

2024-2025 Quality Education Fund Thematic Network - Tertiary Institutes

Progressive Development of STEAM Literacy through STEAM

Education and Self-directed Learning

透過STEAM教育自主學習有序發展STEAM素養

Application of IoT:bit for Data logging

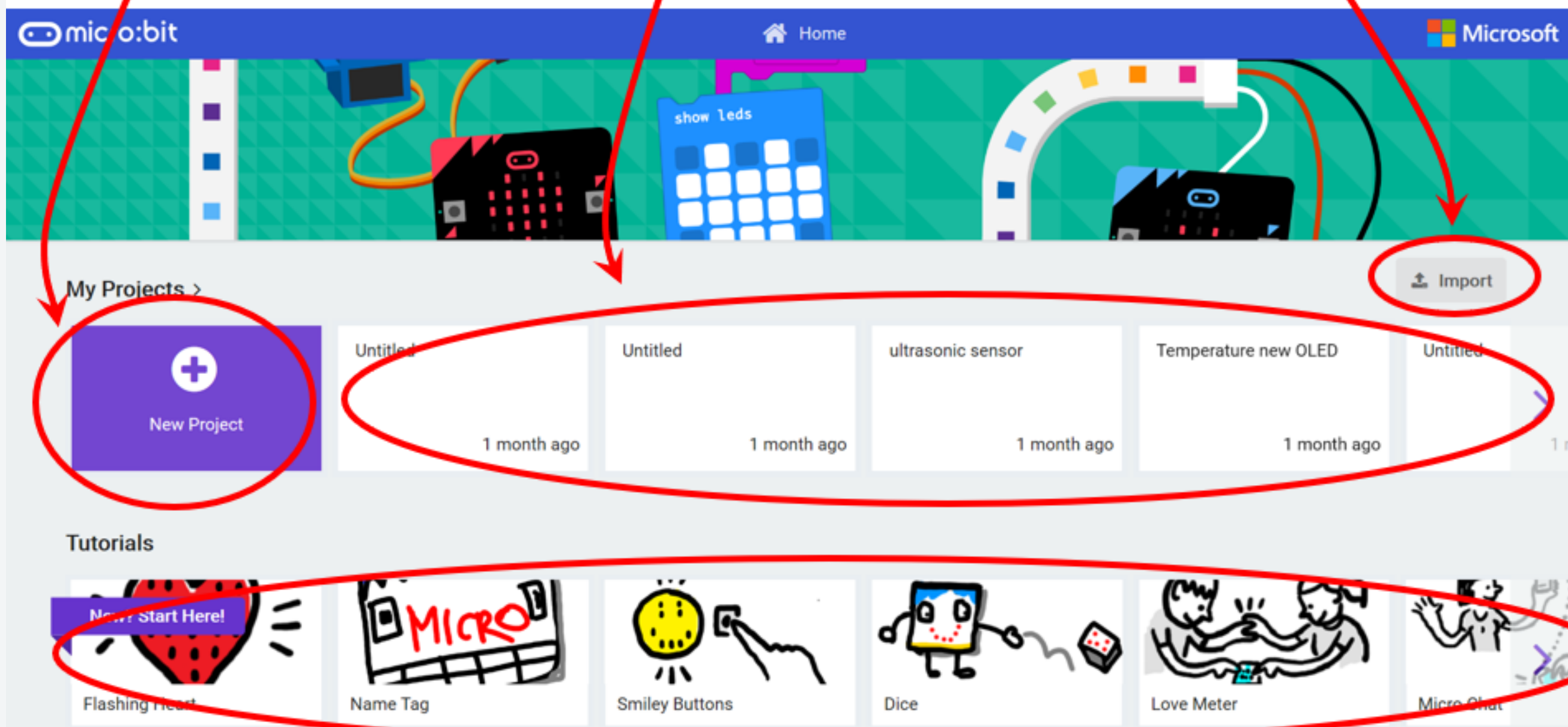
匡智屯門晨崗學校

MakeCode 編程平台

開始新的編程項目

之前的編程項目

從電腦載入之前的
編程檔案(.hex)



編程範例

- 我們先以**線上版 MakeCode** 編程:

