Project Number: 2022-1-CY01-KA210-SCH-000081449

ReSTEMLA

STEM Labs Unlimited!

BBC MICRO:BIT

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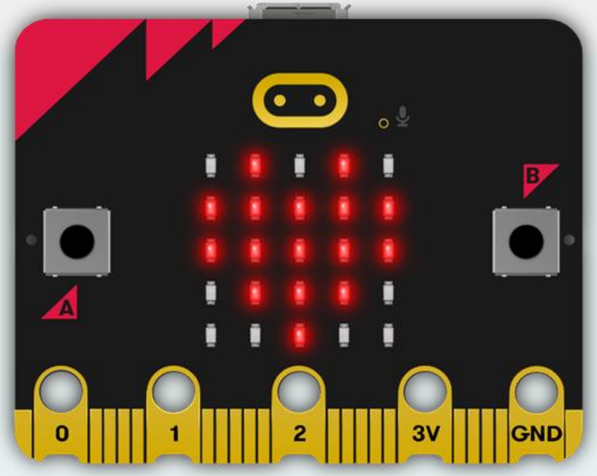
What is a BBC Micro:Bit?



The micro:bit is a pocket-sized, lightweight, open-source programmable **microcontroller** (small computer).

It was designed with the goal of introducing young students to **computer programming** and **digital technology**. The micro:bit provides a simple and accessible platform for learning about coding, electronics, and creative problem-solving and activities related to Science, Technology, Engineering, Arts, and Mathematics – **STEAM.**

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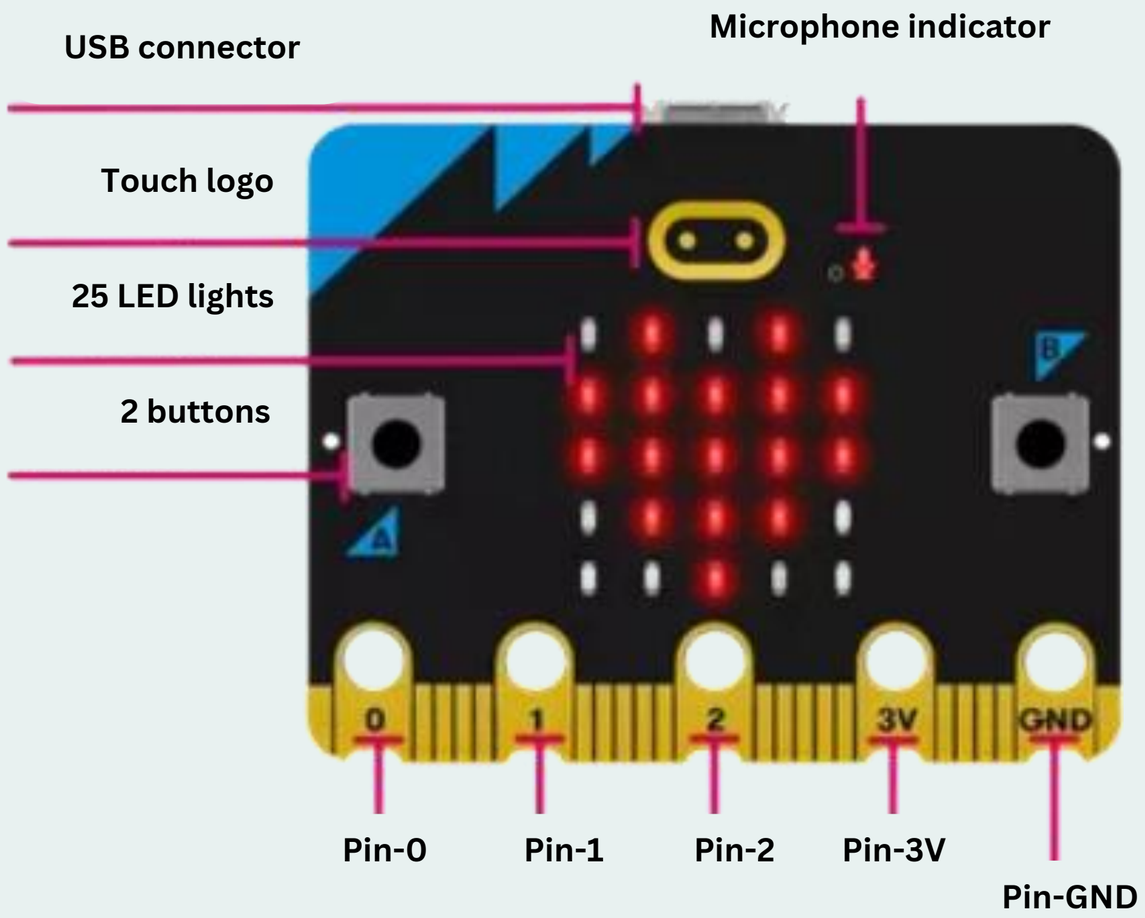
Micro:bit features:

Micro USB Socket - connect the micro:bit to a computer or laptop, that allows the micro:bit to have programs transferred to it.

Microphone - a has built-in microphone.

The microphone LED will light up if the microphone is measuring sound levels. The microphone LED also indicates where the microphone is located.

Touch sensor - the gold logo also works as a touch sensor. It can be used as an extra button in your programs.



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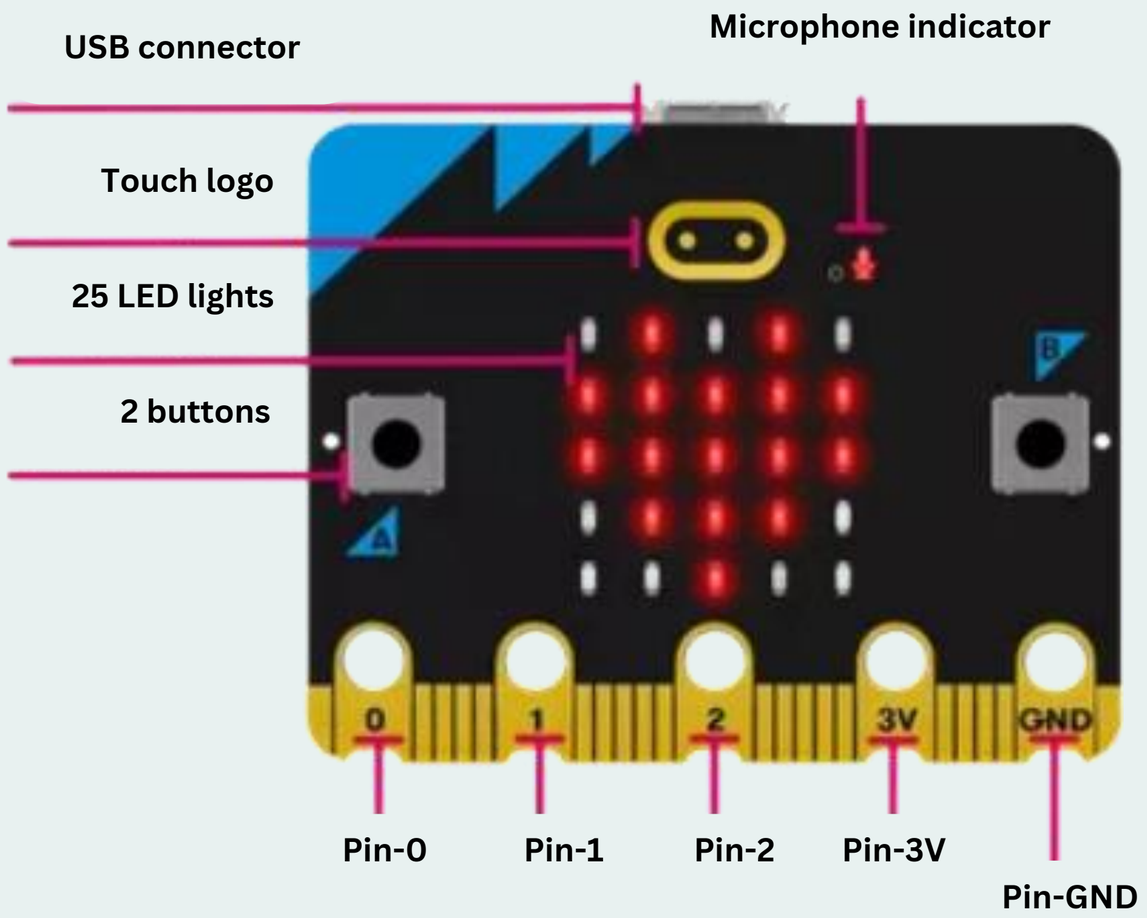
Micro:bit features:

LED Display and Light Sensor - 25 LEDs arranged in a 5x5 grid. The LEDs can be used for displaying pictures, words and numbers. They can also act as sensors and measure light levels.

