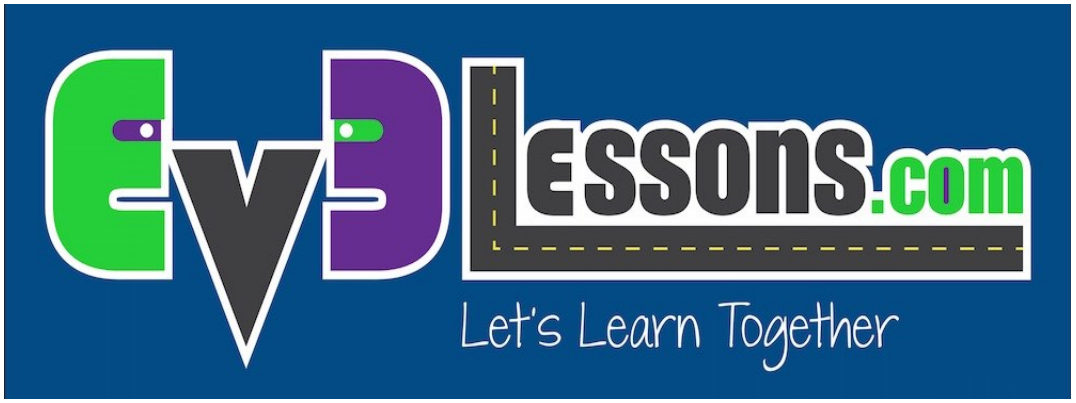
INTERMEDIATE PROGRAMMING LESSON



INTRODUCTION TO MY BLOCKS

By Sanjay and Arvind Seshan

Lesson Objectives

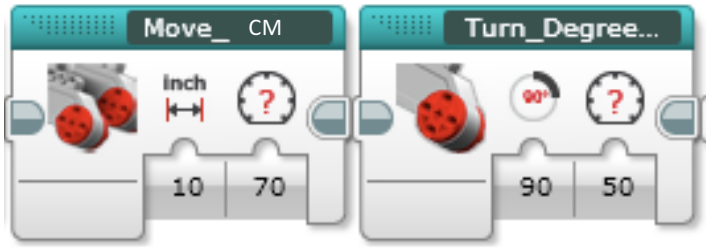
Learn how to make custom blocks in the EV3 Software (My Blocks)

Learn why a My Block is useful

Learn to construct a My Block with Inputs and Outputs (Parameters)

What is a My Block?

- A My Block is a combination of one or more blocks that you create that can be grouped into a single block
- My Blocks are basically your own custom blocks
- Once a My Block is created, you can use it in multiple programs
- Just like any other block in EV3, My Blocks can have both inputs and outputs (parameters)



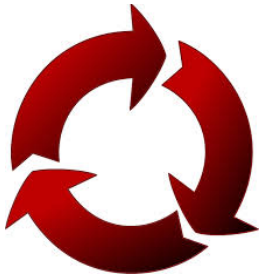
The two blocks above are examples of My Blocks:

- Move_Inches tells the robot to move the number of inches we input
- Turn_Degrees tells the robot to turn the amount we input

- These My Blocks will be taught in separate lessons.

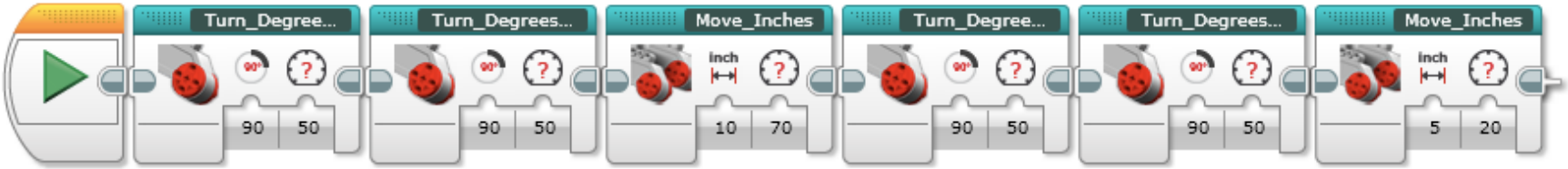
When do You Use a My block?

