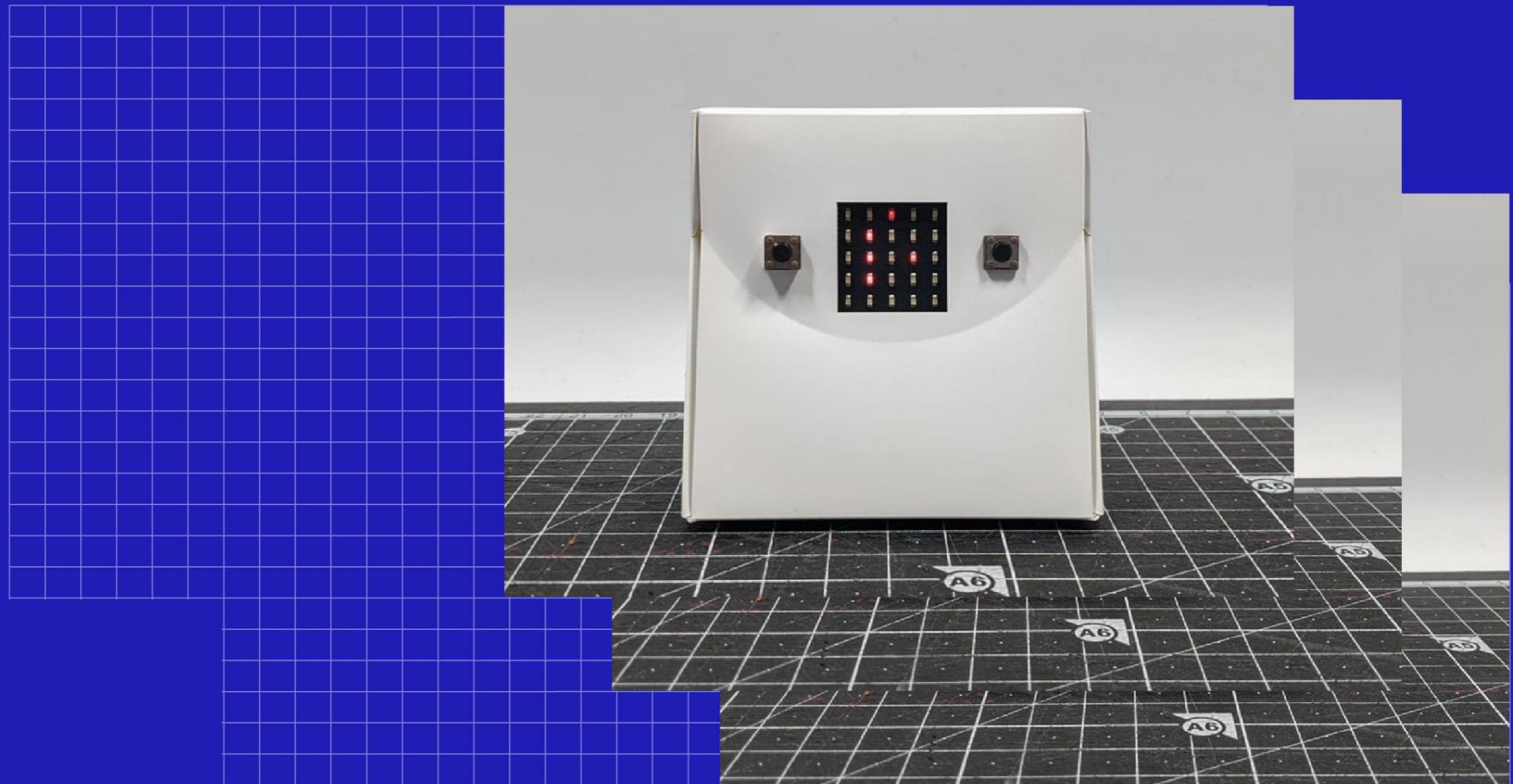


防疫時尚， 救國也要有型！

自製額溫槍工作坊
DIY Micro:bit Infrared Thermometer Workshop



主辦單位:C-LAB 空總臺灣當代文化實驗場 科技媒體實驗群

計畫說明

- 空總臺灣當代文化實驗場C-LAB的科技媒體實驗群，著重於實驗創新與社會鏈結，因此將成立各類項科技媒體實驗室，以跨域、共創、協作方式，打造文化與科技的實驗平台
- 全球因COVID-19疫情持續升溫，全球防疫物資掀起搶購亂象，為發揮實驗自造者 Maker 精神，C-LAB 將舉辦系列 DIY 講座活動，推出防疫二部曲：自製Micro:bit額溫槍及紫外燈消毒口罩工作坊，由背景來自生物醫學、電子工程、科技藝術家、建築等講師共同主動發起參與，以藝術行動主義支持防疫，一起捲起袖子，透過知識原理分享及實作，帶領大家認識紫外線消毒原理與實際效果，並動手自製 Micro:bit 額溫槍

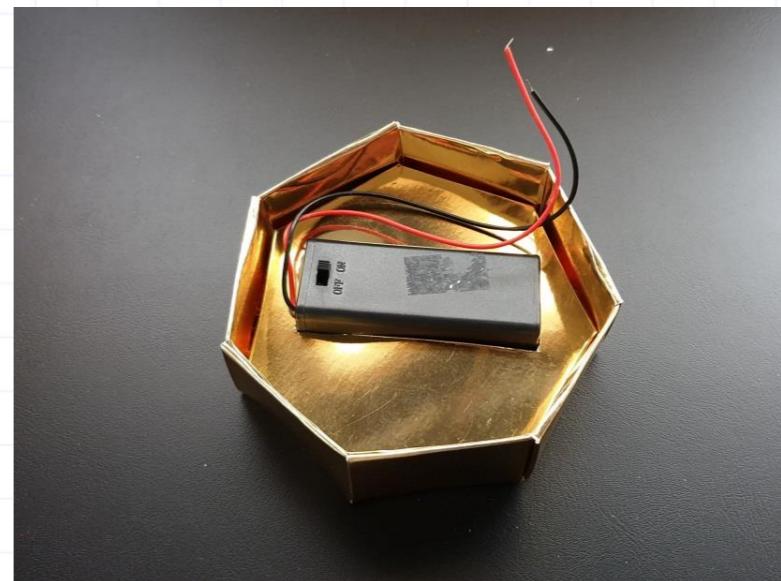
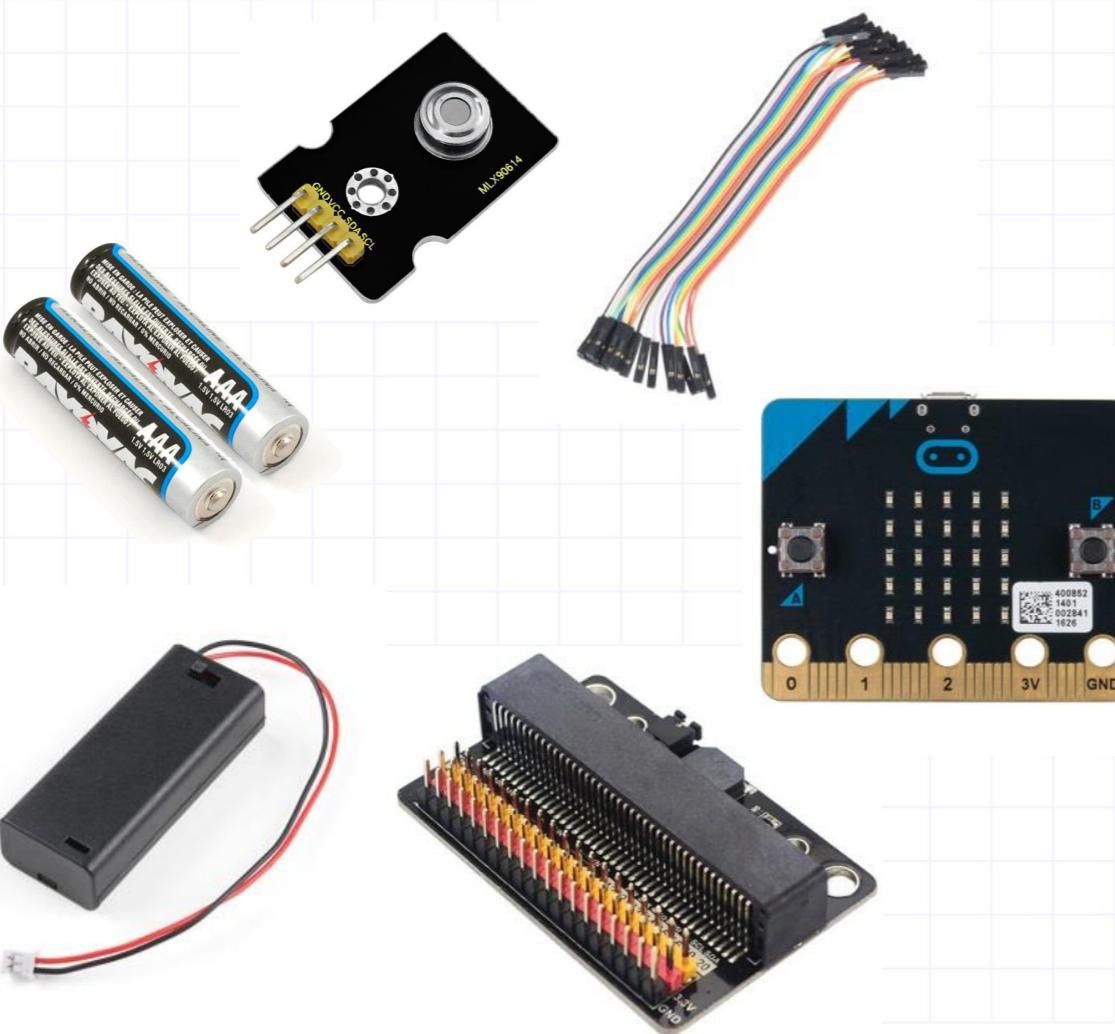
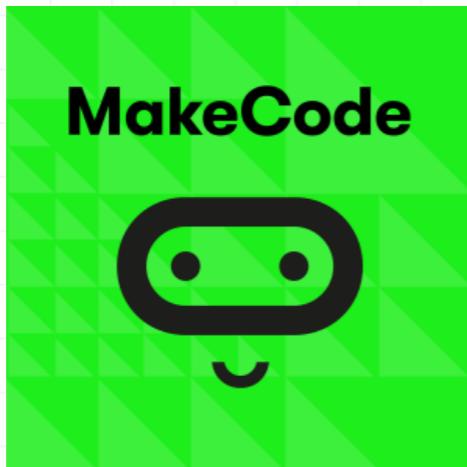


