

micro:bit x SDGs

BBC micro:bit 基礎應用



代理產品

官方代理最新版BBC micro:bit及Raspberry Pi樹莓派基金會原廠產品；並與全球同步供應國際STEAM教育品牌:幼教小教、國高中、大專院校師培各階段所需之系列產品。



教學資源

本平台彙集國際STEAM教育品牌之官方課程教案，更提供相關教學創意教案、跨領域應用教案、產品開箱教學心得、各類型輔助教學影片及資源。



過往實績

推動STEAM教育發展之相關活動紀錄，包含:主辦及協辦之活動、創客展、黑客松、資訊展、教育展、教師研習、營隊舉辦、圖書館課程、師資培訓、志工培訓。



媒體報導

台灣STEAM教育發展最新報導及本公司與各單位機關部會所產出之相關合作成果媒體社群報導。



最新消息

台灣最新STEAM資訊教育活動資訊；並同步提供BBC micro:bit、Raspberry Pi樹莓派、國際STEAM教育品牌最新官方訊息。



官方授權台灣直營代理商 官方授權台灣直營代理商
Taiwan Official Listed Reseller Taiwan Official Approved Reseller

【STEAM教具代理品牌】

奧斯丁教育團隊OURSTEAM in EDUCATION



✓ BBC micro:bit及Raspberry Pi樹莓派基金會官方授權台灣直營代理商



✓ 同步代理經銷多項國際STEAM教育品牌商品，提供教育單位從幼教小教、國高中、大專院校乃至師培等各階段所需之全系列產品服務。



類別選單
所有資源
教師研習
大學生科技英文師資培訓
主題營隊課程
社團課程
線上課程
Micro:bit主板教案分享
Micro:bit延伸套件教案分享
AI 智能小車(AI 識別鏡頭、Cutebot、TPBot、Ringbit car)
Raspberry Pi樹莓派系列
不插電系列桌遊
STEAM系列教案分享



含中文教學陳述。

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2020.10 Micro:bit主板教案分享

最新BBC micro:bit V2 - micro bit v...
Makecode 編碼 利用新的micro:bit功能構建一些有趣的項目。項目1 - 麥

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2021.01 Micro:bit延伸套件教案分享

Smart Coding Kit 智慧編碼套件_應...
介紹 ElecFreaks Smart Coding Kit是一套以micro:bit鈕扣電池擴充板為基

07
2021.01 Micro:bit延伸套件教案分享

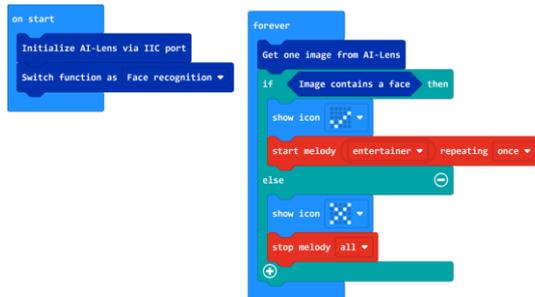
Smart Science IOT:Kit物聯網科學...
雲端平台四部曲 x 第三部 KidsIoT指南 KidsIoT是ElecFreaks生產的IoT (互聯

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2021.08 STEAM系列教案分享

Cubetto Playset 小方頭機器人介紹...
Cubetto Playset 小方頭編碼機器人 是獲殊榮的編碼產品，可以幫助3-6歲的



含圖形化程式內容。



含操作示例圖。



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類別選單	
	所有資源
	教師研習
	大學生科技英文師資培訓
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	社團課程
	線上課程
	Micro:bit主板教案分享
	Micro:bit延伸套件教案分享
	AI 智能小車(AI 識別鏡頭、Cutebot、TPBot、Ringbit car)
	Raspberry Pi樹莓派系列
	不插電系列桌遊
	STEAM系列教案分享

【科技英文師資】_培訓優勢

 豐富跨領域學習歷程，增加畢業後的就業競爭力

臺北資訊跨領域應用課程

BBC micro:bit V2

課程目標：了解如何應用英語結合程式語言撰寫教案，以雙語進行課程教學，並能獨立完成專案作業。

主要教授對象為老師以及大學生，負責教案發想，並擔任師資培訓專員。

西苑高中跨領域科技應用課程

BBC micro:bit V2

課程目標：了解如何應用英語結合程式語言撰寫教案，以雙語進行課程教學，並能獨立完成專案作業。

主要教授對象為老師以及大學生，負責教案發想，並擔任師資培訓專員。



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科技英文師培訓【LEVEL 3】

LEVEL 3 - 18HR

師培師資培養

培訓目標：了解如何應用英語結合程式語言撰寫教案，以雙語進行課程教學，並能獨立完成專案作業。

主要教授對象：為老師以及大學生，負責教案發想，並擔任師資培訓專員。

培訓資格：完成LEVEL 1、LEVEL 2培訓後，於LEVEL 3培訓課程進行獨立考卷。

考核內容：在已設定的主題下獨立完成教案撰寫模式設計，並搭配雙語進行課堂教學，需具備培養種子師資之能力。



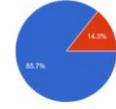

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虎尾科技大學-【應外系 Level 1 科技英文師資線上培訓】

擔任科技英文助教講師_信心度

透過此培訓後，是否有信心可擔任科技英文助教講師?

14 位回應




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零基礎_BBC micro:bit 3小時/6小時

學會運用科技能力解決SDGs真實問題

micro:bit

Round 6: micro:bit x SDGs 聯合國永續發展目標




動物保護議題 - 救救白虎大作戰!

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micro:bit
LISTED RESELLER



Raspberry Pi
APPROVED RESELLER

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【關於我們】 - 過往實績 | 媒體報導 | 最新消息

類別選單

所有訊息

奧斯丁教育團隊 OURSTEAM in EDUCATION

媒體報導 (相關合作成果媒體社群報導)

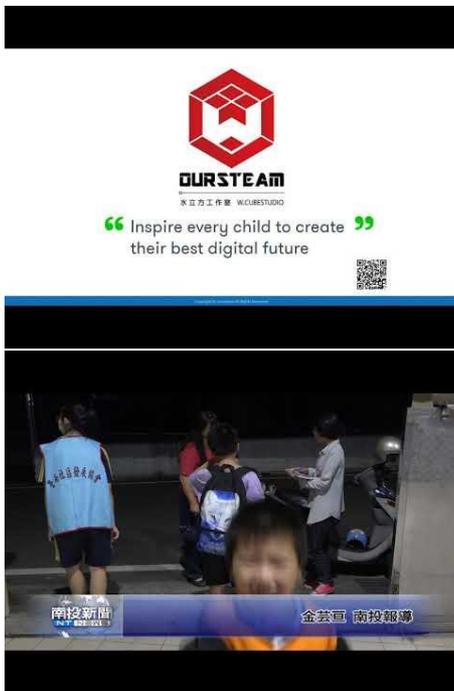
過往實績 (推動STEAM教育發展之相關活動紀錄)

BBC micro:bit 教育基金會官方消息

Raspberry Pi 樹莓派基金會官方消息



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OURS TEAM

我們的 團隊



OUR

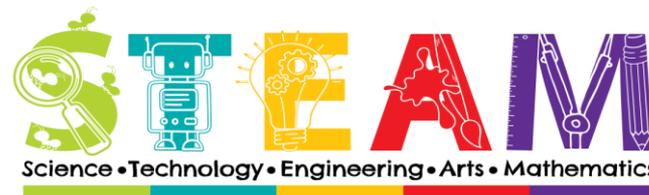
我們的

STEAM



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Taiwan Official Approved Reseller



【STEAM是什麼？多元領域 / 跨領域教育！】

STEAM教育是一種跨學科教育



Science



Technology



Engineering



Arts



Mathematics

+ ENGLISH
FOR EVERYONE

Science Activities

- Weather demos
- Observe living things
- Physical and chemical changes
- Body science



Technology Activities

- Exploring tools
- Book apps and games
- Content creation
- Chain reaction machines



Arts Activities

- Process vs. product
- Open-ended
- Let kids pick the media
- Encourage exploring the media
- Display creations



Engineering Activities

- Building projects
- Sink and float structures
- "How it Works" investigations
- Fixing/repurposing broken toys



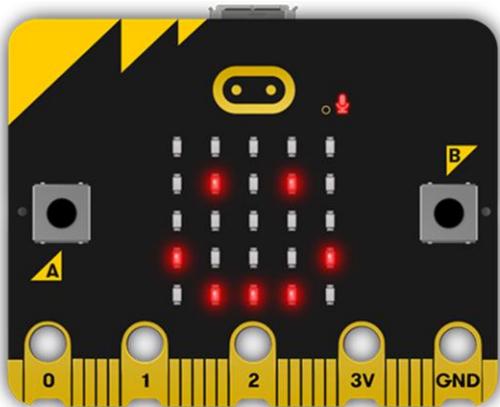
Math Activities

- Compare & contrast
- Identify & create patterns
- Sorting stations
- Shape scavenger hunt



【micro:bit x SDGs】 - 透過**聯合國SDGs**真實問題以**PBL**方式讓孩子們運用**科技能力**在全球發展

THE GLOBAL GOALS
For Sustainable Development



- ✓ **SDGs**全球可持續發展目標，是17個相互關聯的目標的集合，聯合國所有**193**個成員國在**2015**年都同意採取行動。
- ✓ 這是有史以來最雄心勃勃的國際協議，旨在消除貧困和不平等，保護健康和防止氣候變化等全球議題。

【教育部 x micro:bit x SDGs】 -

根據教育部結合聯合國永續發展目標SDGs所推出的
台灣指南- Learn SDGs For Taiwan Schools，以PBL專案發想方式，
體驗STEAM教育核心。



永續發展目標 (SDGs)
教育手冊
臺灣指南

2030
SUSTAINABLE
DEVELOPMENT
>>>>>>>>



Learn SDGs
For Taiwan Schools



【成功大學結合SDGs 影響力排名奪得全球第五】

以聯合國17項永續發展指標（SDGs）作為評分依據的2021世界大學影響力排名結果近日出爐，論文資料庫系統公司愛思唯爾（Elsevier）分析發現，此排名評比全球1240所大學，我國今年有35所大專院校參與排名，最後全數上榜，去年僅24校上榜。

愛思唯爾指出，17項永續發展指標中，我國大專校院在第三項「健康與福祉」、第七項「可負擔的永續能源」、第九項「工業化、創新及基礎建設」三項表現佳。高雄醫學大學等六所大學在「健康與福祉」排名全球前百；成功大學在「工業化、創新及基礎建設」排名全球第五，主因是該項評分以專利引用、產學合作為依據，成大表現亮眼。

成大奪大學影響力排名全球第五 論文公司點出2原因

2021-04-28 18:37 聯合報 / 記者潘乃欣 / 台北即時報導

+ 成功大學



聯合國17項永續發展目標。圖／取自undp.org

do your :bit

A micro:bit digital challenge for the Global Goals

Winners

Check out our amazing previous winners.



2021 winners

Find out more about the winners from do your :...

[Read more](#)



2020 winners

Read about their solutions

[Read more](#)



2019 winners

Find out about their entries

[Read more](#)



The do your :bit challenge is open from now **until 15 July 2022**
<https://microbit.org/projects/do-your-bit/>

【全球創意挑戰賽】

- do your:bit

A micro:bit digital challenge for the Global Goals



- ✓ 透過**micro:bit**基金會發起的**do your:bit**創意挑戰賽，學生可以將所習得的科技能力結合全球目標SDGs，為學習課程提供**具有國際觀**的啟發性活動。
- ✓ 學生也將了解到如何將學習到的科技能力，轉化成改變世界的想法和真實問題的解決方案，培養出**科技融入生活的核心素養**。

【全球創意挑戰賽】 - do your:bit 參賽辦法

2022年(今年)7月15日前，

- 不限制使用軟硬體及運作方式，
- 線上提交對於**解決SDGs創意想法及手繪稿(A4 size)**即可參賽!!!
- **08歲-14歲**，**15-18歲**的孩子將依據年齡參加評比創意提案。

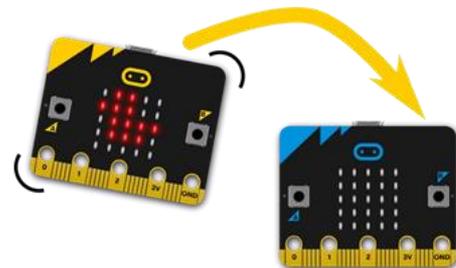
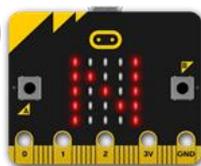
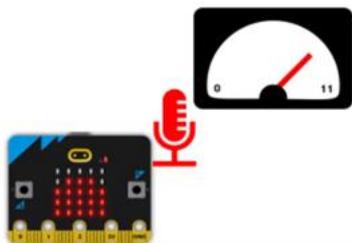
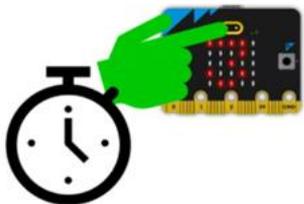
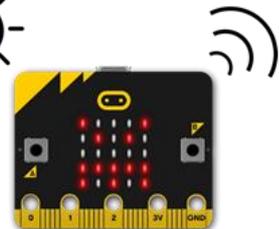
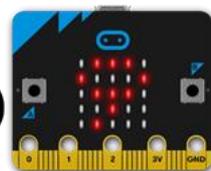
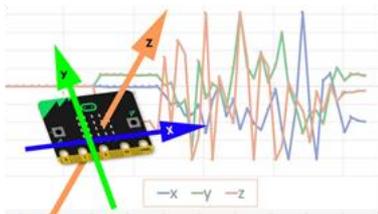
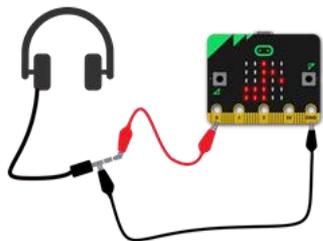
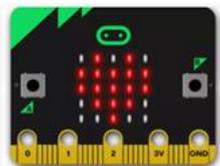
※2022年度SDGs的創意挑戰主題**任選**。

詳細比賽辦法: <https://microbit.org/projects/do-your-bit/challenge/>

2021年do your bit winners: <https://microbit.org/projects/do-your-bit/winners/2021/>



我們該如何利用micro:bit V2主板上的感測及輸出功能進行教案發想呢：
按鈕、觸控、動作偵測、溫度、亮度、磁性、收音、喇叭、燈光、廣播通訊。
有哪一項的功能，是比較有機會可以結合到現有的教學內容中呢？



【全球創意挑戰賽】 - micro:bit V2 x SDGs

目標3.良好健康與社會福利



用micro:bit

- 1.增加對運動的興趣
- 2.協助暖身及運動次數確實



+

=

學生能夠確實鍛鍊體能
減少過重和肥胖、運動不足

【全球創意挑戰賽】 - micro:bit V2 x SDGs

目標13.氣候行動



使用MCU微型處理器監測環境植物



邁向永續發展的環境

【Do your bit 參賽證書】

透過台灣官方活動單位提交作品的參賽者，也將獲得由

●BBC micro:bit教育基金會、●英國文化協會、●聯合國兒童基金會
所共同核發的2022年度 Do your bit 紙本參賽證書!!!



- 學習成果導向
- 參與國際賽事
- 增加學習歷程

2021 micro:bit 全球SDGs創意挑戰賽 - Do your bit

全台提交300多件作品，產出亞太區冠軍-台南市東區大同國小



do your :bit

A micro:bit digital challenge for the Global Goals



Partnering with



2021年 Winner 亞太區 冠軍

Asia and Pacific

Taiwan

Cheng-En, Ko-Hsin and Zi Qing realised that rapid climate change was contributing to rising water levels, putting birds who previously relied on the river for their habitats in danger. Using the micro:bit, the 'Best birds guardian' senses rising water and pulls the birds' nest to safety on the river shore.



透過觀察學校旁的竹溪因氣候變遷水位暴漲，造成鳥類築巢棲地問題，所構思提出的鳥巢守護者作品

協同高公局、統一超商於泰安服務區北站，公開發表展覽全國36組台灣區優選作品

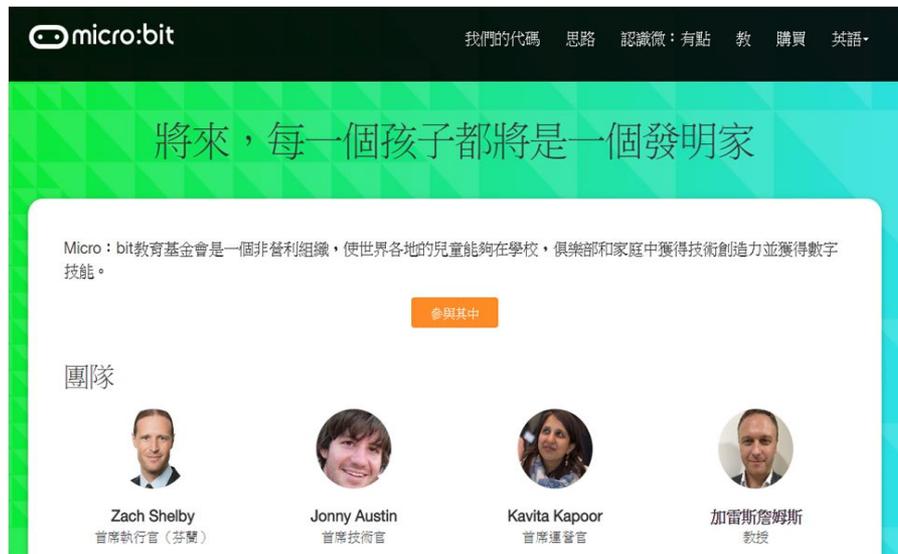


協同高公局、統一超商於仁德服務區北上，全球2019-2022冠軍作品特展



【BBC micro:bit使用率】 -

2016年英國發起至今已有**60幾個國家**、超過**2500萬人**使用micro:bit。
2025年目標：**1億人**可以接觸到micro:bit，利用科技影響他們的生活。



The screenshot shows the micro:bit website interface in Chinese. At the top, there is a navigation bar with the micro:bit logo and the text "我們的代碼 思路 認識微：有點 教 購買 英語". Below this is a large green banner with the headline "將來，每一個孩子都將是一個發明家". Underneath the banner, there is a paragraph of text: "Micro:bit教育基金會是一個非營利組織，使世界各地的兒童能夠在學校、俱樂部和家庭中獲得技術創造力並獲得數字技能。" To the right of this text is an orange button that says "參與其中". Below the text and button is a section titled "團隊" (Team) which features four circular profile pictures of team members with their names and titles below them: Zach Shelby (首席執行官 (芬蘭)), Jonny Austin (首席技術官), Kavita Kapoor (首席運營官), and 加雷斯詹姆斯 (教授).



【BBC micro:bit 沿革】

-Micro:bit的宗旨是為了在校園促進數位素養。憑藉1981、40年前英國BBC micro教育經驗，讓英國11~12歲的孩子開始接觸資訊教育，此舉也讓英國的資訊產業在世界佔有重要的地位。

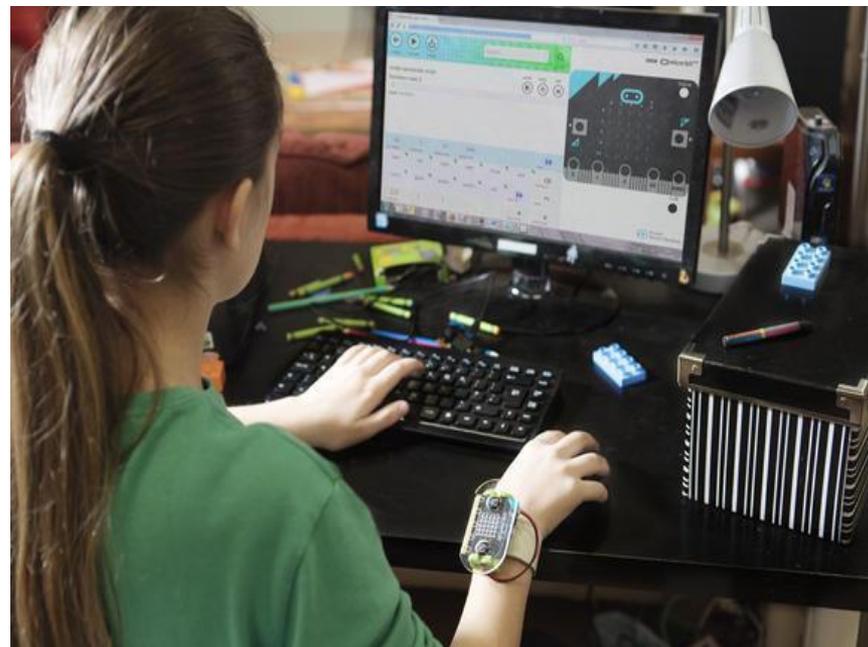


【最新科技教具】-BBC micro:bit

微型電腦40年大躍進 - 體積縮小百倍，效能倍增百倍



theguardian



BBC Micro

BBC micro:bit

【BBC micro:bit】 - 教育計畫創始夥伴

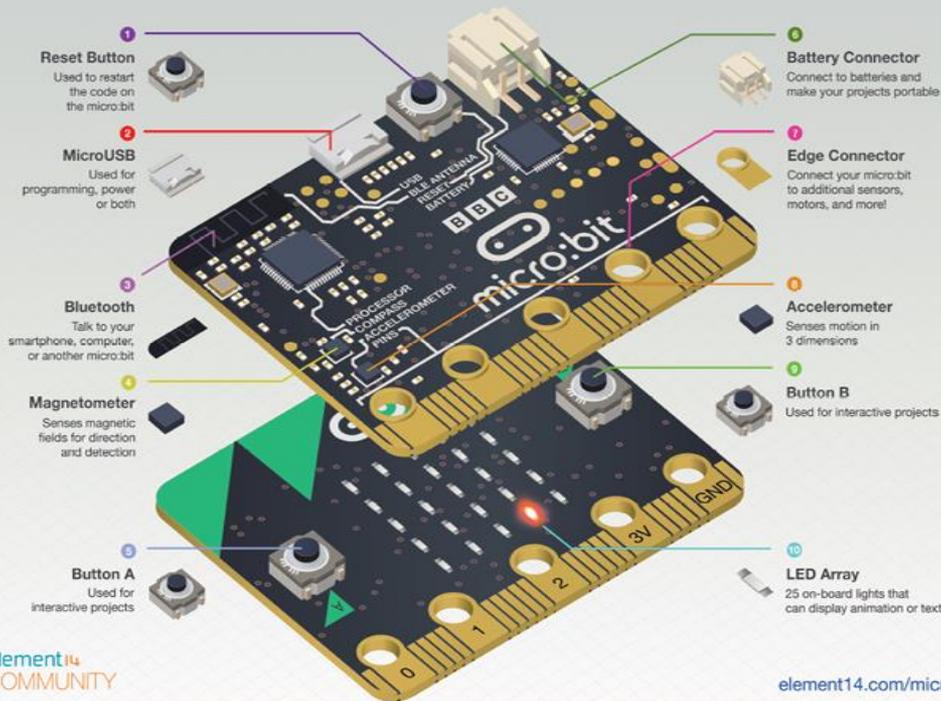
The logo for ARM, consisting of the letters "ARM" in a bold, blue, sans-serif font.The Amazon logo, featuring the word "amazon" in a lowercase, black, sans-serif font with a curved orange arrow underneath it.The BBC logo, consisting of the letters "BBC" in white, bold, sans-serif font, each letter inside a black square.The British Council logo, featuring four blue circles arranged in a 2x2 grid to the left of the words "BRITISH COUNCIL" in a blue, sans-serif font.The IET logo, featuring the letters "IET" in a bold, black, sans-serif font, with "The Institution of Engineering and Technology" written in a smaller font below it.The Lancaster University logo, featuring the words "Lancaster University" in a black, serif font, with the university's crest to the right.The Microsoft logo, featuring the four-color square icon to the left of the word "Microsoft" in a grey, sans-serif font.The NOMINET logo, featuring a stylized "N" icon to the left of the word "NOMINET" in a teal, sans-serif font.The Samsung logo, featuring the word "SAMSUNG" in white, bold, sans-serif font, inside a blue oval.

【BBC micro:bit】 - 五大專案應用



The BBC micro:bit

A pocket-sized, codeable ARM based computer designed for computer education. With a built-in compass, motion detection and Bluetooth technology. With an ambition to inspire digital creativity to develop a new generation of tech' pioneers in collaboration with the element14 Community.



PICK YOUR PROJECT

Fitness Tracker

Requires the use of:

- 1 Accelerometer
- 10 LED Array

Gaming

Requires the use of:

- 5 Button A
- 9 Button B
- 10 LED Array

Metal Detector

Requires the use of:

- 4 Magnetometer
- 10 LED Array

Door Bell / Alarm

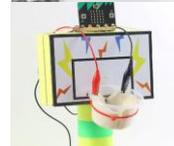
Requires the use of:

- 3 Bluetooth
- 8 Accelerometer
- 10 LED Array

Robotics

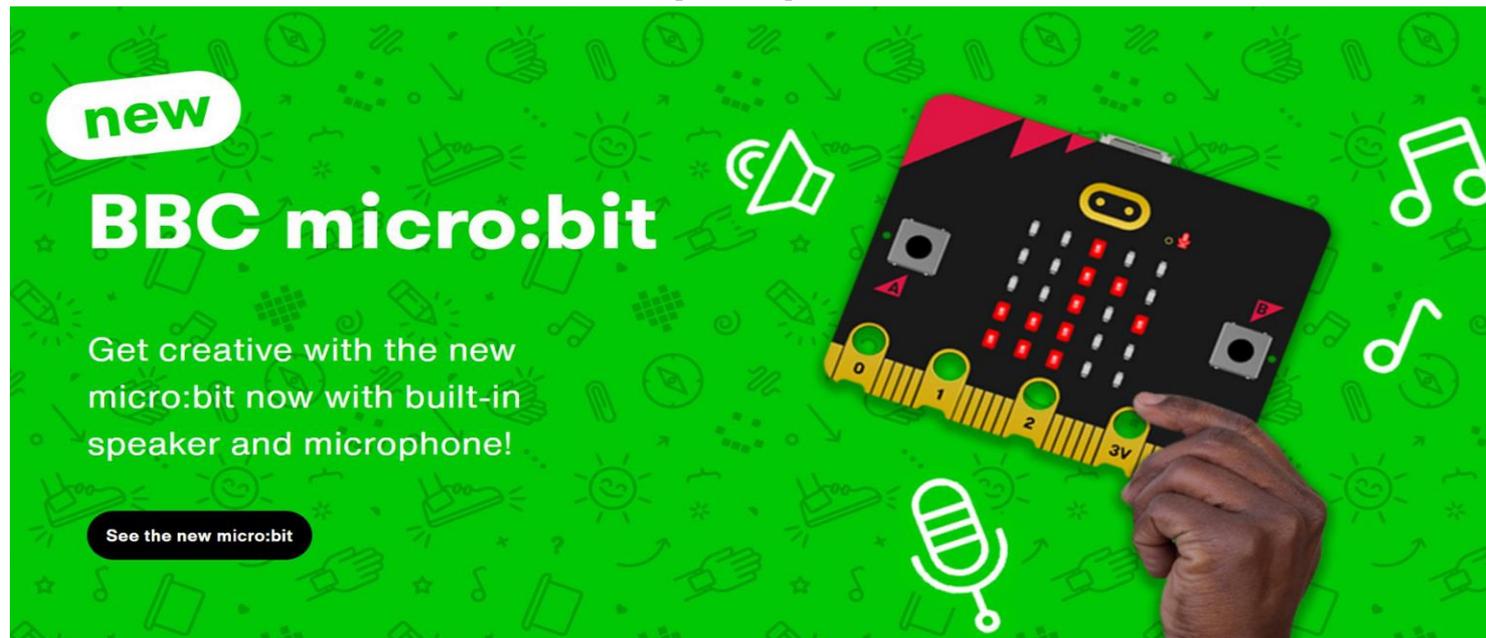
Requires the use of:

- 5 Button A
- 6 Battery
- 9 Button B
- 3 Bluetooth
- 8 Accelerometer
- 7 Edge Connector



【最新科技教具】-好簡單，好上手，好好玩!

BBC micro:bit V2 10/13/2020 06:30全球同步發布!!!

A promotional graphic for the BBC micro:bit V2. The background is a vibrant green with a repeating pattern of white icons representing various educational fields like science, music, and technology. In the center, a hand is shown holding a black micro:bit board, which features a 5x5 grid of red LEDs, a speaker, and a microphone. The board is angled towards the viewer. To the left of the board, the word 'new' is written in a white rounded rectangle. Below it, the text 'BBC micro:bit' is displayed in large white font. Further down, a paragraph of text reads 'Get creative with the new micro:bit now with built-in speaker and microphone!'. At the bottom left, a black button contains the text 'See the new micro:bit'. The overall design is clean and modern, emphasizing the board's new features and educational potential.

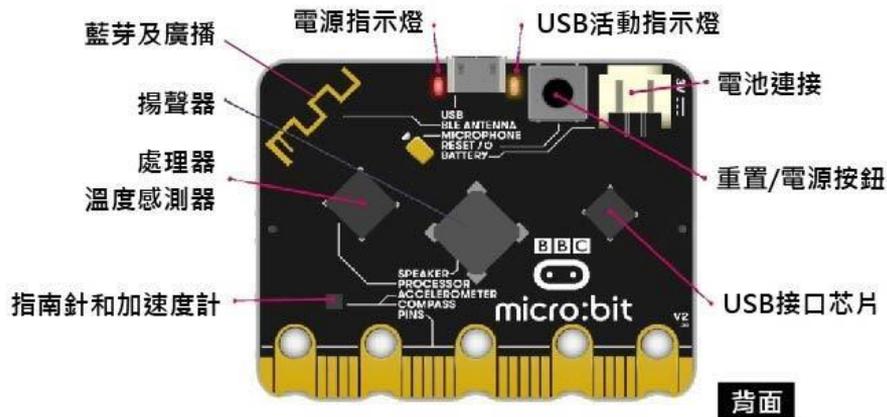
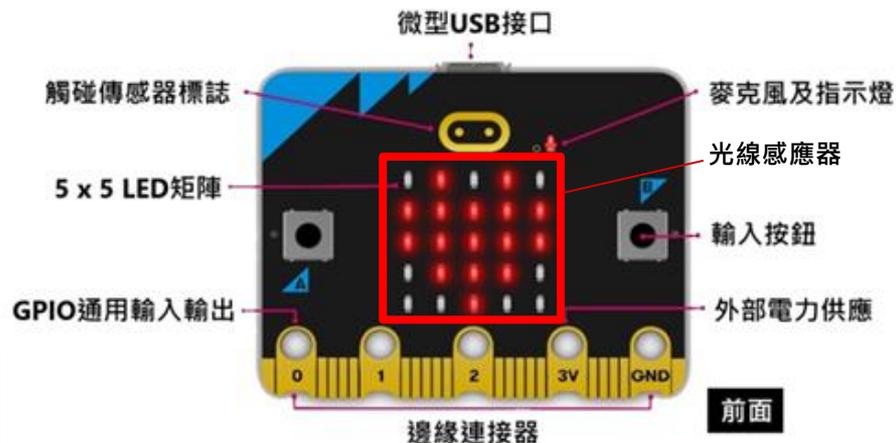
new

BBC micro:bit

Get creative with the new micro:bit now with built-in speaker and microphone!

