# Variables, Conditionals, Loops, and Functions

## The Absolute Basics of Making a Computer Do Stuff

Tim Jackman

BU Summer Challenge

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  - The concepts will extend to other languages

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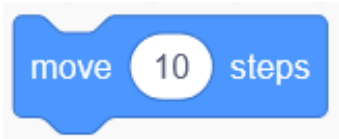

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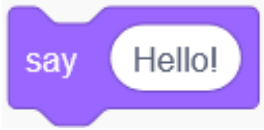

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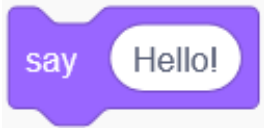

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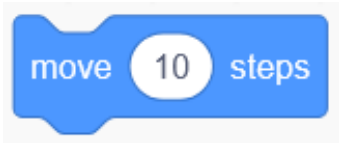


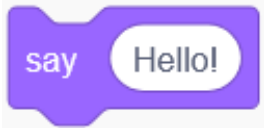


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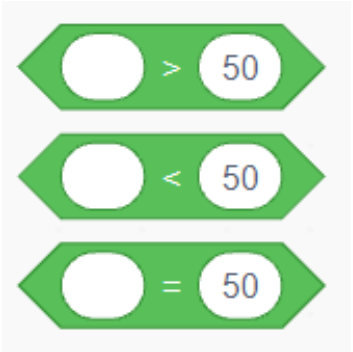

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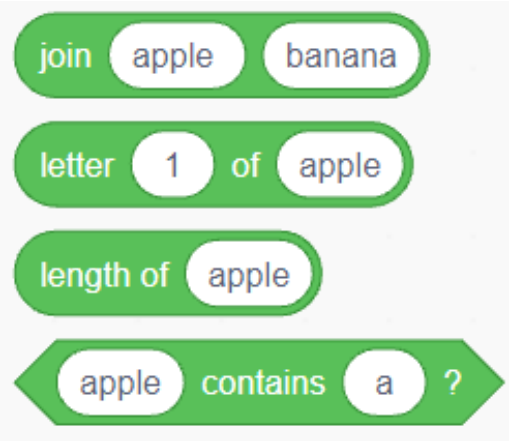

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- Useful for doing actions at regular intervals
- In some programming languages, it is denoted as %
- Typically only used with integers, in some languages (for example Scratch and Java) you can use it with decimals, but it might not be fully accurate.

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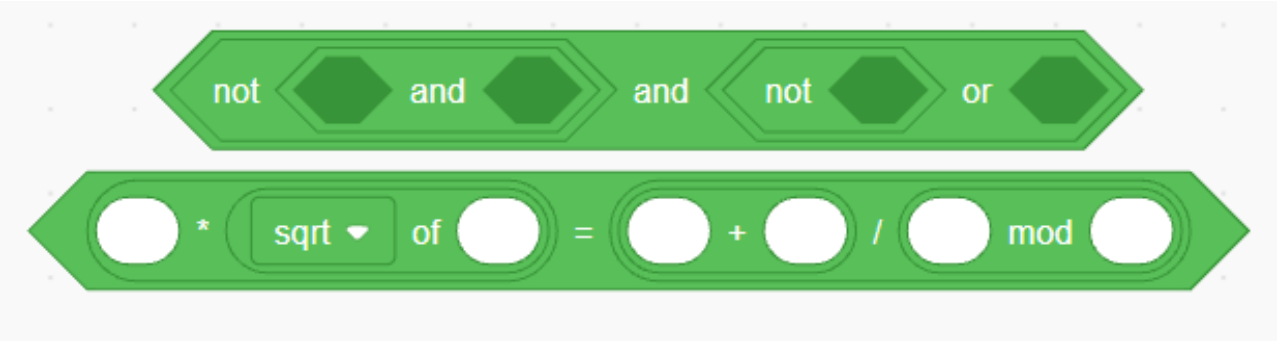

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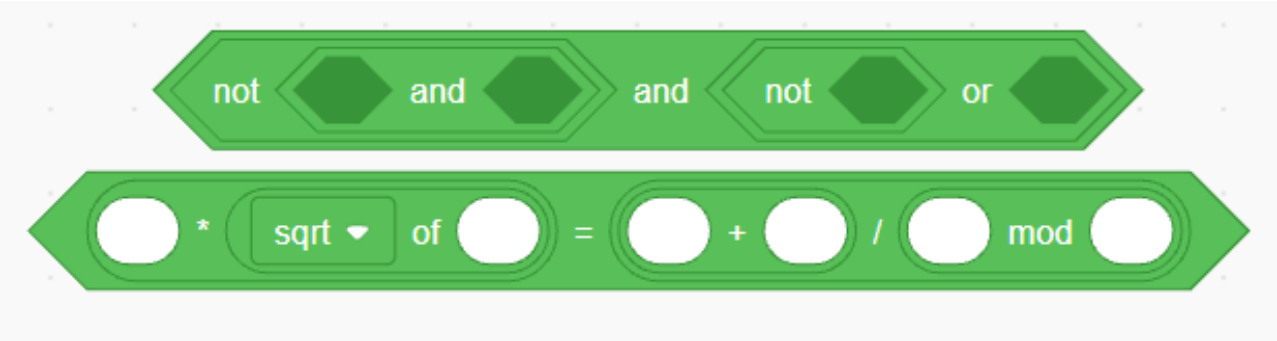


