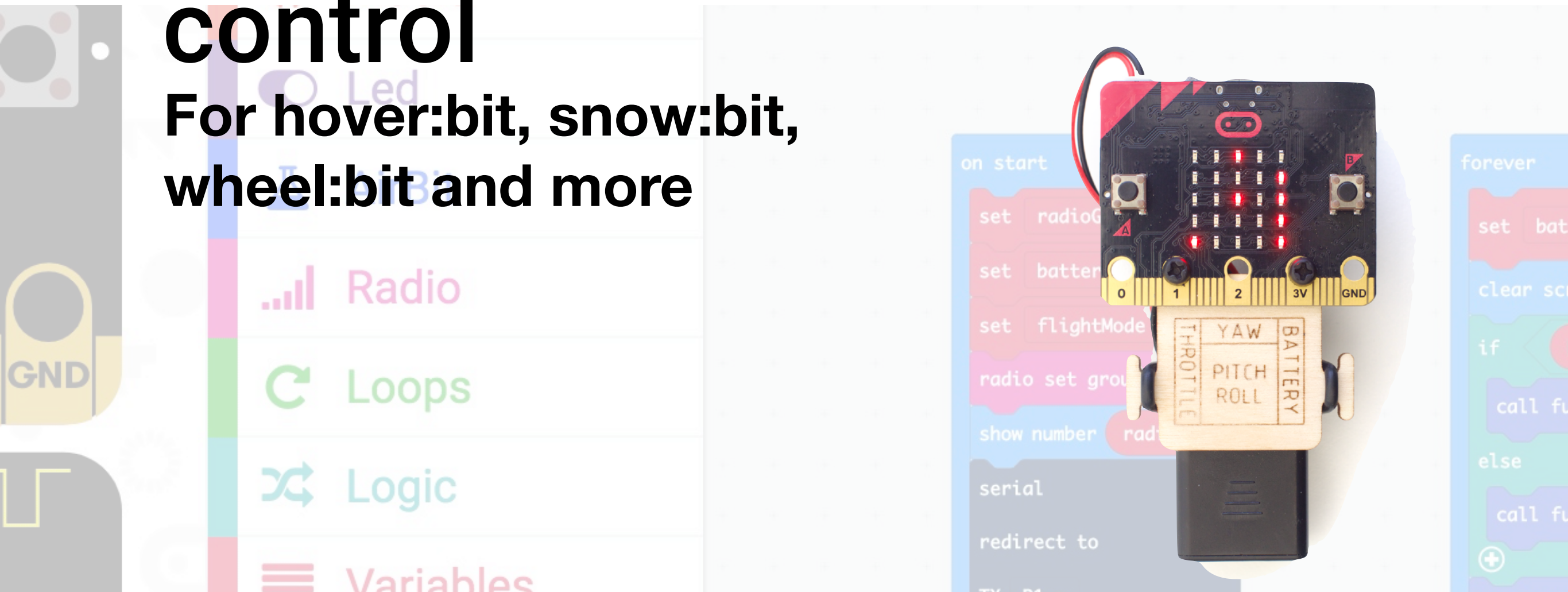




Multi purpose remote

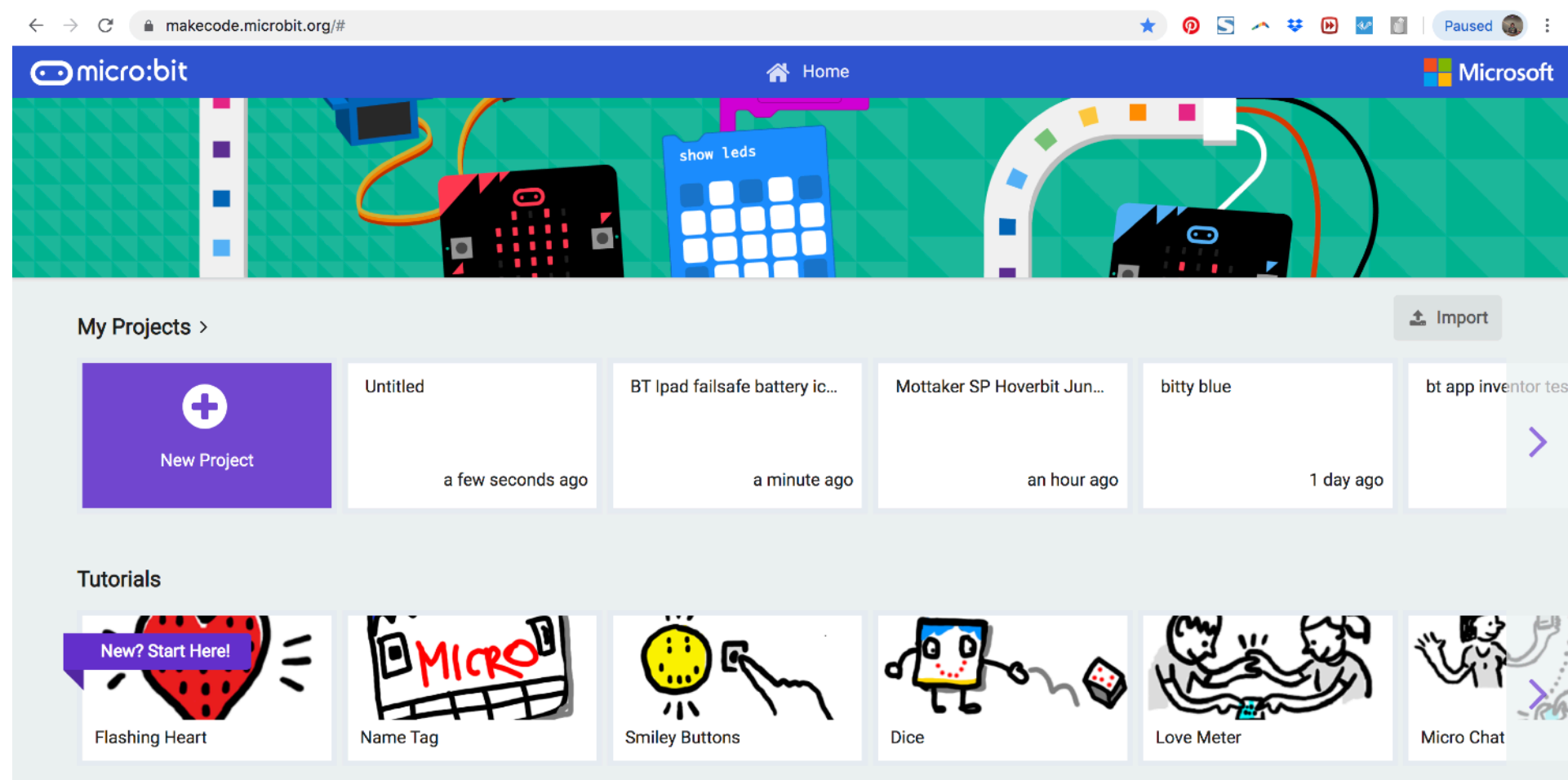
control

For hover:bit, snow:bit,
wheel:bit and more



Start at makecode.microbit.org

Chrome or Edge is recommended for better connection with the micro:bit



Select “New project”.

PS. If you’re new to micro:bit you should try one of the tutorials above first.