See the new micro:bit

認識 micro:bit V2



最新版本V2具備多重感測器：

三軸加速度體感應用、溫度感測器、磁力感測器、聲音感測器、電容式觸控LOGO、光線感應器、藍牙及無線電廣播功能、可編程LED燈及按鈕。

micro:bit V2_ 開箱闖關體驗

※六道關卡帶您認識micro:bit實用功能



[Out of box experience](#)
體驗程式載點

1. **您好！** 會跑出HELLO字母+微笑圖案

2. **按下按鍵** micro:bit會透過箭頭指向引導您按下A按鍵和B按鍵

3. **搖一搖**

會跑出SHAKE字母，請您搖動micro:bit，它具有加速度計能夠感測您搖晃的力量！

4. **傾斜：追逐點點**

會跑出TILT字母，請您透過傾斜去碰撞在原地發亮的點點

5. **聲音感測：拍手**

會跑出CLAP字母，當micro:bit評斷您的拍手達5分，會跑出WOW字母，代表您過關！

※結束這5道關卡後，當您看到愛心動畫時，請同時按下A+B鍵，即可解鎖第六關



micro:bit V2_ 開箱闖關體驗

※六道關卡帶您認識micro:bit實用功能

6.貪吃蛇遊戲

您是會移動的亮點，請透過傾斜去追逐在原地發亮的點點。

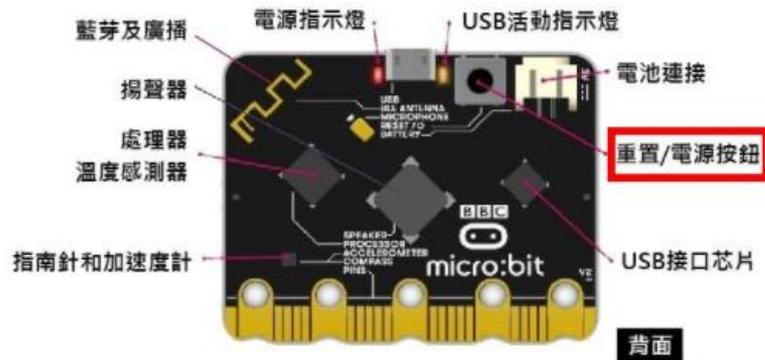
溫馨提醒：

當撞到自己的身體就會秀出跑出GAME OVER! SCORE:分數，接著將重新開始遊戲。

※要結束此關卡有兩種方式：

- (1)長按5秒重置按鈕(如右圖)即進入睡眠模式，micro:bit會閃紅燈提示睡眠中(再按一下即喚醒)。
- (2)將寫好的新程式下載到micro:bit。

※要重新體驗則請按一下重置按鈕。



micro:bit V2_供電方式

1.使用USB線連接到電腦
(透過MICRO USB孔位供電)



2.KSB046專用鋰電池擴充背板
(透過V2鍍銅GPIO金手指處的腳位供電)

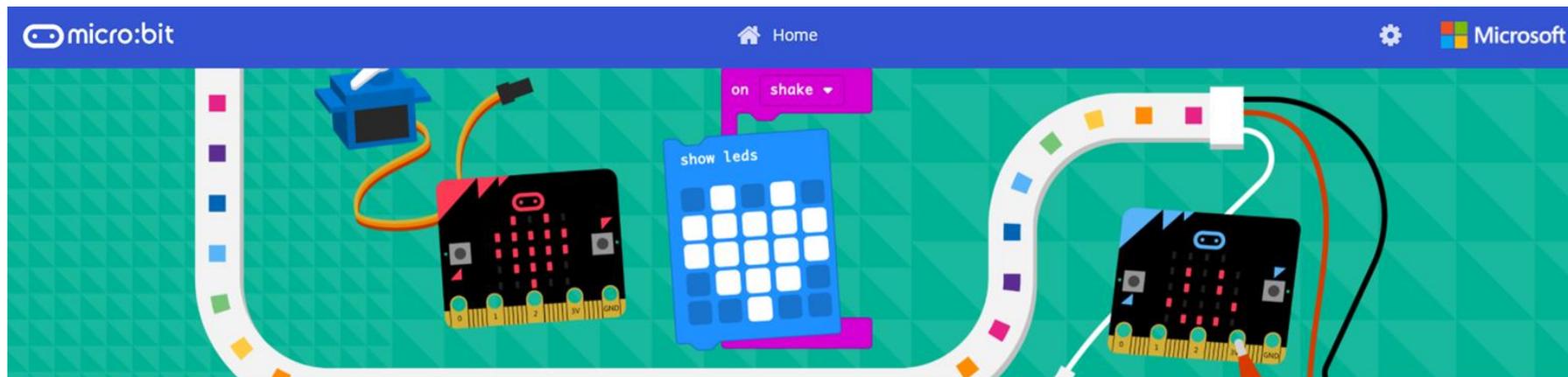


3.micro:bit專用附開關電池盒
(透過JCT電源接頭供電)

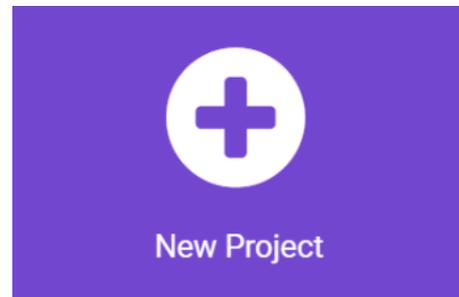


※使用2顆4號電池AAA

認識Makecode (輸入網址：makecode.microbit.org)



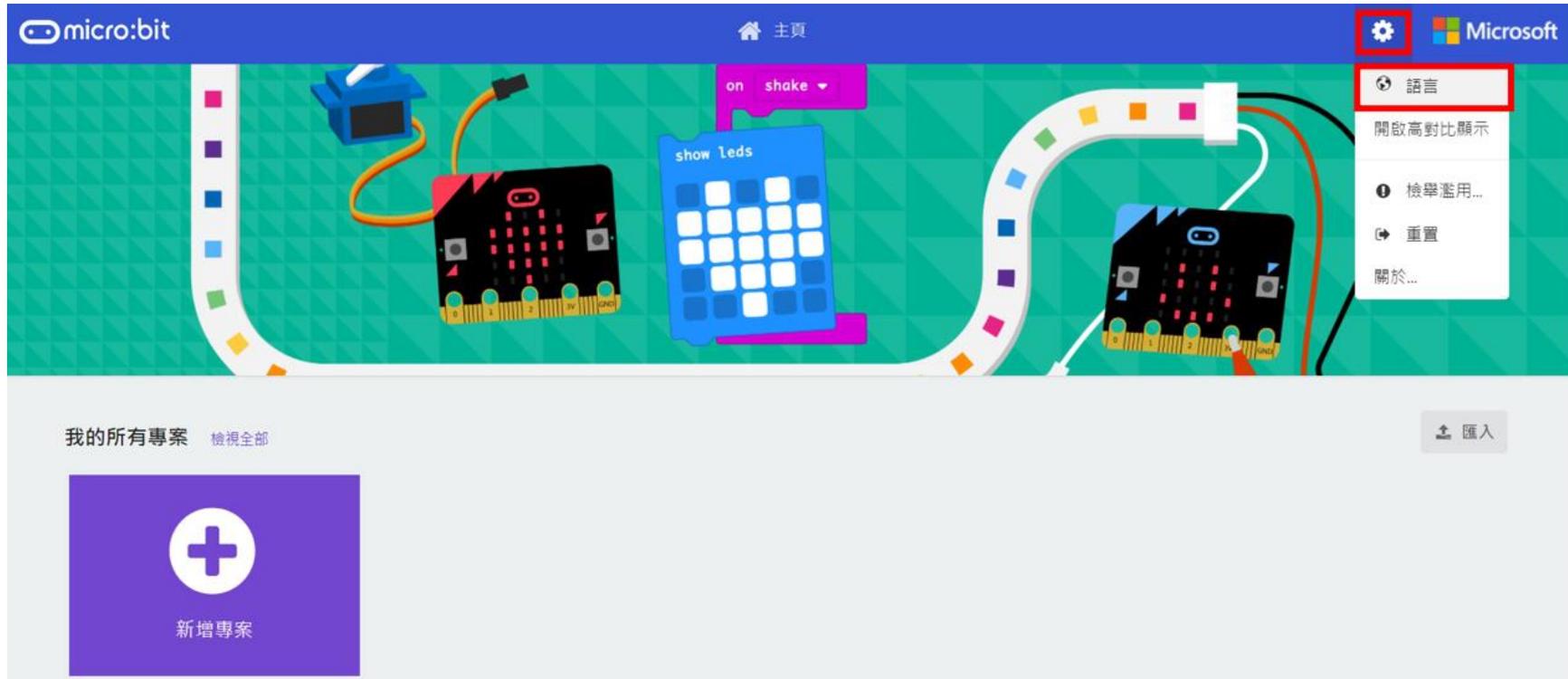
Microsoft MakeCode是以積木為基礎的編程環境，直覺式的操作搭配強大的功能，可以讓micro:bit對於各種輸入做出反應，並能切換為JavaScript、Python，是非常助於學習編程的免費平台。



Makecode_將語言更改為English (makecode.microbit.org)

※請檢查您頁面呈現的語言，確保它是**英文版**。

如果為**中文版**，請參考下圖：按右上方的**"齒輪"**並點選**"語言"**進行修改。



The screenshot displays the Makecode website interface. At the top left, the 'micro:bit' logo is visible. In the top right corner, there is a gear icon for settings and the Microsoft logo. A red box highlights the gear icon, and another red box highlights the '語言' (Language) option in the settings dropdown menu. Other options in the menu include '開啟高對比顯示', '檢舉濫用...', '重置', and '關於...'. Below the settings menu, the text '我的所有專案' (All my projects) is followed by a link '檢視全部' (View all). A large purple button with a white plus sign and the text '新增專案' (Add project) is also visible.

編程模式：Blocks/JavaScript/Python

The image shows the Microsoft MakeCode editor interface for the micro:bit. A modal dialog titled "Create a Project" is open in the center. The dialog has a close button (X) in the top right corner. Below the title, it prompts the user to "Give your project a name." with an empty text input field. Underneath, there is a section for "Code options" with a dropdown menu. The dropdown is currently open, showing three options: "Blocks, JavaScript, and Python" (which is highlighted in blue), "Python Only", and "JavaScript Only". At the bottom right of the dialog is a green "Create" button with a checkmark icon. The background of the editor is slightly dimmed, showing the "micro:bit" logo, a "Home" button, a settings gear, and the Microsoft logo in the top navigation bar. On the left, there is a "My Projects" section with a "View All" link and a large purple "New Project" button with a plus sign icon. On the right, there is an "Import" button and a project card labeled "未命名" (unnamed) with a "9 days ago" timestamp.

Makecode 一鍵轉換到JavaScript

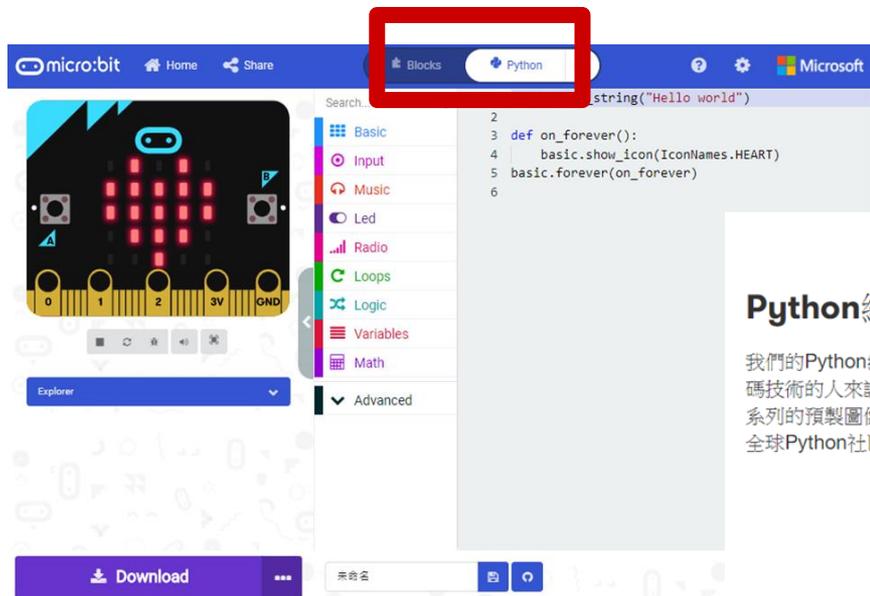
The image displays two side-by-side screenshots of the Makecode editor interface, illustrating the process of switching from the Blocks view to the JavaScript view.

Left Screenshot (Blocks View): The top navigation bar shows the 'Blocks' tab selected. A red box highlights the 'Blocks' button. The main workspace contains a 'show string' block with the text 'Hello world' and a 'forever' loop containing a 'show icon' block.

Right Screenshot (JavaScript View): The top navigation bar shows the 'JavaScript' tab selected. A red box highlights the 'JavaScript' button. The main workspace displays the corresponding JavaScript code:

```
1 basic.showString("Hello world")
2 basic.forever(function () {
3     basic.showIcon(IconNames.Heart)
4 })
5
```

Makecode一鍵轉換到Python

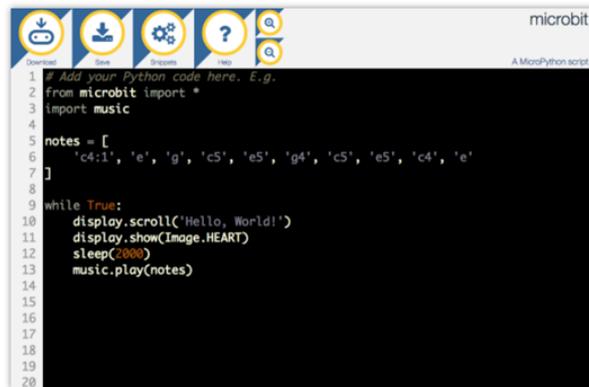


Python編輯器

我們的Python編輯器對於那些想進一步推動編碼技術的人來說是完美的。一系列的片段和一系列的預製圖像和音樂可以幫助您的代碼。由全球Python社區提供支持。

我們的代碼

參考



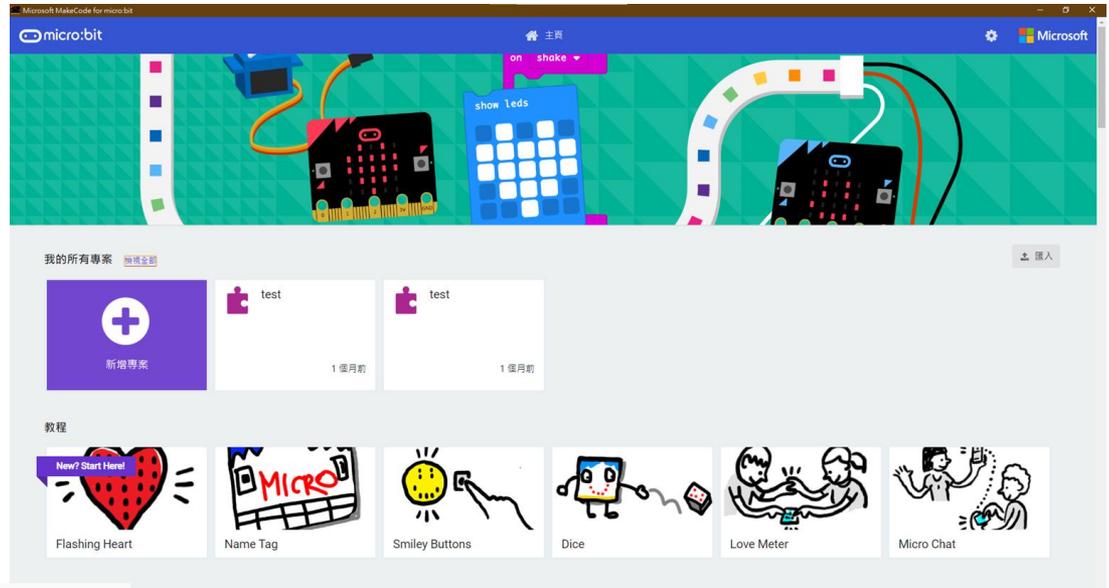
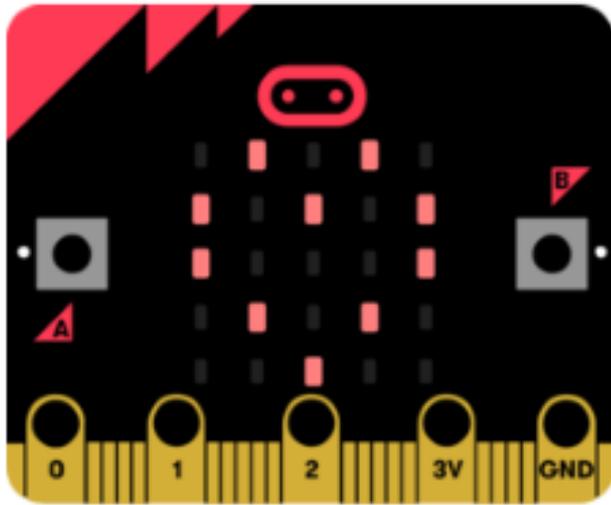
Android和iOS應用程式



微：微軟應用程式讓您可以使用藍牙無線方式將代碼發送到微處理器。不需要線索 詳細了解如何使用Android和iOS應用。

Makecode Offline 離線編程介面

(<https://makecode.microbit.org/offline-app>)



Windows

[makecode-microbit-setup-win64.exe](#)

Mac OS

[makecode-microbit-mac64.zip](#)

micro:bit classroom 線上教室

優勢：

- (1) 能夠觀看**每一位學生**的程式編輯過程。
- (2) **教師端**可以**一鍵傳送程式**給所有學生，或是傳送給指定的學生。

micro:bit | classroom - Beta

Make programming lessons more productive

Easily manage students' work when programming the BBC micro:bit

View more

Set up your classroom

Begin your classroom set-up below. Once you've launched your classroom session you will have the option to add your own code to the classroom editor to share with your students.

Name your activity

Give your new activity a name...

Choose a programming language

MakeCode Python

Select storage setting

Use temporary local storage ?

Launch classroom

教師端創建教室請至：

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



micro:bit classroom 線上教室_教師端創建三步驟

教室創建網站：

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

提醒：教室主要用於檢視學生的程式編寫情況，一間教室以**30名學生**為主，當學生人數較多，請新增第二間micro:bit classroom教室。



Set up your classroom

Begin your classroom set-up below. Once you've launched your classroom session you will have the option to add your own code to the classroom editor to share with your students.

Name your activity

Give your new activity a name...

1.為教室命名

Choose a programming language

MakeCode Python

2.選擇MakeCode

Select storage setting

Use temporary local storage ?

3.按下創建教室鈕

Launch classroom

micro:bit classroom 線上教室_取得教室密碼

※完成教室創建後，點選右上角的**Dashboard**，就能取得教室密碼，並將此畫面截圖分享給學生。
※在左下角處，教師可以隨時掌握教室人數，確認已進教室的學生是哪幾位。

The screenshot shows the micro:bit classroom dashboard. At the top, there is a navigation bar with 'micro:bit | classroom - Beta' on the left and 'Instructions Editor **Dashboard** Student code Save classroom' on the right. Below the navigation bar is a green notification bar that says 'Ask students to use these details to join the classroom and start the coding activity. They can click the I've finished button when they've completed the activity.' with a close button (X). Below the notification bar is a toggle switch for 'Collapse joining details' (off) and 'Expand joining details' (on). The main content area is titled 'Classroom joining details' and includes the instruction 'Open the URL and enter the classroom name and PIN'. There are three rows of information: 'Go to URL' with the value 'microbit.org/join', 'Classroom name' with the value 'Lime Dog Bicycle Trophy', and 'PIN' with the value '321780'. At the bottom left, there is a red-bordered box containing '3 Students have joined' with a party popper icon. Below this box are three student status cards: 'Student A In progress', 'Student B In progress', and 'Student C In progress', each with an edit icon.

micro:bit | classroom - Beta Instructions Editor **Dashboard** Student code Save classroom

Ask students to use these details to join the classroom and start the coding activity. They can click the I've finished button when they've completed the activity. ×

Collapse joining details Expand joining details

Classroom joining details

Open the URL and enter the classroom name and PIN

Go to URL microbit.org/join

Classroom name Lime Dog Bicycle Trophy

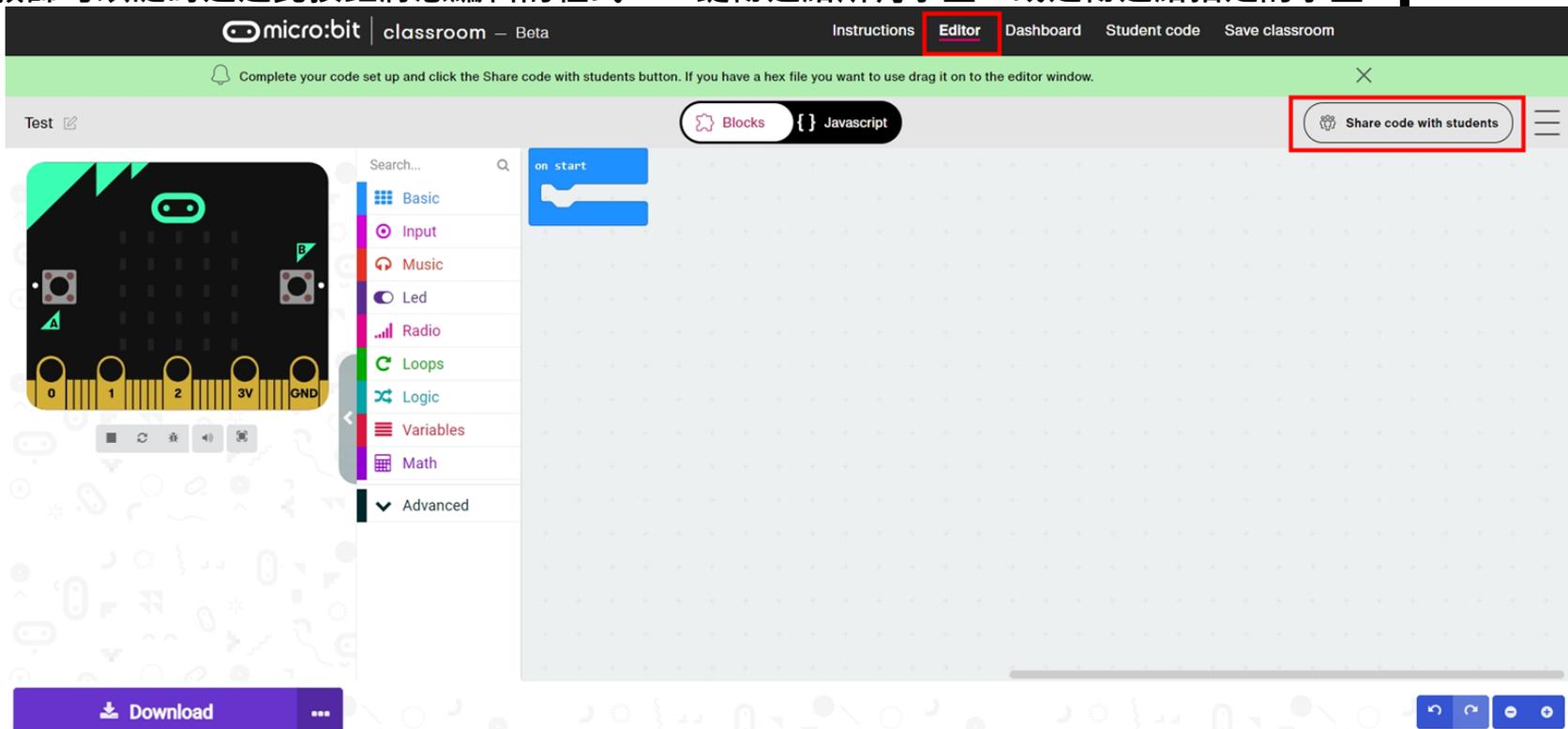
PIN 321780

3 Students have joined 🎉

Student A Student B Student C
In progress In progress In progress

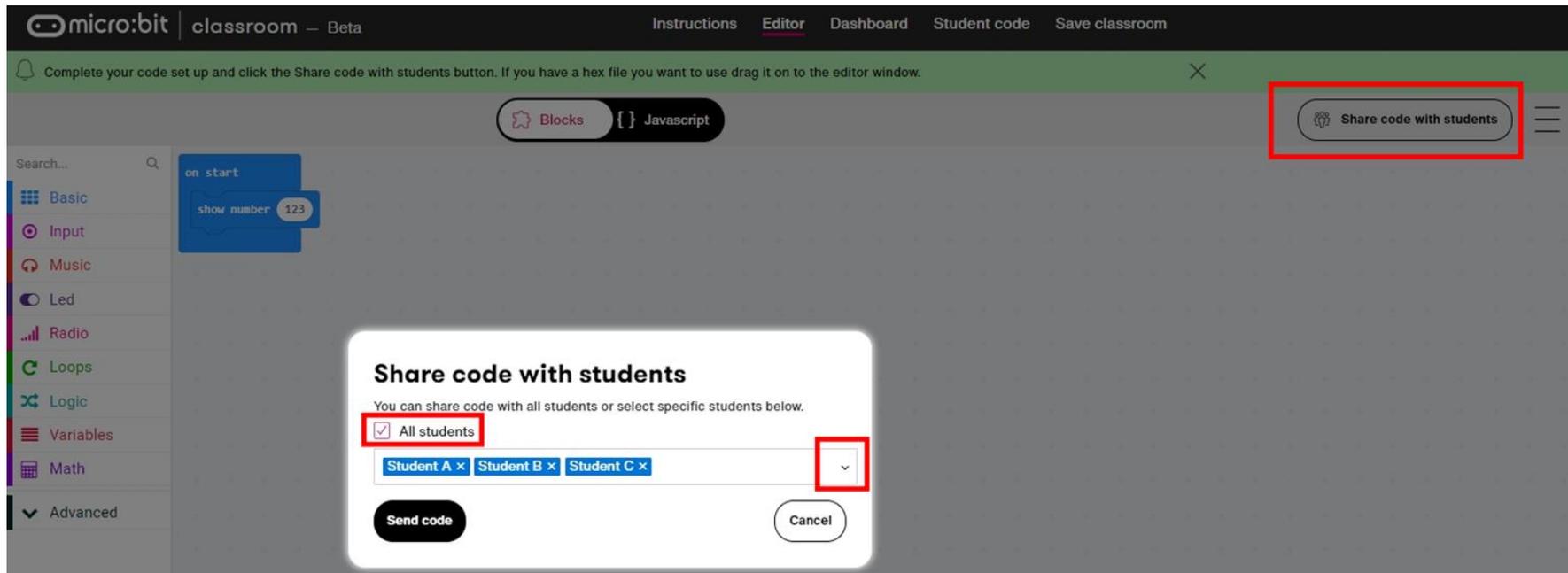
micro:bit classroom 線上教室_教師端編程畫面

※點選右上角的**Editor**，此畫面就是專屬於教師的編程環境，而透過紅框處的Share code with students 教師可以隨時透過此按鈕將您編輯的程式，一鍵傳送給所有學生，或是傳送給指定的學生。



micro:bit classroom 線上教室_教師端一鍵傳送程式

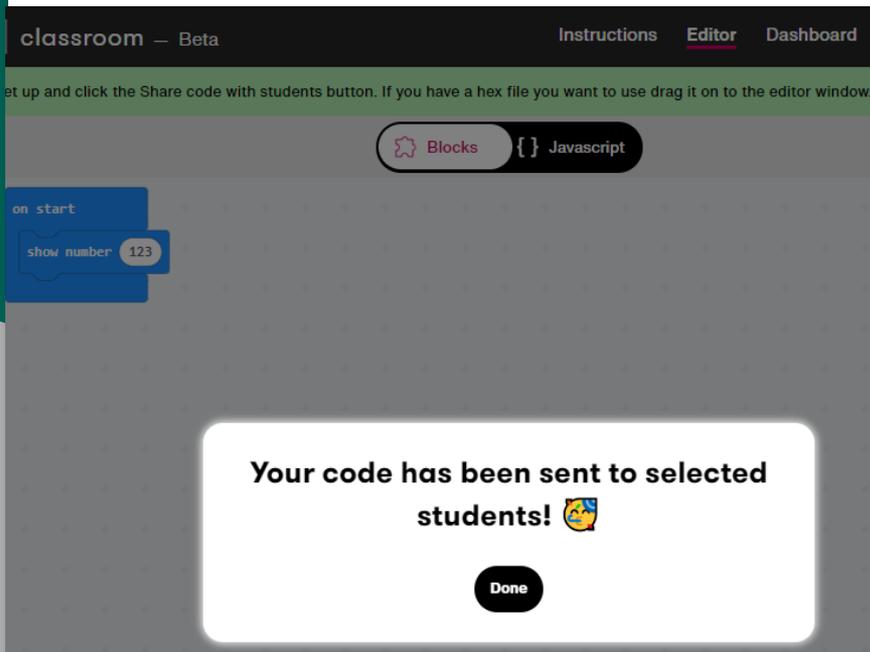
※透過紅框處的Share code with students，教師可以利用此按鈕將您編輯的程式，一鍵傳送給所有學生(勾選All students)，或是傳送給指定的學生(選單可向下拉進行調整)。



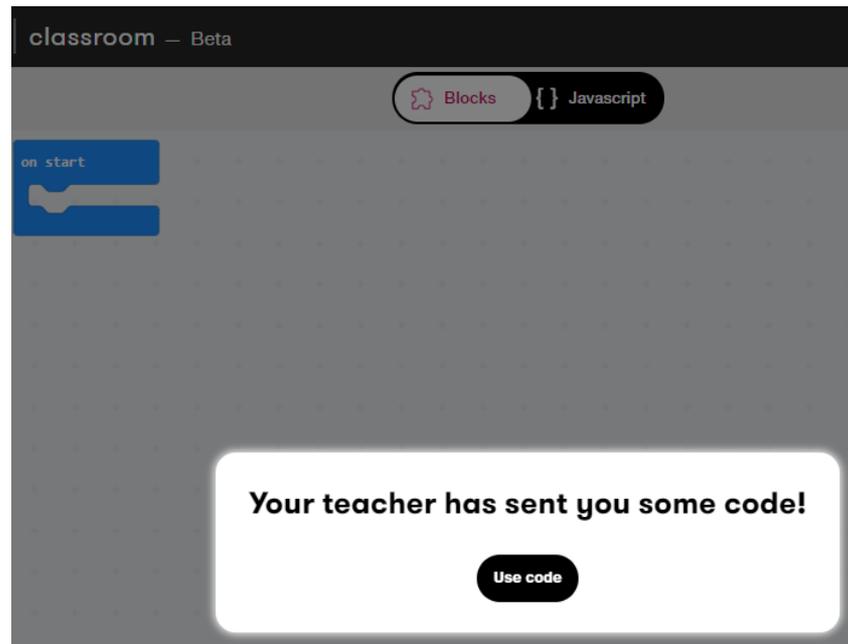
The screenshot displays the micro:bit classroom web interface. At the top, there is a navigation bar with 'micro:bit classroom - Beta', 'Instructions', 'Editor', 'Dashboard', 'Student code', and 'Save classroom'. A green notification bar at the top reads: 'Complete your code set up and click the Share code with students button. If you have a hex file you want to use drag it on to the editor window.' Below this, the editor area shows 'Blocks' and 'Javascript' tabs. A red box highlights the 'Share code with students' button in the top right corner. In the center, a white dialog box titled 'Share code with students' is open. It contains the text 'You can share code with all students or select specific students below.' Below this text, there is a checkbox labeled 'All students' which is checked and highlighted with a red box. Underneath the checkbox is a list of selected students: 'Student A x', 'Student B x', and 'Student C x'. To the right of this list is a dropdown arrow, also highlighted with a red box. At the bottom of the dialog box are two buttons: 'Send code' and 'Cancel'.