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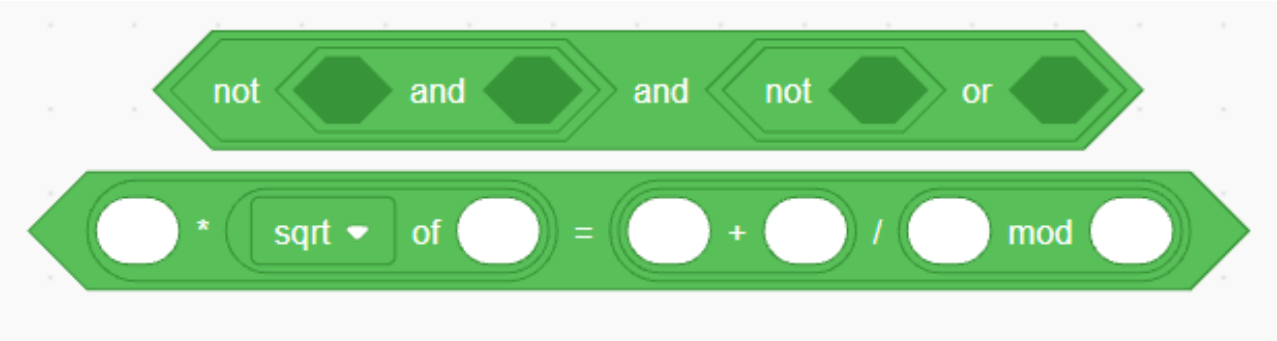


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- In other languages, there are varying orders of operations (like PEMDAS in Math), but typically we'll use parentheses to make avoid both *ambiguity* and *bugs* (like in Math)

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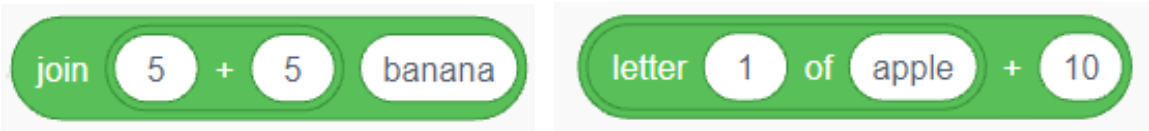

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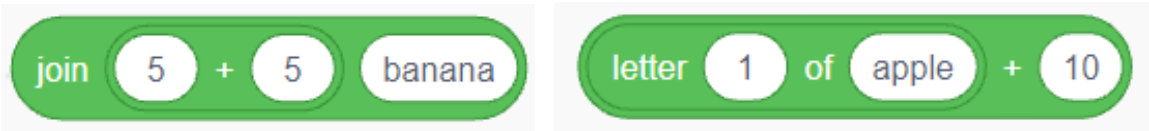


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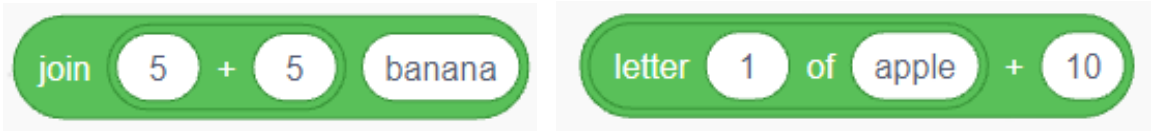


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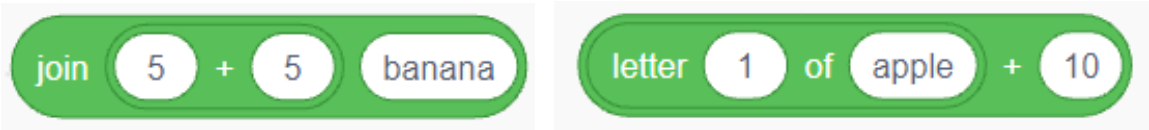


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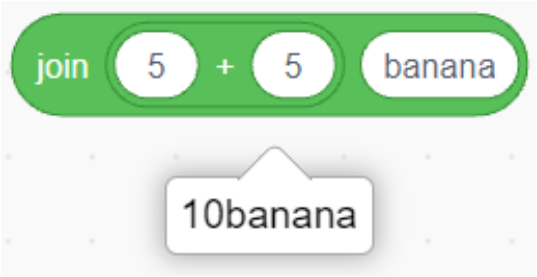

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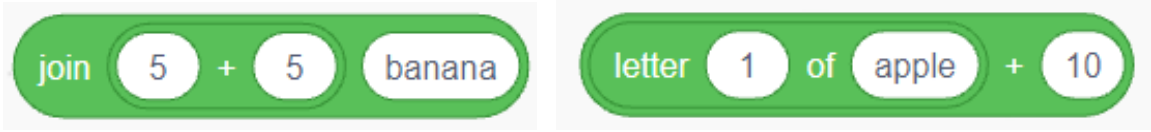


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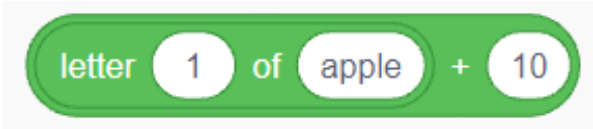


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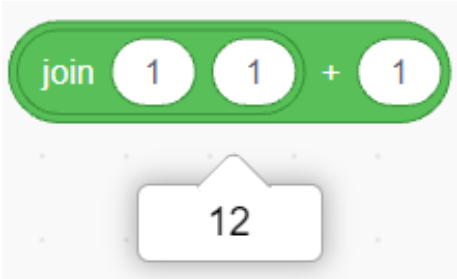

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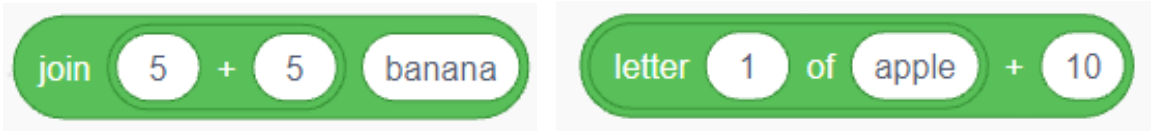


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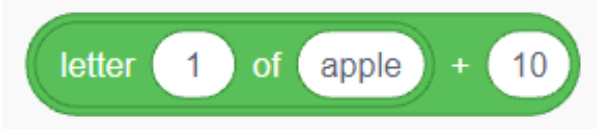


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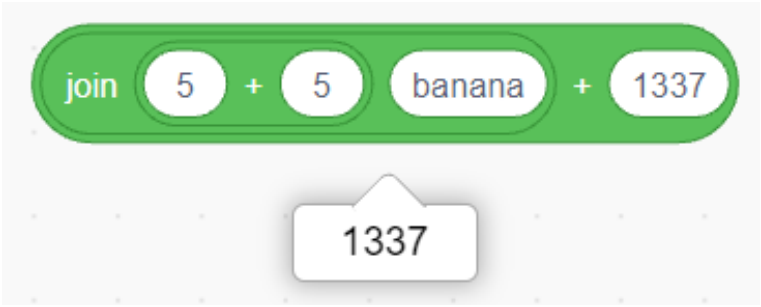

