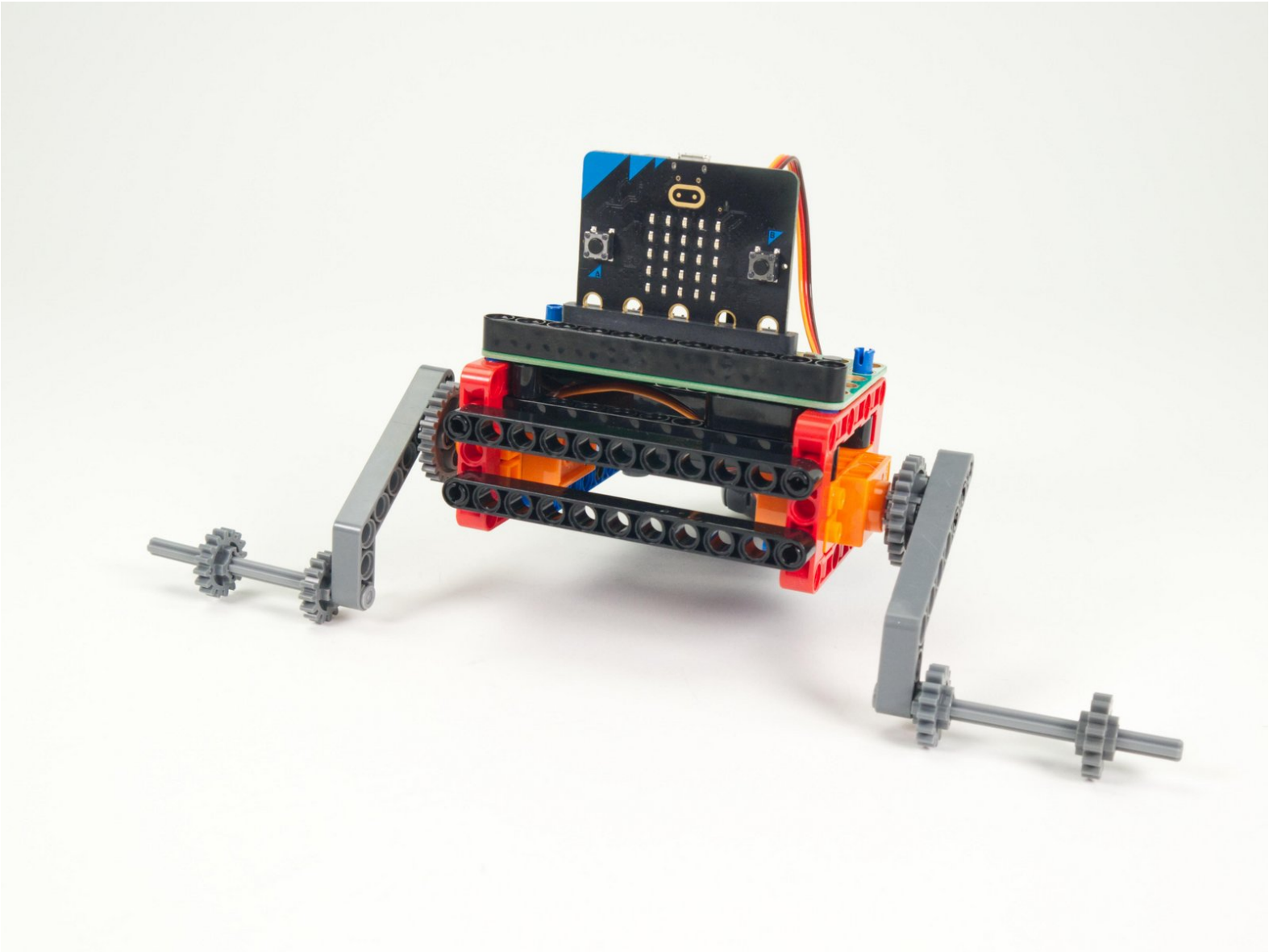
Rover - SwimBot

Who needs wheels to move around? We're going to add arms to our Rover and let it swim (or crawl) across the floor.

Written By: Pete Prodoehl



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INTRODUCTION

Who needs wheels to move around? We're going to add arms to our Rover and let it swim (or crawl) across the floor.