- Whenever the robot is going to repeat an action inside your program
- When code is repeated in a different program
- Organize and simplify your code

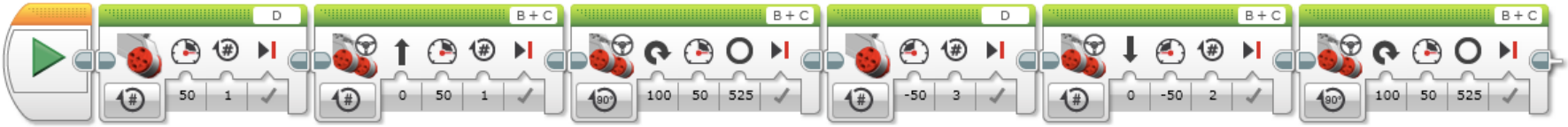


Why Should You Bother?

Because of My Blocks, your missions will look like this…



Instead of this….



This makes your code easier to read and easier to modify!!!

What Makes a Useful My Block

Note: Making My Blocks with inputs and outputs can make them far more useful. However, you need to be careful not to make the My Block too complicated.

Question: Look at the list of three My Blocks below. Which ones do you think are useful for to use?

- Move5CM (Moves the robot five centimeters)
- MoveCM with a centimeter and power input
- MoveCM with centimeter, power, angle, coast/brake, etc. inputs

Answer:

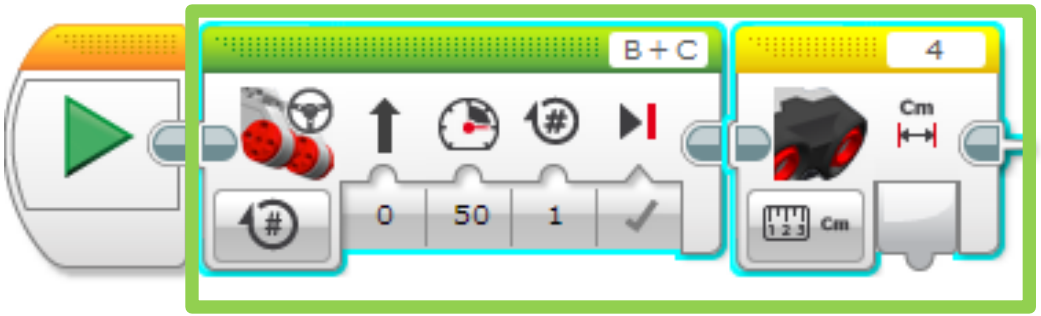
- Move5CM may be used often, but you will be forced to make other My Blocks for other distances. This will not be fixable later.
- MoveCM with centimeters and power as inputs is probably the best choice.
- MoveCM with centimeters, power, angle, coast/brake, etc. might be most customizable, but some of the inputs might never be used.

Step 1: Highlight Blocks

- For this lesson, our goal is to move a desired amount of rotations at a desired power and return the ultrasonic value at the end

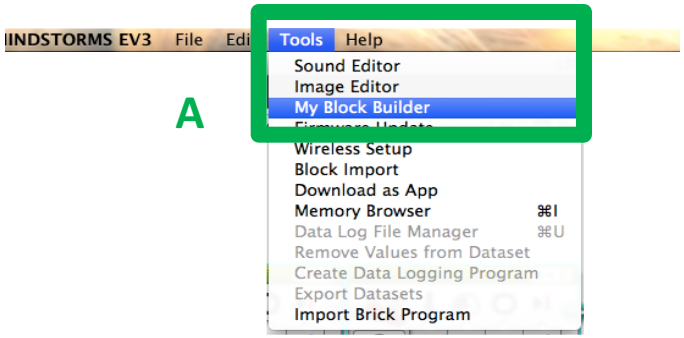
- Question: What would be the input(s) and output(s) for our My Block?
- Answer: The inputs are power and rotations. The Output is distance measured by the ultrasonic sensor.