micro:bit classroom 線上教室_成功傳送程式給學生

※成功傳送指令後，教師端畫面：

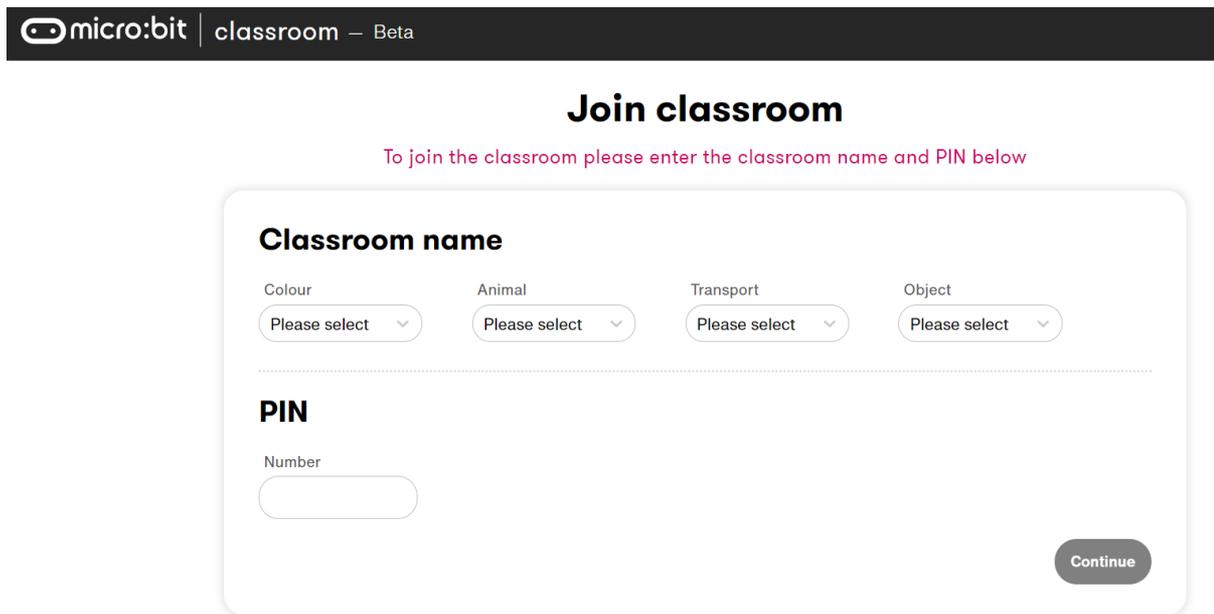


※學生端畫面：請按下 **Use code**，完成接收程式。



micro:bit Classroom_學生進入教室模式 (輸入網址:microbit.org/join)

👉請先輸入上方網址進到教室登入畫面(如下圖)
再到line課程群組的記事本取得今日課程的教室密碼(一張圖片，示意如下)。



micro:bit | classroom — Beta

Join classroom

To join the classroom please enter the classroom name and PIN below

Classroom name

Colour

Animal

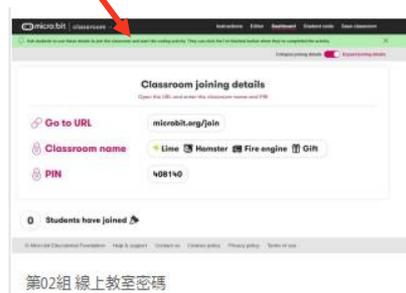
Transport

Object

PIN

Number

Continue



micro:bit Classroom_學生輸入教室密碼 (microbit.org/join)

👉 依照圖片中的密碼：

(1) 於 Classroom name 下拉式選單選擇4個對應的圖案及英文單字並於 PIN 輸入密碼。

Join classroom

To join the classroom please enter the classroom name and PIN below

Classroom name

Colour: Please select (dropdown menu open showing: Blue, Green, Indigo, Lime, Orange, Pink)

Animal: Please select

Transport: Please select

Object: Please select

Continue

micro:bit | classroom - Beta

Instructions Editor Dashboard Student code Save classroom

Collapse joining details Expand joining details

Classroom joining details

Open the URL and enter the classroom name and PIN

※此為示意圖

Go to URL: microbit.org/join

Classroom name: Green Dog Airplane Sunglasses

PIN: 541986

micro:bit Classroom_學生輸入名字 (microbit.org/join)

 micro:bit | classroom – Beta

Join classroom

To join the coding activity, please find your name or enter a new one

Your name

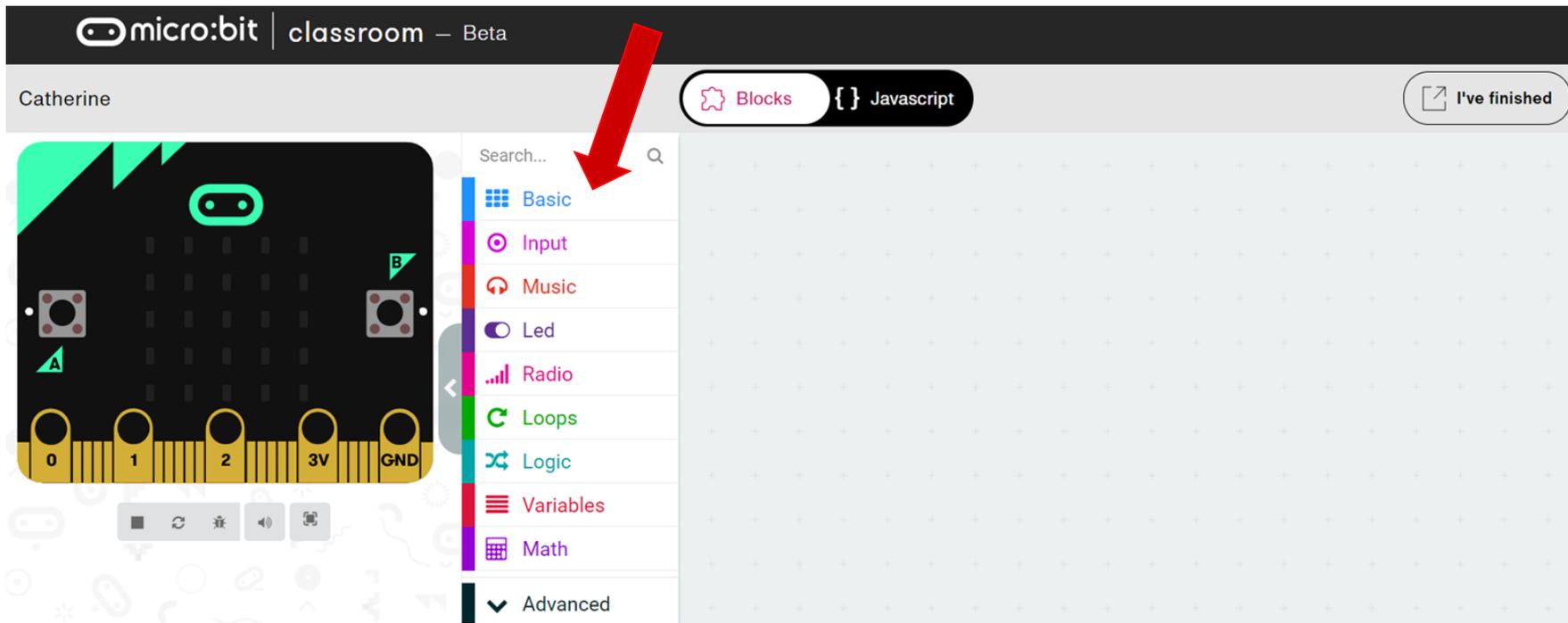
or 

Continue

micro:bit Classroom_成功進入教室模式 (microbit.org/join)

※請確認下方各個顏色的積木是否為**英文版本**。

如果仍顯示中文版，請關閉網頁並回到網址：makecode.microbit.org修改語言後，再次輸入教室網址：microbit.org/join及密碼，重新回到教室中。



The screenshot displays the micro:bit Classroom interface. At the top, the header reads "micro:bit | classroom - Beta". Below the header, the user's name "Catherine" is visible on the left. On the right, there are two tabs: "Blocks" (selected) and "Javascript". Further right is a button labeled "I've finished". The main workspace is a grid of dots. On the left, there is a preview of the micro:bit board with two green arrows labeled "A" and "B" pointing to specific pins. Below the board are several control icons: a square, a refresh symbol, a play symbol, a speaker, and a camera. A search bar labeled "Search..." is positioned above a list of block categories. A red arrow points to the "Basic" category in this list. The categories listed are: Basic, Input, Music, Led, Radio, Loops, Logic, Variables, Math, and Advanced.

micro:bit classroom 線上教室_學生端注意事項

1. 學生請避免按下F5或重新整理按鈕，這將會跳離教室，回到填寫教室密碼的頁面(如下圖)。

micro:bit | classroom – Beta

Join classroom

To join the classroom please enter the classroom name and PIN below

Classroom name

Colour

Please select

Animal

Please select

Transport

Please select

Object

Please select

PIN

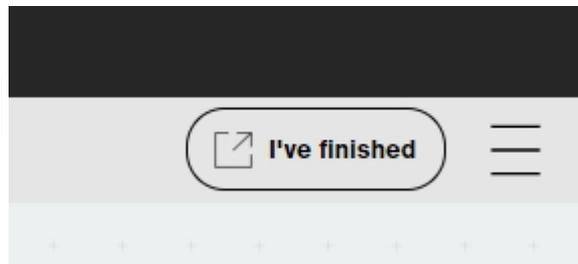
Number

Continue

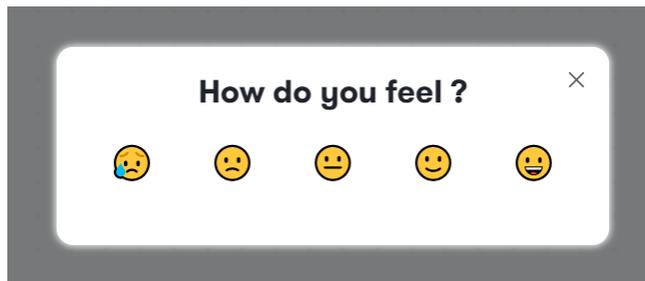


micro:bit classroom 線上教室_學生端注意事項

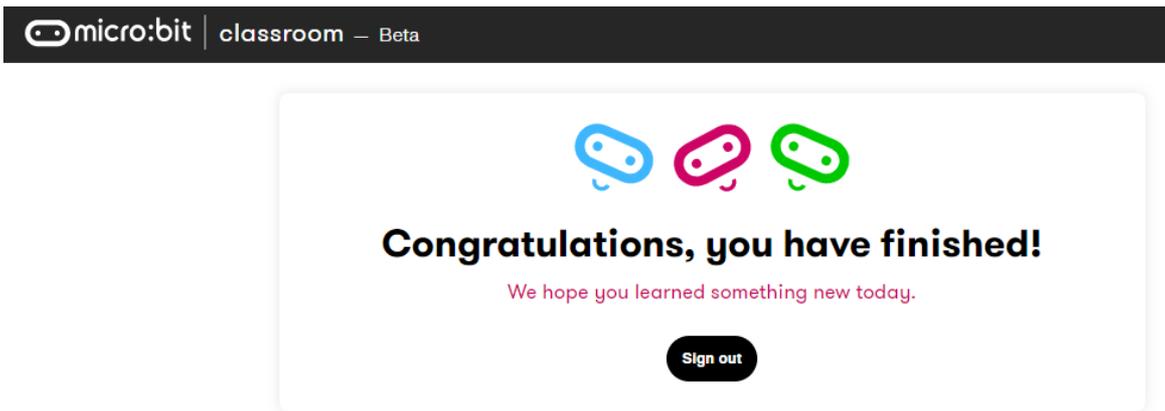
2.課程尚未結束前，請避免按下右上角的I've finished
它將於調查完學生上課滿意度後(圖A)跳離教室(圖B)。



※圖A



※圖B



micro:bit classroom 線上教室_教師端辨別學生狀態

【In progress】指學生端正在編程作業中。

【Finished】指學生端已完成作業並繳交。

【Offline】指學生端已跳離教室介面並離線。

Student code

See each of your students' code live, send code to another student and download a report with all the students' code



Download report for all students
as Word document

Hannes

In progress



rrr

Finished



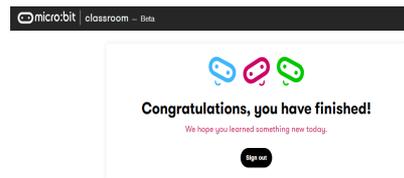
sapphire

Offline



micro:bit classroom 線上教室_繳交作業及修改作業

教師在學生按下右上角的 **I've finished** 後，學生頁面跳離教室並顯示右圖
教師端在 Student Code 可以看見學生的編程作業完成圖示 
點選  便可以編輯學生的繳交狀態，若學生仍需調整，
請老師將 **Finished** 調整到 **In progress** 讓學生回到編程平台繼續作業。



Your students

Select a student and review their code on the right hand panel

Hannes

In progress



Oursteam Alice 

Finished



Edit student

Name

Oursteam Alice

In progress Finished

Please note if a student edits their code after being reset to 'in progress' this will overwrite previously finished work in any new files you download from micro:bit classroom.

Apply changes

Delete

Deleting a student will remove them from the classroom and delete their code. You can use this to remove duplicates but do not use this if a student is absent and you may wish to view or resume their code in future.

Edit student

Name

Oursteam Alice

In progress Finished

Please note if a student edits their code after being reset to 'in progress' this will overwrite previously finished work in any new files you download from micro:bit classroom.

Apply changes

Delete

Deleting a student will remove them from the classroom and delete their code. You can use this to remove duplicates but do not use this if a student is absent and you may wish to view or resume their code in future.

micro:bit classroom 線上教室_學生重新進入教室方法

1.重新回到輸入教室密碼的頁面(microbit.org/join)。鍵入密碼後按下**Continue**。

micro:bit | classroom – Beta

Join classroom

To join the classroom please enter the classroom name and PIN below

Classroom name

Colour

🌿 Lime

Animal

🐕 Dog

Transport

🚲 Bicycle

Object

🏆 Trophy

PIN

Number

321780

Continue

micro:bit classroom 線上教室_學生重新進入教室方法

2.利用左圖中的「Find your name」，
(如右圖)輸入之前使用的名稱按下Continue即可恢復原本進行中的編程。

Join classroom

To join the coding activity, please find your name or enter a new one

Your name

Find your name or Enter new name

Continue

Join classroom

To join the coding activity, please find your name or enter a new one

Your name

Stu or Enter new name

Student C

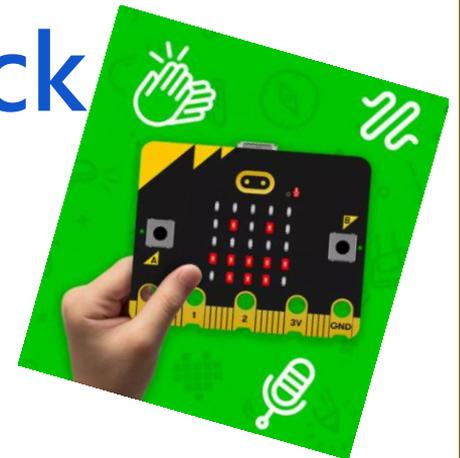
Student B

Continue



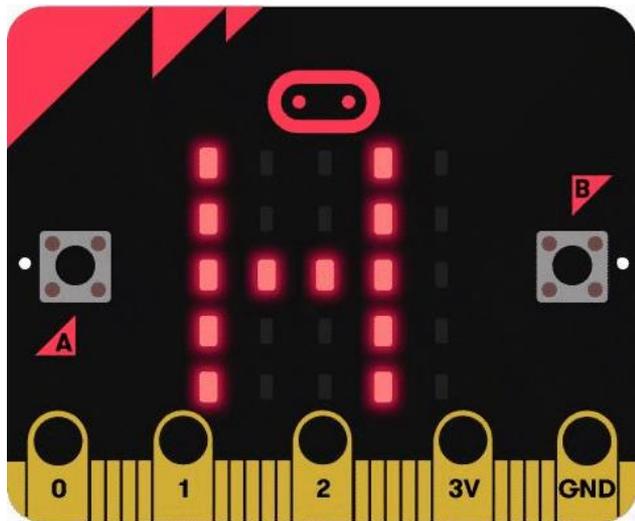
micro:bit

MakeCode x **【Basic】** block



【Basic】_Hello, World!

Hello,World! 是每一種電腦程式語言中最基本的程式，
因此做為程式初學者，編寫出Hello,World! 就成為一個非常可愛的傳統!



硬體連接_ 將程式hex.檔傳送到micro:bit的兩種方式

※兩種方式皆透過使用USB線把micro:bit連接到電腦上。

1.點選「Download」



此方式可以保留程式hex.檔於電腦，方便為不同程式命名並保存。

2.點選Download右側的進行「Connect device」連結裝置

此方式會直接將hex.檔載入micro:bit，方便加快下載速度，但不會留存hex.檔於電腦上。



將程式hex.檔傳送到micro:bit_ 直接下載並保留檔案

步驟1. 使用USB線
把micro:bit連接到電腦上。



將程式hex.檔傳送到micro:bit_ 直接下載並保留檔案

Microsoft | micro:bit

Blocks JavaScript

Search...

Basic
Input
Music
Led
Radio
Loops
Logic
Variables
Math
Advanced

forever

show string "Catherine"

show number 18

show icon

show leds

Download

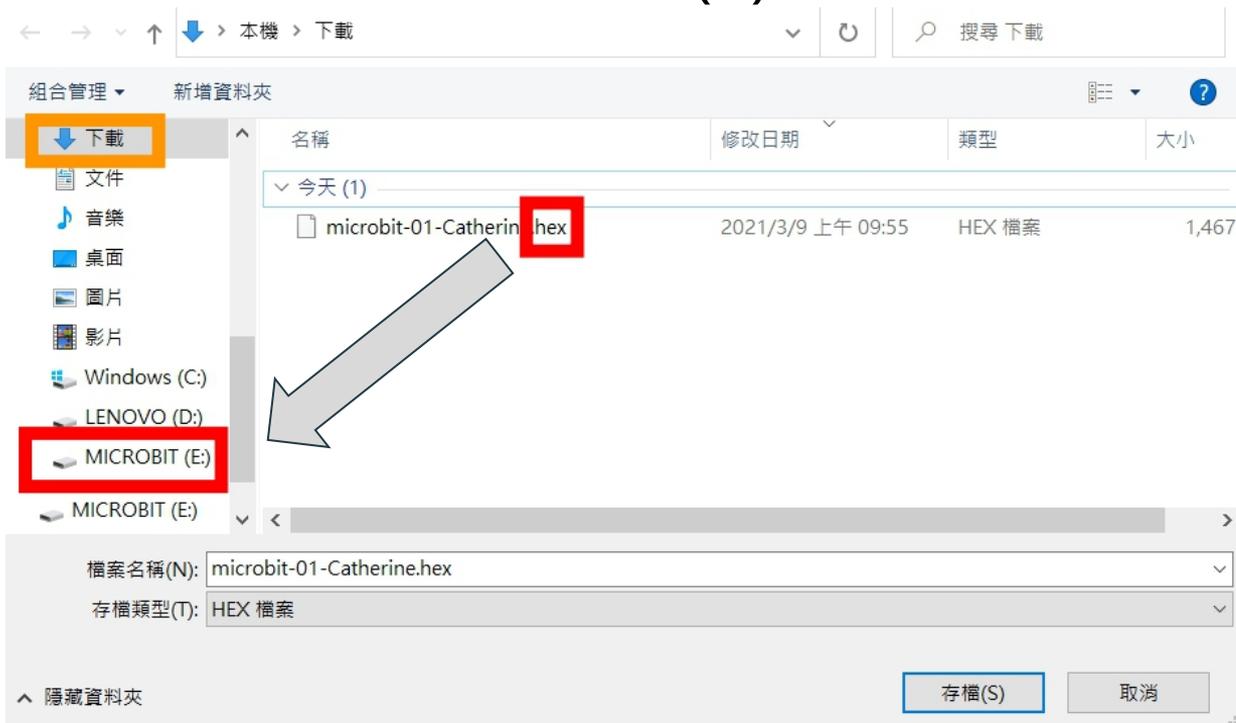
01 Catherine 電子名片

步驟2.
完成程式+自訂名稱，
例如：01 Catherine 電子名片

※每次下載前先更改名稱再下載，以利辨識各個hex.檔案的程式內容。
(開啟micro:bit classroom教室時，則是先下載hex.檔後，再更改名稱)。

將程式hex.檔傳送到micro:bit_ 直接下載並保留檔案

步驟3. 下載後請尋找micro:bit 的程式檔(hex.)，通常會存在下載資料夾內。
找到後請將hex.檔案用滑鼠拖曳到MICROBIT(E:)上。

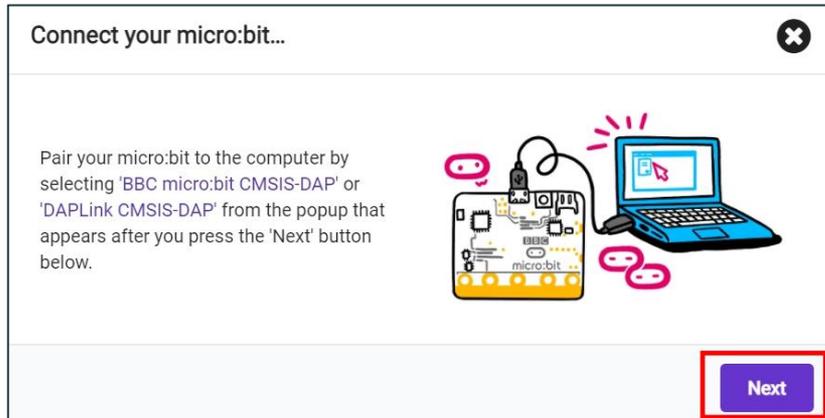
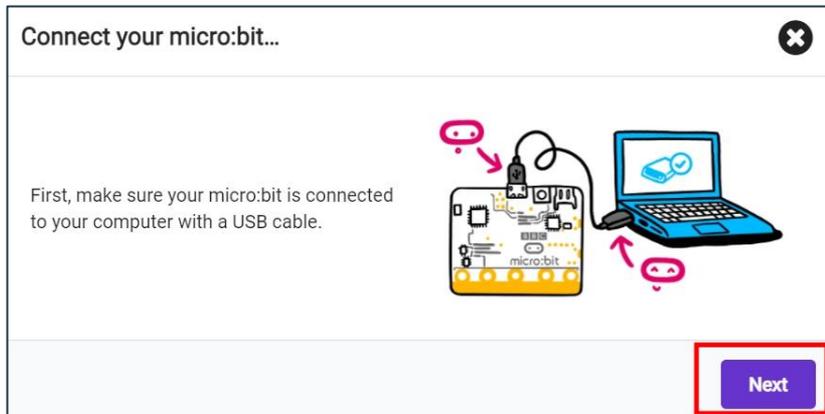


將程式hex.檔傳送到micro:bit_ 連結裝置加速傳輸

1.點選Download右側的  進行「Connect device」連結裝置。



2.點選兩次「Next」。

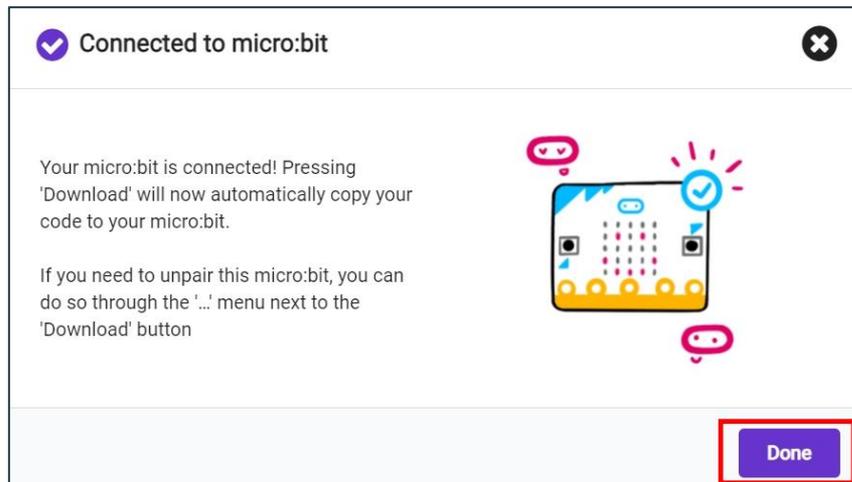


將程式hex.檔傳送到micro:bit_ 連結裝置加速傳輸

3. 以滑鼠點按micro:bit裝置名稱，再按下連線。



4.連結成功，按下「Done」。



將程式hex.檔傳送到micro:bit_ 連結裝置加速傳輸

4. 當連結成功時，Download旁的符號將產生改變，如下圖：

※尚未連結



※連結成功



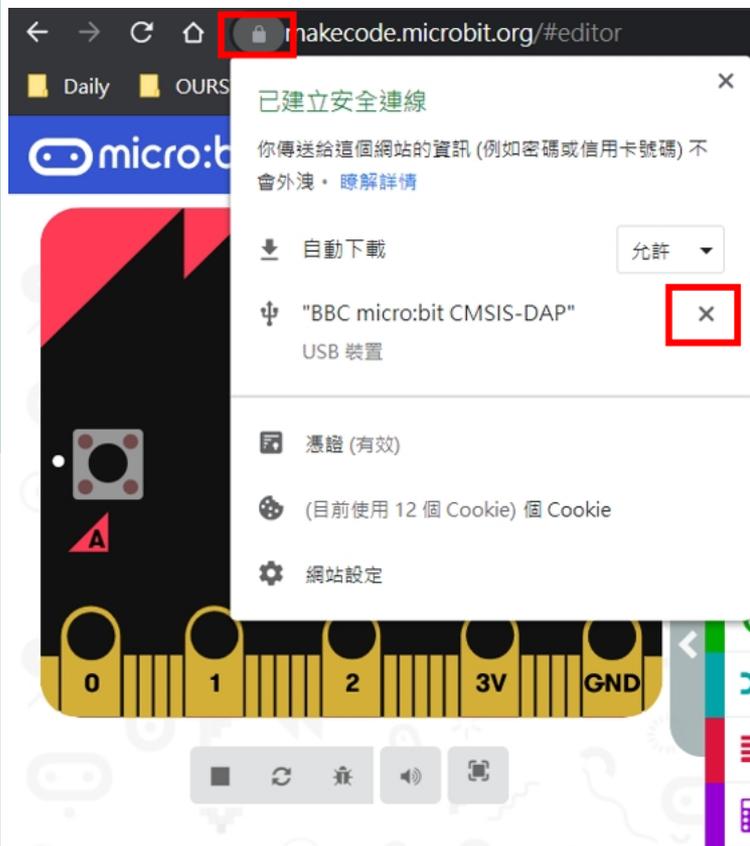
透過連結裝置下載程式到micro:bit後，將短暫顯示

A purple rectangular button with a white checkmark icon and the text "Downloaded!" in white.

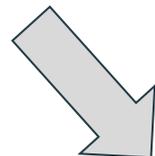
Downloaded!