臺灣當代文化實驗場
Taiwan Contemporary Culture Lab

自製額溫槍工作坊 DIY Micro:bit Infrared Thermometer Workshop

工作坊流程

工作坊流程





臺灣當代文化實驗場
Taiwan Contemporary Culture Lab

自製額溫槍工作坊 DIY Micro:bit Infrared Thermometer Workshop

清點零件 與背景知識

清點零件與背景知識

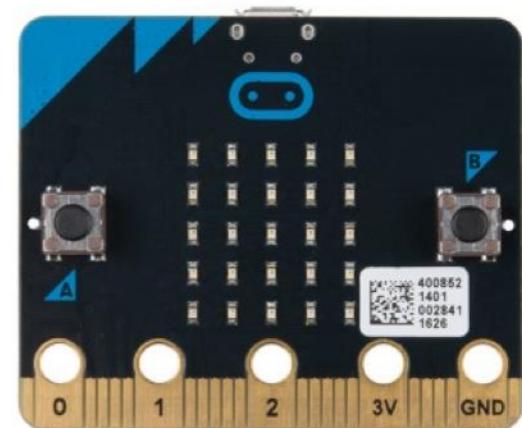
A



+



B



3號電池x2 + 電池盒

Micro:bit 主板

E



D



C



感溫感應器

電子跳線

轉接板

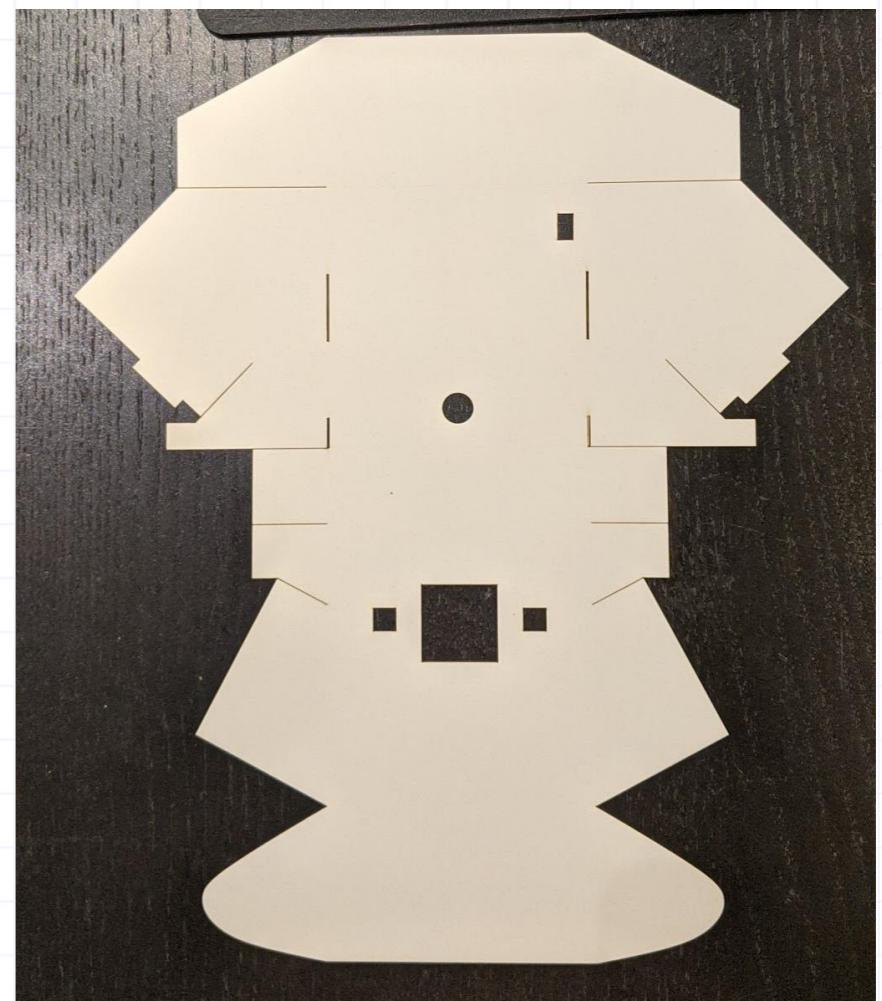
清點零件與背景知識

F



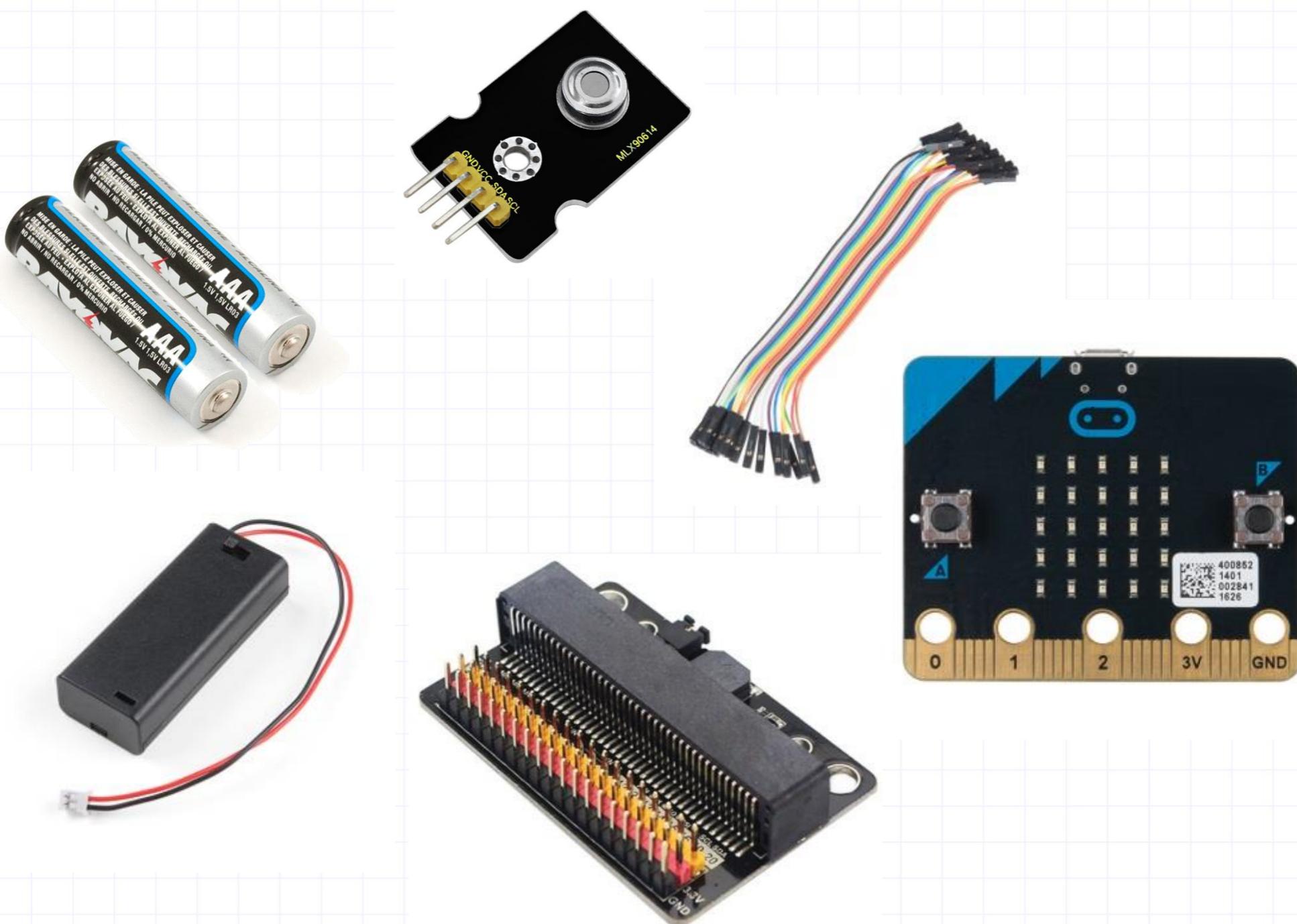
Micro USB 線

G



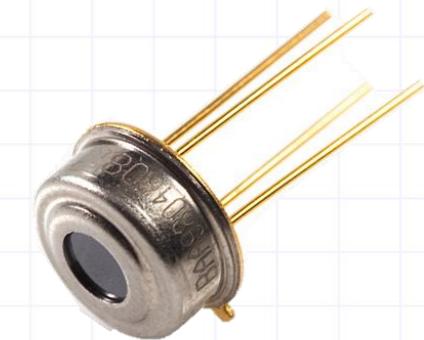
外殼紙模一份

準備這些東西，跟我要做的額溫盒有甚麼關係？

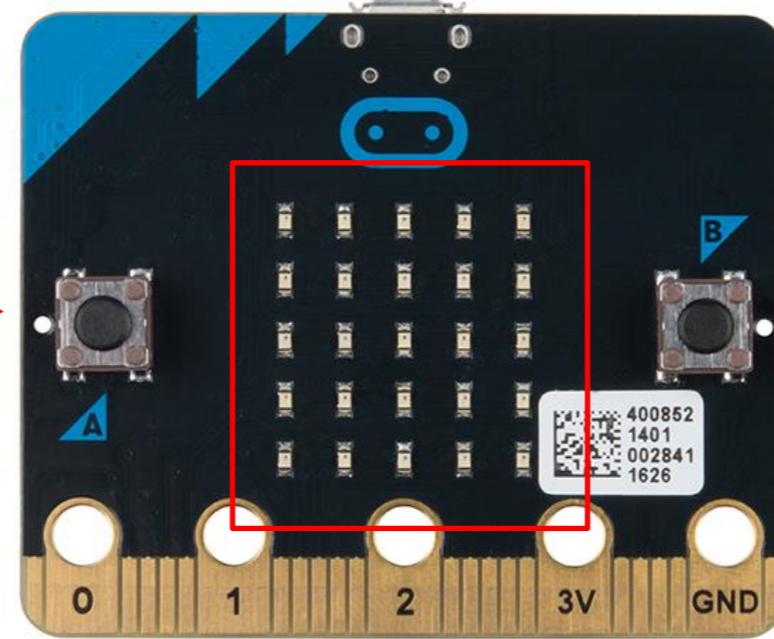


市售額溫槍拆解





MLX90614
非接觸式紅外線