<https://makecode.microbit.org/>

- 點擊 **“+ New Project”**
- 輸入右面程式碼製作**編程**

Micro:bit 模擬器, 測試程式

- micro:bit 可輕鬆地通過 microUSB 連接線 與電腦 進行連接, 點擊Download旁邊的**3點**
- 按**Connect device**, 按**pair**, 選擇要連接的 microbit, 然後按**connect**
- 點擊 **“Download”** 並把檔案儲存至 **“MICROBIT (D:)”** 中(micro:bit 可能出現在不同的硬碟中)

下載程式並在 micro:bit 上運行

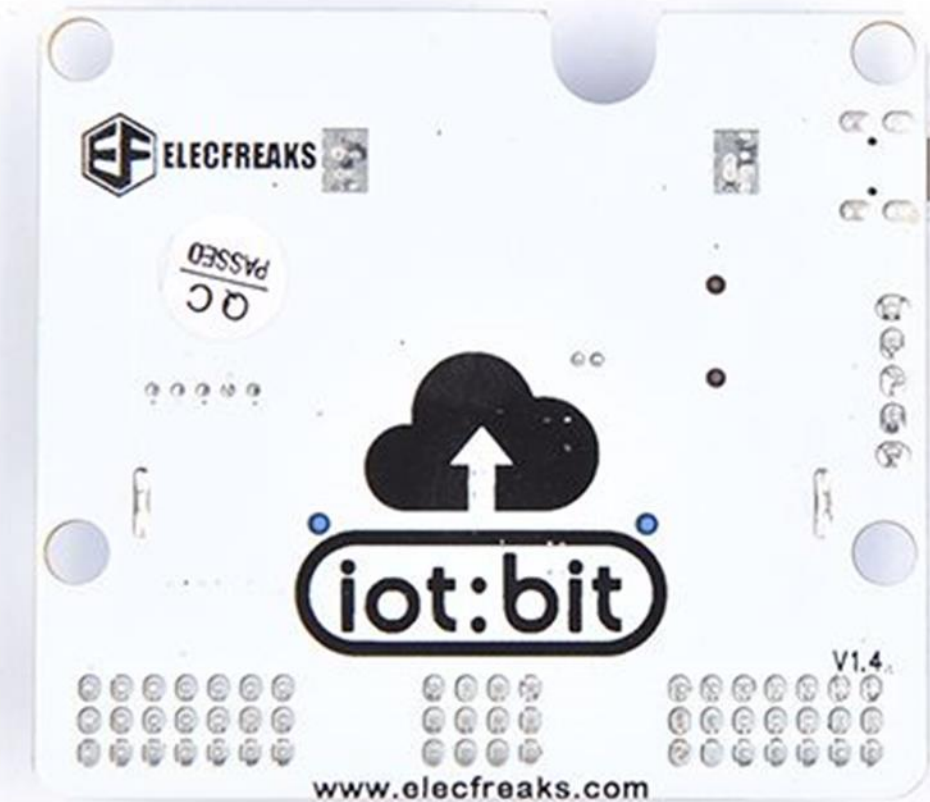
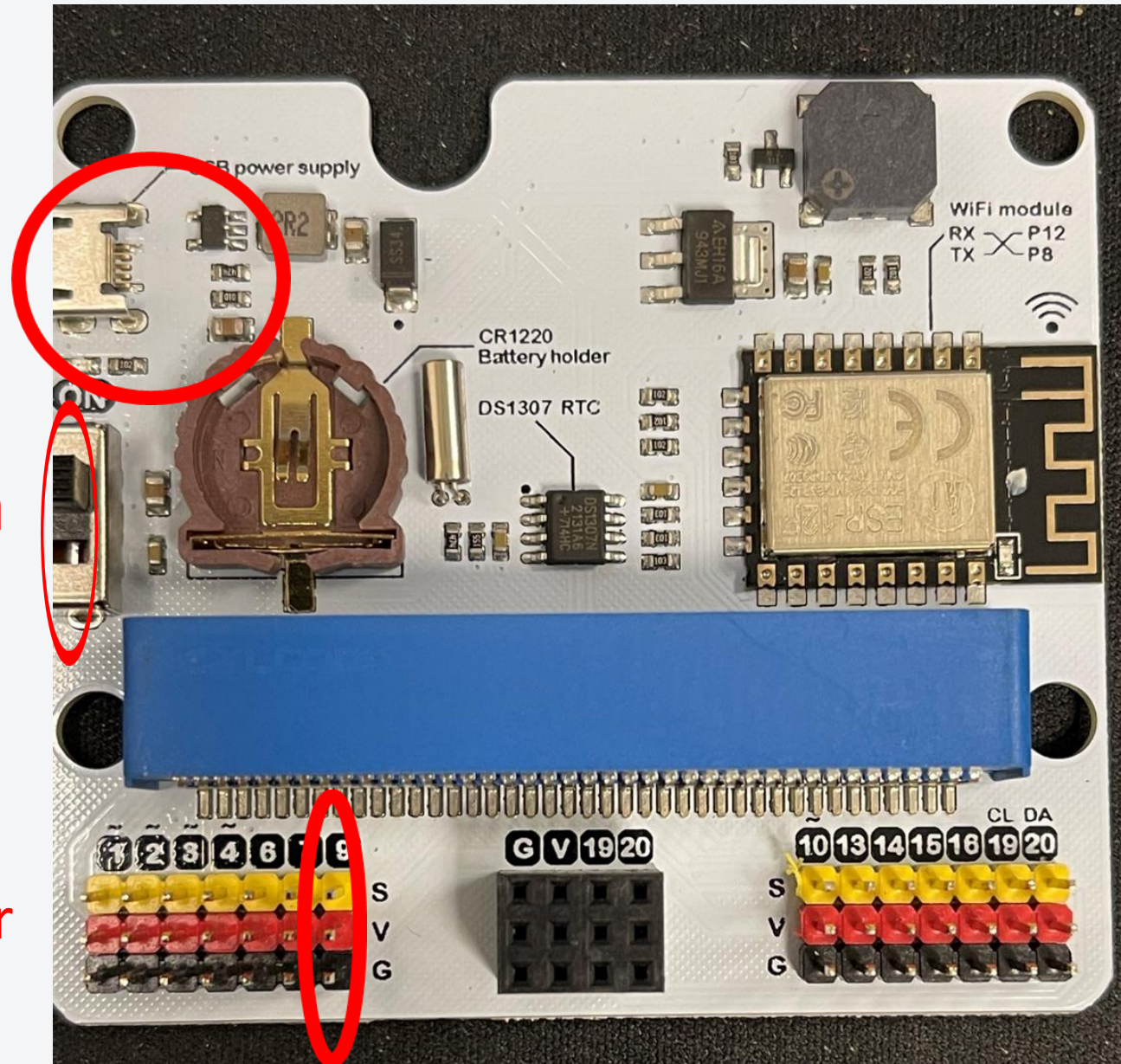
The screenshot displays the Microsoft MakeCode micro:bit online programming environment. The interface includes a virtual micro:bit board on the left, a block-based programming palette in the center, and a workspace on the right. A red bracket groups the palette categories as "程式方塊分類" (Program Block Classification). A red bracket groups the workspace as "編程平台" (Programming Platform). A purple arrow points from the "Download" button at the bottom to the text "下載程式並在 micro:bit 上運行".