若無法成功連結，請重新接上USB或更換一條USB。

將程式hex.檔傳送到micro:bit_ 取消連結裝置



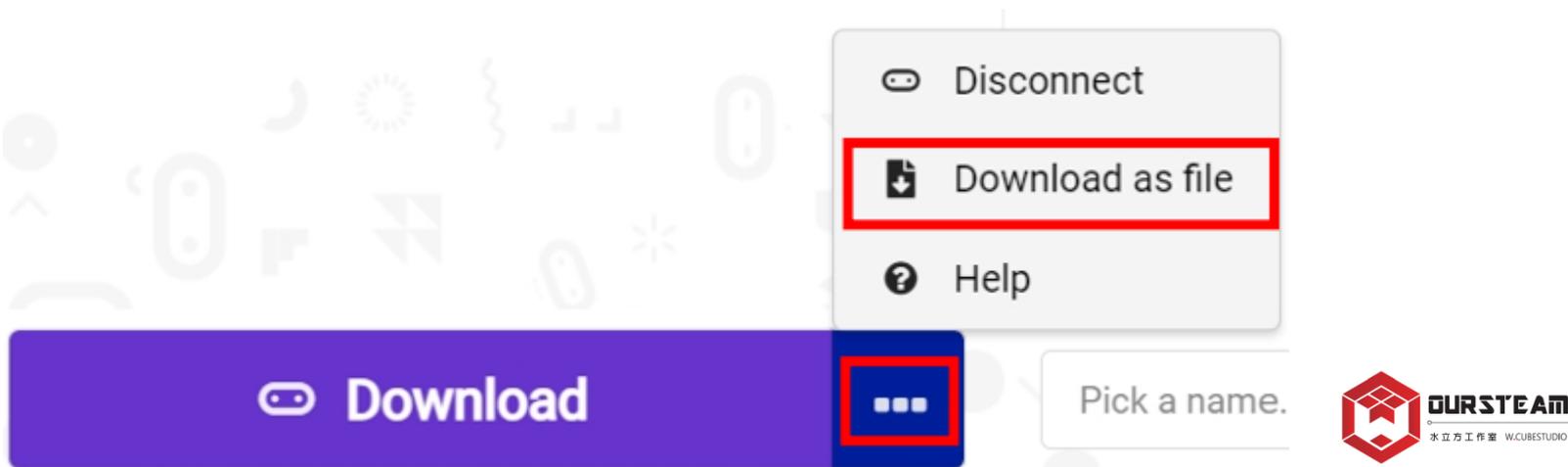
※如需取消連結裝置(如左圖)
請點擊網址左側的「鎖」圖示，
接著在micro:bit裝置名稱旁，點擊「X」。
取消連結後，Download旁的符號將顯示如下：



在連結裝置狀態 _ 下載程式hex.檔

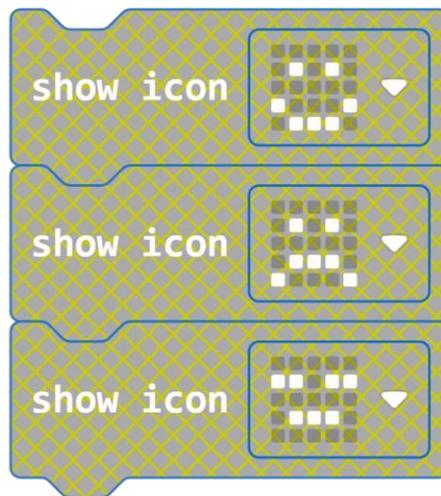
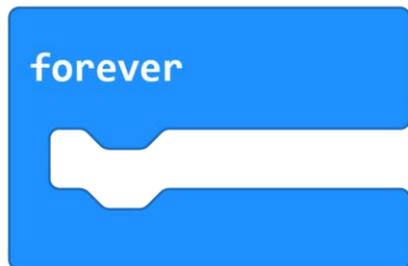
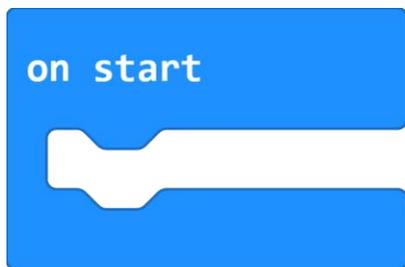
※在「Connect device」連結裝置狀態下，會直接將hex.檔載入micro:bit，方便加快下載速度，但不會留存hex.檔於電腦上。

※若同時希望保留hex.檔於電腦上，只需點選Download右側的  進行「Download as file」即可留存程式hex.檔於電腦上。

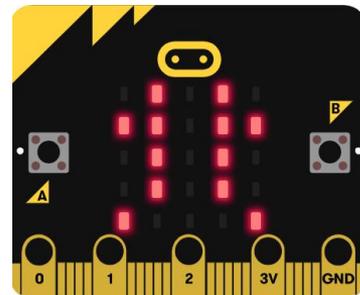
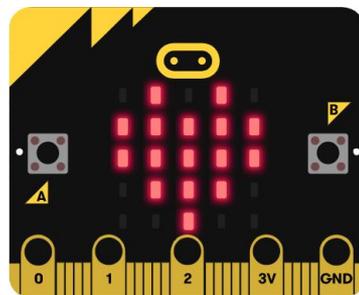


【Basic】_【on start】 v.s. 【forever】

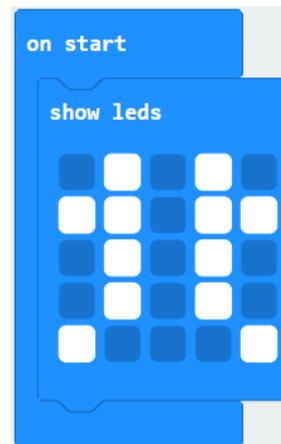
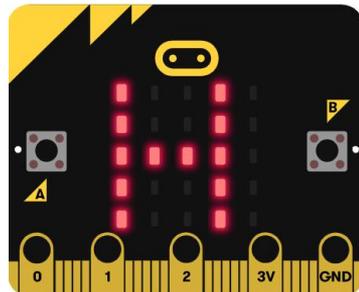
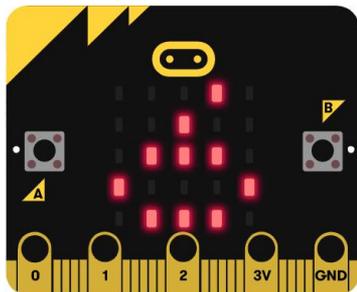
如何使micro:bit "輪播圖案"，透過leds表達豐富的表情變化？



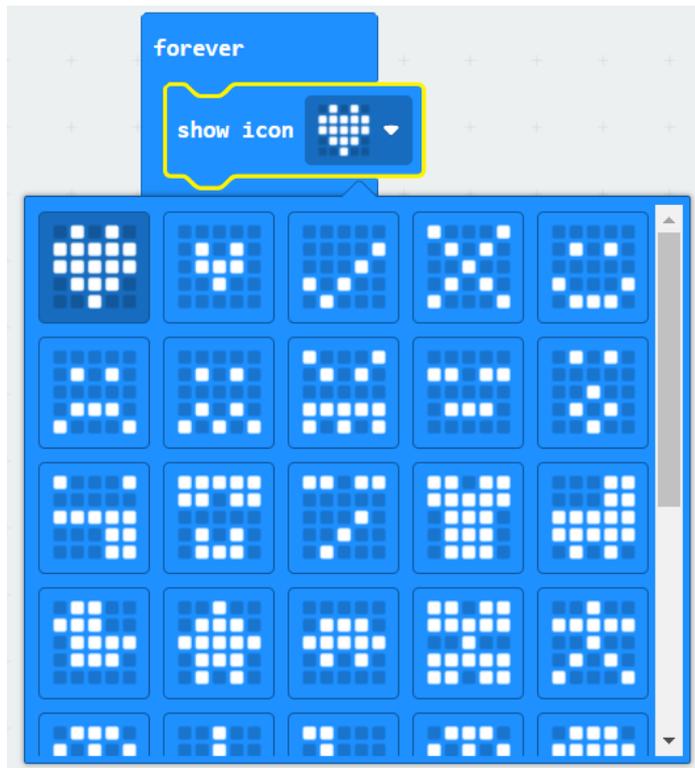
MakeCode_【Basic】基本常用項目



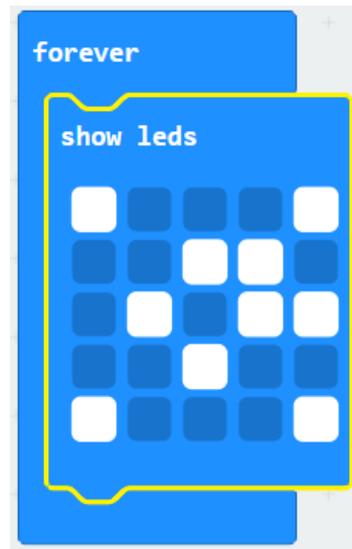
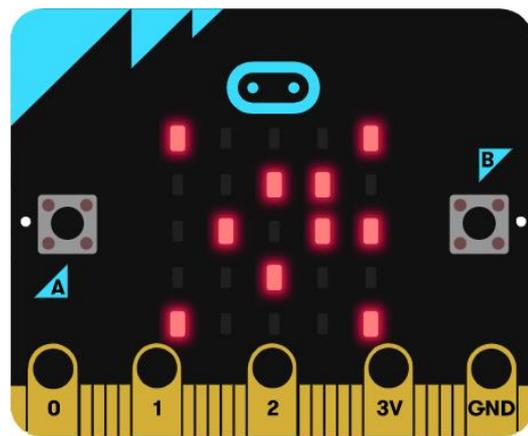
※包含字母、數字和標點符號。



MakeCode_【show icon】 v.s. 【show leds】



[show leds]
用25個LED燈來畫自己喜歡的圖案



運用【Basic】常用項目_製作電子名片

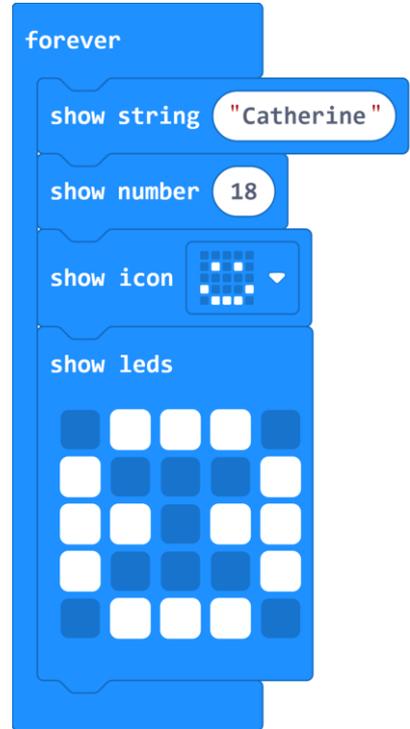
來到科技英文師資培訓營做自我介紹
請利用micro:bit做一張電子名片。

用show string：呈現英文名字

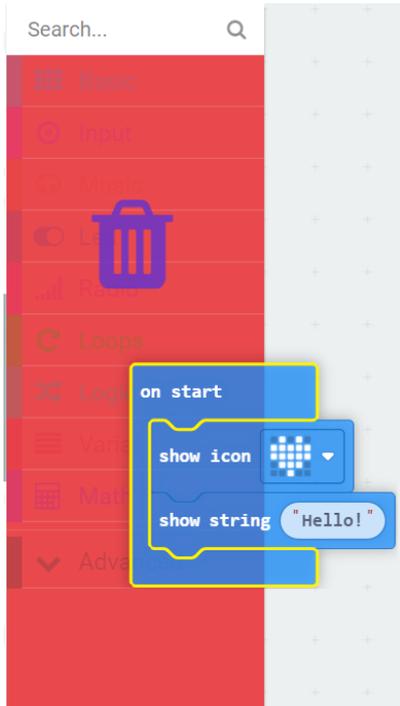
用show number：說明你的心智年齡or實際年齡

用show icon：表示你參與培訓的心情

用show leds：畫出最代表你的一個圖案



MakeCode_ 刪除及復原



刪除：

- ※(如左圖)將積木拖曳到menu，出現垃圾桶後放開積木
- ※或是點選積木，按下鍵盤的 [Delete] 鍵

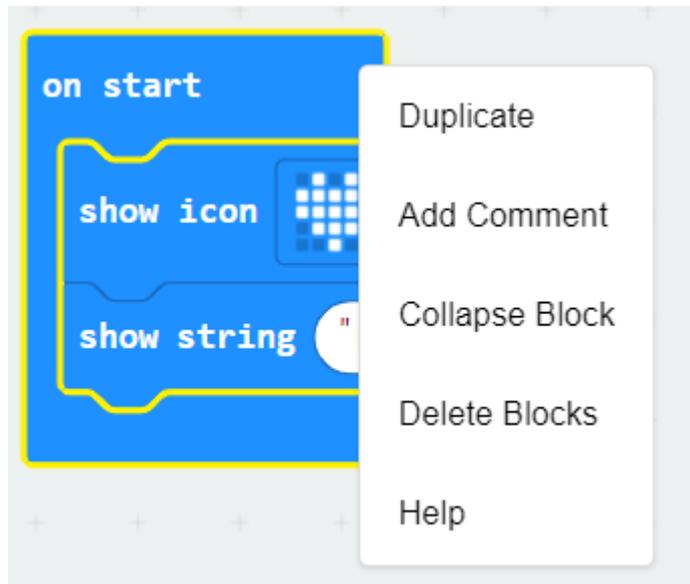
復原：

- ※(如右圖)點選左方箭頭
- ※或是按下鍵盤的 [Ctrl] + [Z] 鍵



MakeCode_ 右鍵操作技巧

※將滑鼠游標放在積木上，點按右鍵叫出功能



Duplicate : 複製積木

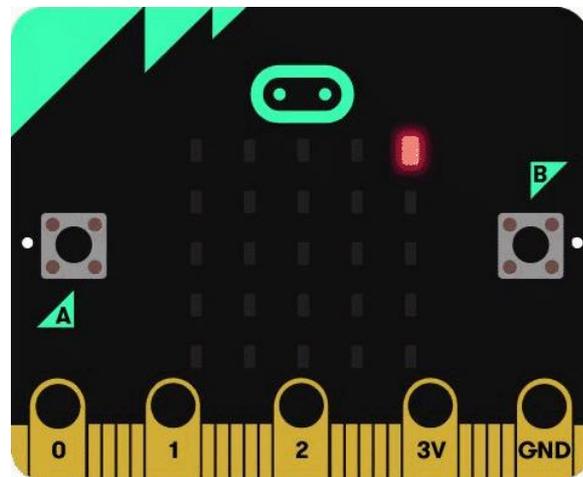
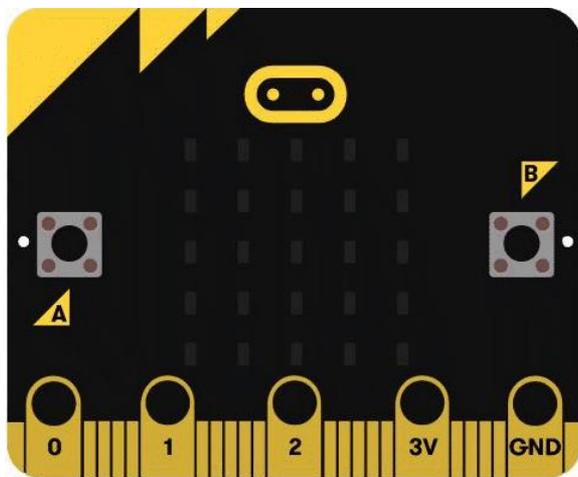
Add Comment : 添加註解

Collapse Block : 摺疊積木

Delete Blocks : 刪除積木

Help : 連結到官網，向您解釋積木的用途

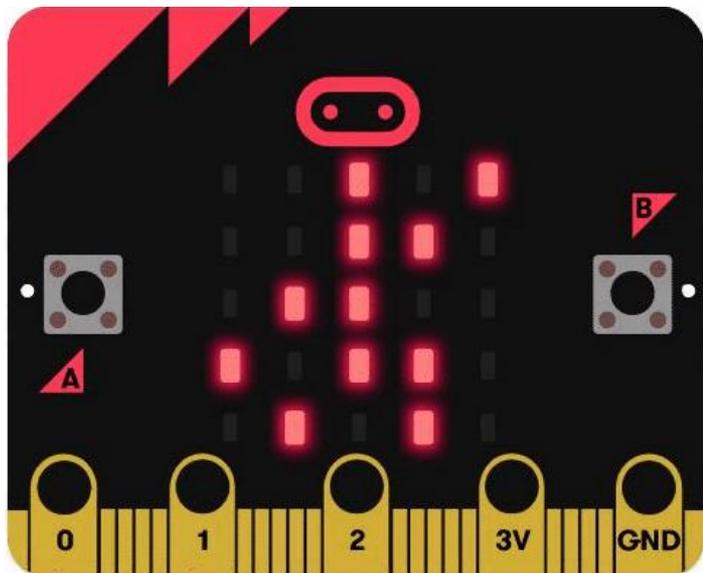
【show leds】_ 讓led跑起來!



※思考一下，如何設計向右跑動的跑馬燈？

【Basic】_【pause、show arrow、clear screen】

※自製Q版動畫式行人專用號誌!



```
forever
  show arrow North
  show string "Go!"
  repeat 4 times
    do
      show leds
      show leds
      show leds
```

```
show leds
show leds
show leds
show leds
```

```
clear screen
pause (ms) 5000
```

【Basic】_【pause、show arrow、clear screen】

※自製Q版動畫式行人專用號誌!

The code block is a 'forever' loop containing the following steps:

- show arrow (North)
- show string ("Go!")
- repeat (4) times
 - do
 - show leds (with a 4x4 grid of 16 white squares)
- show leds (with a 4x4 grid of 16 blue squares)

A callout box points to the 'repeat' block with the text: 要讓行人通過多久的時間，可以根據下方leds跑動的時間長度，來調整綠框要設計repeat幾次最適合。

The code block contains the following steps:

- clear screen
- pause (ms) (5000)

A callout box points to the 'clear screen' block with the text: 幫助消除前項leds

A dropdown menu for the 'pause (ms)' block is shown with the following options:

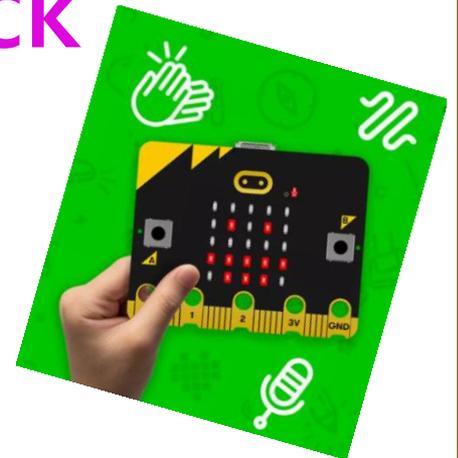
- 100 ms
- 200 ms
- 500 ms
- 1 second
- 2 seconds
- ✓ 5 seconds

A callout box points to the 'pause (ms)' block with the text: pause(ms)單位為毫秒，1秒=1000毫秒。透過設定暫停多久，來製作不開放通行的時間長度。

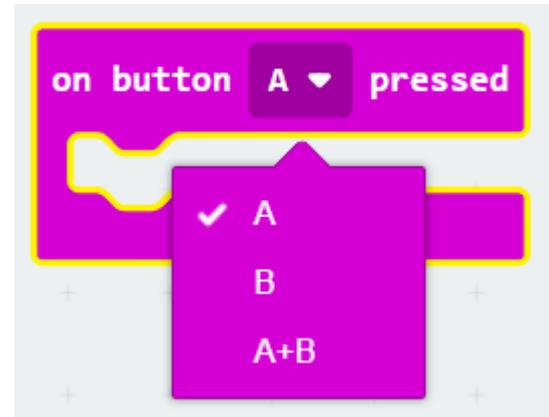
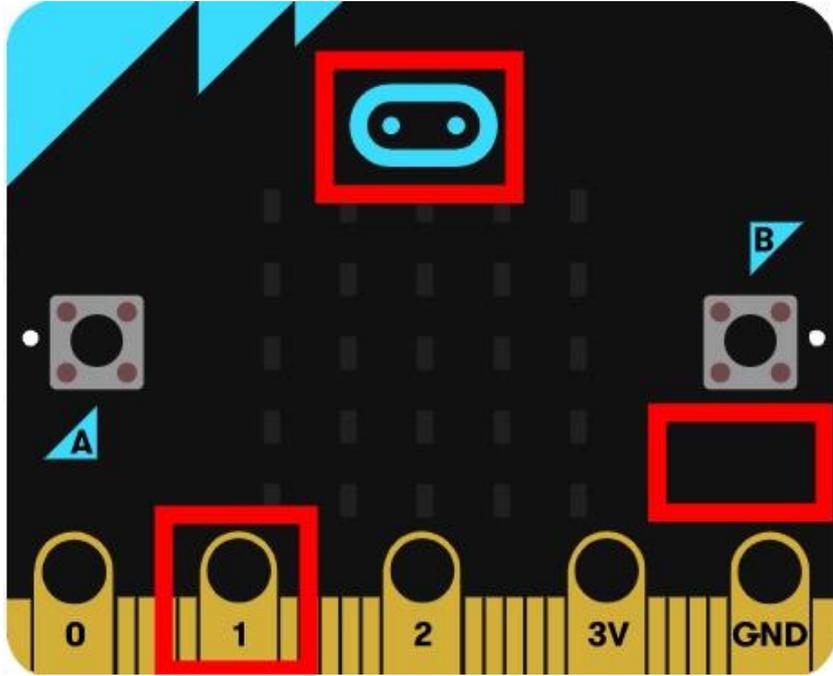


micro:bit

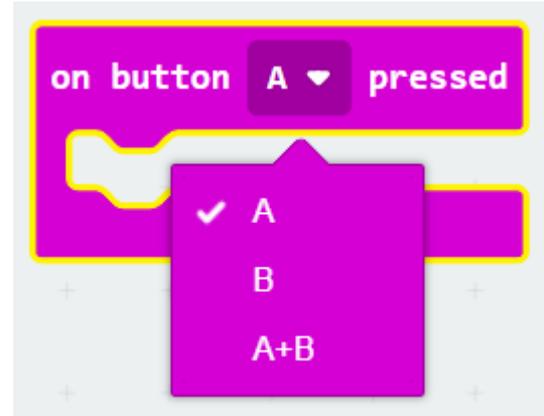
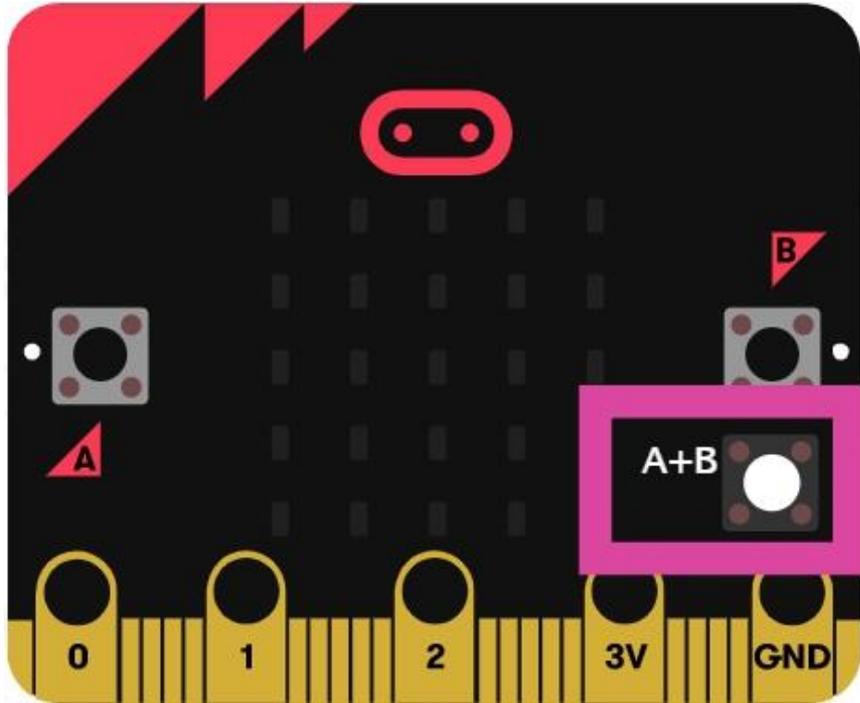
MakeCode x **【Input】** block
x **【Variables】** block



MakeCode_【Input】 猜猜A+B鍵在哪裡？

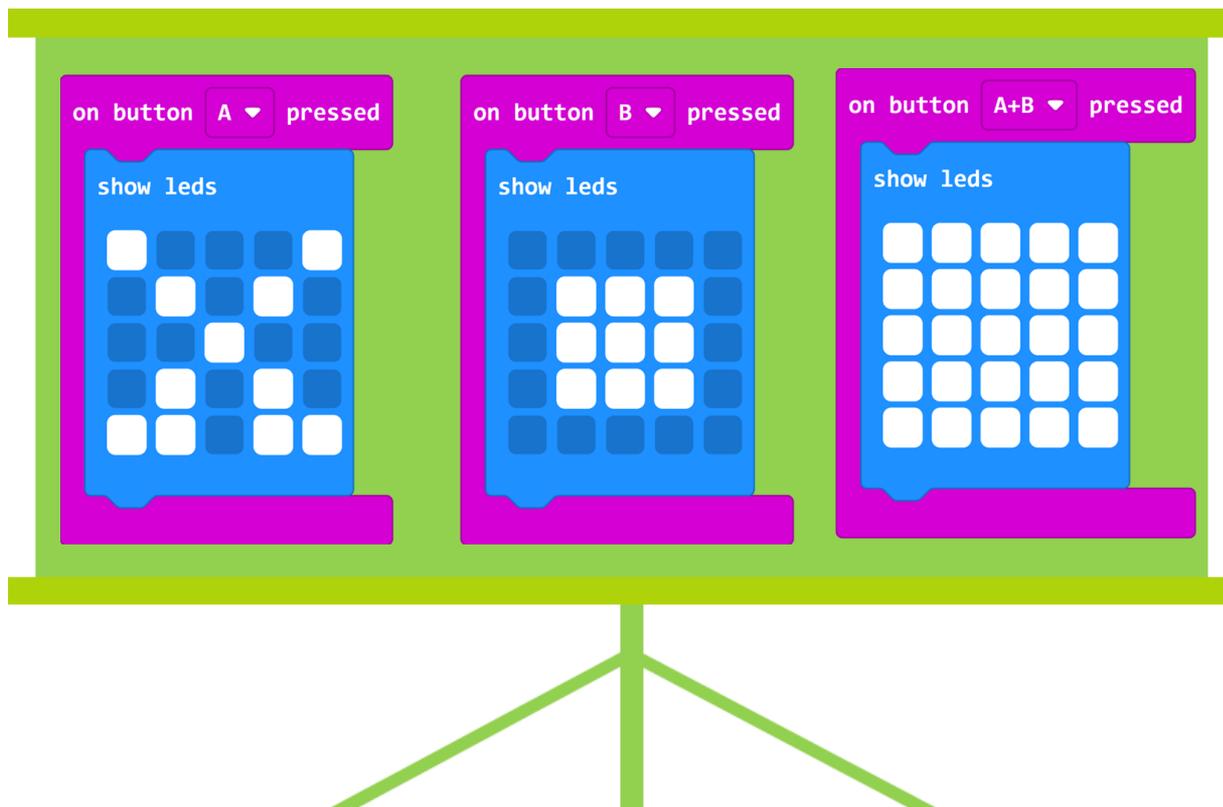


MakeCode_【Input】A+B鍵



※思考一下，實體micro:bit的A+B鍵在哪裡？

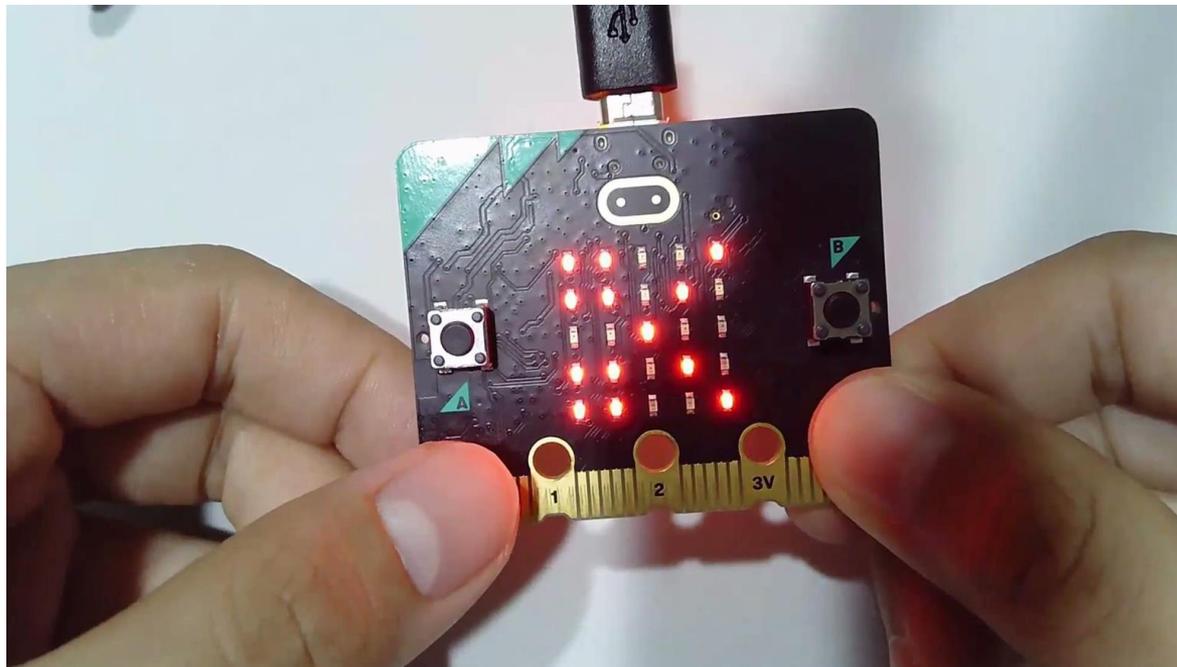
【Basic】 x 【Input】 _AB鍵猜拳機



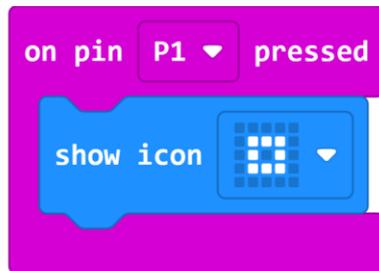
【Input】_pin is pressed_硬體使用方式

※一隻手按下GND(接地引腳)，另一隻手按下P0/P1或P2引腳，
極少量的電流將通過身體流回 micro:bit，完成一個電路。

※micro:bit 整體工作電壓約為3V(伏特)左右，直接碰觸不會有危險。



【Basic】 x 【Logic】 x 【Input】 _ 觸碰式猜拳機



※思考一下，有沒有其他按下P引腳的程式寫法？

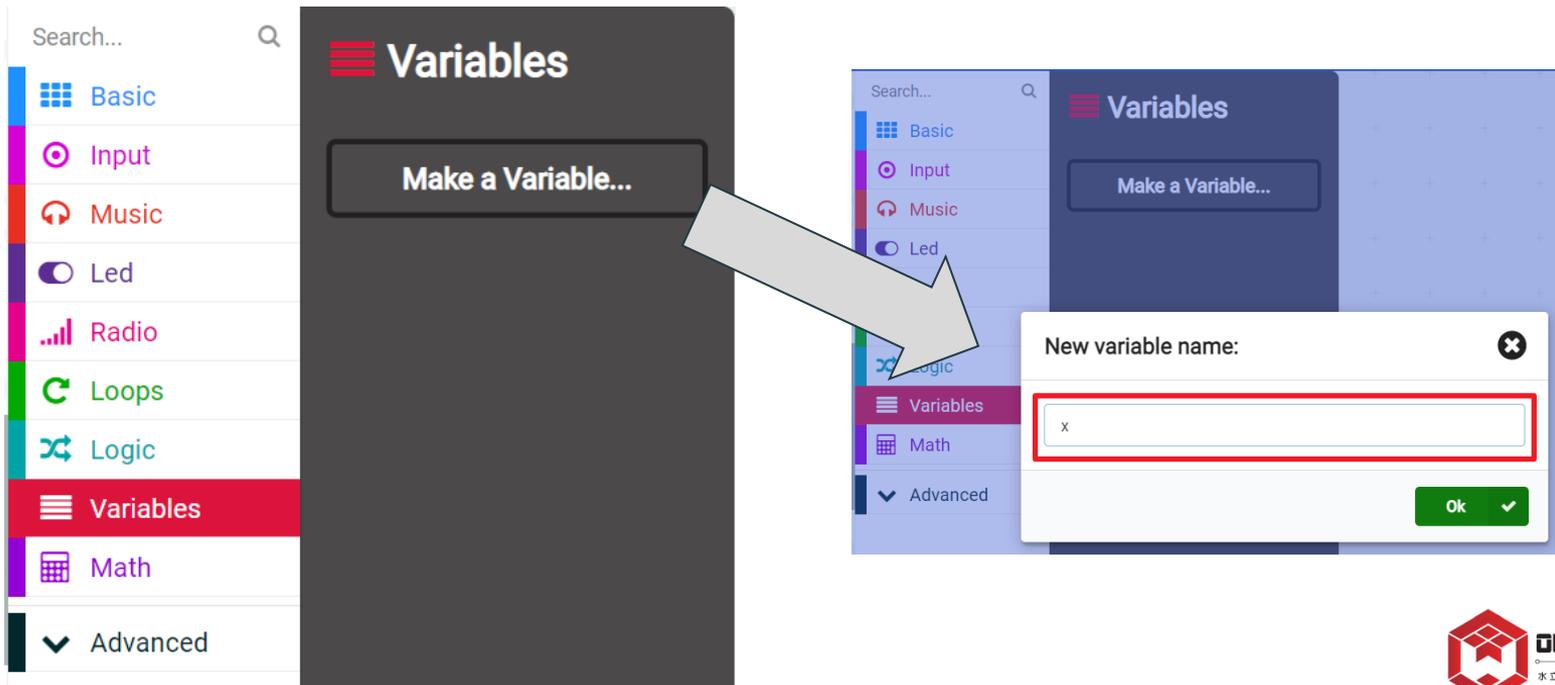
【Basic】 x 【Logic】 x 【Input】 _ 觸碰式猜拳機

```
forever
  if pin P0 is pressed then
    show icon [Rock]
  else if pin P1 is pressed then (-)
    show icon [Paper]
  else if pin P2 is pressed then (-)
    show icon [Scissors]
```

```
on logo pressed
  clear screen
```

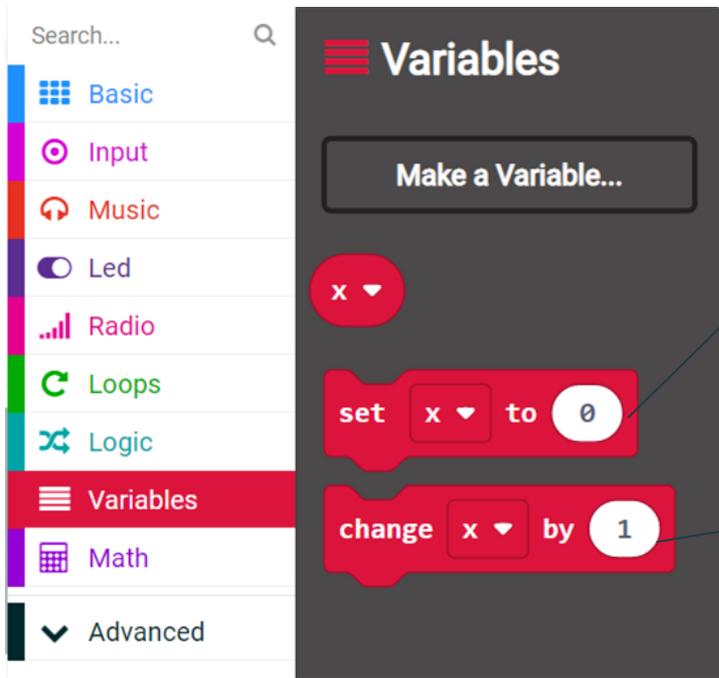
MakeCode_【Variables】

※按下【Make a Variable】即可自由命名變數名稱。



MakeCode_【Variables】

※創建變數後，將出現三項預設的積木程式。



※預設變數為0，可以依照需要的情況設定變數的值。

※by () 指的是：

藉由by後面 () 中的數字做變數的改變。
例如：by(1) 為增加 1。
反之如果要減少數值，則更改為by (-1)。

【Variables】_ 次數計算機

※透過次數計算機，了解三項變數積木程式的功能性。

```
on start
  set number to 0
  show number number
```

