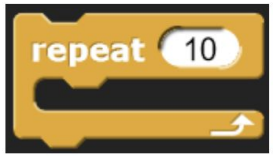
  - 📅 February 14 💘
  - ⏰ 3:00-3:50 pm
  - 📍 CHBE 101 [**Ch**emical and **B**iological **E**ngineering Building]

Programming Basics

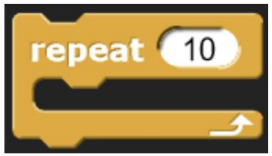
Programming Basics

0. Variable
    a. A named storage location for data
1. Sequencing
    a. In order (top-down)
2. Selection
    a. Conditional Structures
3. Iteration
    a. Loop Structures



Components of an Algorithm

0. Variable
    a. A named storage location for data
1. **Sequencing**
    a. In order (top-down)
2. **Selection**
    a. Conditional Structures
3. **Iteration**
    a. Loop Structures

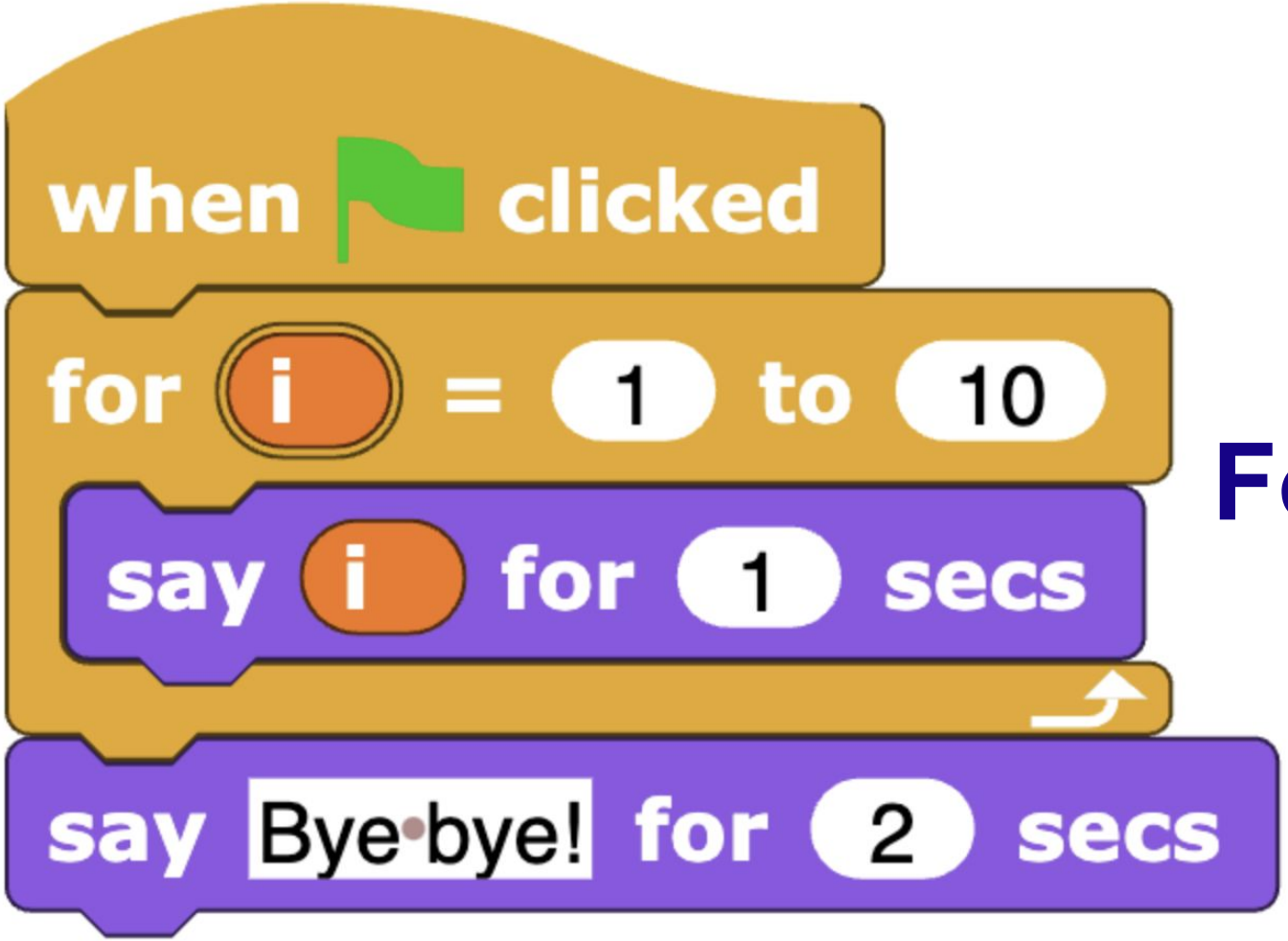


Loops

Repeat Blocks

Repeat some code a finite number of time

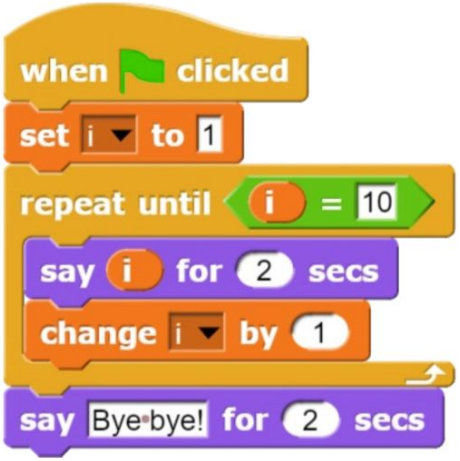
Repeat UNTIL a particular condition has been met.
If the condition is never met, then, it goes on *forever.*

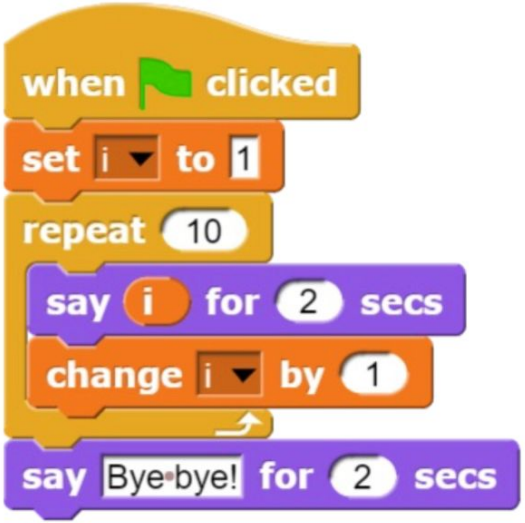


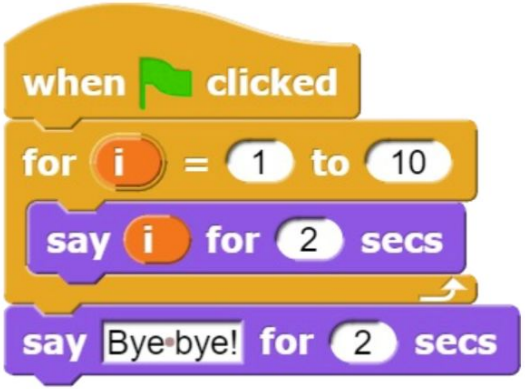
For Loops

Comparing Loops

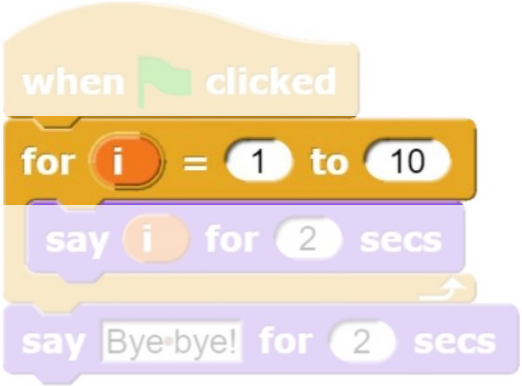
What's the difference between these loops?







What's the difference between these loops?