溫度感測模組



BBC Micro:bit



電池盒
AAA x2

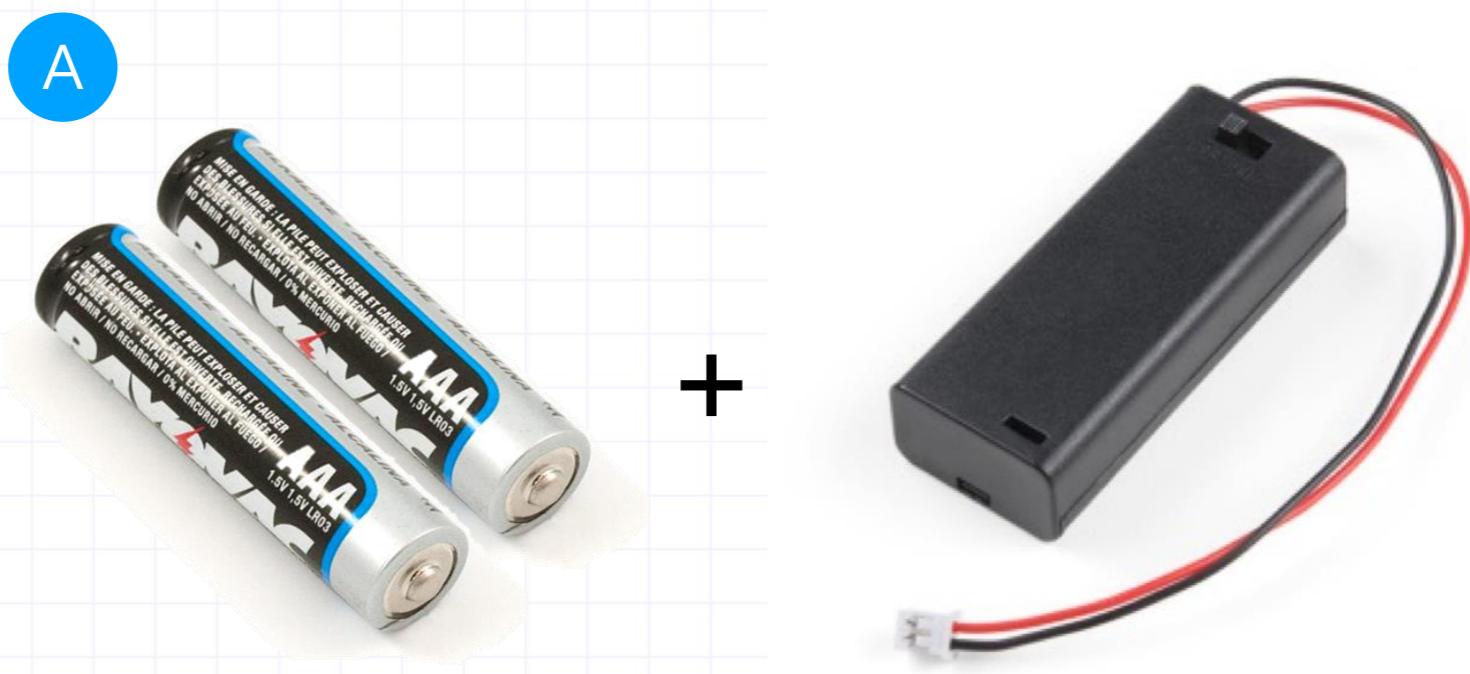


臺灣當代文化實驗場
Taiwan Contemporary Culture Lab

自製額溫槍工作坊 DIY Micro:bit Infrared Thermometer Workshop

組裝講解

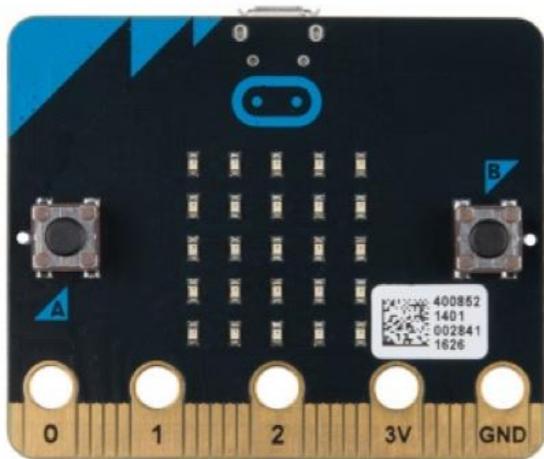
這也很簡單！



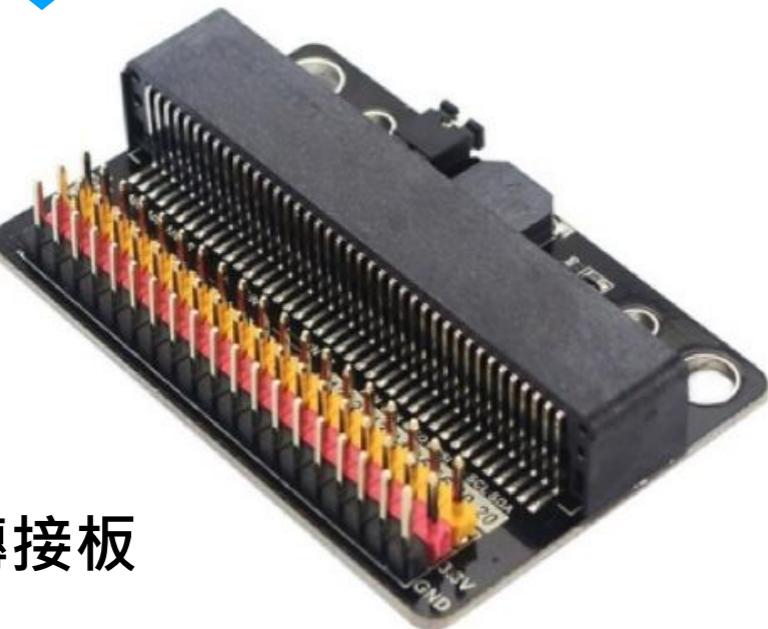
3號電池x2 + 電池盒

從最簡單的開始！

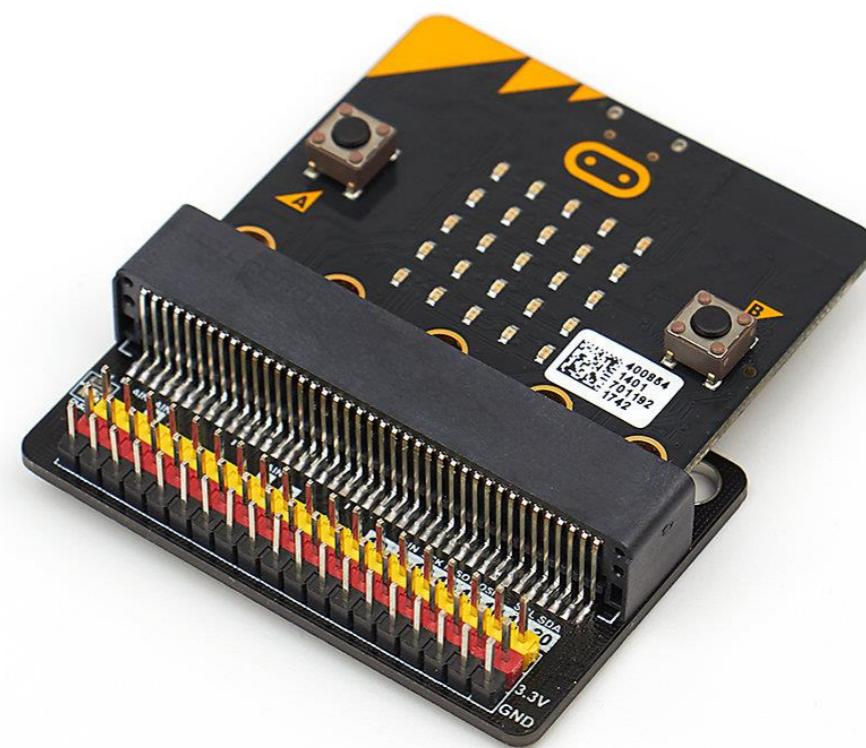
B



Micro:bit 主板

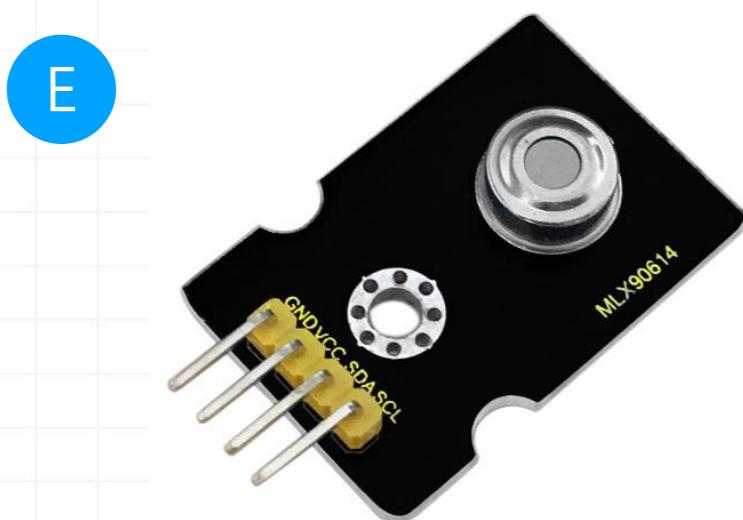


轉接板



正面對插！

這也很簡單！



感溫感應器

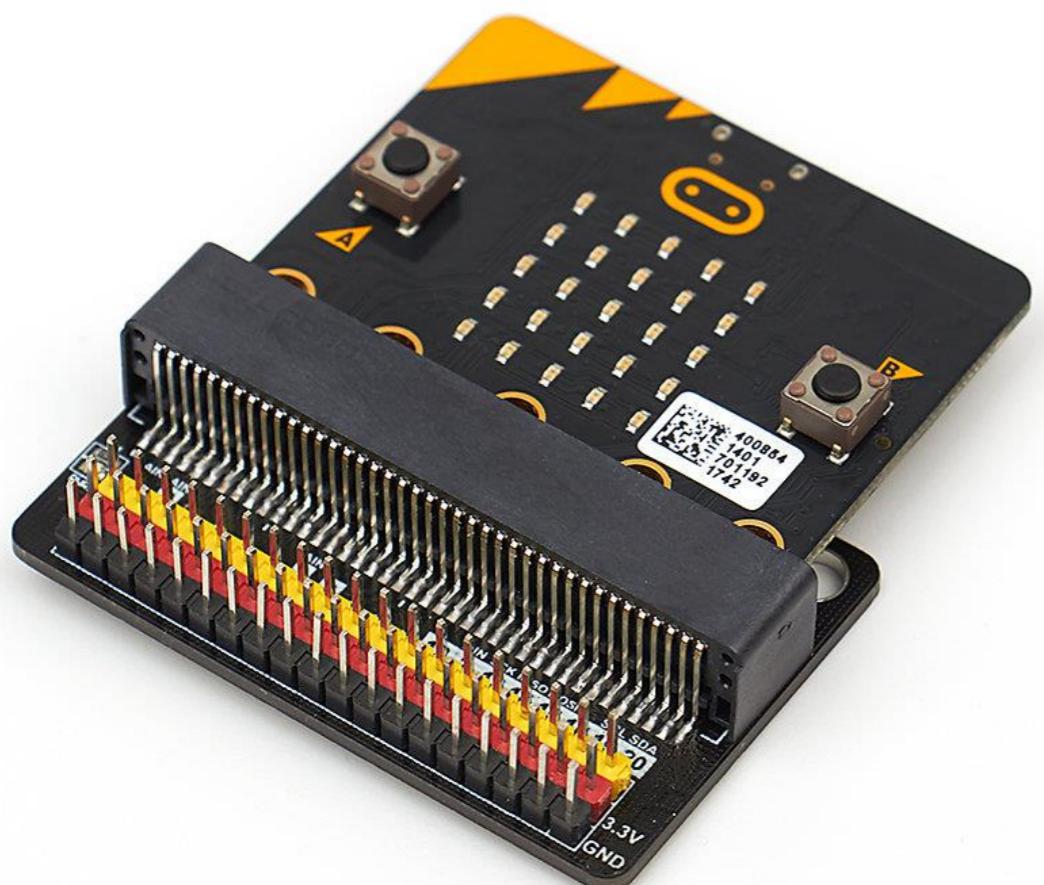


電子跳線

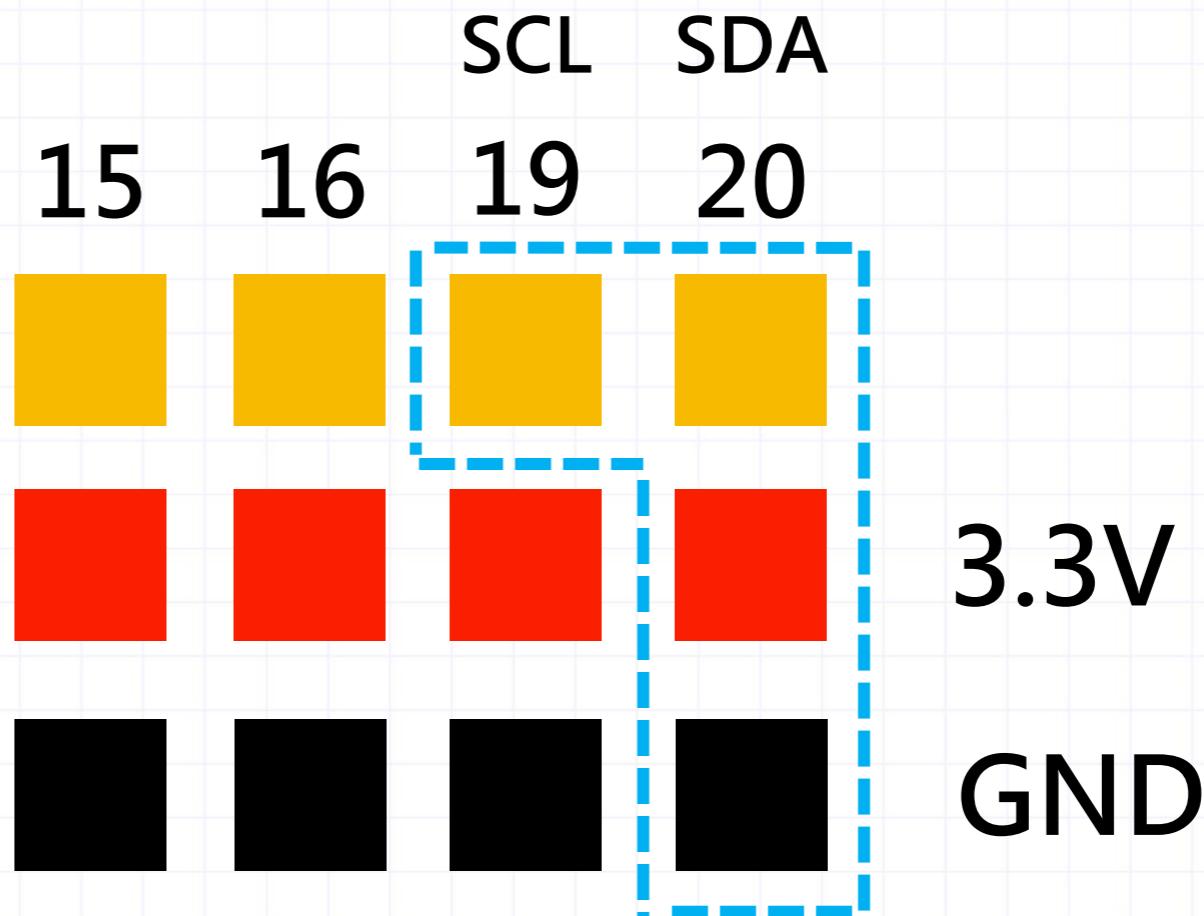
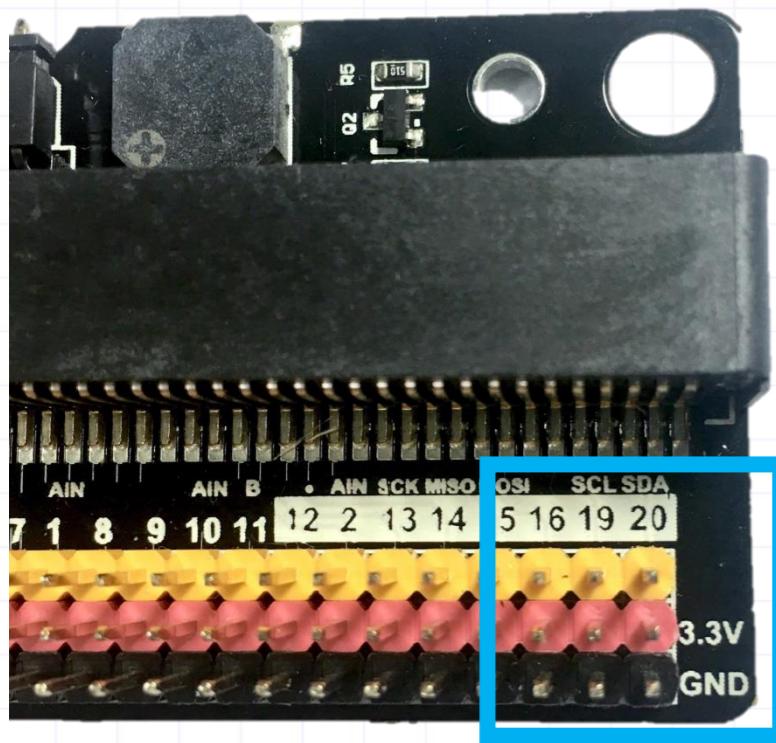
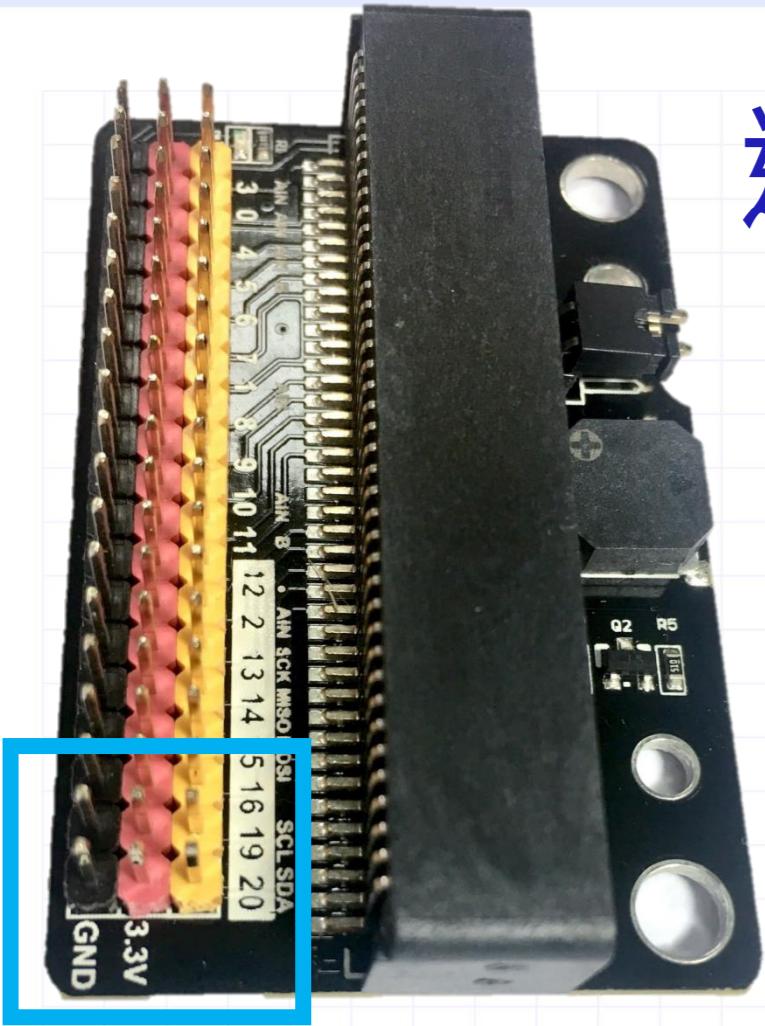
這也很簡單！