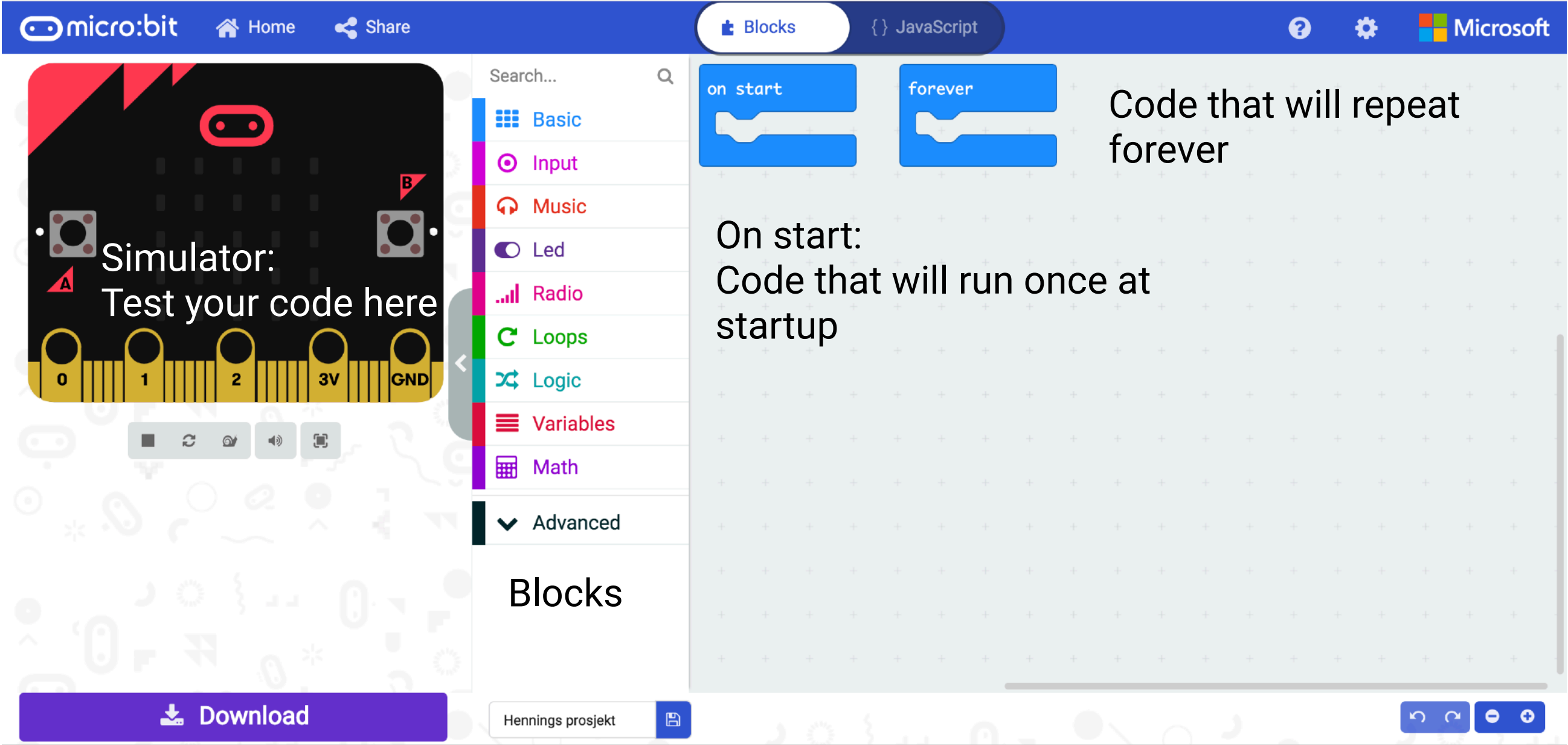
The editor

Main menu

Share your code

Block mode Javascript mode

Settings



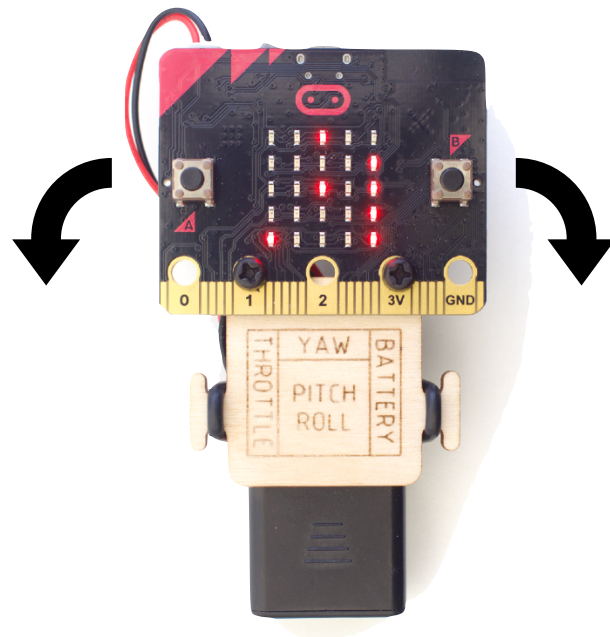
Download to micro:bit

Save a backup
Name your project

Undo zoom

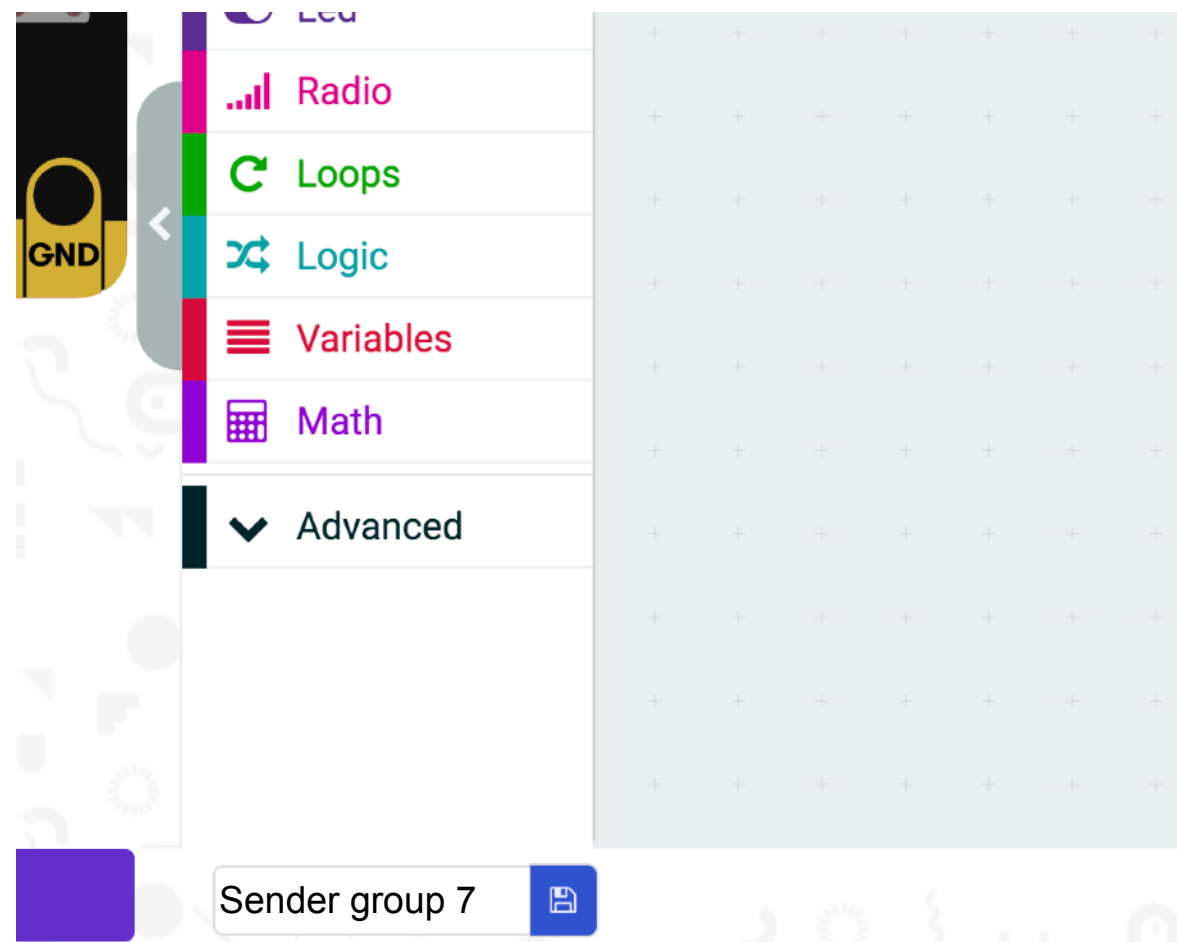
Code for transmitter

We will create a code that turns our transmitter into a remote control for the hovercraft.



Name your project

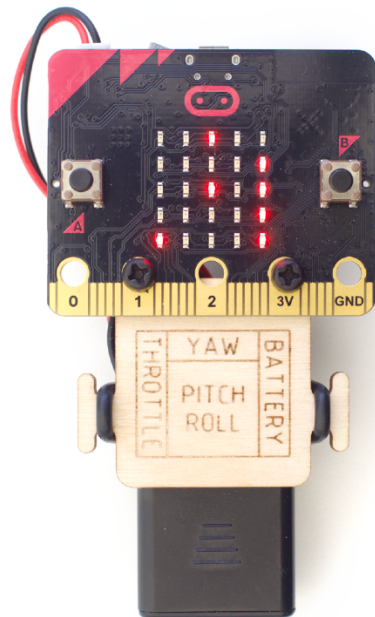
Start by giving your project a name like “Sender group x”.
This is your unique radio channel. If you are alone you can use
channel 7



Abstract

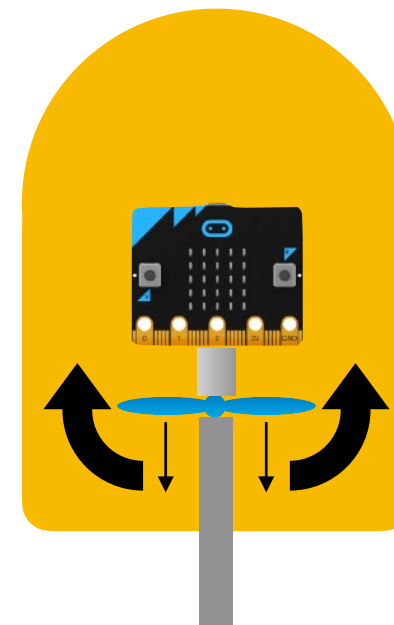
We will be using 3 parameters that will be send over radio to control and steer.

- Arm starts and stops motors.
- Roll controls the steering
- Throttle control the speed.



ART

arm, roll, throttle



Throttle
(Pushing force)

Roll/Rudder
(steering)

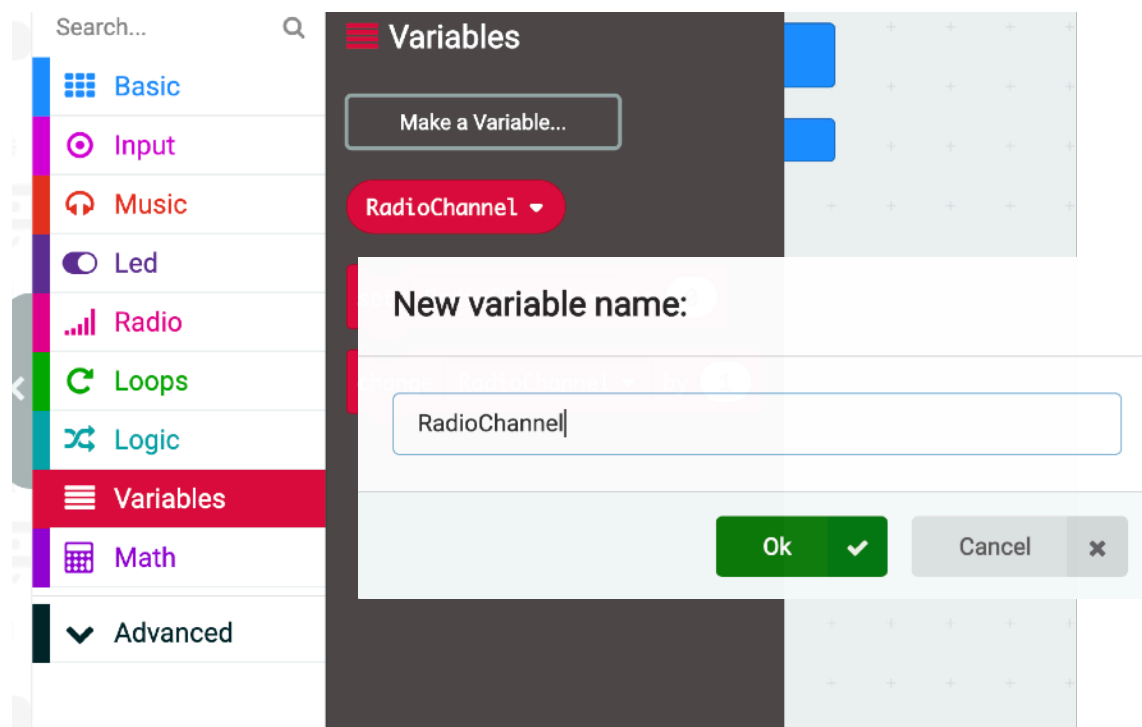
These 3 values control the craft:

Variable:	Type	Minimum	Neutral	Maximum
Arm (start/stop)	Binary	0		1
Throttle (speed)	Percent	0	50	100
Roll (steering)	Degrees	-45	0	45

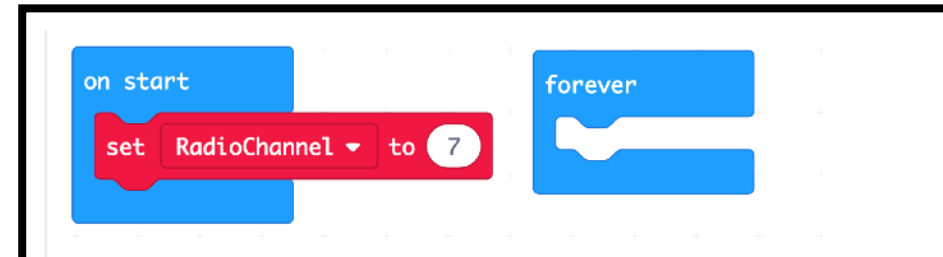
Radio

1. Make a variable called radioChannel
2. Set the radioChannel to 7 (or a number between 0 and 255). This number must also be used on the craft later
3. Use Show Number (in the forever loop) to verify that Arm is changing correctly
4. Use the "radio set group" to make the radio channel take effect
5. If you are in a classroom, each hover:bit maker need to choose their own channel.

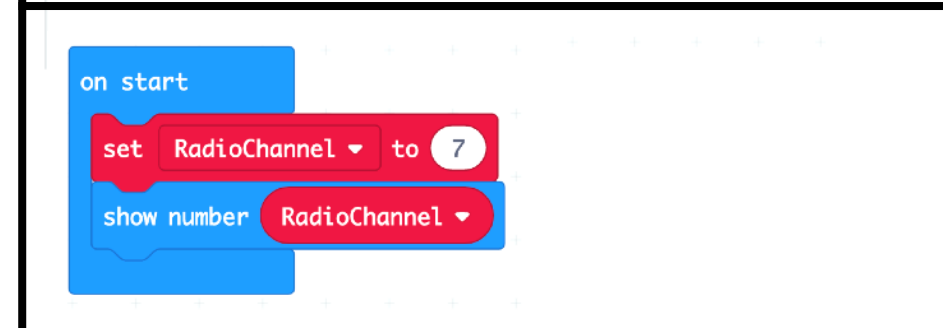
1



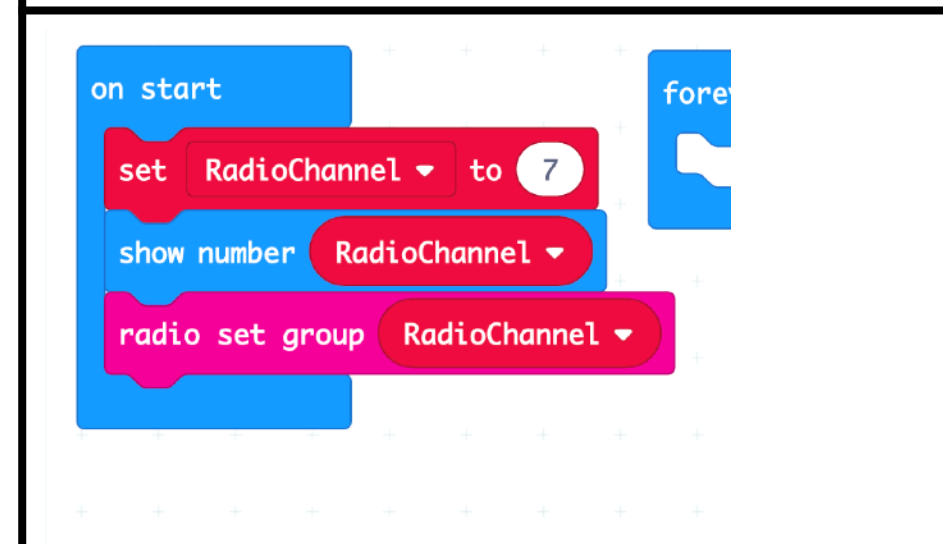
2



3



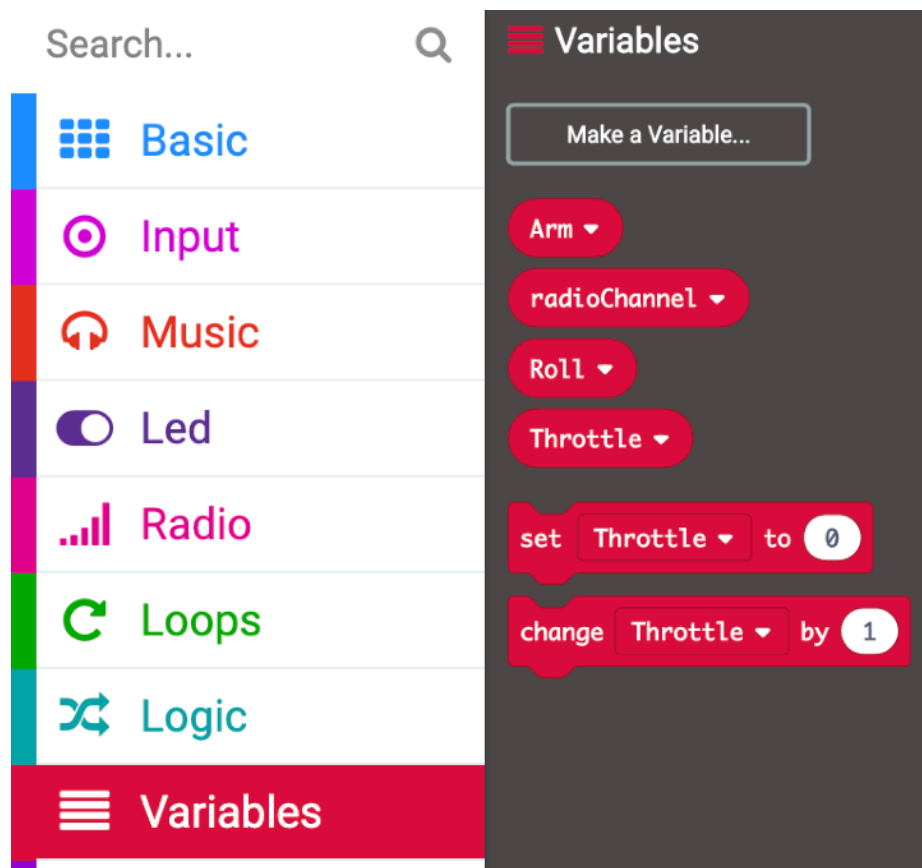
4



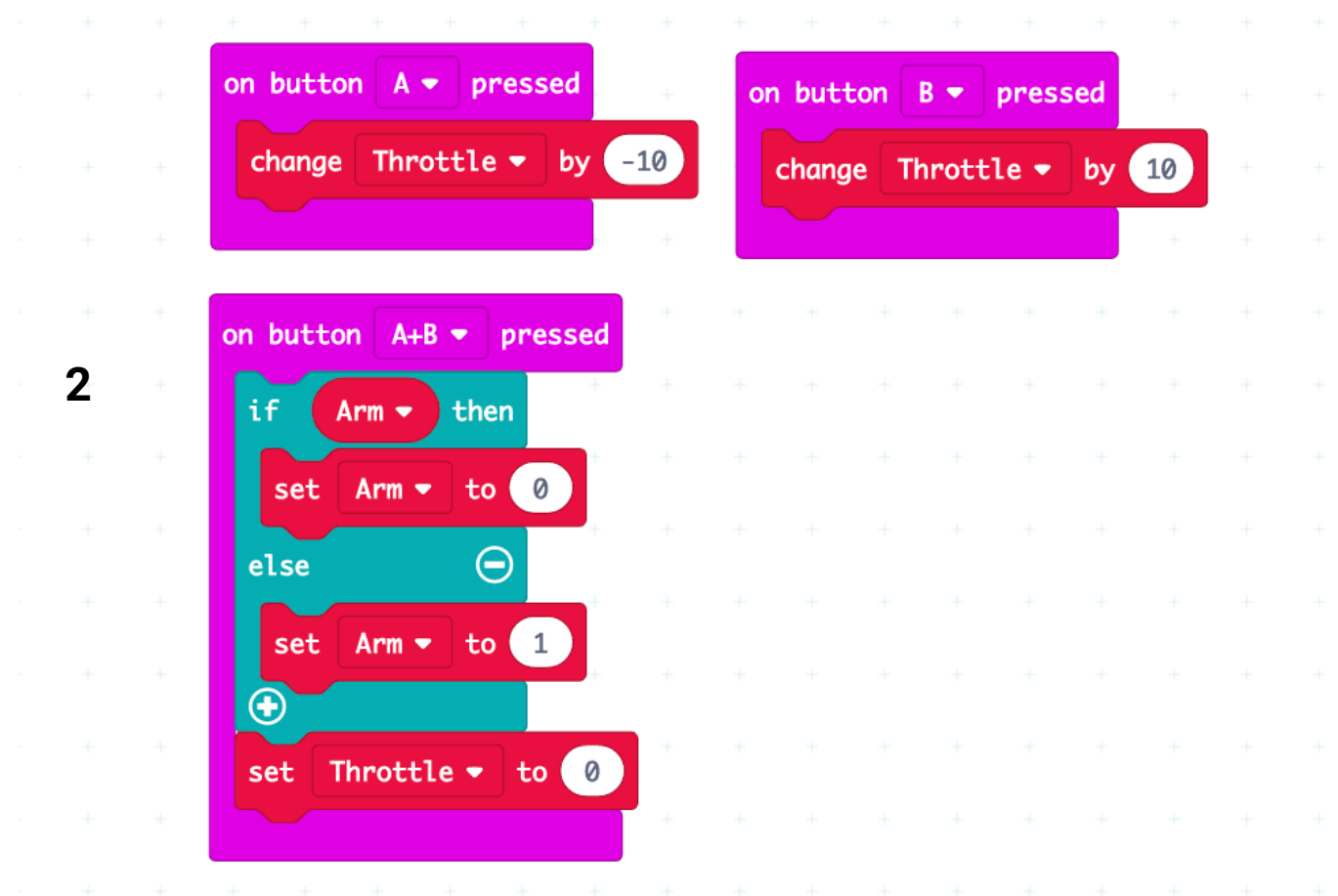
Throttle and Arm

1. Make 3 variables called arm, roll and throttle
2. Use the button functions so button A makes throttle 10 (%) less, and button B makes it 10 more. Use “change”, not “set”
3. Use the buttons A + B (a combination) to change the Arm between 0 and 1 everytime A + B is pressed
4. Also, when we press A + B, set throttle to 0. This makes sure we never start with a full throttle.

