MakeCode Rockets for Microbit

These instructions will code a MicroBit to become the launch code system for your rocket. There are two opportunities to personalise the device to your own specifications. Once the MicroBit has been coded it will then be connected to the Launcher ready for Blast Off!

Go to
https://makecode.microbit.org/beta

Connect and Pair

Connect the MicroBit to the computer. On the MakeCode screen click on the cog wheel in the upper right of the window. Then click pair device, and the green Pair Device button, then the named the Microbit and finally Connect. This enables quick and easy copying of the code onto the Microbit.

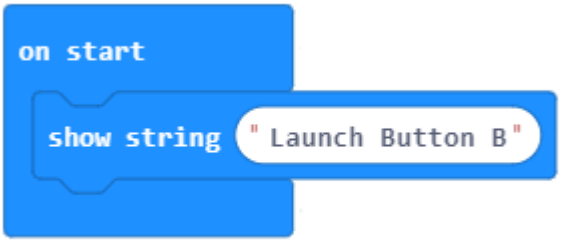
Start Coding Messages

The code starts with some simple messages and pictures. Then moves onto the switches for the launcher. Take it a step at a time. The complete code is at the bottom of the instructions to refer to if you need to.

From the MakeCode starting screen click on the Basic blocks group title. Click, hold and drag to the right the Show String block. Connect it to the on start block. Watch the Microbit on the screen and the message “Hello” will scroll across.

Now click the big Download button at the bottom left of the window. Watch the real Microbit and the message Hello will scroll across the LED on the front. Press the restart button on the back of the MicroBit and the message will rescroll.

Now change the Hello to your own message to play at the start of the launch sequence. You will be pressing Button B to start the launch. SO maybe mention that. But it is up to you!

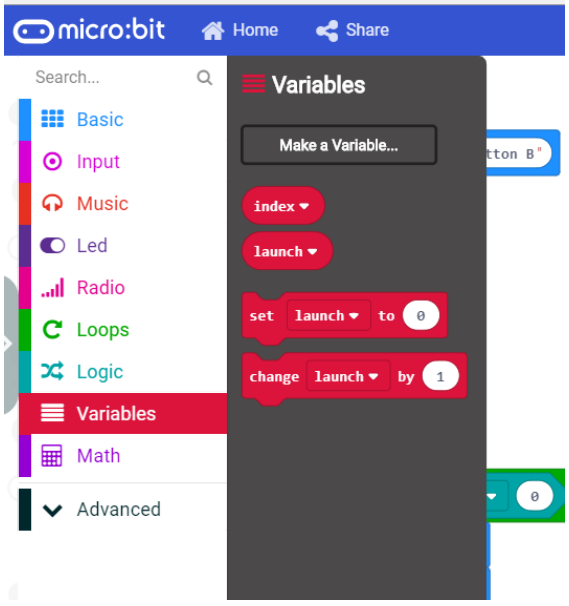


Variables

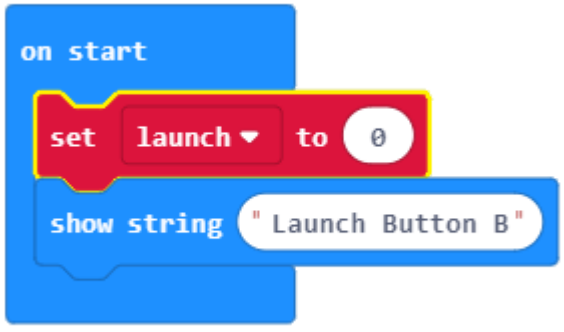
This next piece is a very important part of any coding. Very useful to remember if you can.

A variable is like a labelled box with a message or number inside. You can look at what is inside as often as you'd like to remember what it is. You can also change what is inside for a different number or a different message. But not for a message if it is a number or a number if it is a message. Also you can not change the label on the box. And you can have as many labelled boxes as you require.