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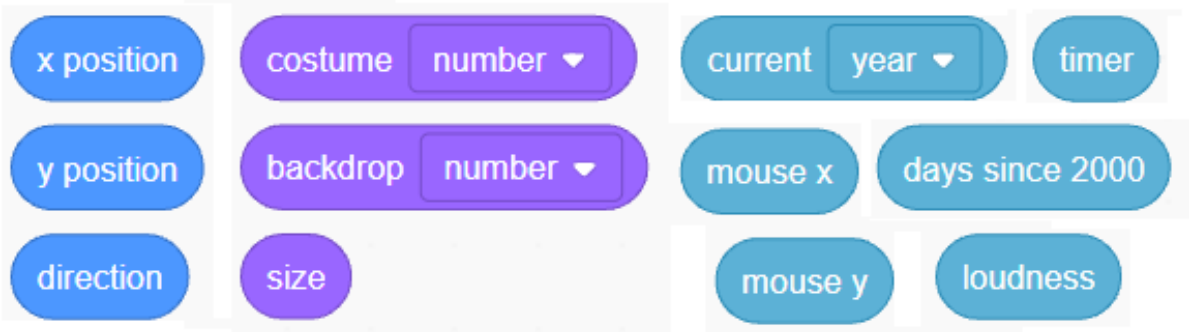

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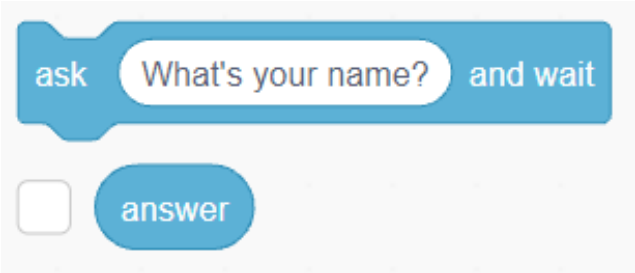


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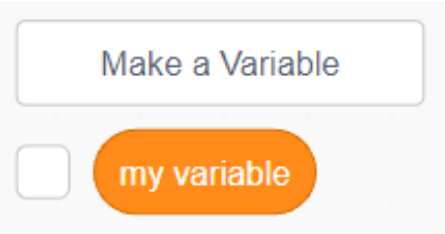

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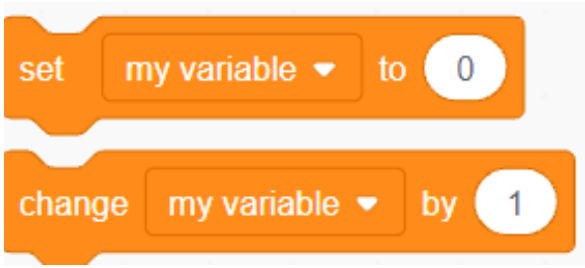

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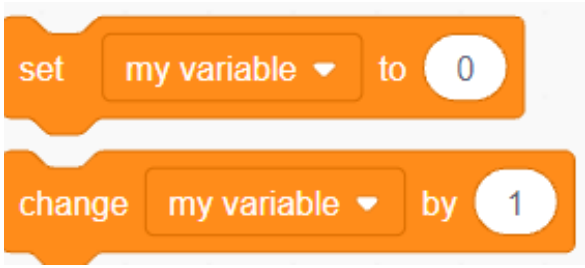


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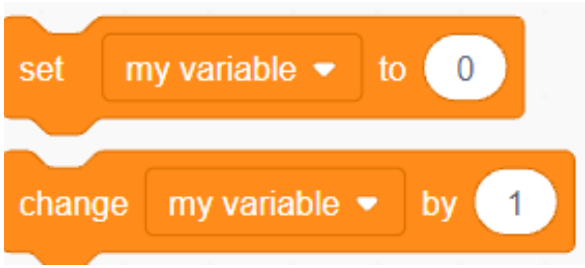


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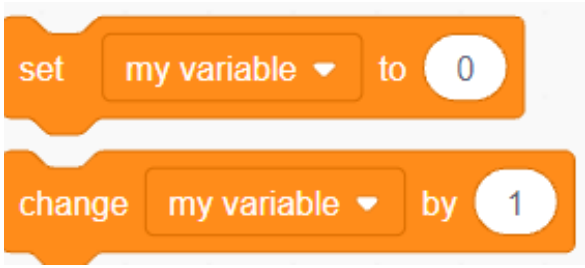


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  - "change v by x" is just *syntatic sugar* for "set v to (v + x)" (it's easier to read and use)

# Demo Time!

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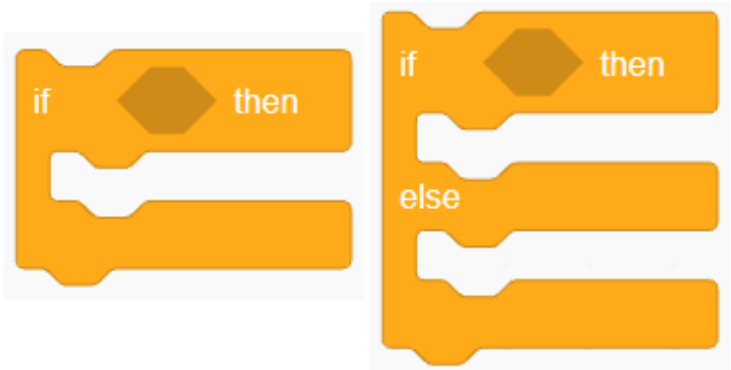