TOOLS:

- Computer (1)

PARTS:

- Bit Board Rover Kit (1)

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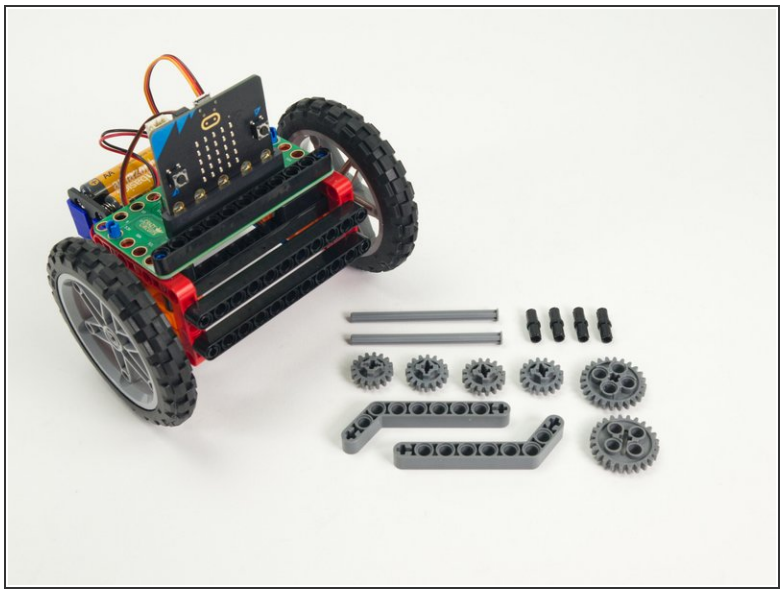
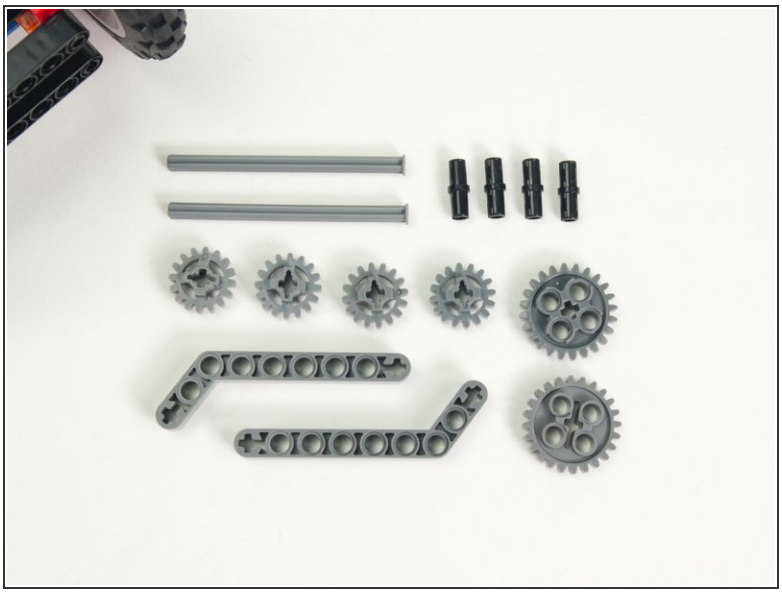
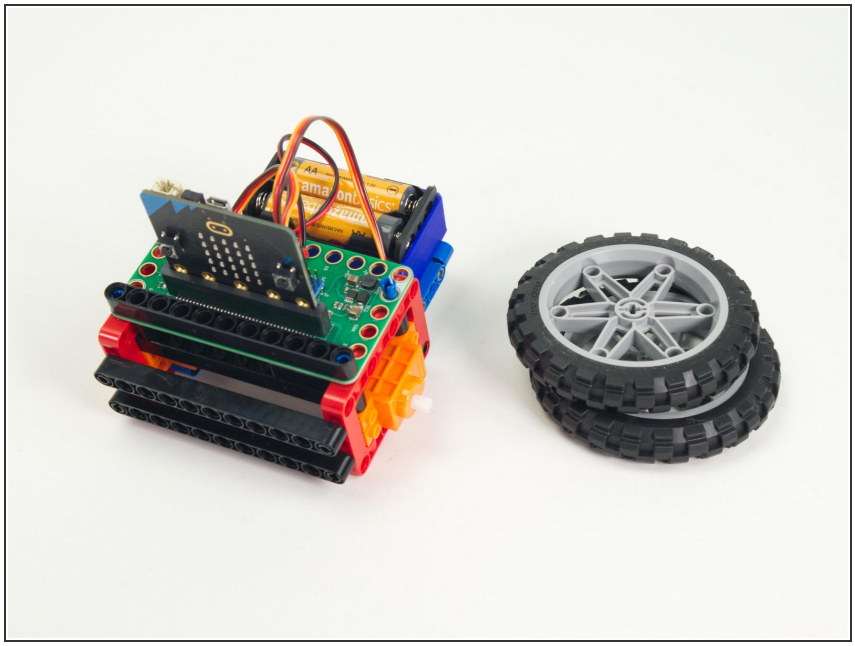
Step 1 — Prepare Your Rover