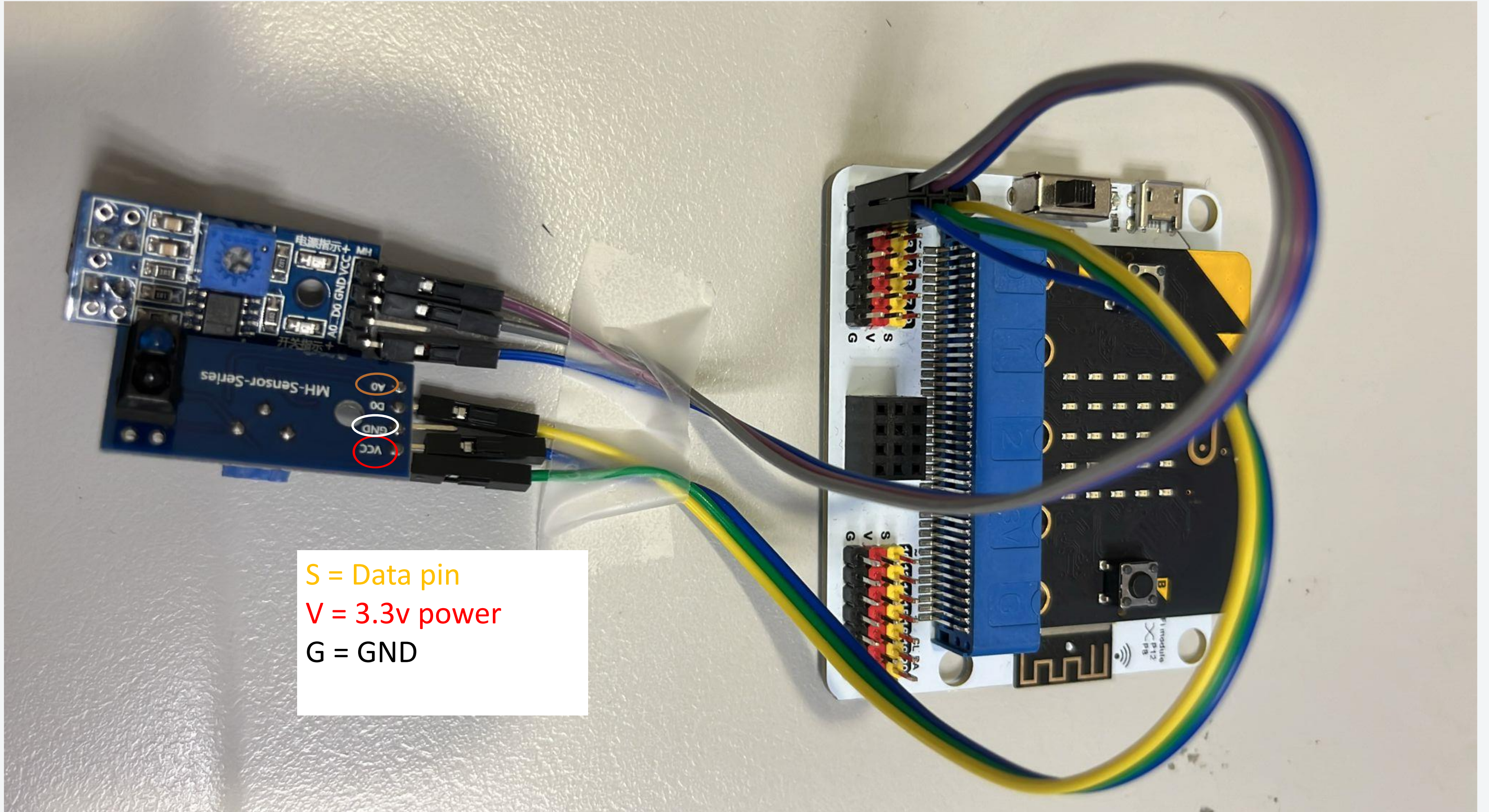
iot:bit

Power supply for
iot:bit

Switch