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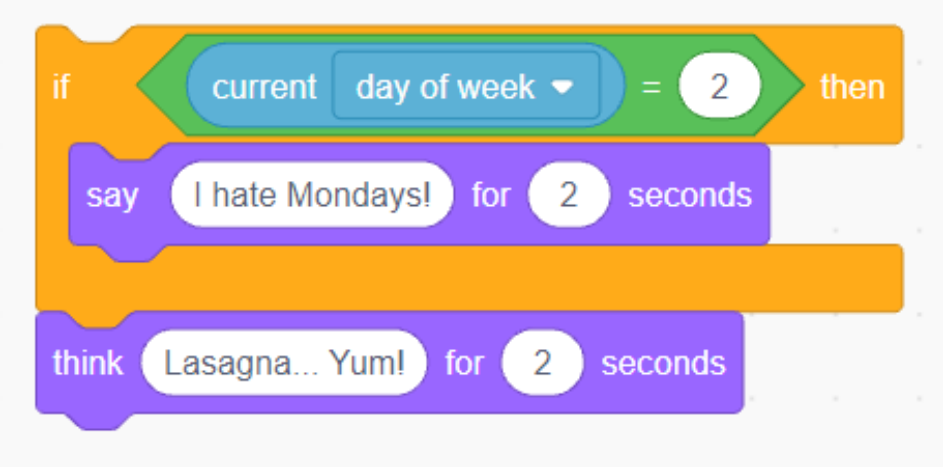

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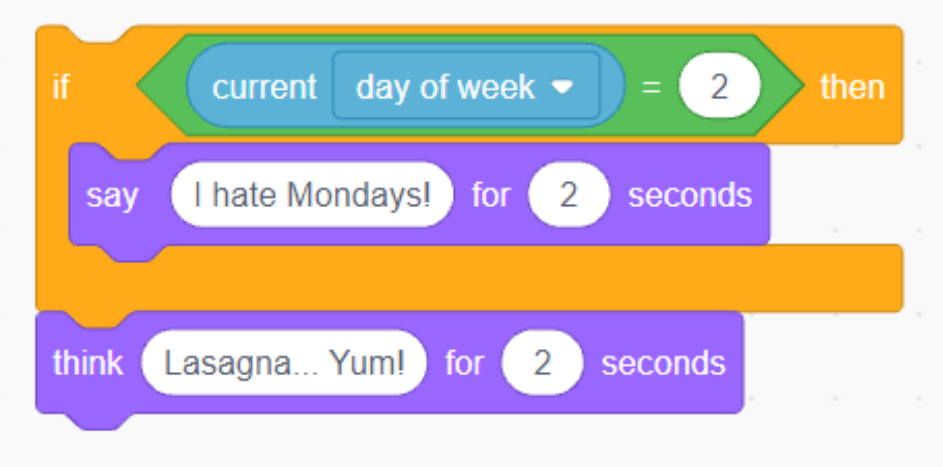


  - The program proceeds to the block of code, whether the condition is met or not

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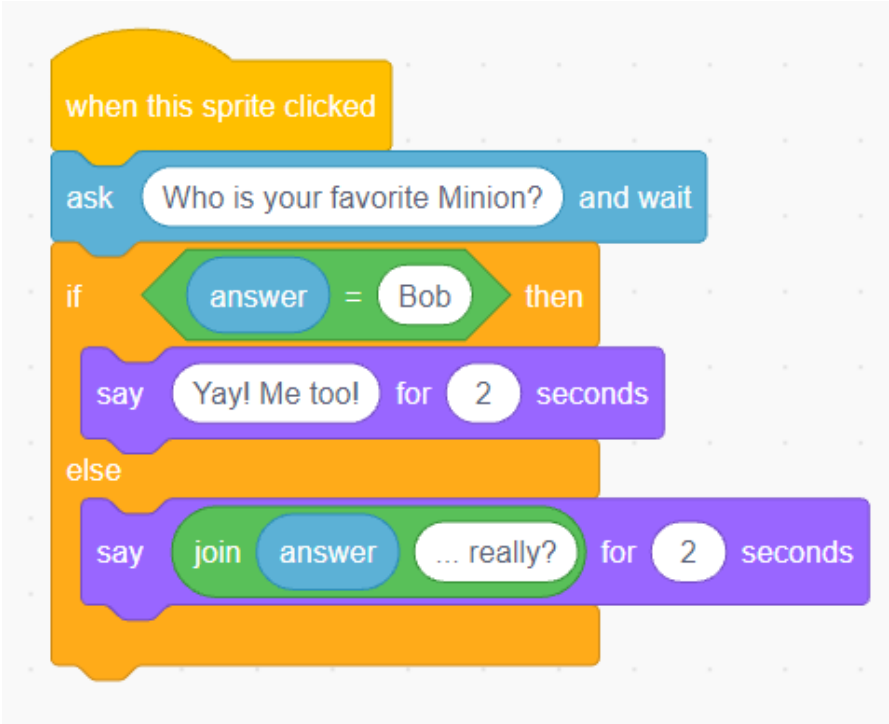


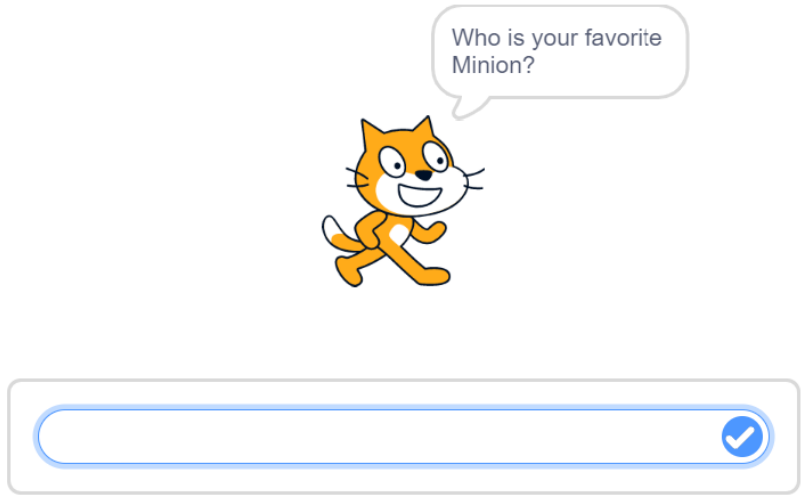

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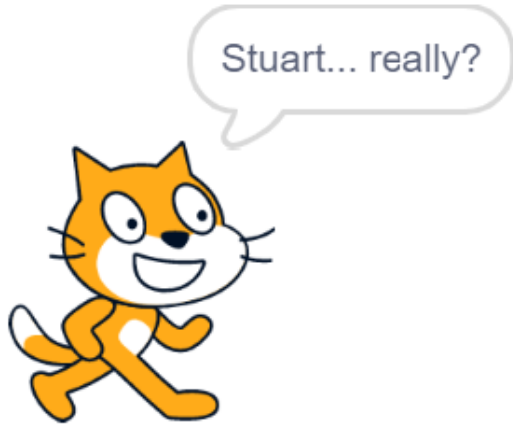

