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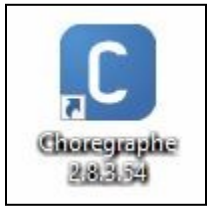
Robot Walks



Goals for this session:

- Understand the purpose and use of the "Move To" and "Counter" boxes.
- Program the robot to walk in a square

*This lesson assumes you know the basics of Choreographe (box libraries, root directory, etc.)

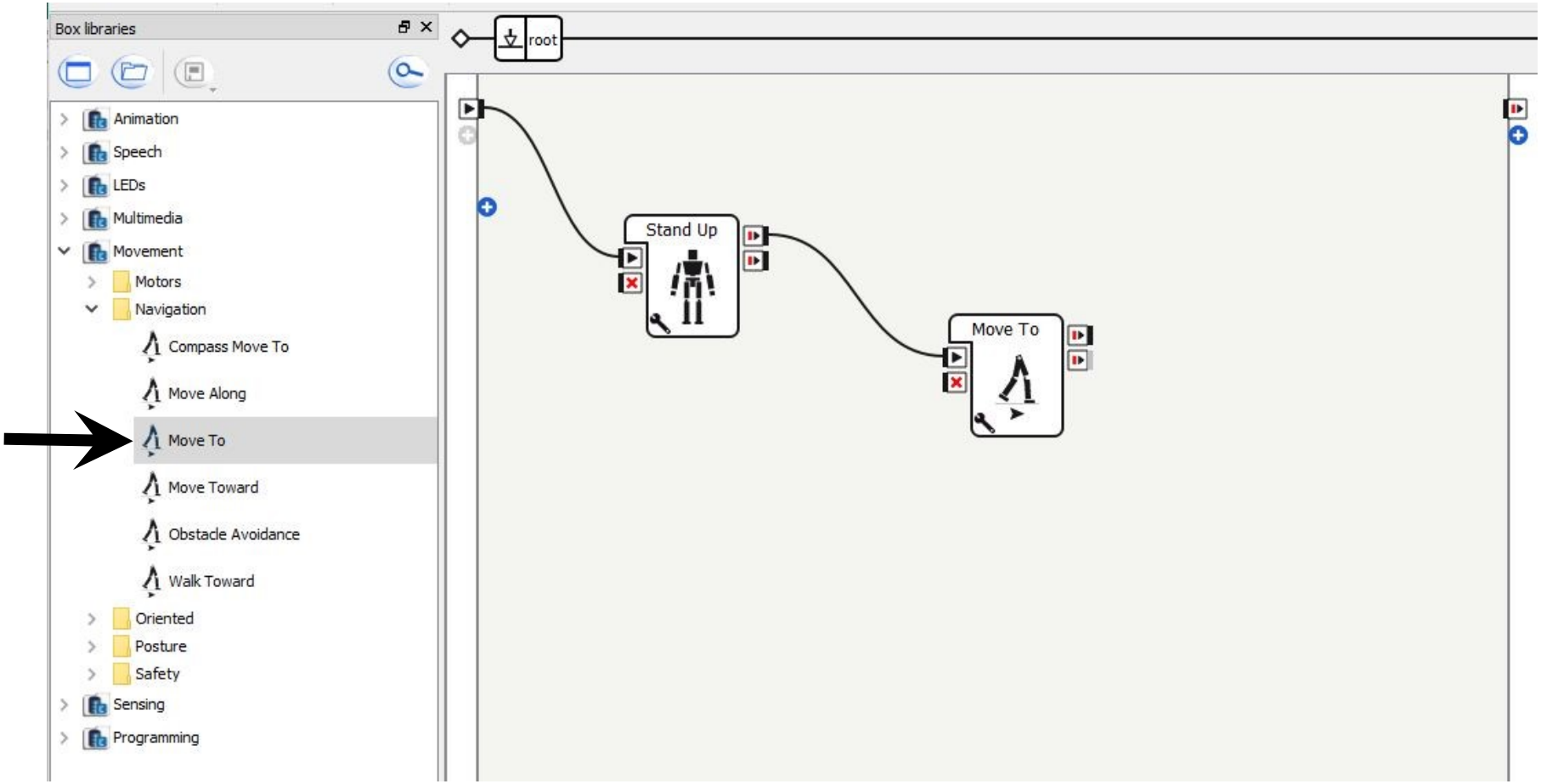
Moving the robot's legs is the trickiest part of programming because of the high risk of the robot losing balance and falling over. The robot can never be put in an off-balance position or it will fall over and damage itself! Because of the balance issues and the complicated programming involved, the robot comes pre-programmed with a number of walking boxes and other leg movements. Please only use the pre-programmed movements.

