香港教育大學
The Education University of Hong Kong

FACULTY OF LIBERAL ARTS AND SOCIAL SCIENCES
博文及社會科學學院

科學與環境學系
Department of Science and Environmental Studies

2023-2024 Quality Education Fund Thematic Network - Tertiary Institutes

STEAM Education with Self-directed and Progressive Learning of Engineering Design Process for Problem-solving

透過STEAM教育自主及循序漸進學習以工程設計流程解難

Application of Analog Electrical Conductivity Sensor

AD & FD POHL Mrs Cheng Yam On School

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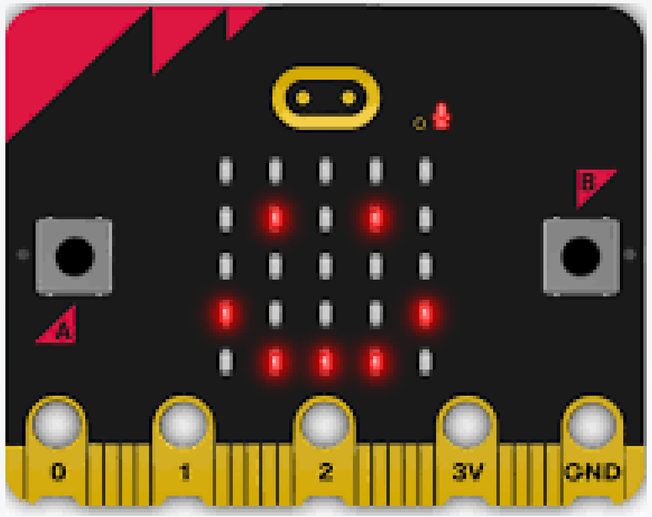
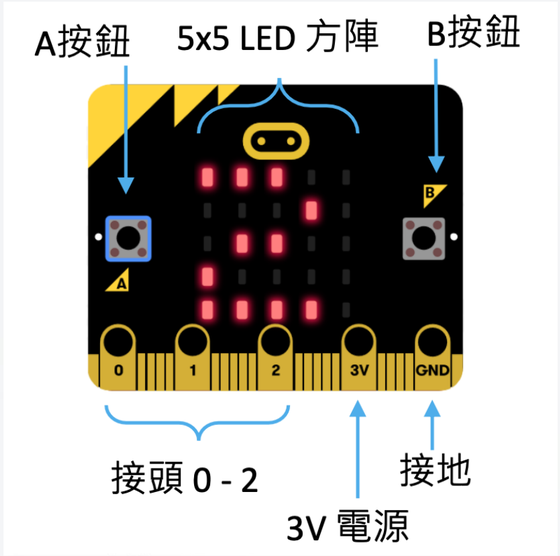
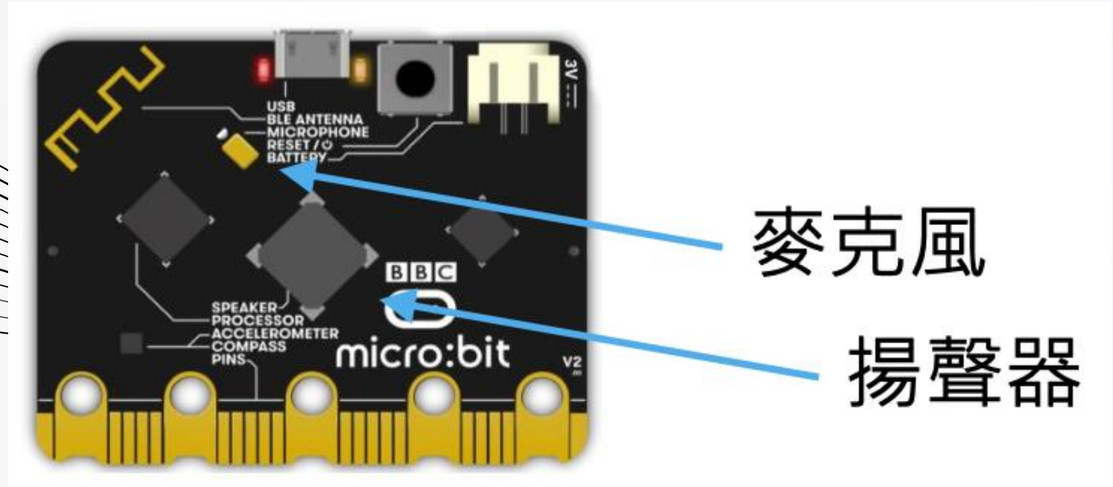
Micro:bit
基本介紹





Micro:bit是由一間英國公司開發設計的微型控制器，用於電腦及編程學。



2個控制按鈕（A鈕和B鈕）

1個重置按鈕

1個5x5 LED顯示方陣

1個3軸加速度傳感器

1個3軸磁力儀

1組2.4GHz無線電模組（用於藍牙傳訊）

1個揚聲器

1個麥克風

1個觸感傳感器

Version 2

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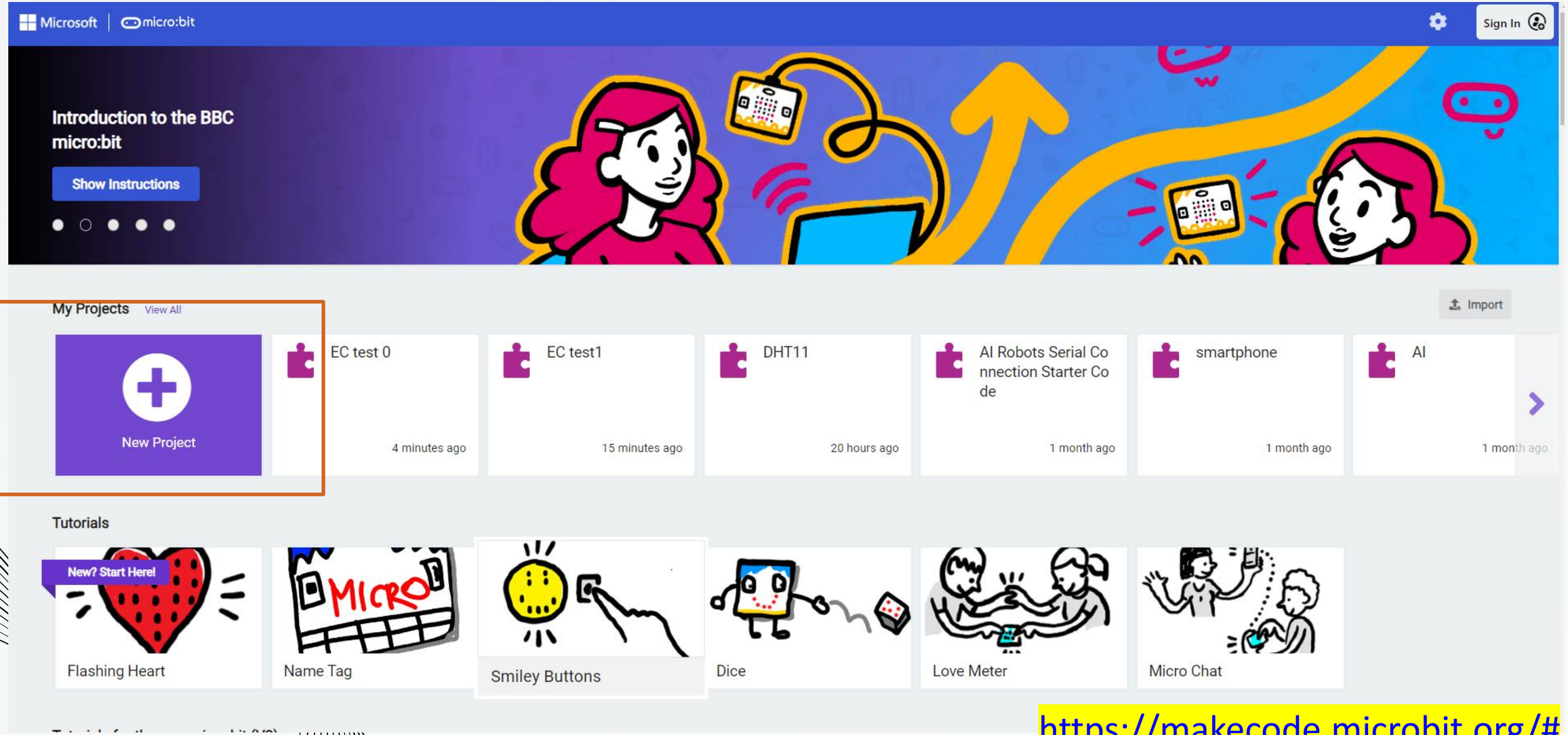
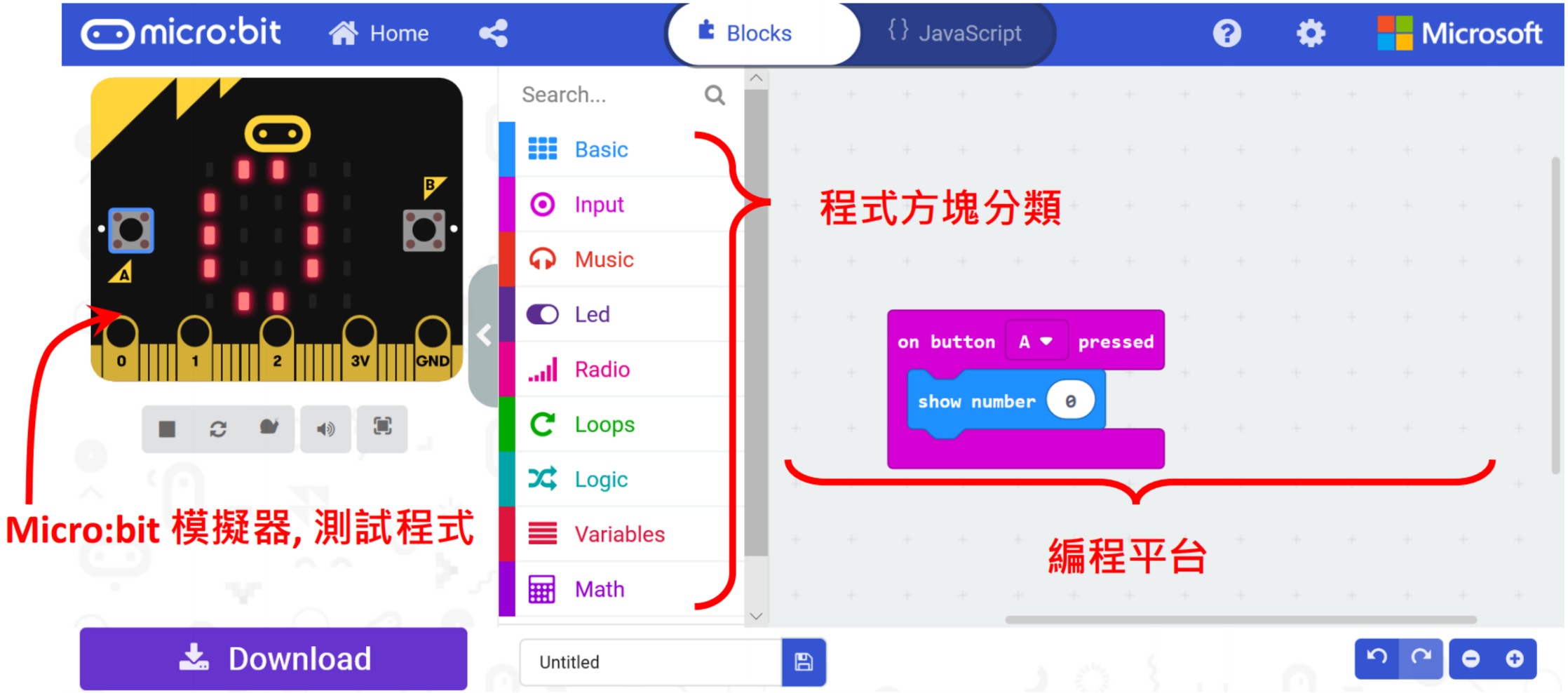
Makecode