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- You can nest conditionals to get more complicated control flows

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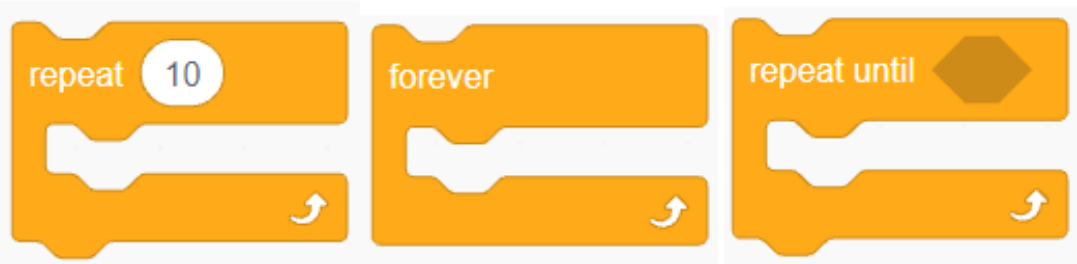

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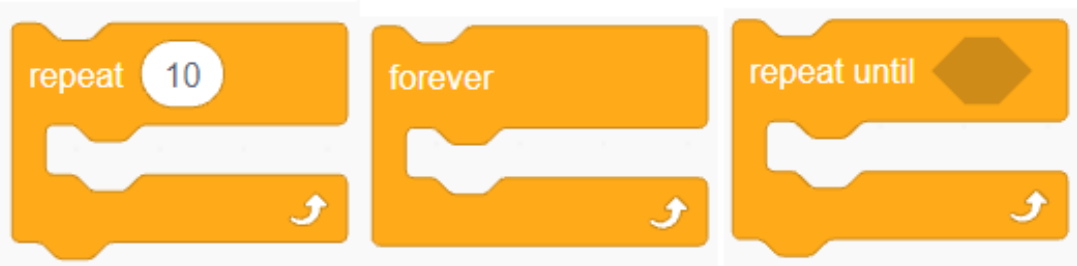

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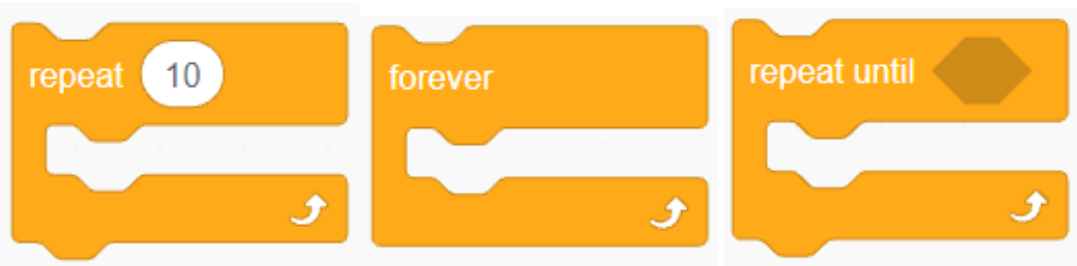


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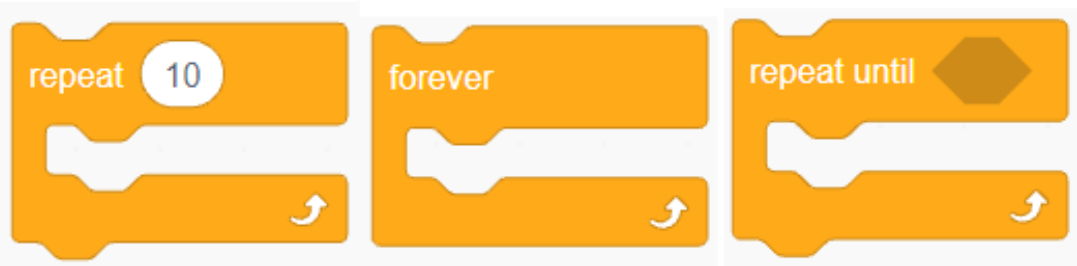


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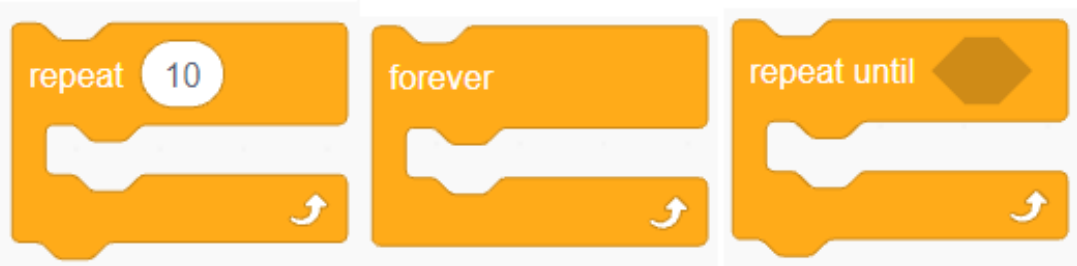