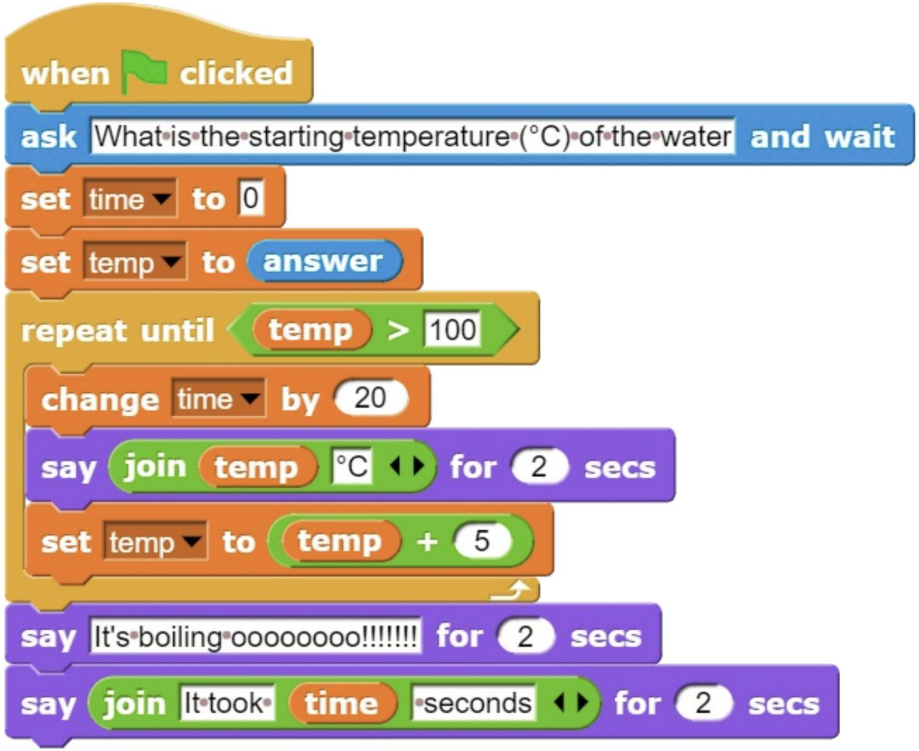


Code Explanation

What does this code block do?

Describe the code in terms of input and output and what is being done.

The block consumes....
It does...
It produces/displays/reports…

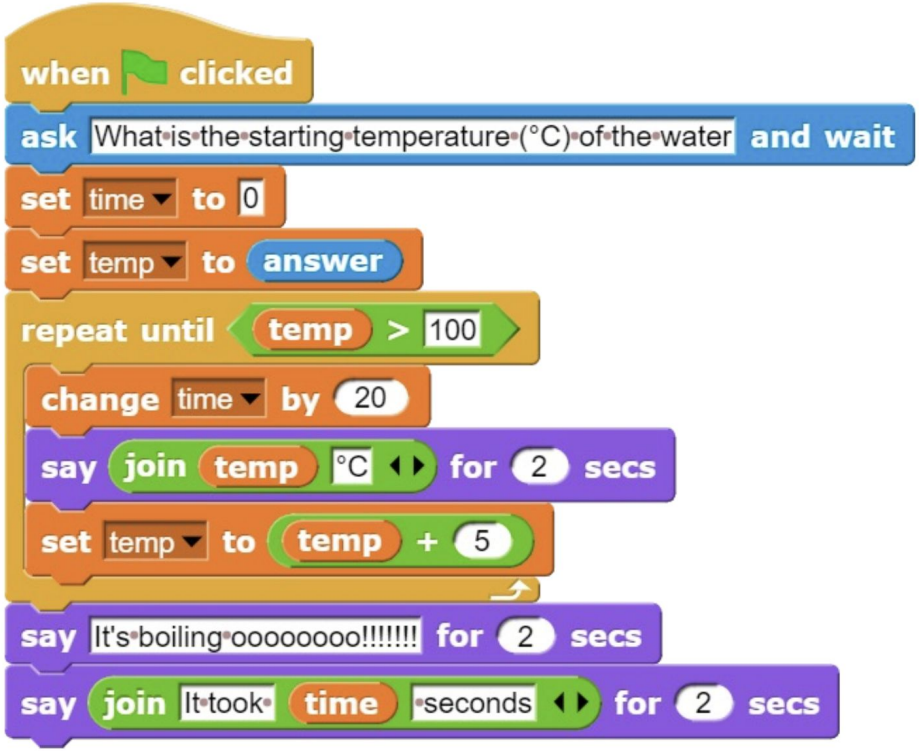


What is the purpose of this block?

The block consumes the starting temperature for water

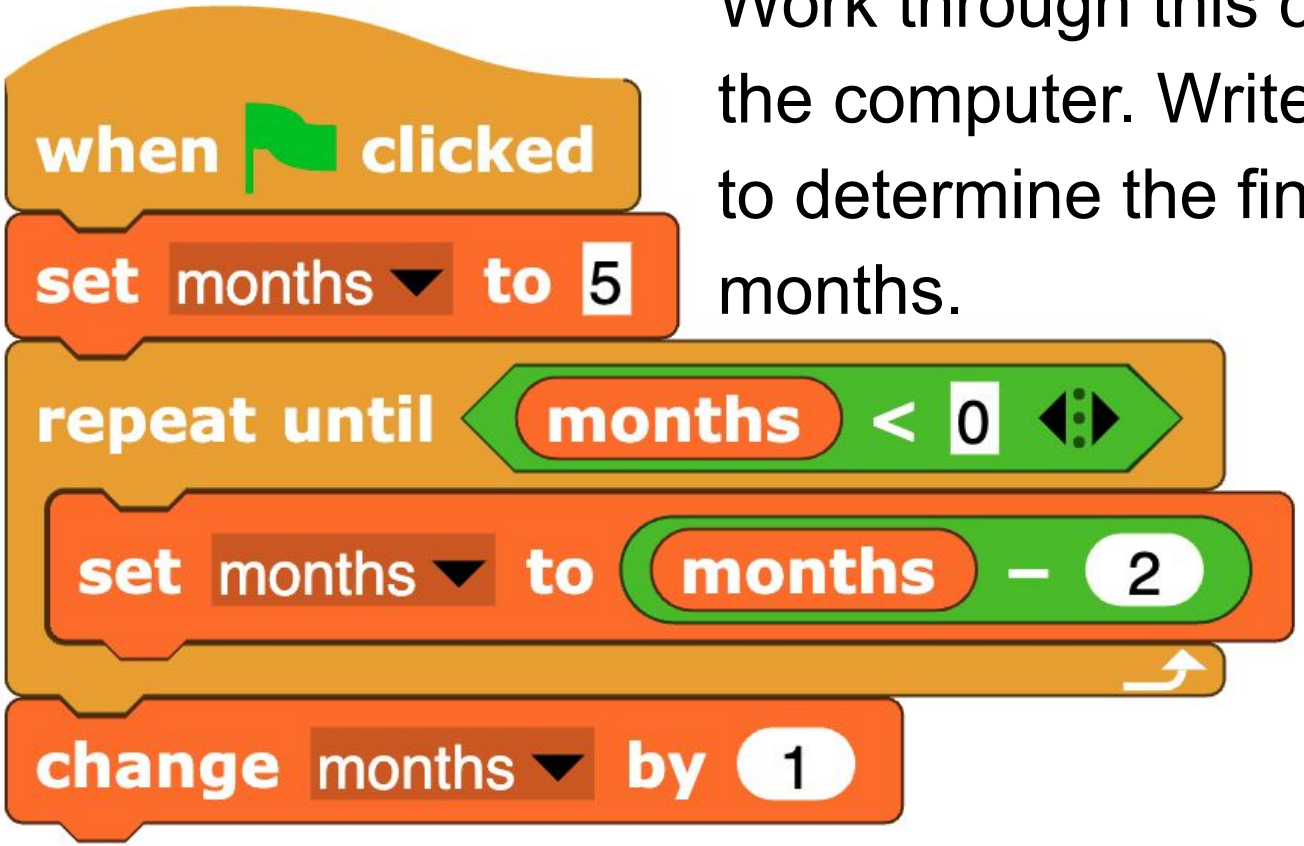
It increases the temperature and time

It produces the time it takes to get the water from the starting temperature to 100 degree Celsius