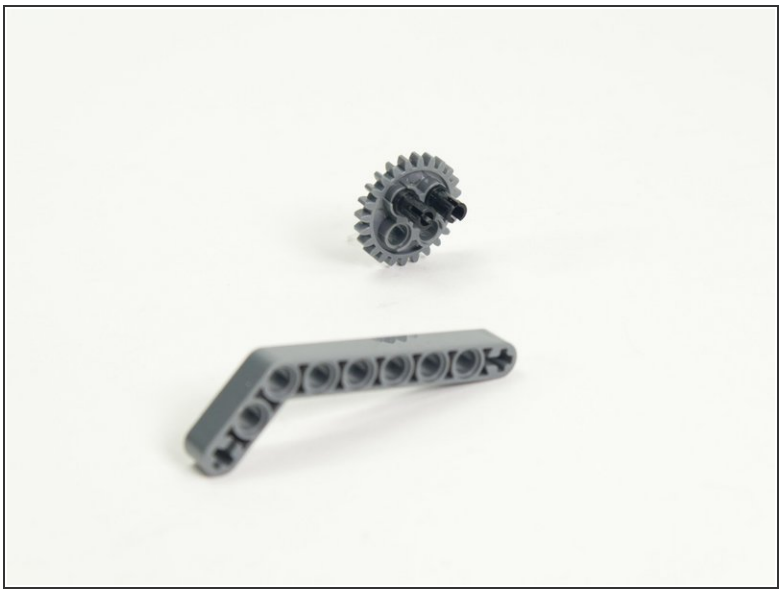
- For this guide you'll need a completed Rover Main Body.
- You'll also need some of the parts used for building the Tank and the Gripper.

Step 2 — Remove the Wheels



- Remove the wheels from the Rover.
  - They should pop right off!
- You can store them with the other parts of the Rover Kit for now.

Step 3 — Build an Arm



- Build the arm as shown by inserting two black pins into the large gear, then attaching the angled beam.

Step 4 — Add the Foot

- Next add the axle with end stop to the end of the angled beam.
- Finally, add the two smaller gears onto the axle.
  - The gears will help by adding some **grip** when moving.