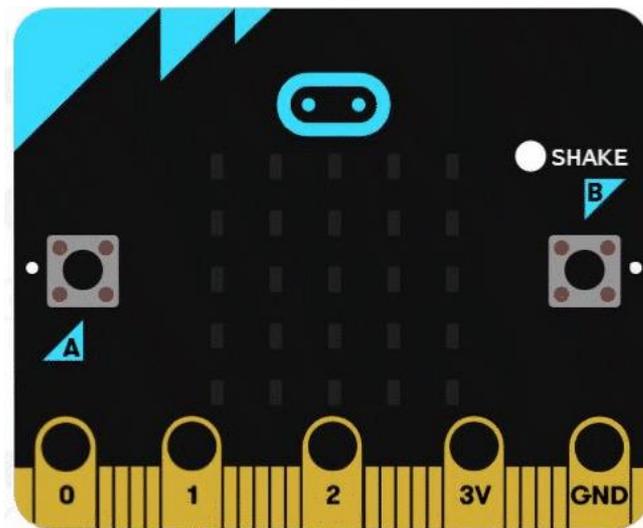
```
on button A pressed
  change number by 1
  show number number
```

```
on button B pressed
  change number by -1
  show number number
```

```
on button A+B pressed
  change number by 10
  show number number
```

【Input】 x 【Variables】 x 【Math】 【Logic】 x 【Basic】_體感猜拳機

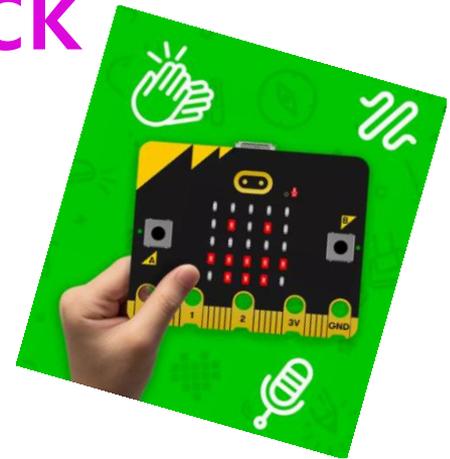
```
on shake ▼  
  set hand ▼ to pick random 1 to 3  
  if hand ▼ = 1 then  
    show icon [Rock] ▼  
  else if hand ▼ = 2 then  
    show icon [Paper] ▼  
  else  
    show icon [Scissors] ▼  
  +
```





micro:bit

MakeCode x 【Input】 block
x SDGs 專案應用



Sustainable Development Goals(SDGs)

目標3.良好健康



- 用micro:bit
- 1.增加對運動的興趣
 - 2.協助暖身及運動次數確實

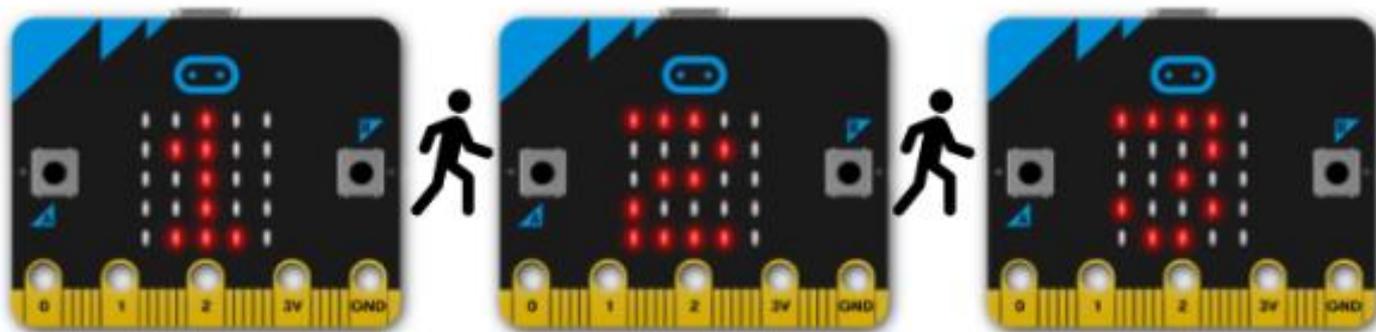


學生能夠確實鍛鍊體能
減少過重和肥胖、運動不足

體育計數器_用micro:bit確保暖身確實

Step counter

micro:bit



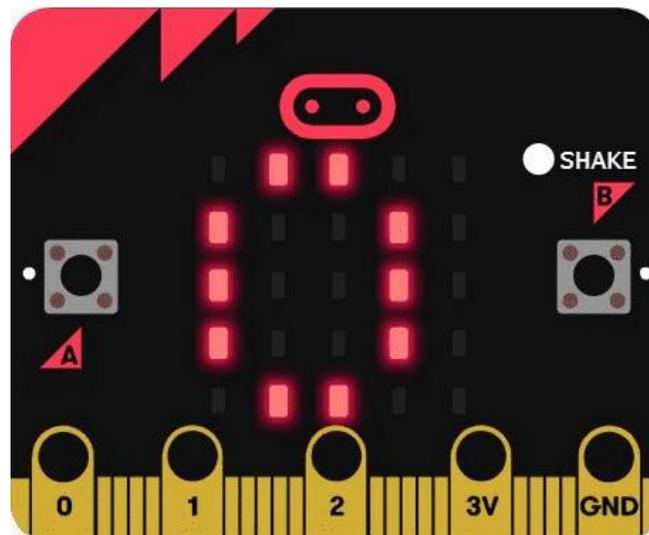
體育計數器_計算次數



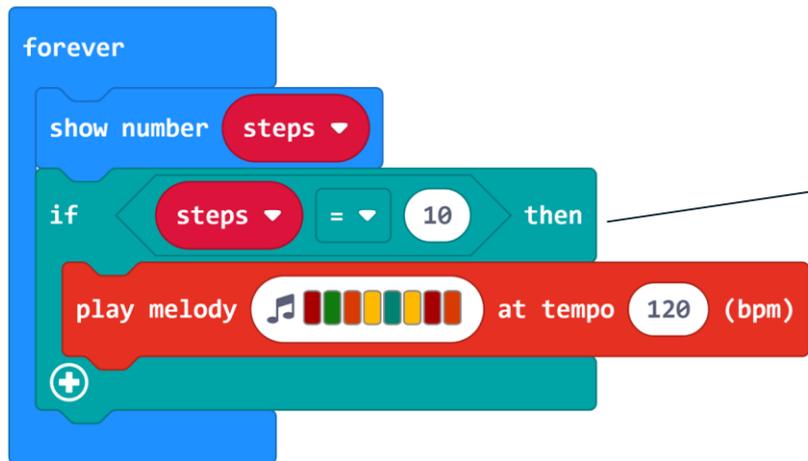
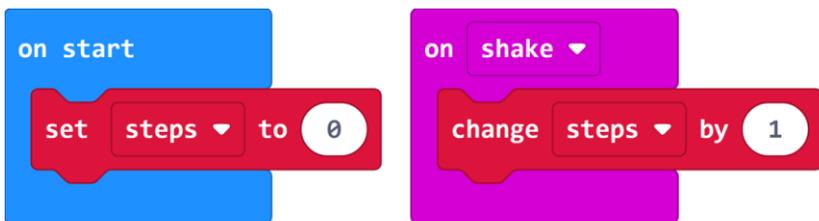
```
on start
  set steps to 0

on shake
  change steps by 1

forever
  show number steps
```



體育計數器_次數達標發出提示音



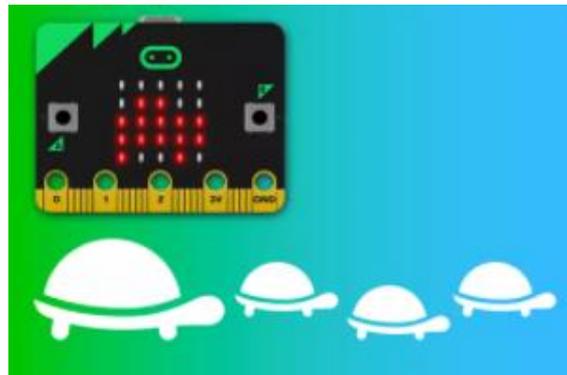
※自訂目標次數。

※自訂達標提示音。

Sustainable Development Goals(SDGs)

目標14.維護海洋資源

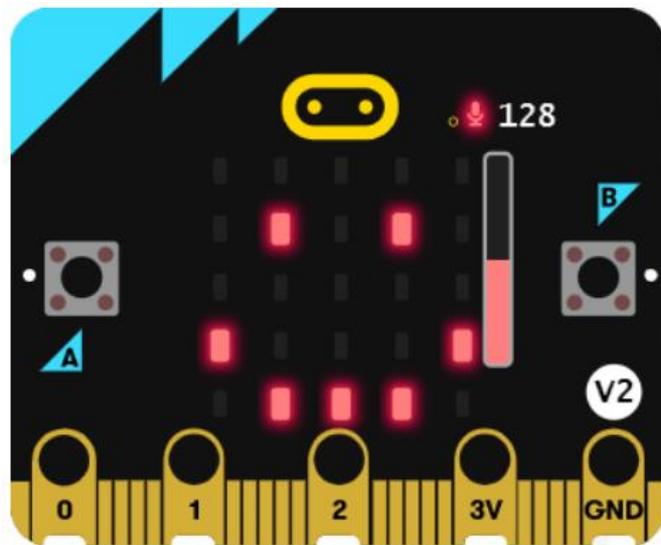
用micro:bit 拯救海龜、減少垃圾量



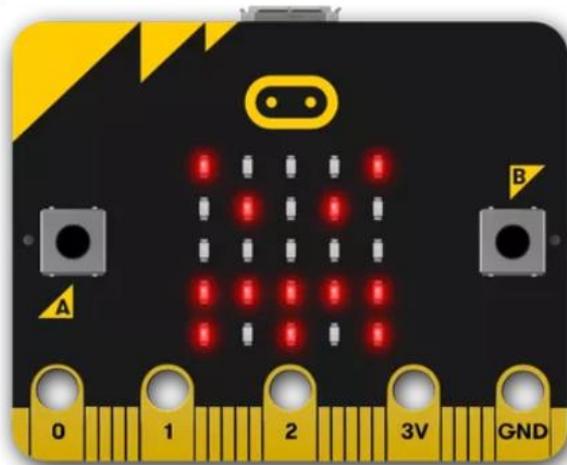
平安快樂生活的海龜

SDGs永續發展目標14：保護水下生命

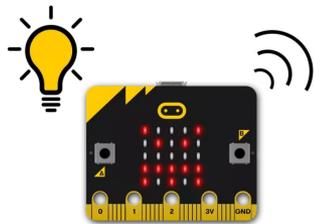
當海龜的鼻子插入了吸管、塑膠叉或是各種垃圾的新聞層出不窮...以下步驟一起做!



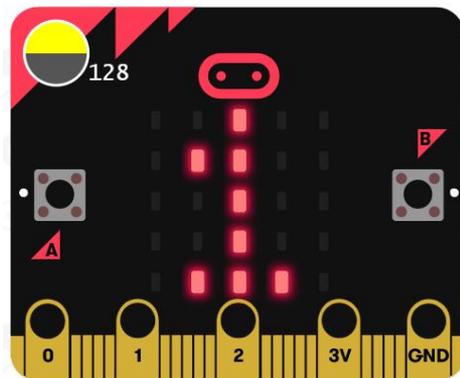
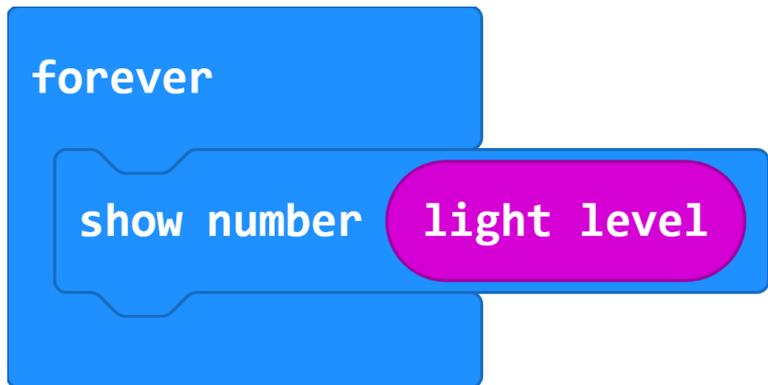
光線感測器_垃圾量偵測警報



光線感測器_取得光線感測值

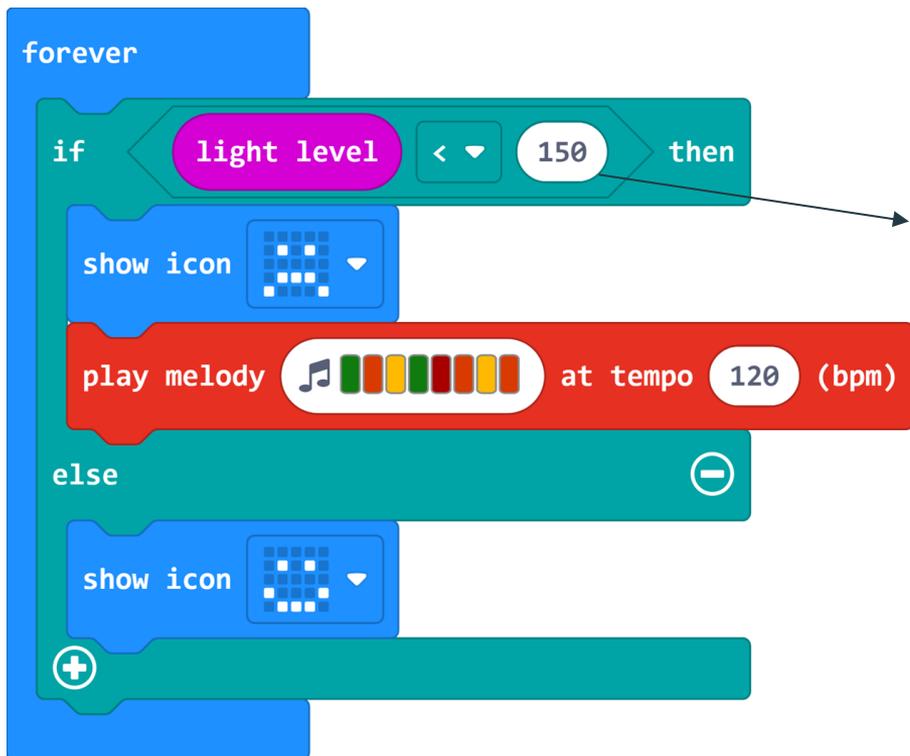
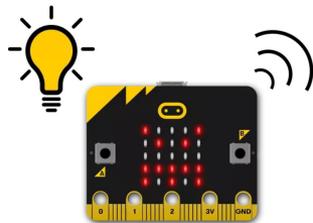


※micro:bit 上的 LED除了作為輸出之外，還能作為輸入設備_光線感測器。
請利用micro:bit來取得目前環境中的光線感測值，為下一步的程式設計找出臨界值。



※光線感測值其數值區間為0~255。

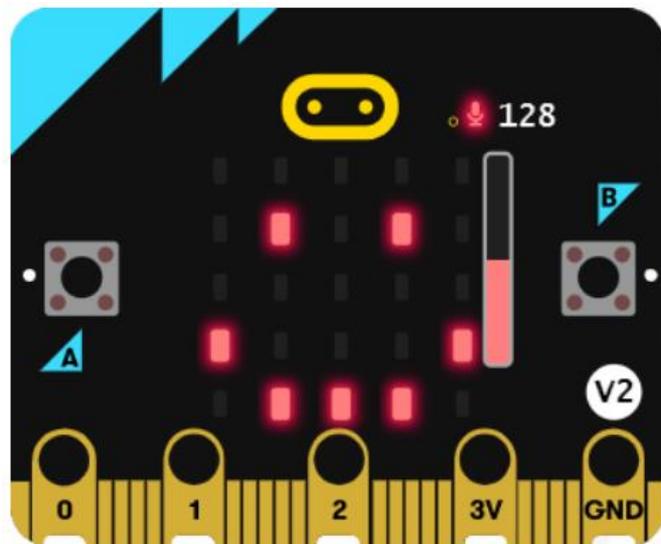
光線感測器_垃圾量偵測警報



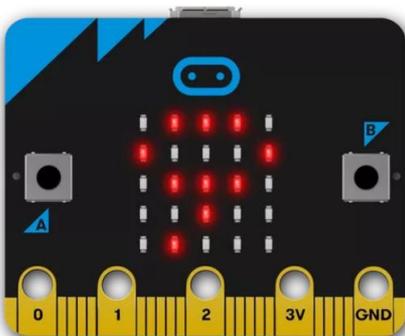
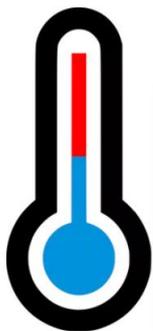
※請設定小於所測量的數值。
測試看看micro:bit是否會發出警報。
並利用手電筒照向micro:bit來解除警報。

SDGs永續發展目標14：保護水下生命

當氣候持續異常、全球暖化的問題日益嚴重、海龜寶寶的性別比例相當失衡...



溫度計_監控海龜孵化溫度

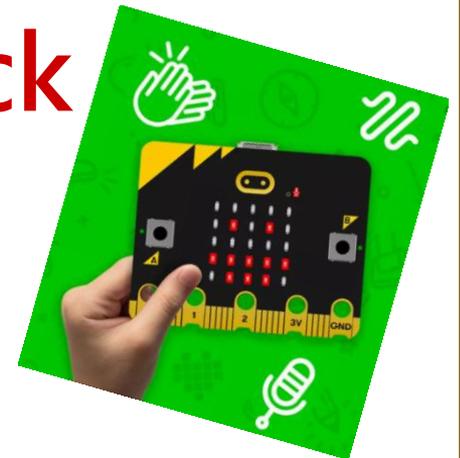


```
forever
  if <temperature (°C) < 28 then
    show icon [ ]
  else if <temperature (°C) ≥ 28 then
    show icon [ ]
    play melody [ ] at tempo 120 (bpm)
    show icon [ ]
    show icon [ ]
    show icon [ ]
    show icon [ ]
```

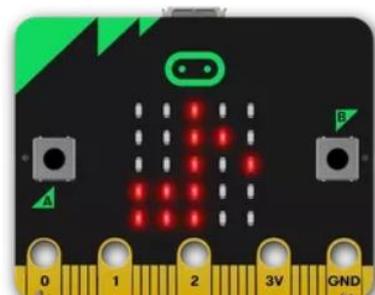


micro:bit

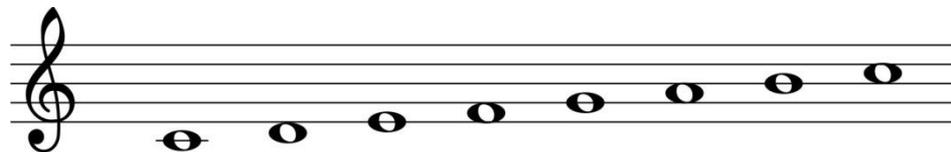
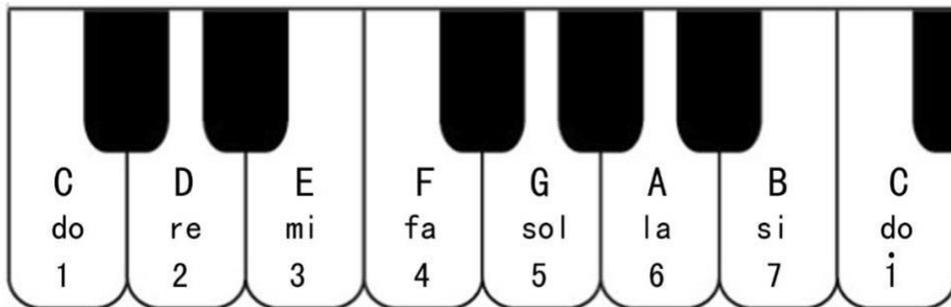
MakeCode x **【Music】** block



【Music】_ 認識音名、唱名

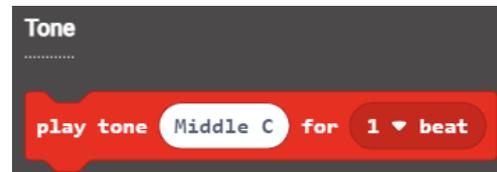


音名
唱名
簡譜

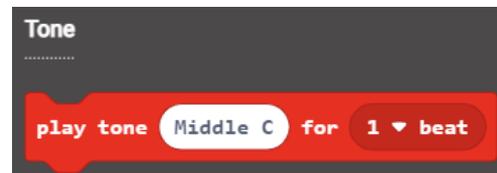


C	D	E	F	G	A	B	C
1	2	3	4	5	6	7	1
Do	Re	Mi	Fa	Sol	La	Ti	Do

【Music】_ 自由創作你的音樂



【Music】_ 自由創作你的音樂



※低音(Low)、中音(Middle)、高音(High)各有一組CDEFGAB可使用。



音樂-大型空氣鋼琴音階micro:bit 結合體感

ZEN

Create a Yoga game where you have to hold a pose for as long as possible without wobbling. The person who stays still the longest wins. This is inspired by the 12 Switch game.



THIS CODE MAY HELP

```
on start
  set wobbling to 0

forever
  plot bar graph of (wobbling)
  up to 10
  if (acceleration (mg) > 10)
  then show icon 🚫

forever
  if (acceleration (mg) > 1000)
  then
    change wobbling by 1
    pause (ms) 100
```

WHERE DO WE USE THIS?

Year 5 students studying game design experiment with motion controls.



音樂好好玩 - micro:bit鋼琴

```
on logo down  
  play tone Middle C for 1 beat
```

```
on logo up  
  play tone Middle D for 1 beat
```

```
on tilt left  
  play tone Middle E for 1 beat
```

```
on tilt right  
  play tone Middle F for 1 beat
```

```
on button A pressed  
  play tone Middle G for 1 beat
```

```
on button B pressed  
  play tone Middle A for 1 beat
```

```
on button A+B pressed  
  play tone Middle B for 1 beat
```

```
forever  
  show icon [grid icon]
```

音樂-micro:bit 音樂結合體感應用

音名	C	D	E	F	G	A	B	C
唱名	do	re	mi	fa	sol	la	si	do

前後 左右 A B A+B

MICRO : BIT

第八個音呢？

一起用MICROBIT來演奏吧！

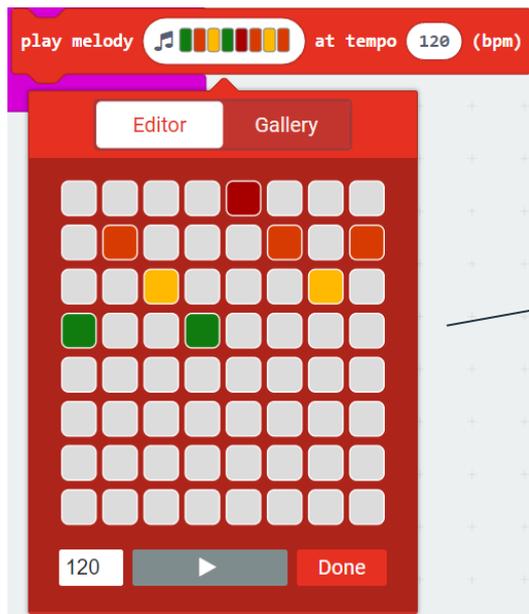
前前AABBA
右右左左後後前
AA右右左左後
AA右右左左後

猜猜看，是哪一首曲子呢？

【Music】_自由創作你的旋律

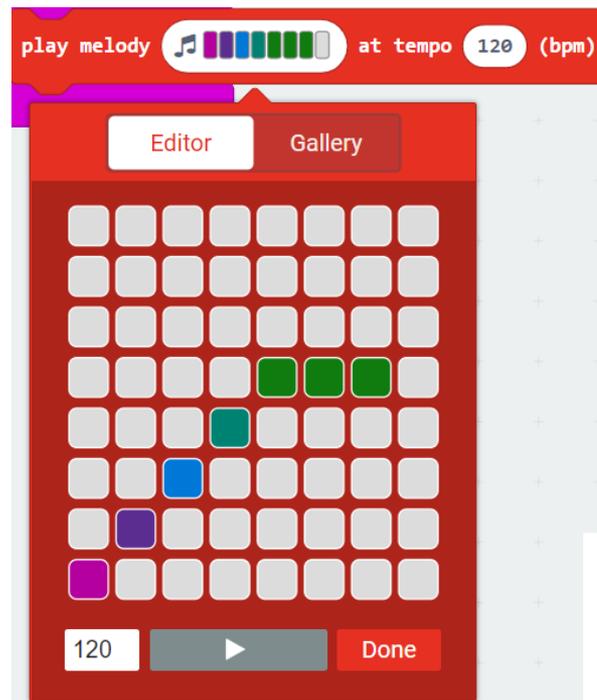
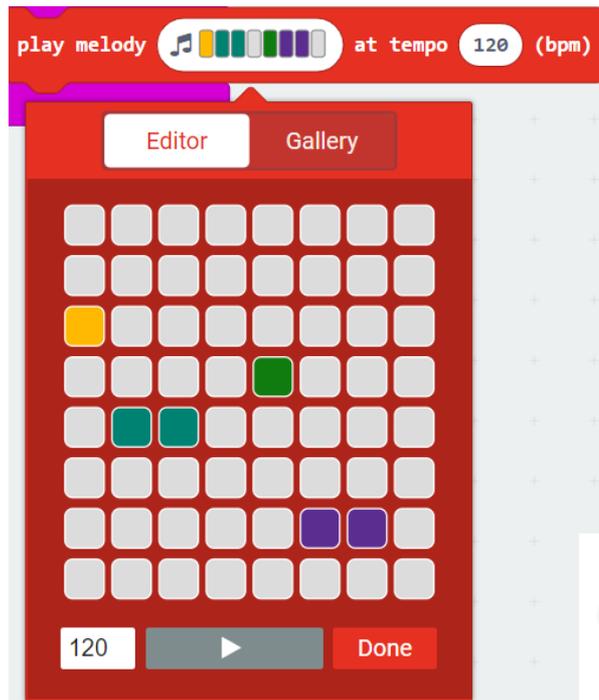


※尚未編輯的旋律將不顯示任何顏色。



※在Editor的每一行以滑鼠點案進行編輯。
每個音都有專屬的顏色對照，方便辨識。

【Music】_猜猜經典旋律



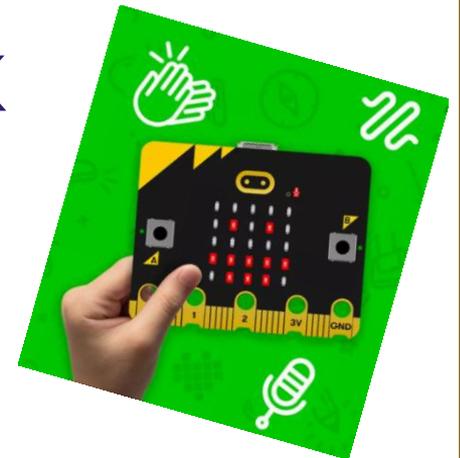
【西苑高中成果發表 - 夜市鋼琴】



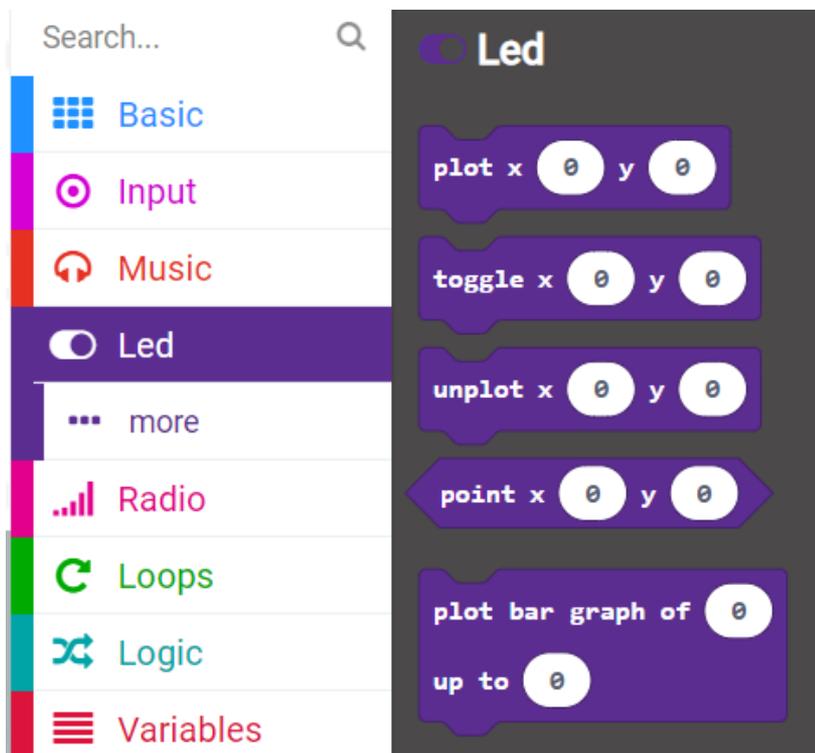


micro:bit

MakeCode x 【Led】 block



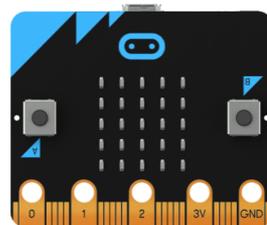
座標_【Led】



※ **【plot】** = 點亮 x(值) y(值)

【x座標】 = 由左至右 → 0,1,2,3,4

【y座標】 = 由上至下 ↓ 0,1,2,3,4



(0,1)
x,y

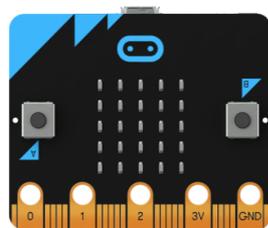
		X				
		0	1	2	3	4
Y	0	0,0	1,0	2,0	3,0	4,0
	1	0,1	1,1	2,1	3,1	4,1
	2	0,2	1,2	2,2	3,2	4,2
	3	0,3	1,3	2,3	3,3	4,3
	4	0,4	1,4	2,4	3,4	4,4

座標_【Led】

※【plot】 = 點亮 x(值)y(值)

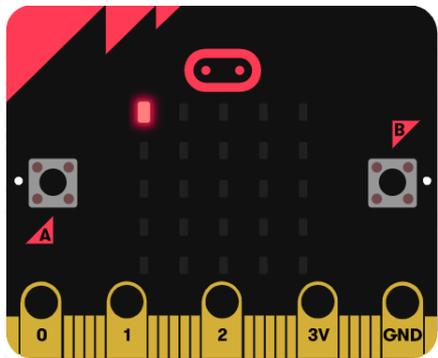
【x座標】 = 由左至右 → 0,1,2,3,4

【y座標】 = 由上至下 ↓ 0,1,2,3,4

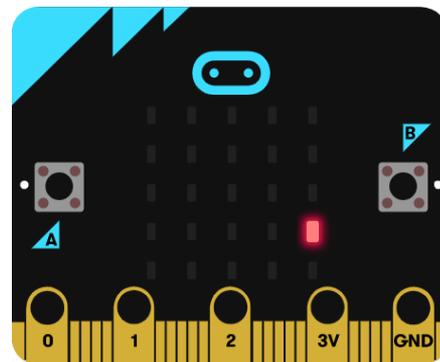


(0,1)
x,y

	X				
	0	1	2	3	4
0	0,0	1,0	2,0	3,0	4,0
1	0,1	1,1	2,1	3,1	4,1
2	0,2	1,2	2,2	3,2	4,2
3	0,3	1,3	2,3	3,3	4,3
4	0,4	1,4	2,4	3,4	4,4