Code Tracing Activity

Activity - Step through this code

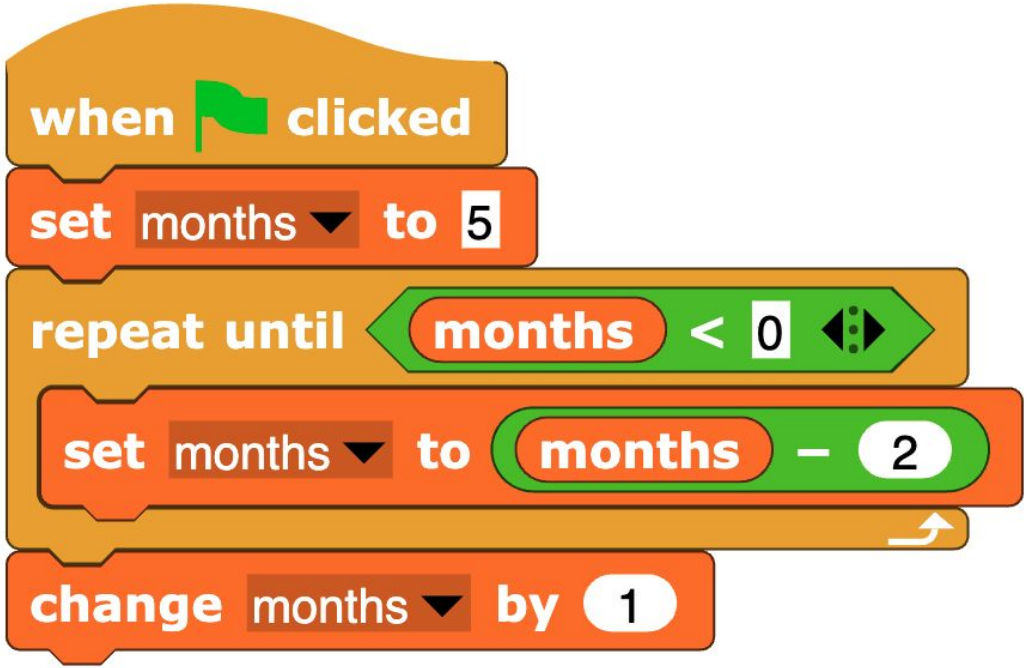


Work through this code as if you're the computer. Write down each step to determine the final value of months.

Activity - Step through this code

Step 1: Write down the variables you want to track.

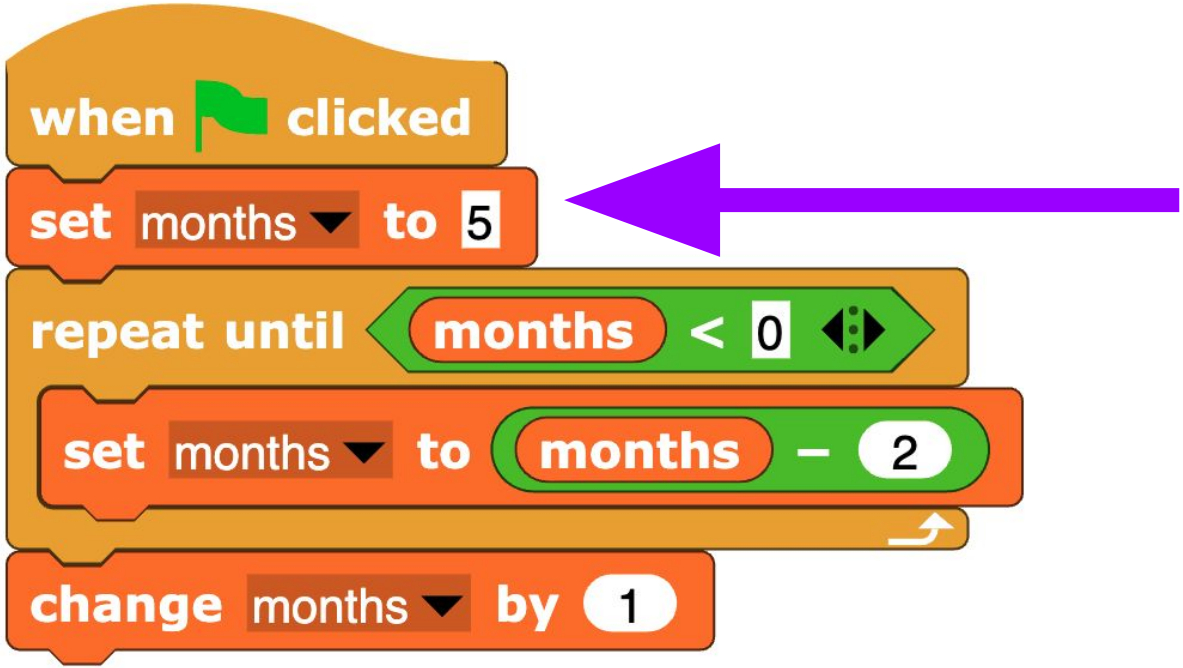
months ☐



Activity - Step through this code

Step 2.0: Write down the value of each variable before entering the loop/repeat block.

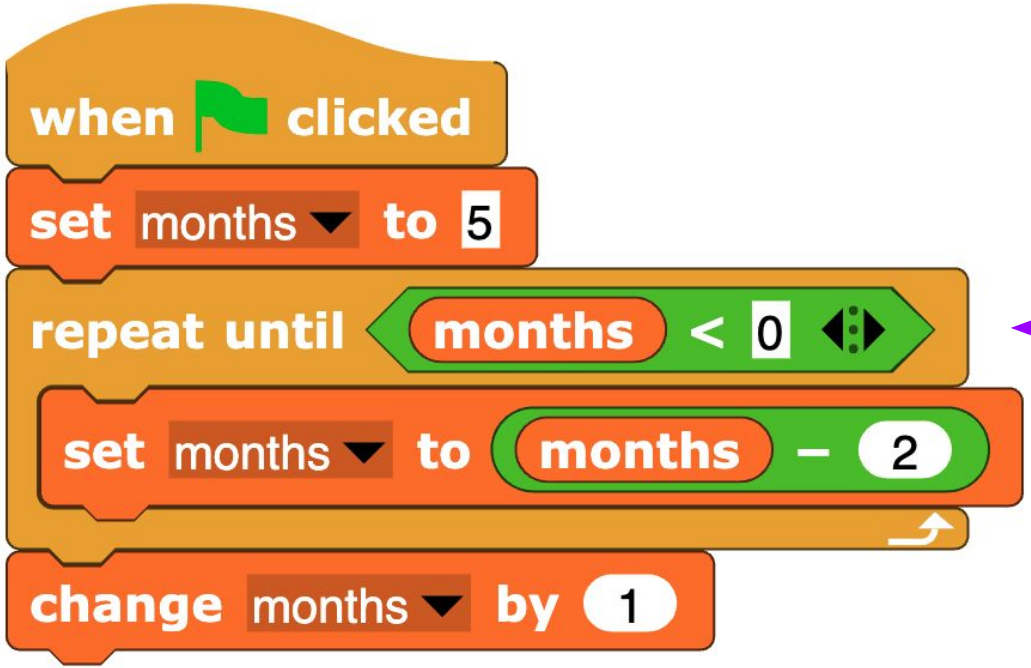
months 5



Activity - Step through this code

Step 2.1: Go through each step of the loop, keep track of the variable and its value.

months 5



Is the condition true?

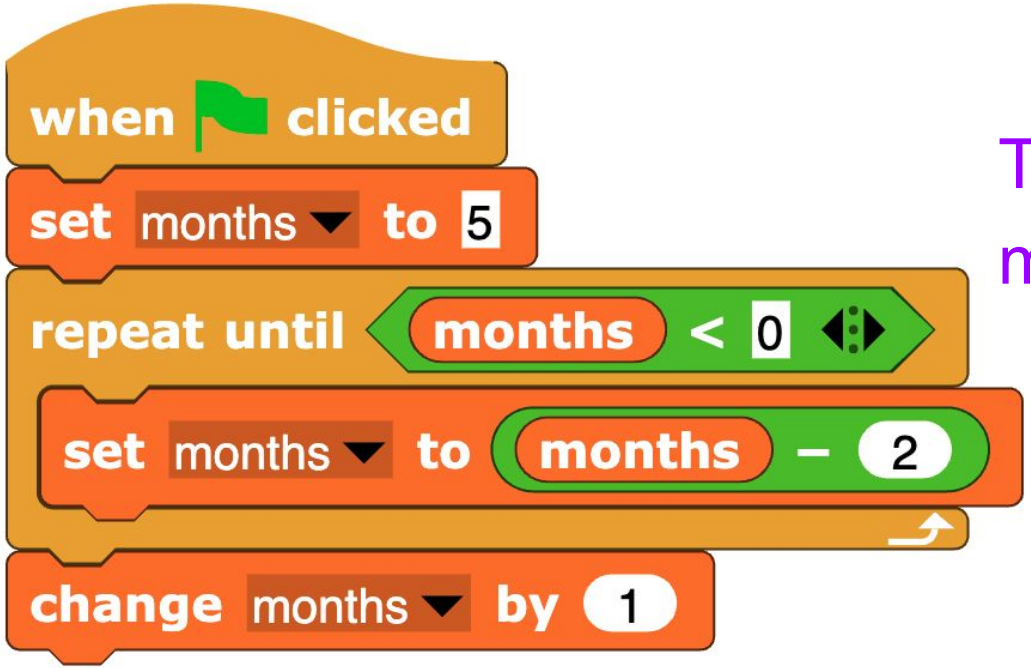
No → Execute code inside the loop.