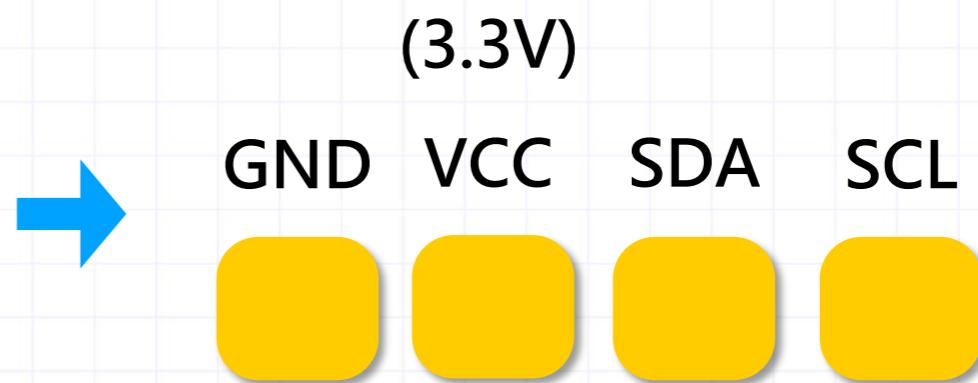
這一步也才進階一點



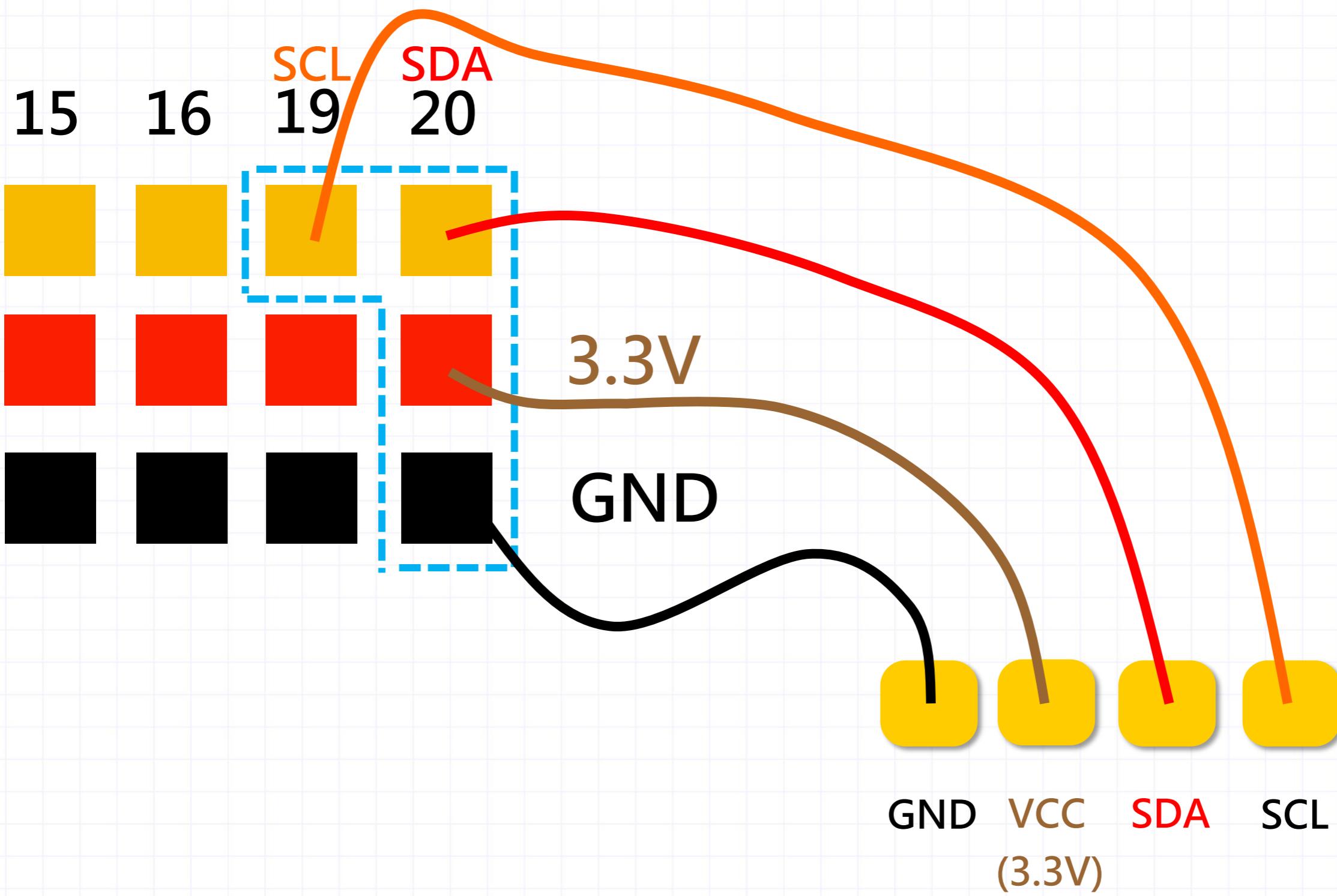
這一步也才進階一點



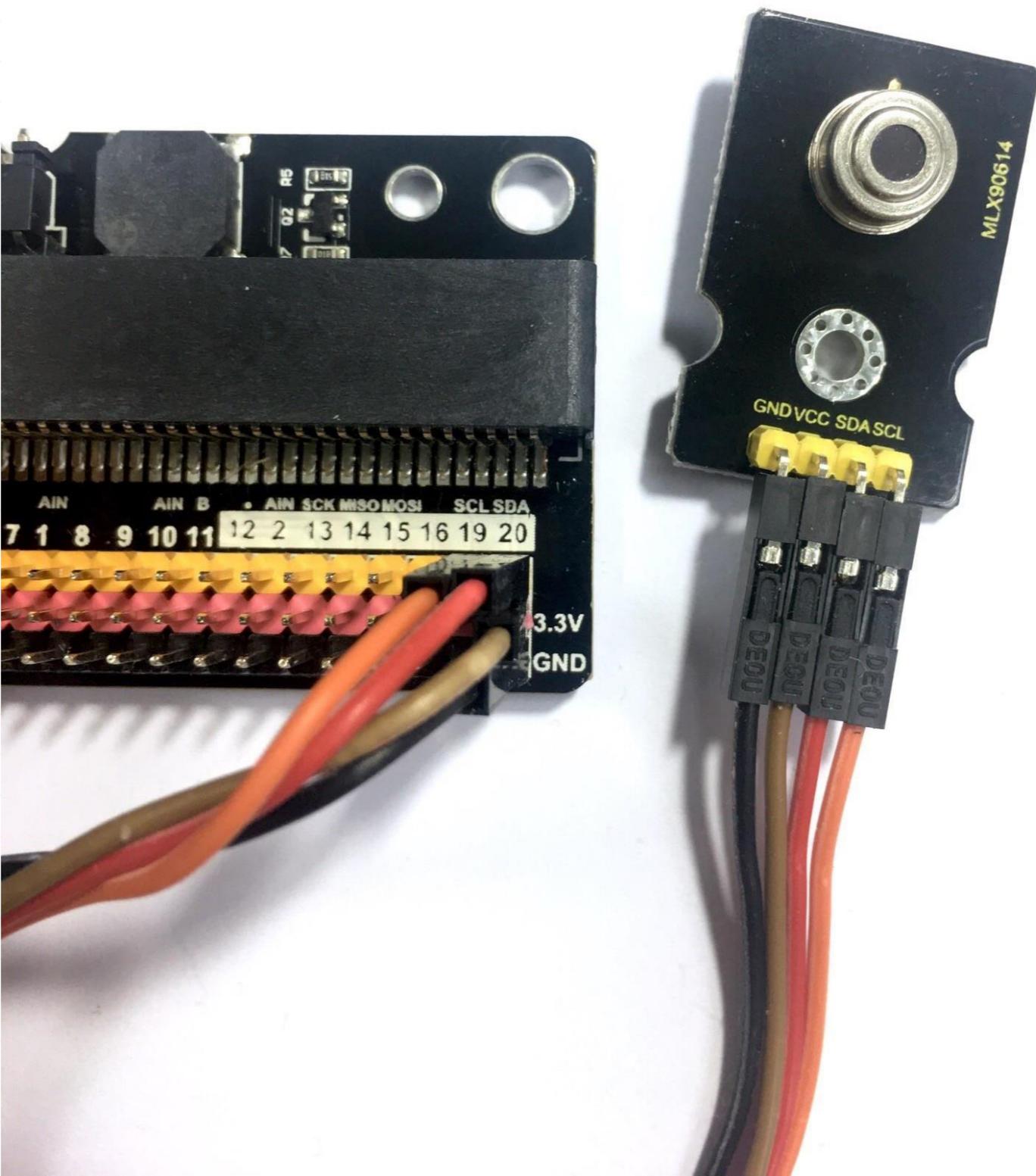
這一步也才進階一點



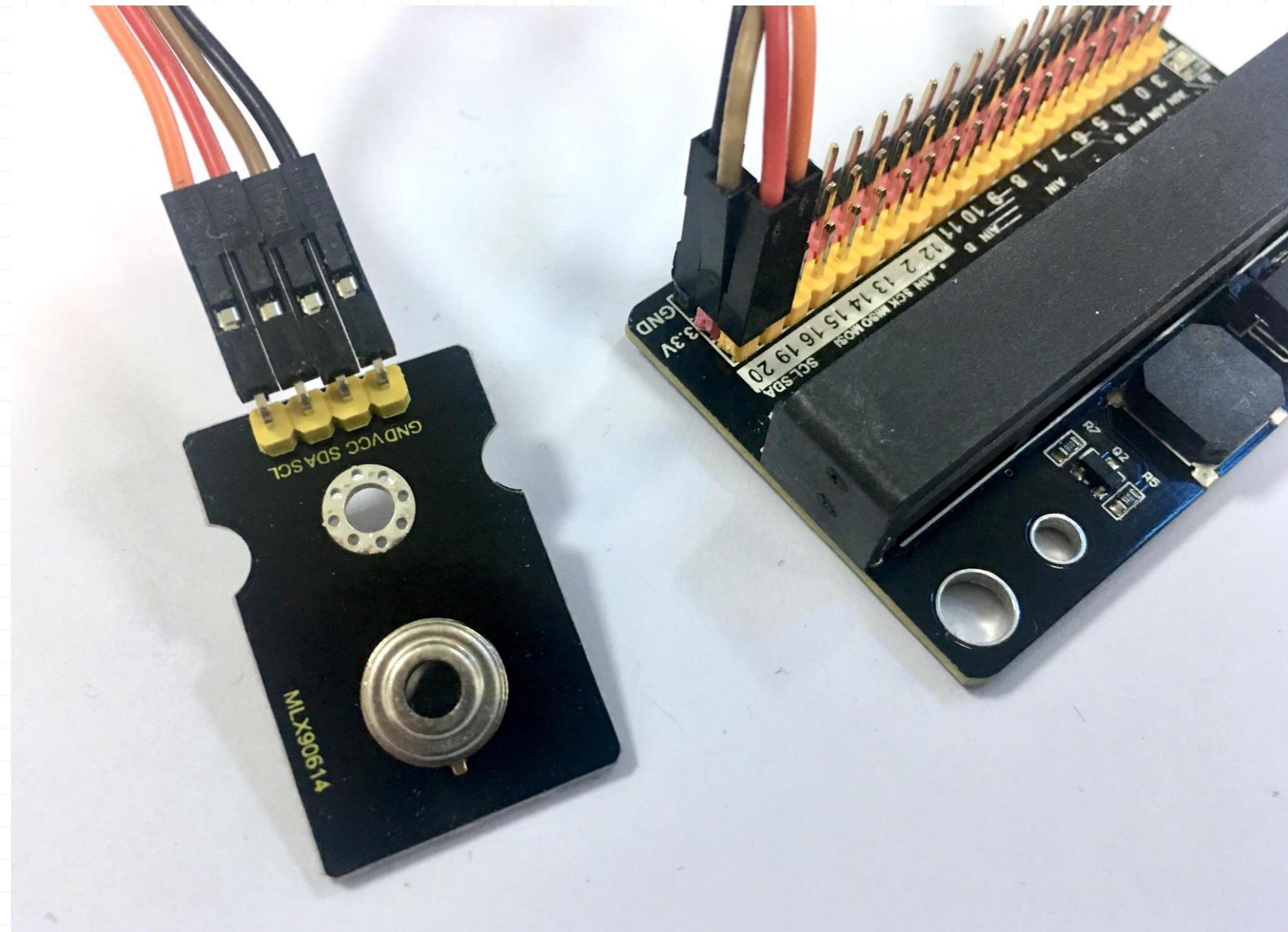