https://makecode.microbit.org/#


micro:bit
Home
Blocks
JavaScript
Microsoft
Search...
Basic
Input
Music
Led
Radio
Loops
Logic
Variables
Math
程式方塊分類
on button A pressed
show number 0
編程平台
Micro:bit 模擬器, 測試程式
Download
Untitled
下載程式並在 micro:bit 上運行

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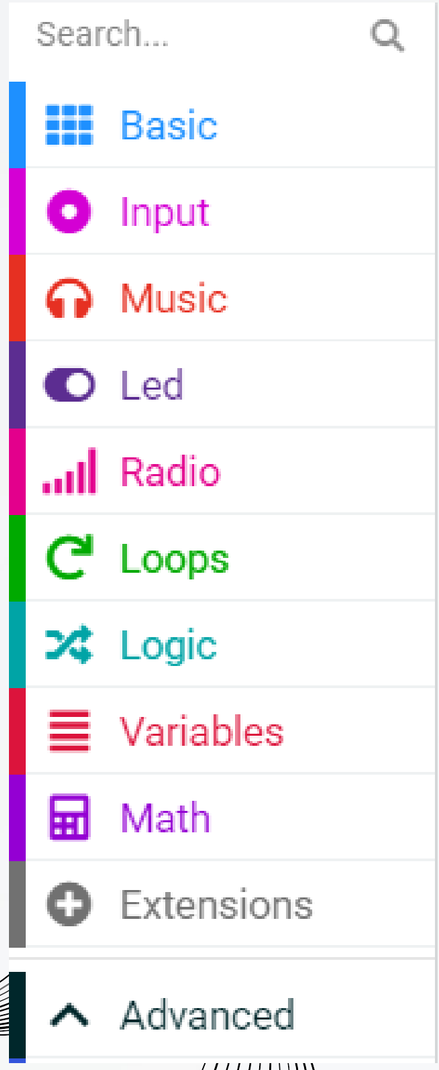
Blocks language



Blocks

Loops

Loops and repetition.

Logic

Logic operators and constants.

Variables

Variables.

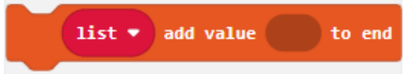
Built-in objects

Math

More complex operations with numbers.

text

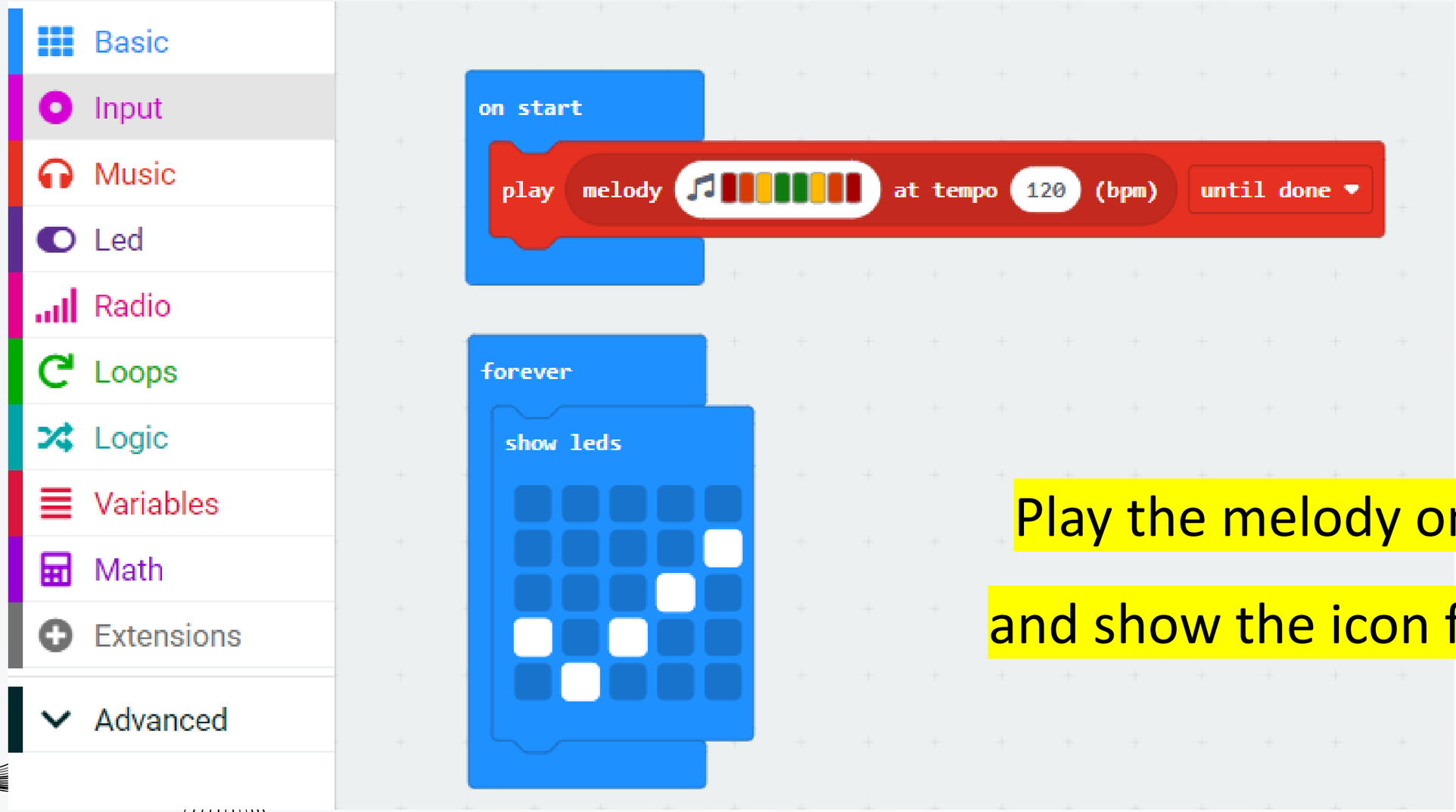
Combine, split, and search text strings.



Arrays

Add, remove, and replace items in lists.

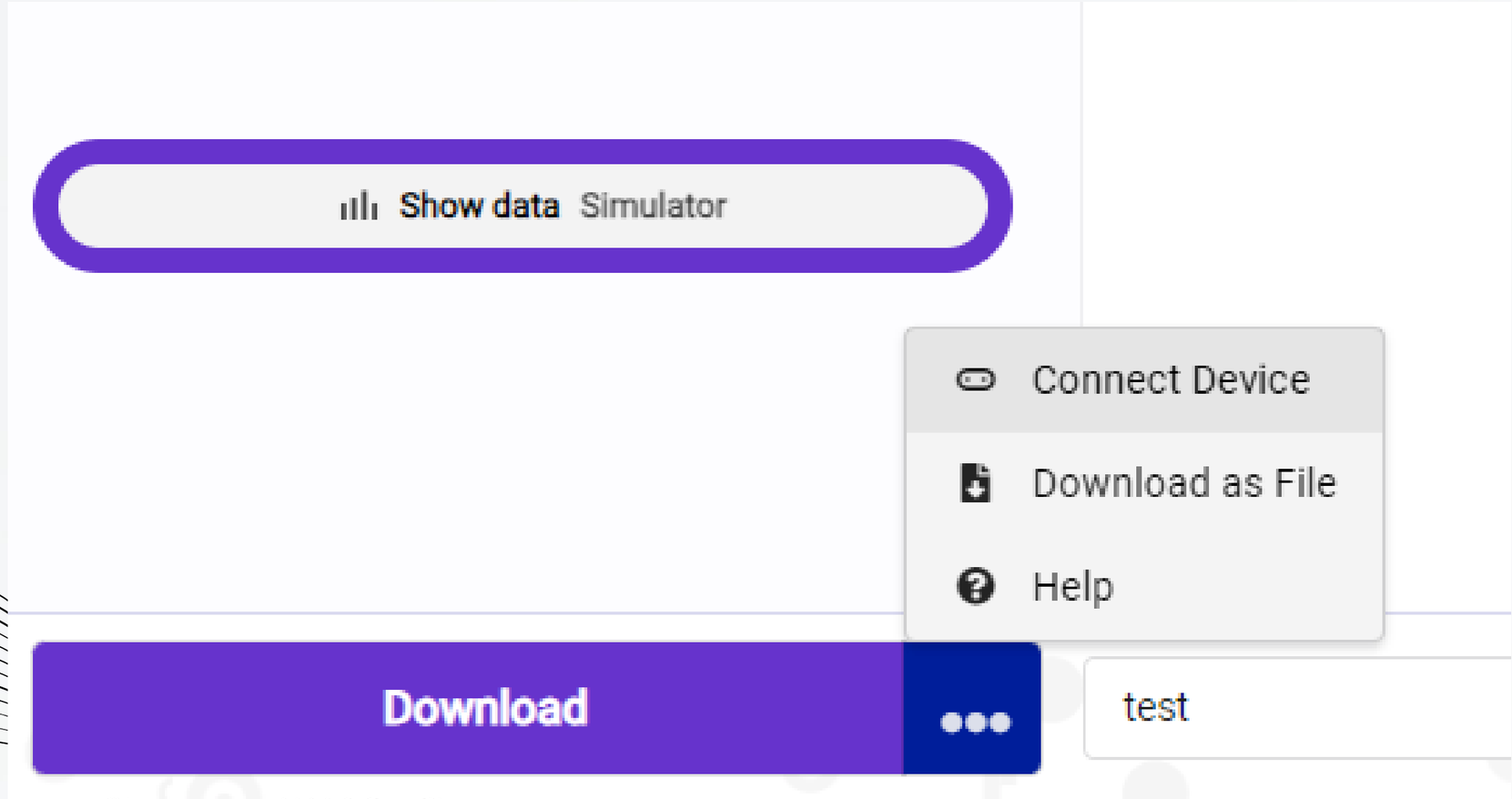
Let's try!