Yes → Exit the loop, execute the first line after the loop.

Activity - Step through this code

Step 2.2: Go through each step of the loop, keep track of the variable and its value.

months 5



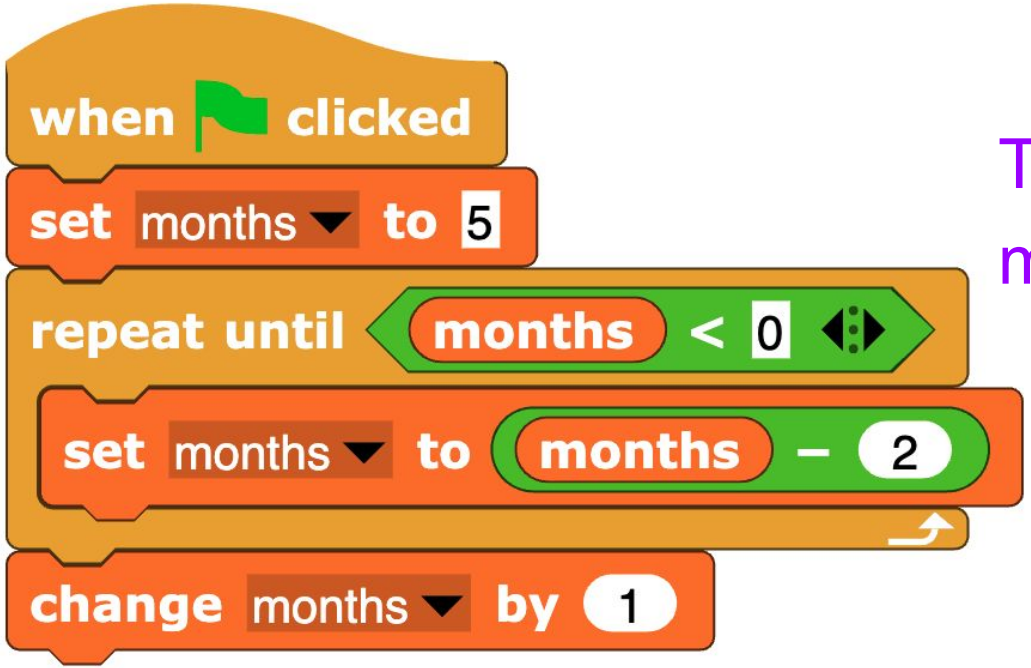
The value stored inside the months variable changes:

5 - 2 = 3

Activity - Step through this code

Step 2.2: Go through each step of the loop, keep track of the variable and its value.

months 3



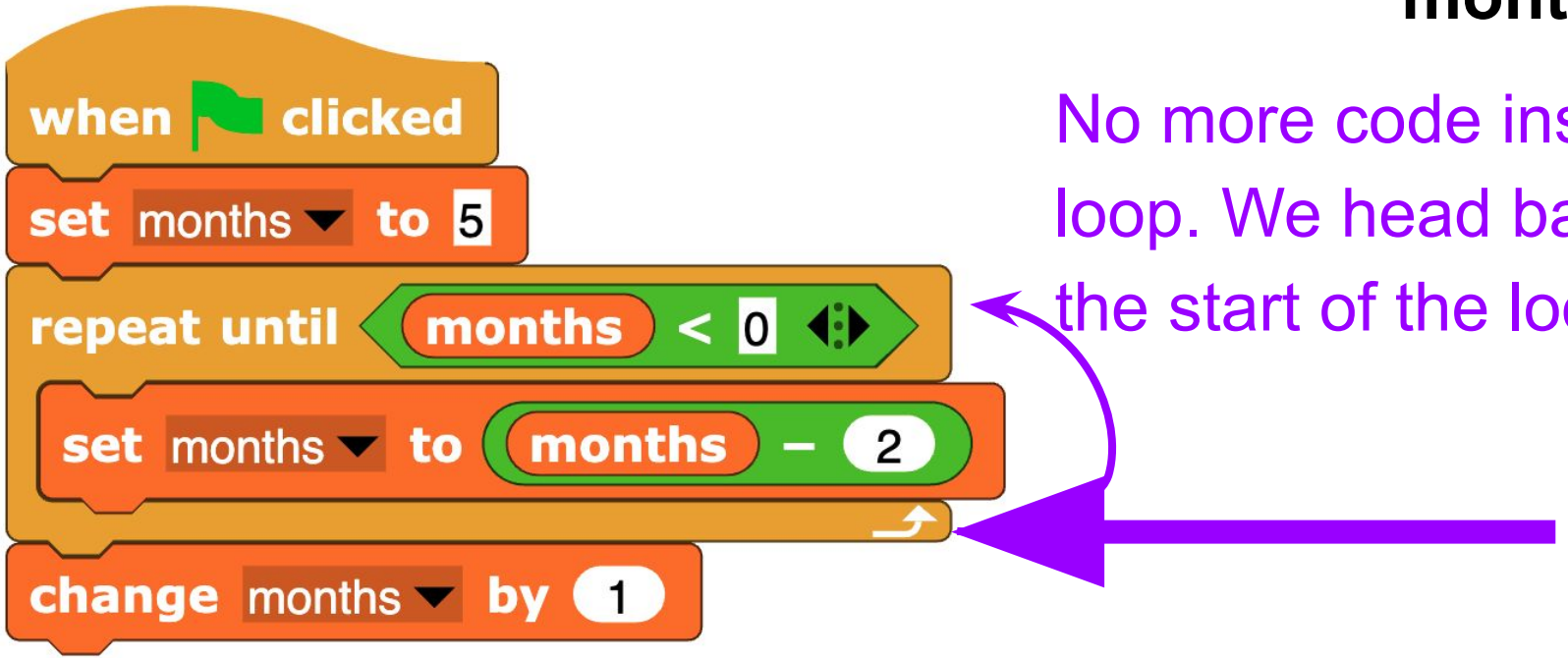
The value stored inside the months variable changes:

5 - 2 = 3

Activity - Step through this code

Step 2.3: Go through each step of the loop, keep track of the variable and its value.

months 3

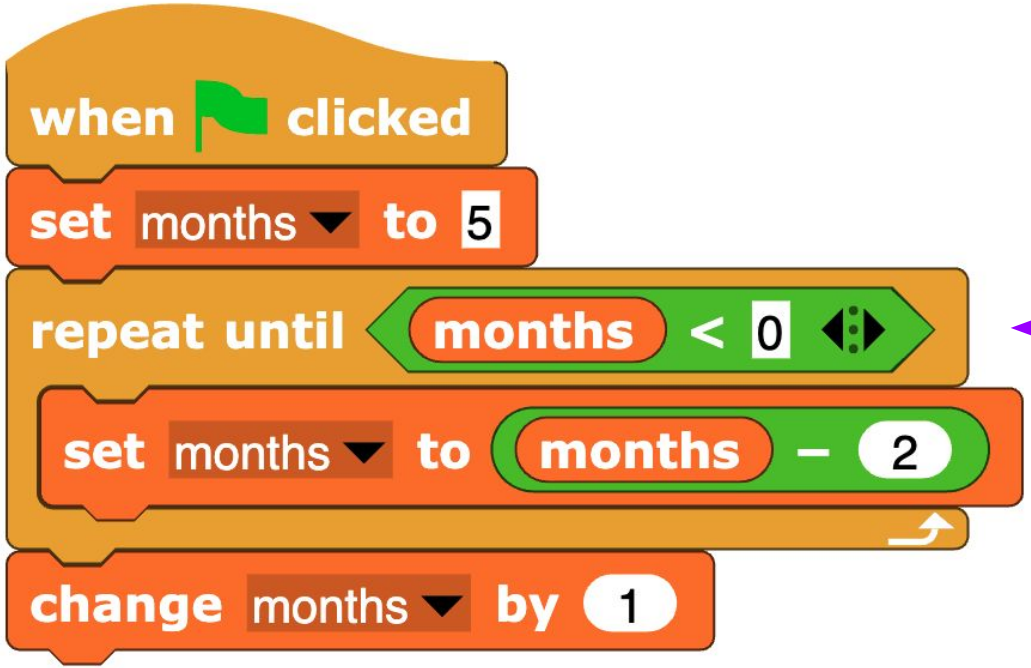


No more code inside the loop. We head back up to the start of the loop.