1

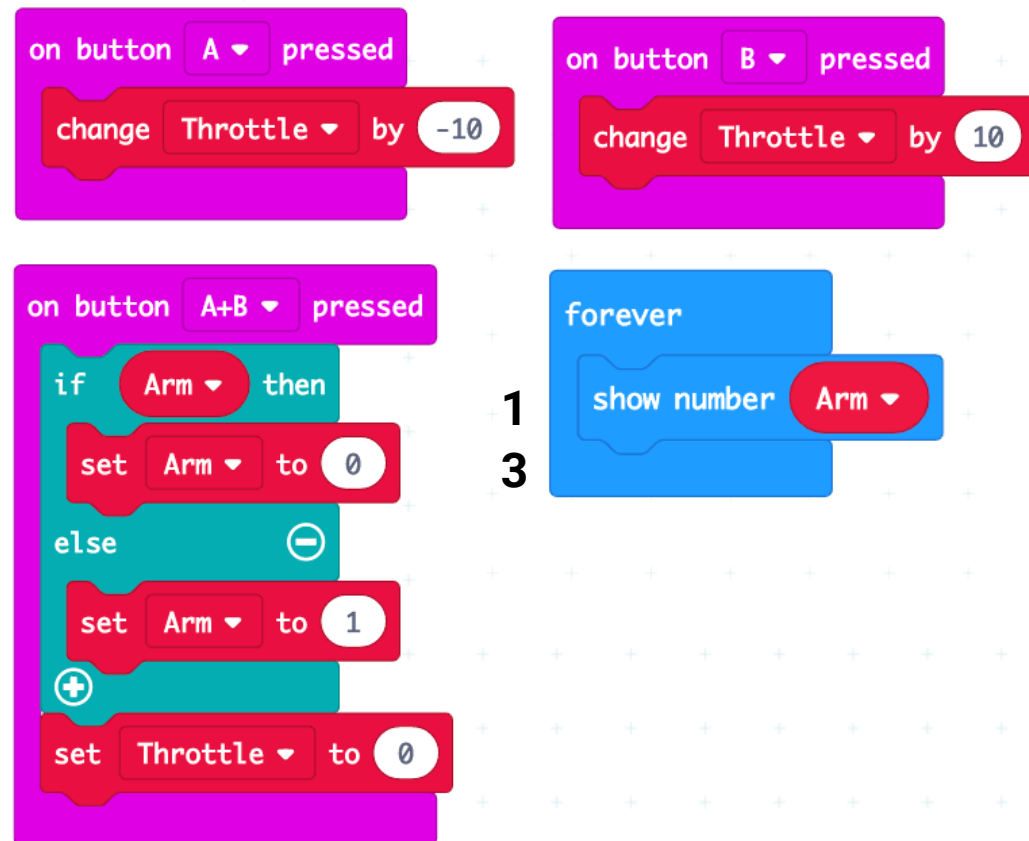


2

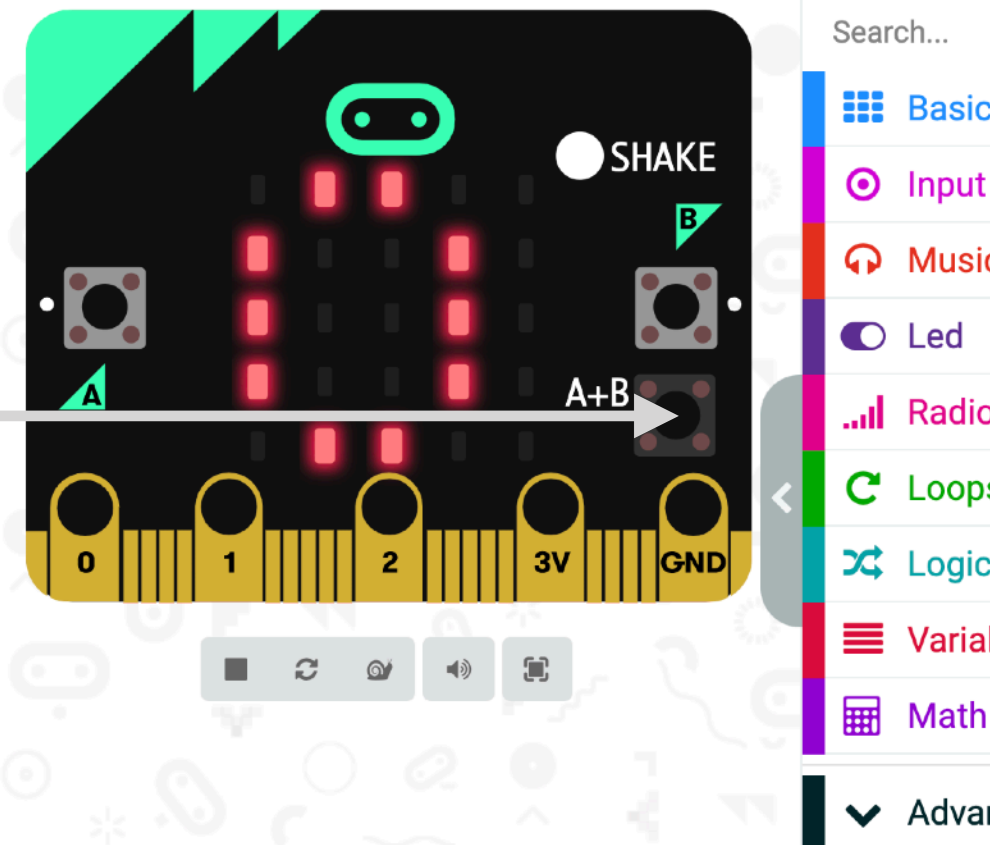


Test the Arm function

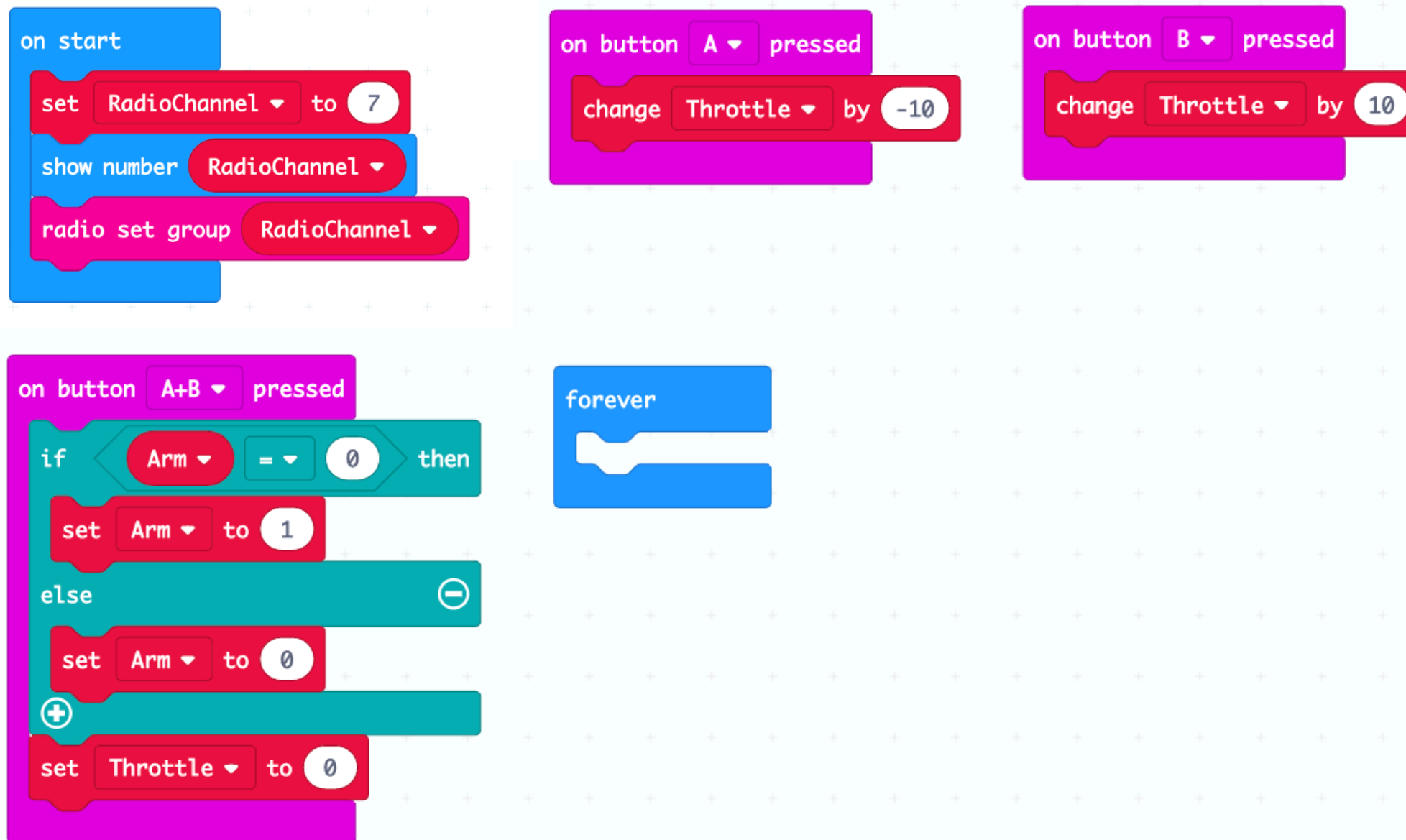
1. Put a Show Number (in the forever loop)
2. Use the simulator to test the A+B function (the number will switch between 0 and 1 and back)
3. Observe that the number is switching between 0 and 1
4. Delete the same show number block when you have tested it. (use delete button or right click - delete)