這一步也才進階一點



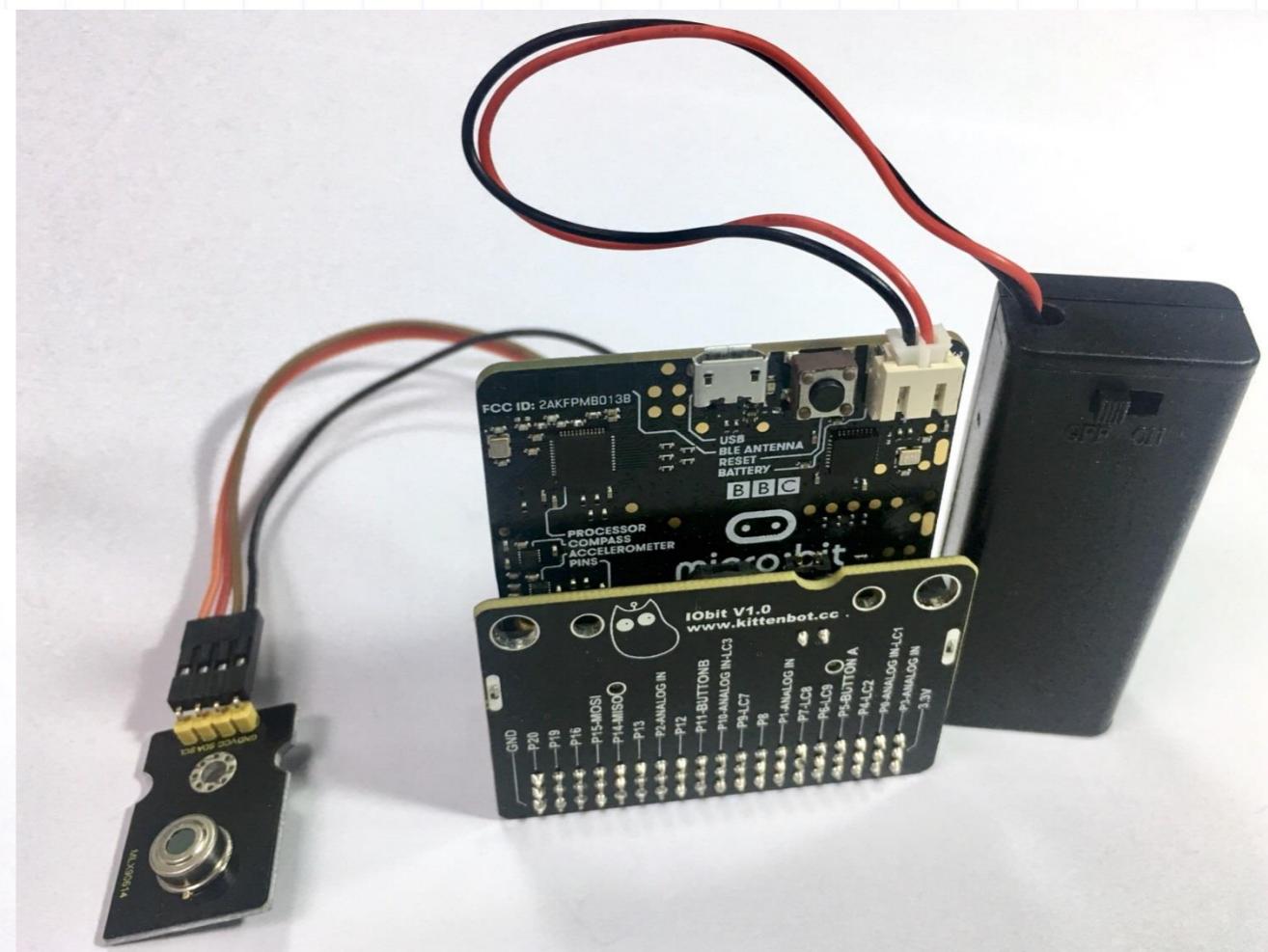
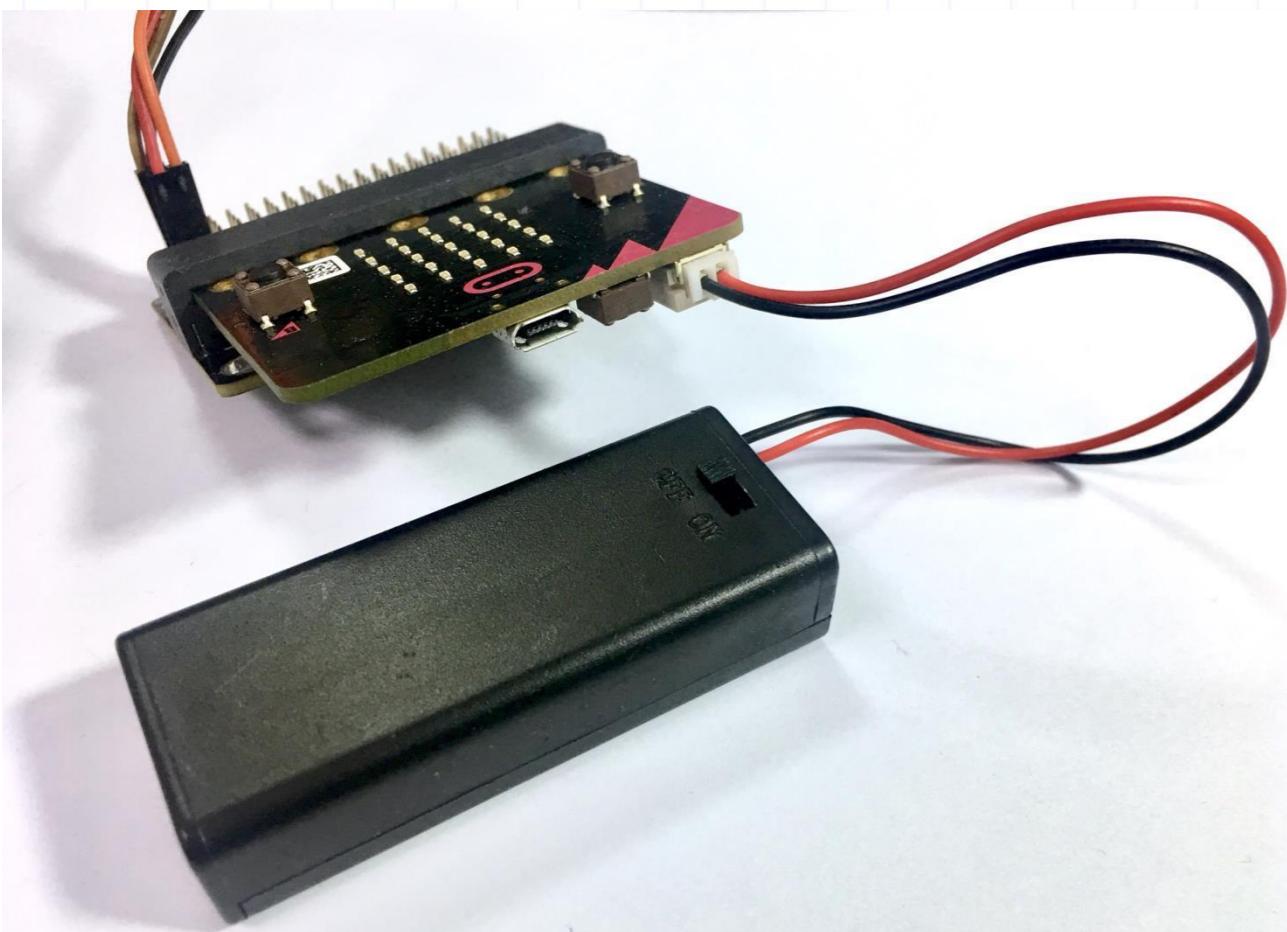
這一步也才進階一點



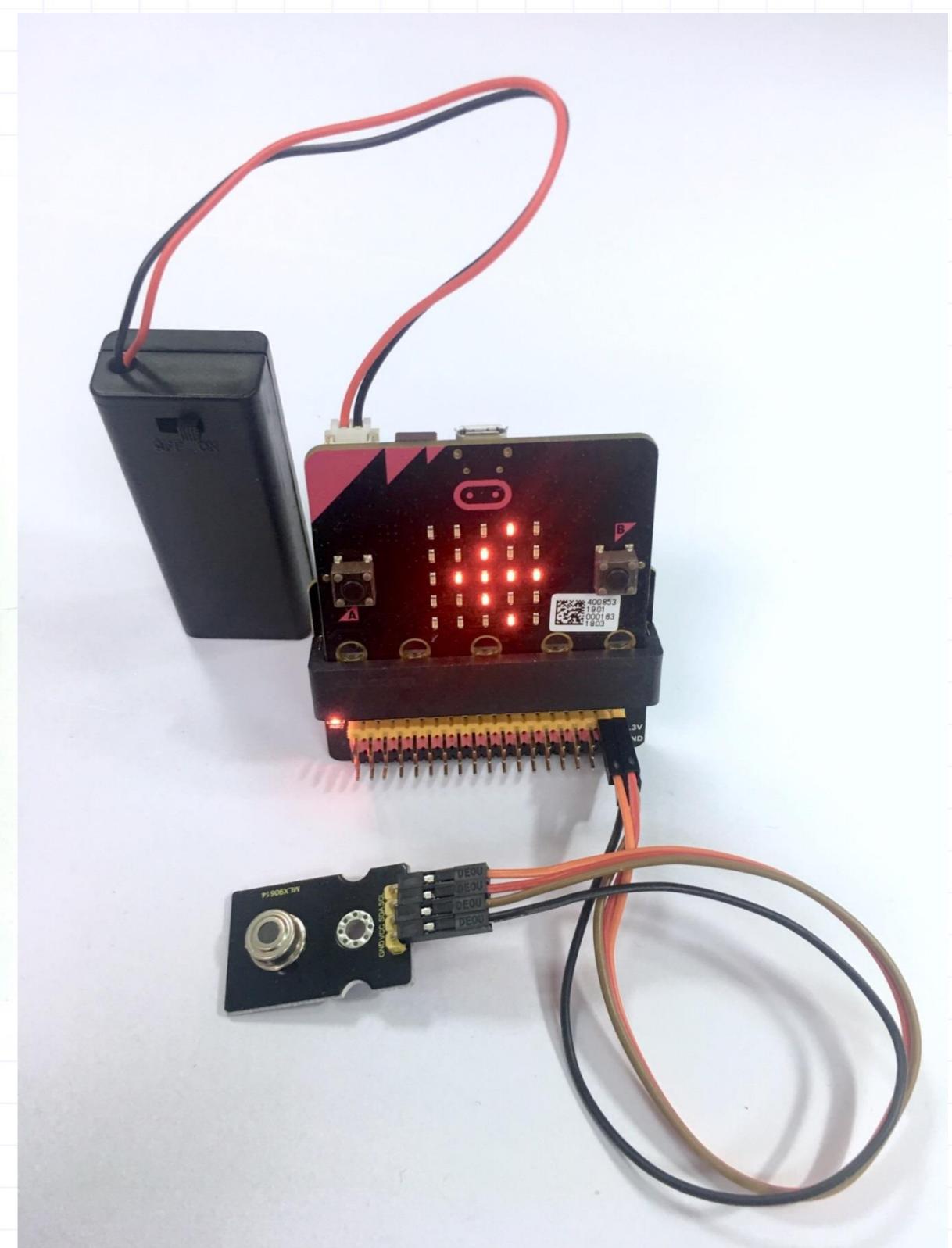
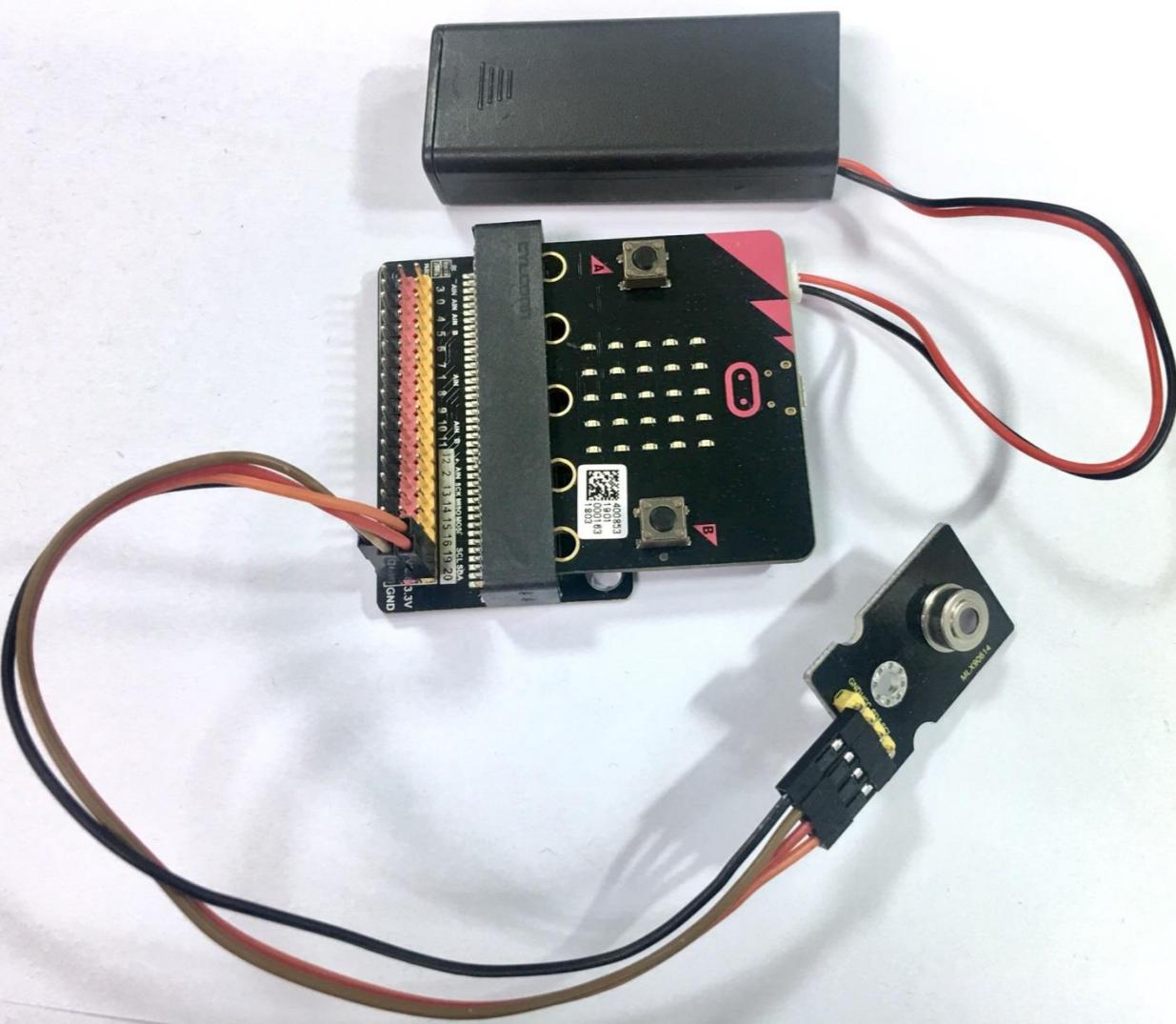
這一步也才進階一點