Activity - Step through this code

Step 2.4: Go through each step of the loop, keep track of the variable and its value.

months 3



Is the condition true?

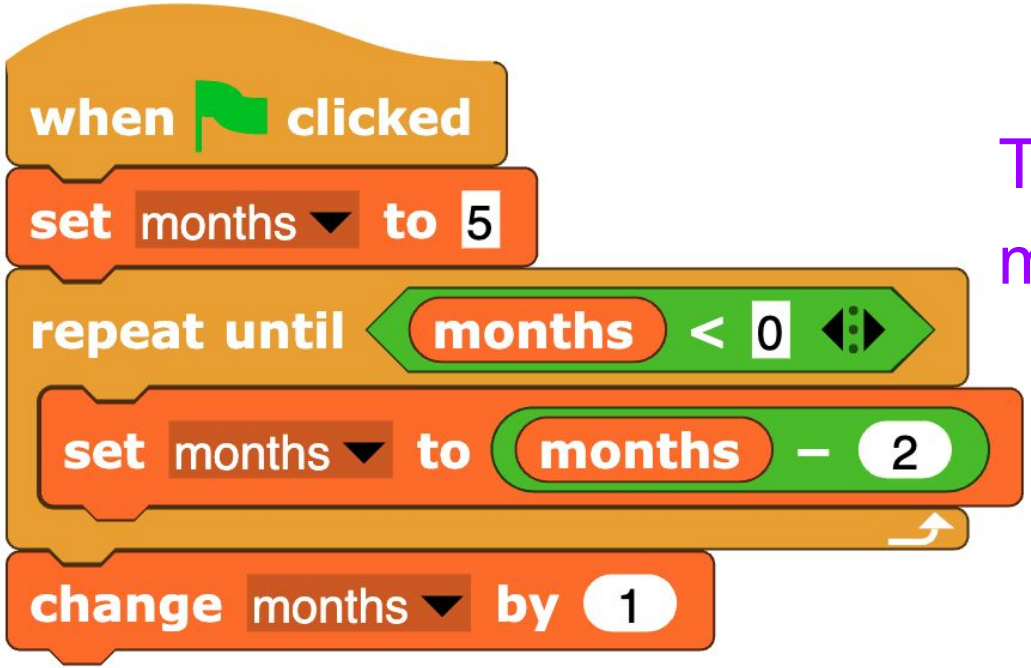
No → Execute code inside the loop.

Yes → Exit the loop, execute the first line after the loop.

Activity - Step through this code

Step 2.5: Go through each step of the loop, keep track of the variable and its value.

months 3



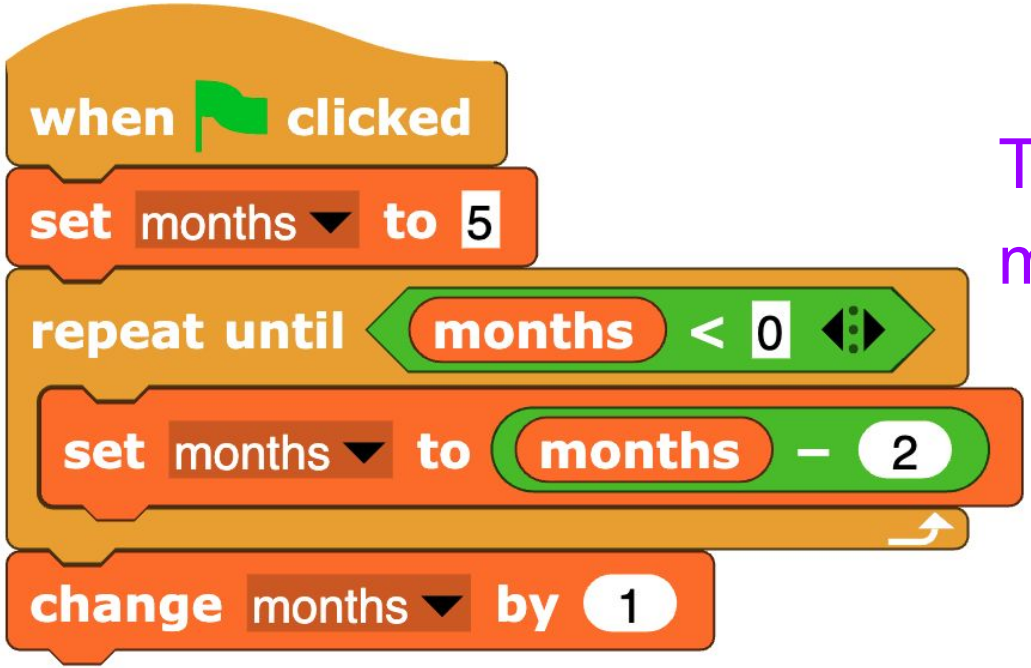
The value stored inside the months variable changes:

3 - 2 = 1

Activity - Step through this code

Step 2.5: Go through each step of the loop, keep track of the variable and its value.

months 1



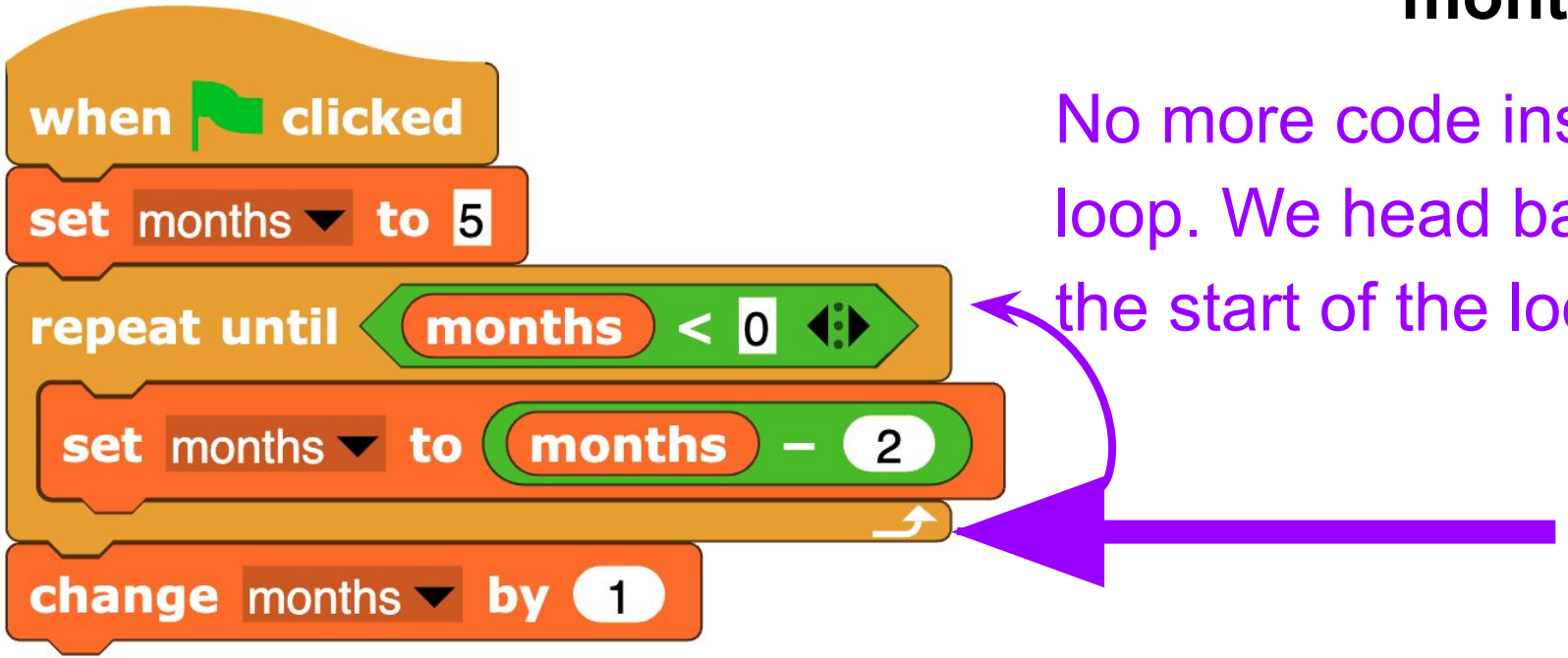
The value stored inside the months variable changes:

3 - 2 = 1

Activity - Step through this code

Step 2.6: Go through each step of the loop, keep track of the variable and its value.

