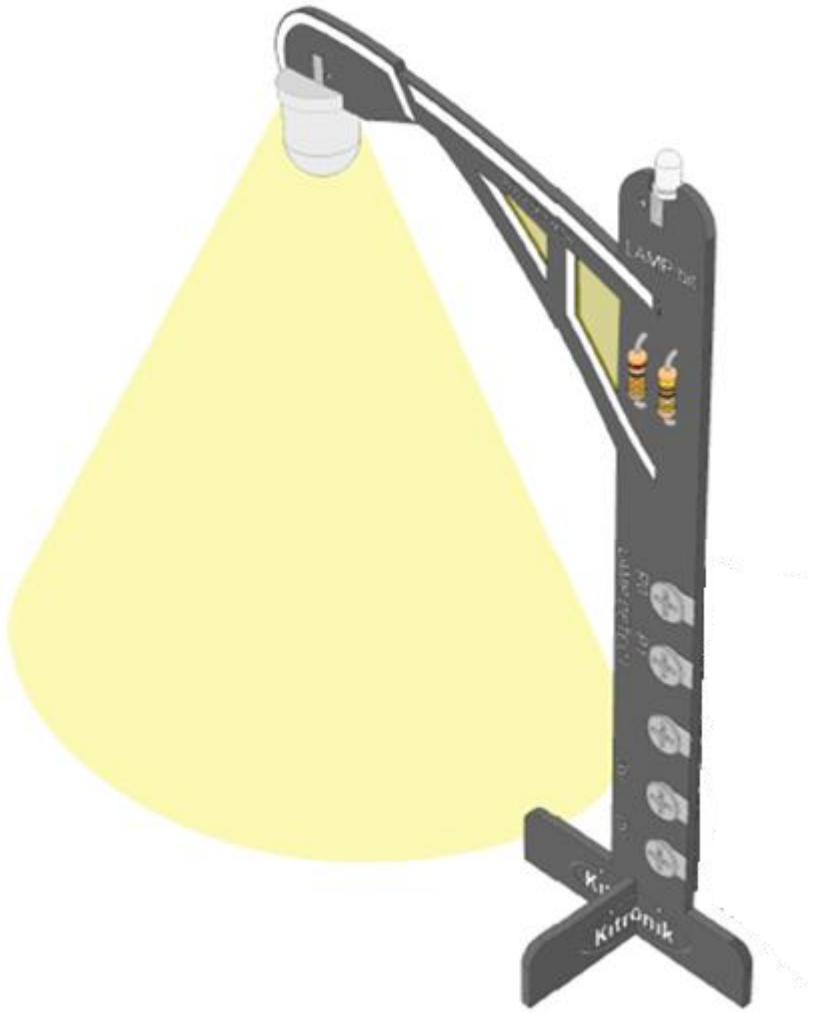
micro:bit

Kitronik Lamp Bit Lessons



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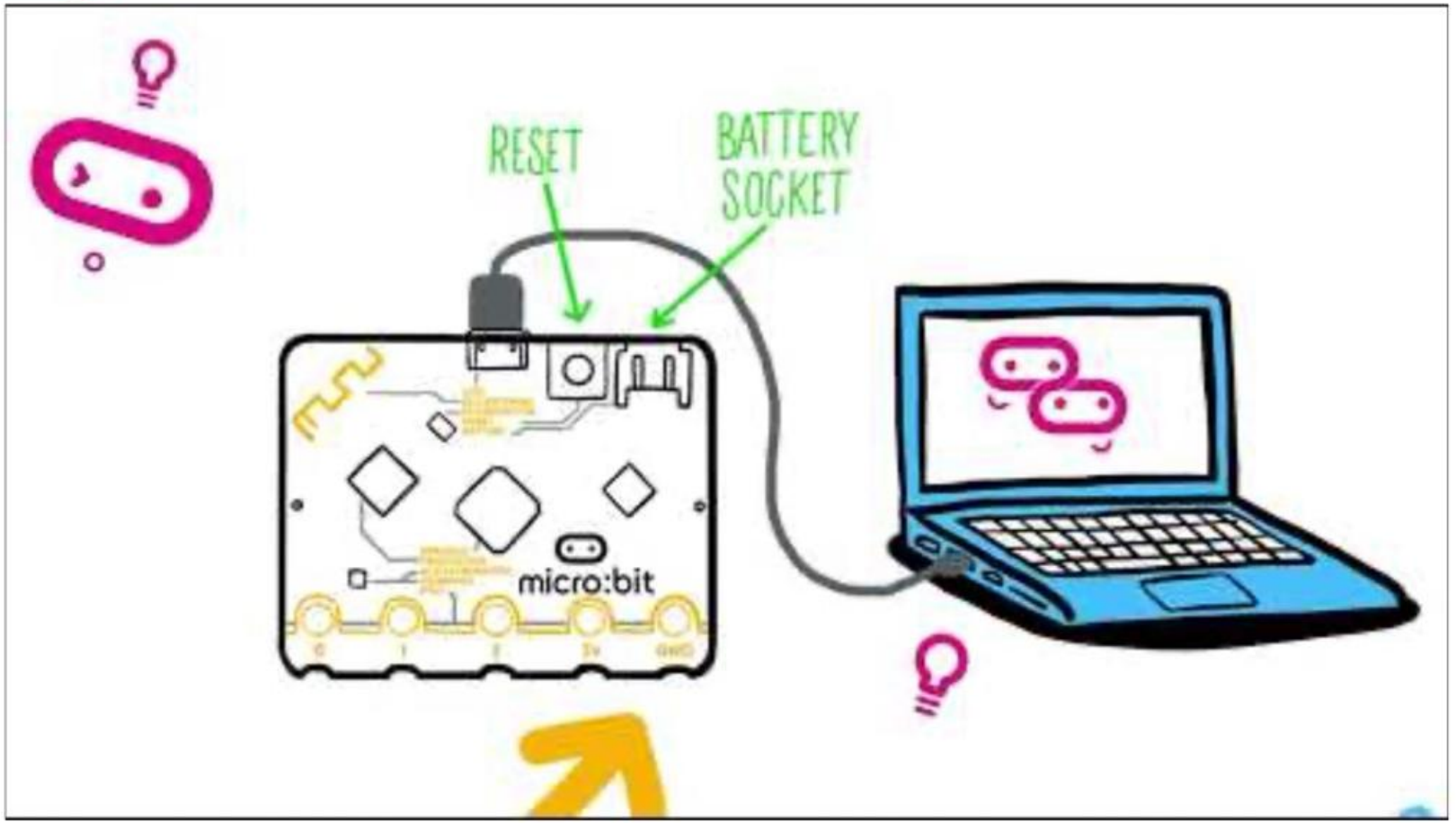
Introducing The Micro:bit



Watch this video. https://www.youtube.com/watch?v=FfVinxVyzYo (1:29)