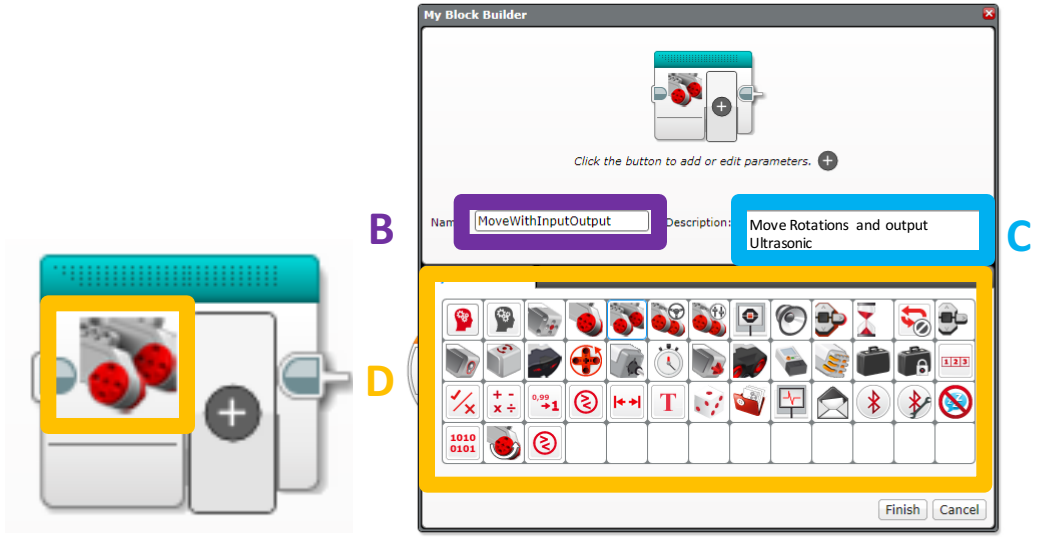
- Step 1: Select the two blocks in the code that you want to turn into a My Block



Step 2: Launch My Block builder

- A: Go to Tools → My Block Builder - If you encounter an error, view the next slide
- B: Pick a My Block Name
- C. Add a Description
- D. Select an Icon for the whole My Block





Common Error Messages

ERROR 1: You must be on a diagram with a selection to create a My Block:

- SOLUTION: You need to highlight all the blocks again before going into My Block Builder

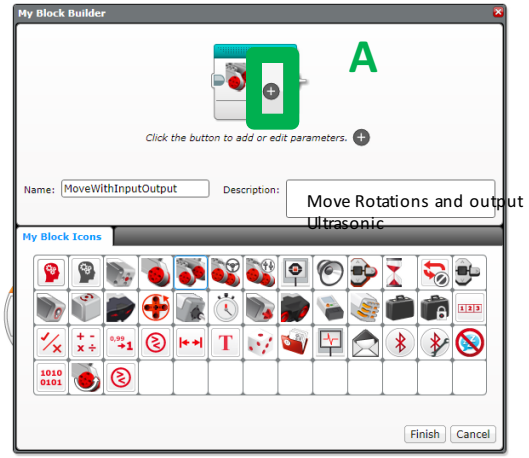
ERROR 2: Start Blocks are not allowed in the selection when creating My Blocks. Remove any Start Blocks from your selection and try making your My Block again.

- SOLUTION: Un-highlight the start block before going into My Block Builder

If you continue to have trouble at this step, just select a single block in your program and create a My Block from it. You can edit add more blocks to a My Block at any time. However, you cannot change the inputs and outputs of a My Block after creation.