最後一步，來電吧！



最後一步，來電吧！



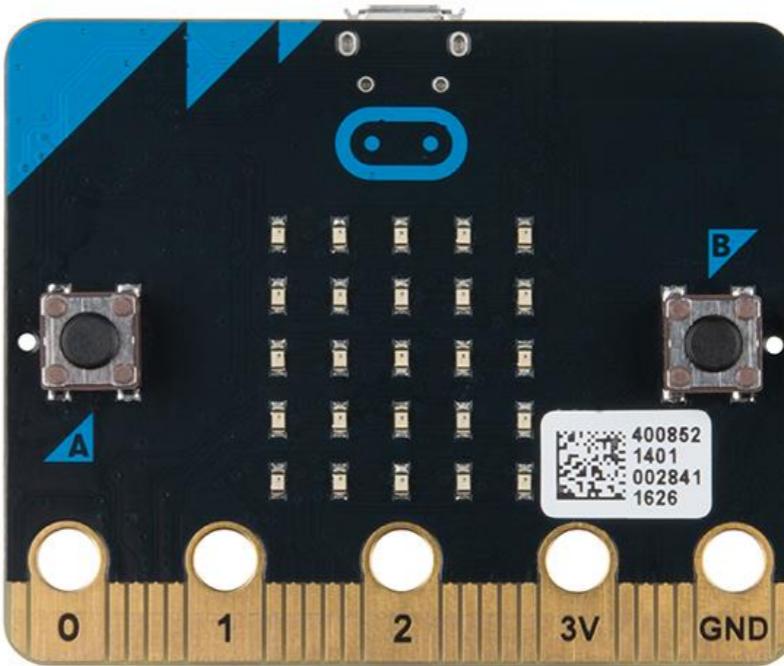


臺灣當代文化實驗場
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自製額溫槍工作坊 DIY Micro:bit Infrared Thermometer Workshop

介紹 Micro:bit

WHAT

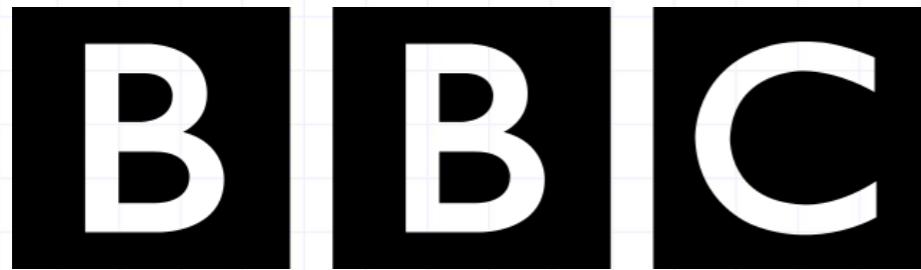


WHY

HOW



WHAT

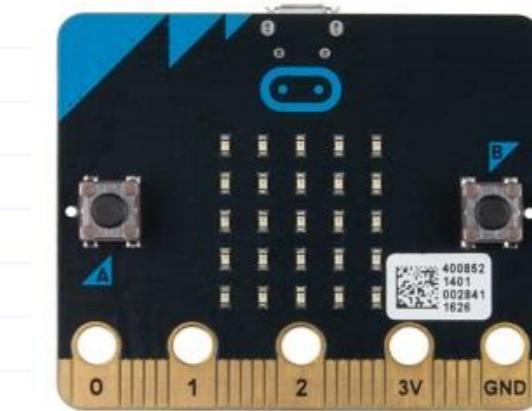


- 電腦教育
- 英國11-12歲的七年級學童
- 免費發送百萬台
- <https://microbit.org/>

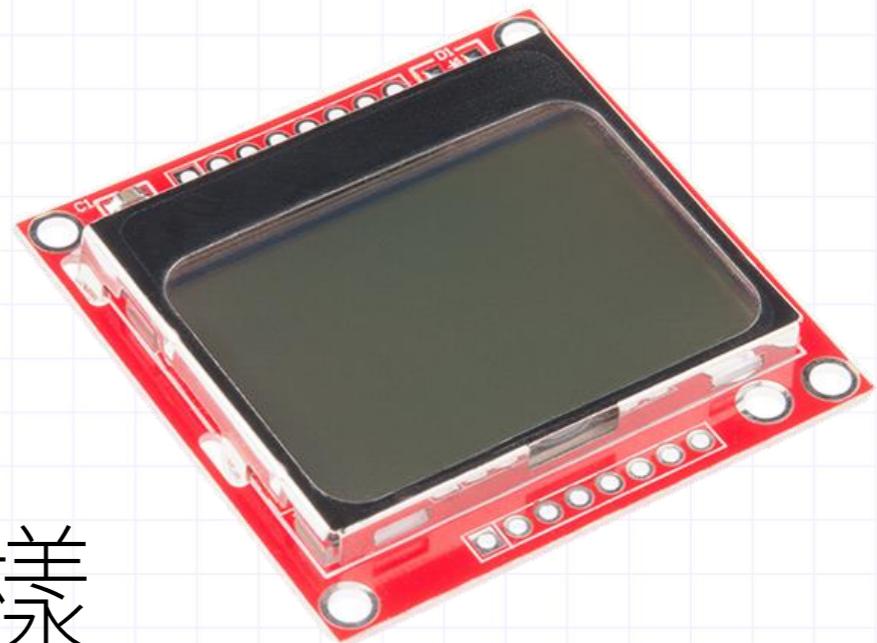
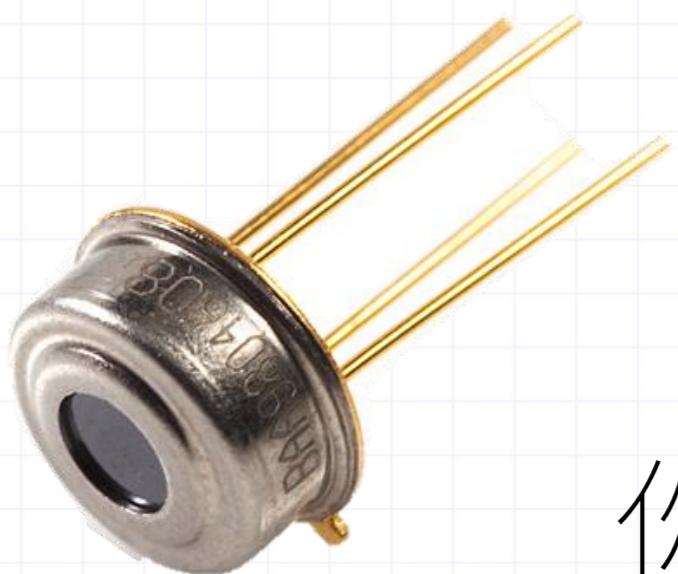
WHY



1.按按鈕



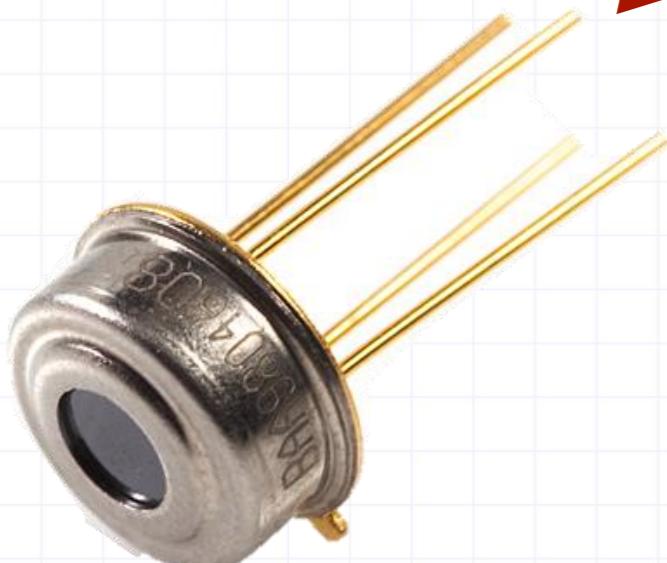
2.直接顯示溫度



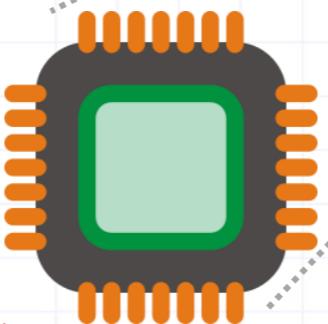
你看起來是這樣

WHY

2. 讀取溫度

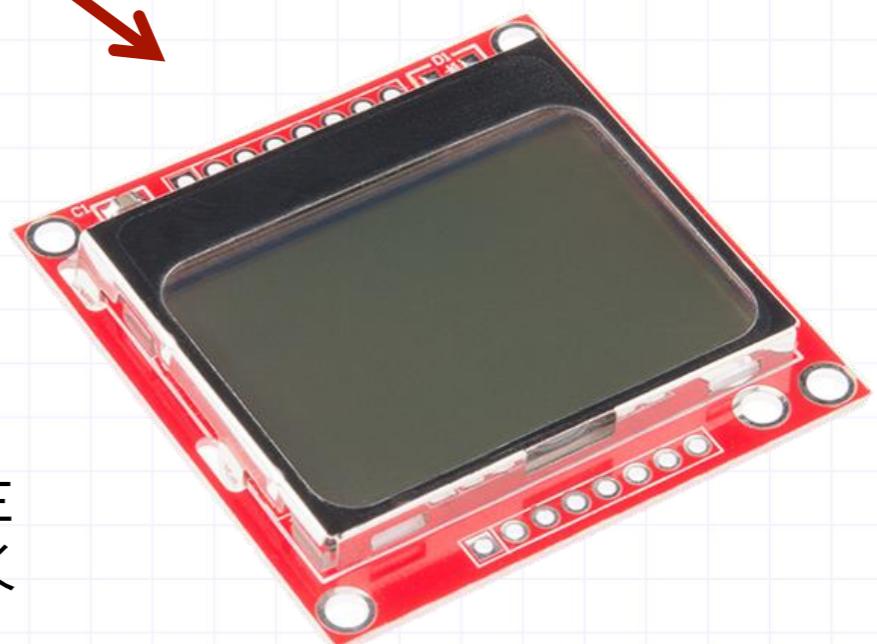


1. 有人按按鈕嗎?



你好，
我是處理器

3. 顯示溫度於面板



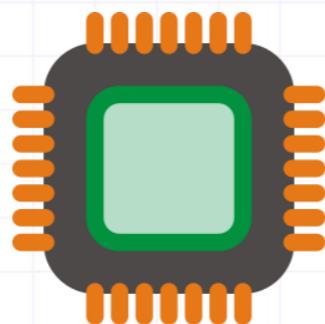
實際上是這樣



WHY

1.有人按按鈕嗎?

2.讀取溫度



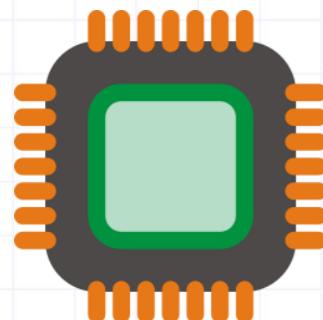
3.顯示溫度於面板

Q: 為什麼處理器會做這三件事?