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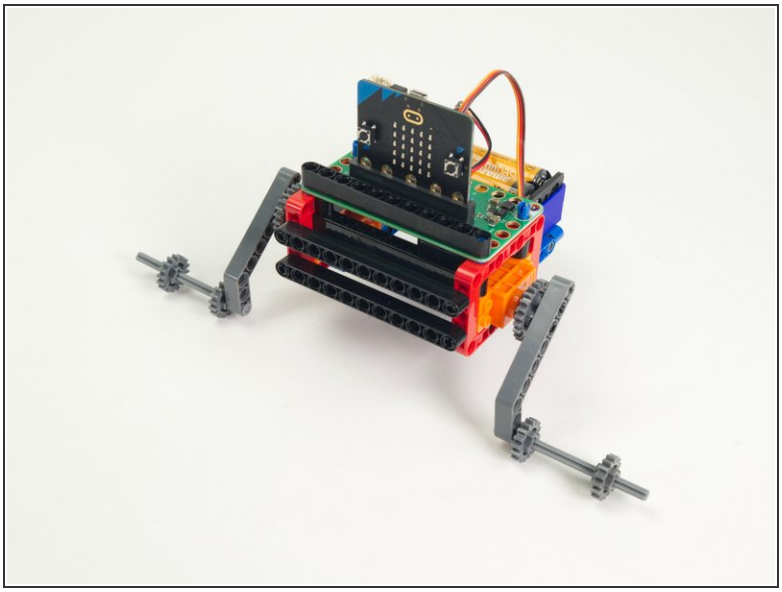
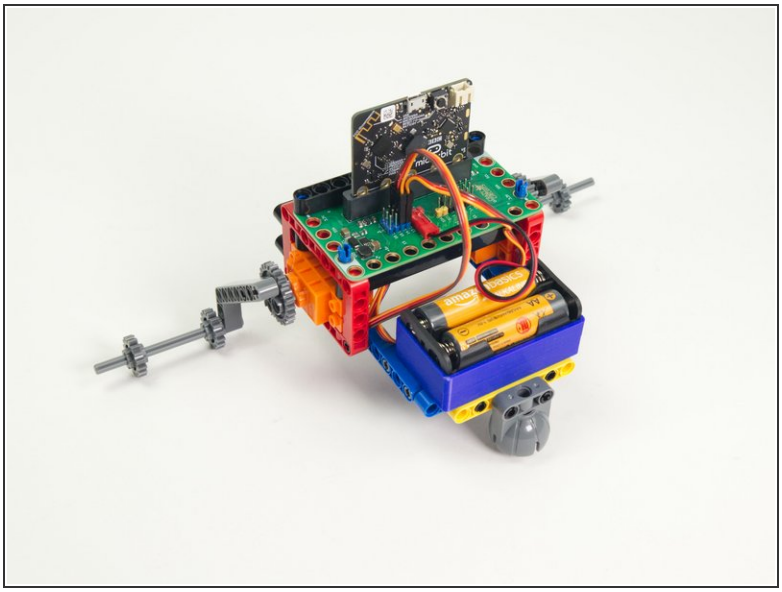
Step 5 — Build Another Arm

- Build the second arm as a mirrored version of the first one.

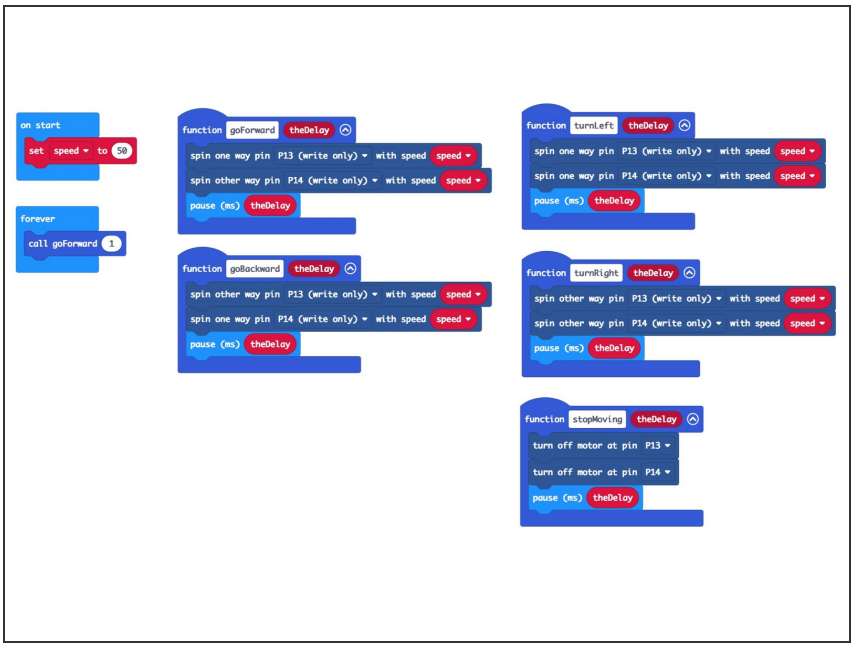
Step 6 — Attach the Arms





- Put the arms onto the servo shafts where the wheels were.
- Your Swimming Rover is almost ready to go. (We still need to add some code before it will move though.)