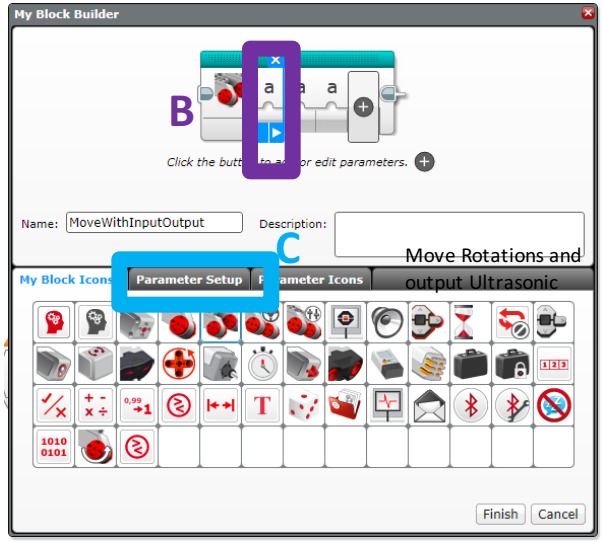
Step 3: Add Inputs/Outputs

A. We need to add two inputs and one output so we will click the + button three times



B. Go back to the first parameter

C. Go to Parameter Setup



Step 4: Setup Parameter for Power

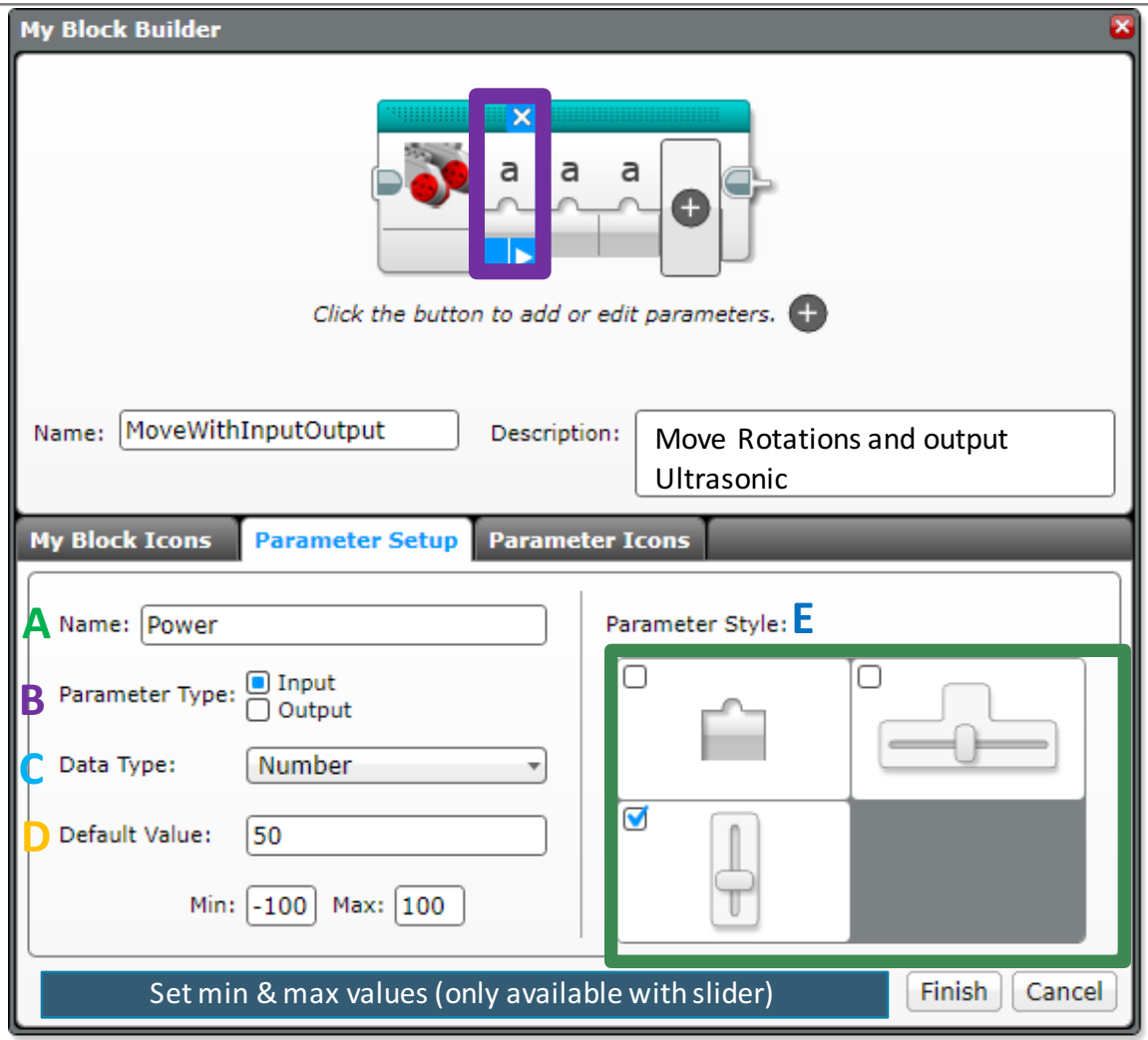
A. Pick a Name

B. Select Input