=



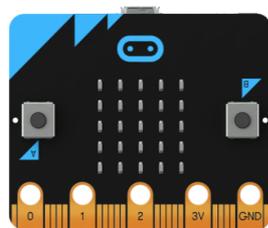
=

座標_【Led】

※【plot】=點亮 x(值)y(值)

【x座標】=由左至右→0,1,2,3,4

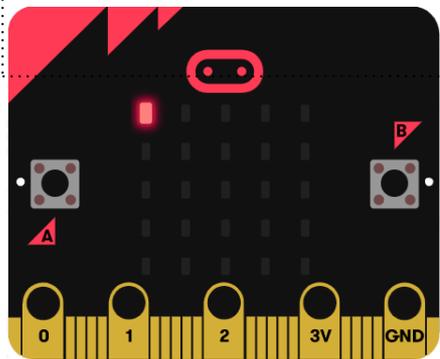
【y座標】=由上至下↓0,1,2,3,4



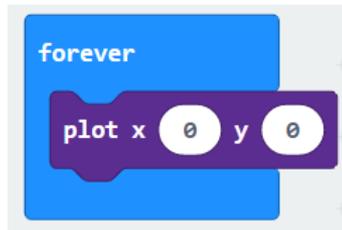
(0,1)
x,y

	X				
	0	1	2	3	4
0	0,0	1,0	2,0	3,0	4,0
1	0,1	1,1	2,1	3,1	4,1
2	0,2	1,2	2,2	3,2	4,2
3	0,3	1,3	2,3	3,3	4,3
4	0,4	1,4	2,4	3,4	4,4

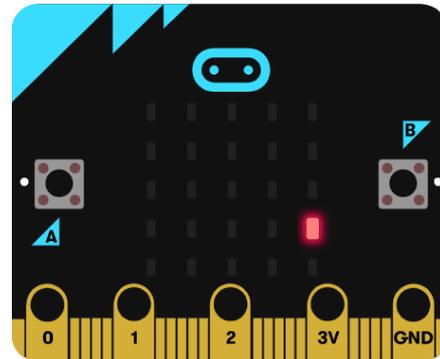
Y



=



=

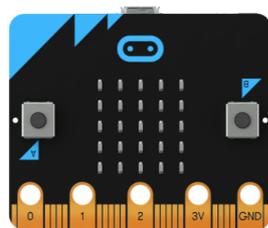


座標_【Led】

※【plot】=點亮 x(值)y(值)

【x座標】=由左至右→0,1,2,3,4

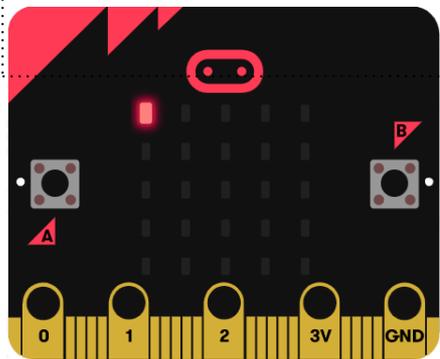
【y座標】=由上至下↓0,1,2,3,4



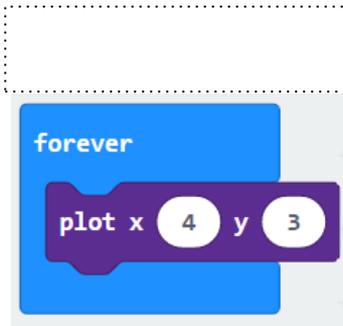
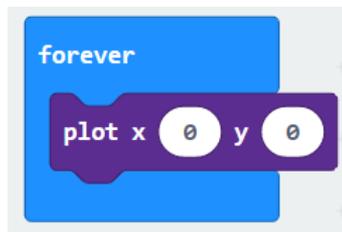
(0,1)
x,y

	X				
	0	1	2	3	4
0	0,0	1,0	2,0	3,0	4,0
1	0,1	1,1	2,1	3,1	4,1
2	0,2	1,2	2,2	3,2	4,2
3	0,3	1,3	2,3	3,3	4,3
4	0,4	1,4	2,4	3,4	4,4

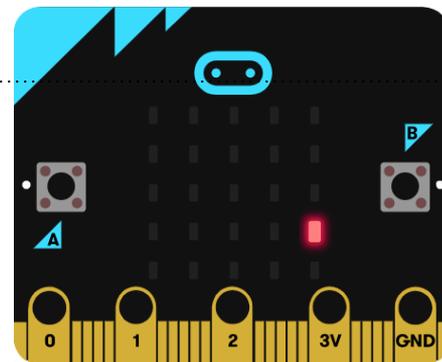
Y



=



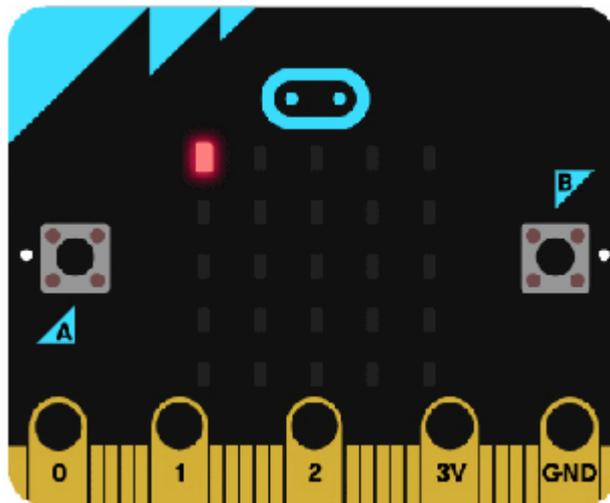
=



動動Led_【Variables】 x 【Led】

讓最上排的Led燈依序動起來!

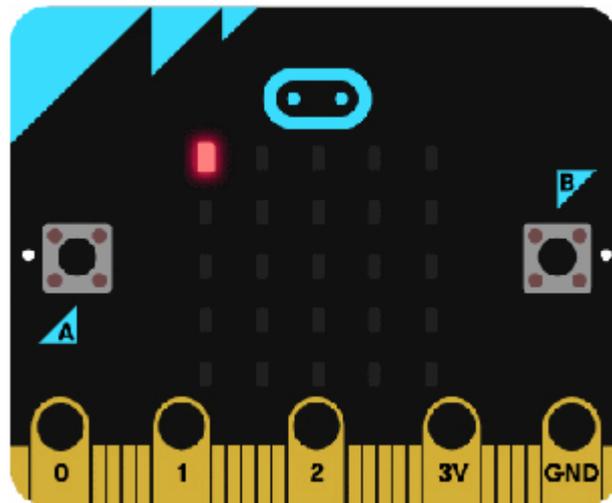
- ※ 【Variables】 = 變數
- ※ 【pause(ms)】 = 暫停(毫秒)
- ※ 【plot】 = 點亮 x(值)y(值)
- ※ 【unplot】 = 不點亮 x(值)y(值)



動動Led_【Variables】x【Led】

讓最上排的Led燈依序動起來!

- ※【Variables】=變數
- ※【pause(ms)】=暫停(毫秒)
- ※【plot】=點亮 x(值) y(值)
- ※【unplot】=不點亮 x(值) y(值)



觀察第一排點燈順序為(0,0) (1,0) (2,0) (3,0) (4,0)

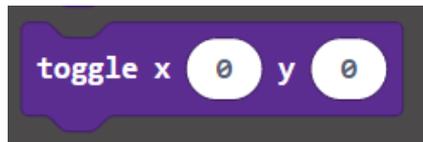
動動Led_【Variables】x【Led】

讓最上排的Led燈依序動起來!

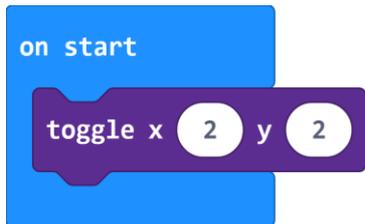
- ※【Variables】=變數
- ※【pause(ms)】=暫停(毫秒)
- ※【plot】=點亮 x(值)y(值)
- ※【unplot】=不點亮 x(值)y(值)

```
forever
  plot x led y 0
  pause (ms) 100
  unplot x led y 0
  change led by 1
```

【Led】_toggle x() y ()



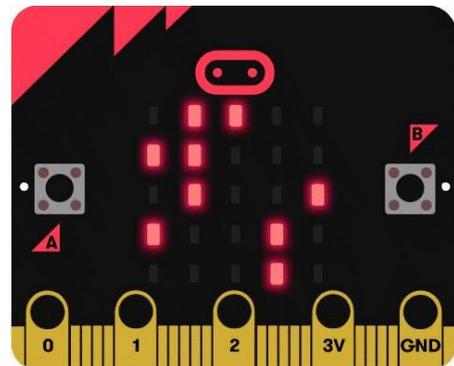
※【toggle() y ()】= 切換LED上特定 x、y 坐標的LED。
作為切換的開關，如果狀態是點亮的就切換為關閉；如果狀態是關閉的就切換為點亮。



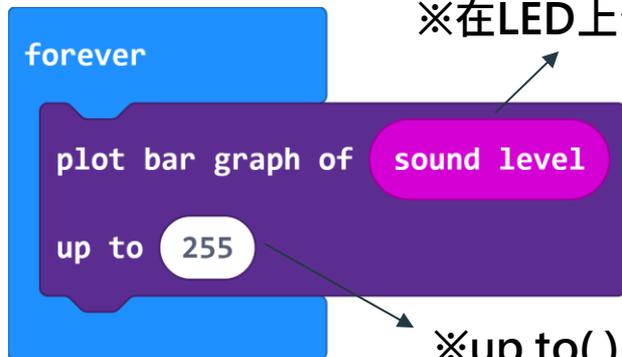
※範例一：了解toggle的運作。



※範例二：簡單製作有趣的動畫。



【Led】_plot bar graph of () up to ()



※在LED上依據設定的of ()顯示值點亮長條圖。

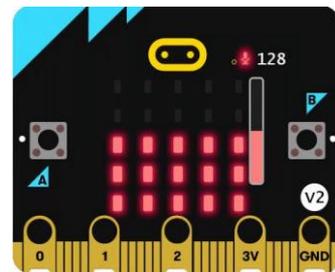
※up to ()的數值為長條圖能顯示的最大數值。

※V2聲浪太強程式：

plot bar graph of "sound level" = "以聲音響度"點亮長條圖。

將麥克風偵測到的音量顯示在micro:bit正面的5x5 LED上。

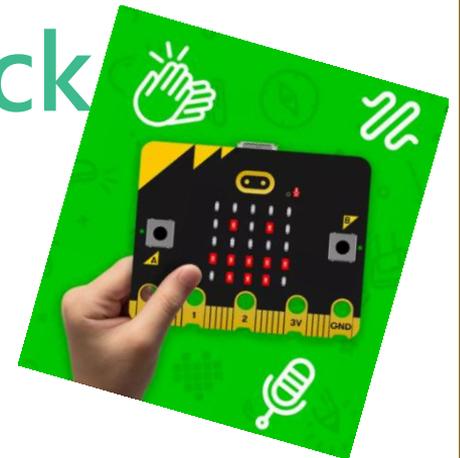
(麥克風偵測聲音的數值為0~255)。





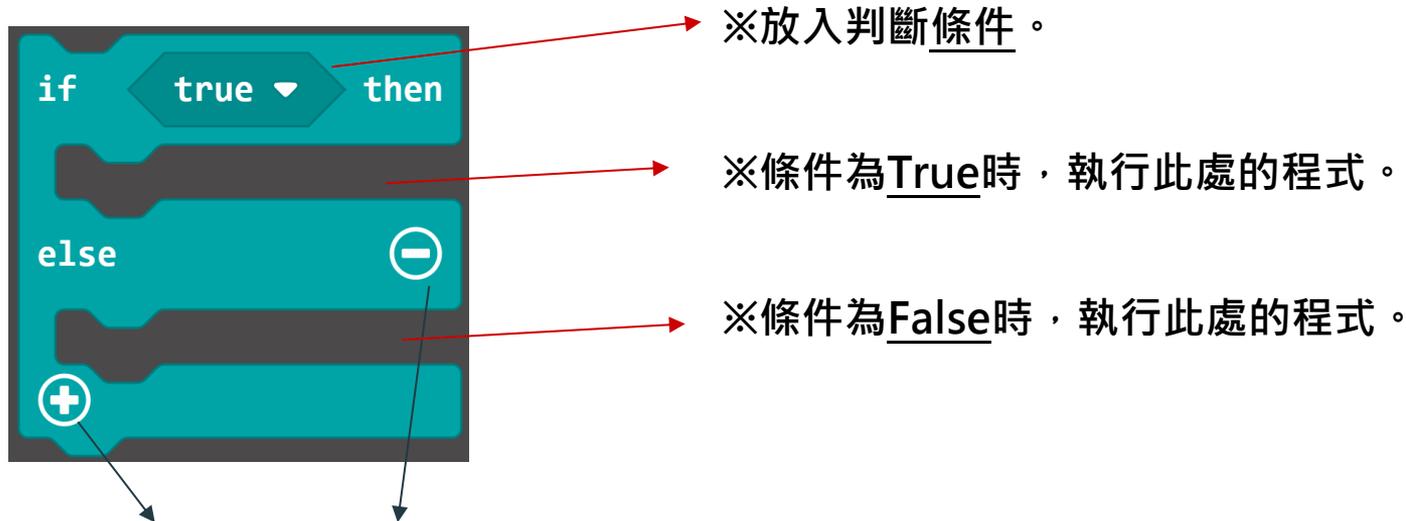
micro:bit

MakeCode x 【Logic】 block



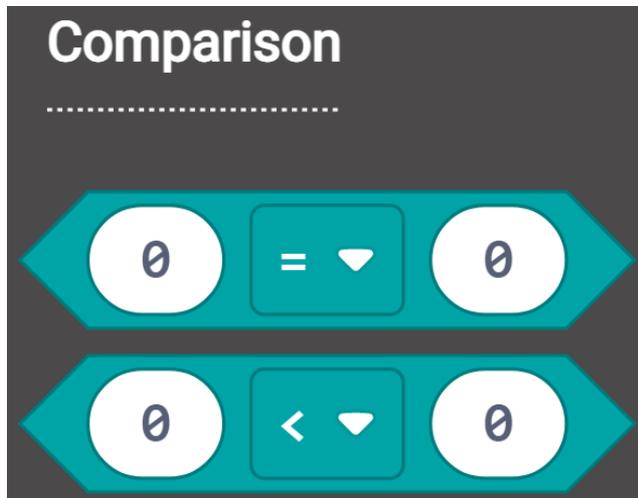
MakeCode_ 【Logic】

※【if—then—else】=「如果—那麼—否則」，具有多重條件的執行選項。
依據條件的True(真)或False(假)來分別執行不同的程式。

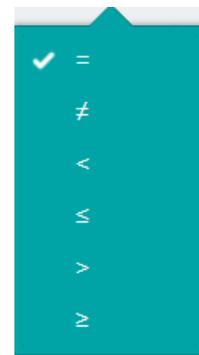


用【+】新增更判斷條件。
用【-】減少程式判斷條件。

MakeCode_【Logic】

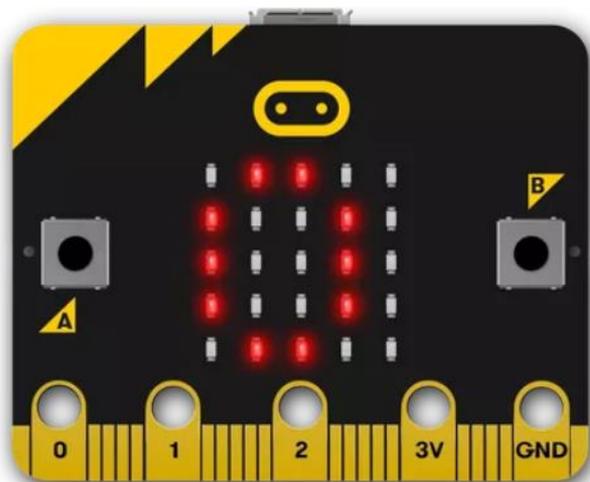


※比較左右兩邊數值的關係是否相等 (=)
不等於 (≠)、小於 (<)、小於等於 (≤)
大於 (>) 或大於等於 (≥)。

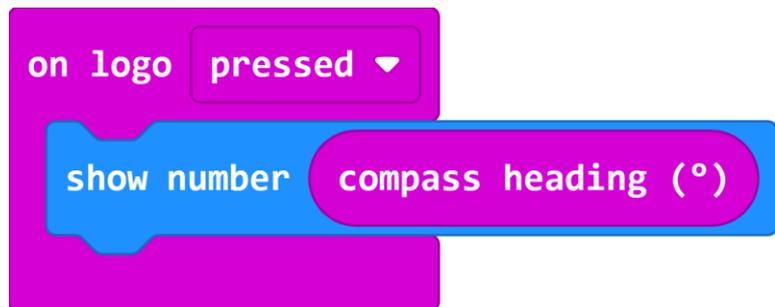


micro:bit 指南針

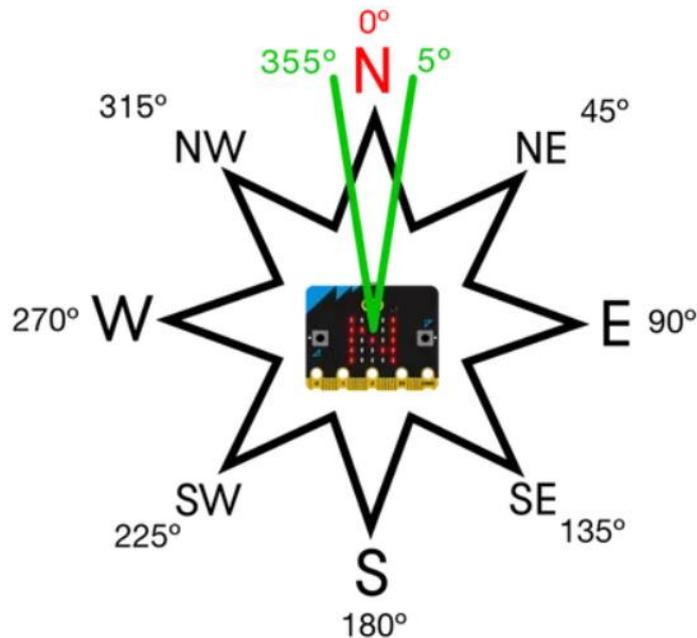
micro:bit內建指南針Compass=電子羅盤，
利用磁力感測晶片偵測特定方位的磁力感測值。



micro:bit 指南針_ 認識方位角數值

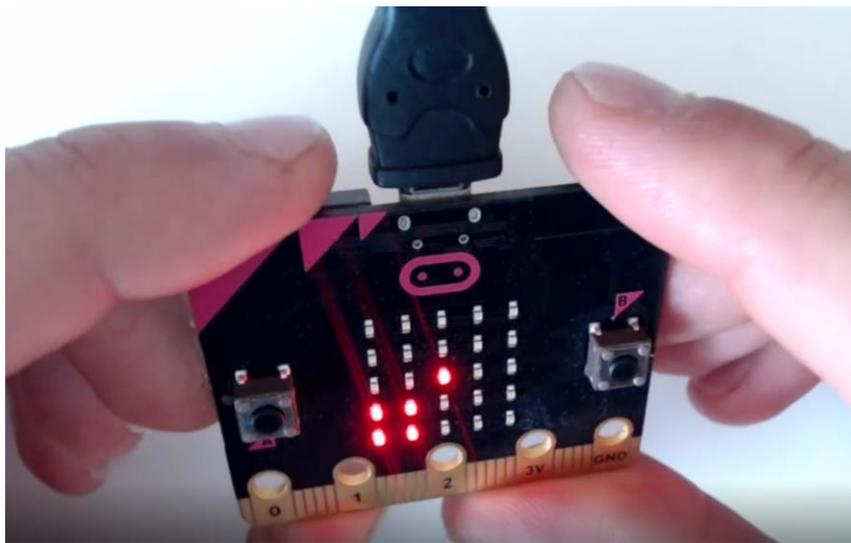


※ **【compass heading】** = 方位感測值



micro:bit 指南針_ 硬體執行校正方式

首次啟動micro:bit指南針時，需先進行校正。LED會顯示"**TILT TO FILL SCREEN**"請您透過傾斜micro:bit使光點都填滿所有的LED，完成後會出現**笑臉圖案**。校正成功就會接著執行您所寫入的程式。

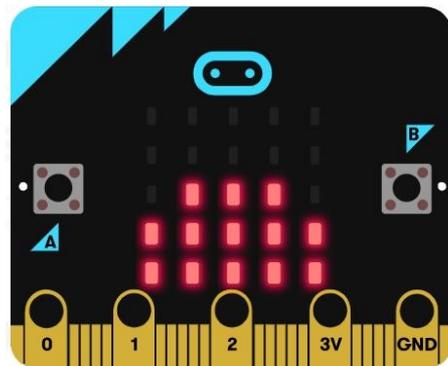


※校正時避開接觸磁鐵、金屬物品等，否則數值就會失準。

磁力強度有多強？

使用磁鐵測試，越靠近micro:bit時，LED填滿的數量就越多！

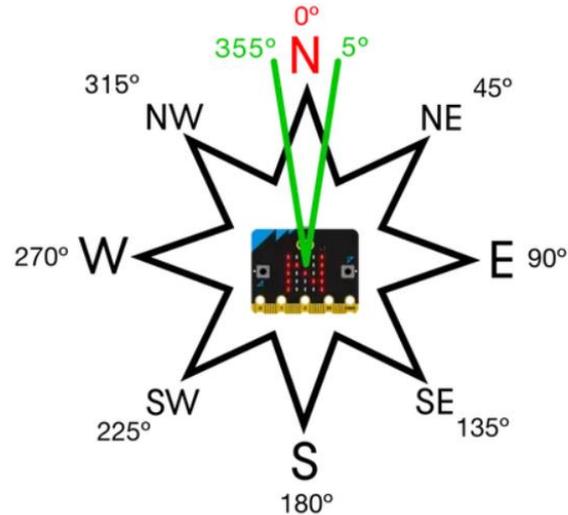
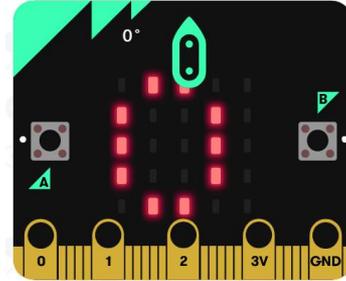
```
forever
  plot bar graph of magnetic force (μT) strength
  up to 255
```



※ **【magnetic_force_strength】** = 磁力感測值_強度

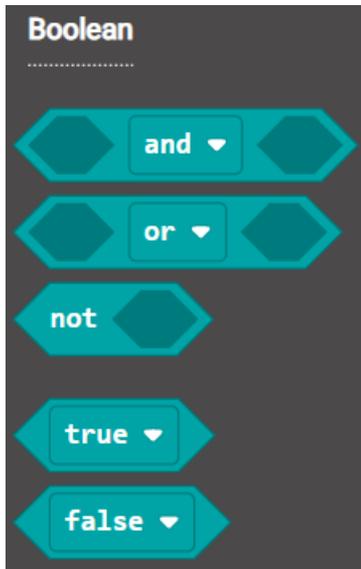
micro:bit 指南針

```
forever
  show number compass heading (°)
  if compass heading (°) ≤ 45 then
    show string "N"
  else if compass heading (°) ≤ 135 then
    show string "E"
  else if compass heading (°) ≤ 225 then
    show string "S"
  else if compass heading (°) ≤ 315 then
    show string "W"
  else
    show string "N"
```



MakeCode_【Logic】

※最常見的三種資料類型：數值、字串、布林值。
布林值(Boolean)是辨別True(真)或False(假)的邏輯資料型別。



※邏輯布林運算

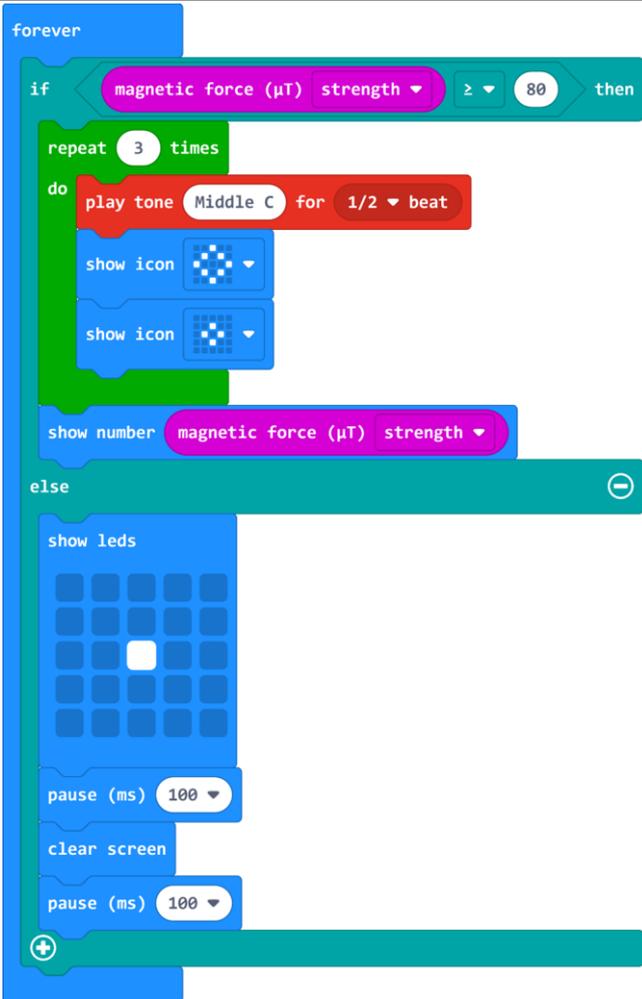
and：判斷「左邊」與「右邊」的布林運算結果是否同時為True(真)。

or：判斷「左邊」與「右邊」的布林運算結果是否其中一個為True(真)。

not：將布林運算結果

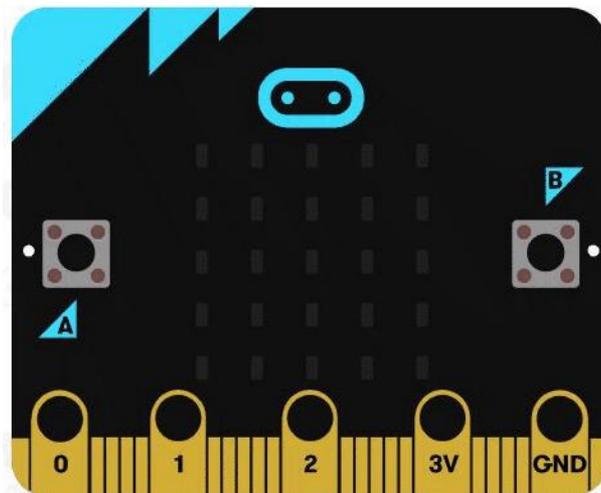
由True(真)改變為False(假)，或由False(假)改變為True(真)。

micro:bit_磁力感測警報器



當磁力強度超過臨界值時，
將重複撥放三次提示聲響及圖示。

否則micro:bit只會閃亮一顆LED燈。



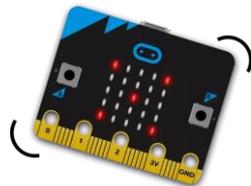
【Logic】_ 骰子機

```
on start  
  show icon [dice icon]
```

```
on shake  
  set dice to pick random 1 to 6
```

```
forever  
  if dice = 1 then  
    show leds [1 dot]  
  else if dice = 2 then  
    show leds [2 dots]  
  else if dice = 3 then  
    show leds [3 dots]
```

```
  else if dice = 4 then  
    show leds [4 dots]  
  else if dice = 5 then  
    show leds [5 dots]  
  else if dice = 6 then  
    show leds [6 dots]
```



【Logic】_true、false

_ 骰子機(增加啟動與關閉功能)

```
on start
  show icon [dice icon]
  set play to false
```

```
on button A pressed
  set play to true
```

```
on button B pressed
  set play to false
```

```
on shake
  if play = true then
    set dice to pick random 1 to 6
```

```
forever
  if dice == 1 then
    show leds [1 dot]
  else if dice == 2 then
    show leds [2 dots]
  else if dice == 3 then
    show leds [3 dots]
  else if dice == 4 then
    show leds [4 dots]
  else if dice == 5 then
    show leds [5 dots]
  else if dice == 6 then
    show leds [6 dots]
```

【Logic】_true、false_ 骰子機(增加清除畫面功能)

```
on start
  show icon
  set play to false
```

```
on shake
  if play = true then
    set dice to pick random 1 to 6
```

```
on button A pressed
  set play to true
```

```
on button B pressed
  set play to false
```

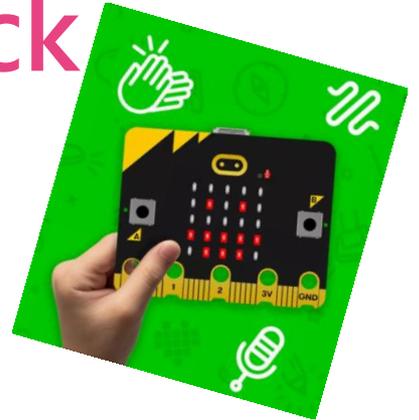
```
forever
  if dice = 1 then
    show leds
  else if dice = 2 then
    show leds
  else if dice = 3 then
    show leds
  else if dice = 4 then
    show leds
```

```
else if dice = 5 then
  show leds
else if dice = 6 then
  show leds
if play = false then
  set dice to 0
  clear screen
```