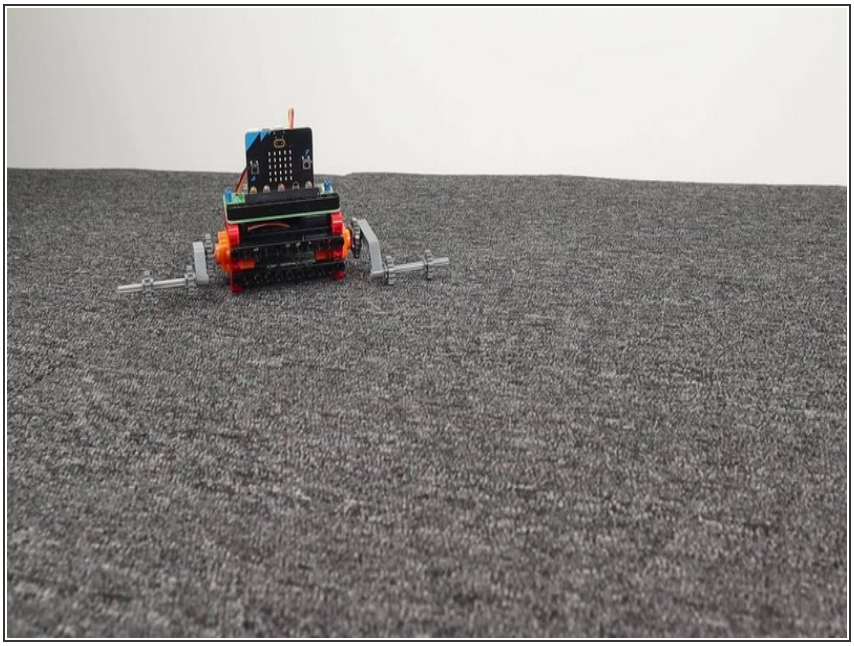
Step 7 — Load the Code



⚠ If you've never used a micro:bit before you'll want to check out this guide: [Bit Board V2 Setup and Use]

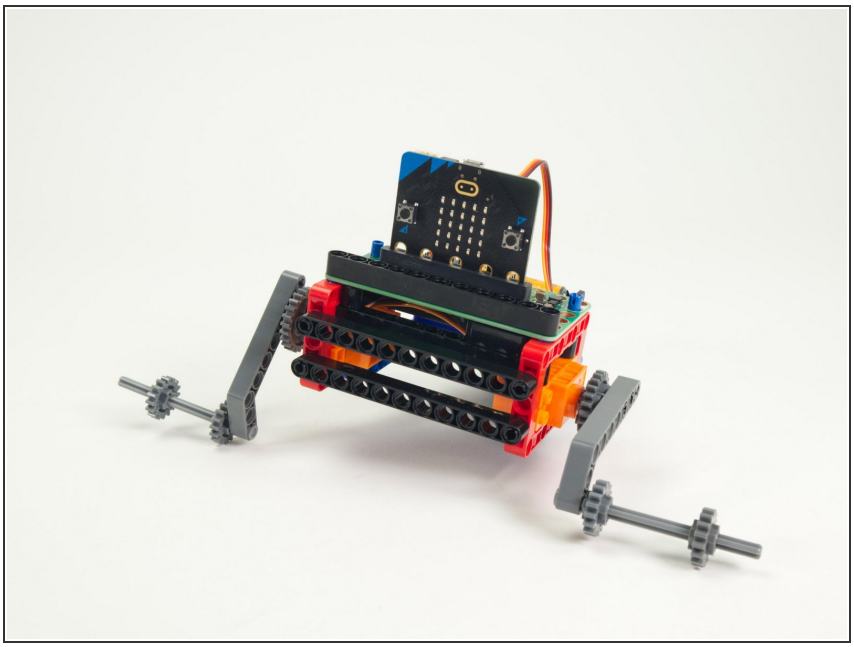
- We're going to load the following code for our **SwimBot Forward** program: [https://makecode.microbit.org/_48ffga9Uw...]
- This code is very simple, and just makes the Rover go forward. (For now!)

Step 8 — Test it Out!