Buttons - two buttons, A and B, on the front. The buttons can be pressed separately or together. Pressing the buttons can be used to trigger code.



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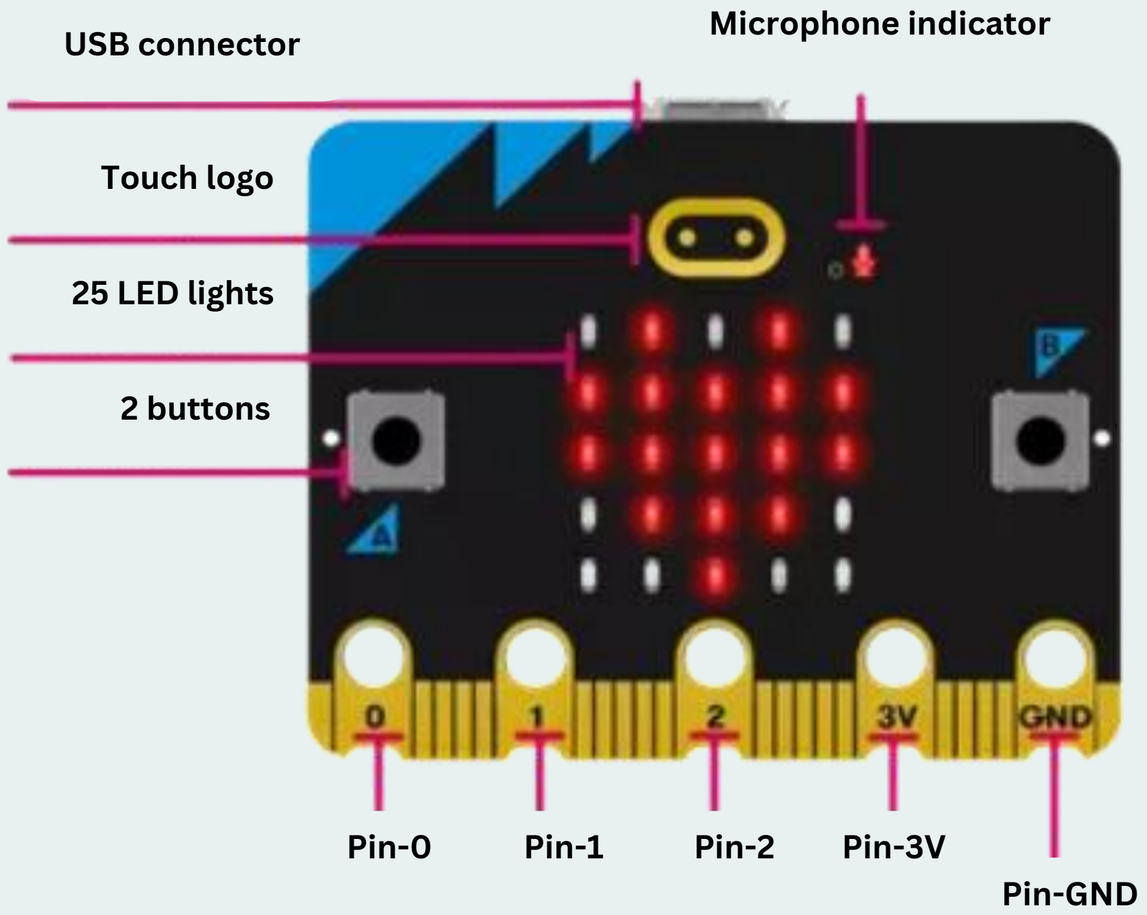
Micro:bit features:

Input and Output Pins - micro:bit contains small holes on the edge. These are called pins and these pins can be split into three categories: GPIO; 3V power; and GND.

The pins can be used to create circuits and physically connect the micro:bit to external things. The 3V and GND pins are connected to the power supply of the micro:bit.



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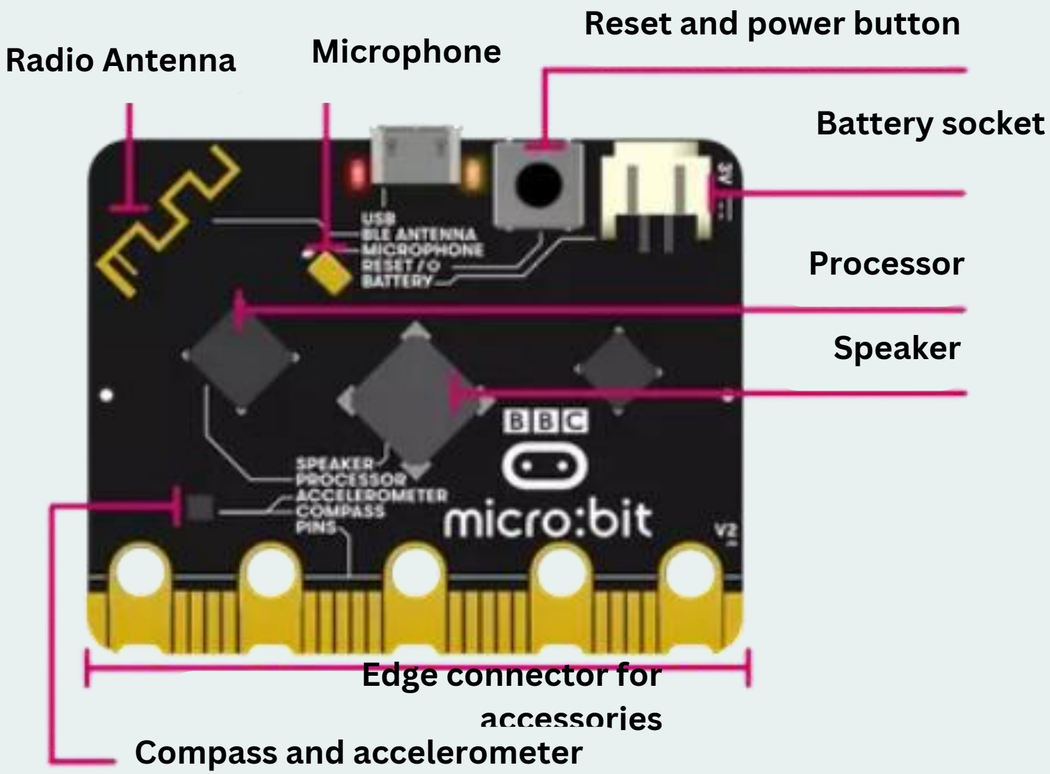
Micro:bit features:

Radio and Bluetooth – the micro:bit can communicate wirelessly with other micro:bits using radio waves. Tablets can also connect to the micro:bit wirelessly via Bluetooth.

Reset button – reset the micro:bit or restart a program from the beginning. You can also place the micro:bit into power-saving sleep mode by holding down the button and waiting until the red LED on the left goes dark before releasing the button.