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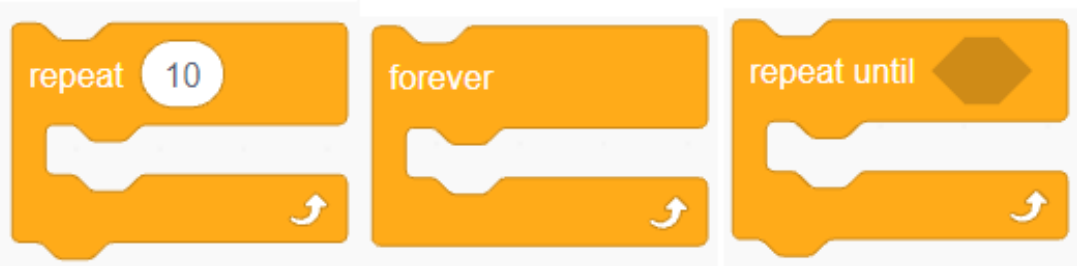


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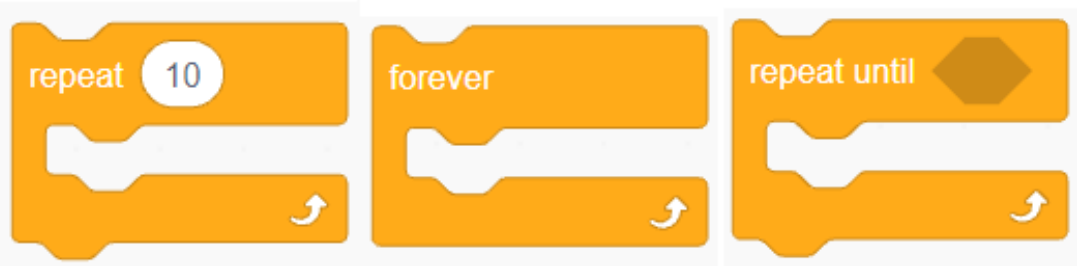


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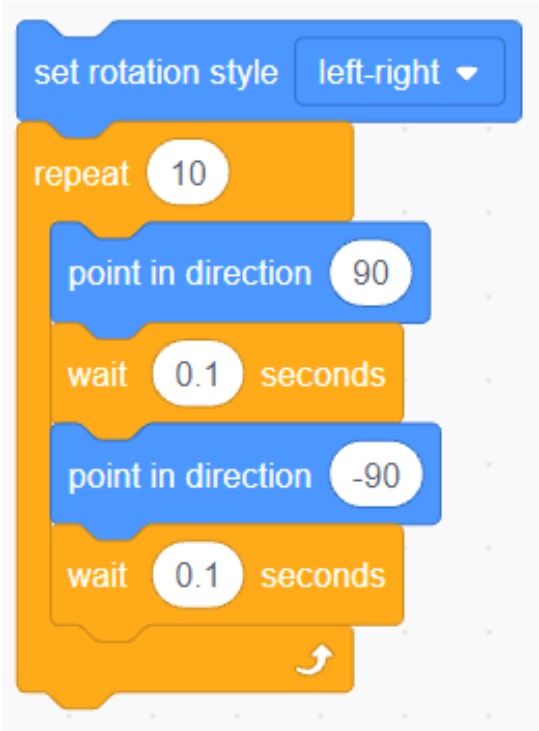

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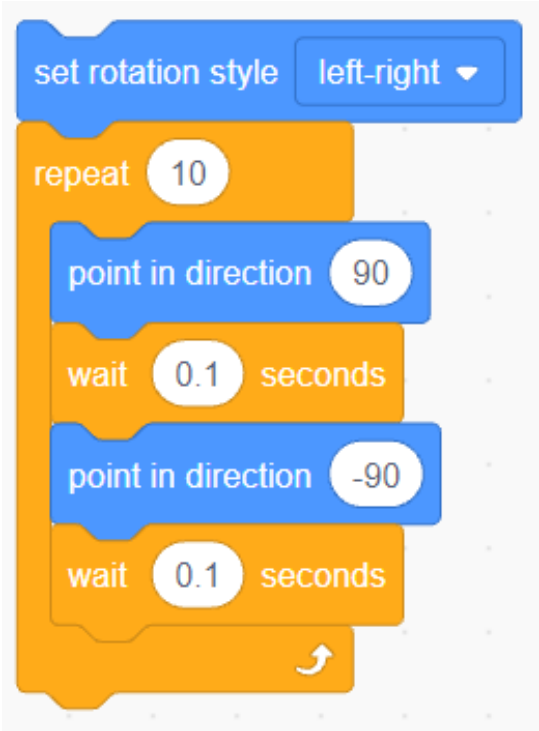


- This code will make the sprite "shimmy"

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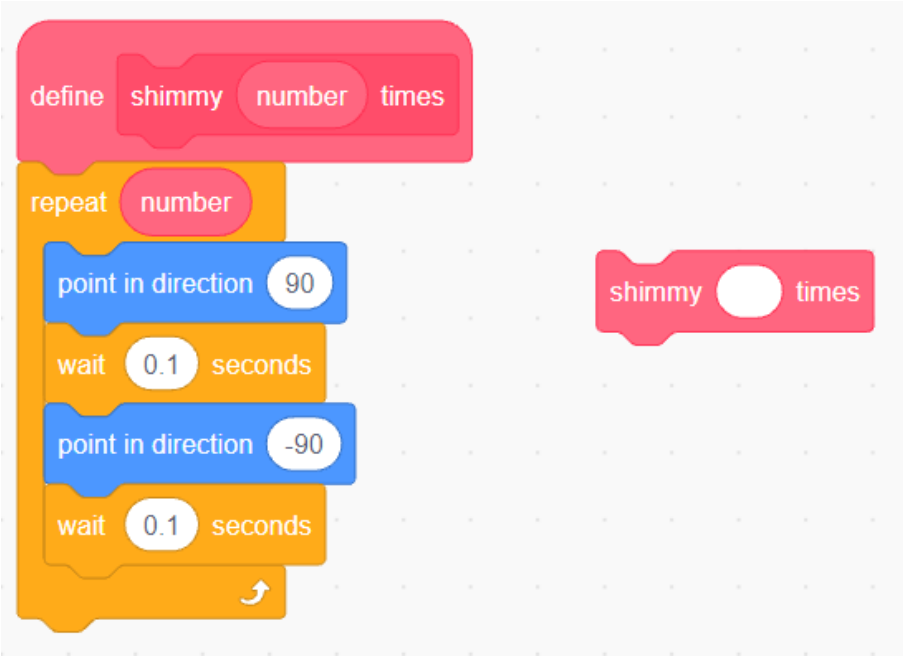