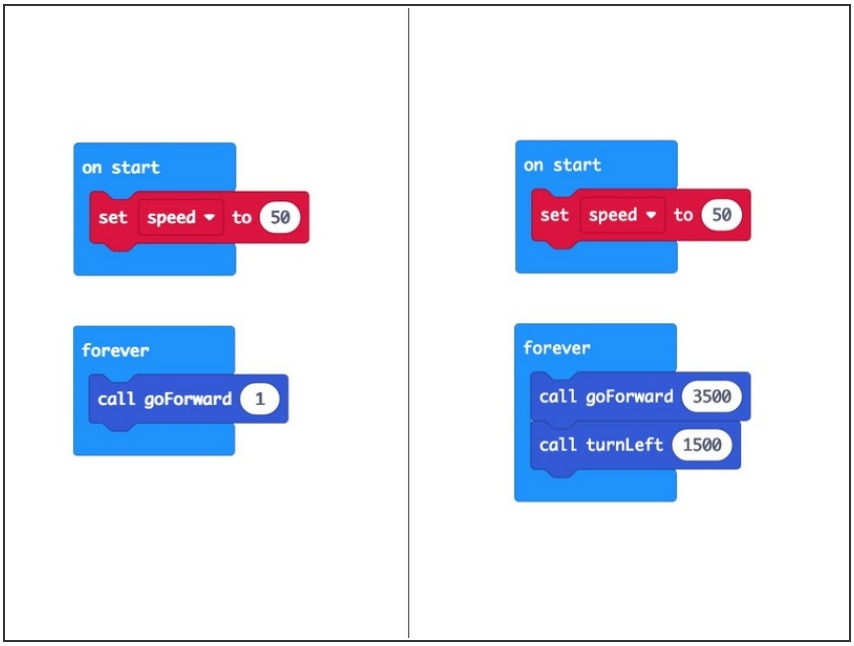
- Power on the Rover and set it on the floor. (Carpet will work much better than a smooth floor, but it's time to experiment!)
- The Rover should crawl (or swim) forward. Though not very gracefully!

Step 9 — Take a Turn



- Hopefully your SwimBot went mostly straight. But... can you get it to turn one direction? Let's try!
- We can adjust things in two ways, either by adjusting the code, or by adjusting the physical build (in this case, the arms).
- Let's look at the code first...