Play the melody on start

and show the icon forever.

How to connect with micro:bit?



1. Connect Device
2. Download

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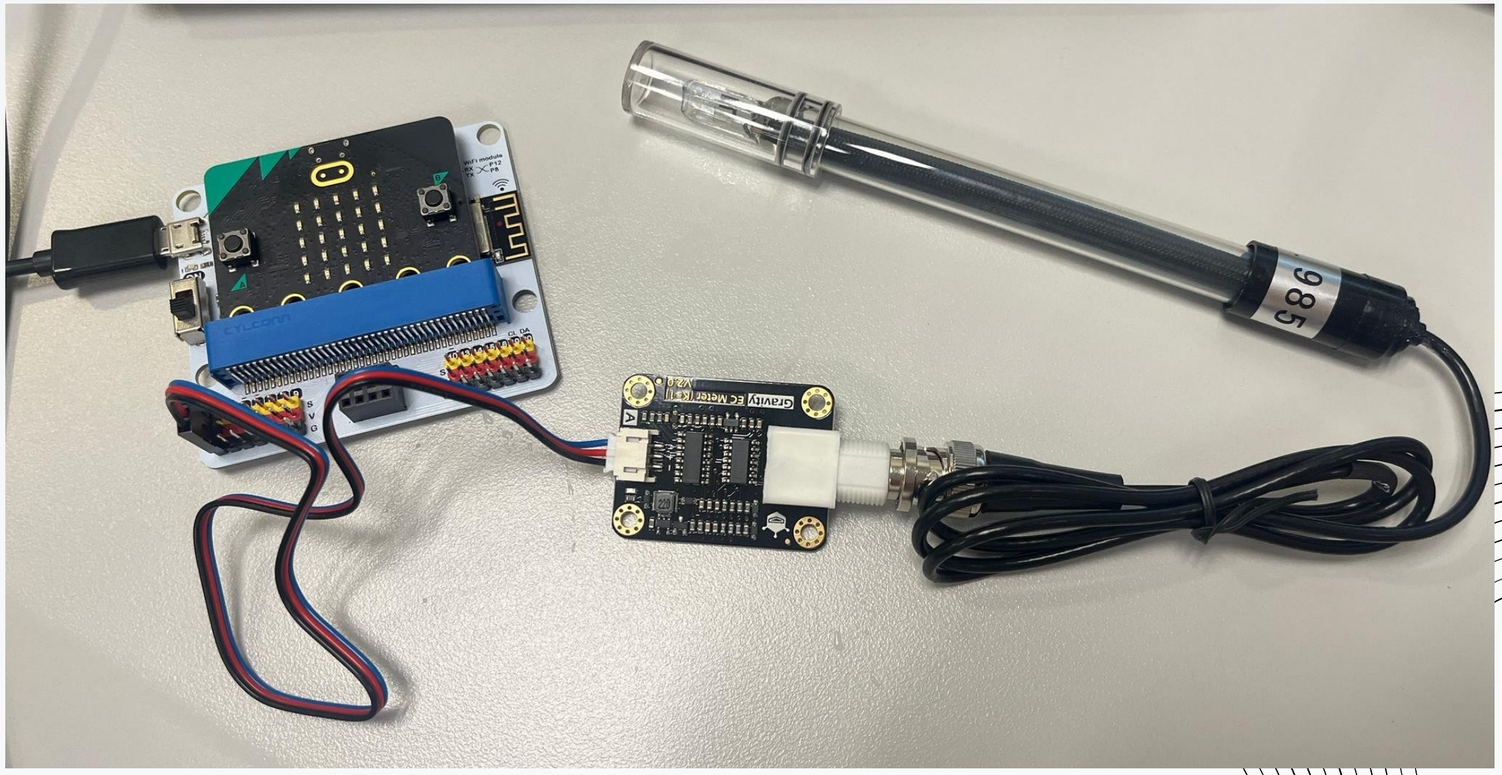
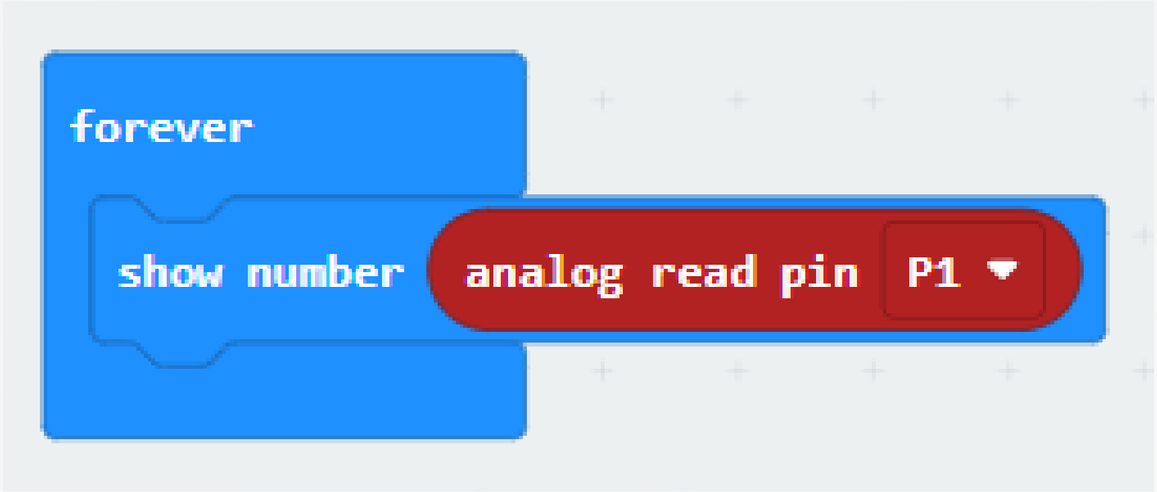
Gravity: Analog Electrical Conductivity Sensor

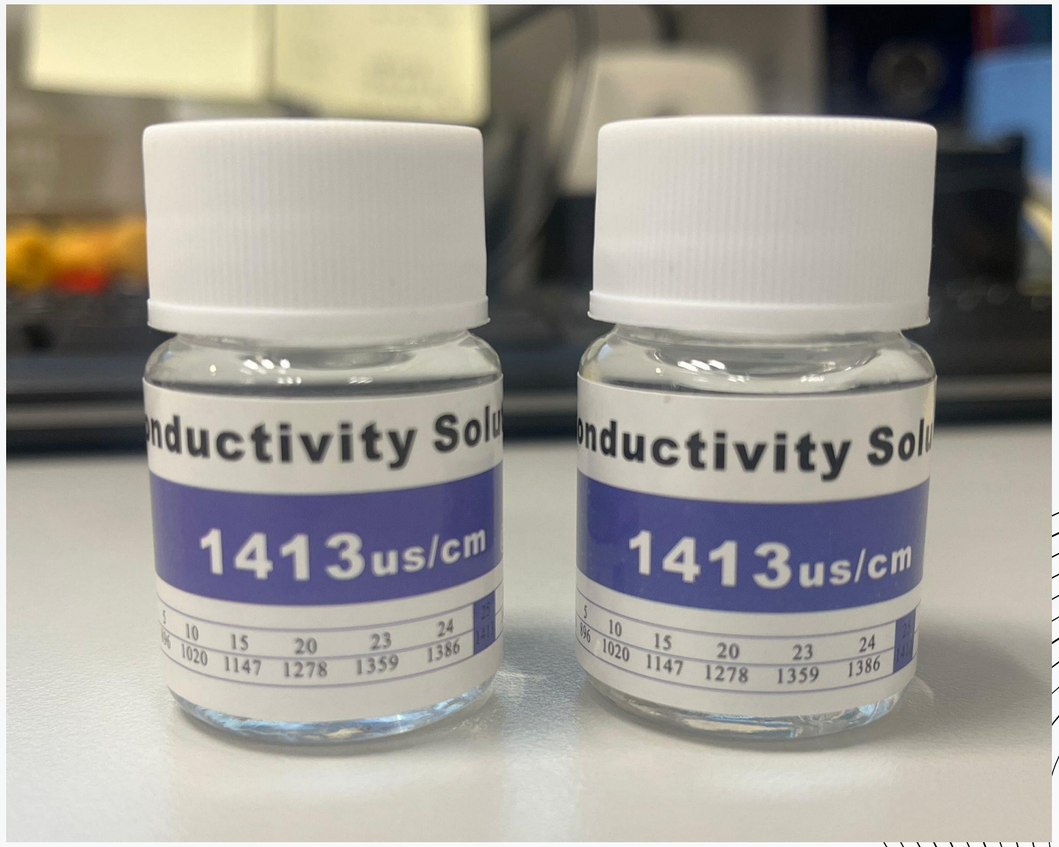
Materials

- Electrical Conductivity Probe
- Signal Conversion Board (Transmitter) V2
- Micro:bit
- Iot:bot