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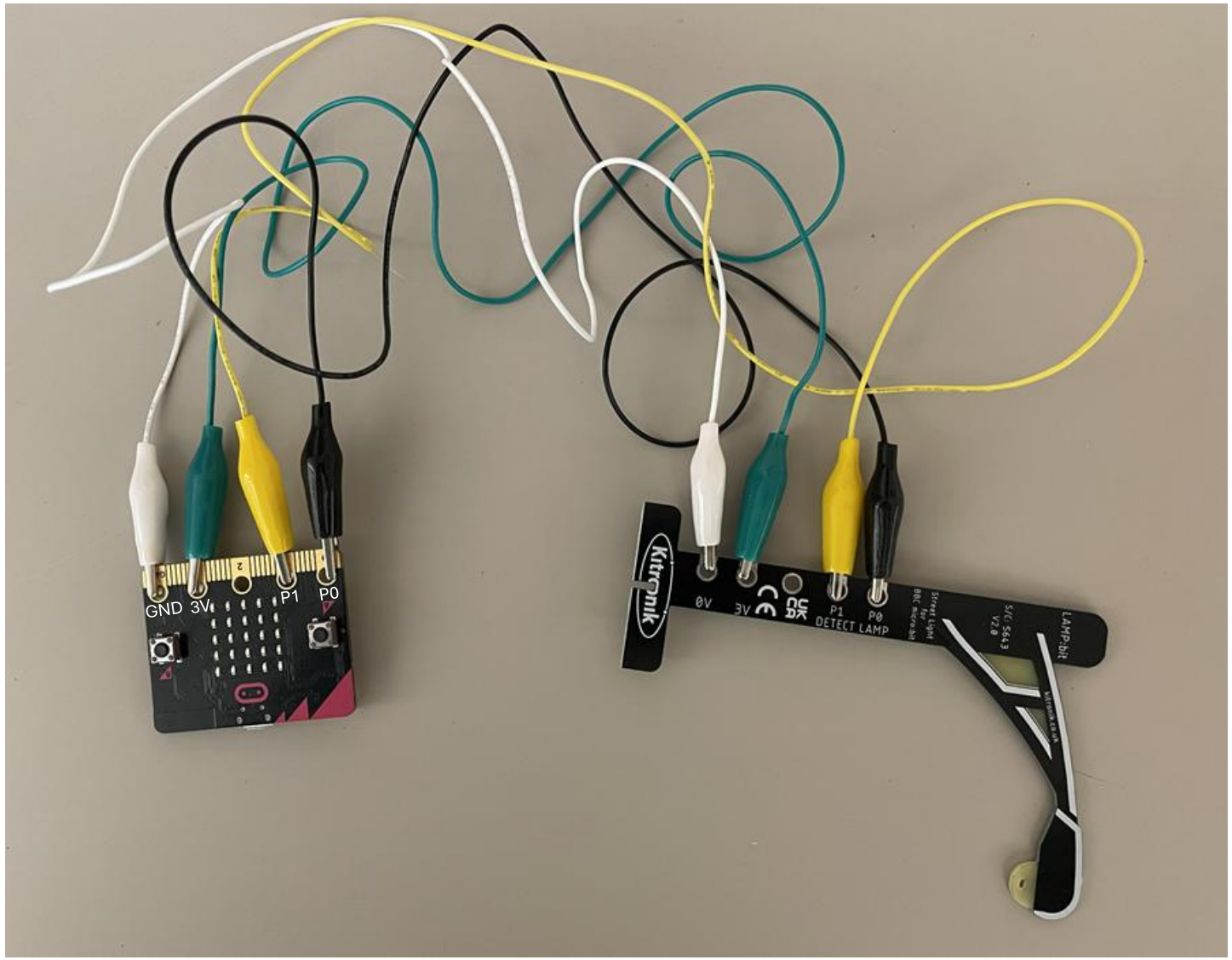
Ask Mr. Desmond for the micro:bit device, a set of wires with alligator clips, and the Kitronik Lamp Bit.



Connect the ports on the micro:bit to the ports on the Lamp Bit using the provided wires with alligator clips.
Connect: P0 to P0, P1 to P1, 3V to 3V, and 0V to GND.

Check in with Mr. Desmond.

SD

Ask Mr. Desmond for the micro:bit USB cable and the lamp post support base.

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Plug the USB cable into the micro:bit and your Chromebook.

Wait a moment for the Chromebook to recognize
and connect to the micro:bit.

Check to make sure that the micro:bit is accessible when
viewing your Google Drive or your Files.

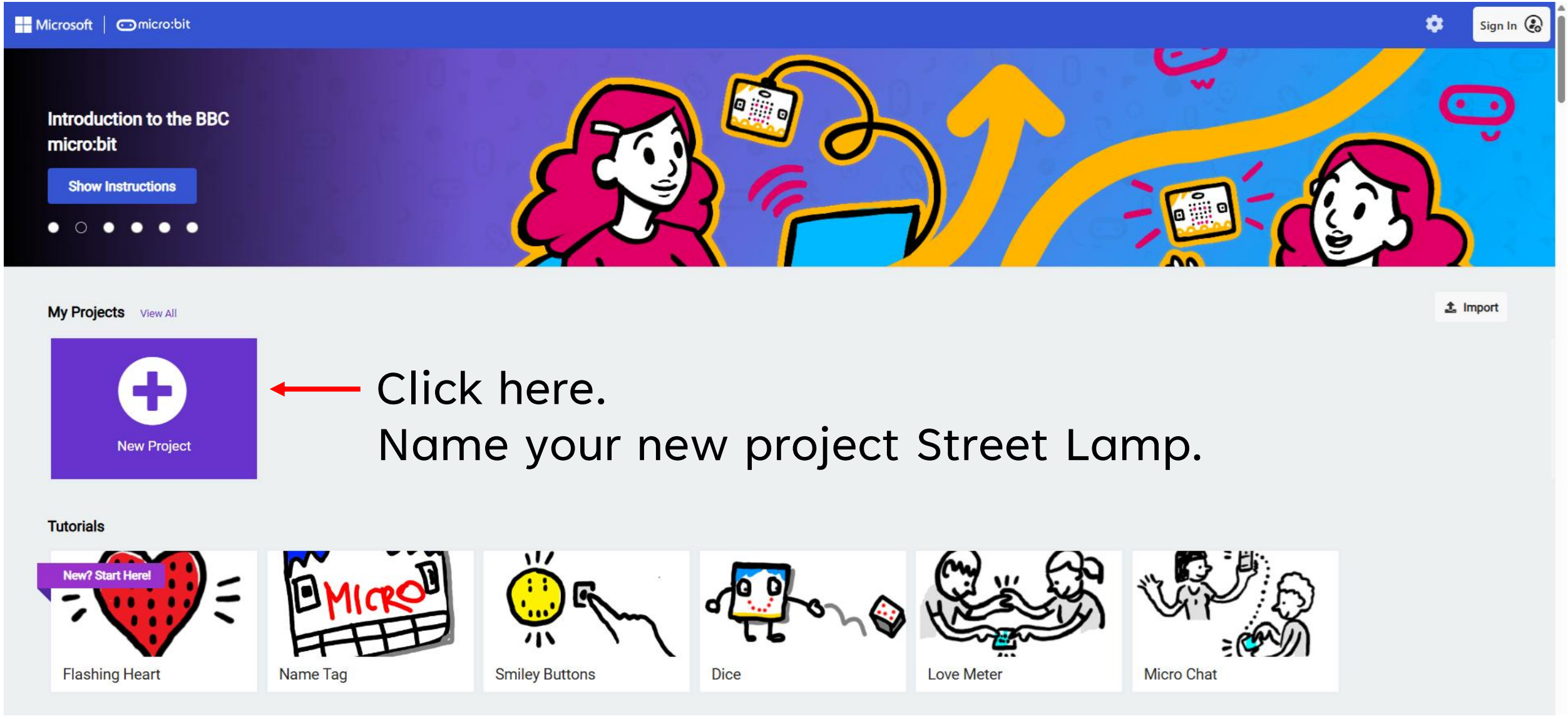
Check in with Mr. Desmond.

Ready to code? Go to the next page to begin.

SD

Open a new MakeCode project.