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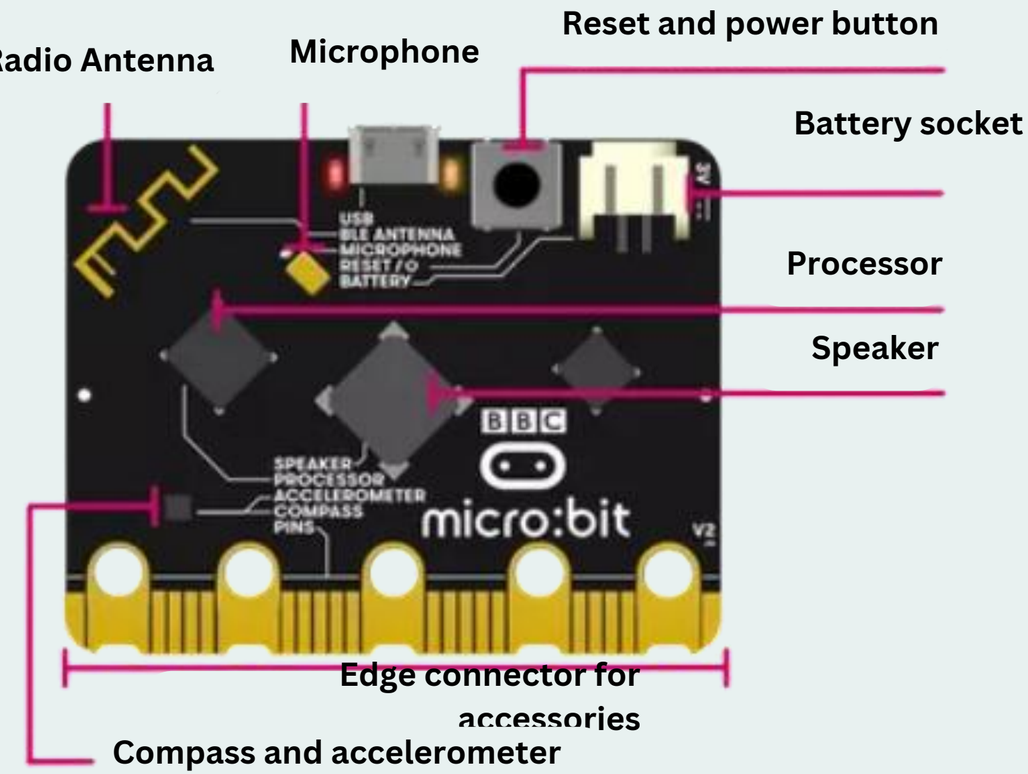
Micro:bit features:

Battery - powered using a battery pack. Instead of using a computer to power it, the battery pack can be plugged into the micro:bit.

Processor – contains a microprocessor. A processor is sometimes called the '**brains**' of a computer. The processor receives the inputs, runs the programs and gives outputs. It fetches, decodes and carries out the instructions coded on an online micro:bit editor.

Temperature Sensor – inside the processor that can give you an approximation of the air temperature (Celsius).



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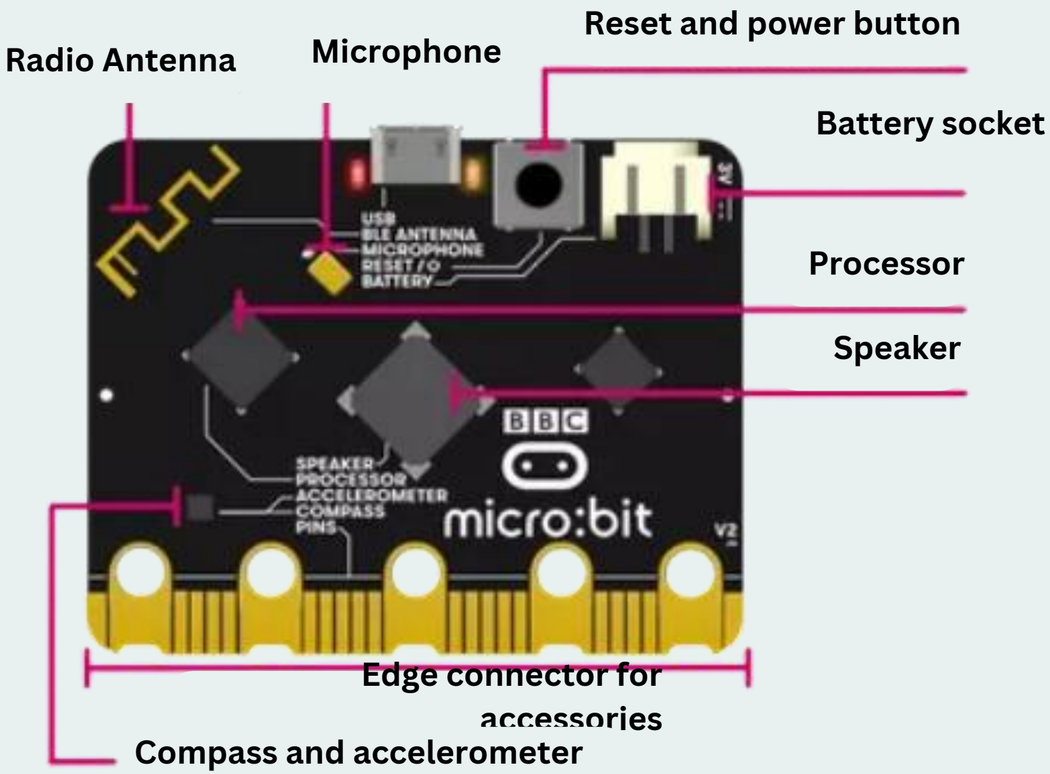
Micro:bit features:

Accelerometer - contains a motion sensor that measures movement. The **accelerometer** can detect when the micro:bit is tilted left to right, backwards and forwards and up and down.

Compass - the micro:bit has a built-in compass that can detect the direction in which it is facing.



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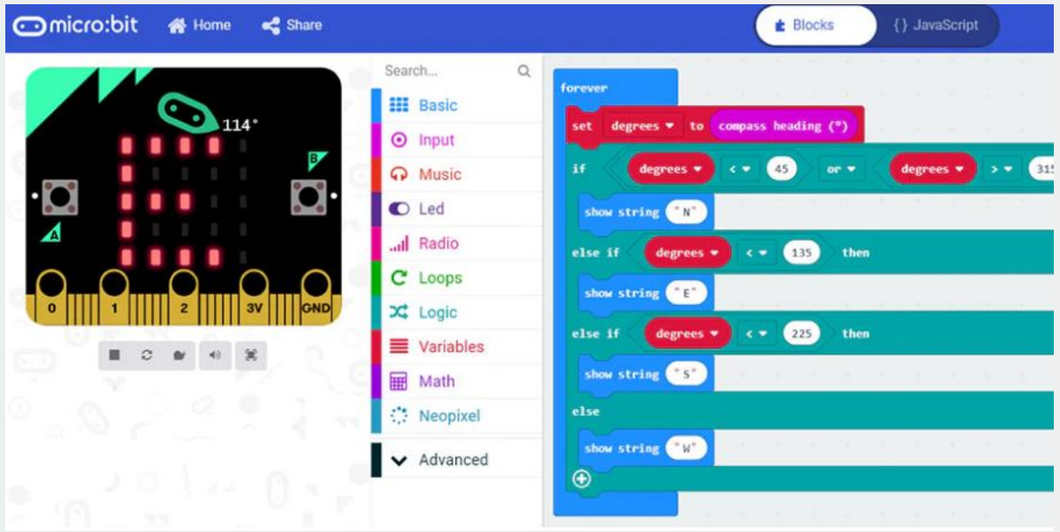
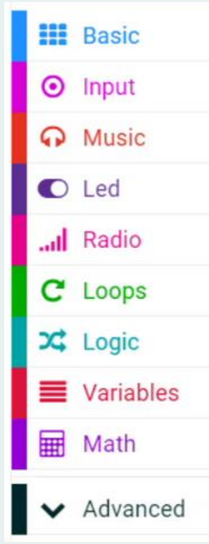
What is Makecode?

- user-friendly
- web-based platform
- designed for coding and programming education.