Calibration





Record the Reading & Find the Slope

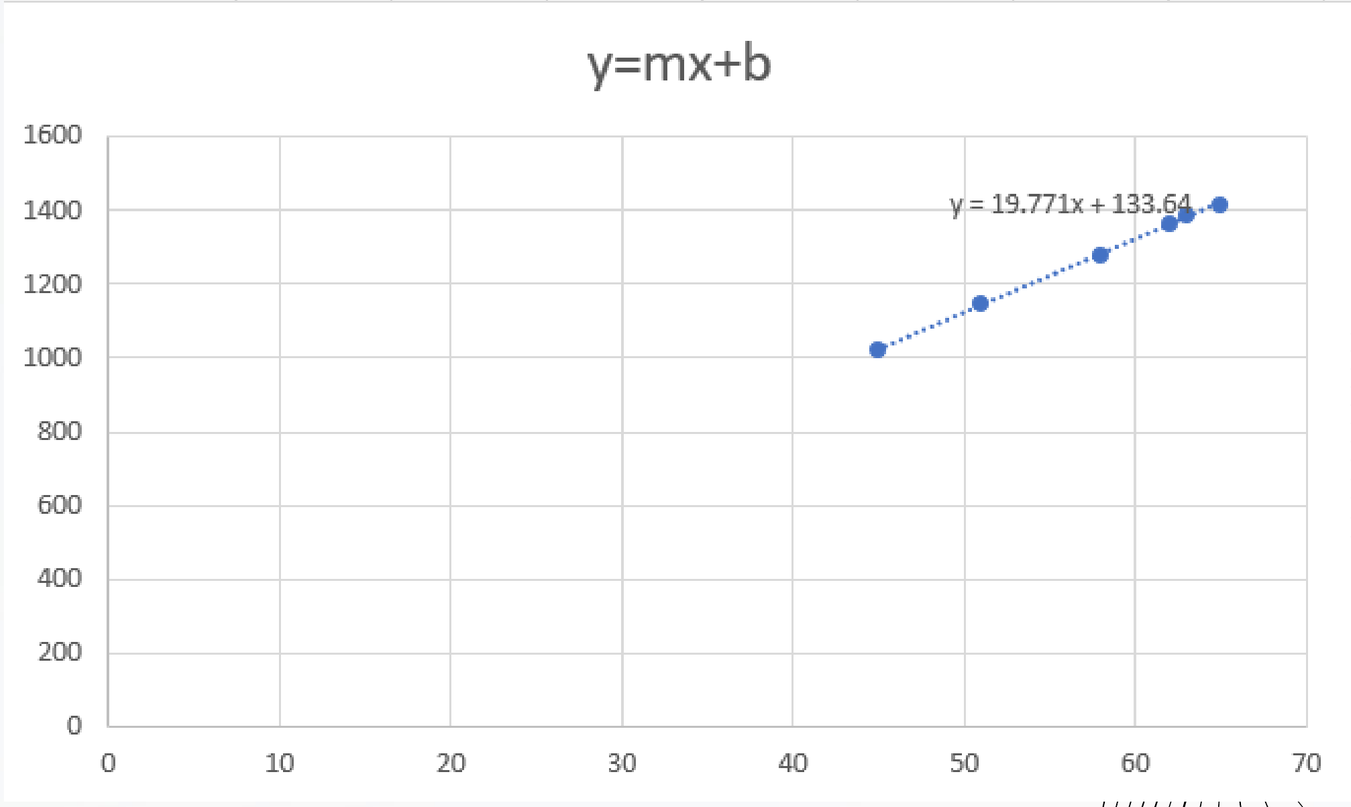
Standard Solution of 1413us/cm

in different temperature (different EC)

- Slope(m) =19.771
- y-intercept (b) = 133.64

y(EC)=19.771x+133.64

x (Reading)	45	51	58	62	63	65
y (EC)	1020	1147	1278	1359	1386	1413
Temp°C	10	15	20	23	24	25



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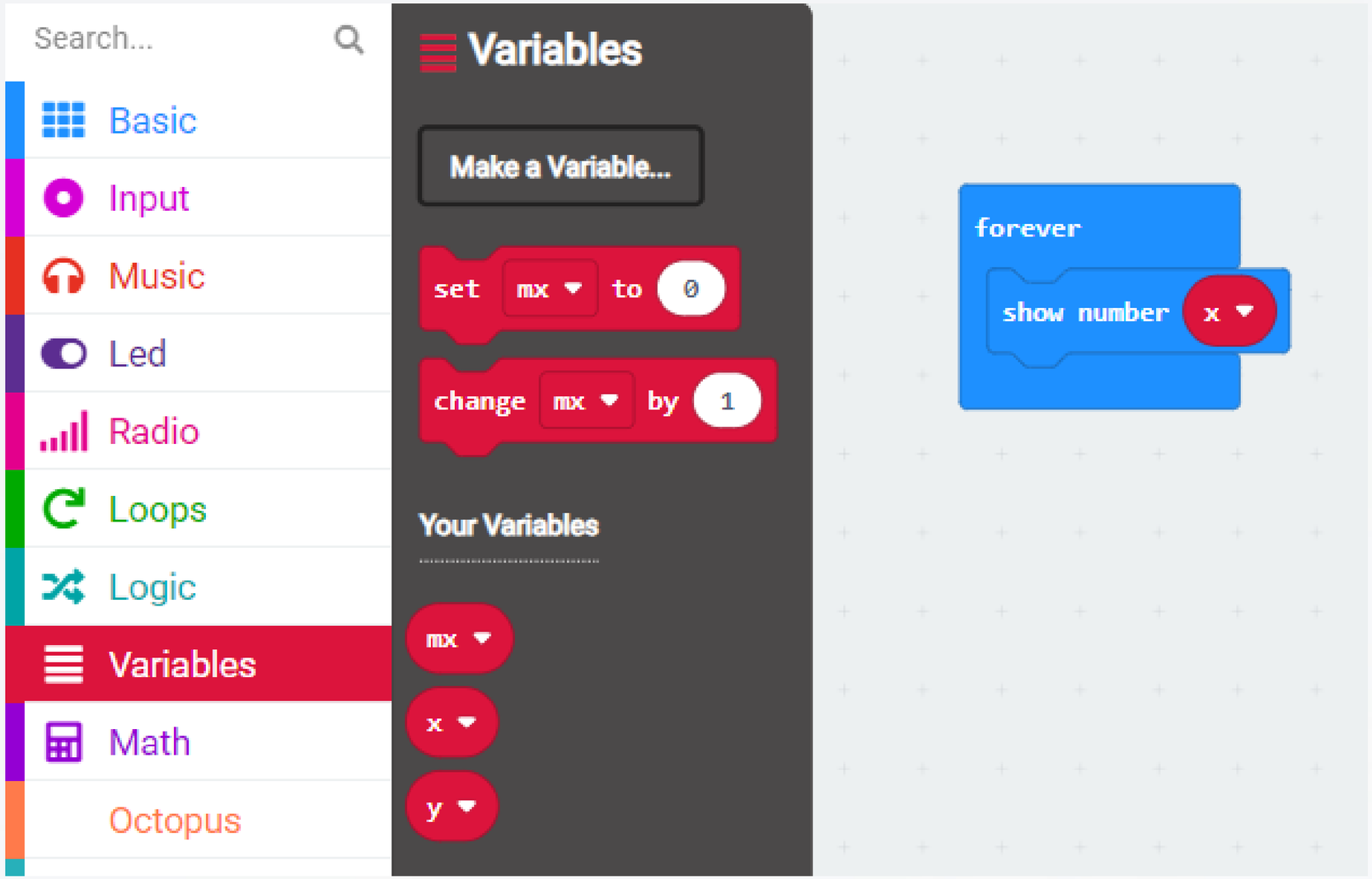
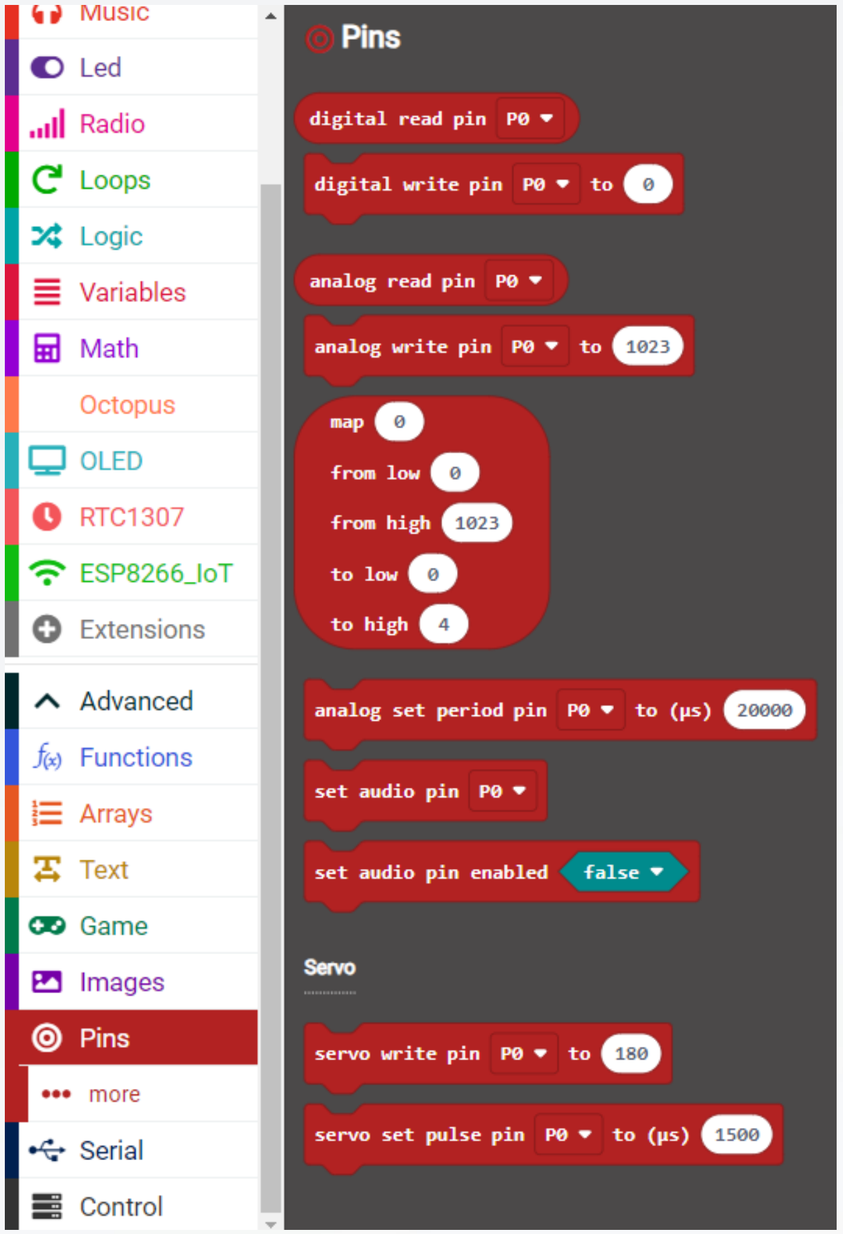
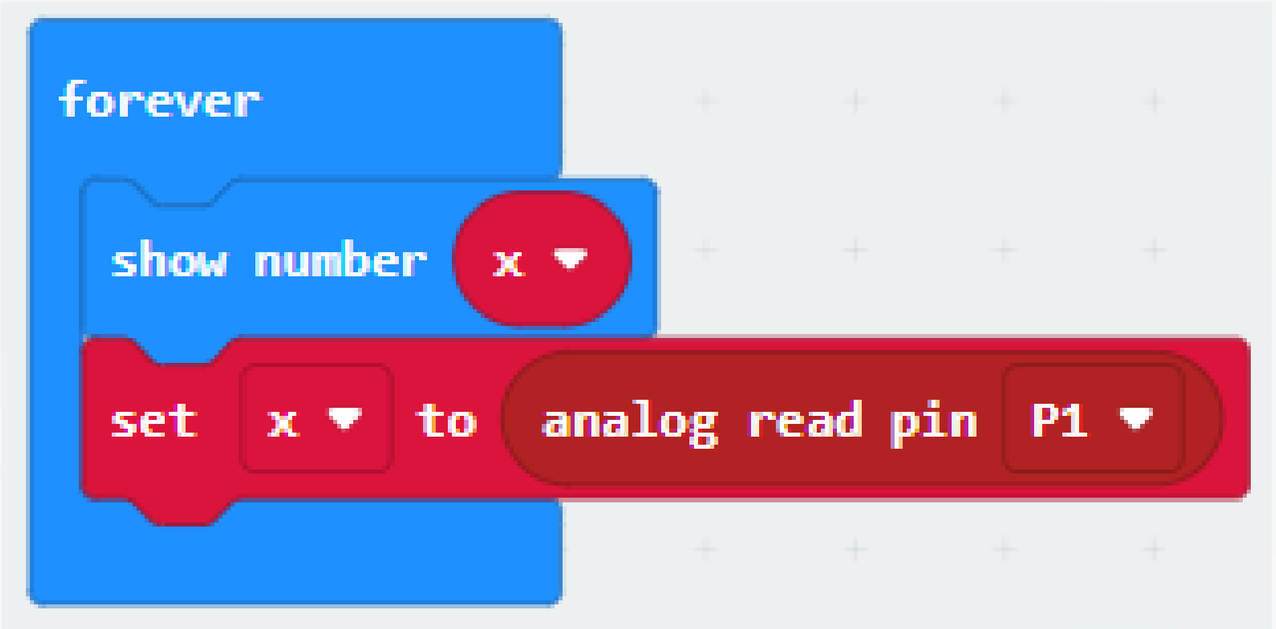
Micro:bit Coding