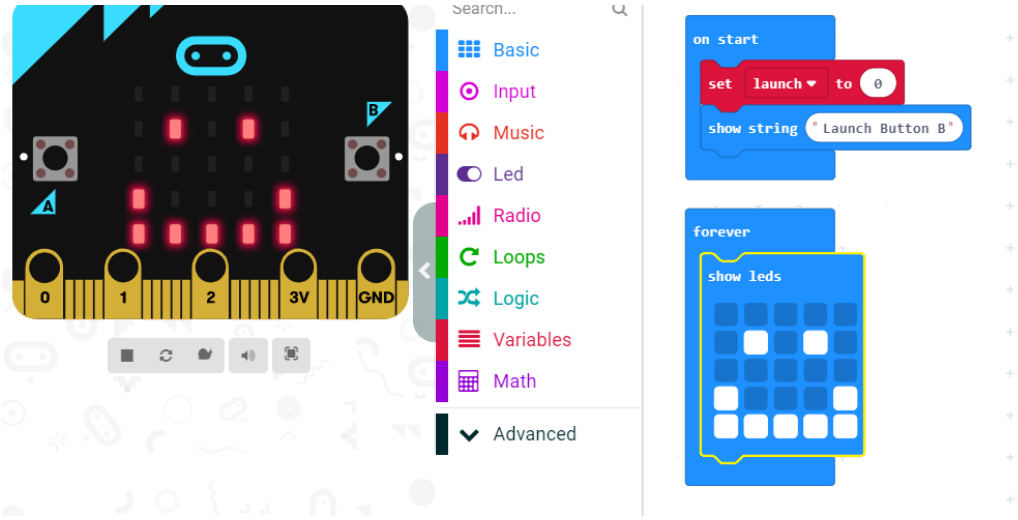
Go to the Variables group and click on Make a Variable. Call it launch. Launch or LAUNCH are different to launch in computer code. Here it will not matter but correct spelling in computer coding is very important. See the image below for help.



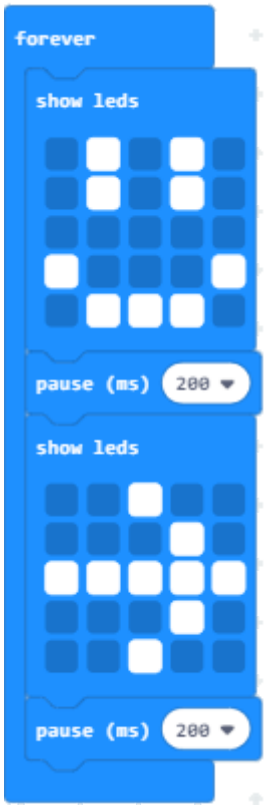
Drag and drop the set launch to 0 into the on start box, as below. This variable called launch is set to zero because the launch is not happening, yet. When it does the value for launch will change to one and things will happen.



Now from Basic drag a blank Image box and connect it inside the Forever block. Draw your own picture on it by clicking the small squares. You will be drawing two pictures that will animate to remind you that the launcher is waiting for you to press the button. So maybe make the pictures similar, here there is a smiley face to start.
When your picture is ready Download onto the MicroBit to check it works.



Next draw the second image and between each one, and at the end, place a pause (ms) 200 block. Change the time with the small drop down arrow.