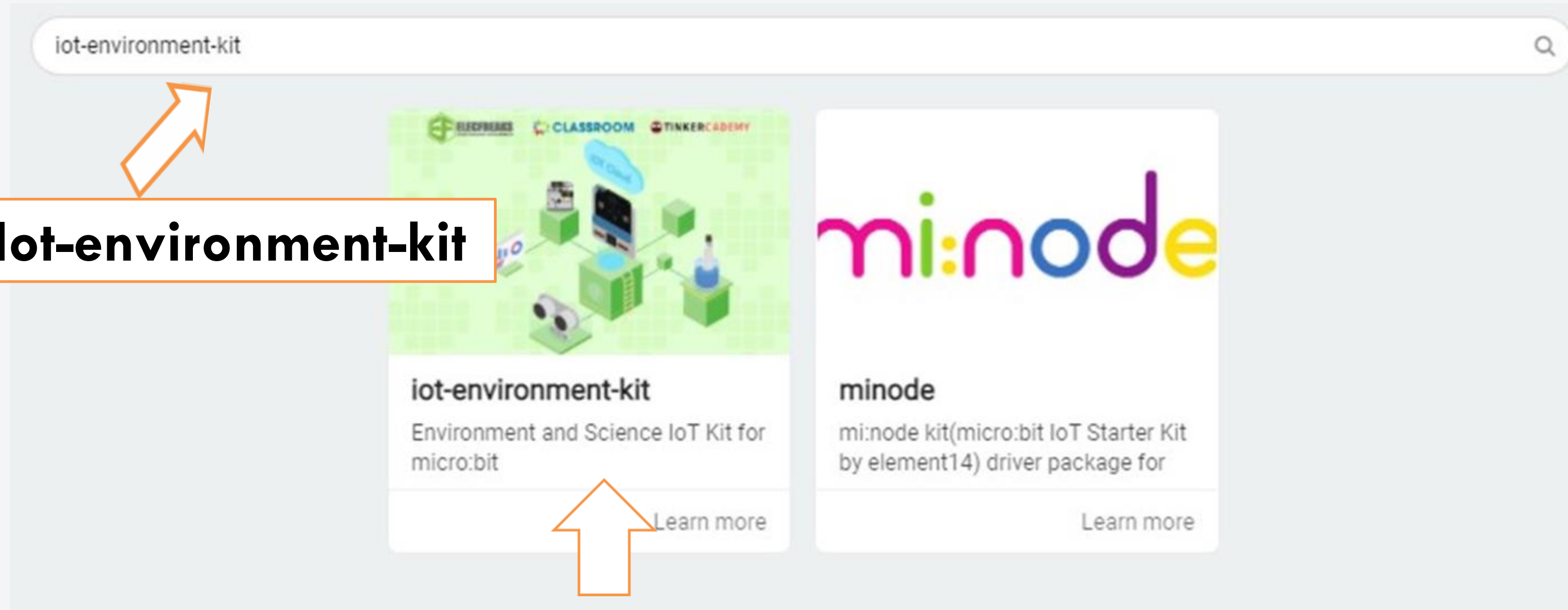
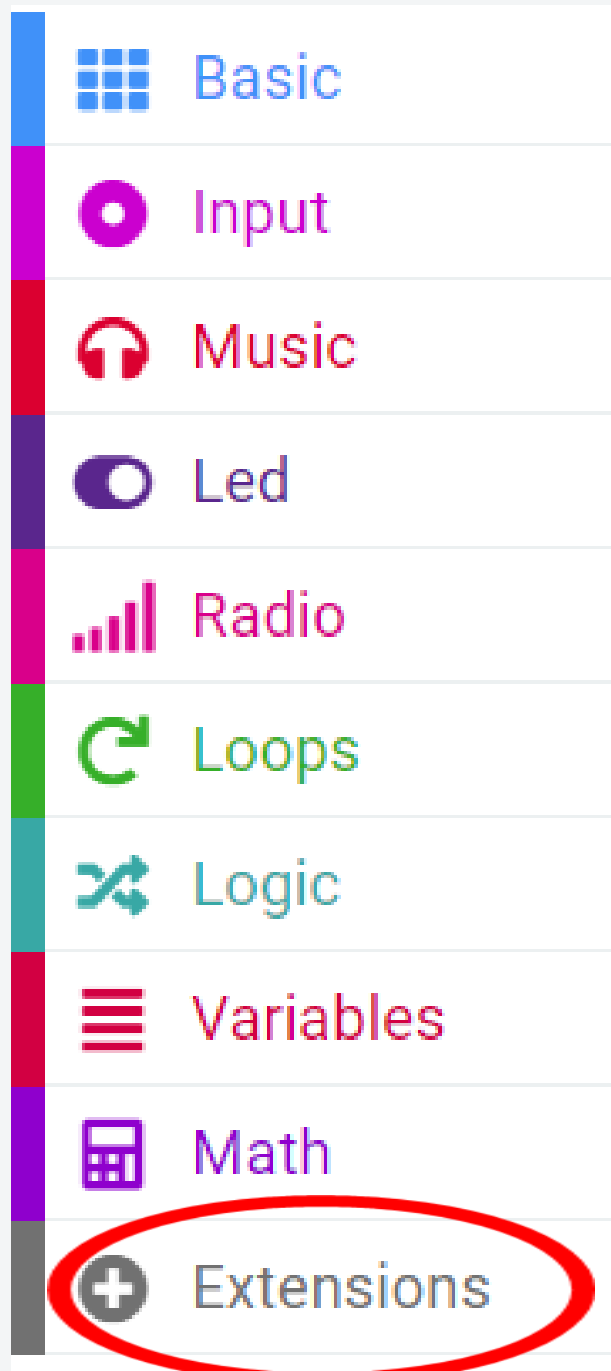
S = Data pin
V = 3.3v power
G = GND