C. Power is a Number

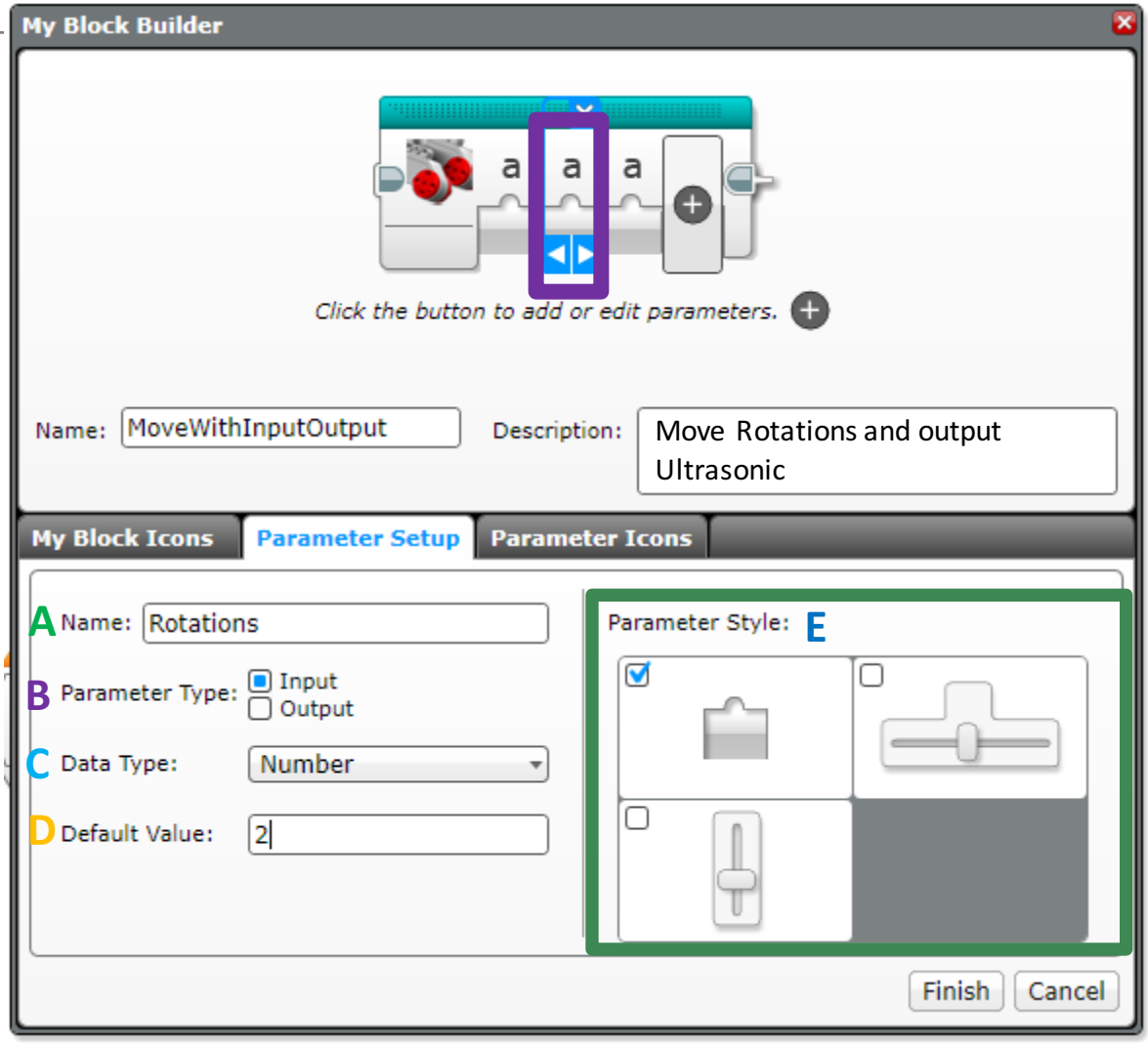
D. Choose a default value

E. Choose button Style



Step 5: Setup Parameter for Rotation

Now click on the second parameter



A. Pick a Name

B. Select Input

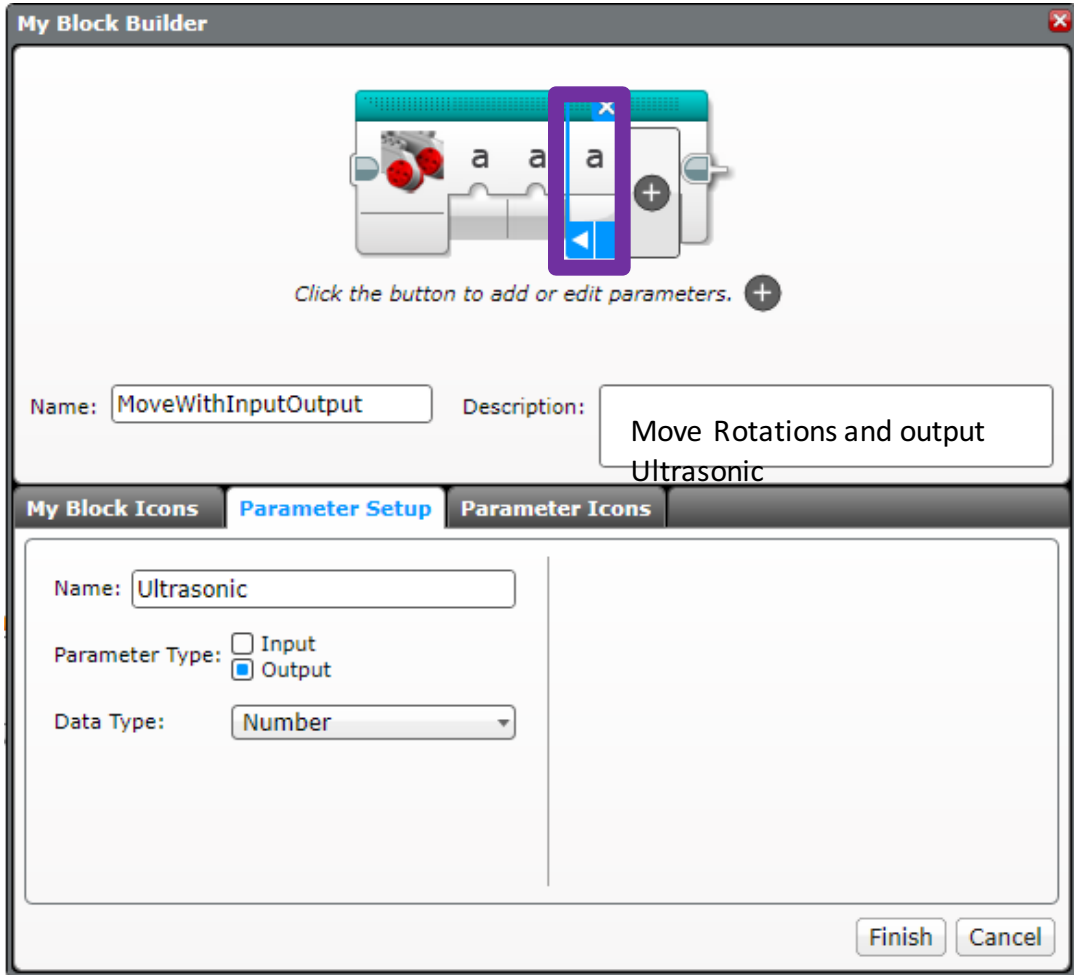
C. Rotation is a Number

D. Choose a default value

E. Choose button Style

Step 6: Setup Parameter for Ultrasonic

Now click on the third parameter



A. Pick a Name

B. Select Output

C. Ultrasonic output is a Number

Step 7: Setup Parameter Icons

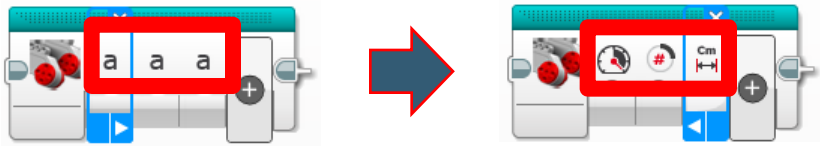
In this step, we will change the icons for the parameters from “a” to an image of your choice.