Let's start with a demonstration

First, I will start with the robot standing by dragging a "Stand Up" box onto the workspace.

Next navigate to "Movement" > "Navigation" and drag a "Move To" box onto the workspace and connect up.

(The "Move Towards" box is similar except the robot will not stop walking until it receives another command.)

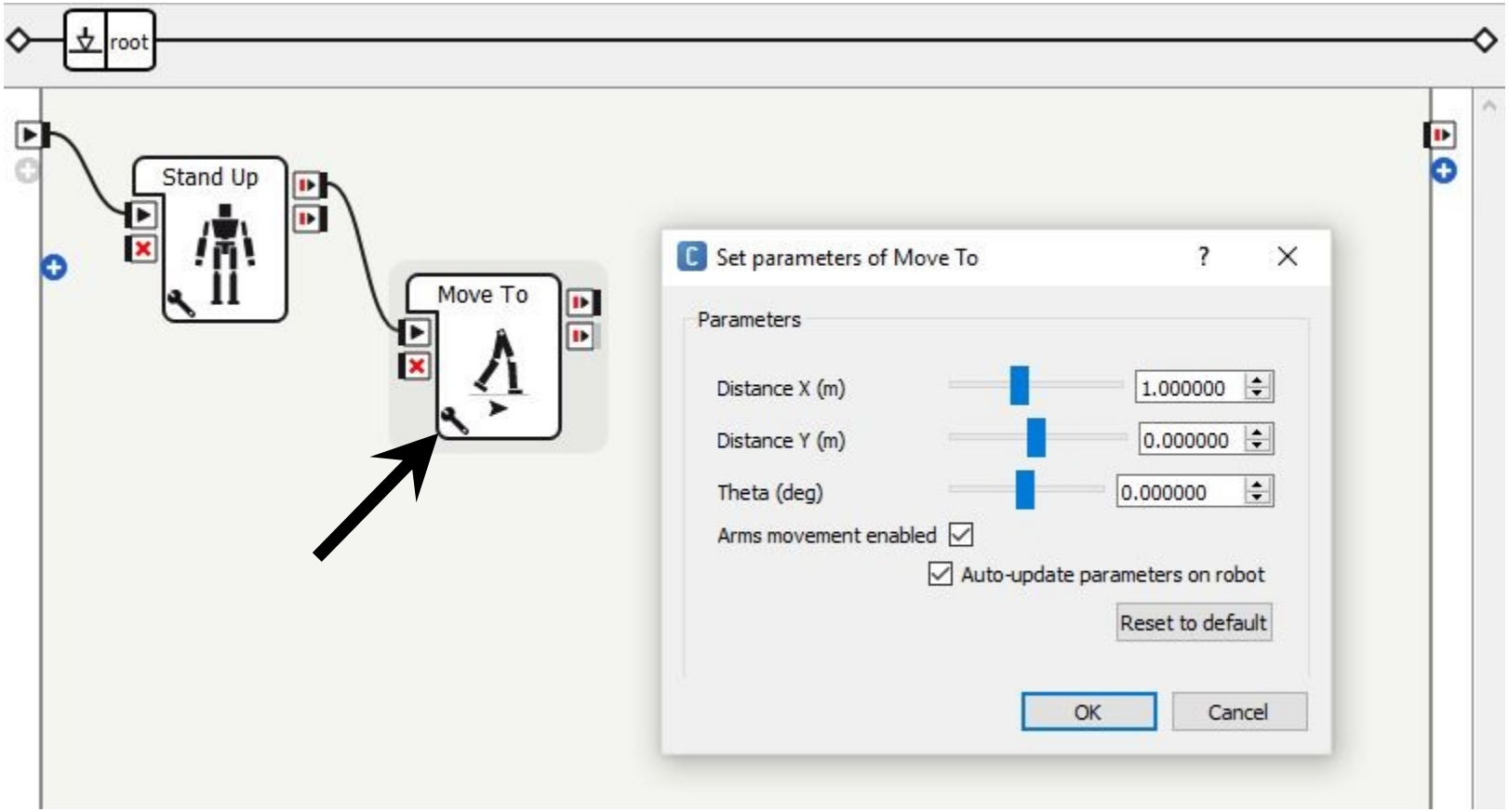


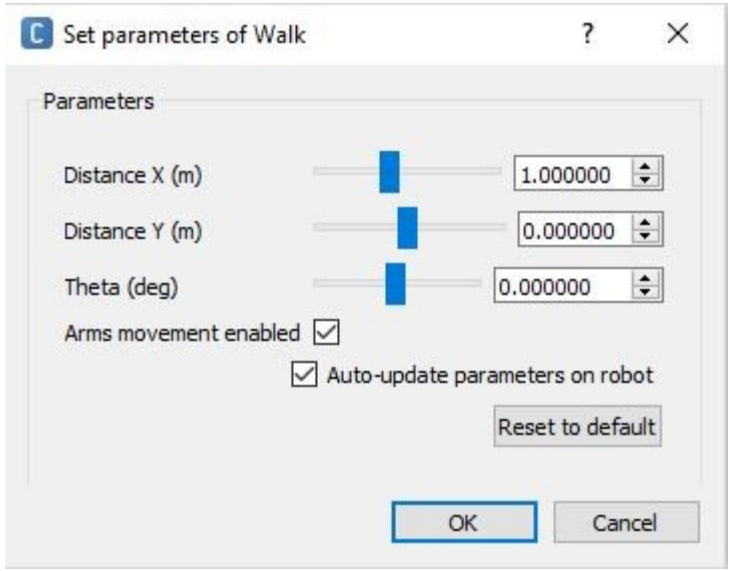
Click on the wrench symbol in the corner of the "Move To" box.

Now we can set the parameters of the box.

- The **X** value moves **forward.**