It offers a **block-based coding** interface where users can drag and drop visual code blocks to create programs. The platform supports various devices, including the BBC micro:bit, and features online simulators for virtual testing.



access to basic micro:bit functionality

events and data from sensor

generation of music tones

control of the LED screen

communicate using radio packets

loops and repetition

logic operators and constants

variables

more complex operators

functions, arrays, text, game, images, pins, serial, control

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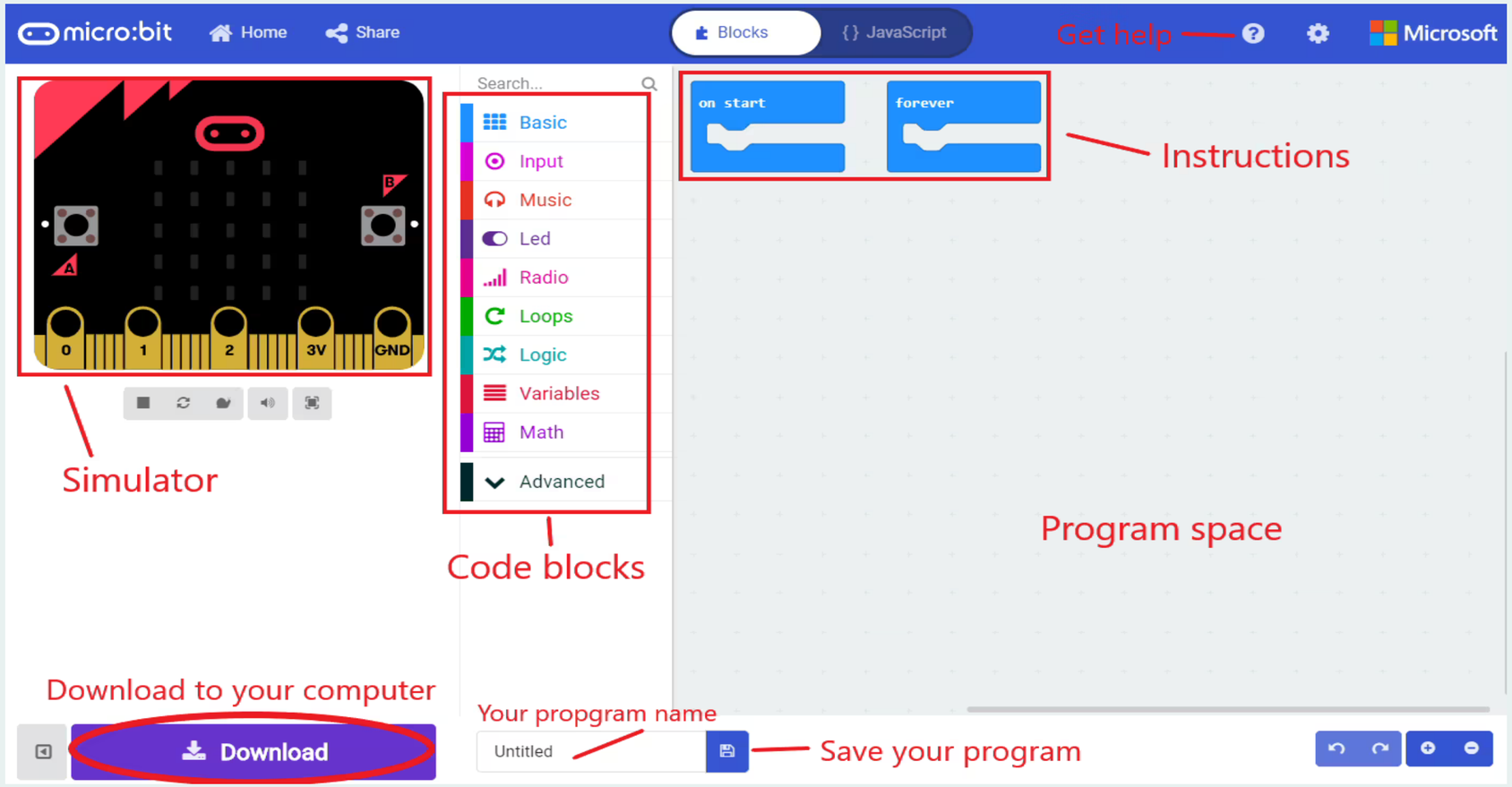
What is MakeCode?



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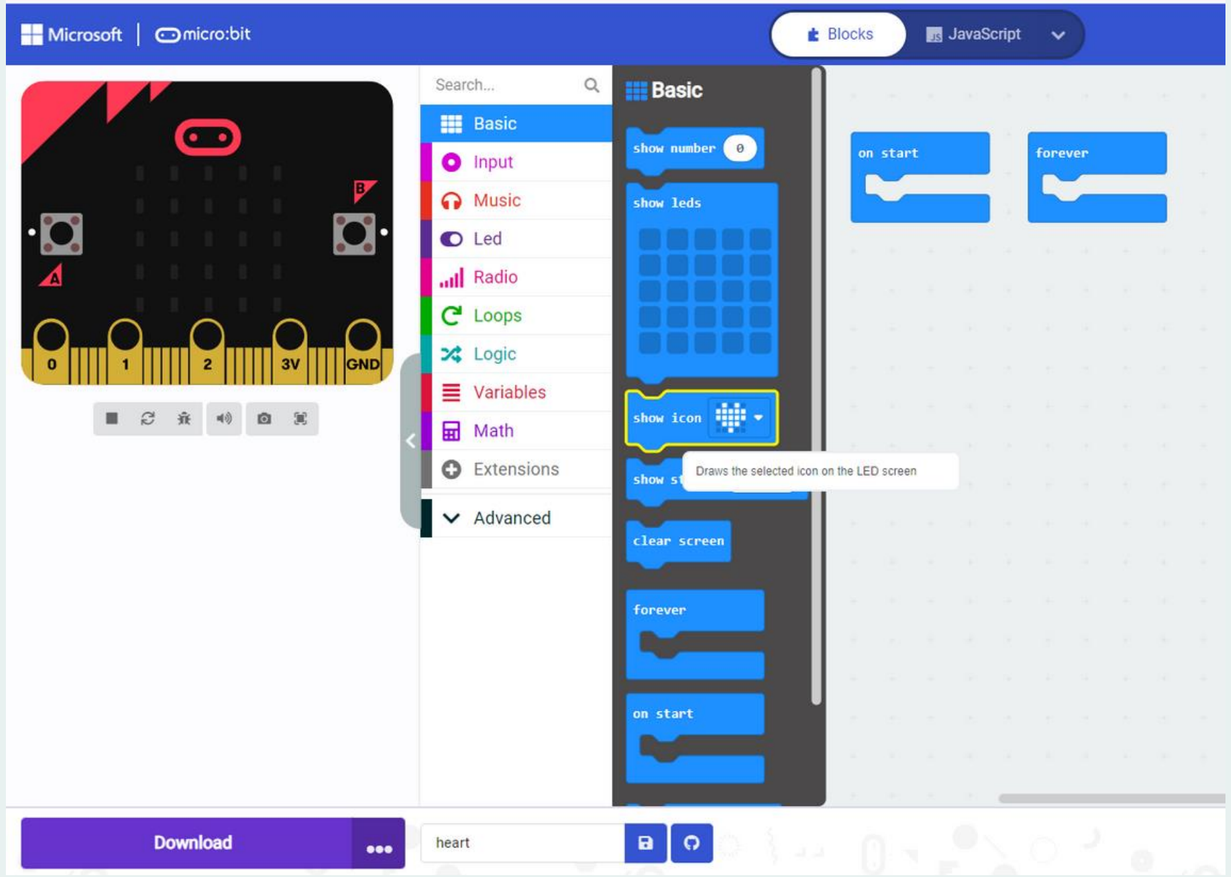
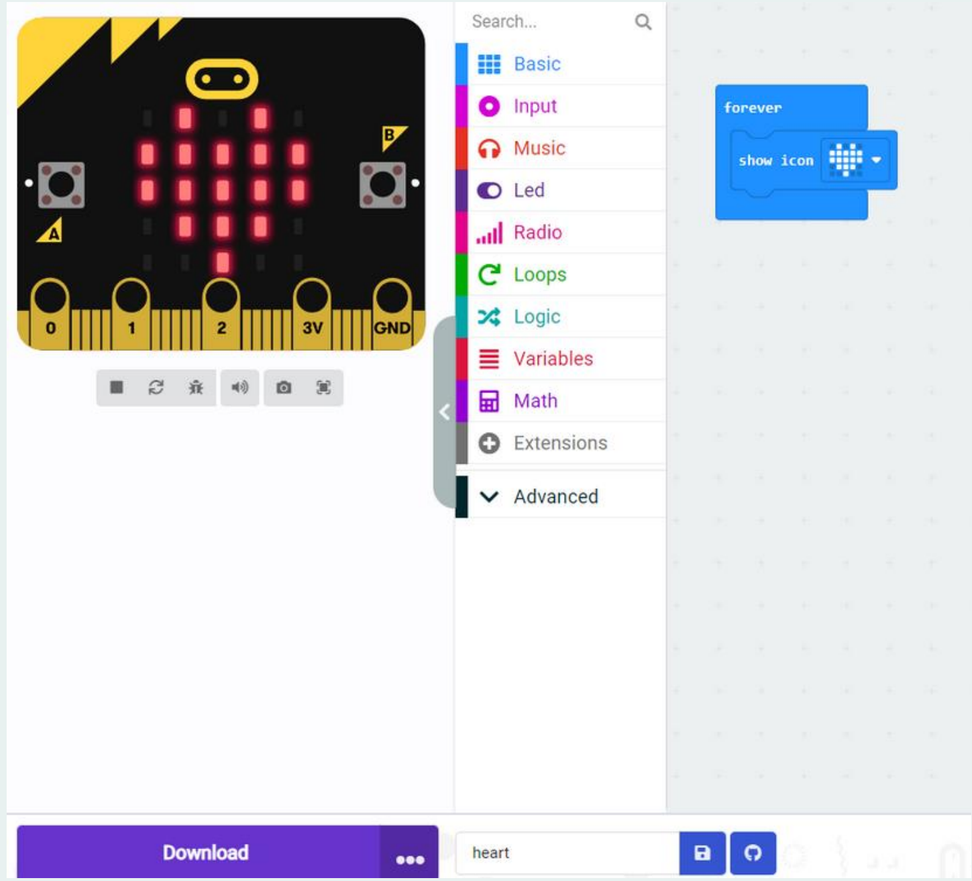
What is MakeCode?