https://makecode.microbit.org/



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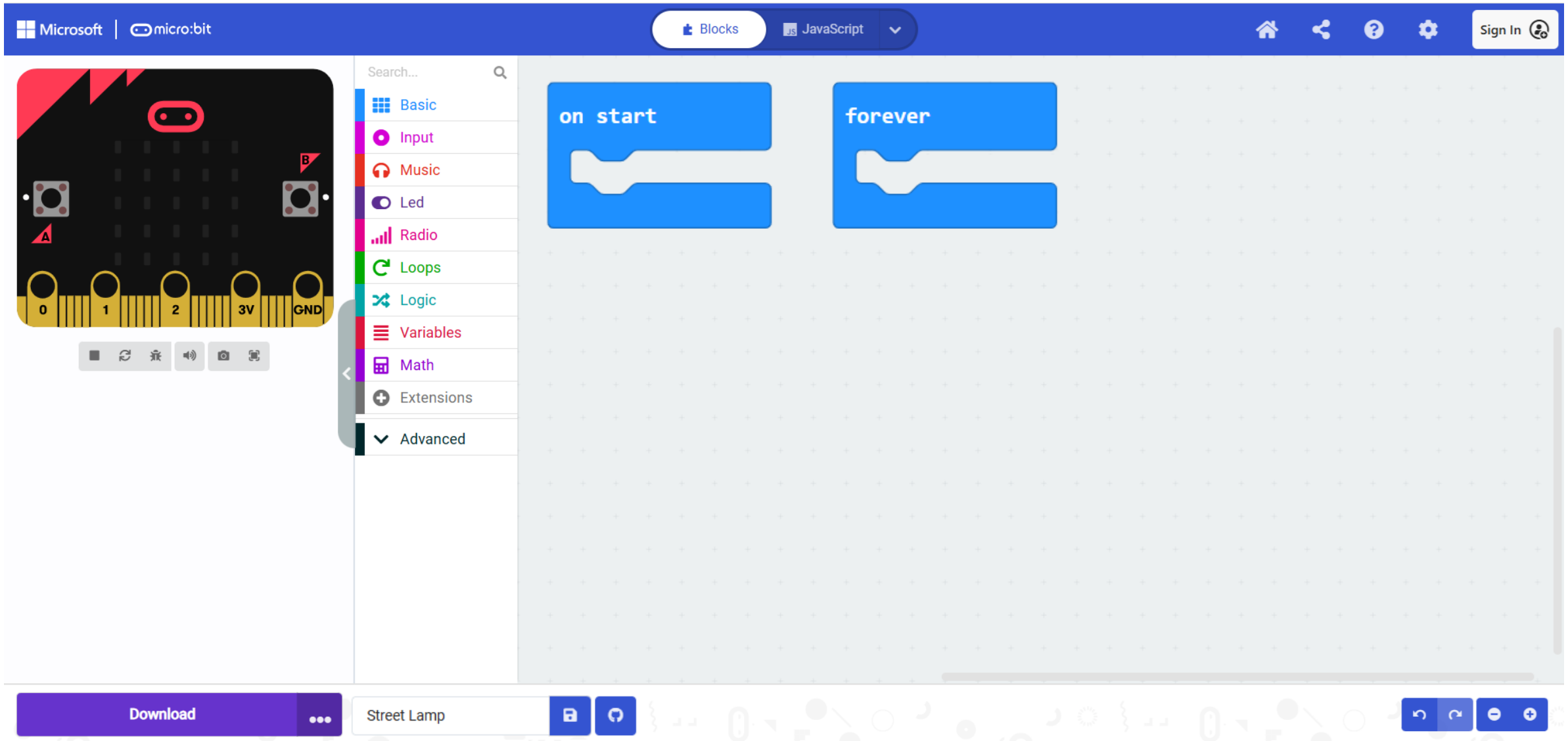
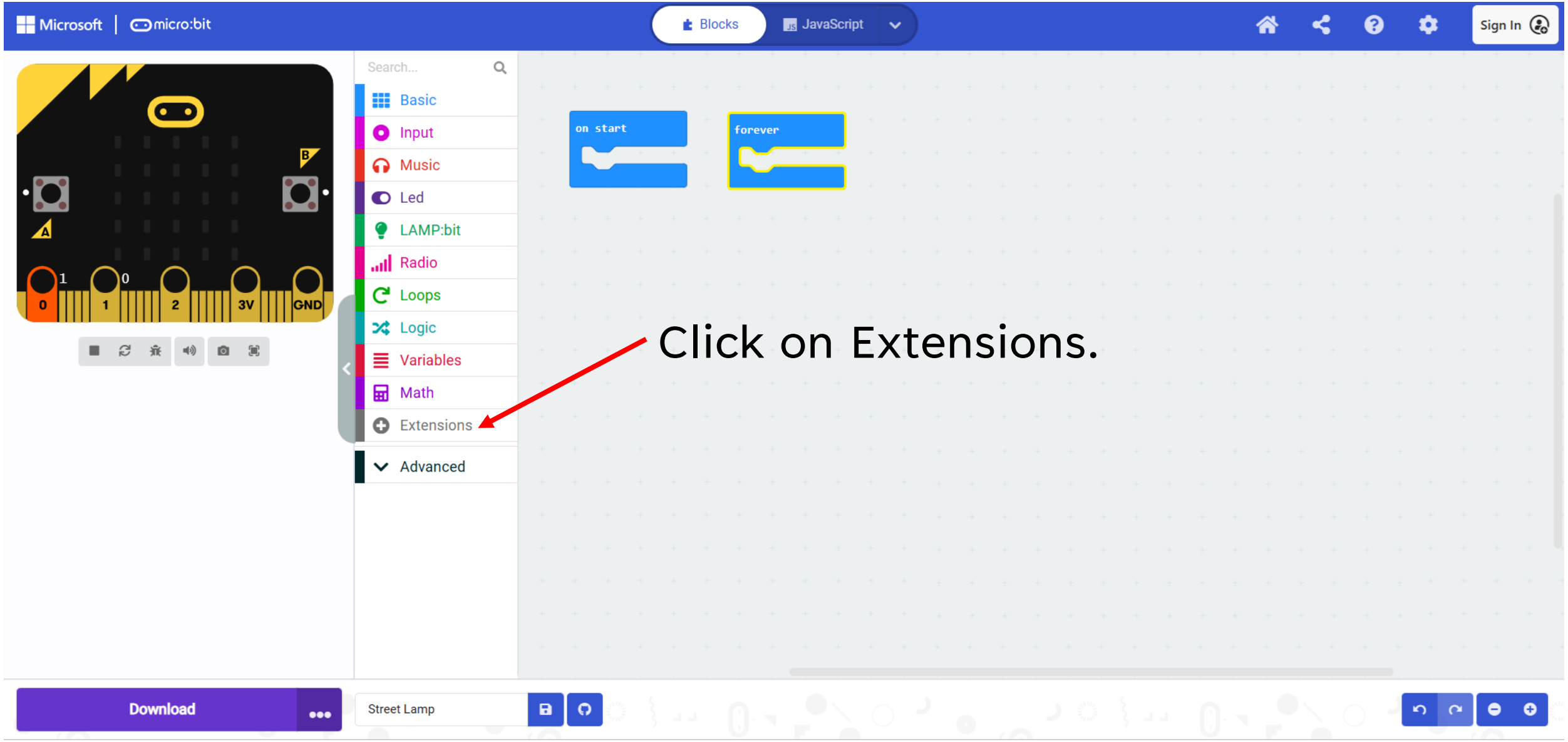
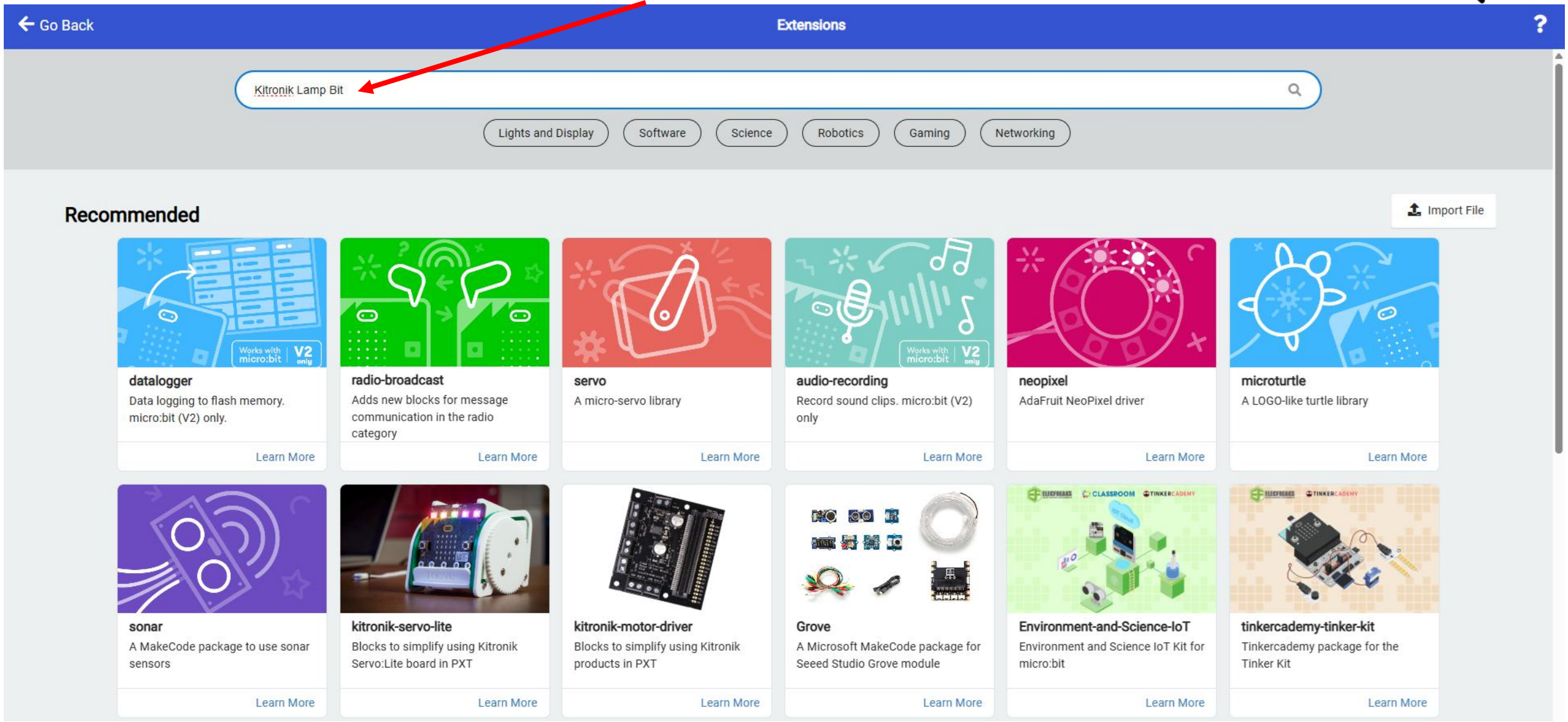
Follow all the steps of this lesson. Do not skip any pages.