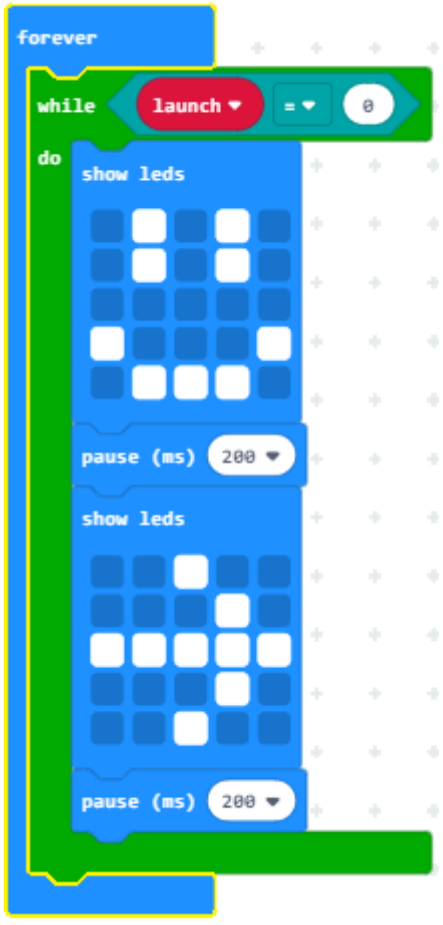


Download again. Your images should be switching back and forth.

The next piece of code blocks make sure that the animation only plays when the launcher is waiting for the button to be pressed. Once the countdown has started the animation stops.

From the Loop, Logic and Variables groups drag three blocks out shown below.

And place them around the previous blocks as shown below. This code means that as long as the value of zero is in our variable box labelled launch, animate the pictures.

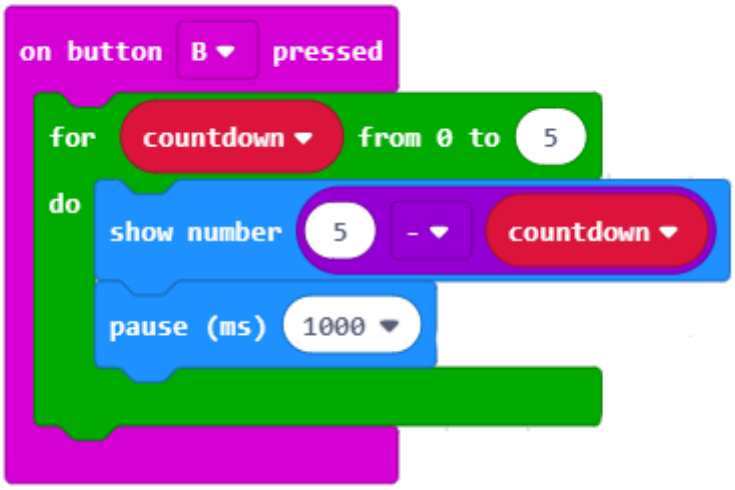


The Countdown

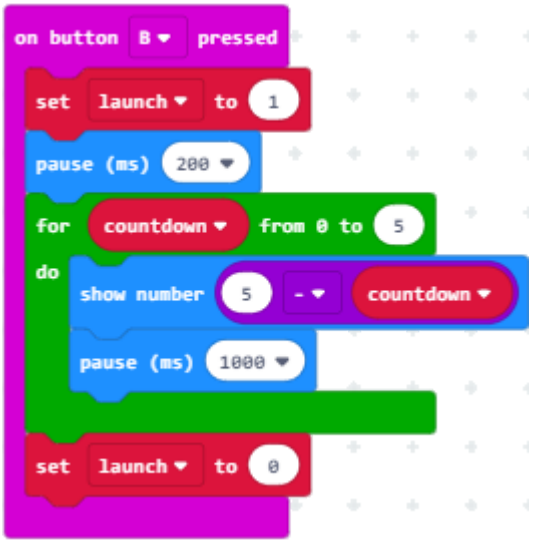
If Button B is pressed at any time the countdown to launch needs to start. The MakeCode blocks can only count upwards from 0. To get a backwards result the value of the count is subtracted from 5 as the count goes up.

First count is 0.	5 - 0 = 5.	First countdown number is 5.
Second count is 1	5 - 1 = 4	Second countdown is 4.
Third count is 2	5 - 2 = 3	Third countdown is 3.
Fourth count is 3	5 - 3 = 2	Fourth countdown is 2.
Fifth count is 4	5 - 4 = 1	Fifth countdown is 1.
Last count is 5	5 - 5 = 0	LAUNCH!