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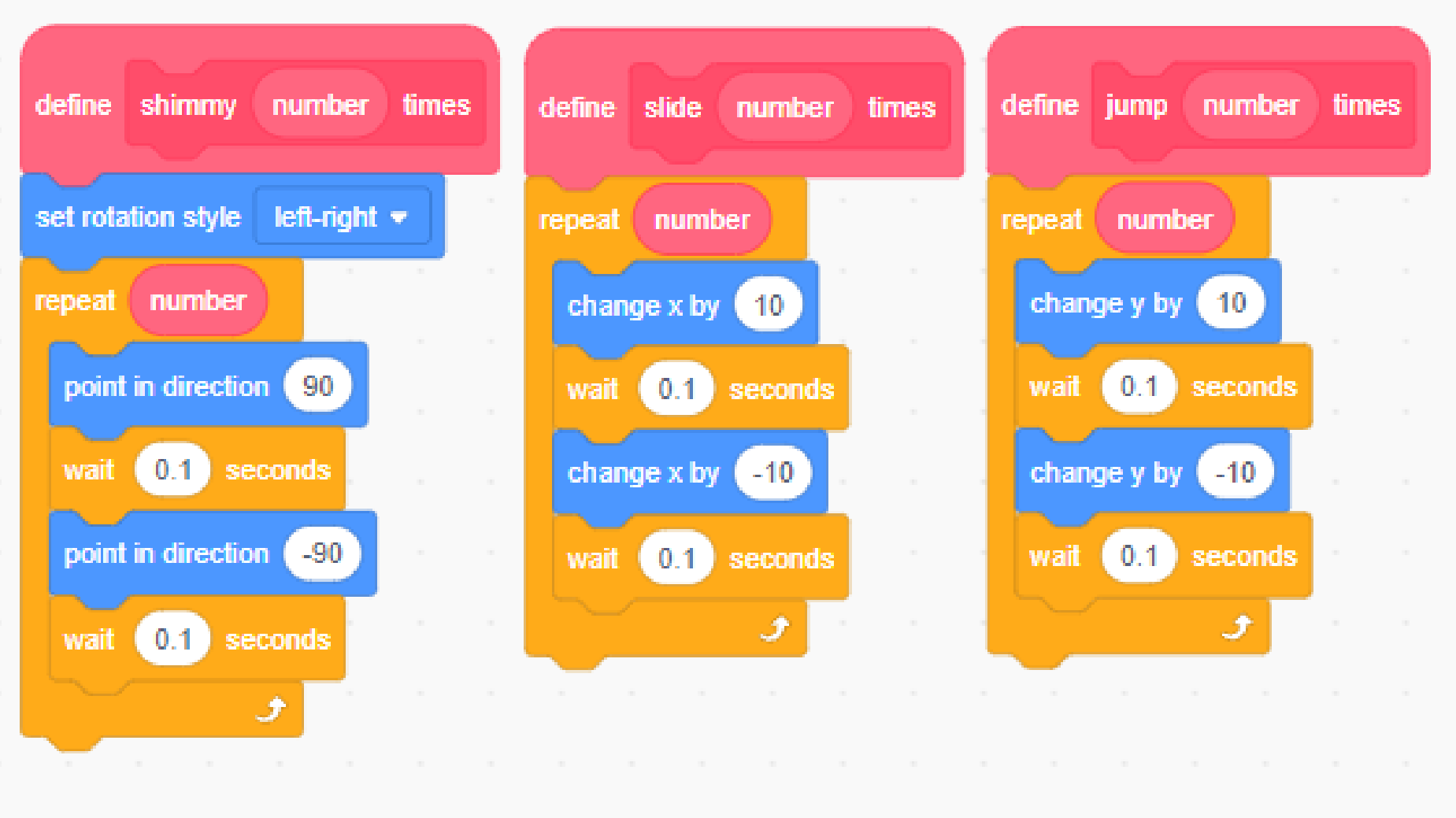

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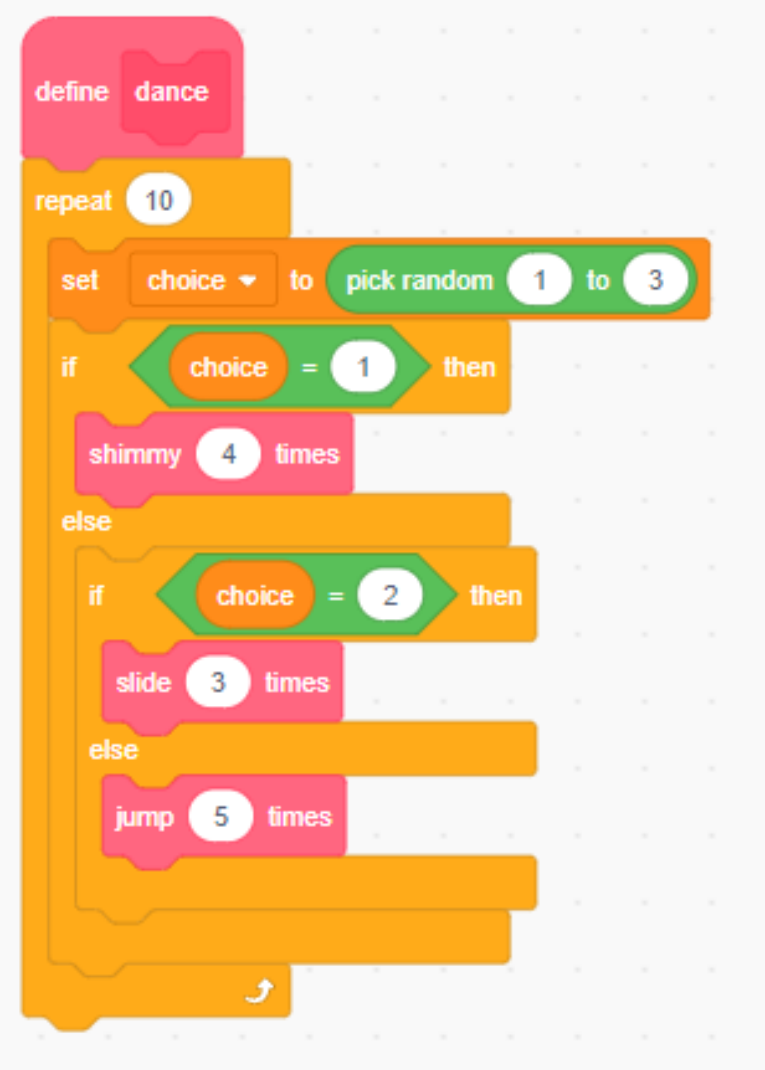