Microsoft
micro:bit
Blocks
JavaScript
Sign In
Search...
Basic
Input
Music
Led
LAMP:bit
Radio
Loops
Logic
Variables
Math
Extensions
Advanced
on start
forever
Click on Extensions.
Download
Street Lamp

SD

In the search box type Kitronik Lamp Bit and then click the .



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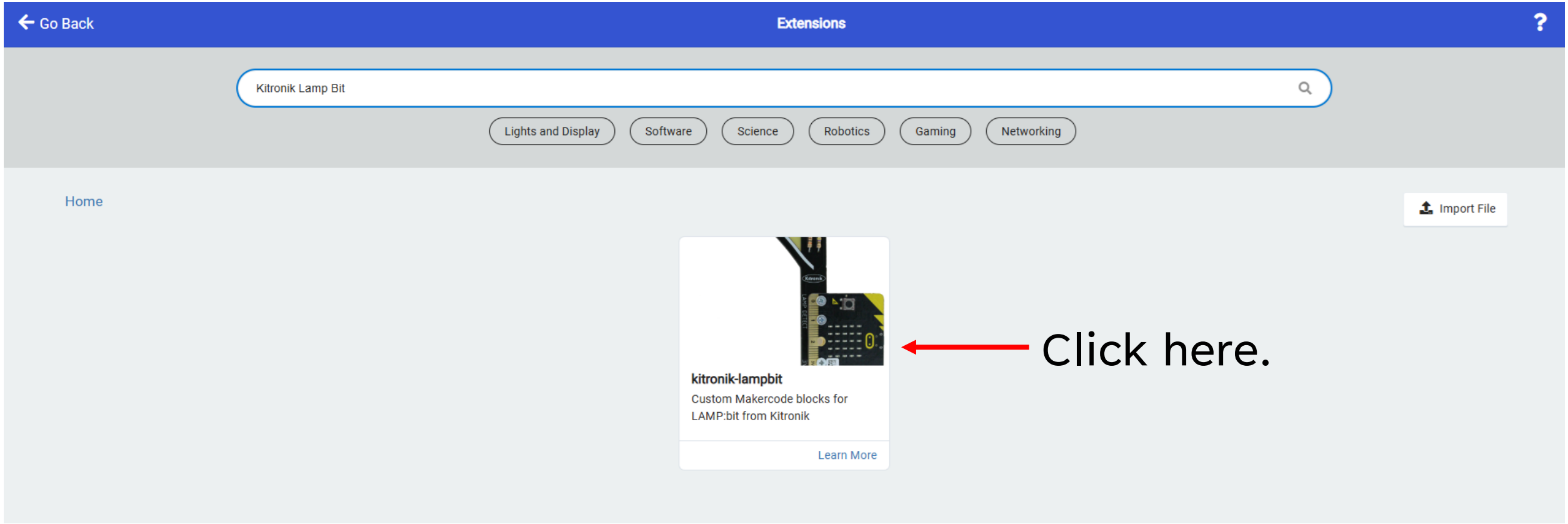
Click on the kitronik-lampbit box.



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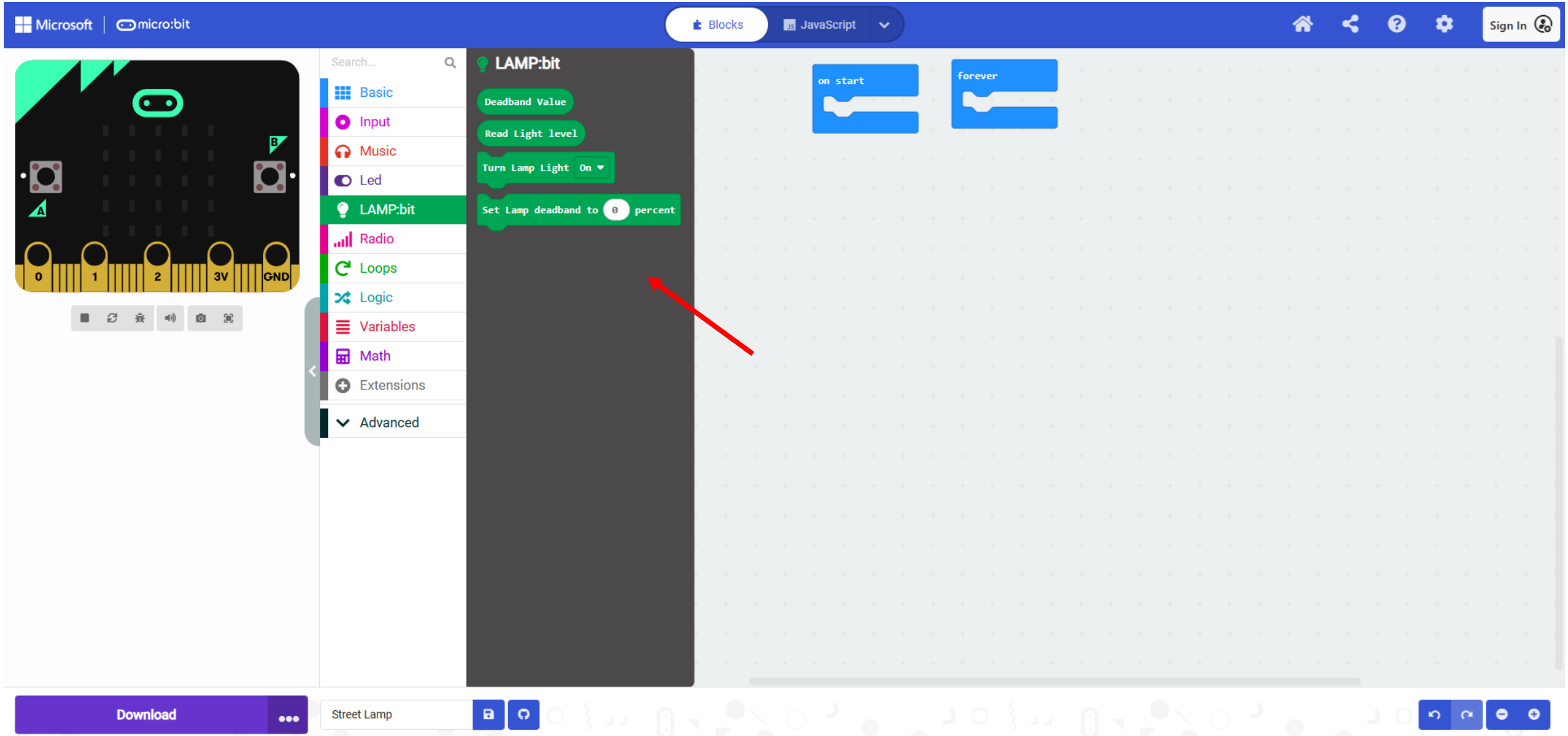
Notice the LAMP:bit code blocks have been added.



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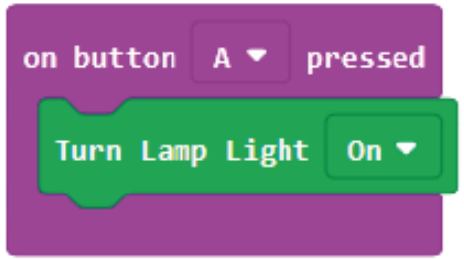
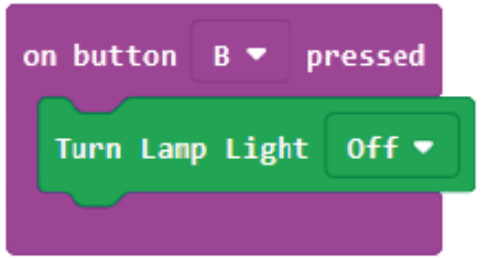
LESSON 1

STREET LAMP

Create the code sequences below.





Download your code.
Carefully follow the instructions on the next page.