months 1

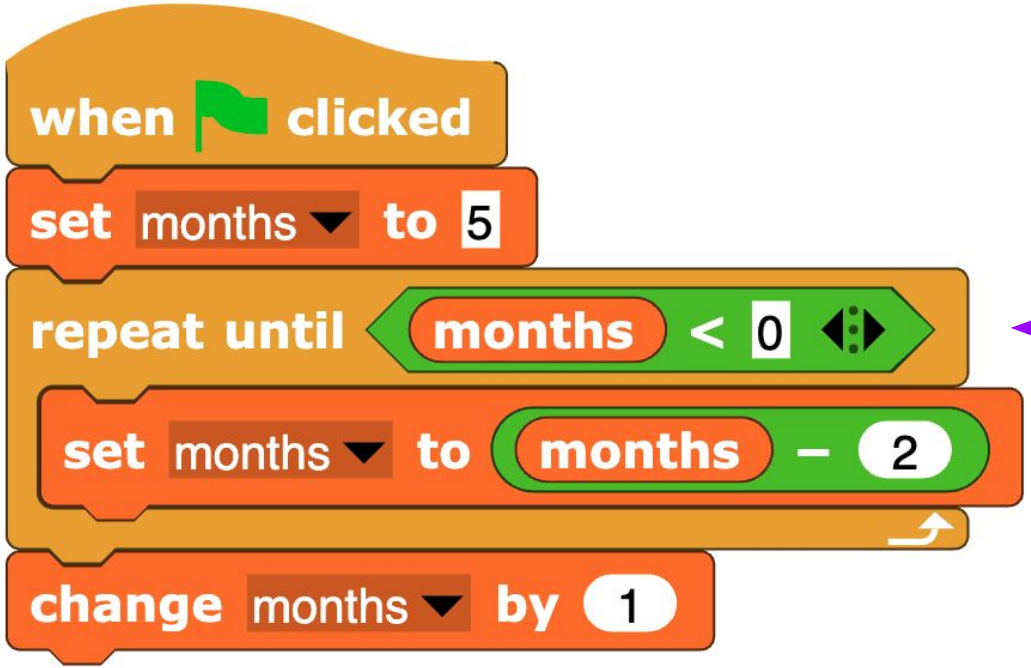


No more code inside the loop. We head back up to the start of the loop.

Activity - Step through this code

Step 2.7: Go through each step of the loop, keep track of the variable and its value.

months 1



Is the condition true?

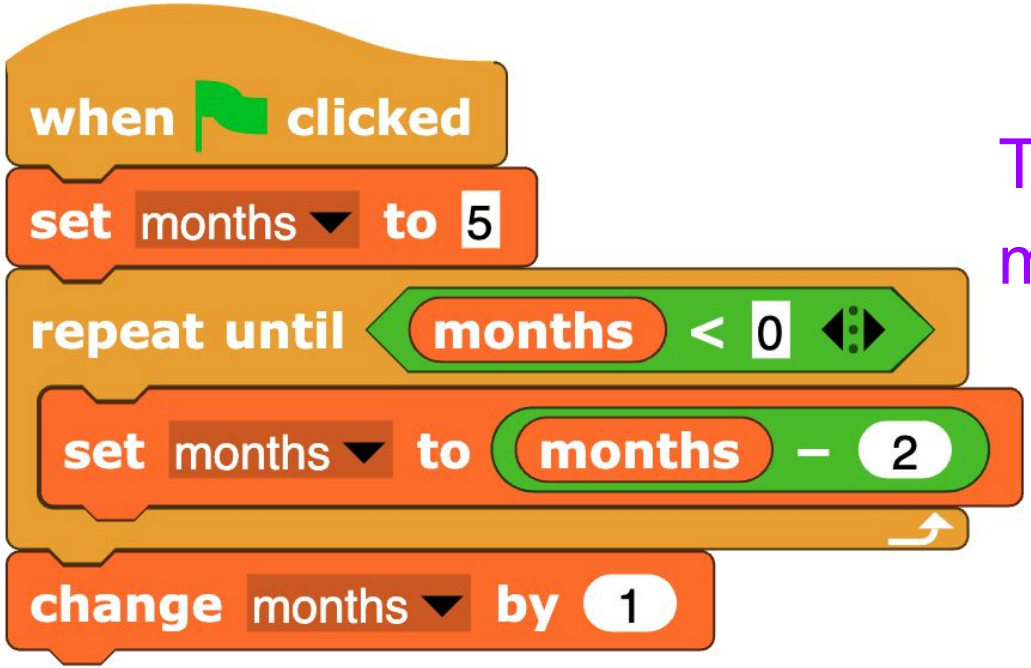
No → Execute code inside the loop.

Yes → Exit the loop, execute the first line after the loop.

Activity - Step through this code

Step 2.8: Go through each step of the loop, keep track of the variable and its value.

months 1



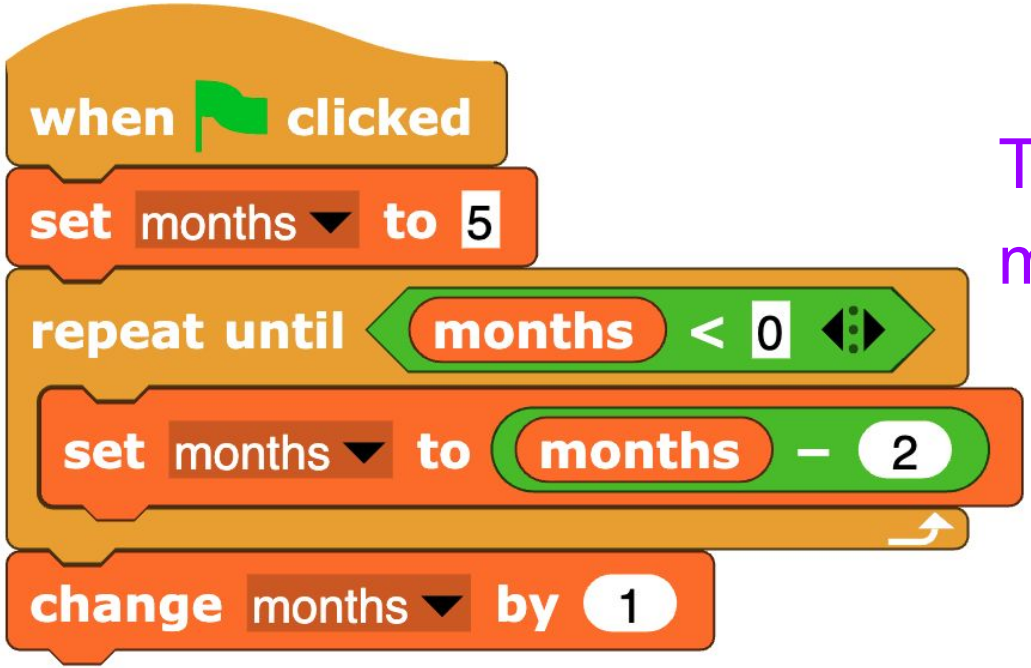
The value stored inside the months variable changes:

1 - 2 = -1

Activity - Step through this code

Step 2.8: Go through each step of the loop, keep track of the variable and its value.