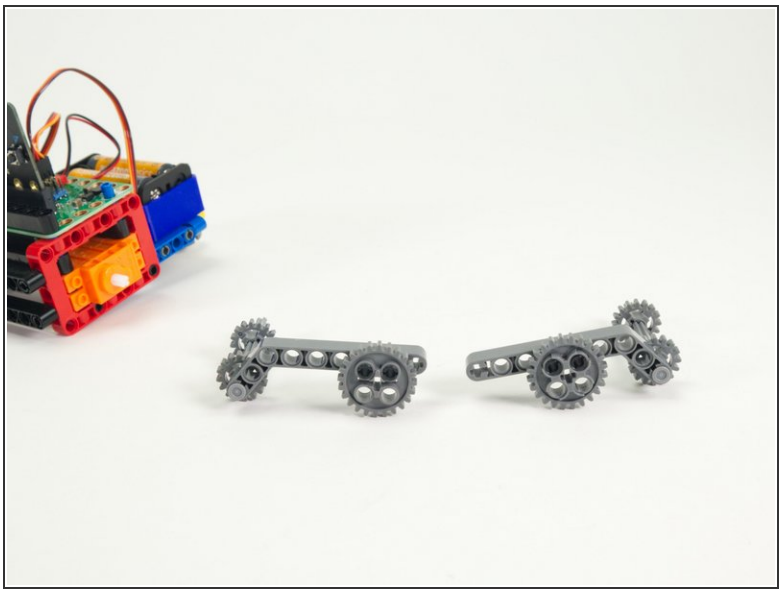
Step 10 — Code Changes

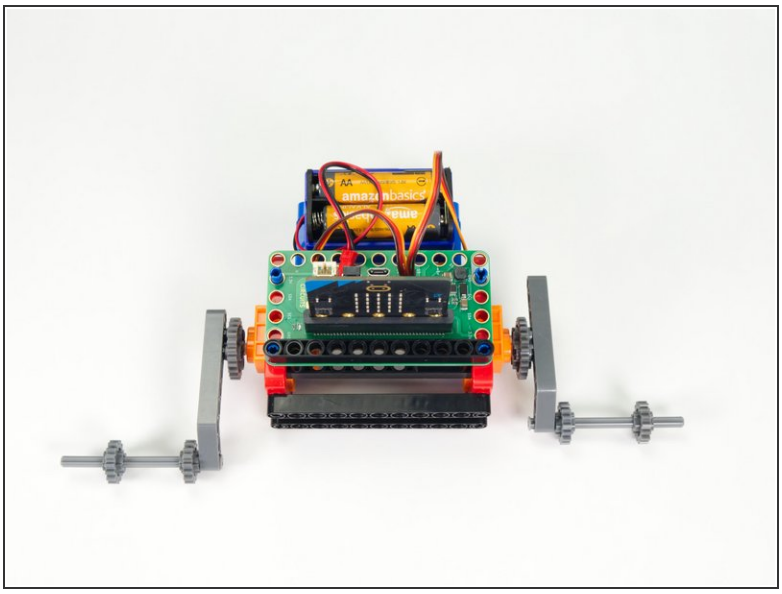


- Our original code just told the Rover to **go forward** for one millisecond, and then that command repeated over and over.
- Here is an example of a code change with **turn left** that could get your Rover moving with turns.
  - (The original code is shown on the left, new **"turning"** code on the right.)

We did not include the function to make the Rover go **backwards** because doing so just flips it upside down! (So that's an option if you want it.)

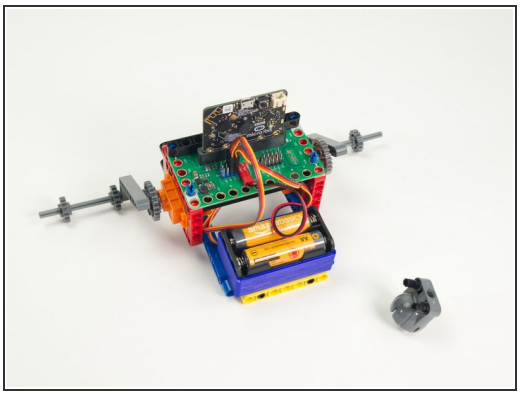
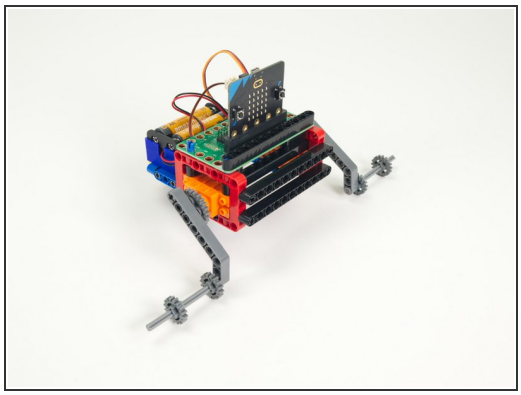
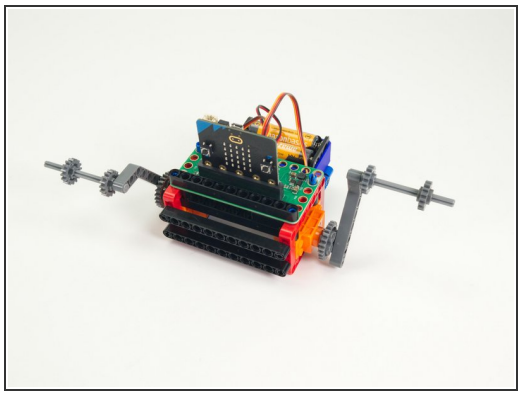
Step 11 — Arm Changes





- Let's reload our original code that just made the SwimBot go forward. Done? Good!
- Now let's remove the arms and make some adjustments.
- Try moving the pins from the **first and second** holes of the beam to the **third and fourth** holes.
- Reattach the arms and give it a go! Is your SwimBot turning now?

Step 12 — Take it Further

- Want to take it further? One thing you can do is remove the caster wheel on the back of the Rover. See how it moves without it.
- You can also adjust the arms, flip them around, adjust the gears... Experiment!
- Alternately, leave your Rover as-is and make changes in the code. (Or make changes to both!)
- You can also adjust the speed in the code. How will that change how the Rover moves?
- You might even try remotely controlling this Swimming/Crawling. bot!
- See if you can find other ways to make a SwimBot (or CrawlBot) with the parts in your Rover Kit.