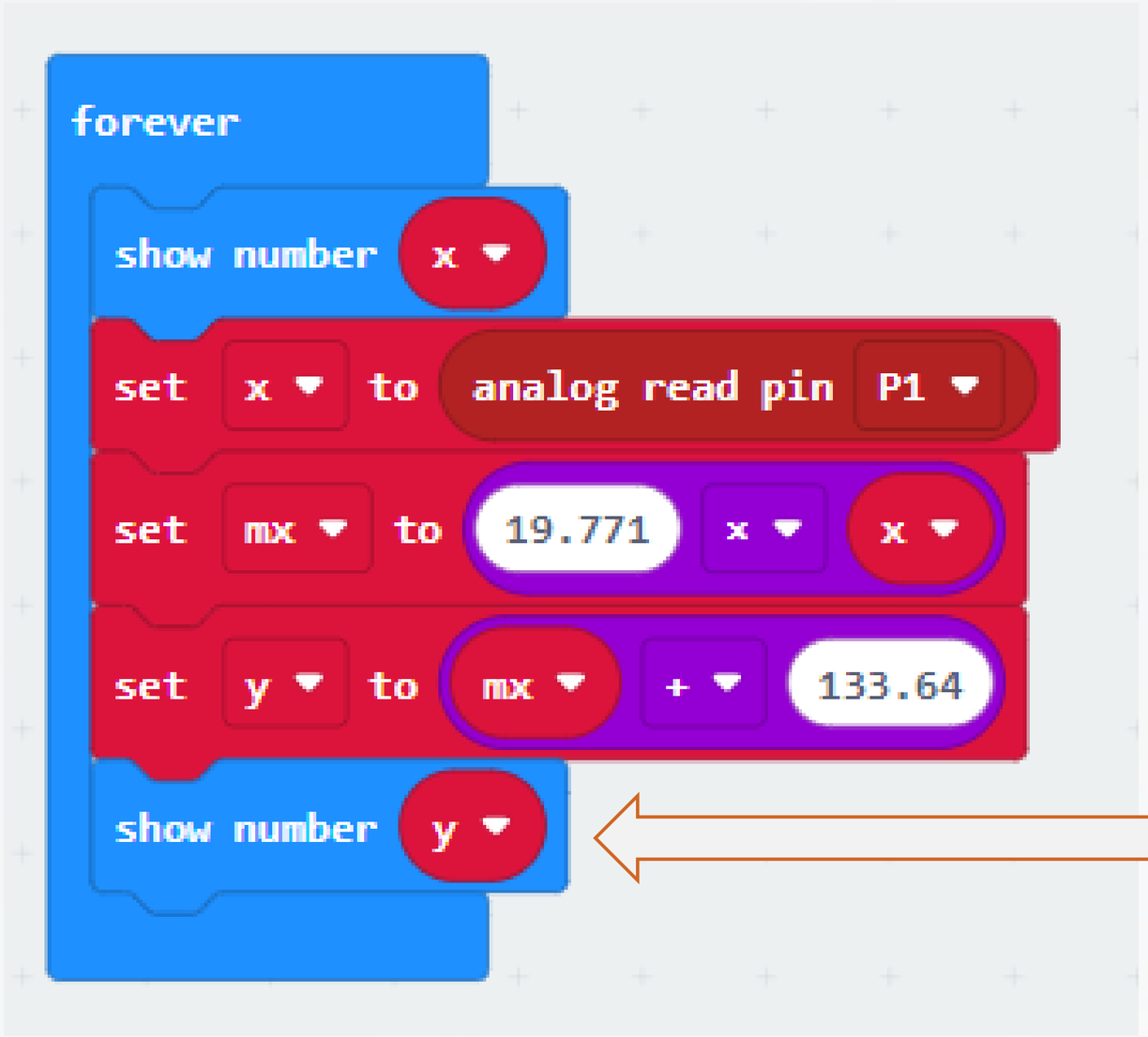


Make a variable, set “x”, “y”, and “mx”.





1. Show number “x”
2. Set “x” to analog read pin “P1”



y(EC)=19.771x+133.64

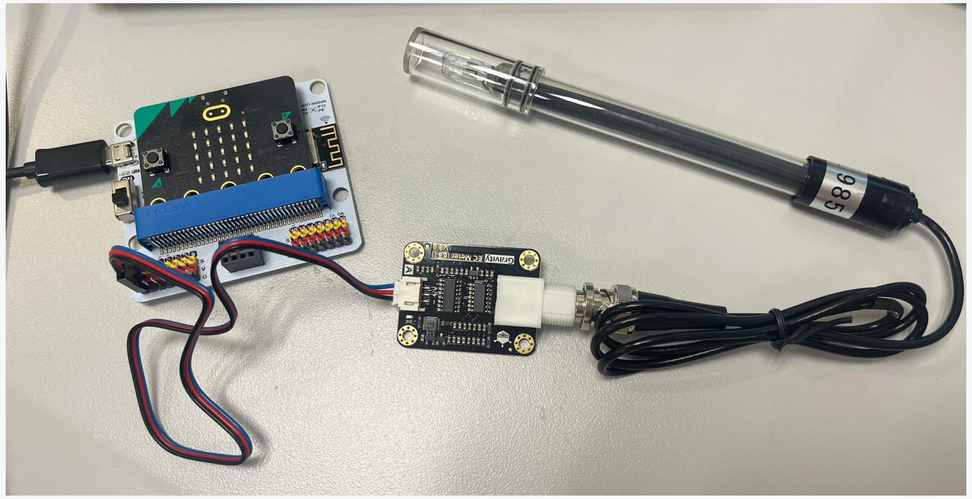
“mx”=19.771*”x”

“y”= “mx”+133.64

Show number “y”

“y” is the EC

Let's set up the EC sensor!



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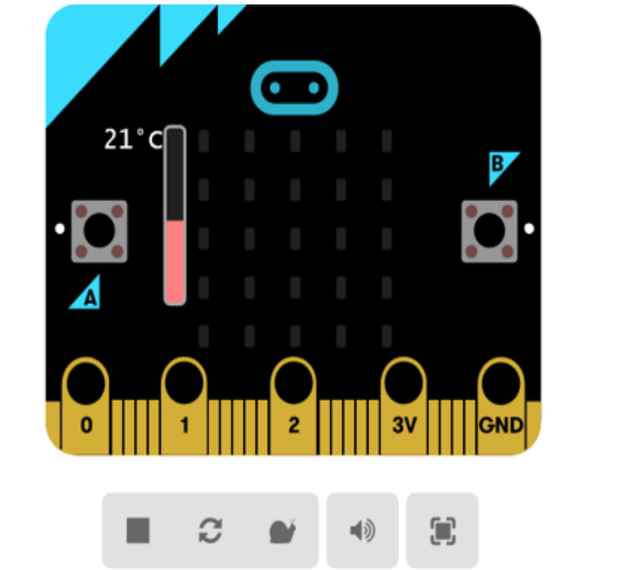
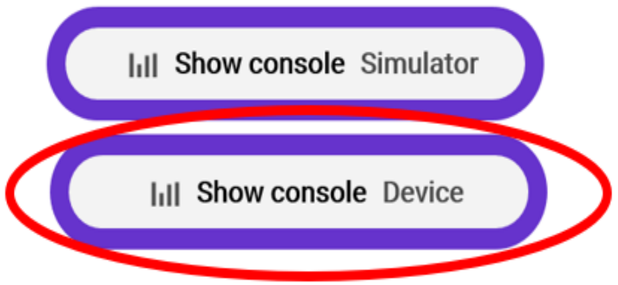
How to read the micro:bit's serial?