Step-by-step Guide To Download Your Code To Micro:Bit

1) Connect. Plug your micro:bit device into the Chromebook with a USB cable; it will appear as a new drive named MICROBIT in your Files app.
2) Code & Download. In MakeCode, build your program and click the purple Download button. Do not PAIR. Click the blue Download as File button. This saves a "_____.hex" file (e.g., microbit-program.hex) to your Chromebook's Google Drive or Google Files.
3) Locate File. Open the Files app (the blue folder icon) and find your downloaded "_____.hex" with the files in your Google Drive or with the files in your Google Files.
4) Drag & Drop. Click and drag the "_____.hex" file directly onto the MICROBIT drive.
5) Transfer. The MICROBIT drive will momentarily disappear as the code is transferred to the micro:bit device. Look for the blinking lights on the micro:bit and an on-screen message showing you the status of your download.
6) Run. Your program will start automatically on the micro:bit once the transfer is complete.

Need help? Watch a video to help you with these steps to download your code to the micro:bit from a Chromebook.
https://www.youtube.com/watch?v=9V2oAsB3F8s

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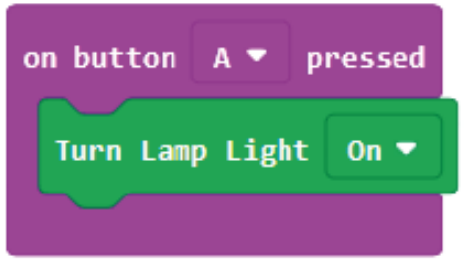
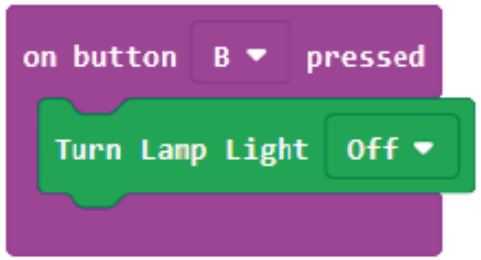
LESSON 1

STREET LAMP

Create the code sequences below.





Did you download your code?
Test your code.

Press Button A. What happens?
Press Button B. What happens?

Show Mr. Desmond your working street lamp.

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LESSON 1

STREET LAMP

Answer the following questions on a piece of paper.

1) Why do we need and use street lights in our city?

2) When do the city street lights turn on and off?

Be prepared to discuss your answers with Mr. Desmond.

SD

LESSON 2

STREET LAMP LIGHT DETECTION

You might be wondering how do the city street lights tell when it’s light and when it’s dark?

City street lights turn on and off using a phototransistor light sensor as an input to tell when it is light or dark. When the phototransistor light sensor reads that there is a lot of light (a high light value reading) the lamp is off. When the photo-transistor light sensor reads that there is not a lot of light (a low light value reading) the lamp is on.

The Kitronik Lamp Bit has and uses a phototransistor light sensor just like the city street lights.

LESSON 2

STREET LAMP LIGHT DETECTION

Use the phototransistor light sensor to read the light value at the table where you are currently sitting. [Light levels will differ across the room.]

Create this code sequence. Download your code. Test your code.

Have the street lamp in an upright position so that light from above will shine directly on the phototransistor at the top of the lamp post.

SD

LESSON 2

STREET LAMP LIGHT DETECTION

Use the phototransistor light sensor to read the light value at the table where you are currently sitting. [Light levels will differ across the room.]

If the light level reading on your micro:bit is over 200 the code download did not work properly.
Download and run your code again.
Most of the time the light level reading will be below 100.

If the light level reading on your micro:bit is less than 30 then move your equipment to a different location in the classroom where you can get more light.

SD

LESSON 2

STREET LAMP LIGHT DETECTION

Use the phototransistor light sensor to read the light value at the table where you are currently sitting. [Light levels will differ across the room.]

Run your code again.
Determine the most consistent or median light level reading on your micro:bit.

Show Mr. Desmond the light level reading on your micro:bit.

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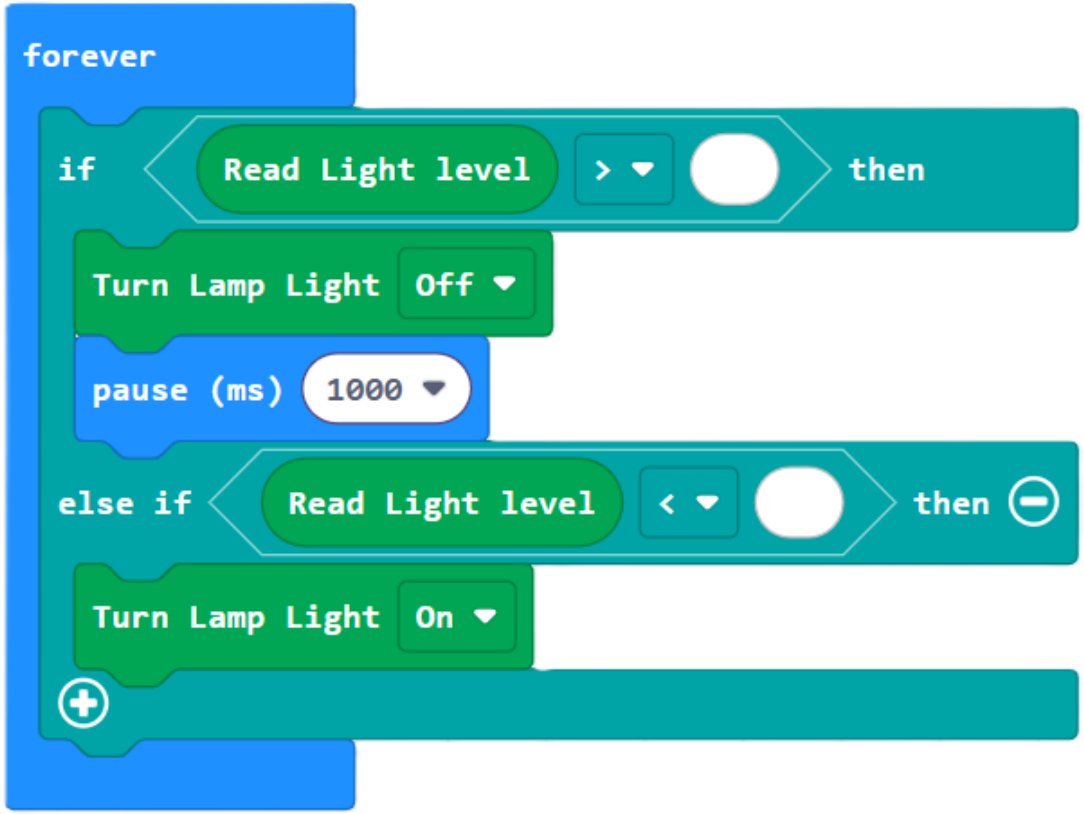
LESSON 2

STREET LAMP LIGHT DETECTION

Create the code sequence below.



If your light level reading is greater than 100 complete the code as follows.

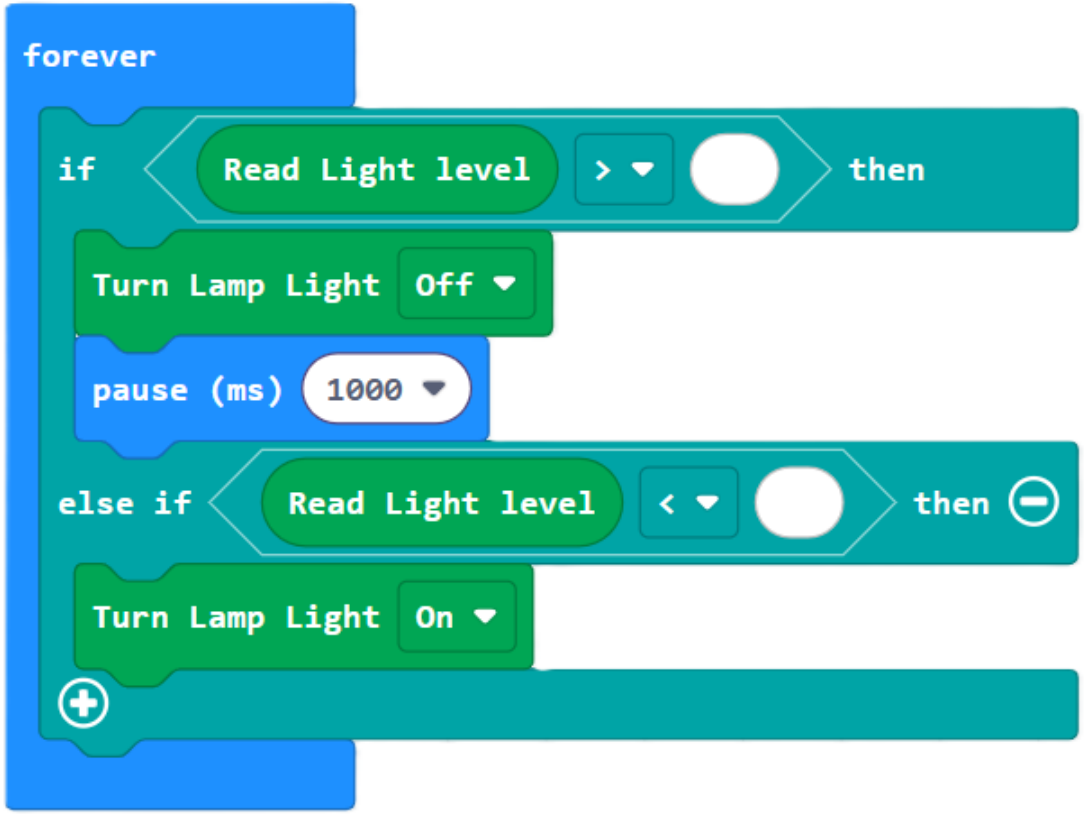
The greater than (>) value should be 100.
The less than (<) value should be 90.