2



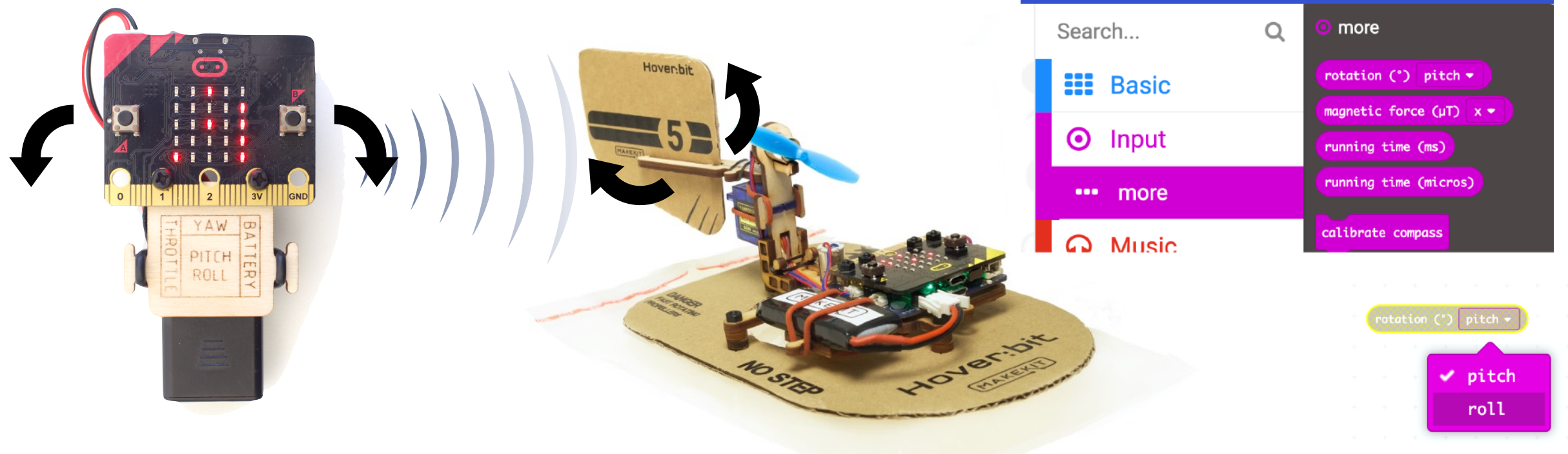
This is the code so far



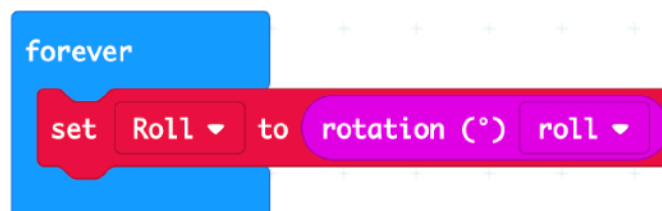
Roll and rudder

We want to control the craft's steering by using the orientation sensor on the micro:bit. This is called roll. This will control the rudder or steering on the craft.

Task: In the forever block, set the roll variable to the rotation roll. The block is called "rotation pitch". Drag it out and change it to "roll" by clicking the small triangle at the right.



This is what you should end up with:



Use the display to show Arm on /off

When we connect the battery or press reset, the code in On Start will show our radio channel.
We want to use the display to also show our Arm, Roll and Throttle values as they change.
Before we plot, we use clear screen to prevent the screen to get filled with pixels.

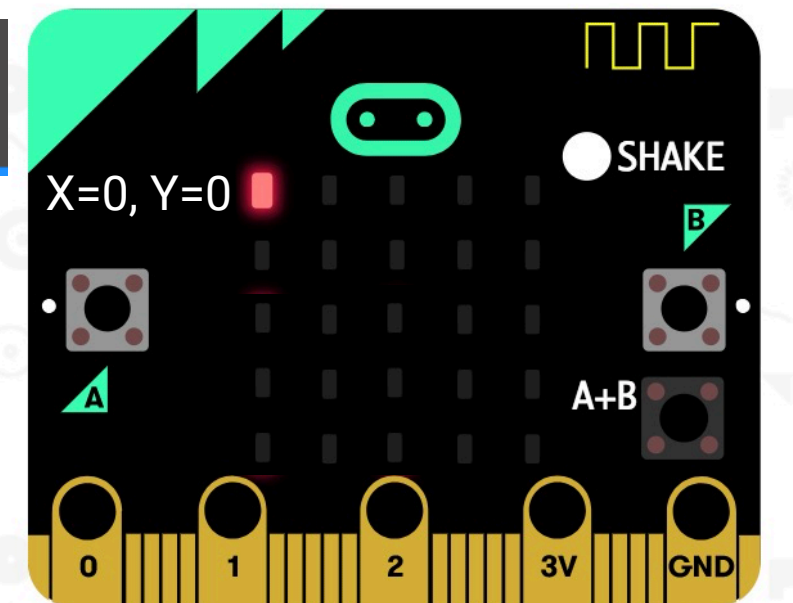
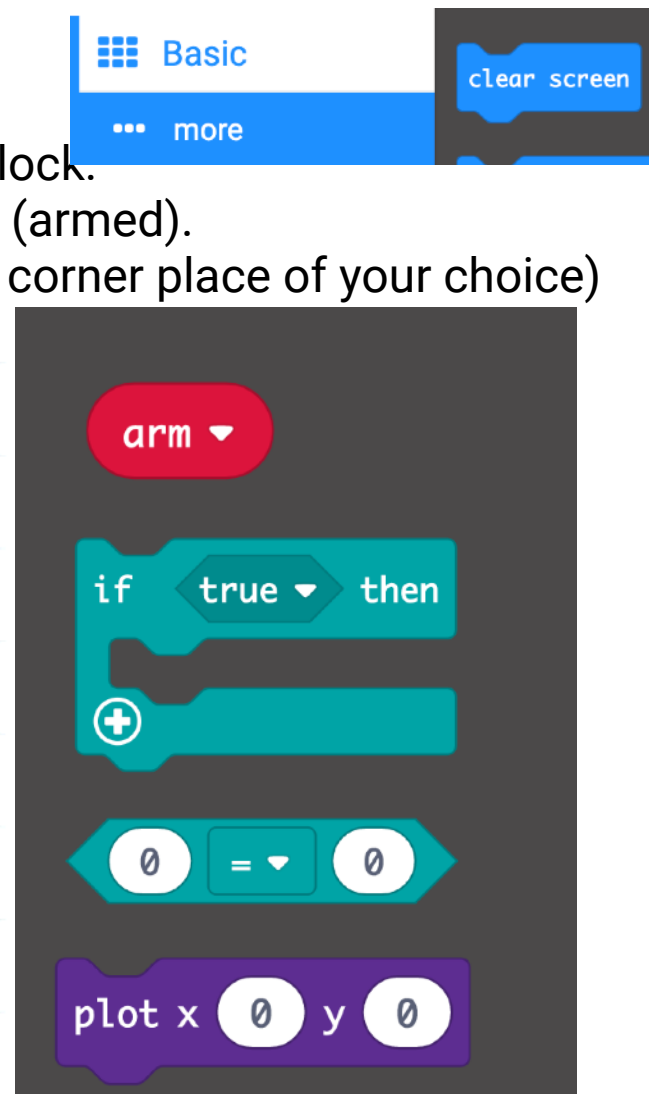
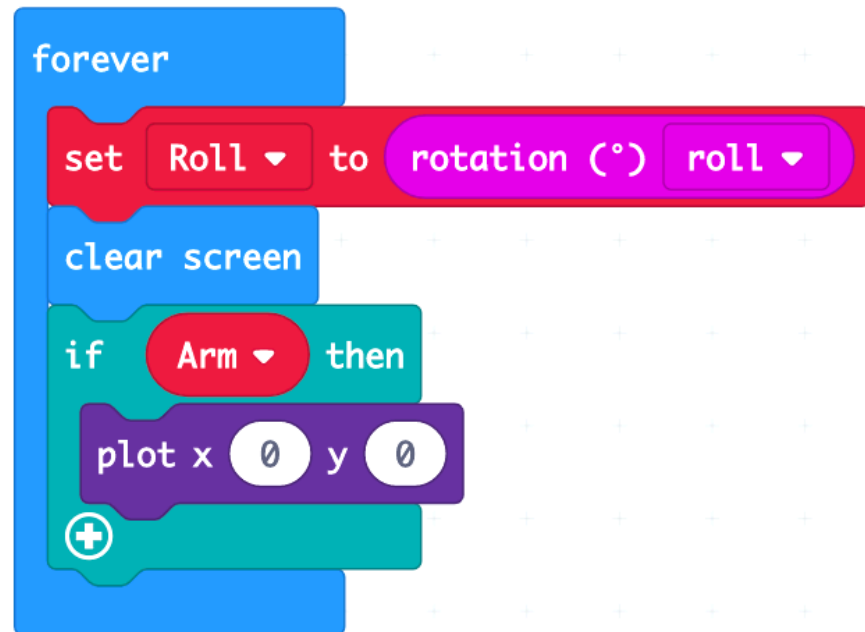
Show arming

Find the forever-block.

Insert a clear screen block under the roll block.

Use the if-block to check if arm is not zero (armed).