S = Data pin
V = 3.3v power
G = GND

MakeCode extensions



iot:bit WiFi setting

```
on start
  set ESP8266 RX P8 TX P12 Baud rate 115200
  connect Wifi SSID = "SSID" KEY = "Password"
  if Wifi connected true then
    show icon
    pause (ms) 2000
    clear screen
```

拖入這些block。
然後輸入 Wi-Fi 名稱和密碼。

Microbit coding

```
forever
  if analog read pin analog pin P1 ≥ 150 then
    set start to running time (ms)
  else if analog read pin analog pin P2 ≥ 150 then
    set end to running time (ms)
  +
  set ms to end - start
  set s to ms / 1000
  set speed_cms to 13 / s
```

拖入這些block。

```
on button A pressed
  reset
```

軌道的長度 (cm)，可以視乎情況改變

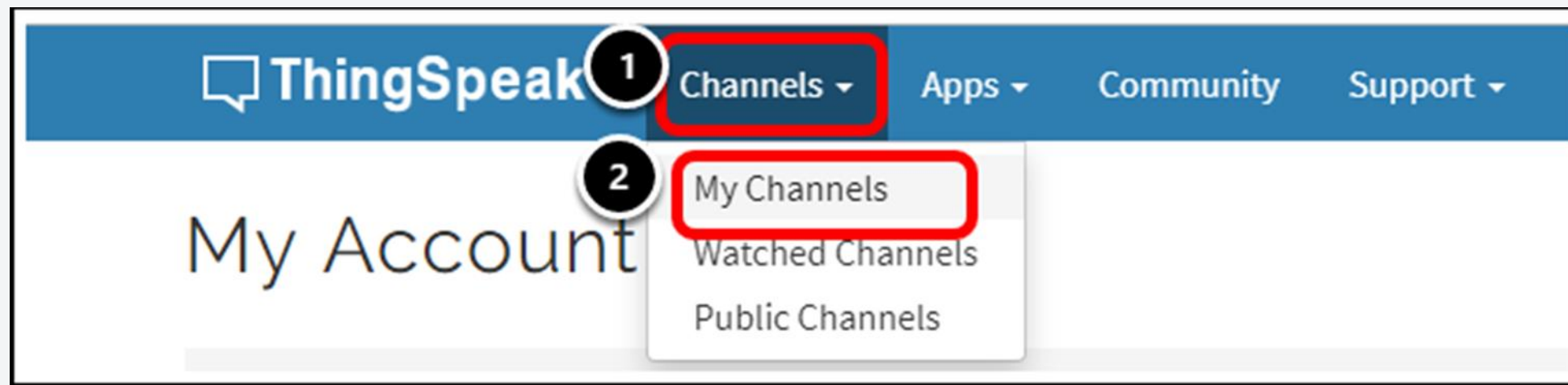
ThingSpeak Set Up

Step 1: 登入

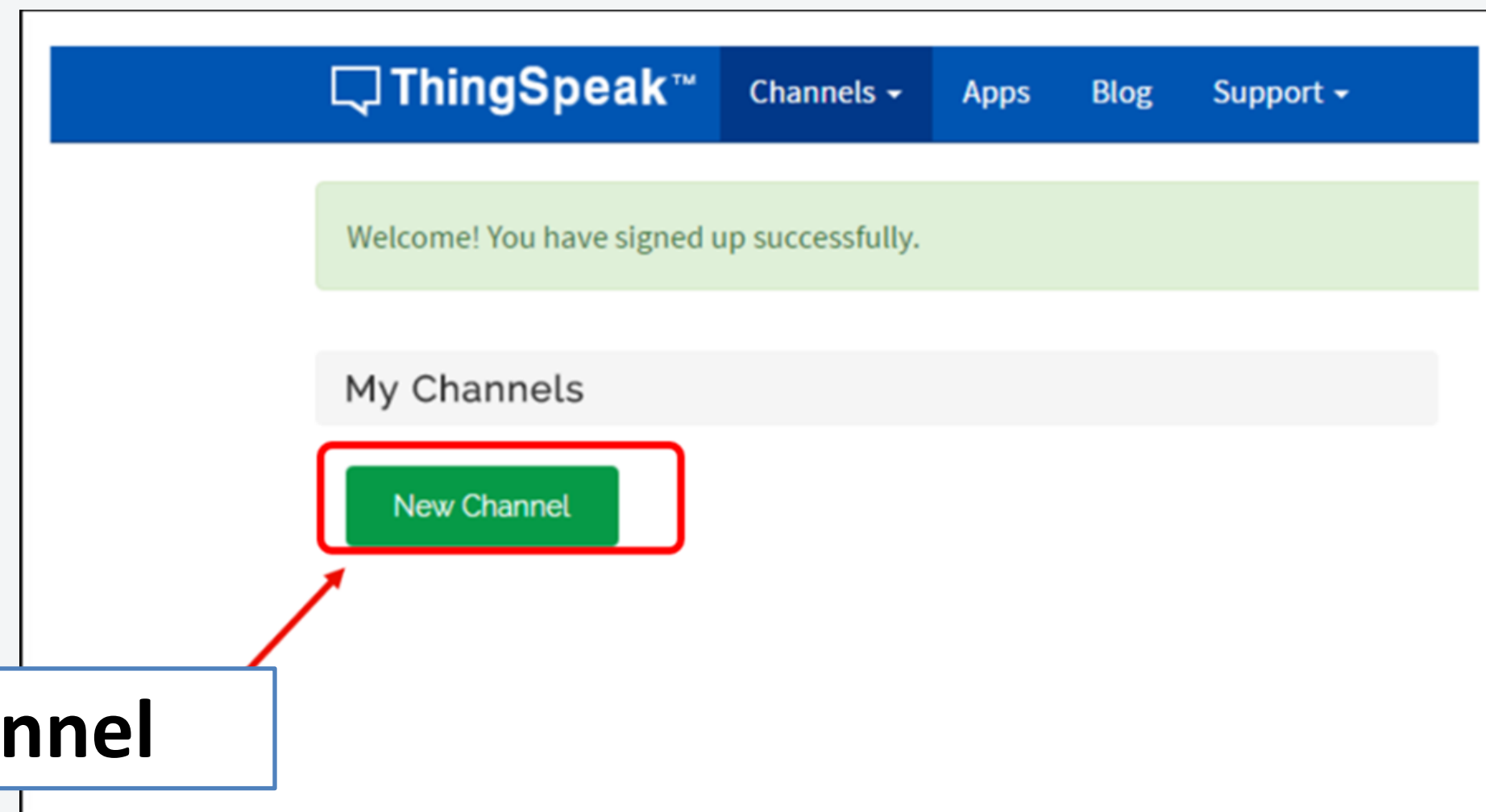
<https://thingspeak.com>

The screenshot shows the ThingSpeak website's sign-up page. The navigation bar includes 'ThingSpeak™', 'Channels', 'Apps', 'Community', 'Support', 'Commercial Use', 'How to Buy', 'Sign In', and 'Sign Up'. The main heading is 'Sign up for ThingSpeak'. Below this, a paragraph explains that signing up is free but with some limitations, and that users must create a new MathWorks account or log in with an existing one. The 'Create MathWorks Account' section contains a form with the following fields: 'Email Address' (with a red error message 'Missing required information'), 'Location' (set to 'United States'), 'First Name', and 'Last Name'. A note states: 'To access your organization's MATLAB license, use your school or work email.' To the right of the form is a diagram illustrating the data flow: 'SMART CONNECTED DEVICES' send data to a cloud labeled 'DATA AGGREGATION AND ANALYTICS ThingSpeak™', which then connects to a 'MATLAB' computer for 'ALGORITHM DEVELOPMENT SENSOR ANALYTICS'.