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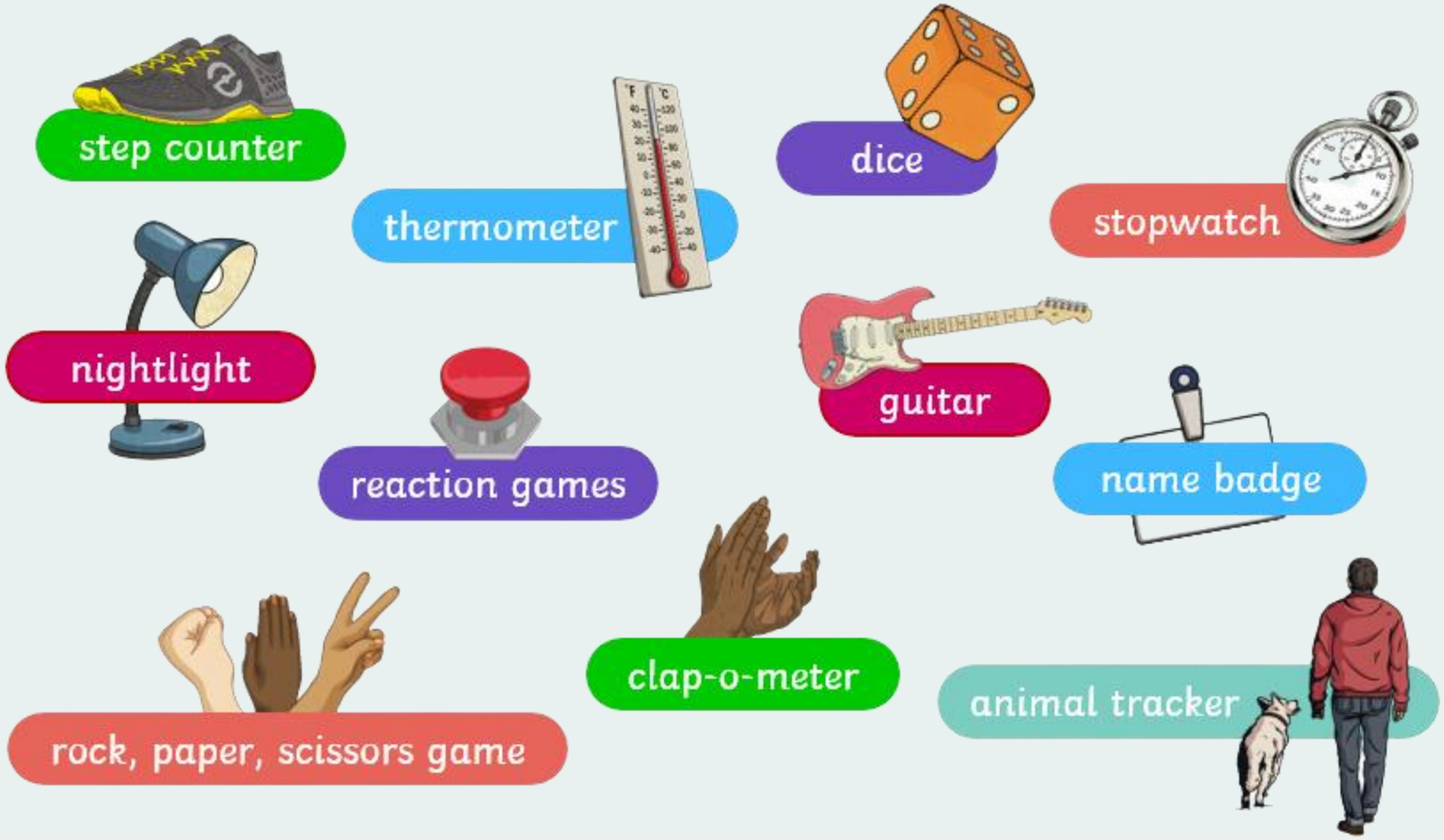
How can a BBC micro:bit be used:



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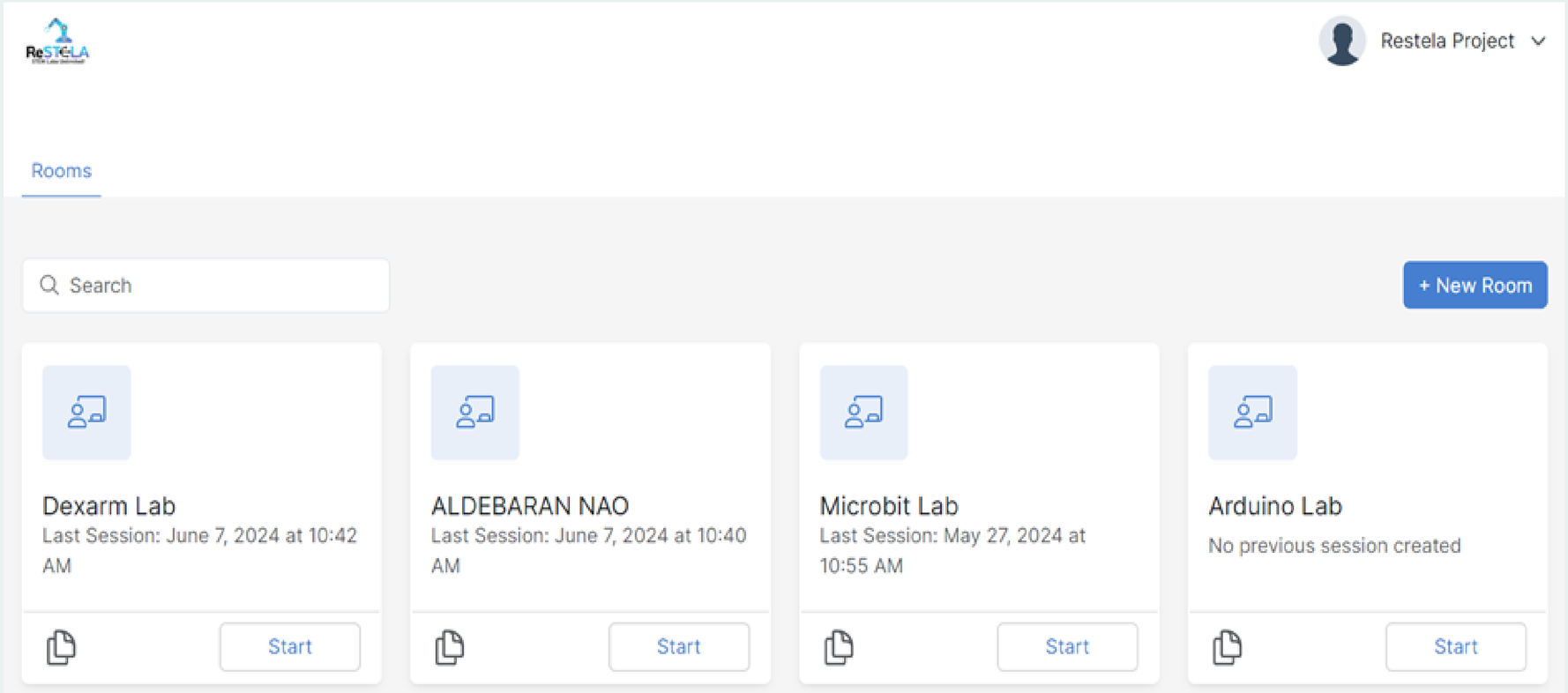
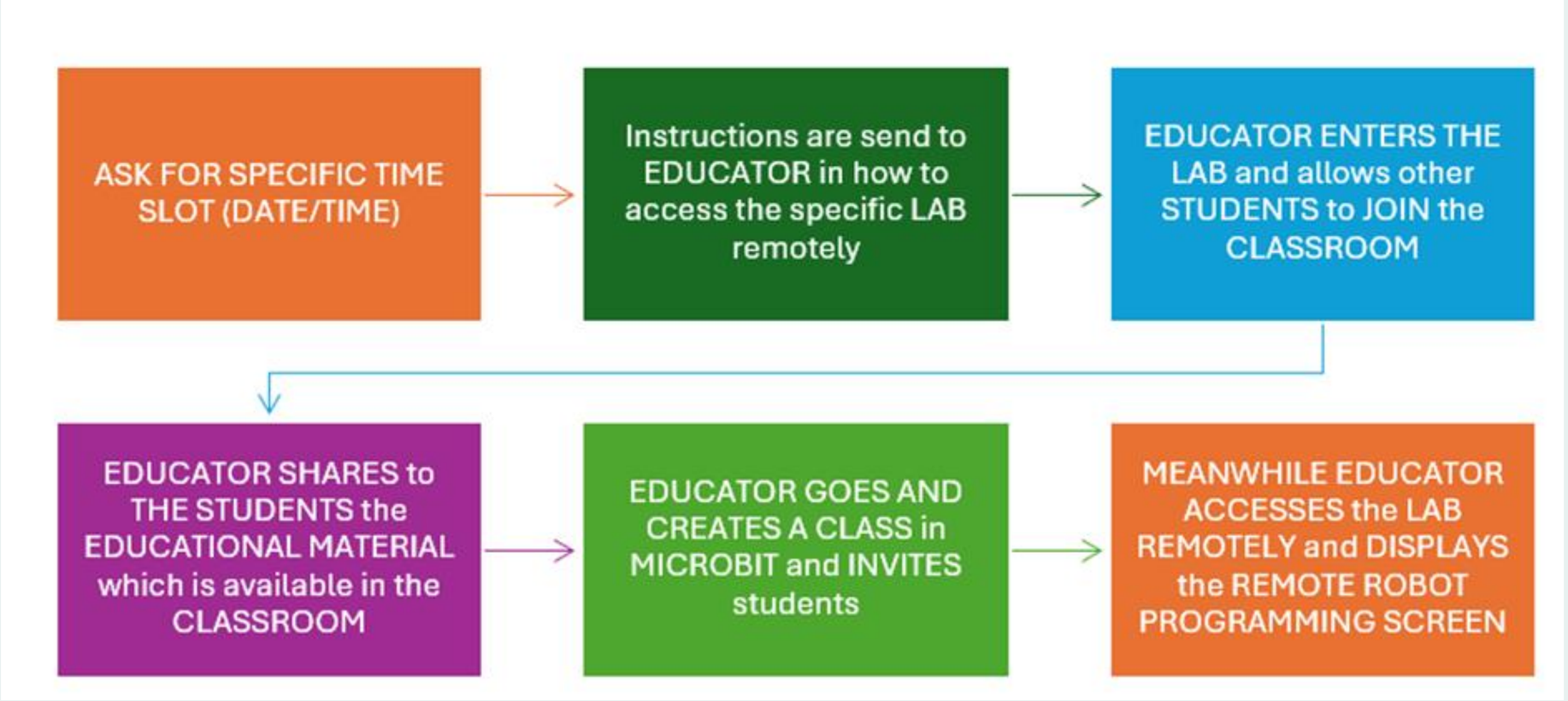
ReSTELA system



ReSTELA system



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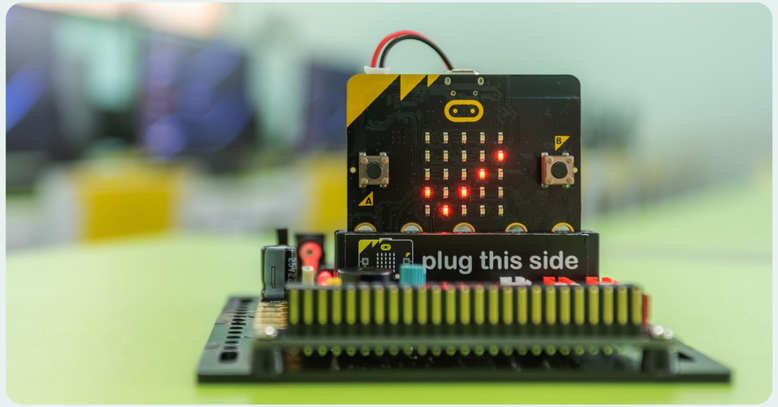
Microbit activities

Unit #1: PixelPlay - Creating with Micro:bit

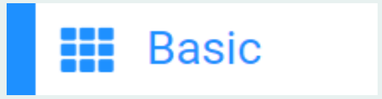
Unit #2: Melody Maker - Creating with Microbit

Unit #3: Eco Robo - Environmental monitoring with Microbit

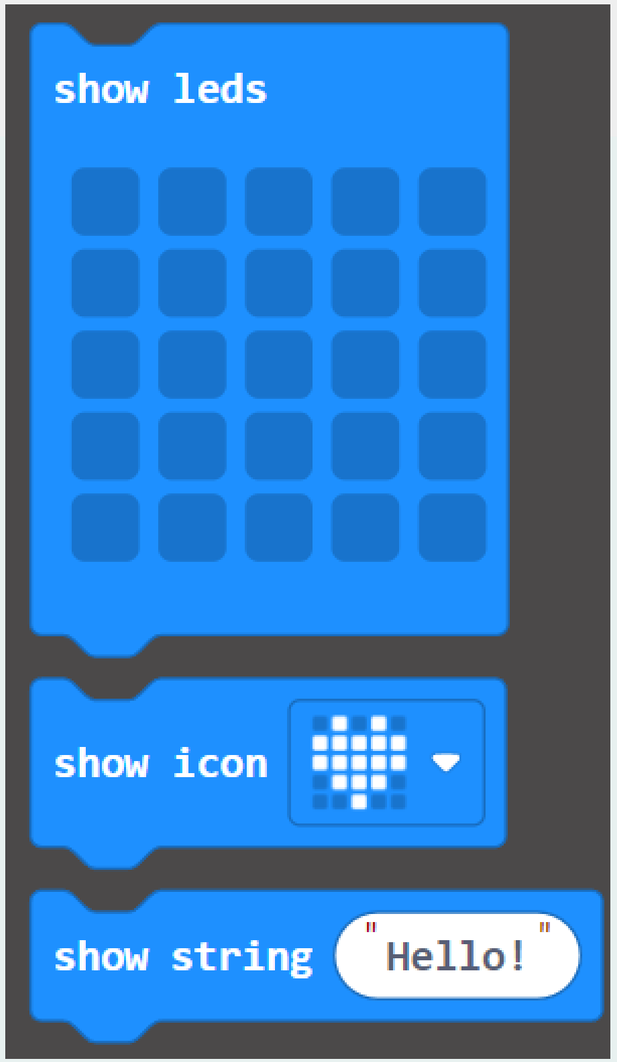
Unit #4: Robo Move Movement with Microbit



Activity #1: Pixel Play

1. Go to the “ Basic “ block 

2. Choose one of the following blocks:
   - “ show leds” : draw your own icon
   - “ show icon” : choose one of the default icons
   - “ show string” : write a message



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Activity #1: Pixel Play

For this activity, you can use the following blocks:

“ on start” : runs your code once

“ forever ” : repeats the code forever

“ pause “ : pause for specific milliseconds

“ on shake” : to view something as soon as you shake (accelerometer reading)