A: 有人 寫程式叫它做的!!

WHY

讀取 & 執行



我是處理器

程式指令：
偵測有人按按鈕嗎？
如果有的話
先去讀取溫度
然後把溫度顯示在面板



有人

你寫的程式，是處理器在執行的！

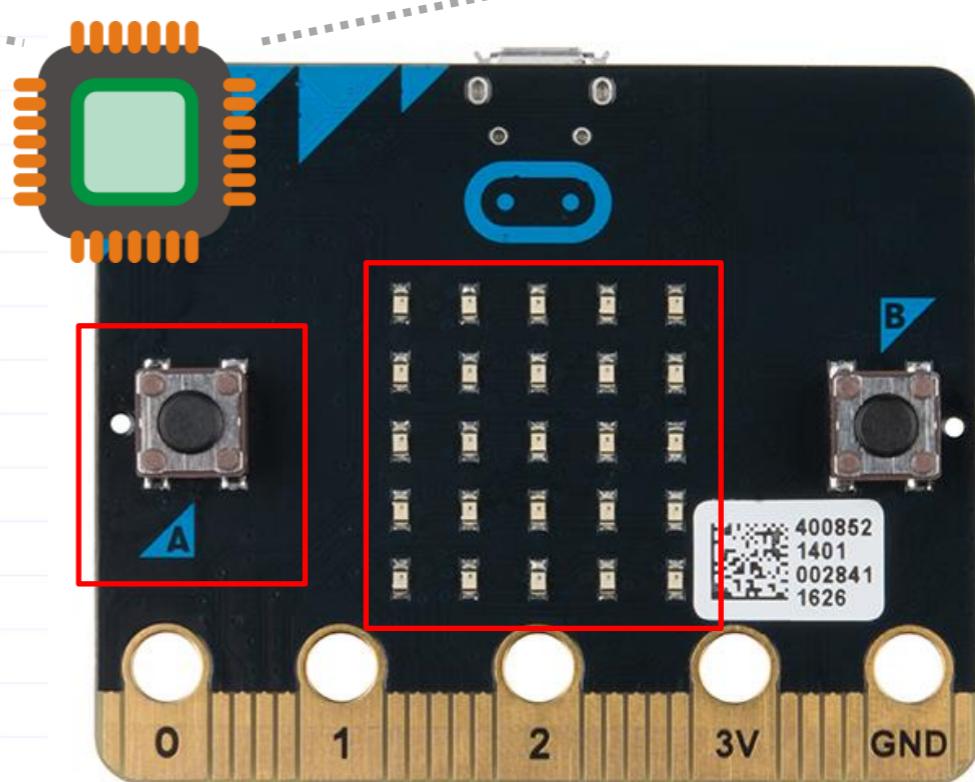


你就是今天的“有人”

程式指令：
偵測有人按A鍵嗎？
如果有的話
先去感測器模組讀取溫度
然後把溫度顯示在 LED 矩陣上



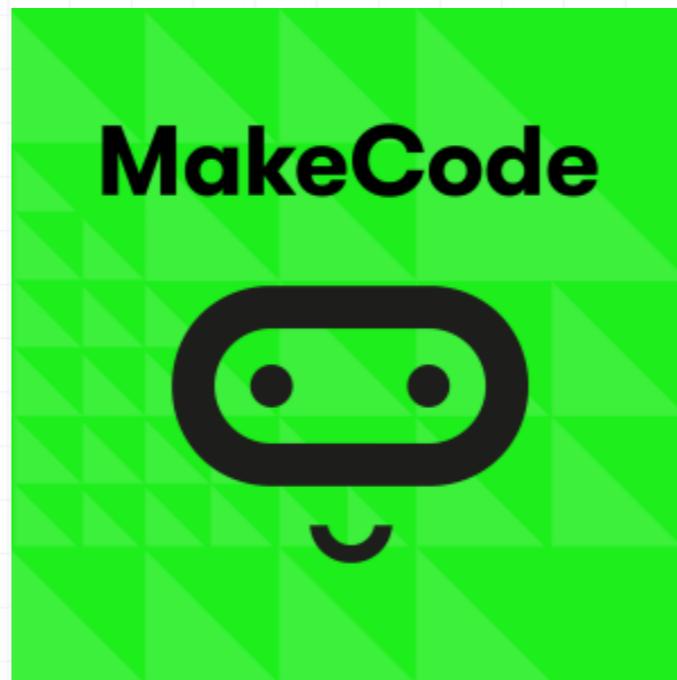
溫度感測模組



Micro:bit

WHO

我要怎麼寫程式叫 Micro:bit 幫我做事情？

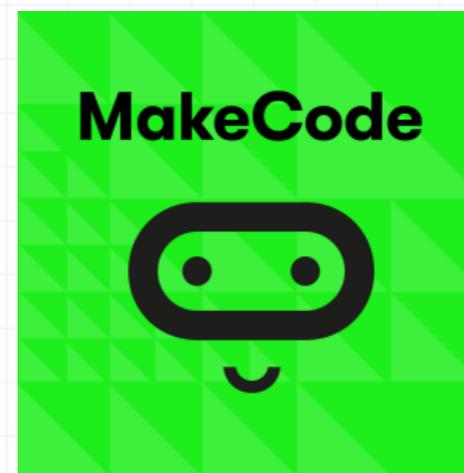
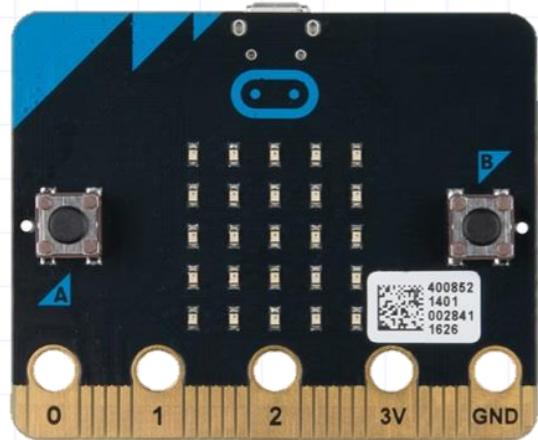


如果你想要…

寫文件



做投影片



寫microbit的程式

microbit的程式編輯器



臺灣當代文化實驗場
Taiwan Contemporary Culture Lab

自製額溫槍工作坊 DIY Micro:bit Infrared Thermometer Workshop

練習使用 MakeCode

動手第一支程式
燒錄額溫程式

HOW

- 介紹程式撰寫環境
- 練習：動畫
- 練習：按鈕事件
- 練習：燒錄

第一支程式

The image shows the Scratch micro:bit workspace. On the left, there is a preview of the micro:bit board with red pixels displayed on its LED matrix. The workspace itself contains the following script:

```
当启动时
    顯示 圖示 [grid v]
    顯示 圖示 [grid v]
    
當按鈕 A 被按下
    清空 屏幕
    顯示 文字 [Hello! v]
    
當按鈕 B 被按下
    清空 屏幕
    顯示 圖示 [grid v]
```

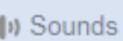
The script consists of two main sections: "當啟動時" (When Started) and "重複無限次" (Loop无数次). The "當啟動時" section contains two "顯示 圖示" (Show Picture) blocks. The first shows a grid pattern, and the second shows a solid blue square. The "重複無限次" section contains a loop that runs indefinitely. Inside the loop, there are two "當按鈕 A 被按下" (When Button A is pressed) blocks. Each of these blocks contains a "清空 屏幕" (Clear Screen) block followed by a "顯示 文字" (Show Text) block with the text "Hello!". There are also two "當按鈕 B 被按下" (When Button B is pressed) blocks, each containing a "清空 屏幕" block followed by a "顯示 圖示" (Show Picture) block showing a grid pattern.

教學現場

- 108 課綱科技領域資訊科技課程
- STEAM (Science, Technology, Engineering, Art, Mathematics)
- 運算思維

MIT Scratch <https://scratch.mit.edu/>

SCRATCH  File Edit  Tutorials  



Code

Motion

- move (10 steps)
- turn (15 degrees)
- turn (15 degrees)
- go to [random position]
- go to x: (0) y: (0)
- glide (1 secs to) [random position]
- glide (1 secs to x: (0) y: (0))
- point in direction (90)
- point towards [mouse-pointer]
- change x by (10)
- set x to (0)
- change y by (10)

Looks

Sound

Events

Control

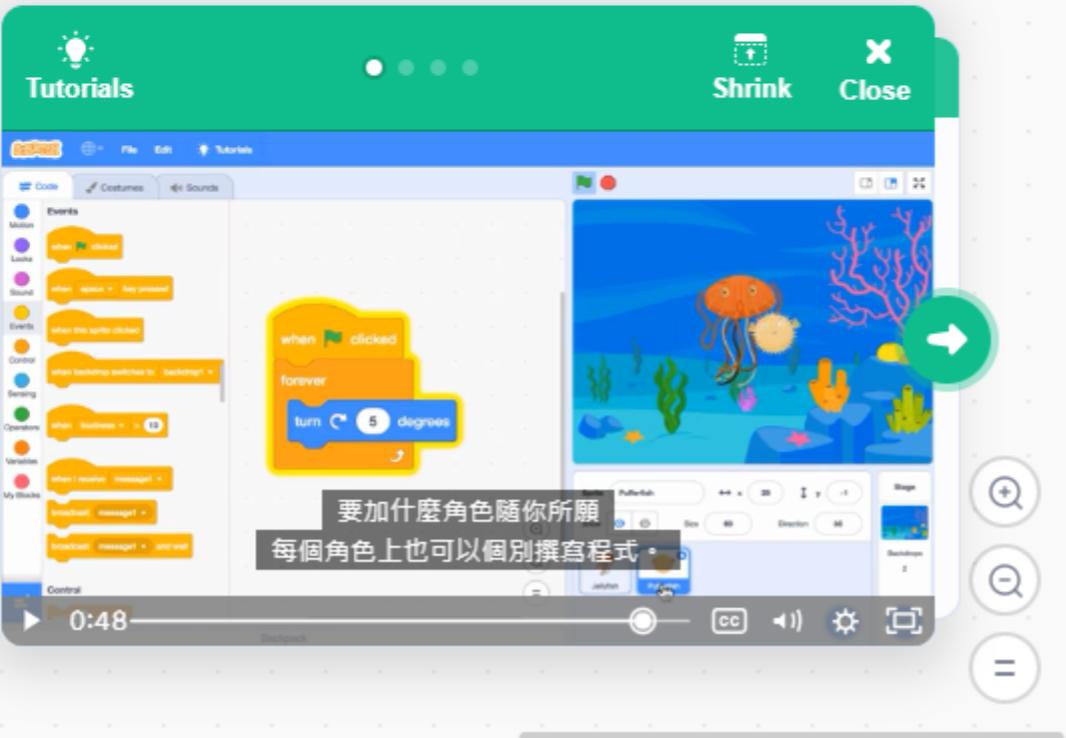
Sensing

Operators

Variables

My Blocks

Tutorials



Sprite Sprite1    Size (100)  Direction (90)

Show  

Stage

Backdrops

1

有趣的專案

- Micro:bit Selfie Remote

<https://www.hackster.io/techmirtz/micro-bit-selfie-remote-a8c7cb>

- Micro:bit Motorbike Simulator

<https://github.com/musabkilic/MicroBike/>

- Fruit Keyboard

<https://makecode.microbit.org/projects/banana-keyboard/make>

- Football Game

<https://make.techwillsaveus.com/microbit/activities/microfootball>

- Top 25 Micro:Bit Projects You Must Try 2019!