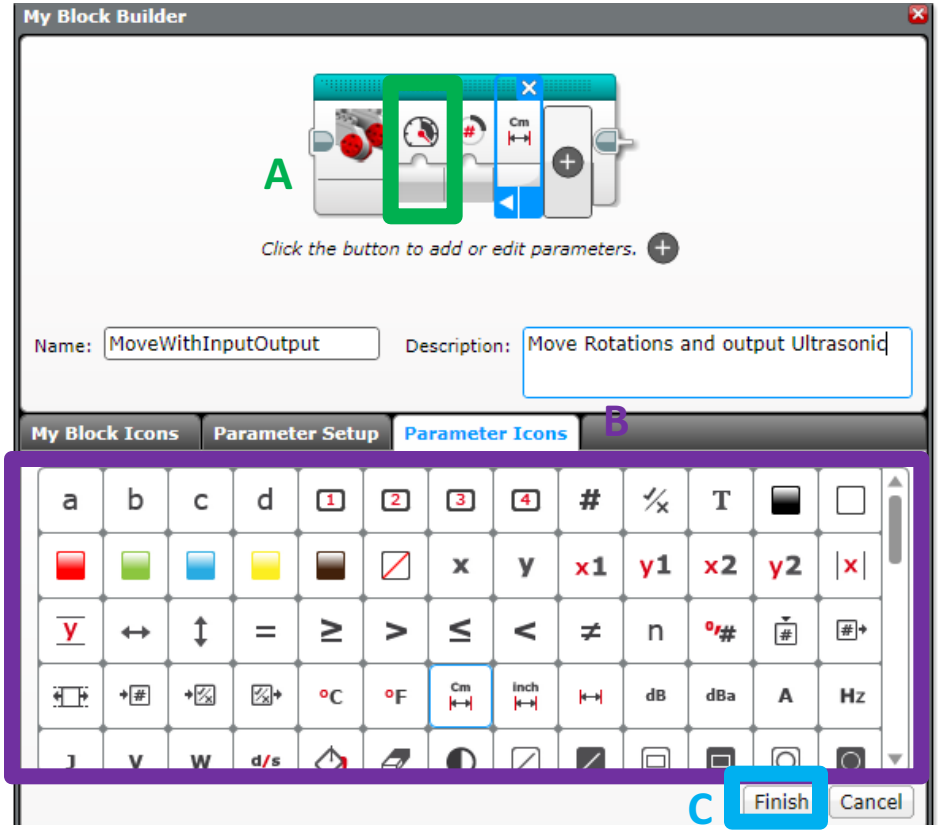
A. Click on a parameter

B. Click on the tab Parameter Icons if not already on this tab, and choose an icon

C. Repeat steps A and B for each parameter

D. Press Finish when you are done.



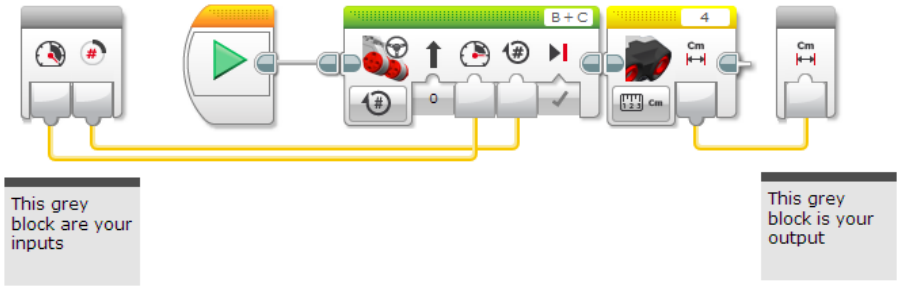


Step 8: Add Data Wires

A. When you click Finish (on previous slide) you will see this.

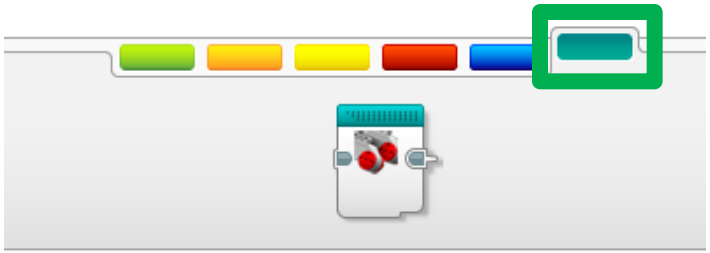
These grey blocks are our inputs/outputs (parameters) that were set up automatically by the My Block Builder