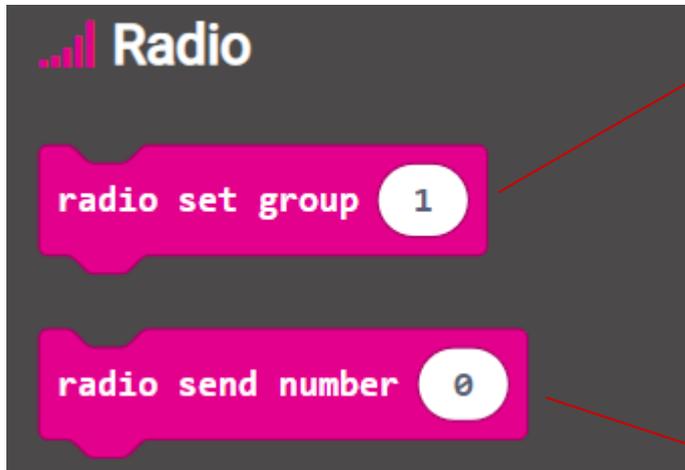


micro:bit

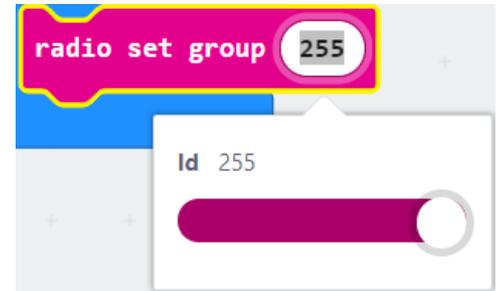
MakeCode x **【Radio】** block



MakeCode_【Radio】

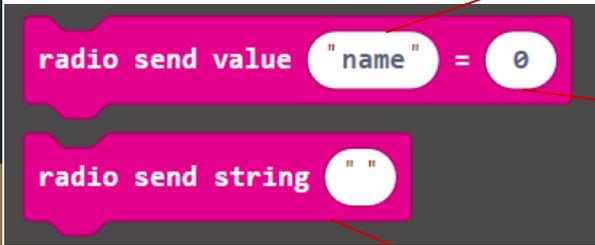


※設定micro:bit廣播的群組Id，不同micro:bit需在相同群組才能接收或發送廣播。群組Id設定範圍：0~255。廣播的距離範圍：最遠約 70 公尺。



※透過廣播發送數字給在相同群組的micro:bit。廣播發送的數字會暫存在 `receivedNumber` 中。

MakeCode_【Radio】

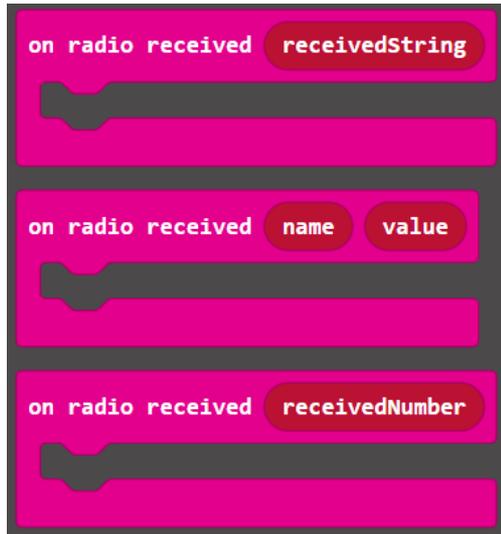


※透過廣播發送一對字串與數字給在相同群組的micro:bit。
廣播發送的字串會暫存在 **name** 變數中，字串長度最多8字元；

廣播發送的數字會暫存在 **value** 變數中。

※廣播發送字串給在相同群組的micro:bit，字串長度最多18字元
廣播發送的字串會暫存在 **receivedString** 變數中。

MakeCode_【Radio】



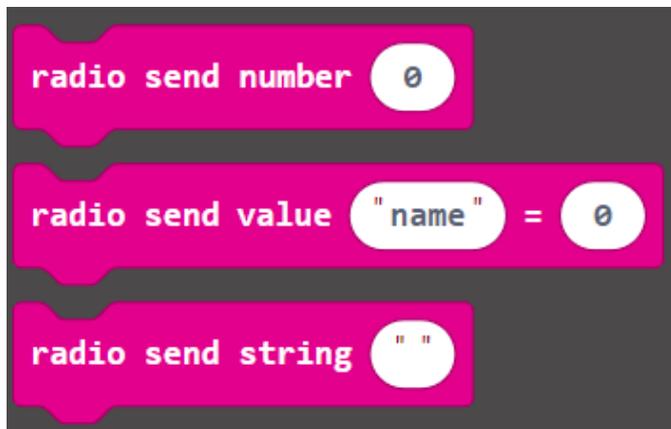
※用來接收相同群組micro:bit發送的字串廣播。

※用來接收相同群組micro:bit發送的一對字串與數字廣播。

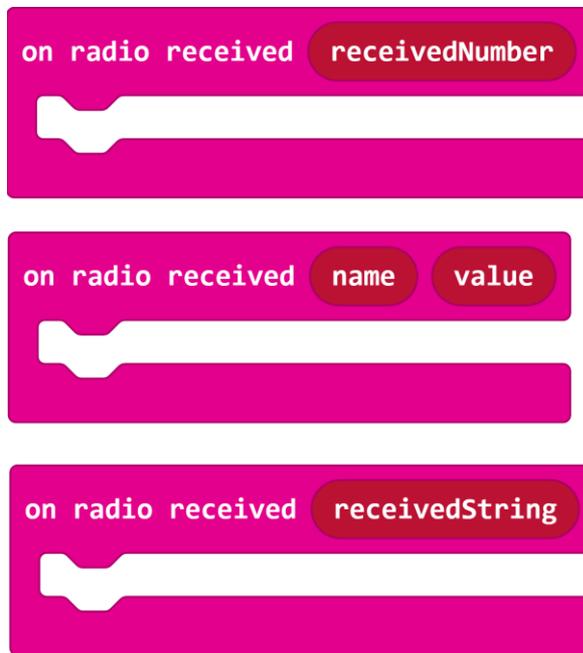
※用來接收相同群組micro:bit發送的數字廣播。

MakeCode_【Radio】

※傳送端

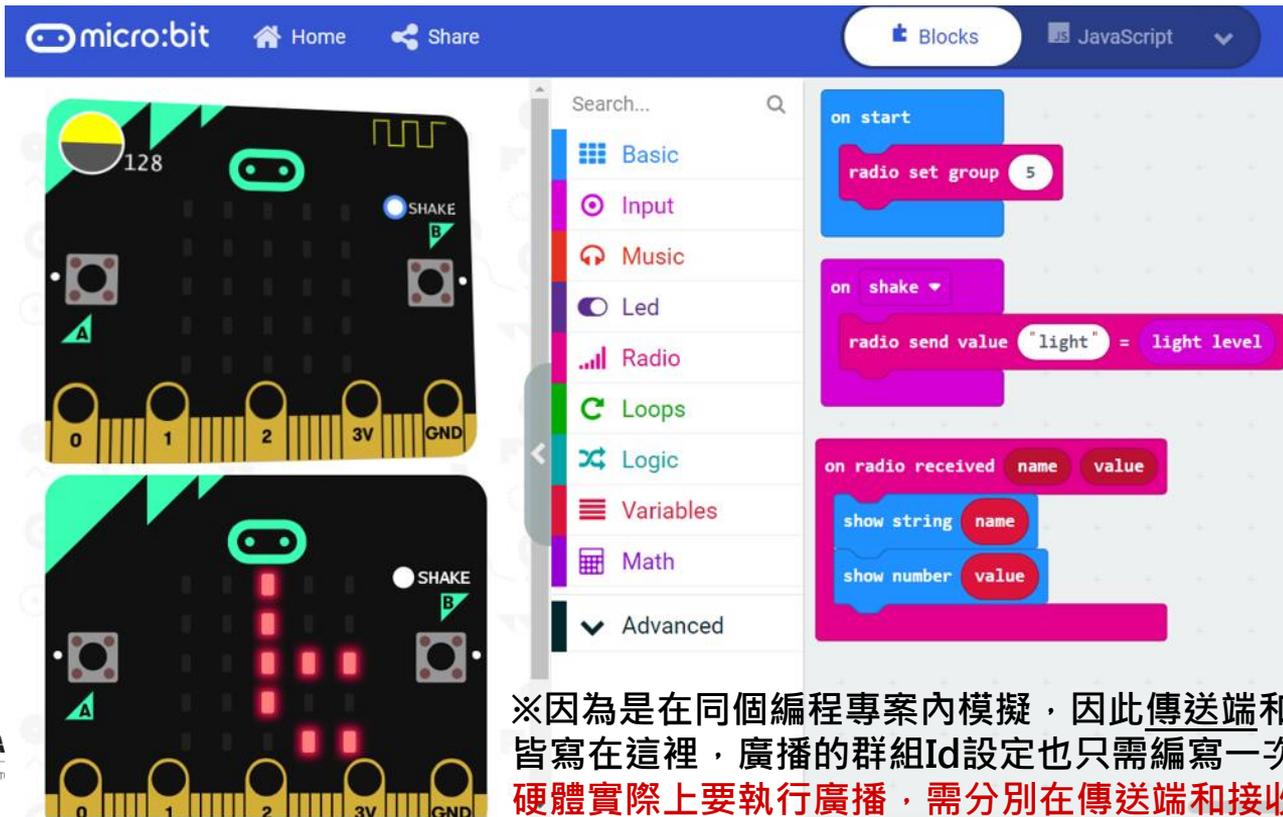


※接收端



【Radio】_回傳室外光線值(同一專案內模擬)

※ 當使用【Radio】積木時，模擬器會自動產生另一個 micro :bit以藍牙傳輸的圖示。

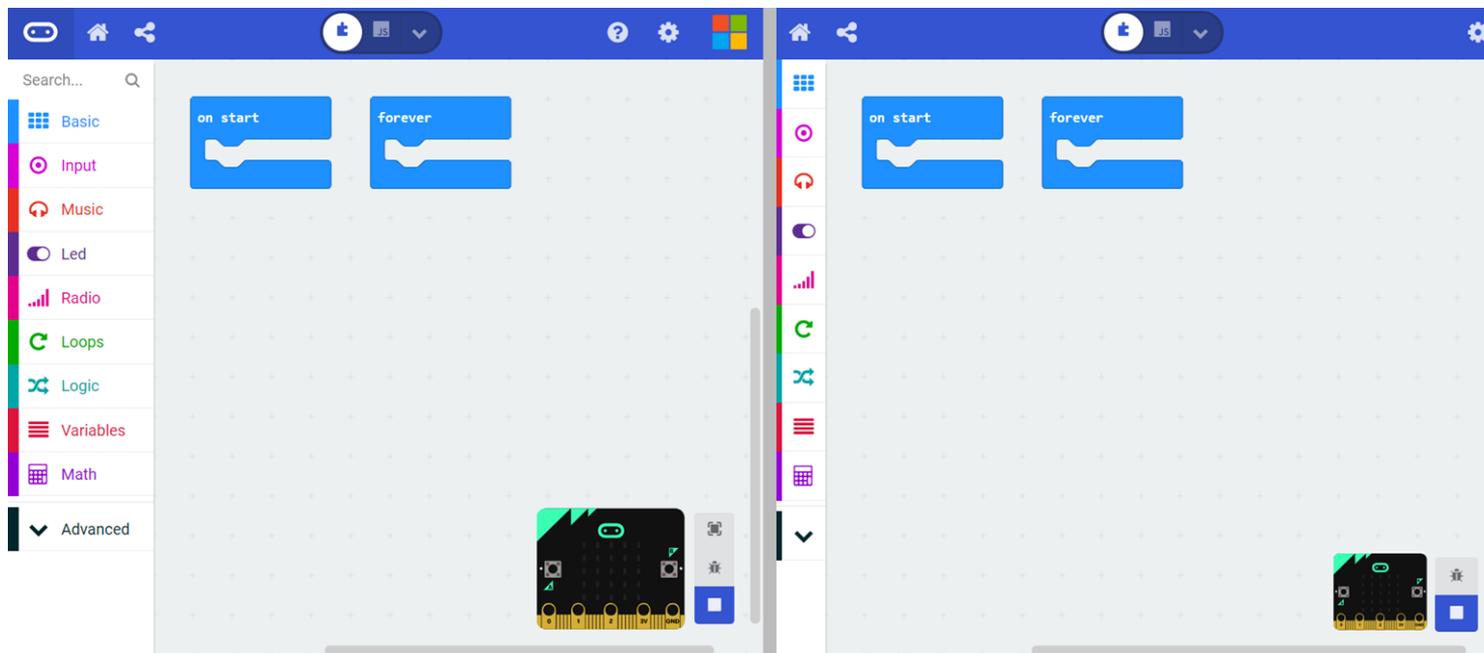


The screenshot displays the micro:bit simulator interface. At the top, there's a navigation bar with 'micro:bit', 'Home', 'Share', 'Blocks', and 'JavaScript' options. The main area is split into two parts: on the left, two virtual micro:bit boards are shown. The top board has a yellow and black light sensor icon and a digital display showing '128'. The bottom board has a similar sensor icon and a display showing a red bar chart. On the right, a code editor shows a block-based program. The code starts with an 'on start' block containing a 'radio set group' block with the value '5'. Below that is an 'on shake' block containing a 'radio send value' block with 'light' as the name and 'light level' as the value. At the bottom is an 'on radio received' block with 'name' and 'value' inputs, containing 'show string name' and 'show number value' blocks.

※因為是在同個編程專案內模擬，因此傳送端和接收端的程式皆寫在這裡，廣播的群組Id設定也只需編寫一次。
硬體實際上要執行廣播，需分別在傳送端和接收端都寫入程式。

【Radio】_回傳室外光線值(以兩個專案模擬)

※輸入此[網址](#)就能在一個網頁內開啟兩個MakeCode專案，方便測試兩片micro:bit的廣播功能，以及編寫適用於硬體的程式。



【Radio】_回傳室外光線值(以兩個專案模擬)

The image displays two side-by-side screenshots of the Microsoft MakeCode editor for the micro:bit, illustrating a radio communication setup. The left window is labeled "傳送端" (Transmitter) and the right window is labeled "接收端" (Receiver).

傳送端 (Transmitter) Code:

- on start** block: radio set group 5
- on shake** block: radio send value "light" = light level

接收端 (Receiver) Code:

- on start** block: radio set group 5
- on radio received** block: show string name, show number value

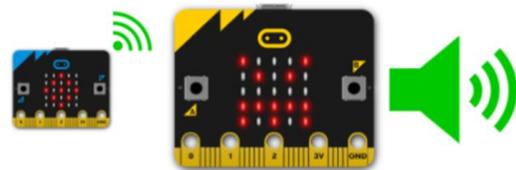
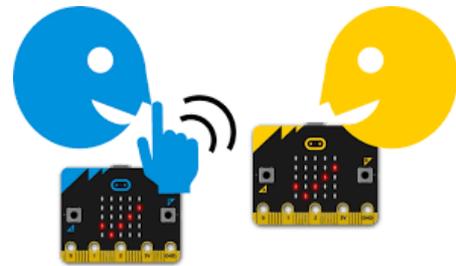
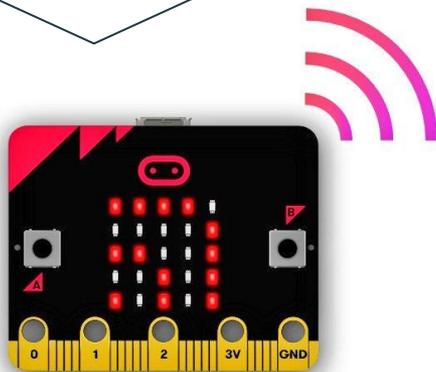
Both windows show a virtual micro:bit board at the bottom right. The left window's sidebar includes a search bar and categories like Basic, Input, Music, Led, Radio, Loops, Logic, Variables, Math, and Advanced.

Makecode_廣播【Radio】x 摩斯密碼

micro:bit的處理器內建低耗電藍牙模組，
透過藍牙廣播傳遞無線訊號。

使用廣播功能可以讓多個micro:bit
之間相互傳遞與接收訊息。

在無干擾、最理想的狀況下最遠達70公尺。
可以透過廣播功能來製作遙控器、互動式遊戲等。

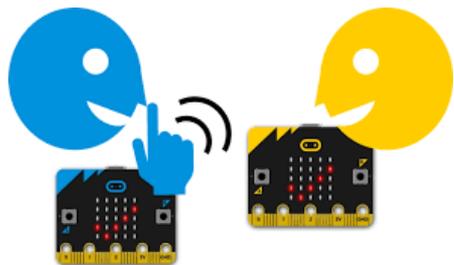


Makecode_廣播【Radio】x 摩斯密碼

A ● -
B - ● ● ●
C - ● - ●
D - ● ●
E ●
F ● ● - ●
G - - ●
H ● ● ● ●
I ● ●

J ● - - -
K - ● -
L ● - ● ●
M - -
N - ●
O - - -
P ● - - ●
Q - - ● -
R ● - ●

S ● ● ●
T -
U ● ● -
V ● ● ● -
W ● - -
X - ● ● -
Y - ● - -
Z - - ● ●



【Radio】_心情廣播機

※傳送端：

```
on start
  radio set group 1

on button A pressed
  radio send number 0
  radio send string "happy"
  show icon [happy icon]

on button B pressed
  radio send number 1
  radio send string "sad"
  show icon [sad icon]

on button A+B pressed
  radio send number 2
  radio send string "angry"
  show icon [angry icon]
```

※接收端：

```
on start
  radio set group 1

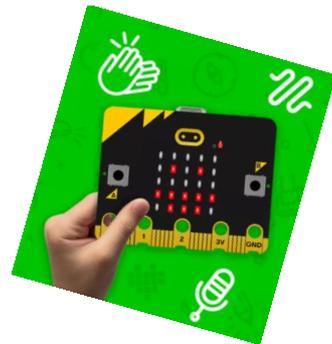
on radio received receivedString
  show string receivedString

on radio received receivedNumber
  if receivedNumber = 0 then
    show icon [happy icon]
  else if receivedNumber = 1 then
    show icon [sad icon]
  else if receivedNumber = 2 then
    show icon [angry icon]
```



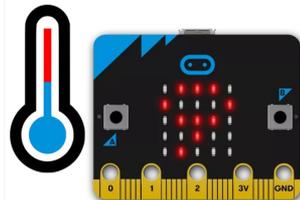
micro:bit

MakeCode x **【Music】** x **【Led】**
x **【Logic】** x **【Radio】** block 綜合運用



【Music】 x 【Led】 x 【Logic】 x 【Radio】

_智慧溫度監測警報器



假設種植在室外的番茄，其適合生長的溫度為15~30°C，超過將不利於生長。安裝在室外的micro:bit透過廣播將溫度超標的提醒傳回給室內的micro:bit，我們就能對植物進行加溫或降溫處理。

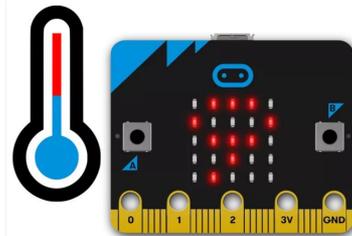
※傳送端：

```
on start
  radio set group 1

forever
  if temperature (°C) ≥ 15 and temperature (°C) ≤ 30 then
    show icon [grid]
  else
    radio send number 1
    show icon [grid]
```

The image shows a Scratch script for a micro:bit. It starts with an 'on start' block containing a 'radio set group' block with the value '1'. This is followed by a 'forever' loop. Inside the loop, there is an 'if' block with two conditions: 'temperature (°C) ≥ 15' and 'temperature (°C) ≤ 30'. If both conditions are met, the 'show icon' block displays a grid icon. If either condition is not met, the 'else' block contains a 'radio send number' block with the value '1' and another 'show icon' block displaying a grid icon.

【Music】 x 【Led】 x 【Logic】 x 【Radio】 _智慧溫度監測警報器



※接收端：

```
on start
  radio set group 1

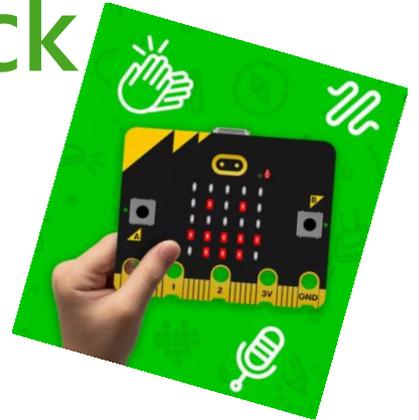
forever
  toggle x pick random 0 to 4 y pick random 0 to 4
```

```
on radio received receivedNumber
  if receivedNumber = 1 then
    play tone Middle C for 1 beat
```



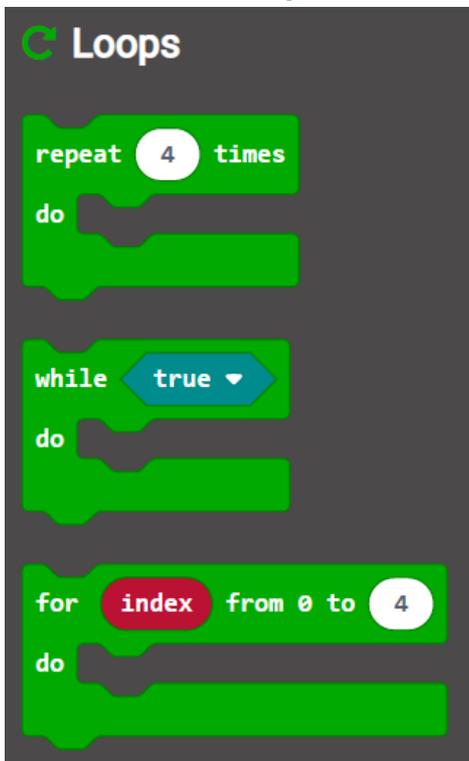
micro:bit

MakeCode x **【Loops】** block



MakeCode_【Loops】

※除了【Basic】的forever之外，當需要程式重複執行多次、或是依指定次數重複時，可以使用【Loops】的相關程式積木，確保程式能以簡短、清晰可讀的方式重複執行多次。



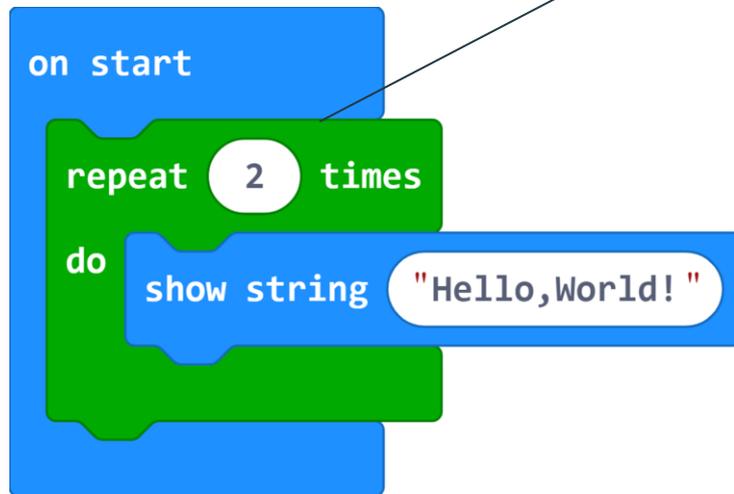
重複迴圈(Repeat Loop)：將程式內容重複執行的指定次數。

條件迴圈(While Loop)：在符合指定條件時，程式將一直重覆運行，直到條件不符合。

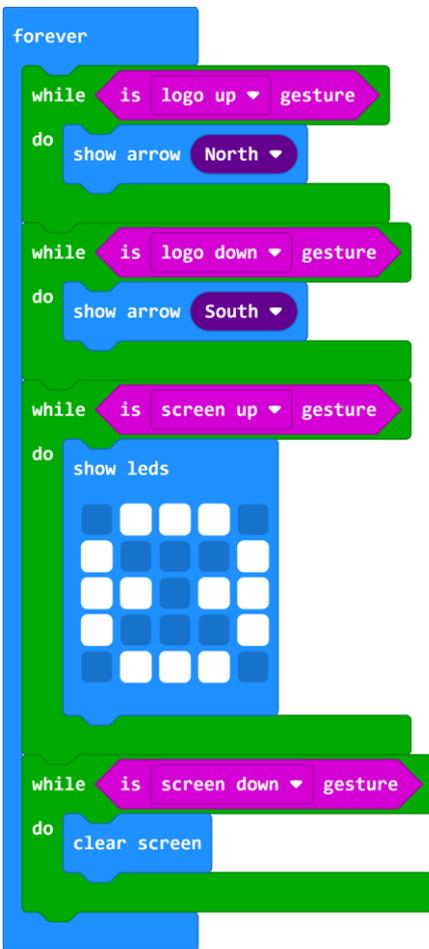
變數迴圈(For Loop)：使程式重覆指定的次數，每運行一次，該變數將會增加1，直到等於結束次數時停止。

MakeCode_【Loops】

※重複迴圈(Repeat Loop)：將程式內容重複執行的指定次數。



MakeCode_【Loops】



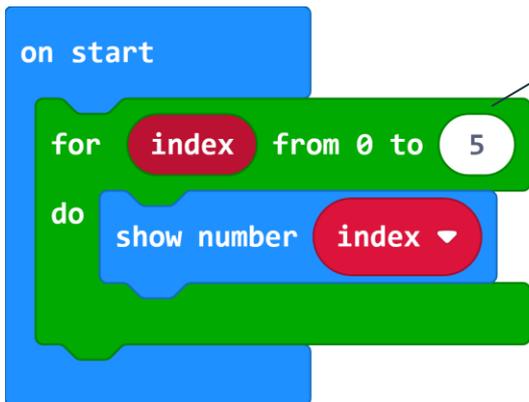
※條件迴圈 (While Loop) :
在符合指定條件時，程式將重覆運行，直到條件不符合。

logo up=micro:bit立著，logo朝上方；
logo down=micro:bit立著，logo朝下方。

screen up=micro:bit平放，正面朝上；
screen down=micro:bit平放，正面朝下。

MakeCode_【Loops】

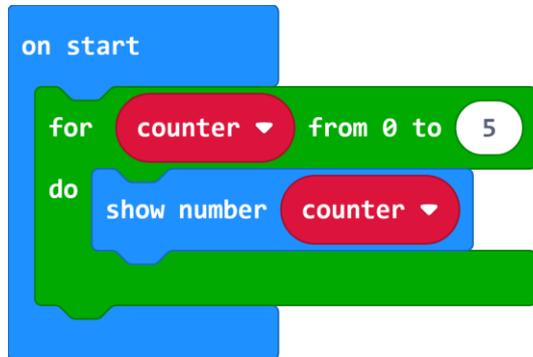
※變數迴圈(For Loop)：使程式重覆指定的次數，每運行一次，該變數將會增加1，直到等於結束次數時停止。



```
on start
for index from 0 to 5
do
  show number index
```

The image shows a Scratch code block. It starts with an 'on start' block. Below it is a 'for' loop block with the variable 'index' selected, ranging from 0 to 5. Inside the loop is a 'do' block with a 'show number' block and the variable 'index' selected.

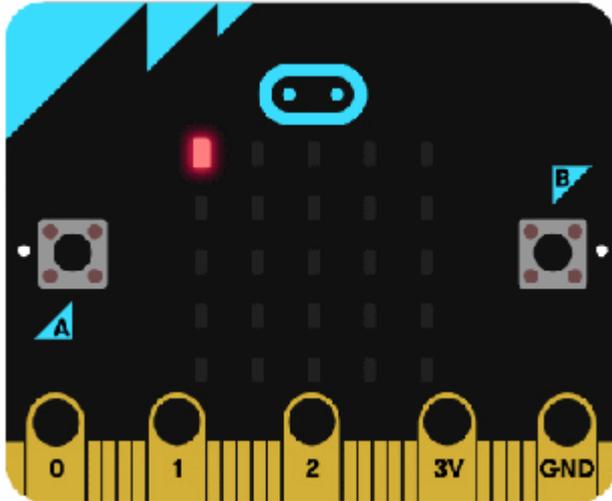
※ **index** 可替換成其他名稱的變數。



```
on start
for counter from 0 to 5
do
  show number counter
```

The image shows a Scratch code block. It starts with an 'on start' block. Below it is a 'for' loop block with the variable 'counter' selected, ranging from 0 to 5. Inside the loop is a 'do' block with a 'show number' block and the variable 'counter' selected.

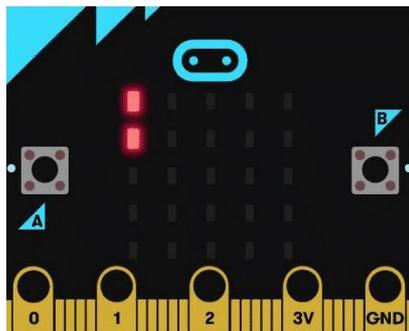
MakeCode_【Loops】



```
forever
  for index from 0 to 4
  do
    plot x index y 0
    pause (ms) 100
    unplot x index y 0
```

【Loops】_ 無限循環led

※先執行外層的變數迴圈 $x=0$ ，再執行內層的 $y=0$ 、 $y=1\dots$ ，執行到 $y=4$ 才會再回到外層 $x=1$ 。因此led點亮的狀態是 $(0,0)$ 、 $(0,1)\sim(0,4)$ ，當 $y=4$ 時停止，接著執行外層的 $x=1$ ，再執行內層的 $y=0$ 、 $y=1\dots$ ，led點亮的狀態是 $(1,0)$ 、 $(1,1)\sim(1,4)$ ，以此類推。



(0,1)
x,y

	X				
	0	1	2	3	4
0	0,0	1,0	2,0	3,0	4,0
1	0,1	1,1	2,1	3,1	4,1
2	0,2	1,2	2,2	3,2	4,2
3	0,3	1,3	2,3	3,3	4,3
4	0,4	1,4	2,4	3,4	4,4

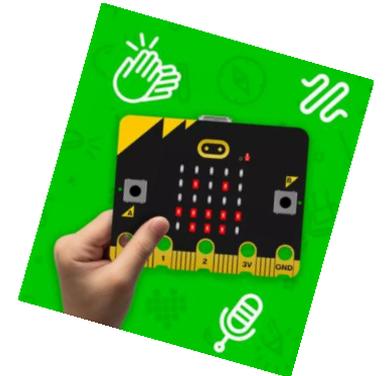
Y

```
forever
  for x from 0 to 4
    do
      for y from 0 to 4
        do
          toggle x x y y
          pause (ms) 100
```

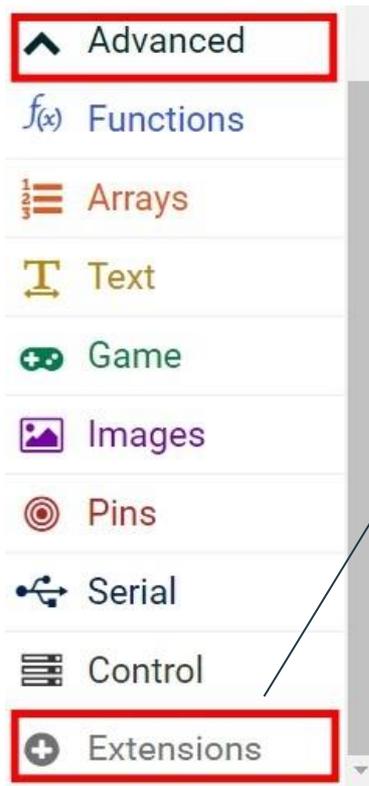


micro:bit

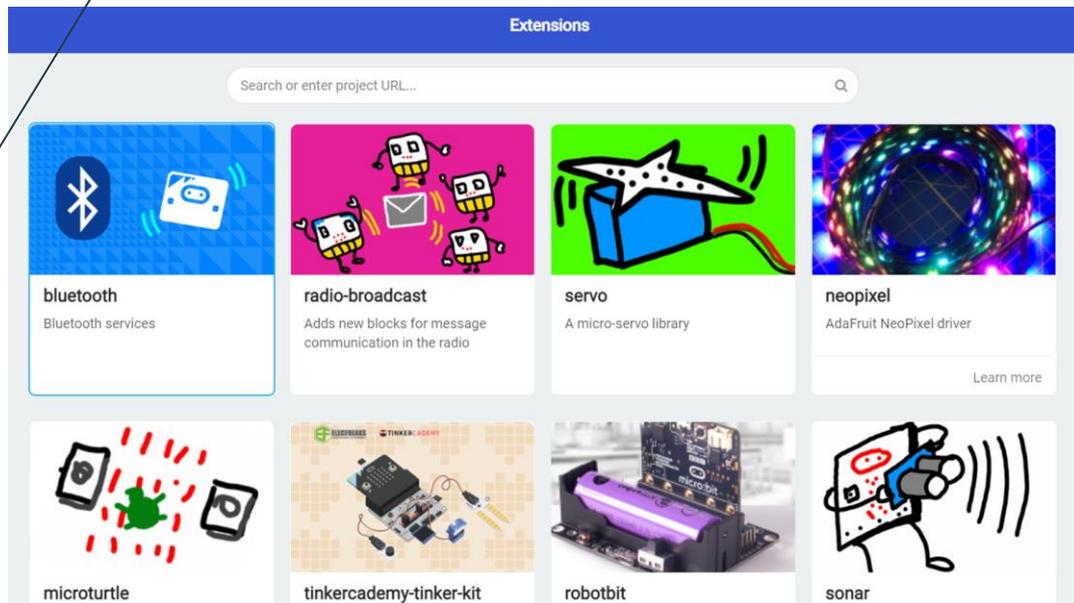
MakeCode x **【Neopixel】** block



Makecode_【Advanced】 & 【Extensions】

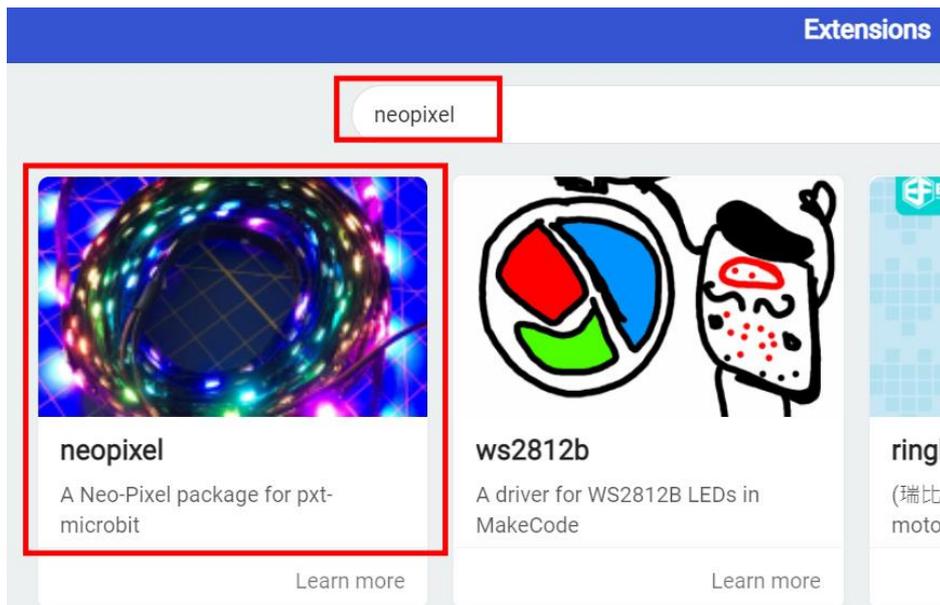


(如左圖)點選【Extensions】擴充功能，
輸入：[neopixel](#)，新增此函式庫來進程式設計。



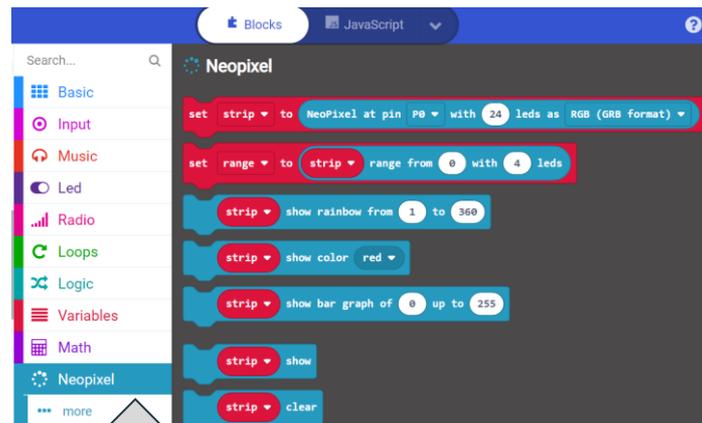
【Extensions】_【Neopixel】

※點選圖片以下載neopixel，即可獲得函式庫來進行與燈相關程式設計。



The screenshot shows the MakeCode Extensions interface. A search bar at the top contains the text 'neopixel'. Below the search bar, three extension cards are visible. The first card, titled 'neopixel', features a glowing LED strip and is highlighted with a red border. The second card, titled 'ws2812b', shows a cartoon character holding a LED strip. The third card, titled 'ringl', shows a ring of LEDs. Each card includes a 'Learn more' link at the bottom.