If armed plot at coordinate 0,0 (or another corner place of your choice)



Optional: Display Roll and Throttle

We can also show roll and throttle in the display. Use the blocks below to convert roll and throttle into values that can be plotted on the screen. We want the throttle pixel to move upwards, starting at coordinate 0,4, then climb towards 0,0

We want the roll pixel to slide across the screen, from 0,2 (middle left) to

Show Throttle

Continue in the forever-block.

Insert a plot-block. In the y-section, insert a map block.

In the map block, insert the Throttle variable, then 0,100,4,0.

This will take a number between 0 and 100 as input, and squeeze it down to a number between 4 and zero.

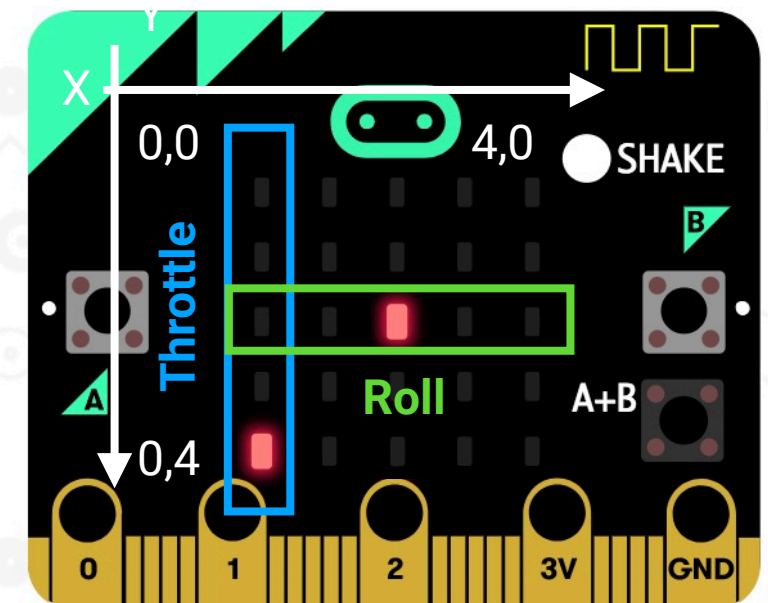
Show Roll

Continue in the forever-block.

Insert a plot-block. In the y-section, insert a map block.

In the map block, insert the Roll variable, then -45,45,0,4.

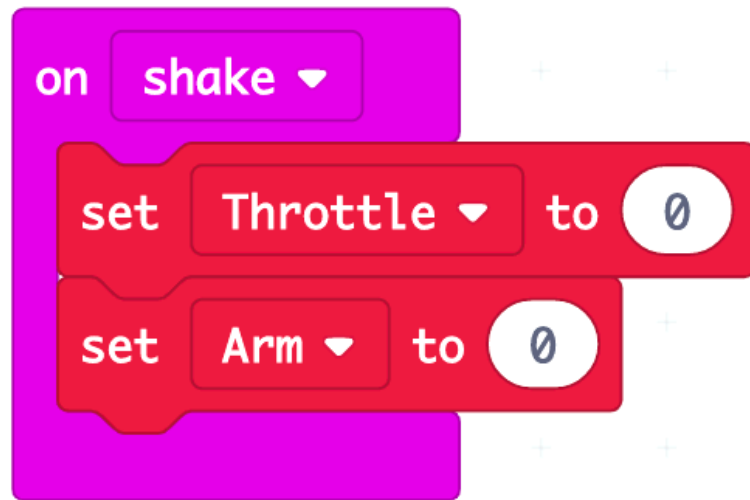
This will take a number between -45 and 45 (roll degrees), and squeeze it down to a number between zero and 4



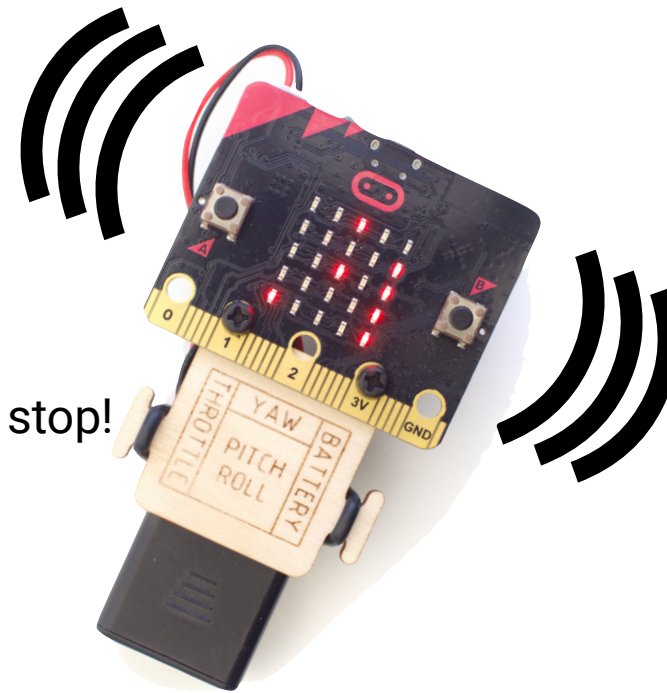
```
clear screen
if Arm then
  plot x 0 y 0
  +
  plot x 0 y map Throttle from low 0 high 100 to low 4 high 0
  plot x map Roll from low -45 high 45 to low 0 high 4 y 2
```

Emergency stop

Make this little code to create a quick and effective way to stop your hover:bit. All you need to do is to shake your controller and the motor will stop.



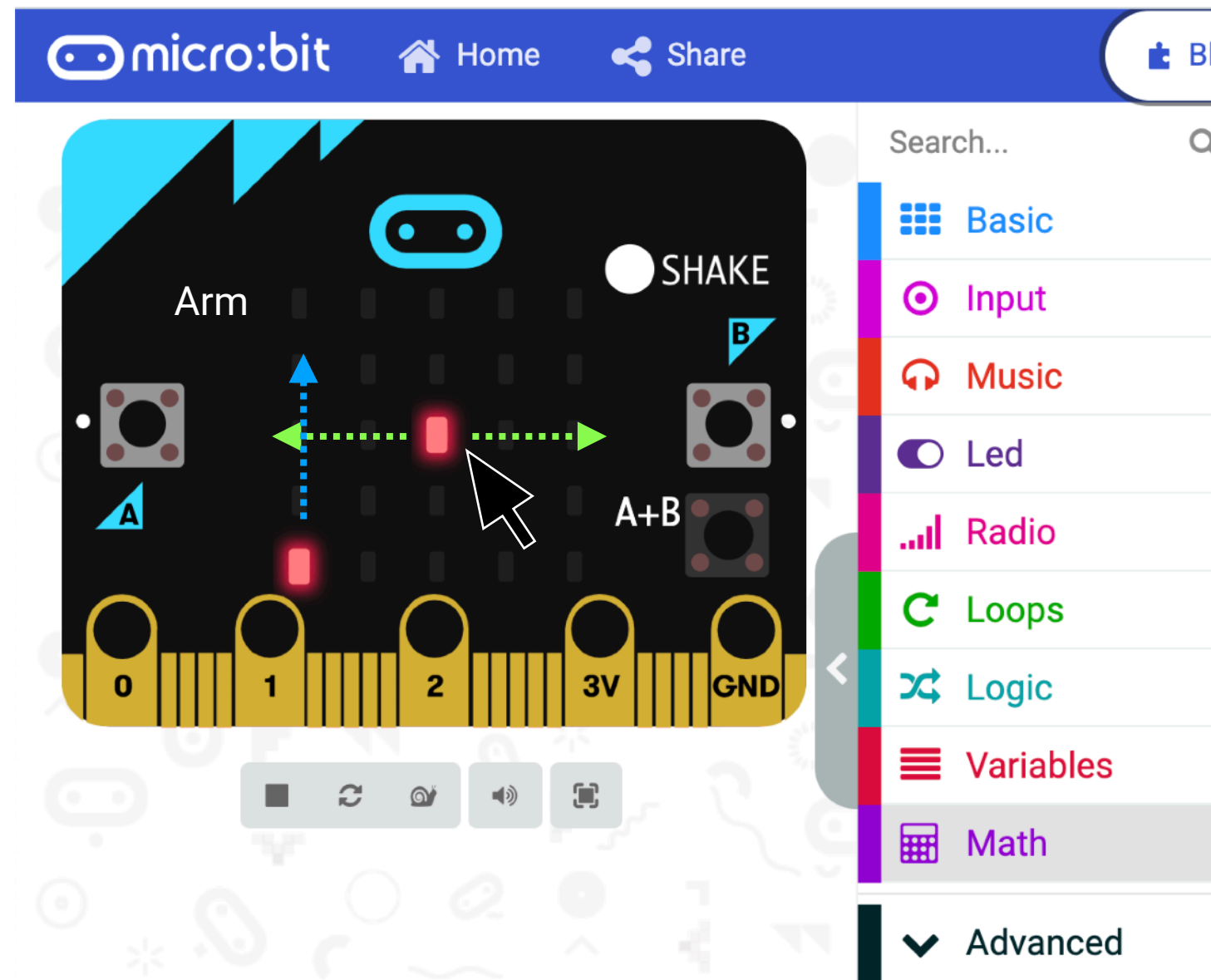
Shake to stop!



Test it!

Use the simulator (left side of make:code) to test your code.

- Press the A+B button to make the arming light to turn on (top left on your screen)
- Press "Shake" to simulate a shake that will turn off arm light.
- If you added the roll/throttle light, move the mouse cursor sideways over the micro:bit. Make sure the dot moves along your mouse arrow. (Green span)
- Press B button numerous times. Verify that the throttle is climbing upwards as in the blue span.