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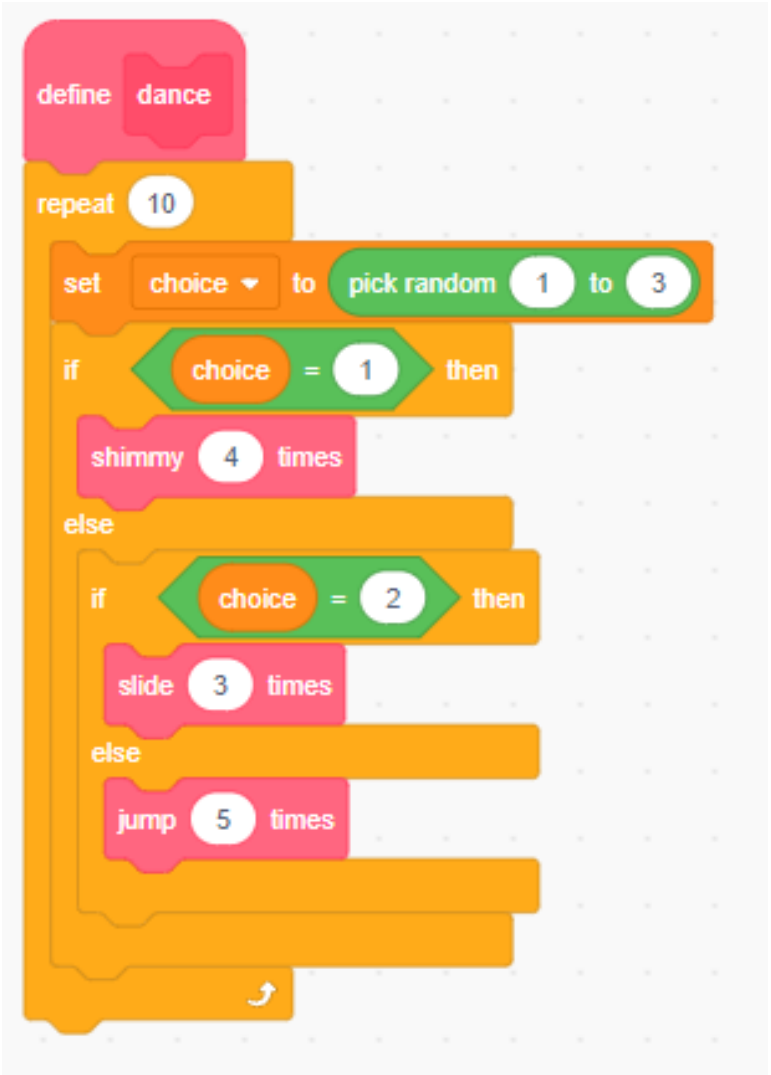


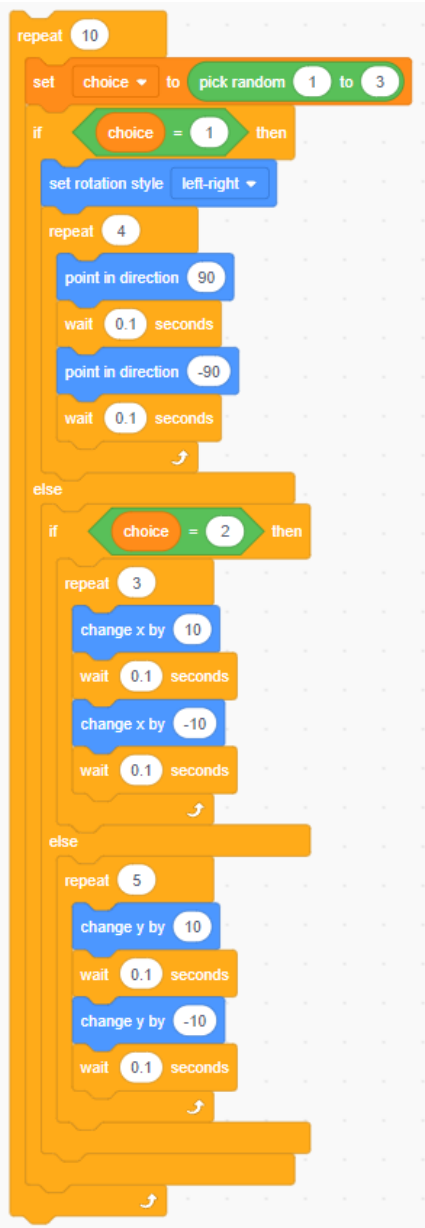

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- If we're working in a team, other people can use our functions without needing to know how they work!
- The key to problem solving is to break your problem into sub-problems, solve those subproblems, and then put those solutions together.

# Challenge

Create a program that has a sprite say the numbers 1 to 100, replacing any multiples of 3 with the word Fizz, replacing any multiples of 5 with the word Buzz, and any multiples of both with FizzBuzz.

1, 2, Fizz, 4, Buzz, Fizz, 7, 8, Fizz, Buzz, 11, Fizz, 13, 14, FizzBuzz, 16, . . .

(This is an actual "common" job interview question to weed out people who don't know the basics, you can now pass it with what we've seen!)