These are the blocks to do the countdown set out above. When Button B is pressed a new variable “countdown” starts counting from zero to five. The number is shown as 5 minus the countdown. Then a one second pause before the next count.
Make this block up and Download onto the MicroBit. Press Button B when the animation has started.



You will notice that the animation still plays during the countdown. To stop that happening the launch value needs to be changed. Add the set variable to block from the Variable group at the top and bottom of the button block like this. And a Pause 200 at the top too. Download the code again and press the B button..

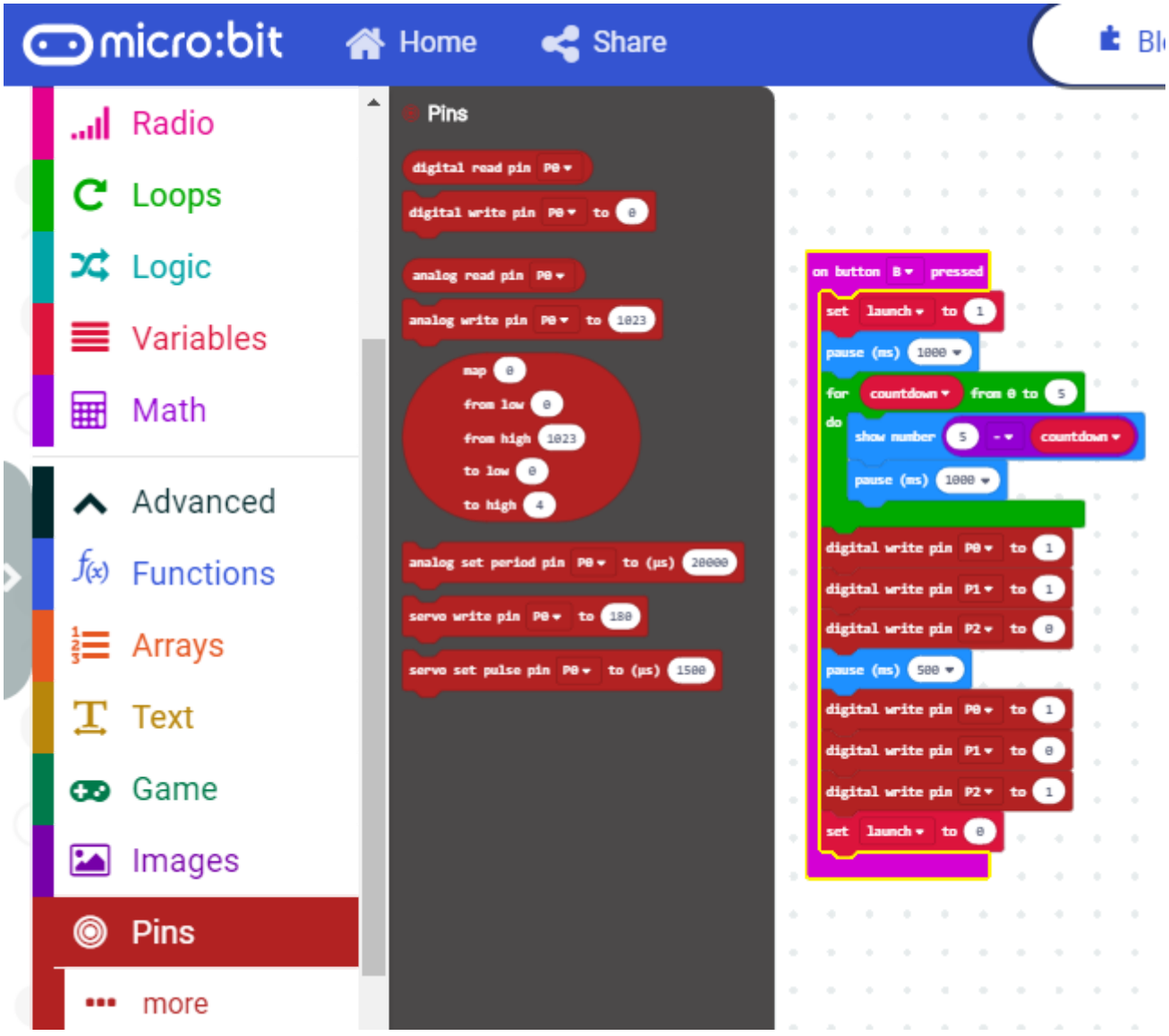


The Button B can be pressed again and again and the countdown will start.