If your light level reading is less than 100 go to the next page.

LESSON 2

STREET LAMP LIGHT DETECTION

Create the code sequence below.



If your light level reading is greater than 90 but less than 101 complete the code as follows.

The greater than (>) value should be 90.
The less than (<) value should be 80.

If your light level reading is less than 90 go to the next page.

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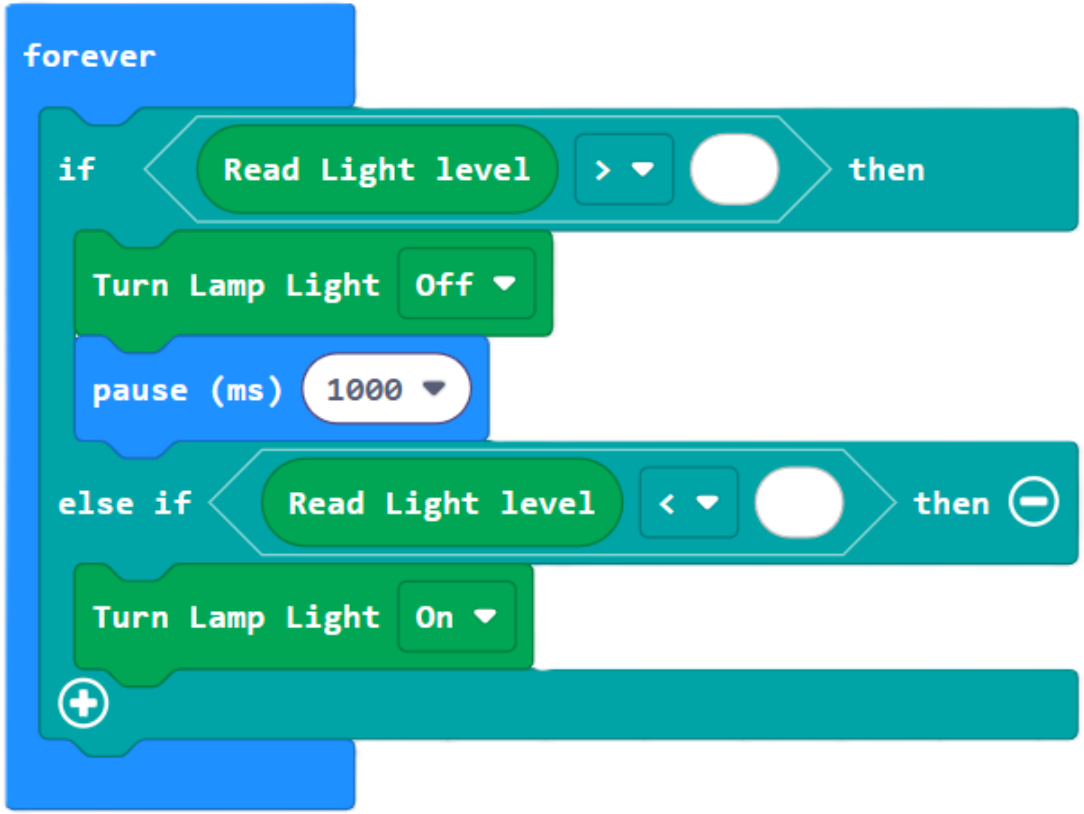
LESSON 2

STREET LAMP LIGHT DETECTION

Create the code sequence below.



If your light level reading is greater than 80 but less than 91 complete the code as follows.

The greater than (>) value should be 80.
The less than (<) value should be 70.

If your light level reading is less than 80 go to the next page.

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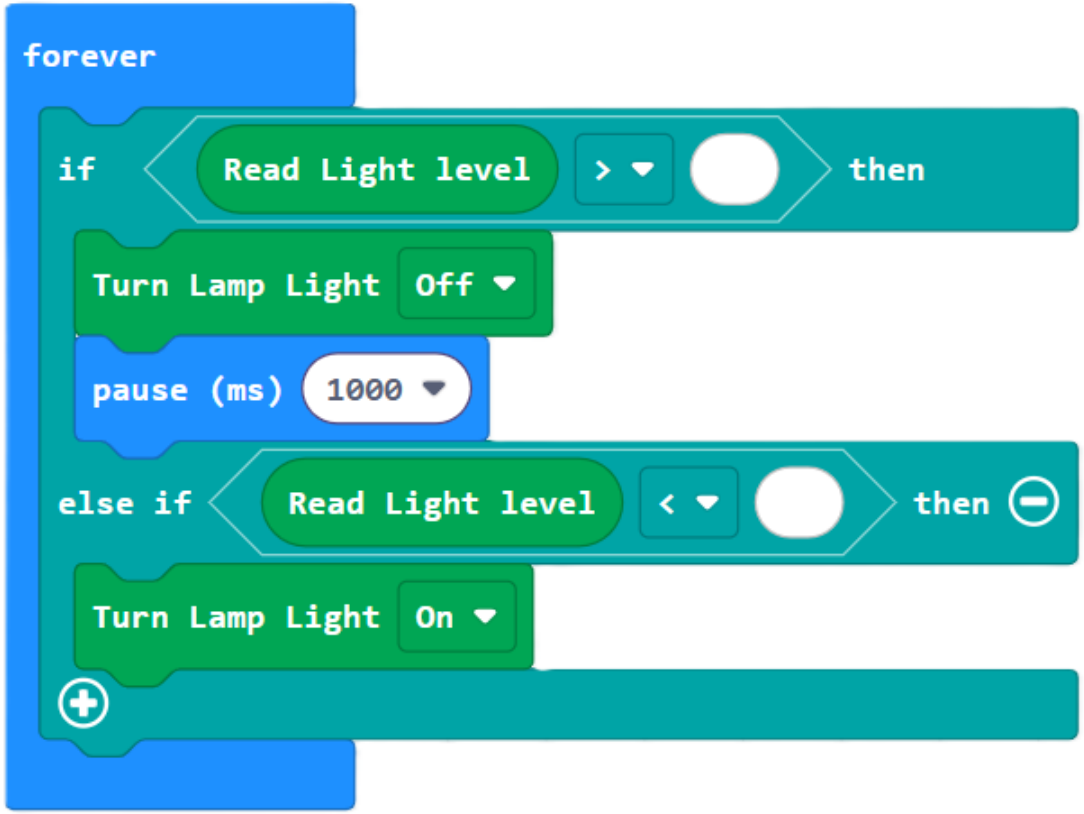
LESSON 2

STREET LAMP LIGHT DETECTION

Create the code sequence below.



If your light level reading is greater than 70 but less than 81 complete the code as follows.