You can also add loops or logic blocks to make your code a bit more advanced

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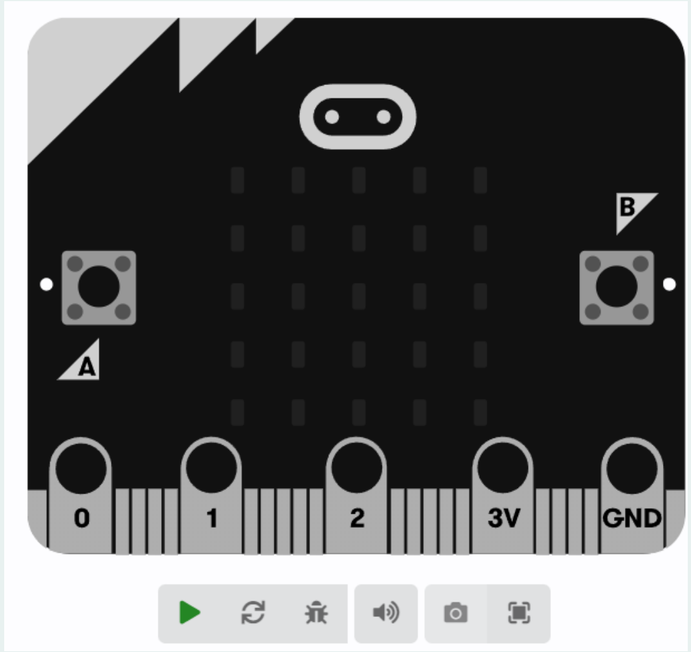
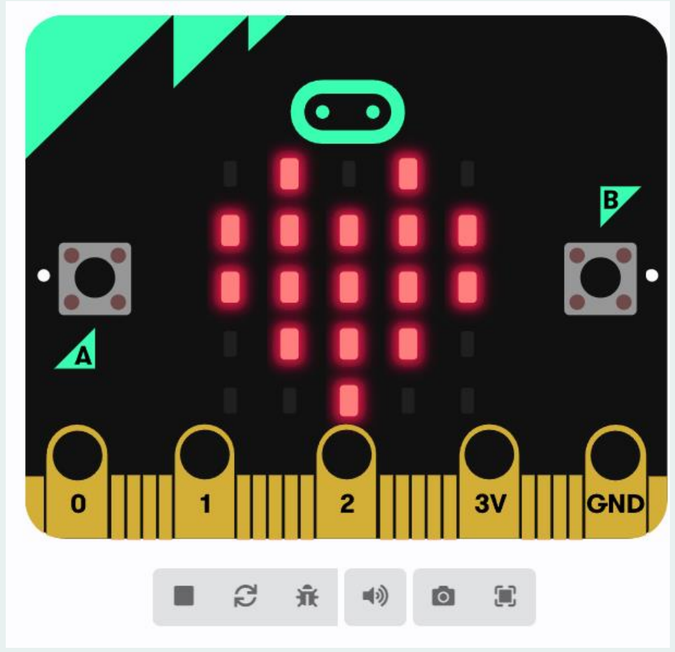
Activity #1: Pixel Play

3. There are two methods to test your program (this applies to all activities) :
    a. Use the simulator on the left (press play/stop/restart)





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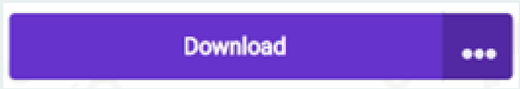
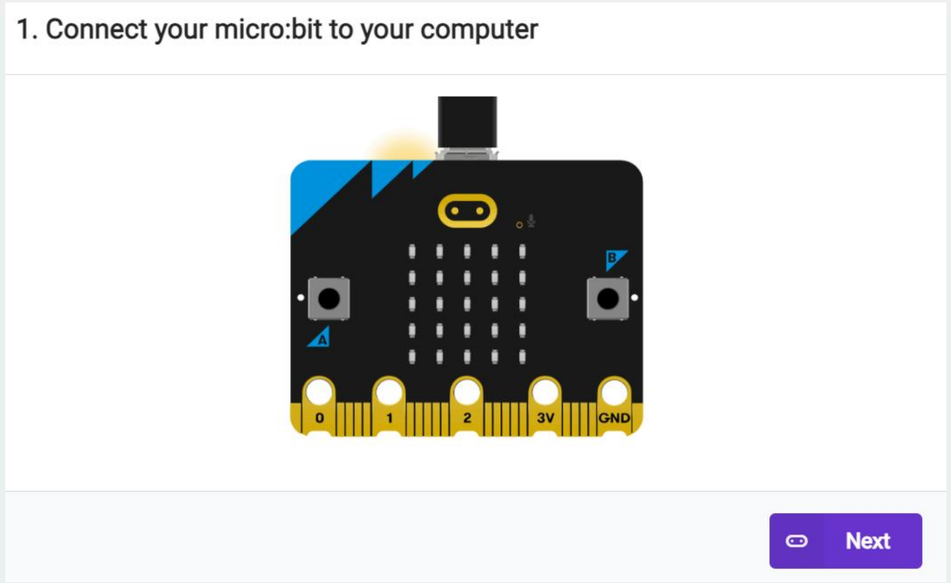
Activity #1: Pixel Play

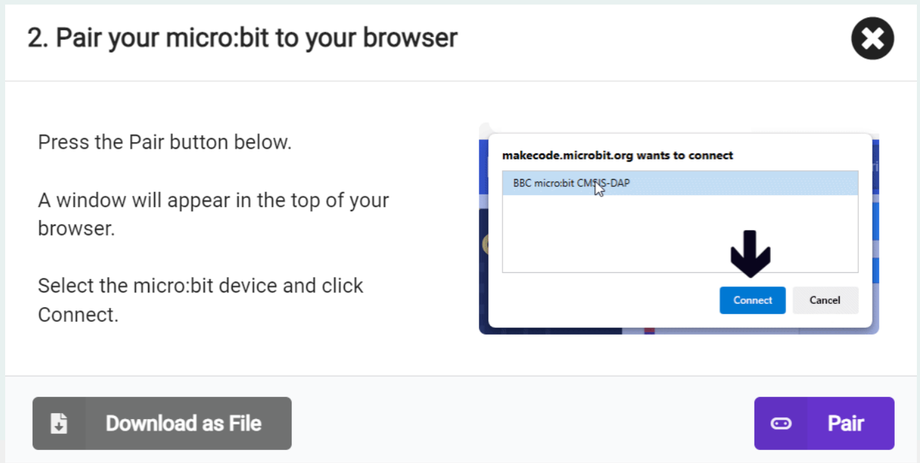
b. Download the code on the microbit device.

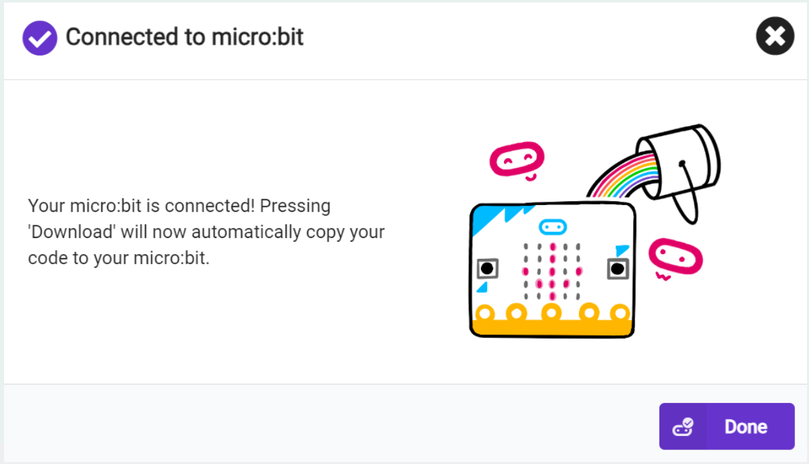
- First press “ Download “.



- Then follow the instructions.