- The **Y** value moves **sideways.**
- The **Theta** value turns in a **circle.**

Tip: A value of 1.00000 = one meter. So you are setting distances in meters or fractions of a meter. One meter equals approximately 26 robot steps. 0.3 meters equals approximately 9 steps.





The robot only moves while facing forward. If you only set the Y value, the robot will shuffle sideways while facing forward.

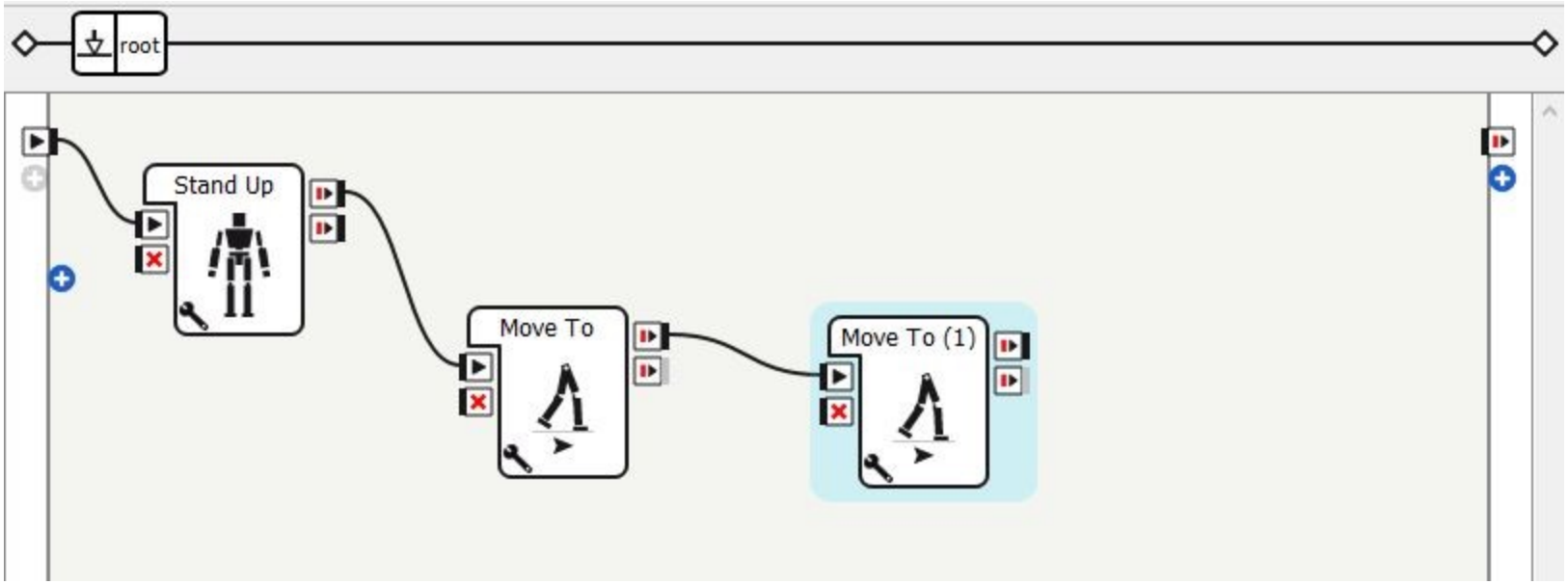
With the X and Y value set, the robot will shuffle along on an angle, while always facing forward.