※下載後的載入畫面。



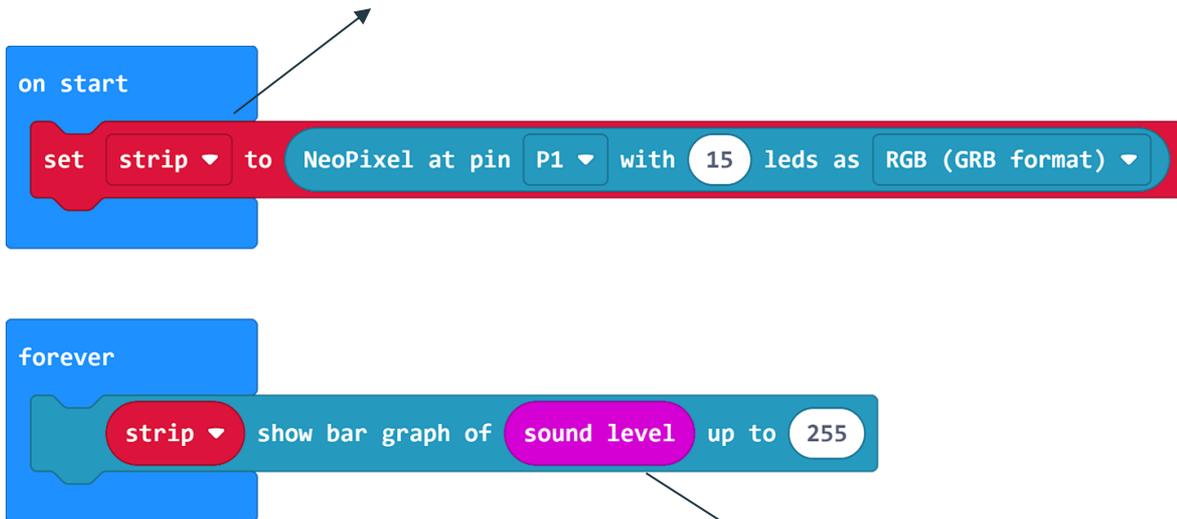
The screenshot shows the MakeCode editor interface with the 'Neopixel' extension loaded. The left sidebar shows a list of blocks, with 'Neopixel' selected. The main workspace shows a script with several blocks: 'set strip to Neopixel at pin P0 with 24 leds as RGB (GRB format)', 'set range to strip range from 0 with 4 leds', 'strip show rainbow from 1 to 360', 'strip show color red', 'strip show bar graph of 0 up to 255', 'strip show', and 'strip clear'. A grey arrow points from the 'Neopixel' block in the sidebar to the 'strip show' block in the script.



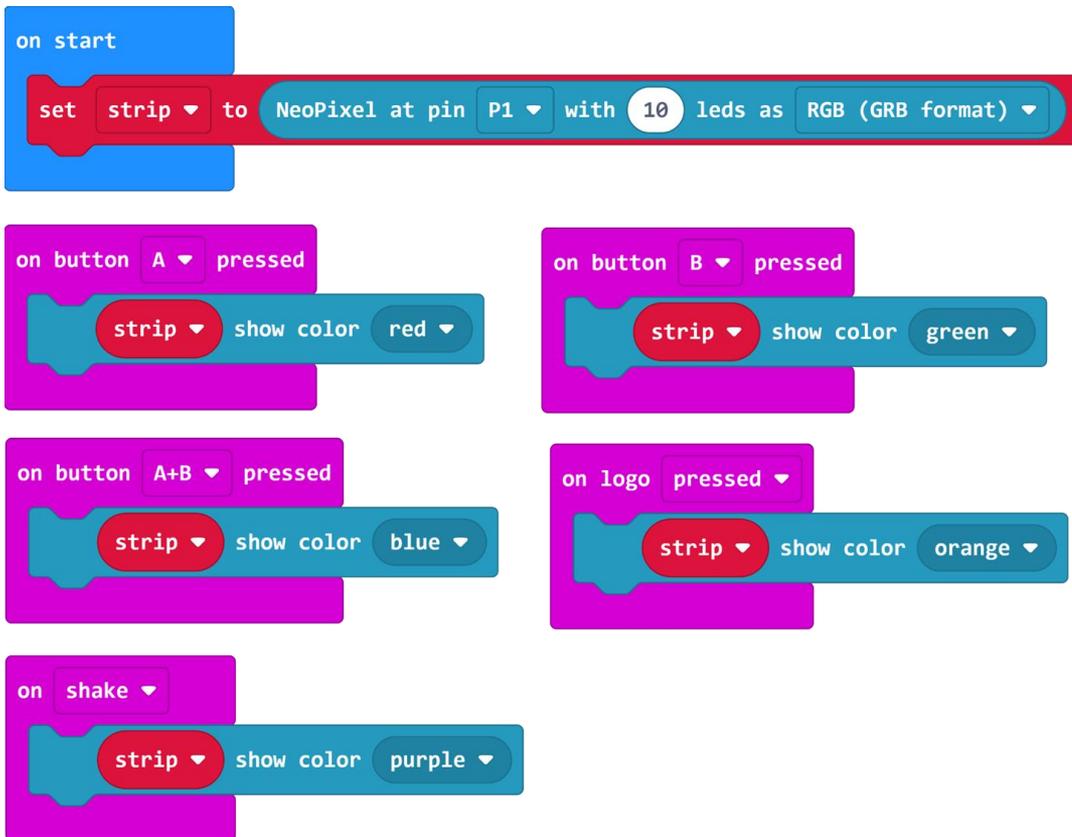
【Neopixel】_呼吸燈

※讓燈條跟著sound level(聲音感測值)產生變化。

※設定燈條接到P1腳位(依實際接線而定)，燈條有10顆燈(數量依硬體而定)設定好後這個燈條會指定到變數strip，藉由設定strip變數，便能控制燈條。



【Neopixel】_控制燈光顏色



The image displays a Scratch script for controlling a Neopixel LED strip. The script begins with an 'on start' block containing a 'set strip to Neopixel at pin P1 with 10 leds as RGB (GRB format)' block. Below this, there are five event-driven blocks: 'on button A pressed' (show red), 'on button B pressed' (show green), 'on button A+B pressed' (show blue), 'on logo pressed' (show orange), and 'on shake' (show purple). Each event block is followed by a 'strip show color' block with the corresponding color selected.

```
on start
  set strip to Neopixel at pin P1 with 10 leds as RGB (GRB format)

on button A pressed
  strip show color red

on button B pressed
  strip show color green

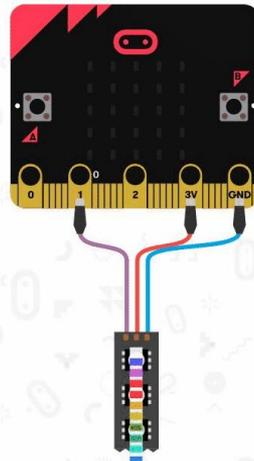
on button A+B pressed
  strip show color blue

on logo pressed
  strip show color orange

on shake
  strip show color purple
```

按下A鍵，燈條所有燈泡呈現紅光；
按下B鍵，燈條所有燈泡呈現綠光；
按下A+B鍵，燈條呈現藍光。
以此邏輯設計更多不同燈光的控制。

【Neopixel】_夜間安全氣氛燈



```
on start
  set strip to NeoPixel at pin P1 with 10 leds as RGB (GRB format)
  strip show rainbow from 1 to 360
```



※這個積木能讓燈上的10顆燈每顆顯示不同的顏色，顏色變化是依據彩虹的色相變化排列。

```
forever
  strip rotate pixels by 1
  strip show
  pause (ms) 100
```



※這個積木組合能讓第1顆的顏色跑去第2顆，而第2顆燈的顏色跑去第3顆
依此類推，最後第10顆燈的顏色跑到第1顆。

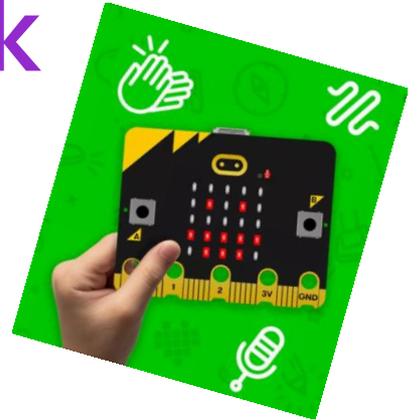
※任何改變都要搭配[strip show刷新顯示]積木才會顯示在燈條上。
※搭配[pause(ms)暫停...毫秒]的積木，以利於看出燈光流動的效果。





micro:bit

MakeCode x **【Math】** block

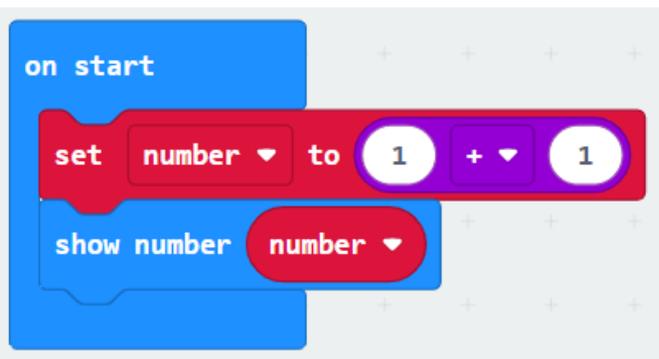


micro:bit 讓數學更有趣

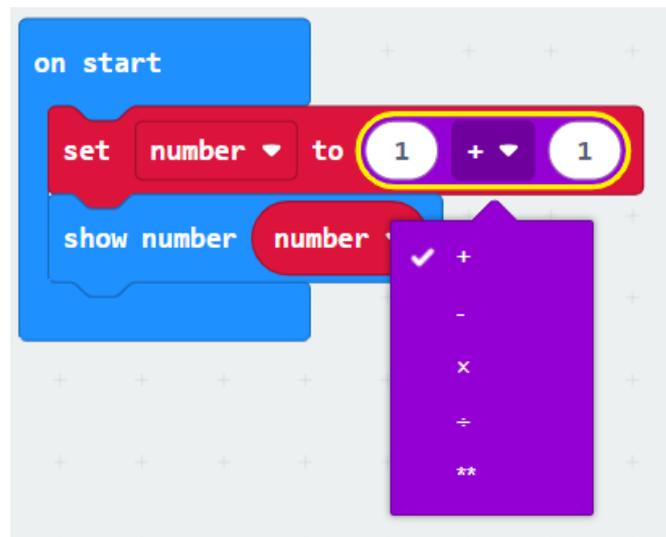


(1)加、減、乘、除_【Input】 x 【Variables】 x 【Math】

※經典題目：1+1=2



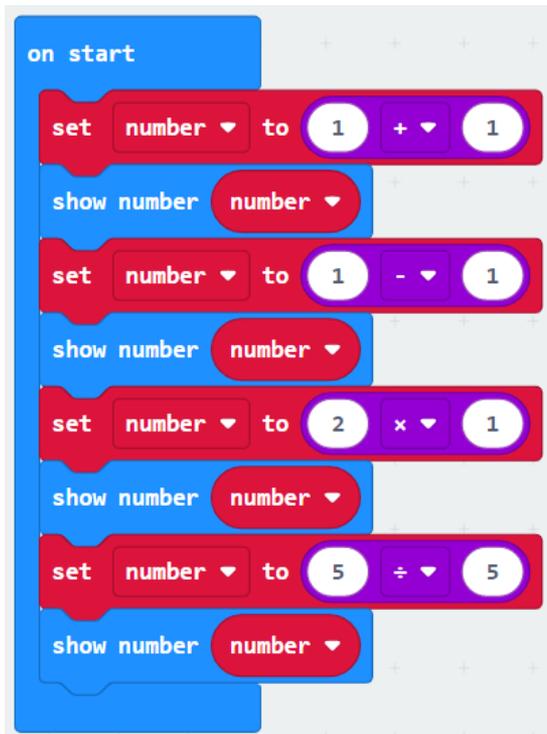
※下拉選擇更多功能



※思考一下，為什麼需要設計變數？

(1)加、減、乘、除_【Input】 x 【Variables】 x 【Math】

運用(+, -, *, /)的計算
來指定秀出一個4位數，請問這個4位數是？



```
on start
  set number to 1 + 1
  show number number
  set number to 1 - 1
  show number number
  set number to 2 x 1
  show number number
  set number to 5 ÷ 5
  show number number
```

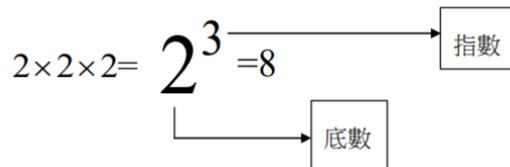
The image shows a Scratch script starting with an 'on start' block. It contains four pairs of 'set number to' and 'show number' blocks. The first pair sets 'number' to 1 + 1 and shows it. The second pair sets 'number' to 1 - 1 and shows it. The third pair sets 'number' to 2 x 1 and shows it. The fourth pair sets 'number' to 5 ÷ 5 and shows it.

(2)餘數、指數_【Input】x【Variables】x【Math】

```
on start
  set number to remainder of 7 ÷ 4
  show number number
```

```
on start
  set number to 5
  set number to number ** 3
  show number number
```

【remainder of】=相除之後的



【**】=指數

指數運算符號會將：

左邊的數字乘以自己右邊數字的次數。

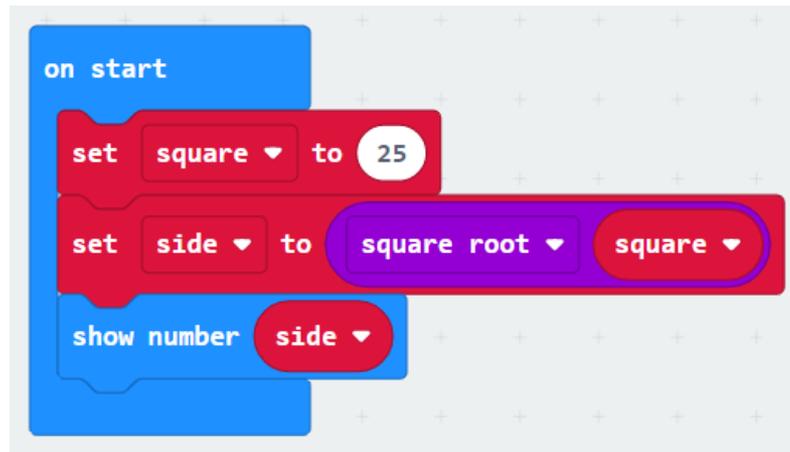
例如： $5 ** 3 = 5 * 5 * 5 =$

(3)平方根_【Input】 x 【Variables】 x 【Math】

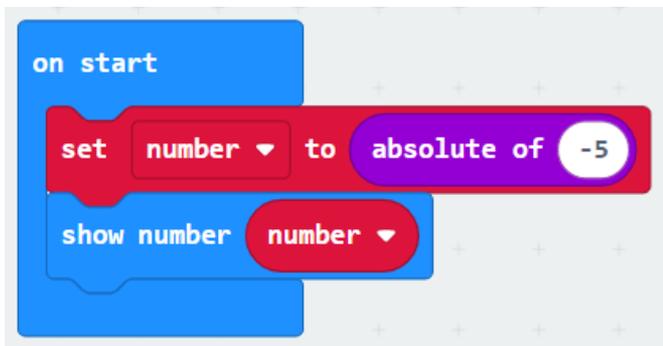
※正方形的面積 = 邊長(side)的平方
已知正方形的面積=25，透過程式來用平方根求出邊長(side)

※程式:

- 1.將變數_square(正方形面積)設為：25
- 2.將變數_side(邊長)設為：square(正方形面積)的平方根
- 3.顯示變數_side(邊長)的數字

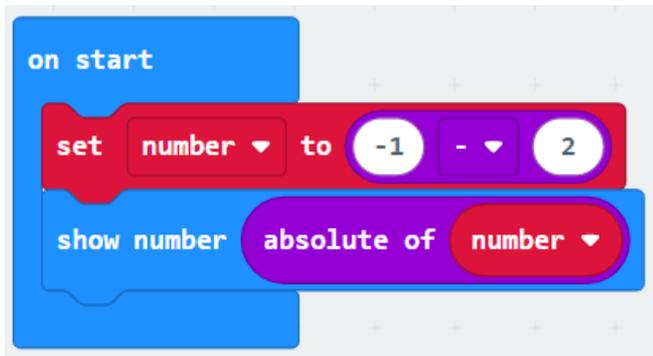


(4) 絕對值_ 【Input】 x 【Variables】 x 【Math】



```
on start
  set number to absolute of -5
  show number number
```

※ 【absolute of】 = 絕對值
當一個數是正數，它的絕對值就是自己
當一個數是負數，把負號拿掉就會是它的絕對值

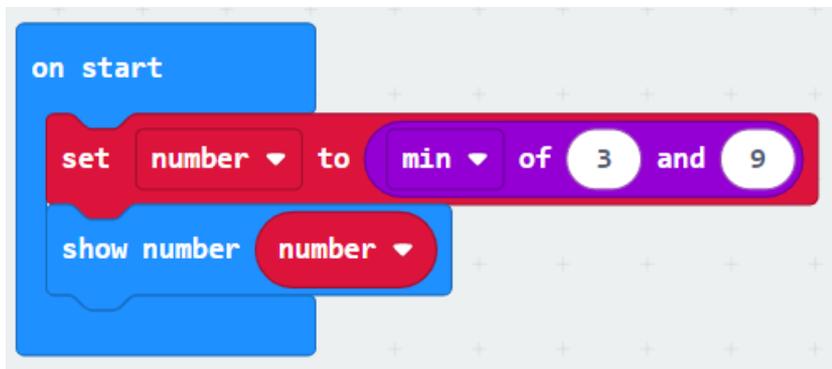


```
on start
  set number to -1 - 2
  show number absolute of number
```

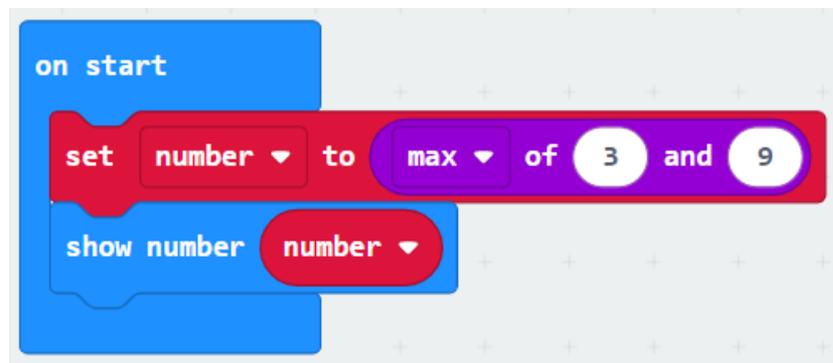
※用程式來計算出數線上兩點間的距離 $|-1-2|$ = 絕對值3

(5)最大值、最小值_【Input】 x 【Variables】 x 【Math】

※ 【min】 = 最小值

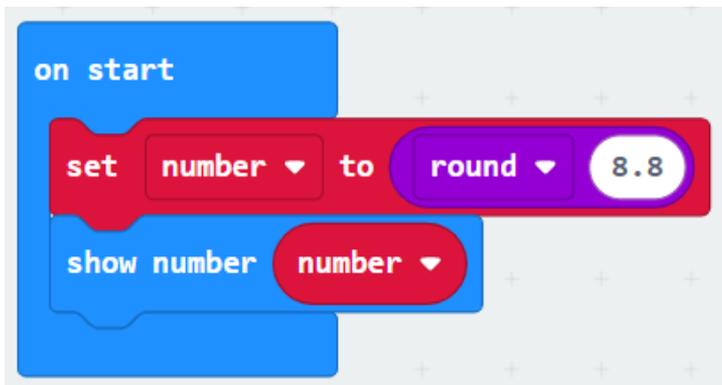


※ 【max】 = 最大值

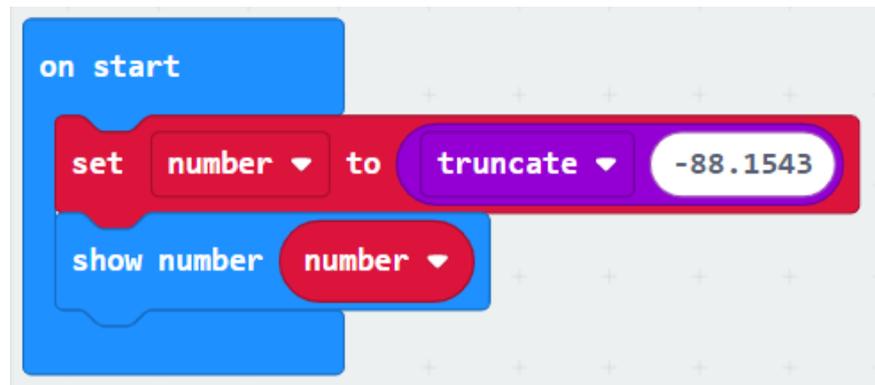


(5)四捨五入、截斷取整_【Input】x【Variables】x【Math】

※【round】=四捨五入

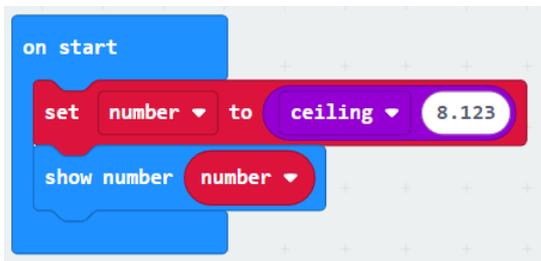


※【truncate】=截斷取整



(6)無條件進位&捨去、隨機取數_【Input】x【Variables】x【Math】

※【ceiling】=無條件進位



```
on start
  set number to ceiling 8.123
  show number number
```

The image shows a Scratch script starting with an 'on start' block. It contains two blocks: a 'set number to ceiling 8.123' block and a 'show number number' block. The 'ceiling' block is highlighted in purple.

※【floor】=無條件捨去



```
on start
  set number to floor 6.98
  show number number
```

The image shows a Scratch script starting with an 'on start' block. It contains two blocks: a 'set number to floor 6.98' block and a 'show number number' block. The 'floor' block is highlighted in purple.

※【random】=隨機取數

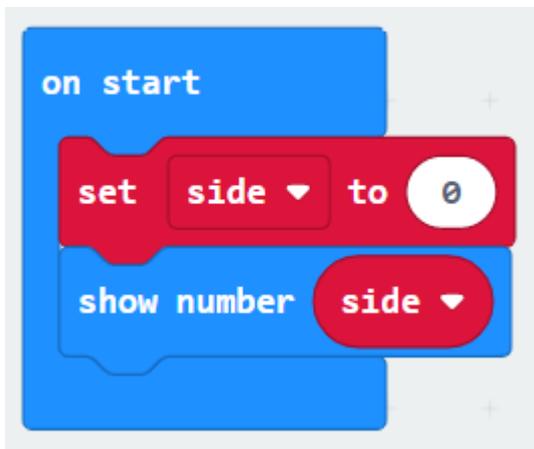


```
on button A pressed
  set number to pick random 0 to 9
  show number number
```

The image shows a Scratch script starting with an 'on button A pressed' block. It contains two blocks: a 'set number to pick random 0 to 9' block and a 'show number number' block. The 'pick random' block is highlighted in purple.

micro:bit行動計算機_立方體體積

編程-1



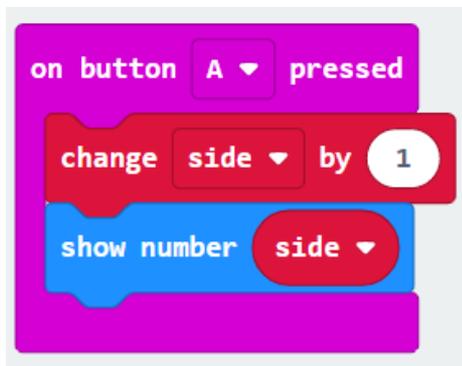
※正方體的體積=邊長×邊長×邊長

※程式:

- 1.新增變數_side為邊長
- 2.當啟動時，邊長歸零，並顯示目前的數字

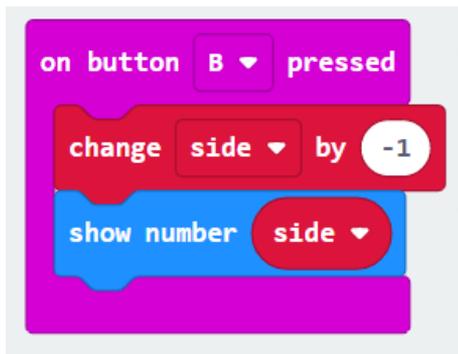
micro:bit行動計算機_立方體體積

編程-2



※當A鍵被按下時，邊長+1，並顯示目前的數字

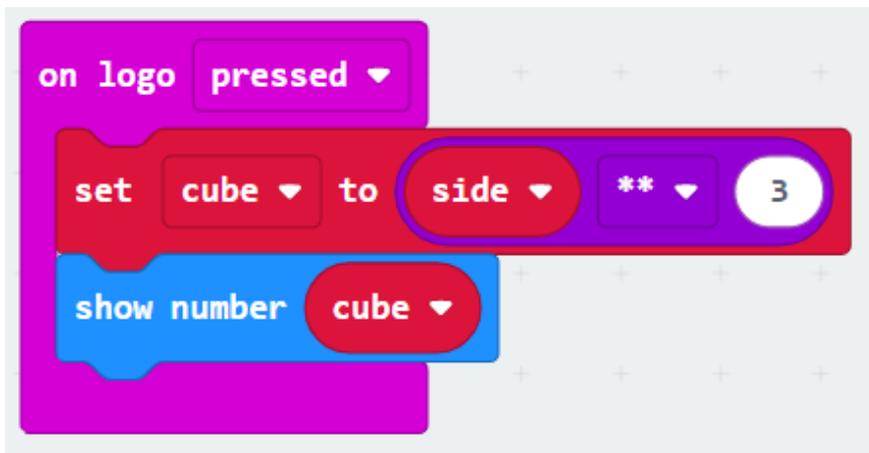
編程-3



※當B鍵被按下時，邊長-1，並顯示目前的數字

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編程-4



※正方體的體積=邊長×邊長×邊長

※程式:

- 1.新增變數_cube為立方體體積
- 2.按一下logo→ side x side x side
→計算出立方體體積

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※編程1-4總覽

```
on start
  set side to 0
  show number side
```

```
on button A pressed
  change side by 1
  show number side
```

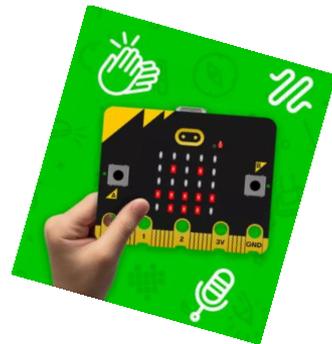
```
on button B pressed
  change side by -1
  show number side
```

```
on logo pressed
  set cube to side ** 3
  show number cube
```



micro:bit

MakeCode x 【Loops】 x 【Math】
x 【Neopixel】 block 綜合運用



【Loops】 x 【Math】 x 【Neopixel】 _轉吧轉吧 七彩霓虹燈

設計讓每個燈泡都依照彩虹的顏色順序顯示不同的顏色，當按下A鍵，燈泡會依照順序輪流變換顏色50次；按下B鍵則反方向變換顏色50次；按下A+B的按鍵則所有燈泡都熄滅(顯示黑色=關閉燈泡)。

```
on start
  set strip to NeoPixel at pin P1 with 10 leds as RGB (GRB format)
  strip show rainbow from 1 to 360
```

```
on button A pressed
  repeat 50 times
    do
      strip rotate pixels by 1
      strip show
      pause (ms) pick random 50 to 200
```

```
on button B pressed
  repeat 50 times
    do
      strip rotate pixels by -1
      strip show
      pause (ms) pick random 50 to 200
```

```
on button A+B pressed
  strip show color black
```

※當按下A+B鍵時，因變數_strip已被定義為黑色(=關閉燈泡)，因此再去按A鍵或B鍵是無法亮燈的。
可以透過micro:bit背面的reset鍵重新啟動程式，或模擬器的  再次體驗。



micro:bit

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