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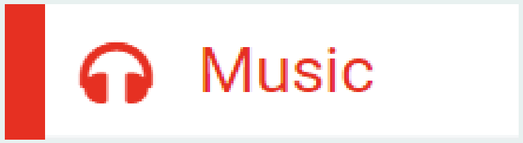
Activity #2: Melody Maker

1. Go to the “ Music “ block

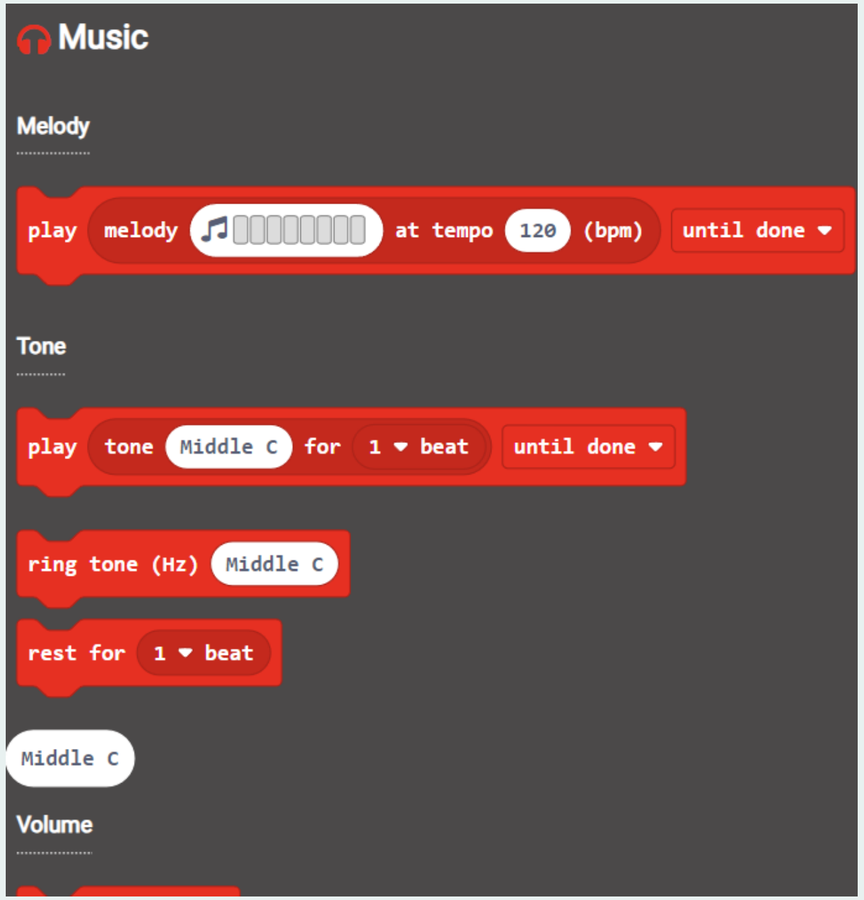


2. Choose one of the following blocks:

“ play melody”

“ play tone”

“ show string”



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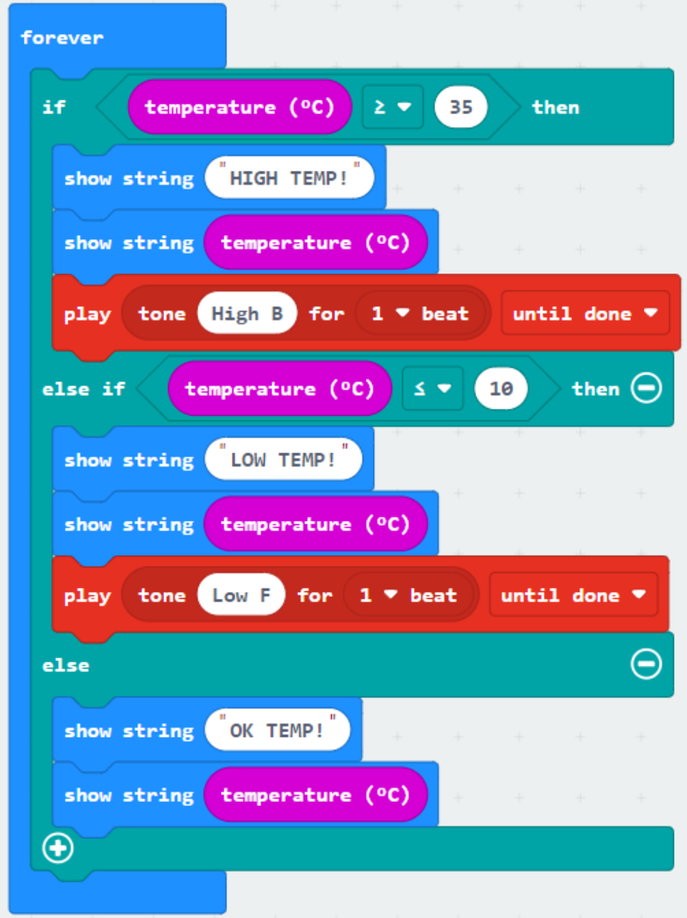
Activity #3: Eco Robo

1. Use this code to display the room temperature:

2. Use the code on the right to play an alarm and send a warning when the temperature is too high or too low.



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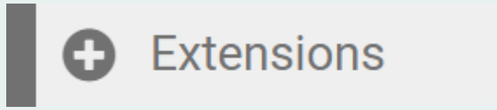
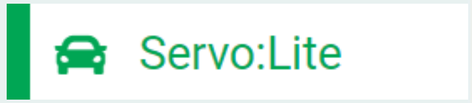
Activity #4: Robo Move

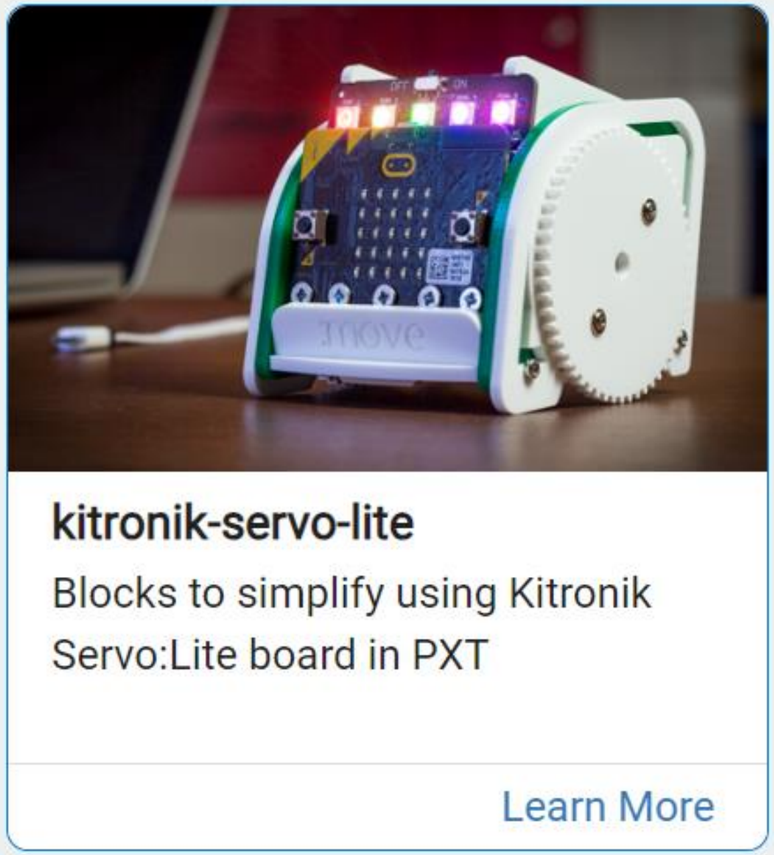
1. Go to the “ Extensions “ block



2. Scroll down and select the “kitronik-servo-lite” extension

3. You should now see the following block:





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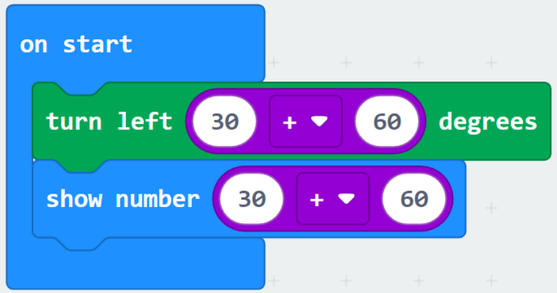
Activity #4: Robo Move

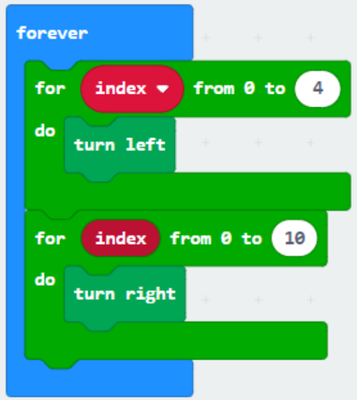
4. From the servo:lite block you can now choose any of the following blocks on the right:

“ turn left /left ” : at certain degrees or default

“ drive backwards / forwards” : at certain distance or default

5. You can also incorporate math, loops, and logic blocks to make a more advanced projects:





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