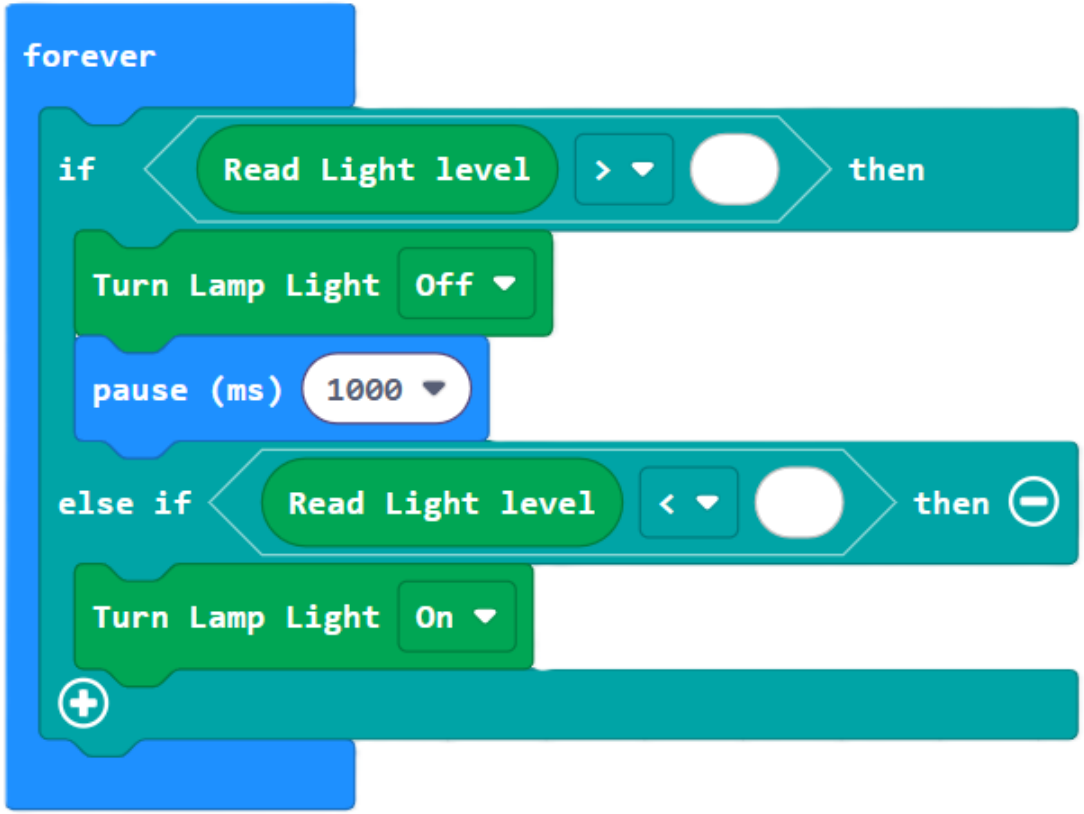
The greater than (>) value should be 70.
The less than (<) value should be 60.

If your light level reading is less than 70 go to the next page.

LESSON 2

STREET LAMP LIGHT DETECTION

Create the code sequence below.



If your light level reading is greater than 60 but less than 71 complete the code as follows.

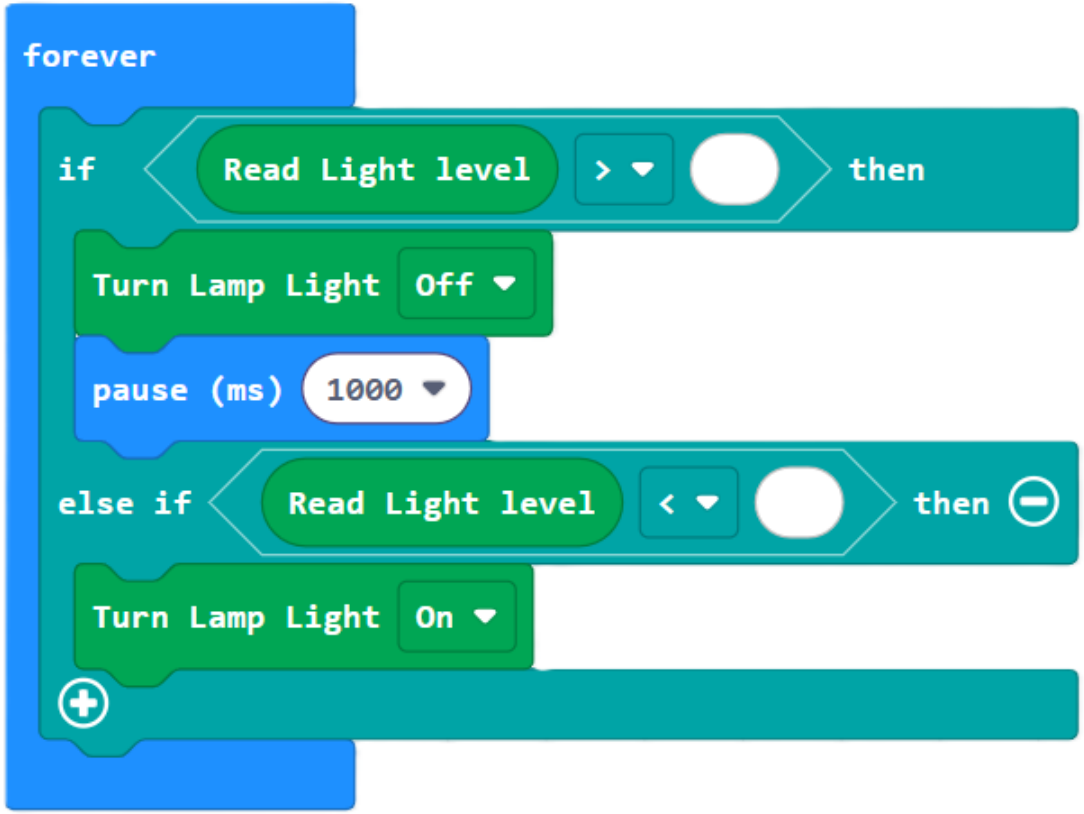
The greater than (>) value should be 60.
The less than (<) value should be 50.

If your light level reading is less than 60 go to the next page.

LESSON 2

STREET LAMP LIGHT DETECTION

Create the code sequence below.



If your light level reading is greater than 50 but less than 61 complete the code as follows.

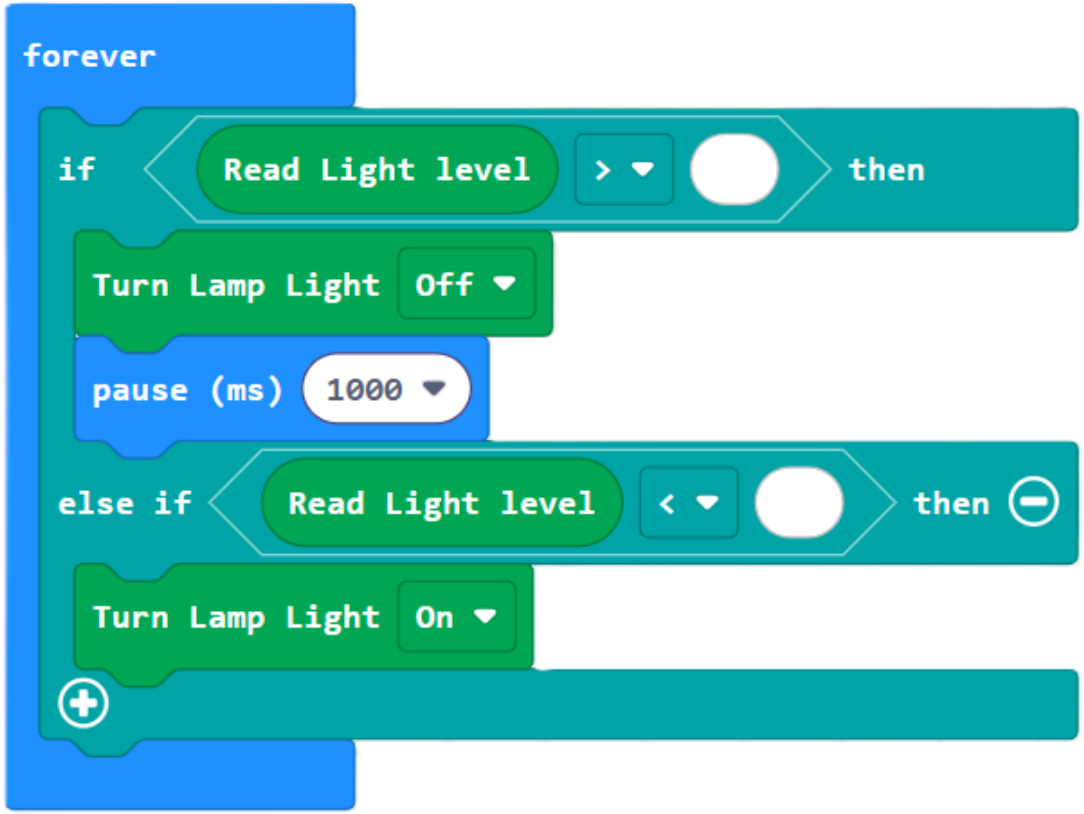
The greater than (>) value should be 50.
The less than (<) value should be 40.

If your light level reading is less than 50 go to the next page.

LESSON 2

STREET LAMP LIGHT DETECTION

Create the code sequence below.