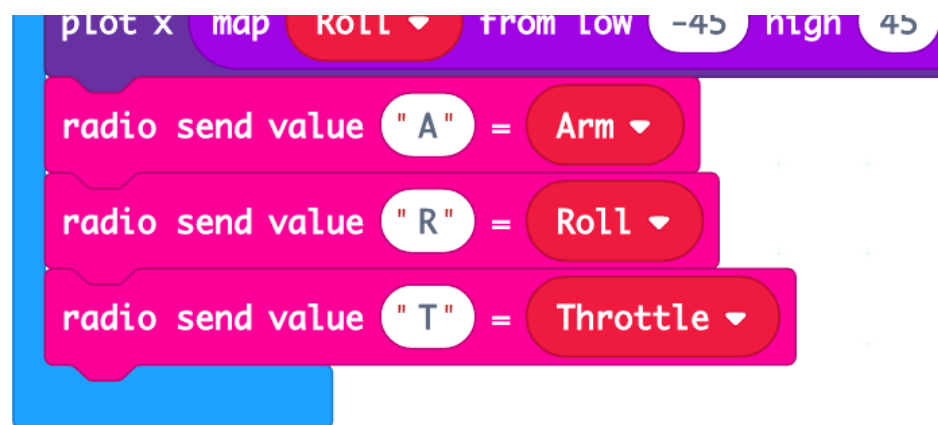
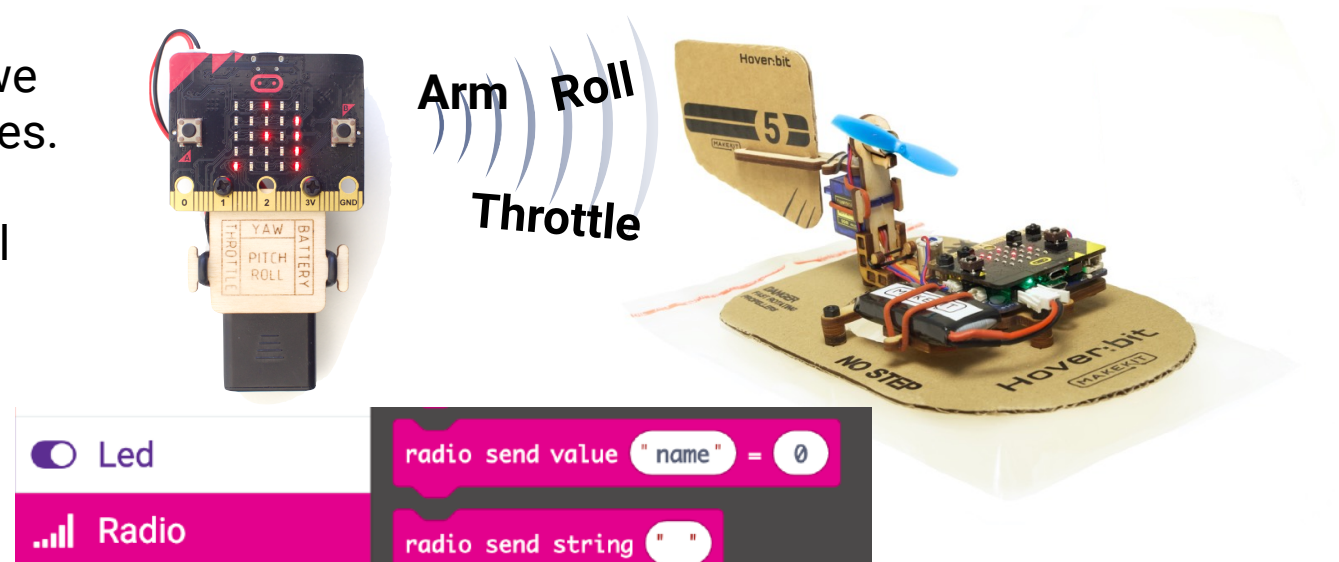


Send the values over radio

To make our remote control work wirelessly, we need to use the radio to transmit our ART-values. They will be sent as separate numbers, with a little name tag on them so the receiver can tell them apart.

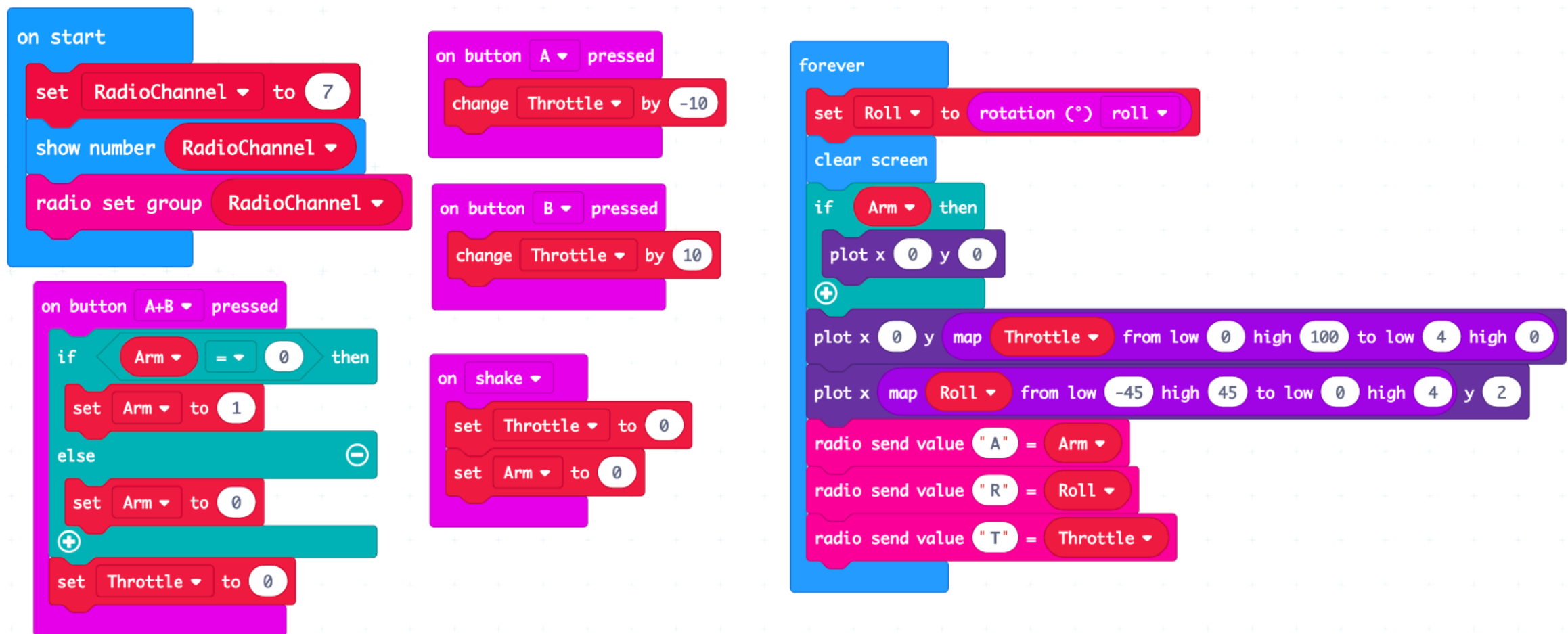
At the bottom of the Forever-loop:

- Use the radio send value = 0 block
- Make one block where you send the letter "A" (must be capital) together with the Arm value.
- Do the same with Roll (R) and throttle (T)



Summary

This is the full code



Download the code

Connect the micro:bit with USB. To connect the device, press the 3 dots right off the download button and follow the instructions, select the micro:bit device on the list.

<https://microbit.org/get-started/first-steps/set-up/>

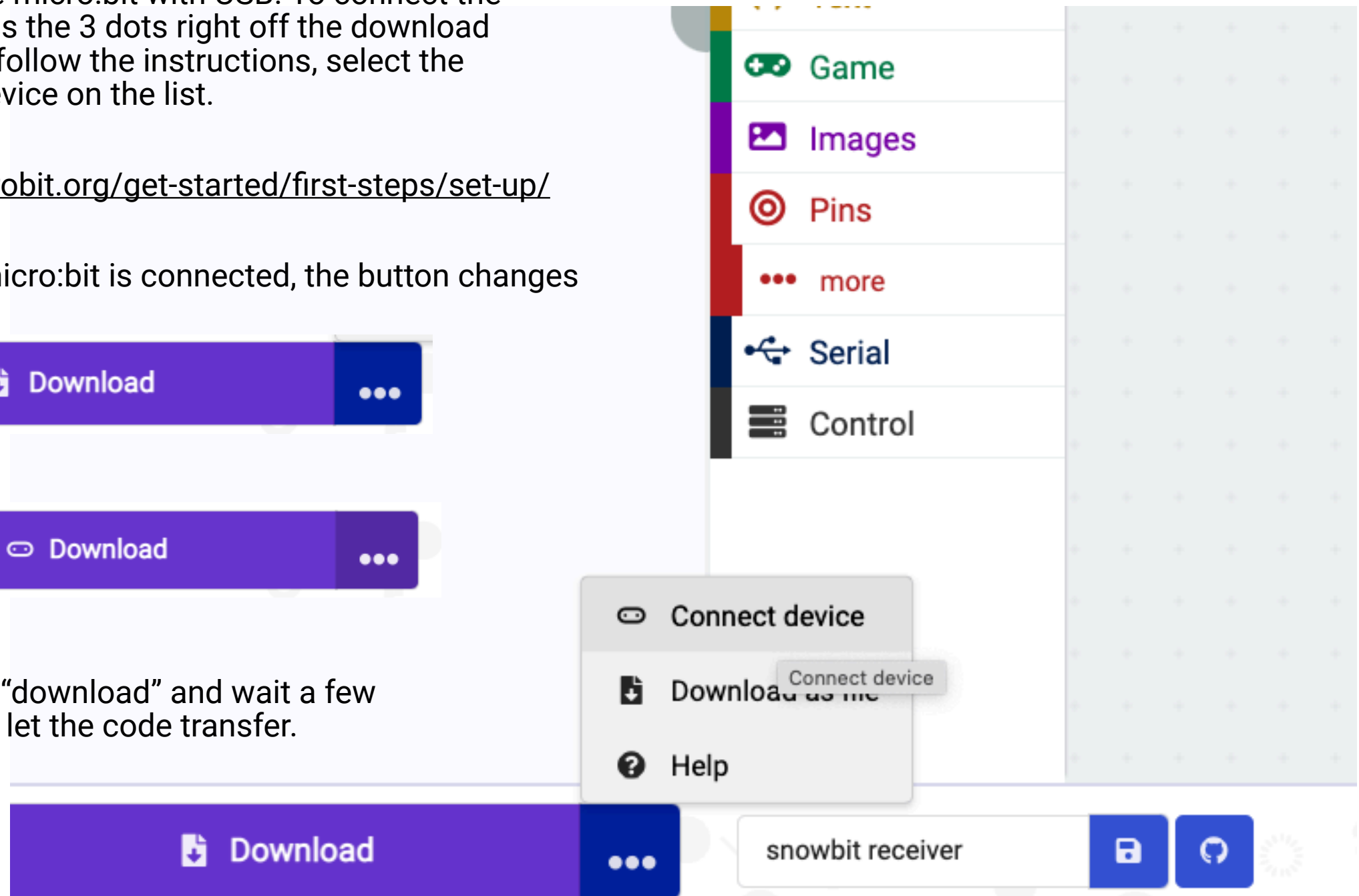
When the micro:bit is connected, the button changes from this



To this



Now press “download” and wait a few seconds to let the code transfer.