ThingSpeak Set Up



Step 2: 登入“ThingSpeak”後，
點擊頻道並選擇“My Channels”



Step 3: Click New Channel

ThingSpeak Set Up

New Channel

Name

IOT TESTING

Description

Field 1

Number



Field 2



Field 3



Field 4



Step 4: 輸入Channel名稱，並在“Field”中新增名稱以記錄數據，然後Save Channel

Save Channel

ThingSpeak Set Up

Private View Public View Channel Settings Sharing **API Keys** Data Import

Write API Key

Key

[Generate New Write API Key](#)

Read API Keys

Key

Note

[Save Note](#) [Delete API Key](#)

Step 5: Copy API Key

ThingSpeak Set Up

The image shows a screenshot of a Makecode block for ThingSpeak setup. The block is green and contains the following text and fields:

- connect thingspeak** (highlighted with a yellow border)
- set data to send ThingSpeak**
- Write API key =** (with a red border around the input field containing the text "6P8B4QJT45TW3BOG")
- Field 1 =** (with a dropdown menu showing "speed_cms")
- A plus sign icon (+) indicating more fields can be added.
- Upload data to ThingSpeak**
- pause (ms)** (with a dropdown menu showing "1000")

**Step 5: 拖入這些block
Paste API Key in Makecode**

完整 coding

```
on start
  set ESP8266 RX P8 TX P12 Baud rate 115200
  connect Wifi SSID = "SSID" KEY = "Password"
  if Wifi connected true then
    show icon
    pause (ms) 2000
    clear screen
```

```
on button A pressed
  reset
```

```
forever
  if analog read pin analog pin P0 >= 150 then
    set start to running time (ms)
  else if analog read pin analog pin P1 >= 150 then
    set end to running time (ms)
  set ms to end - start
  set s to ms / 1000
  set speed_cms to 30 / s
  connect thingspeak
  set data to send ThingSpeak
  Write API key = "6P8B4QJT45TW380G"
  Field 1 = speed_cms
  Upload data to ThingSpeak
  pause (ms) 1000
```



ThingSpeak Set Up

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

+ Add Visualizations + Add Widgets Export recent data

MATLAB Analysis MATLAB Visualization

Channel 4 of 4 < >

Channel Stats
Created: 7.months.ago
Last entry: 22.days.ago
Entries: 0

Field 1 Chart

dht11

temp

Date

ThingSpeak.com

Field 2 Chart

dht11

humid

Date

ThingSpeak.com

Step 6: Click Private View 睇結果

ThingSpeak Set Up

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

Import

Upload a CSV file to import data into this channel.

File No file chosen

Time Zone

Export

Download all of this Channel's feeds in CSV format.

Time Zone

Step 7: Click Download

ThingSpeak Set Up

Want to clear all feed data from this Channel?

Clear Channel

Want to delete this Channel?

Delete Channel

係Channel Settings 可以Clear Data,
或者將成個 Channel delete

ThingSpeak Public View Sharing

testing

Channel ID: 1281894

Author: mwa0000020852618

Access: Public

Private View

Public View

Channel Settings

Sharing

API Keys

Data Import / Export

Channel Sharing Settings

- Keep channel view private
- Share channel view with everyone
- Share channel view only with the following users:

Email
Address

Enter email here

Add User

Help

ThingSpeak allows you to control who can view the data in your channel. Irrespective of the settings on this tab, reading data from or writing data to the fields of a channel requires the appropriate API key for the channel.

Channel Sharing Settings

- **Keep channel view private:** Selecting this option keeps your channel private. Only you will be able to see the channel view.
- **Share channel view with everyone:** Selecting this option makes the public view of your channel viewable by anyone browsing the ThingSpeak website.
- **Share channel view only with the following users:** Selecting this option shares the private view of your channel only with specific ThingSpeak users.

請掃描以下二維碼填寫意見表，
謝謝！

School-based PD Workshop - Application of IoT:bit for Data logging

**Speaker: Ms. Lam Hong Ching Anastasia
Research Assistant I**