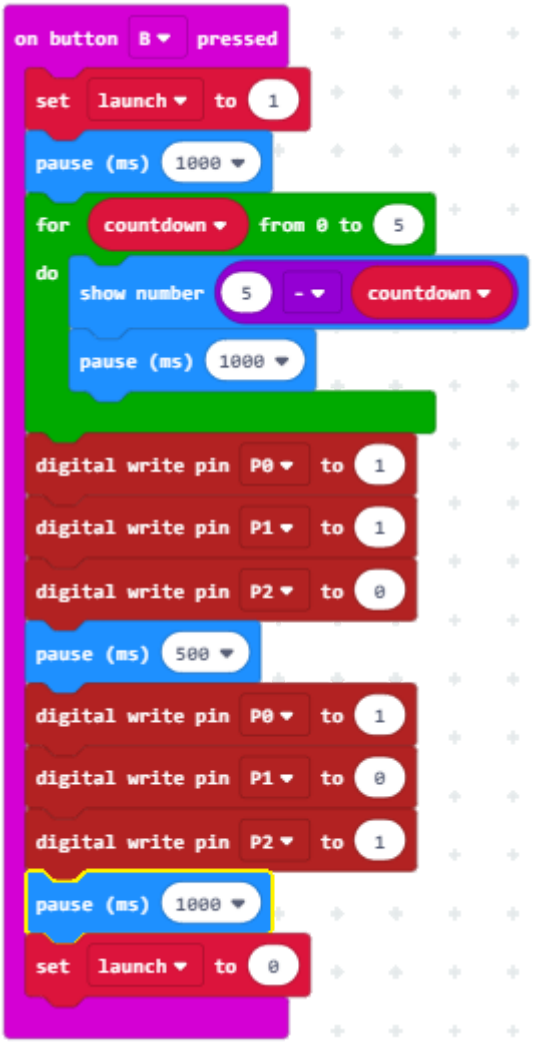
The final part of the code is the switching of the launcher system itself. There is one set of switches to launch the rocket and another to reset for the next launch.

Launch the Rocket

Six lines of new code are needed. These are found under the Advanced area of Groups under Pins. The picture below shows where they can be found. The line needed is the “digital pin P0 to 0”. Pull six of these across into the Button B block with two pauses too. Just the code block is shown on the next page..