If your light level reading is greater than 40 but less than 51 complete the code as follows.

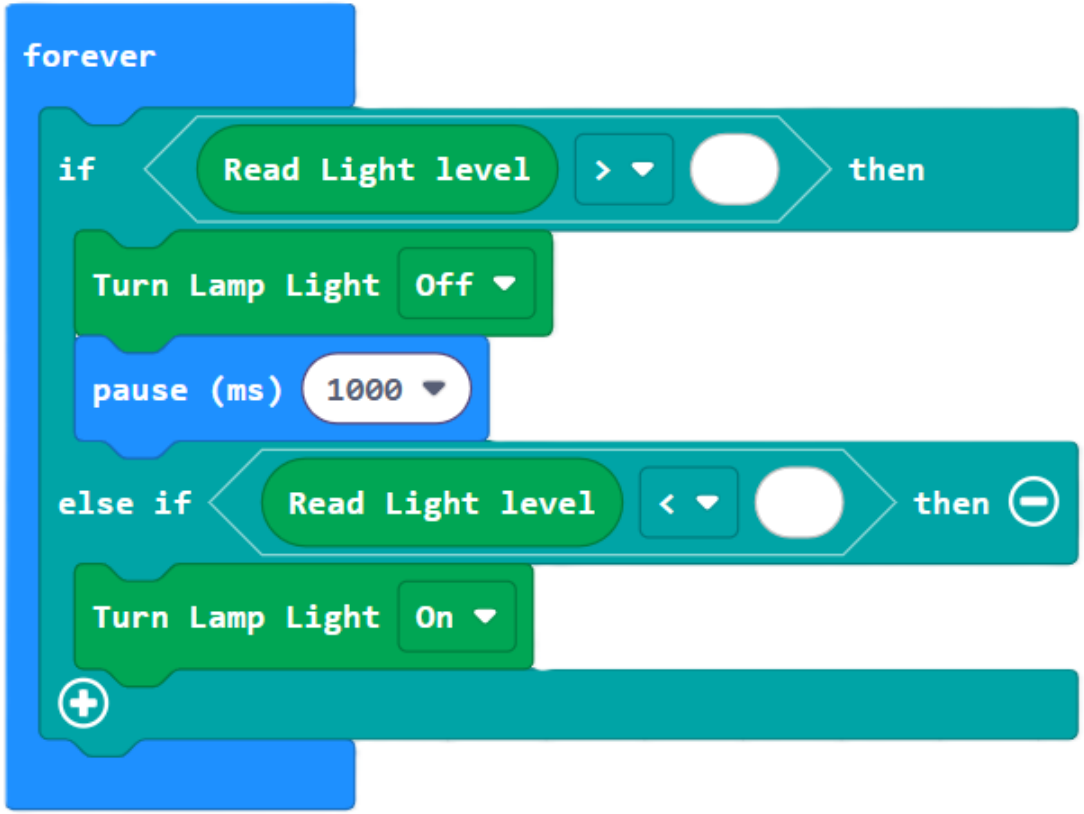
The greater than (>) value should be 40.
The less than (<) value should be 30.

If your light level reading is less than 40 go to the next page.

LESSON 2

STREET LAMP LIGHT DETECTION

Create the code sequence below.



If your light level reading is greater than 30 but less than 41 complete the code as follows.

The greater than (>) value should be 30.
The less than (<) value should be 20.

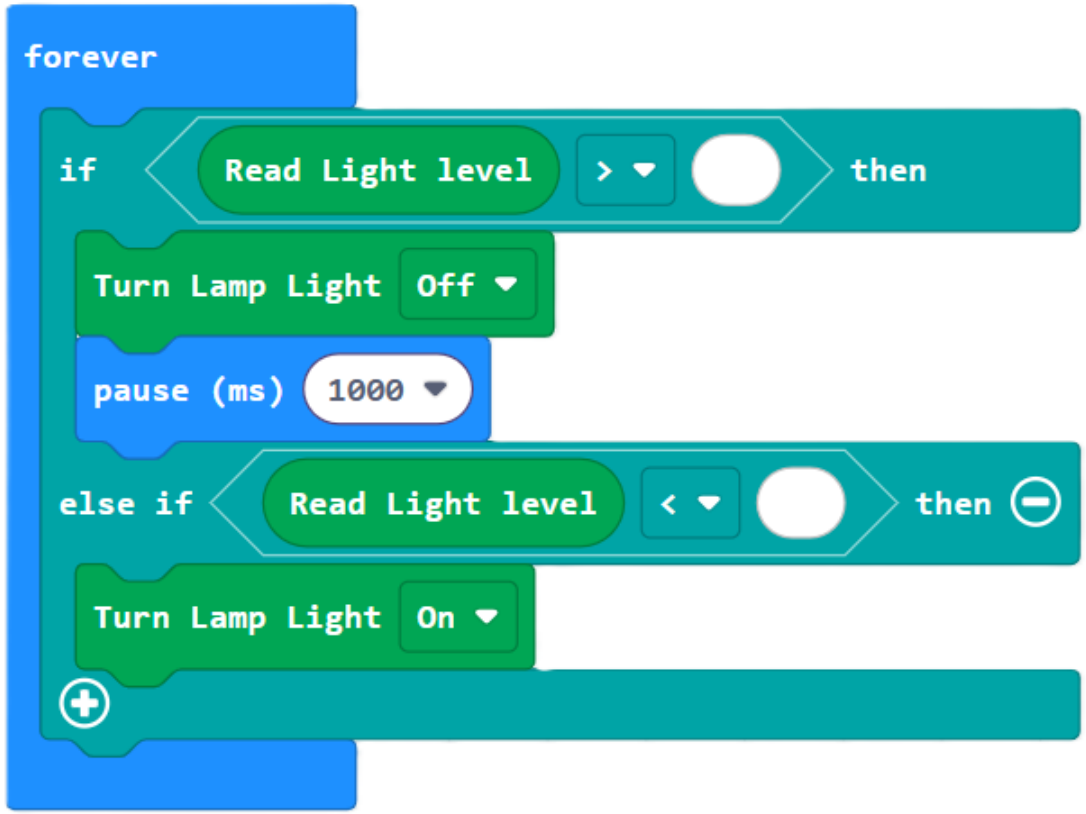
LESSON 2

STREET LAMP LIGHT DETECTION

Turn the lamp on and off using the phototransistor light sensor as an input to tell when it is light and dark.

Download your code.

Go to the next page.



LESSON 2

STREET LAMP LIGHT DETECTION

Have the street lamp in an upright position so that light from above will shine directly on the phototransistor at the top of the lamp post.

Test your code.

Without touching the phototransistor hold your cupped hand over the phototransistor for three seconds and then away from the phototransistor. Repeat this action two more times.

Not sure what to do. Watch this short video. Sensor Test

LESSON 2

STREET LAMP LIGHT DETECTION

Have the street lamp in an upright position so that light from above will shine directly on the phototransistor at the top of the lamp post.

The lamp should go on when covered and be off when not covered.

If this is not working modify your code by changing the greater than and less values. Work with new values of plus 10 or minus 10 until the sensor is reading in the proper range.

LESSON 2

STREET LAMP LIGHT DETECTION

Test your code again.
Repeat the action of moving your cupped hand over the phototransistor and then away from the phototransistor.
What happens?

Show Mr. Desmond your working street lamp using the phototransistor to detect differences in the amount of light.

[Sometimes there is a small processing error in how the phototransistor reads the light level. This error may cause the lamp to blink. Ignore this issue.]

LESSON 2

STREET LAMP LIGHT DETECTION

Adjust your code.
Set the less than value to the existing value minus twenty.

Download your code. Test your code.

Repeat the action of moving your cupped hand over the phototransistor and then away from the phototransistor. What happens?

Are there any functional differences in how things work?

LESSON 2

STREET LAMP LIGHT DETECTION

Adjust your code again.
Reset the less than value to the original value.
Set the greater than value to the existing value plus thirty.

Download your code. Test your code.
Repeat the action of moving your cupped hand over the phototransistor and then away from the phototransistor.
What happens?

Are there any functional differences in how things work?

LESSON 2

STREET LAMP LIGHT DETECTION

Adjust your code again.
Reset the greater than value to the original value.

Download your code and test the system again.

LESSON 2

STREET LAMP LIGHT DETECTION

Answer the following questions on a piece of paper.

1) How does the system function?
   Explain how and why the street lamp is on or off.

2) What happened to the effectiveness of the light sensor when you adjusted the greater than and less than values?

Be prepared to discuss your answers with Mr. Desmond.