months -1



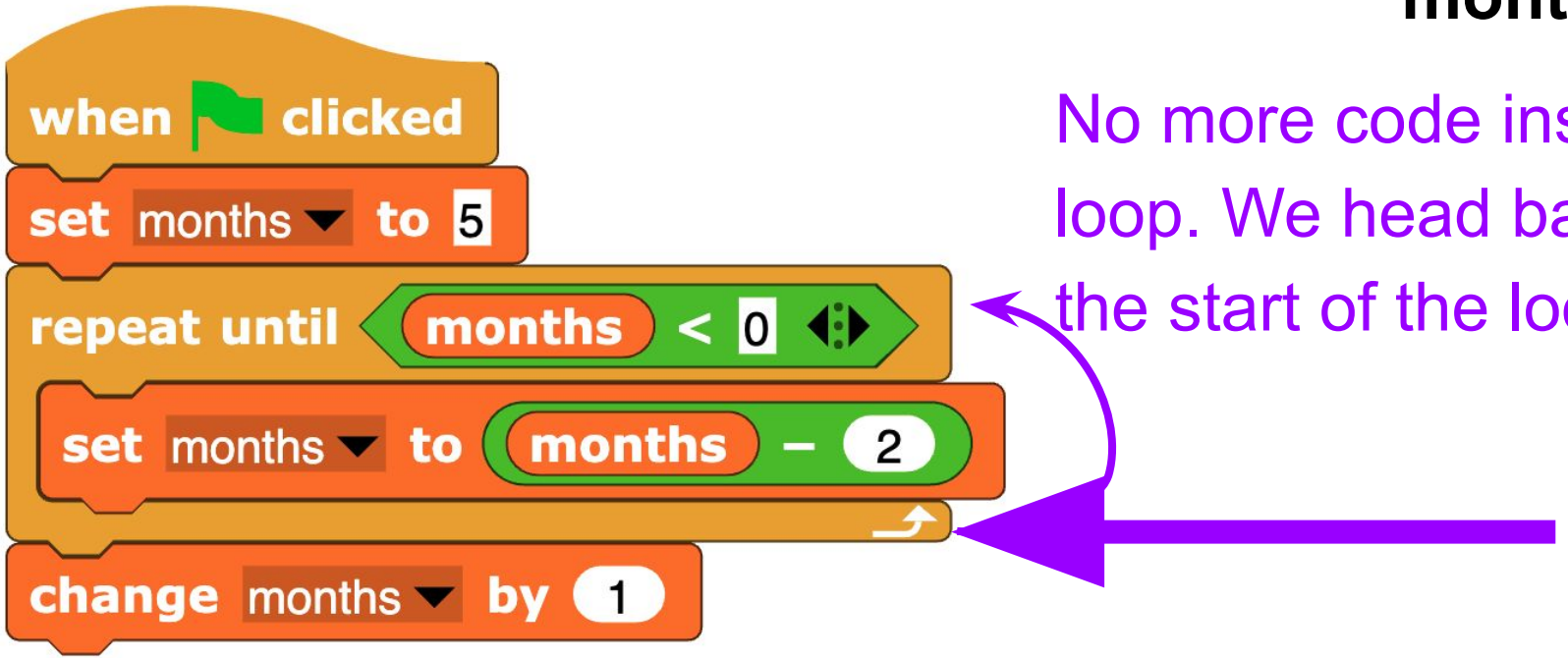
The value stored inside the months variable changes:

1 - 2 = -1

Activity - Step through this code

Step 2.9: Go through each step of the loop, keep track of the variable and its value.

months -1

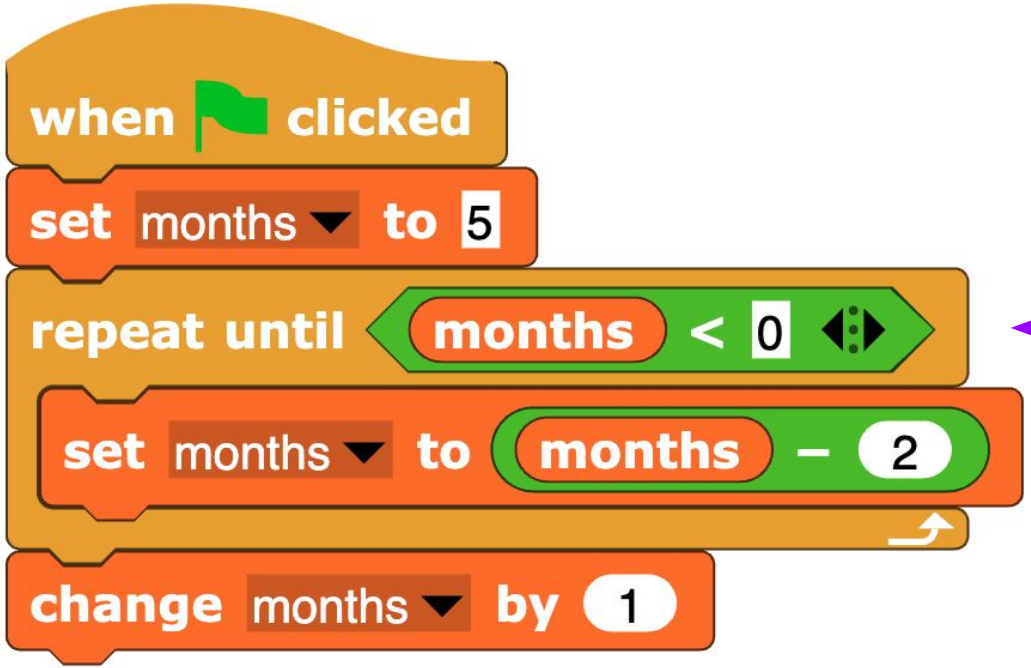


No more code inside the loop. We head back up to the start of the loop.

Activity - Step through this code

Step 3.0: Write down the value of each variable after exiting the loop/repeat block.

months -1



Is the condition true?

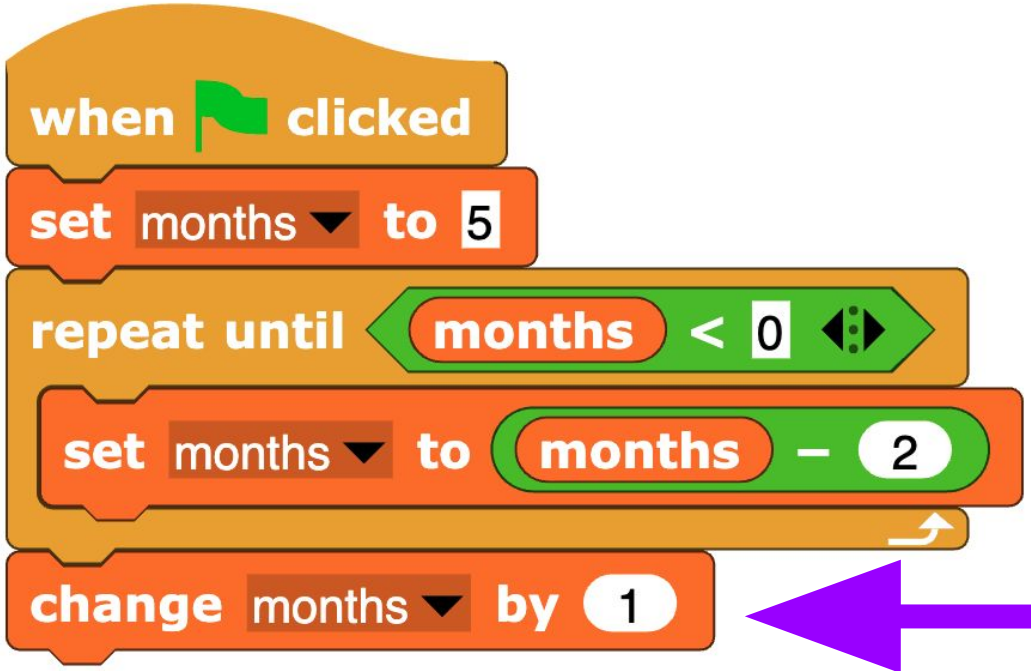
No → Execute code inside the loop.

Yes → Exit the loop, execute the first line after the loop.

Activity - Step through this code

Step 3.1: Go through any remaining code, keep track of the variable and its value.

months 0



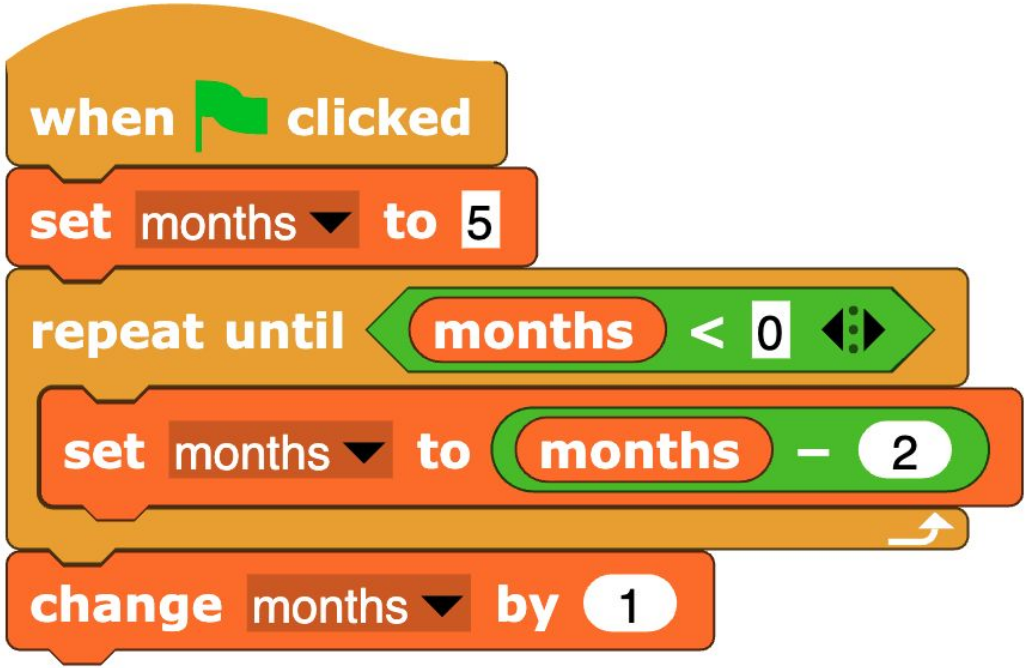
The value stored inside the months variable changes:

-1 + 1 = 0

Activity - Step through this code

Step 4: Celebrate! You have solved the question

months 0



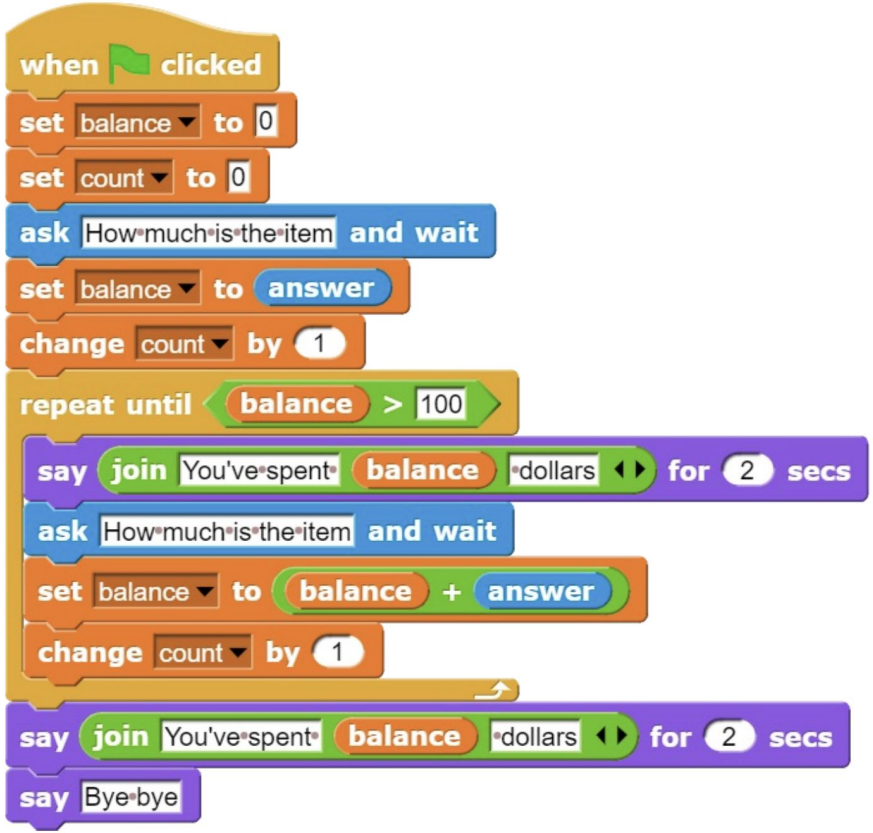
Done!

Take-Home Activity

What does this code block do?

Describe the code in terms of input and output and what is being done.

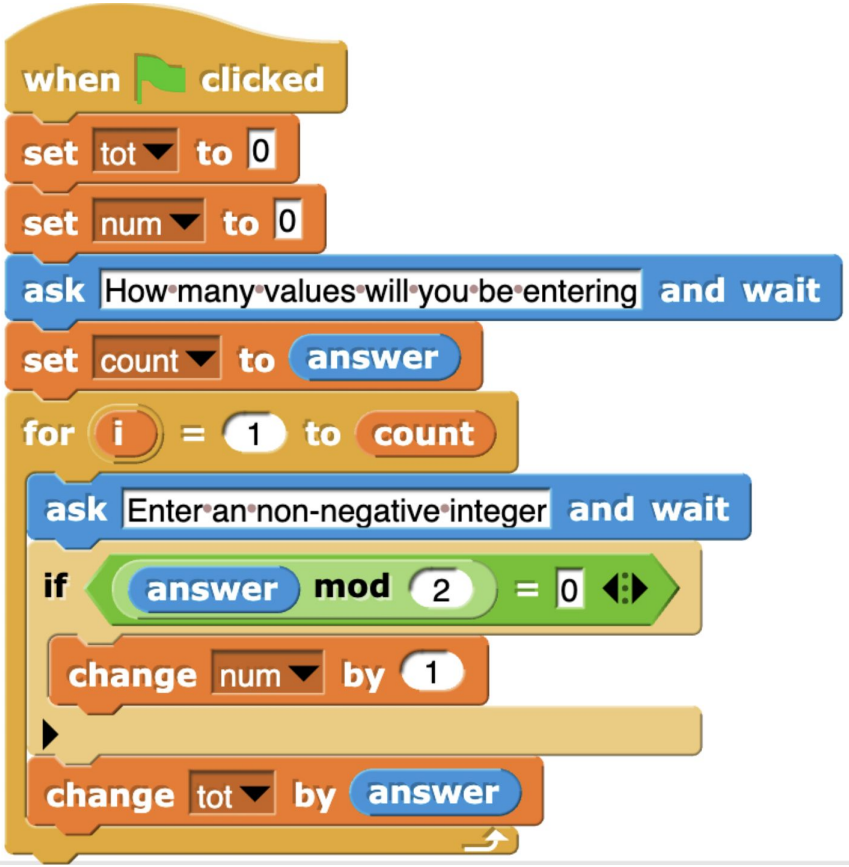
The block consumes....
It does...
It produces/displays/reports…



What does this code block do?

What is the value of **tot**, **num** and **count** when the block is run? *[for practice, you can assume a number between 1-6]*

What does this code block do?



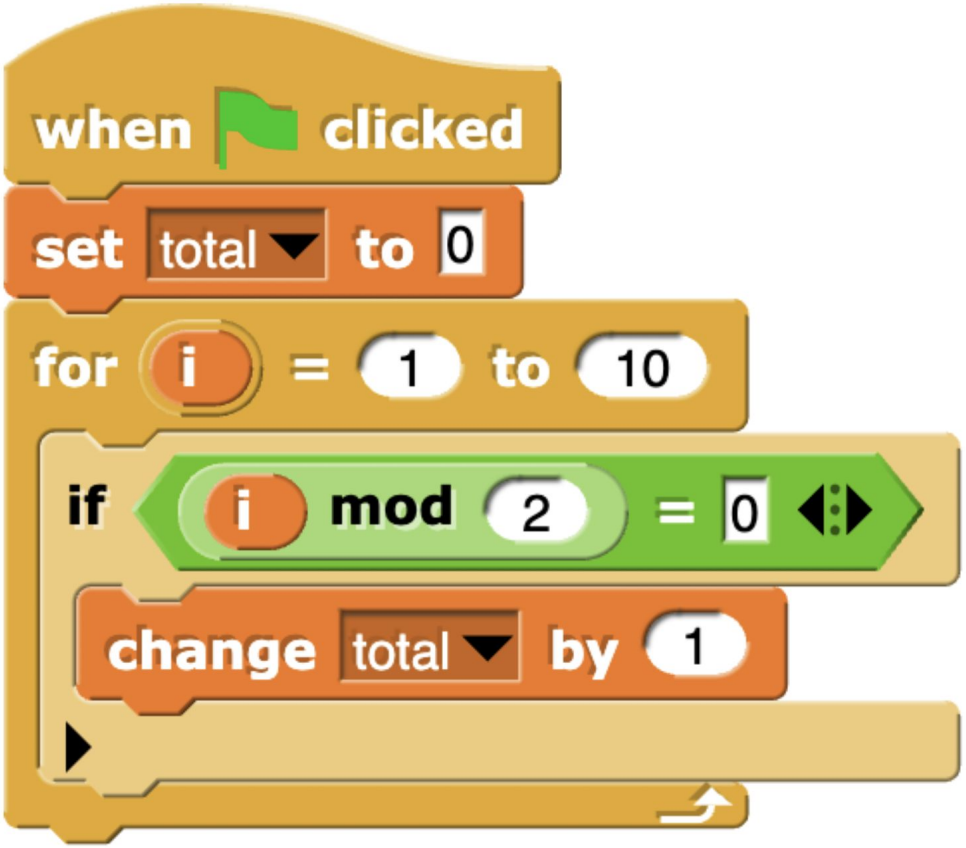
Q: What will the following expression report?

A. True

B. False

Q: What is the value of total when this code block is run?

What does this code block do?



Midterm Q/A

Wrap up

Course Admin

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