The Theta numbers stand for degrees out of 360. For example, a Theta setting of 180 would make the robot turn around and face backwards.

Tip: a negative value makes the robot turn right; a positive value makes the robot turn left.

If the X and/or Y value and the Theta value are set in the same box, the robot will execute these commands simultaneously by moving in a line while rotating. It produces a kind of twirling slow motion, not the most natural of movements.

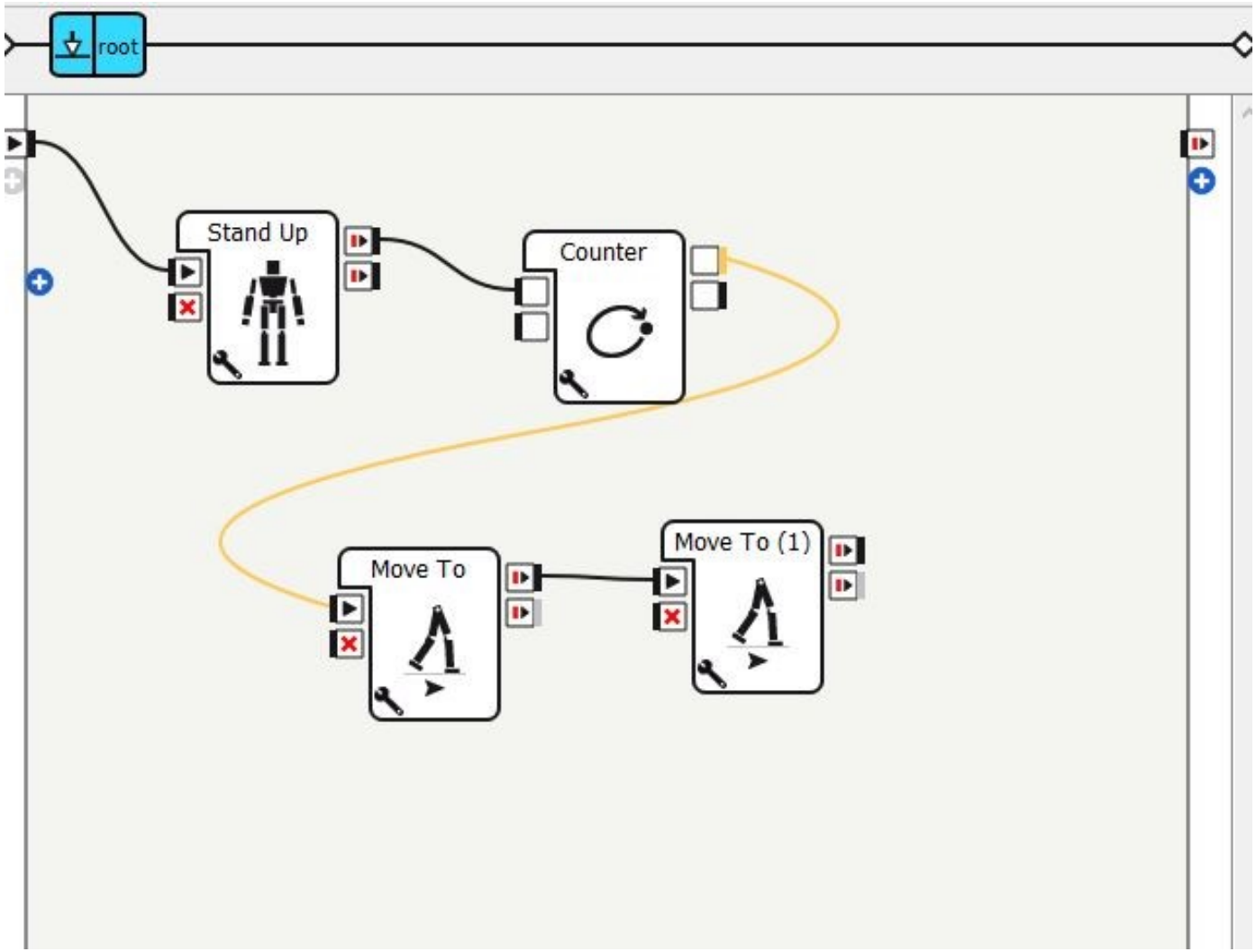
By using two boxes, one to walk and one to turn, the robot will execute the commands one after another, like a soldier.