以 micro:bit 作數據記錄儀

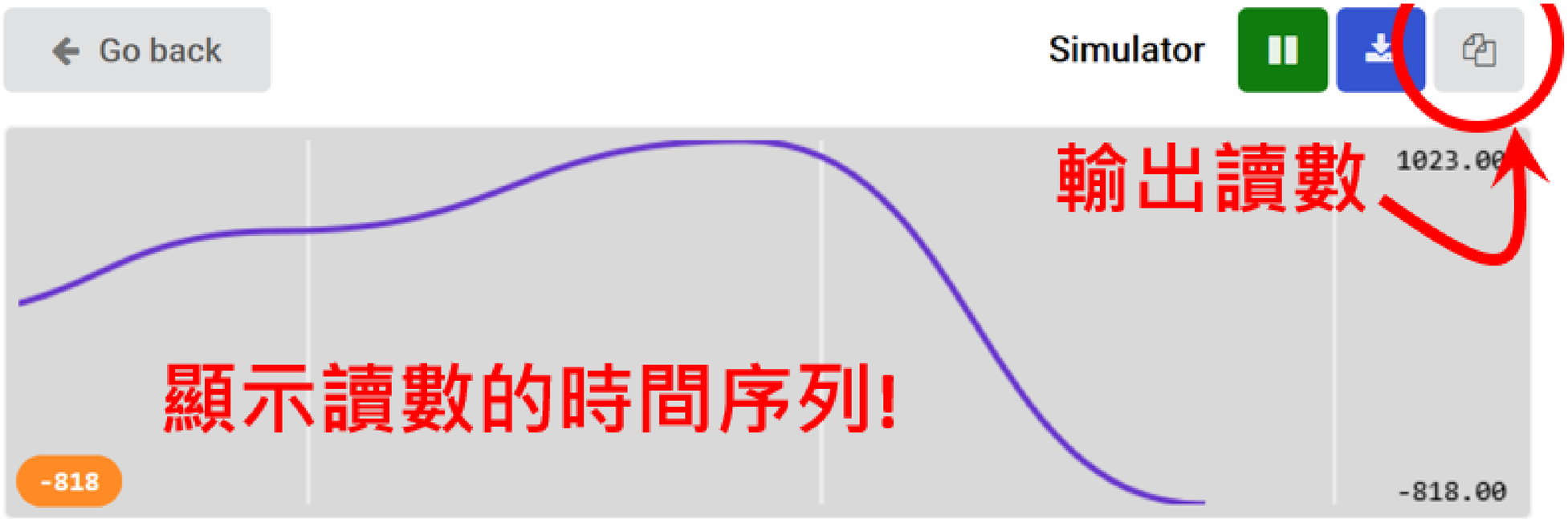
- 我們可以電腦**顯示/讀取/記錄**傳感器讀數
- 以 **MakeCode 線下版讀取讀數會比較穩定**
- 我們先試試以下的編碼 (Serial 序列):





以 micro:bit 作數據記錄儀

- 點擊 “**Show console**”(顯示系統監控)



- 我們可以在“**Show console device**”右上角的 “**Export data**” 或 “**Copy text**” 下載數據

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How to connect with ThingSpeak?

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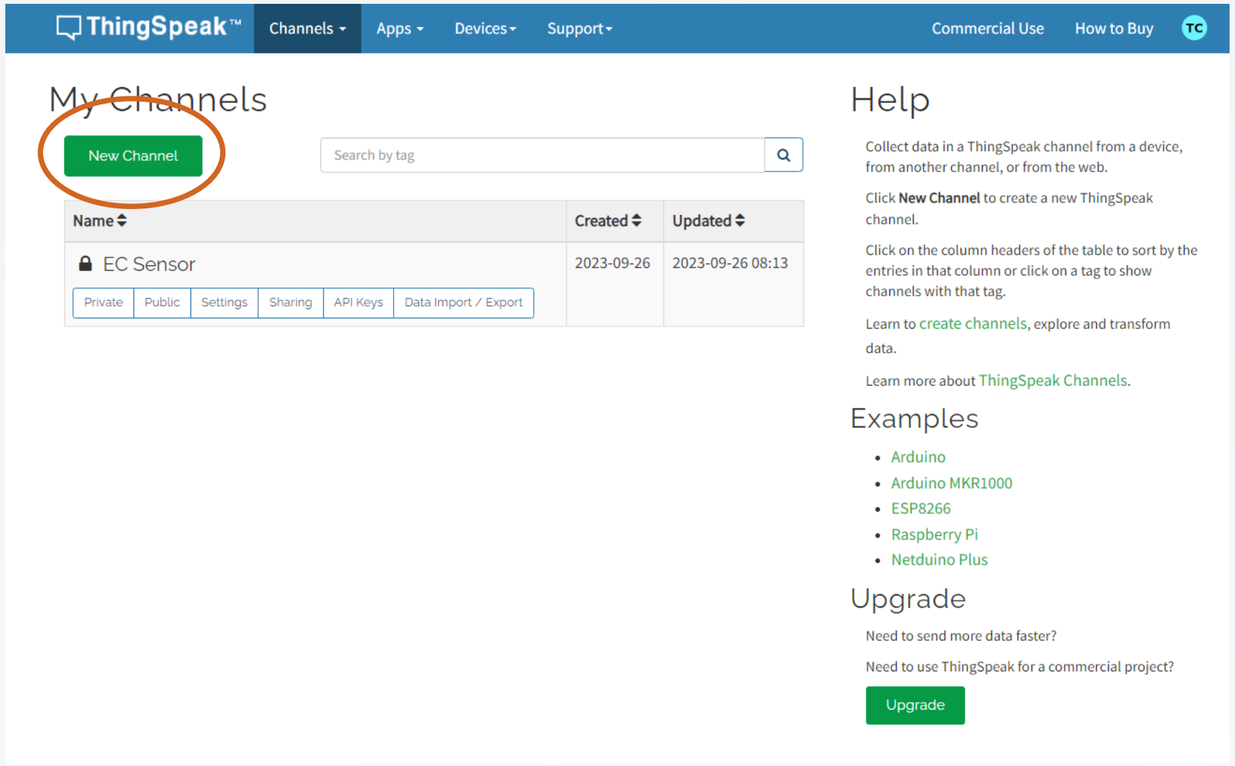
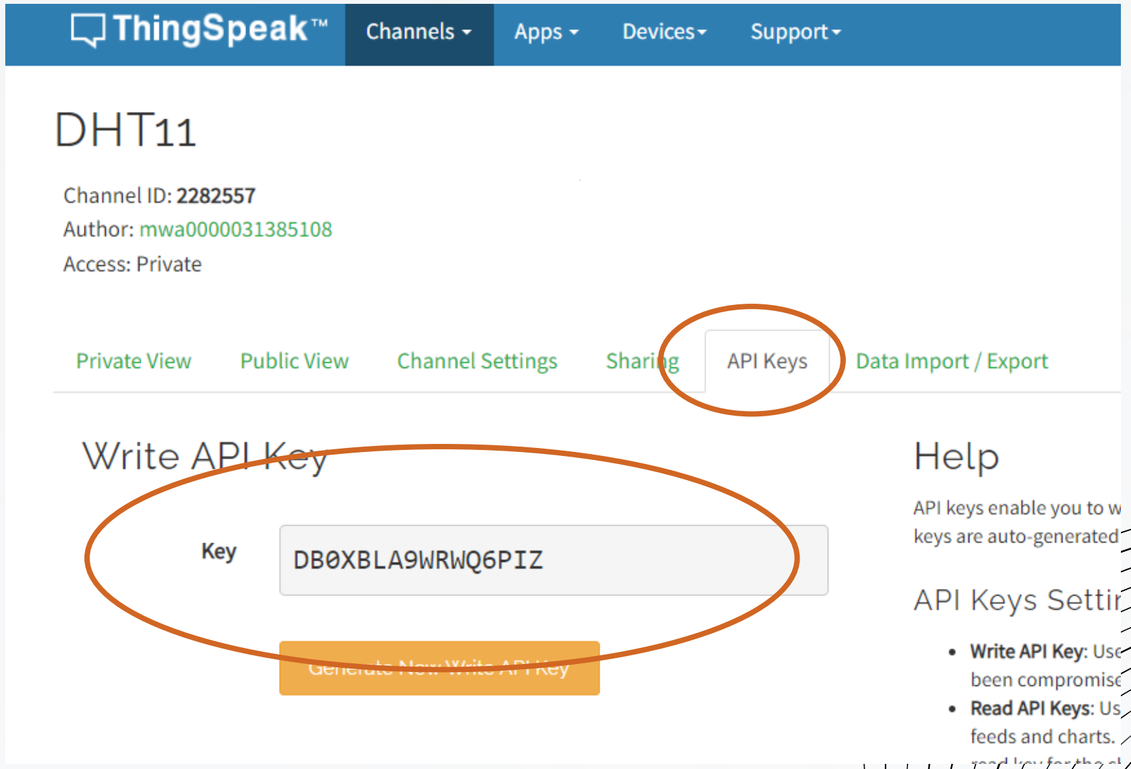
Login to ThingSpeak