Using the remote

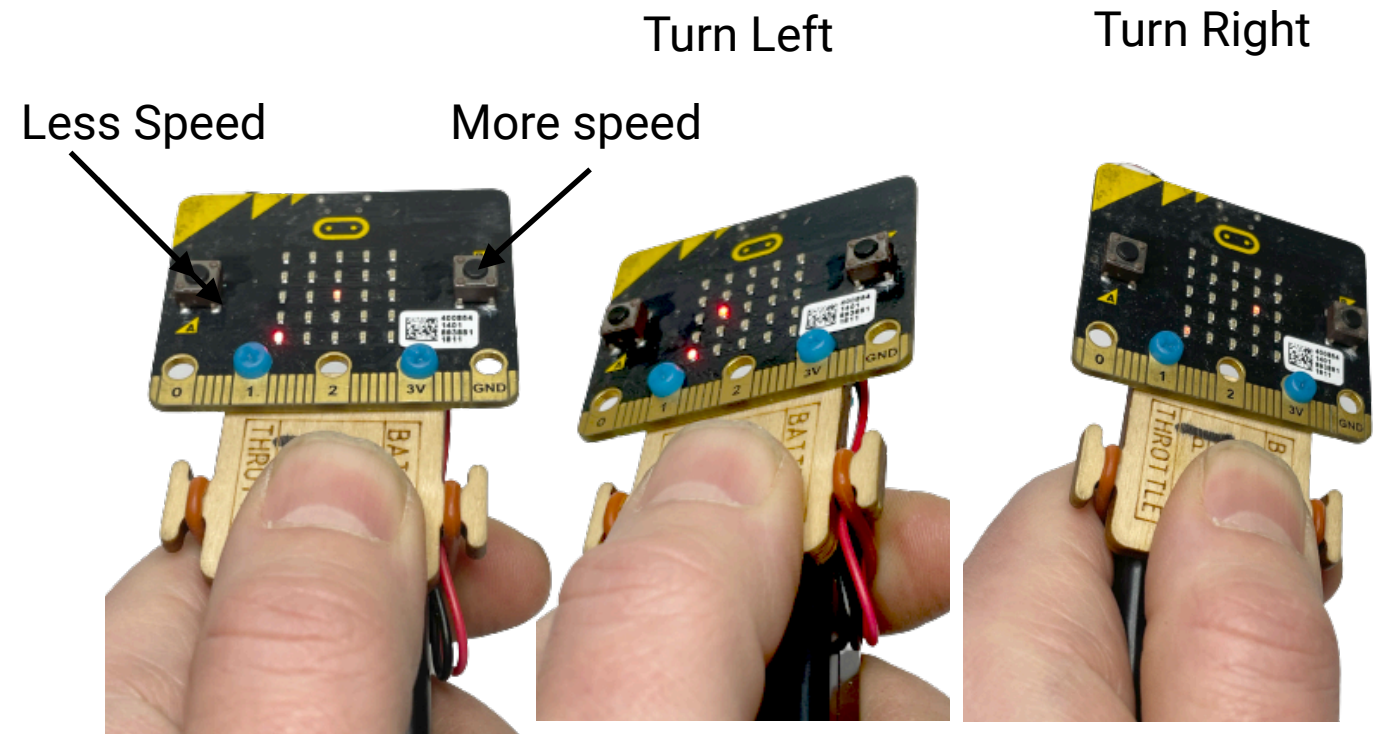
Start and stop: A + B button (press and release quickly)

Less gas: Button A

More gas: Button B

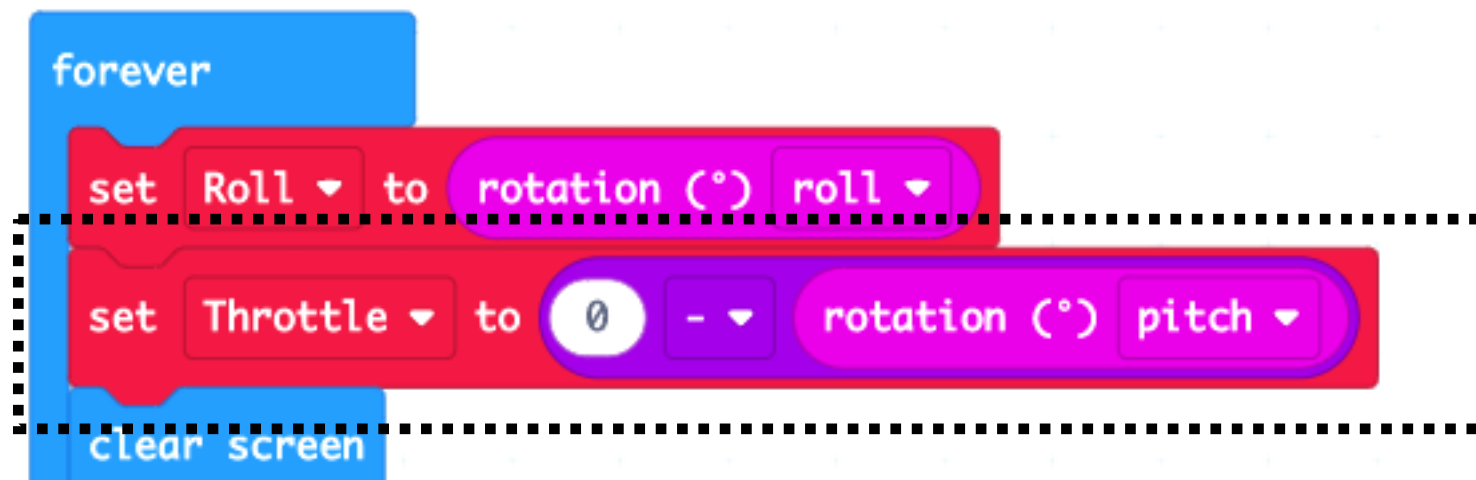
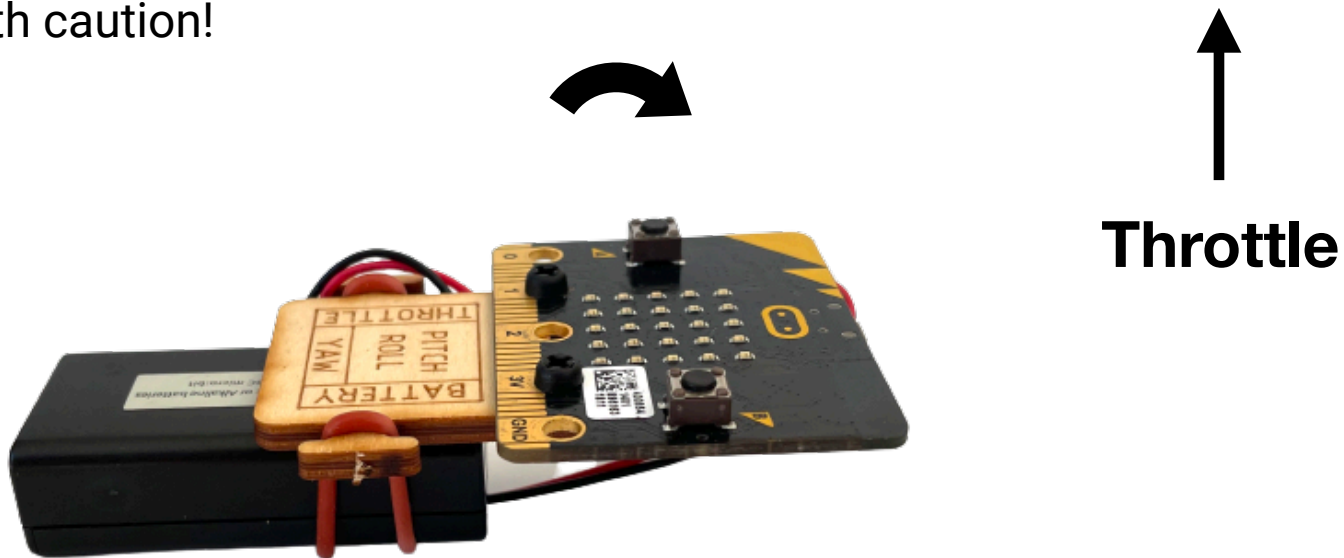
Turn: Turn sideways like a key (see photo)

Emergency stop: Shake.



Variation: tilt control

Would you like to be able to tilt the controller forward to change the throttle? The following block will output the pitch angle as throttle. Use with caution!

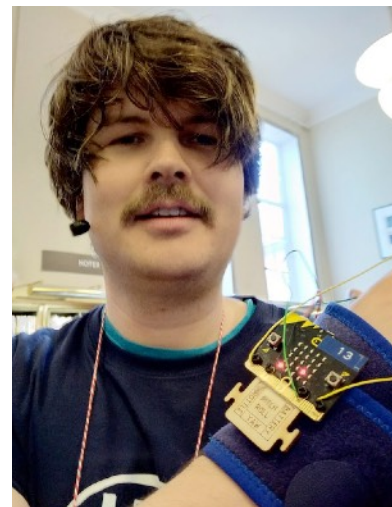


Contact us:

Get help at our Facebook group:
www.facebook.com/groups/goairbit/

Do you have suggestions for
improvements to the product
or the guide?
Then I would like to hear from
you!

You can contact me directly at
henning@makekit.no



Henning Pedersen,
Chief product
developer