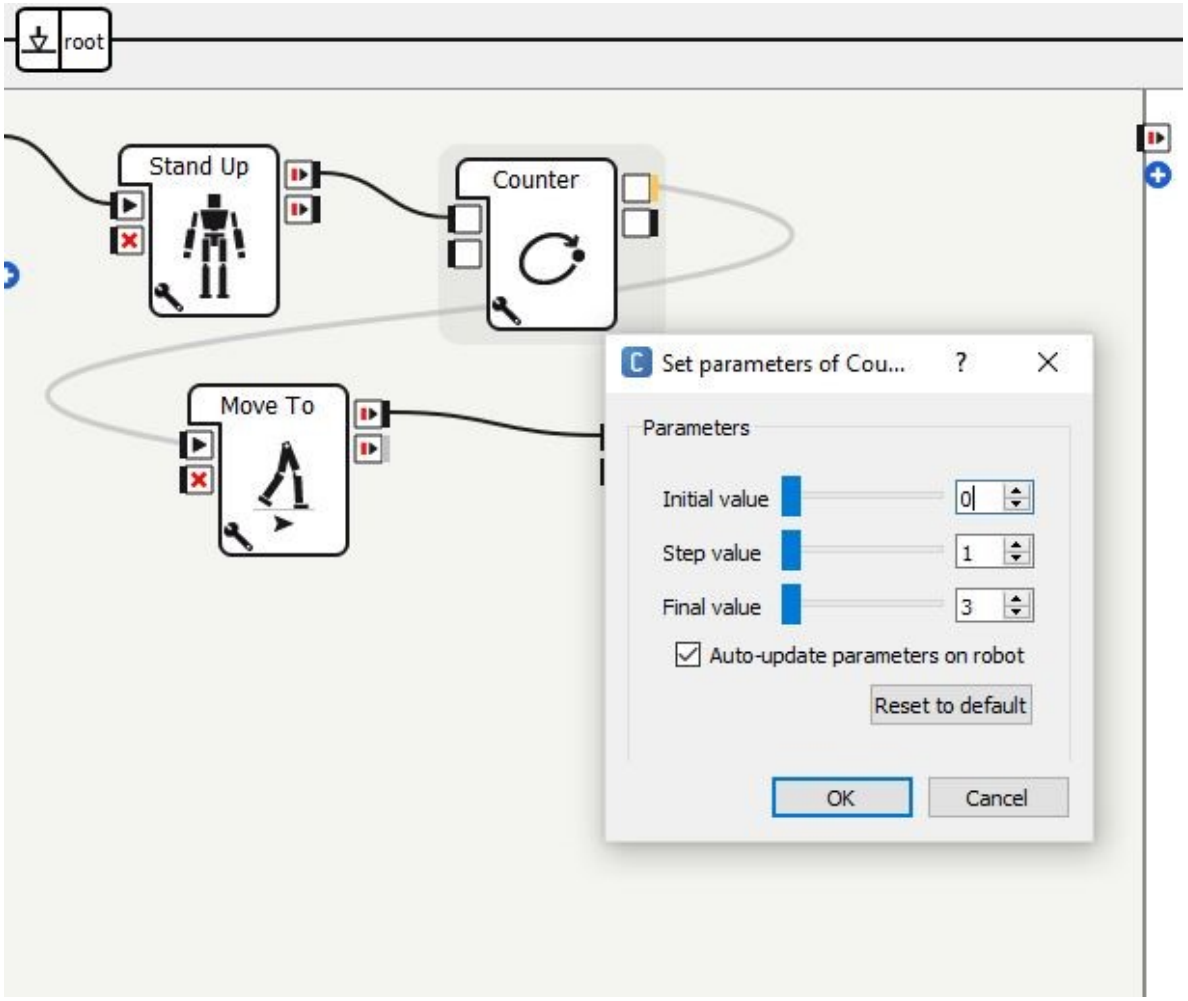


While we could drag eight "Move To" boxes on to the workspace and connect them all up and program them all separately, there is a more efficient way to program the robot to walk in a square by using the "Counter" box.

Navigate to "Programming" > "Logic" and drag the "Counter" box onto the workspace. Insert the "Counter" box between the "Stand Up" box and the two "Move To" boxes.

The first "Move To" box will have the X value set to 0.2 or 0.3, and the Y and Theta values at 0. The second "Move To" box will have the Theta value set to 90 and the X and Y values at 0.





Click on the wrench symbol on the "Counter" box

Initial value = How many times the motion has already occurred. Set to 0

Set value = how many times the robot should perform the action before repeating the action. Set to 1.

Final value = How many times the robot should repeat the action before stopping. Set to 3.

These parameters tell the robot that it has not performed the action yet, but after performing the action once, it should repeat it three more times for a total of four times to make a square.

Make sure your boxes are attached as shown in the example below.

Complete the program with another "Stand Up" box to return the robot to a neutral standing position.

Save your program on a flash drive and bring to the teacher to test on a live robot.