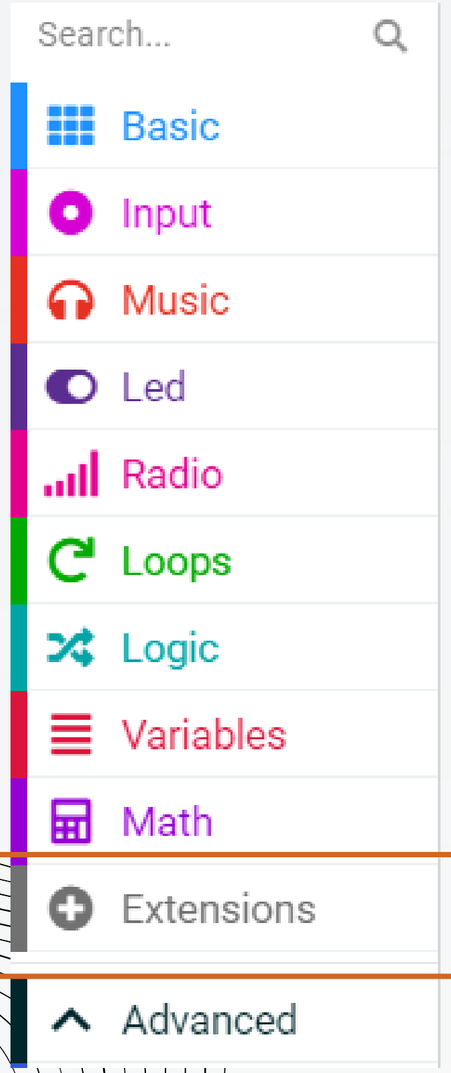
1. Add new channel



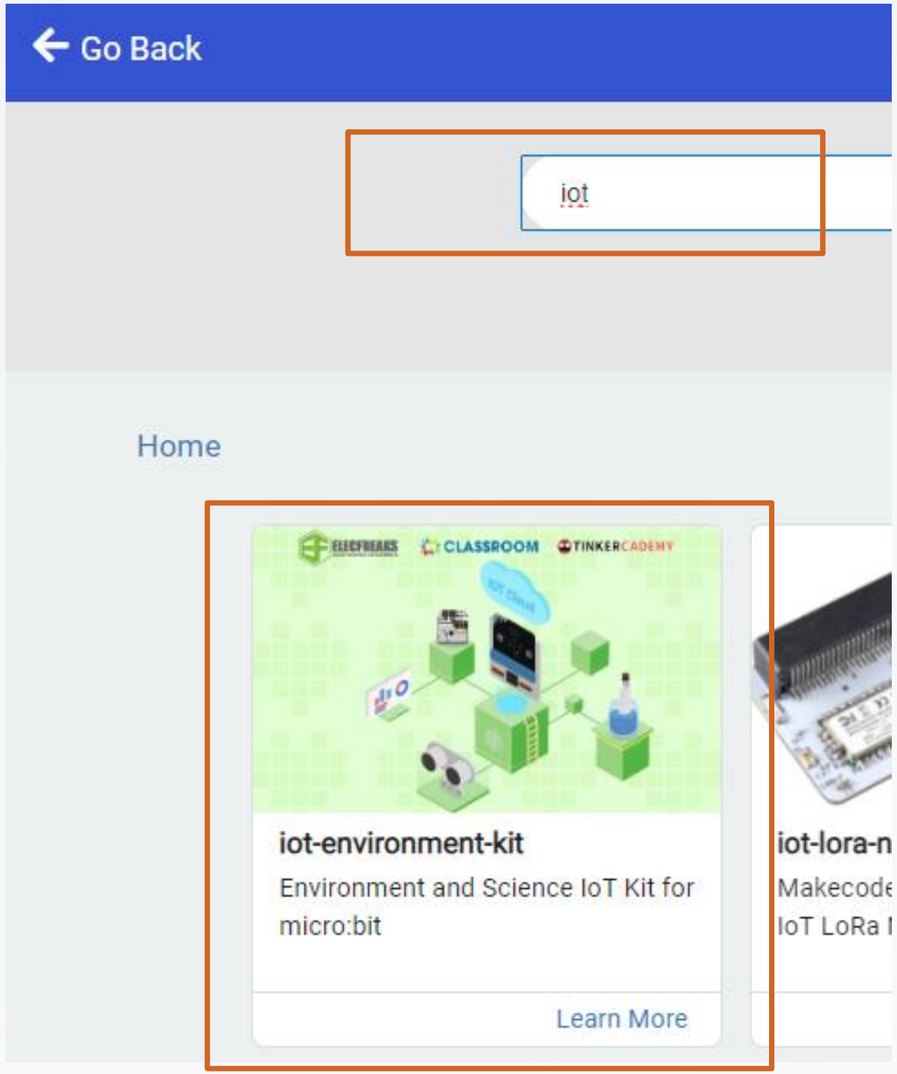
2. Find API Key

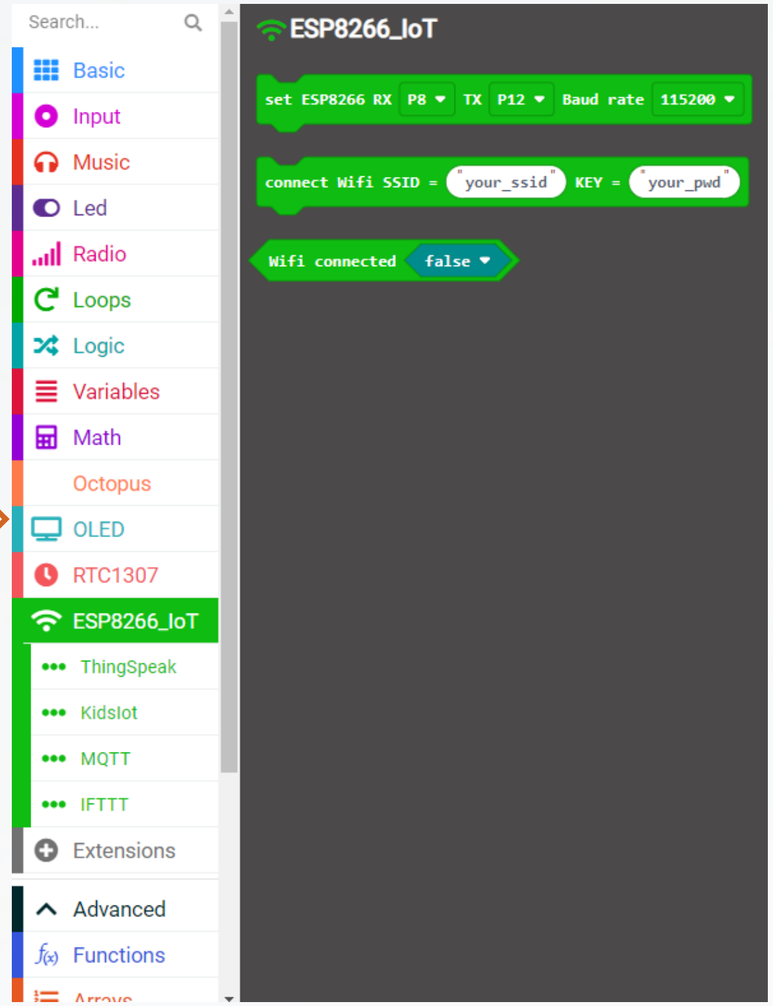
Add extensions to Makecode

1. Click "Extensions"



2. Search "iot" and choose "datalogger"





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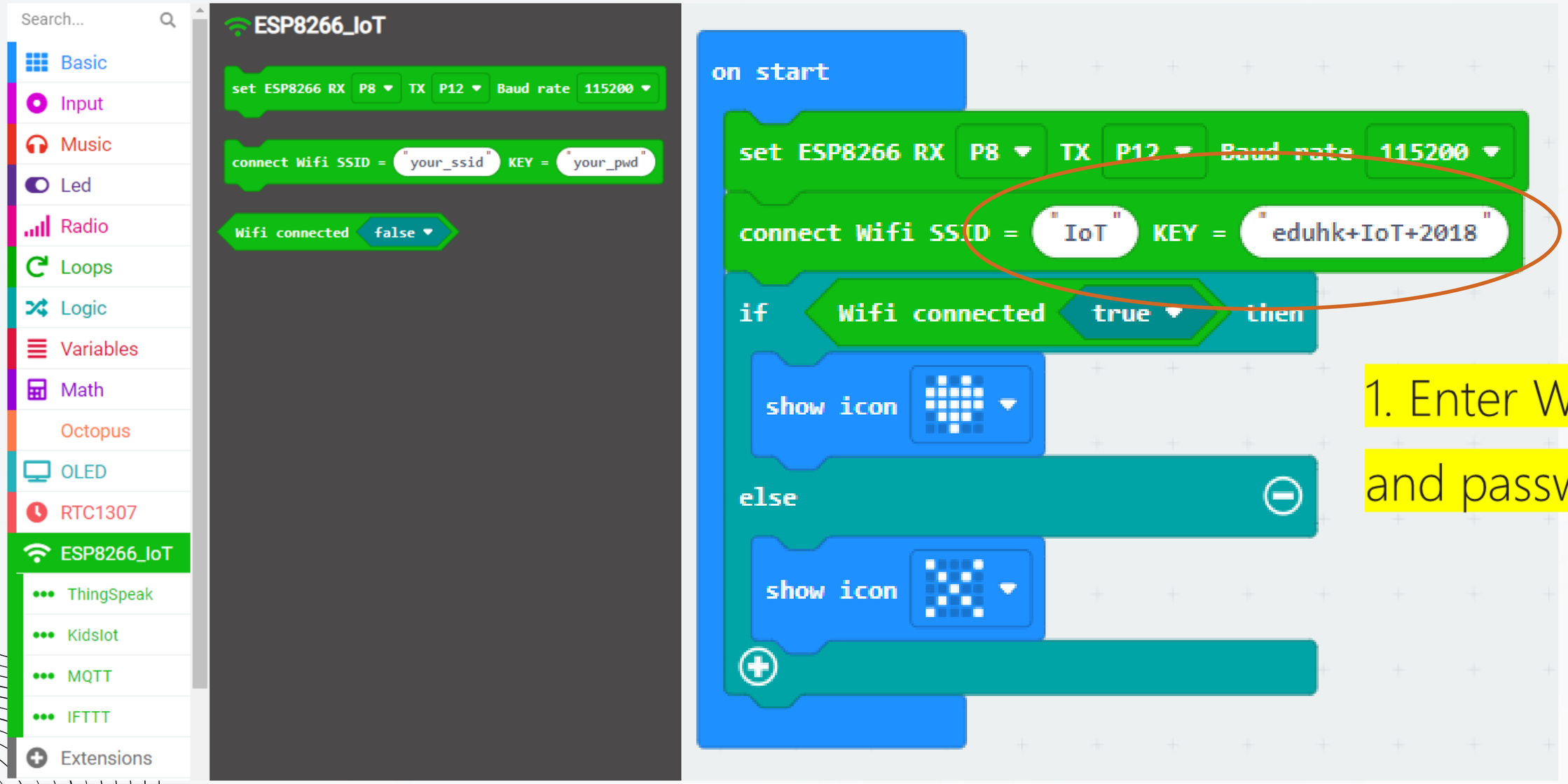
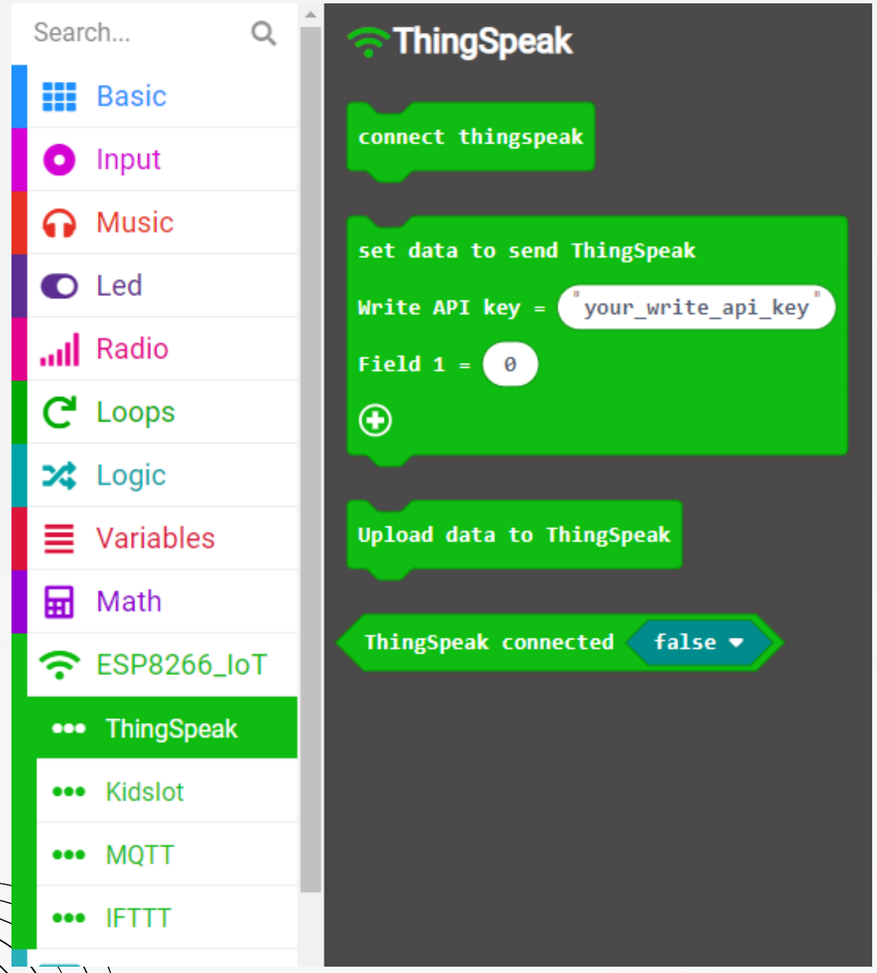
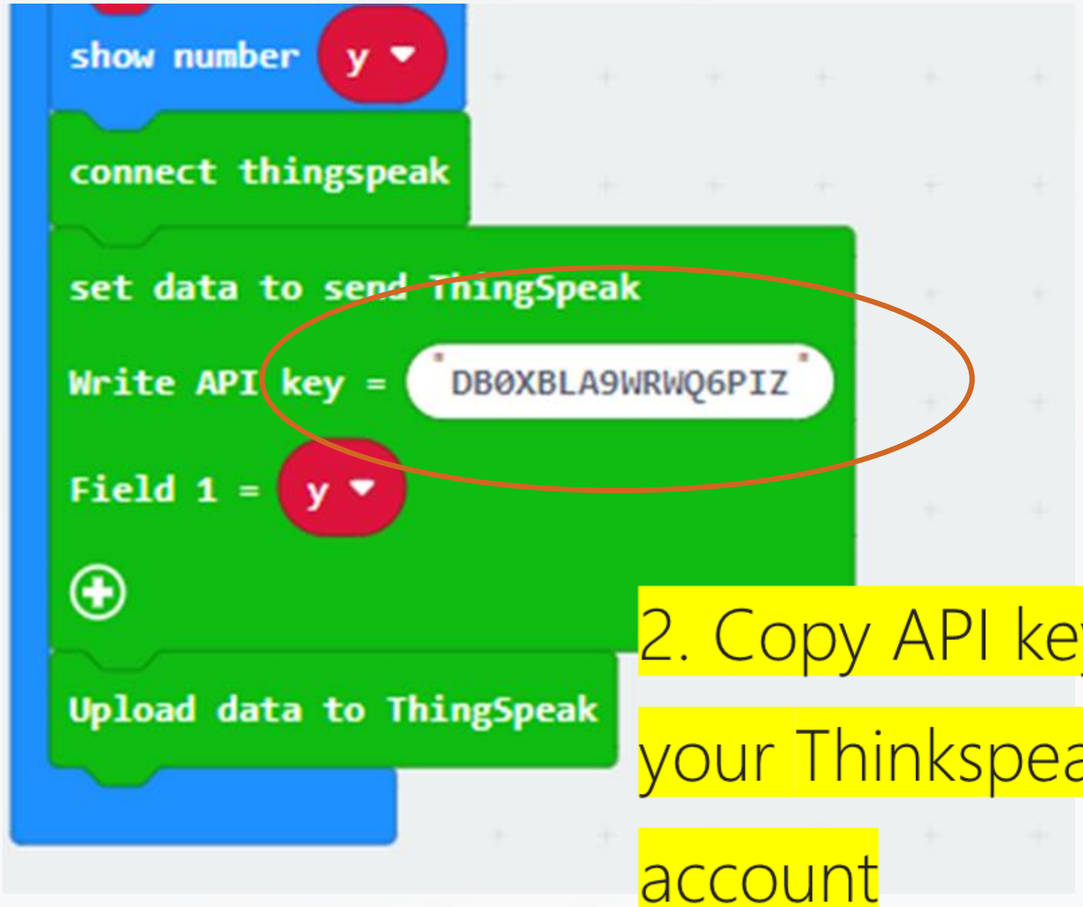
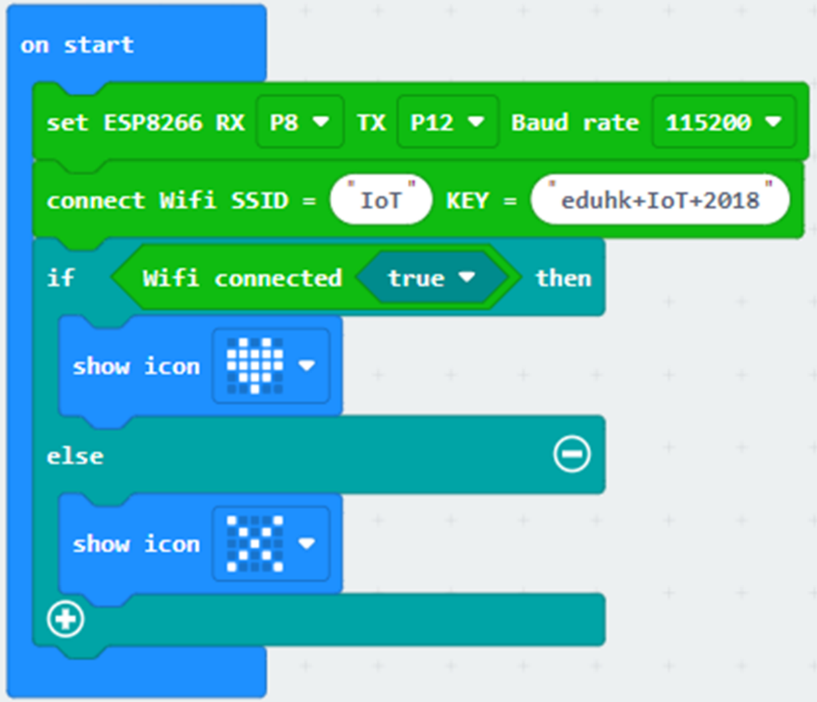


1. Enter Wi-Fi id and password





2. Copy API key from your Thinkspeak account



- https://makecode.microbit.org/_D1UHTDL6maKf

Record on ThingSpeak