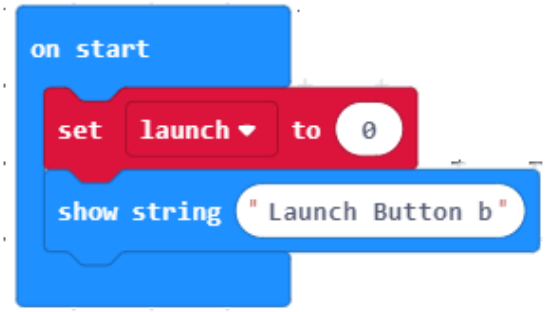


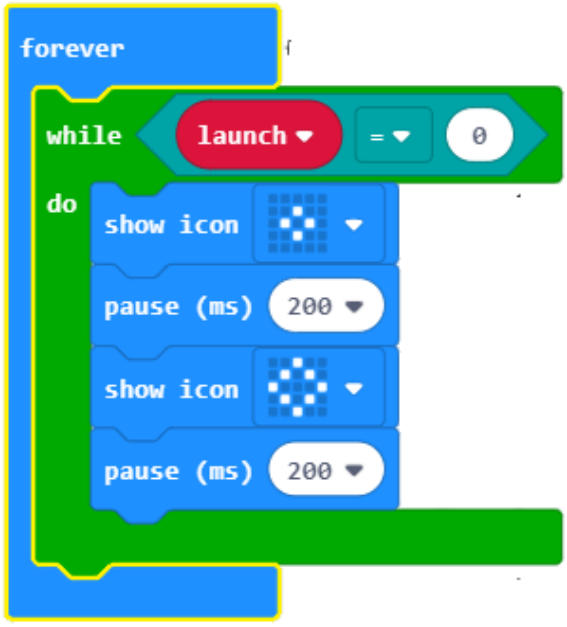
This is the last piece of code completed. Download this onto the Microbit and check that it seems to work.

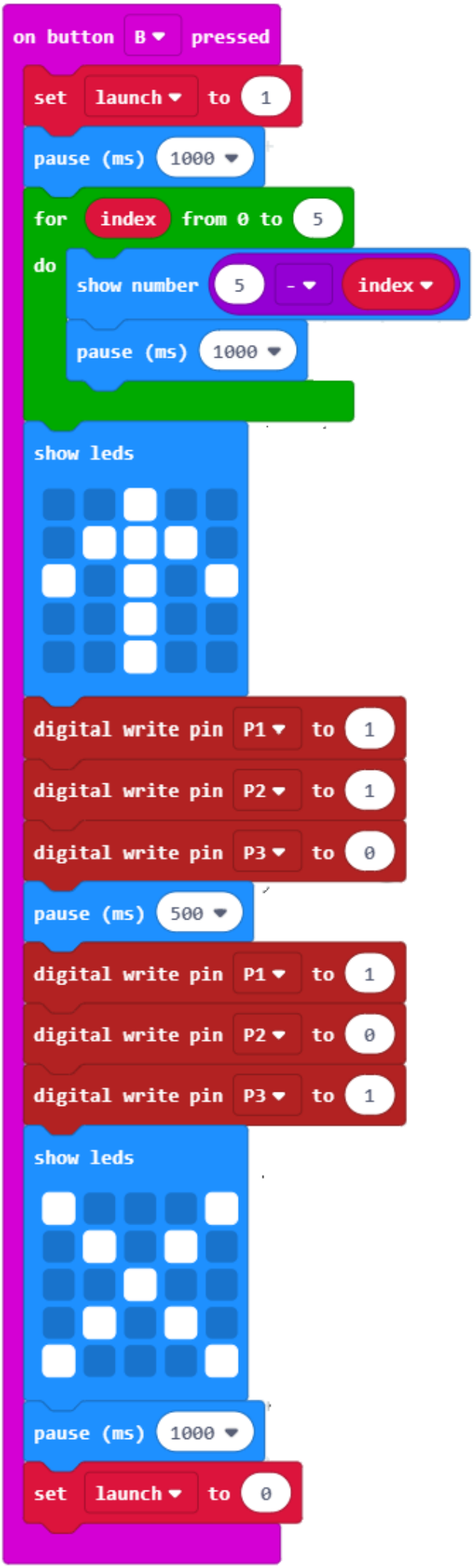


All is now ready to launch your rocket.

All the complete code is on the next page. Remove your MicroBit from the computer and take it with your rocket to the lad pad.


on start
set launch to 0
show string " Launch Button b "


forever
while launch = 0
do
show icon
pause (ms) 200
show icon
pause (ms) 200


on button B pressed
set launch to 1
pause (ms) 1000
for index from 0 to 5
do
show number 5 - index
pause (ms) 1000
show leds
digital write pin P1 to 1
digital write pin P2 to 1
digital write pin P3 to 0
pause (ms) 500
digital write pin P1 to 1
digital write pin P2 to 0
digital write pin P3 to 1
show leds
pause (ms) 1000
set launch to 0