B. Wire up the My Block by dragging a data wire from each parameter to its corresponding slot on the move steering block and sensor block.



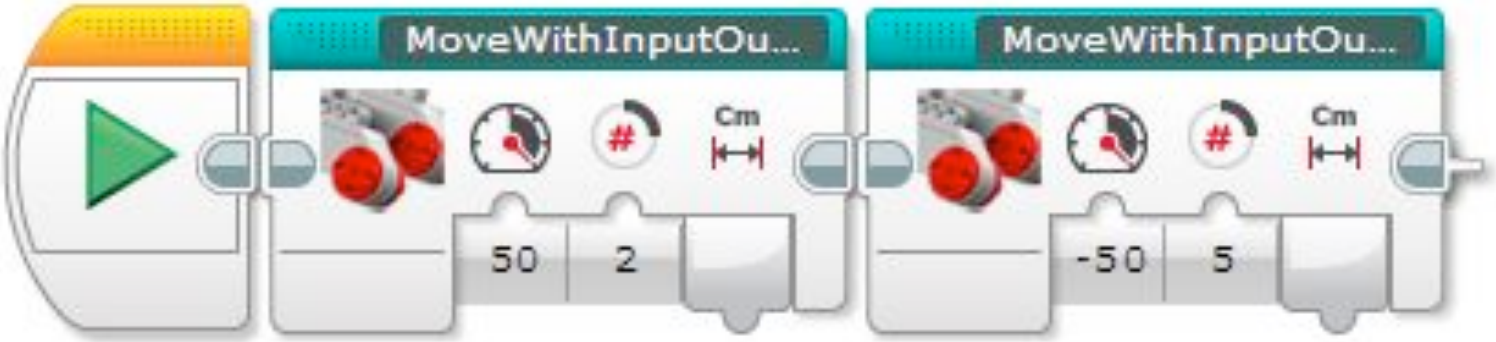
Where is the My Block?

A. Your My Block will appear in the turquoise tab. You can now use this block in any program.



B. Below, the same My Block is used twice. Once to move forward 2 rotations and then backwards 5 rotations.

Note: The same My Block can be used with different input values.



Credits

This tutorial was created by Sanjay Seshan and Arvind Seshan

More lessons are available at www.ev3lessons.com