EC Sensor

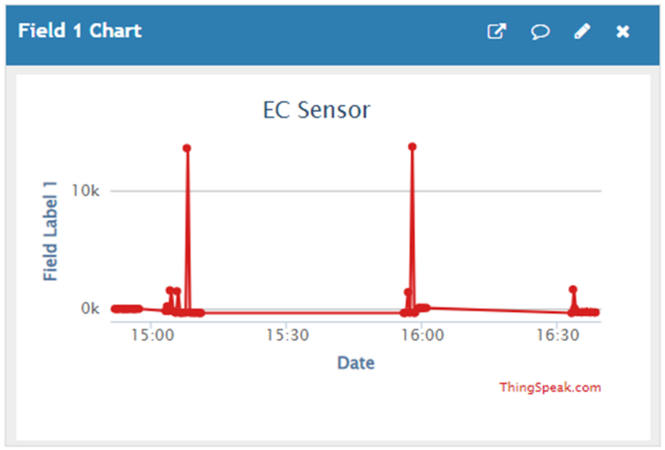
Channel ID: **2282557**
Author: mwa0000031385108
Access: Private

Private View | Public View | Channel Settings | Sharing | API Keys | Data Import / Export

Add Visualizations | Add Widgets | Export recent data | MATLAB Analysis | MATLAB Visualization

Channel Stats

Created: 8 days ago
Last entry: about 23 hours ago
Entries: 97



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School-based PD Workshop - Application of Analog Electrical Conductivity Sensor

Speaker: Ms. Chan Tsz Ying
Research Assistant I

請掃描以下二維碼填寫意見表，謝謝！

https://forms.gle/iY9teNBNYdkgtpap6