<https://www.seeedstudio.com/blog/2019/12/10/top-25-microbit-projects-for-beginners-2019/>

有趣的專案

- My robot asks me for money
<https://www.youtube.com/watch?v=Jskg6gfSGd8>
- Make a SELF-WATERING plant
<https://www.youtube.com/watch?v=55KwoZq-qPA>
- Automatic cat feeder
<https://www.youtube.com/watch?v=hKnmdphkzsk>

學習資源

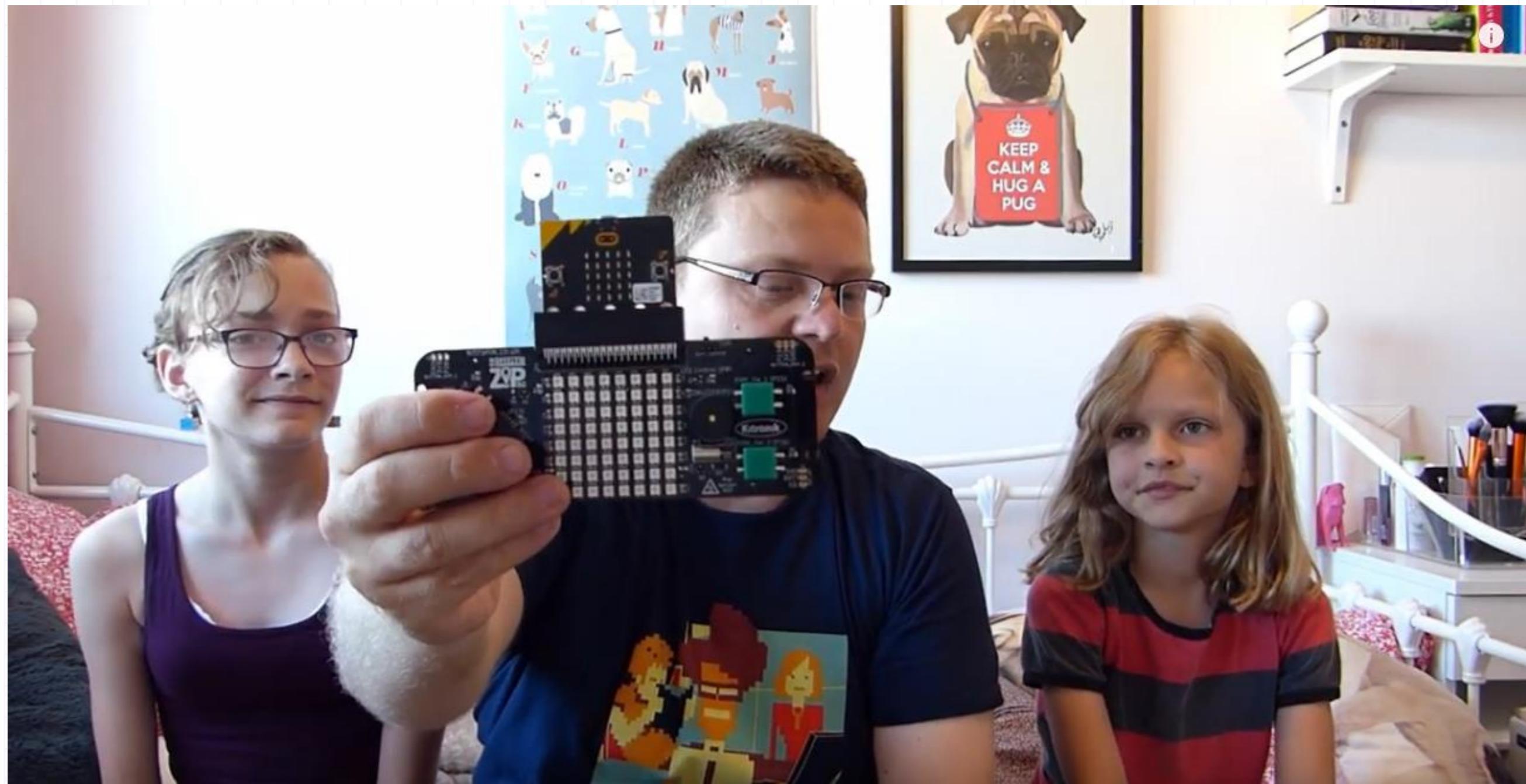
- Microsoft MakeCode 官方頻道

<https://www.youtube.com/playlist?list=PLMMBk9hE-SeqUGt71Myb1iA45w9EvqQbA>

學習資源

- Microbit Episodes (from MicroMonsters)

https://www.youtube.com/playlist?list=PL86twtxo_L9Q9WcOrLN-9fQxGqNCeS-TS



學習資源

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

專案



Tutorials



Games



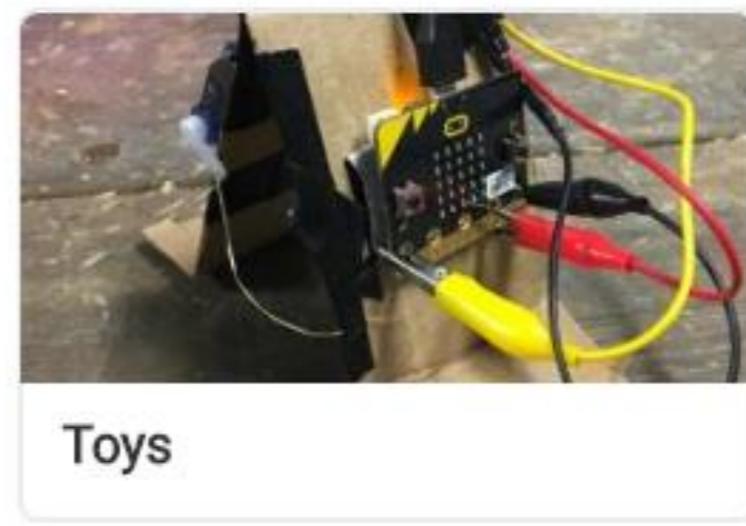
Radio Games



Fashion



Music



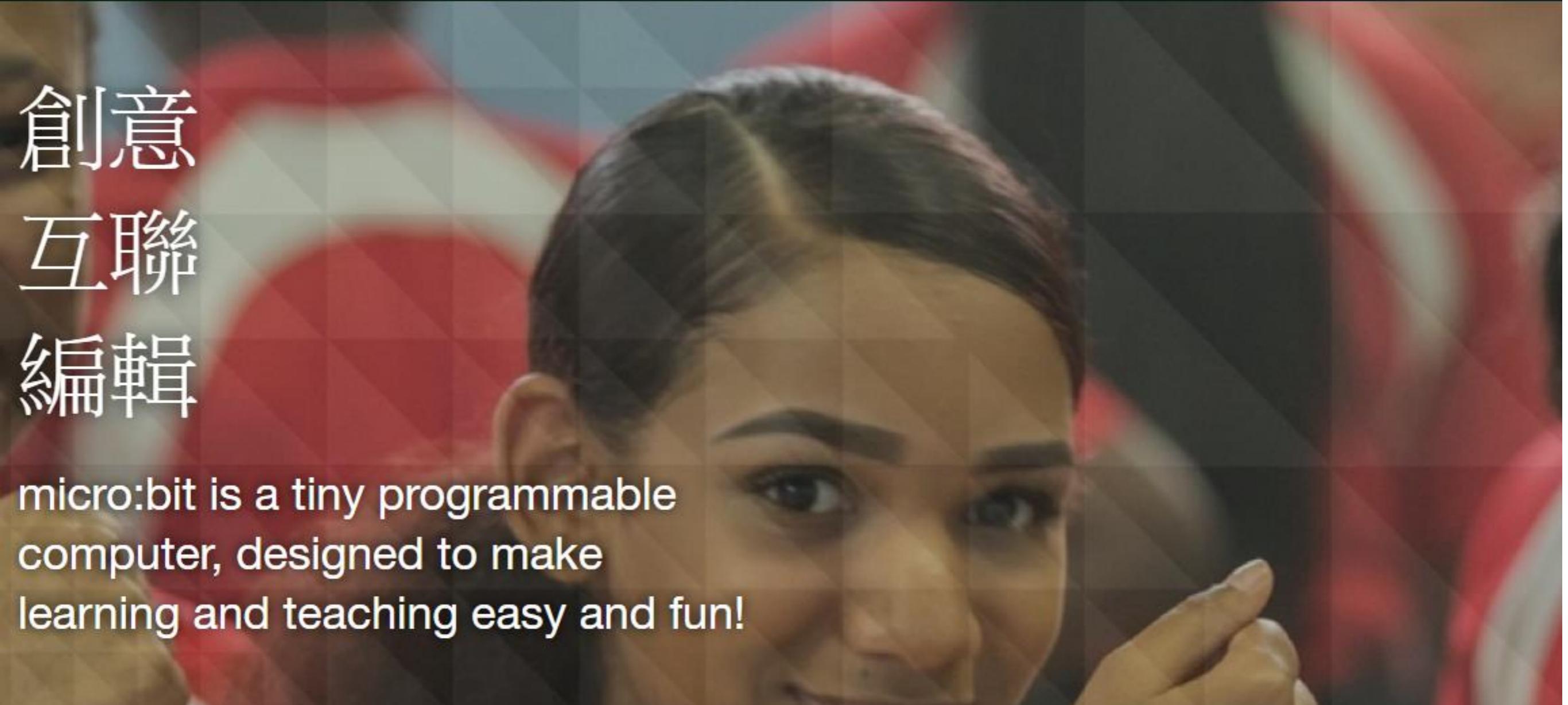
Toys

教學資源

<https://microbit.org/>

The image shows a screenshot of the BBC micro:bit website. At the top, there is a navigation bar with the BBC micro:bit logo on the left and four buttons: "Get started", "Projects", "Lessons", and "Let's code", which are highlighted with a red border. To the right of these buttons is a "Buy" link. Below the navigation bar, the text "BBC micro:bit" is displayed in large white letters. To the left of the text is an illustration of the BBC micro:bit board, showing its 5x5 LED matrix and various pins. Below the illustration, the words "Create | Learn | Code" are written in white. Underneath that, the tagline "Get creative, get connected, get coding!" and the sub-tagline "The pocket-sized computer transforming the world" are visible. At the bottom left, there is a button labeled "Learn at home". On the right side of the image, there is a photograph of three children (two girls and one boy) holding up their own BBC micro:bit boards towards the camera, smiling.

創意 互聯 編輯

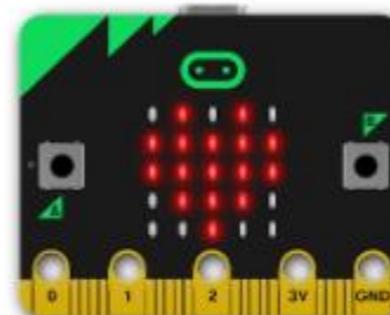


micro:bit is a tiny programmable computer, designed to make learning and teaching easy and fun!

我是老師

我該如何在學校使用microbit?

了解更多



我已經收到我的micro:bit

開始之前我需要做什麼?

入門指引

更新額溫槍程式

額溫槍程式：

[microbit-mlx90614-nocal_v2.hex](#)



臺灣當代文化實驗場
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校 正

溫度校正

MLX90614精確度： $\pm 0.5^{\circ}\text{C}$
(0到 50°C 的物體溫度範圍內)



溫度校正

- 下載檔案：[microbit-mlx90614-nocal_v2.hex](#)
- 汇入 MakeCode



溫度校正





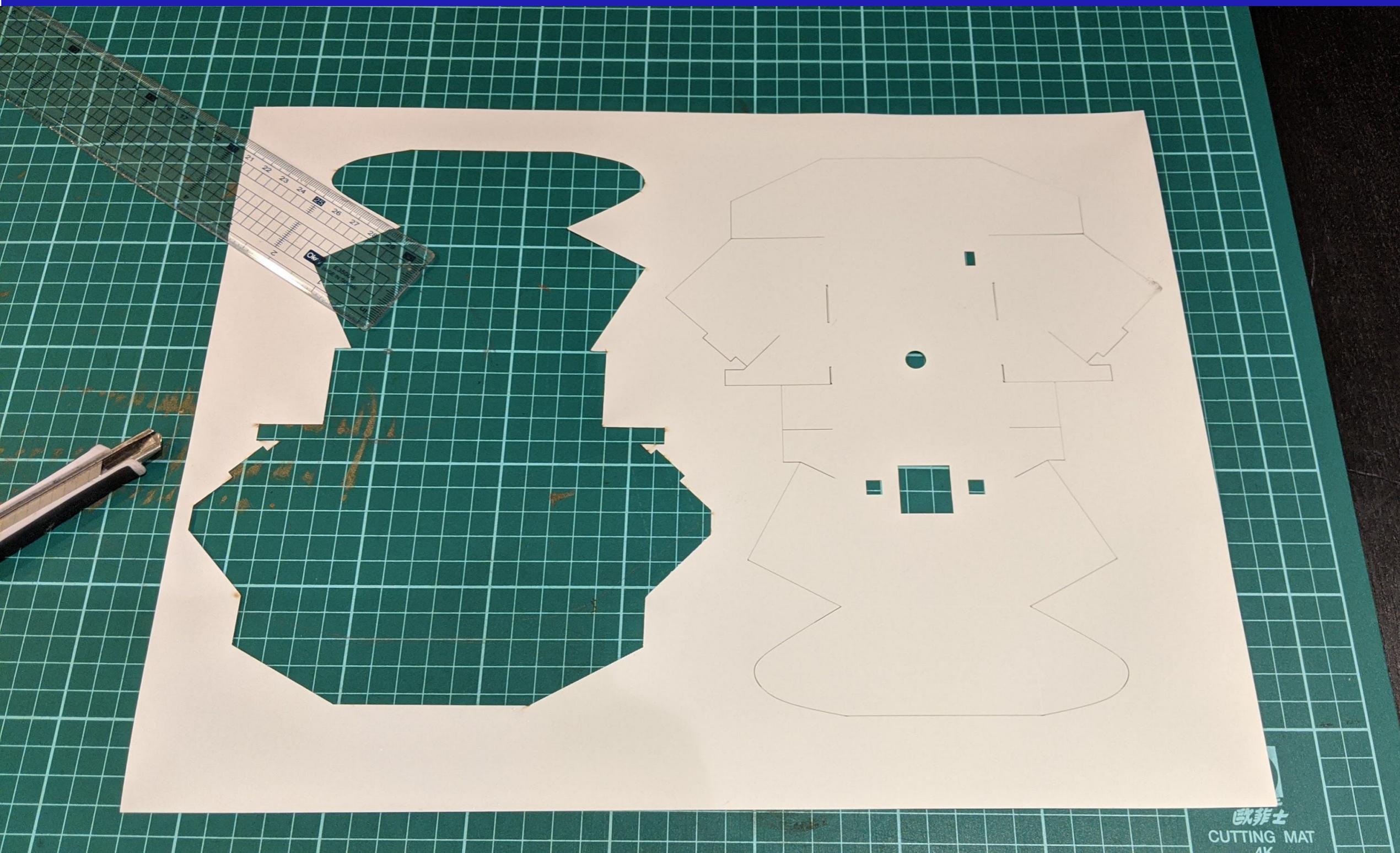
臺灣當代文化實驗場
Taiwan Contemporary Culture Lab

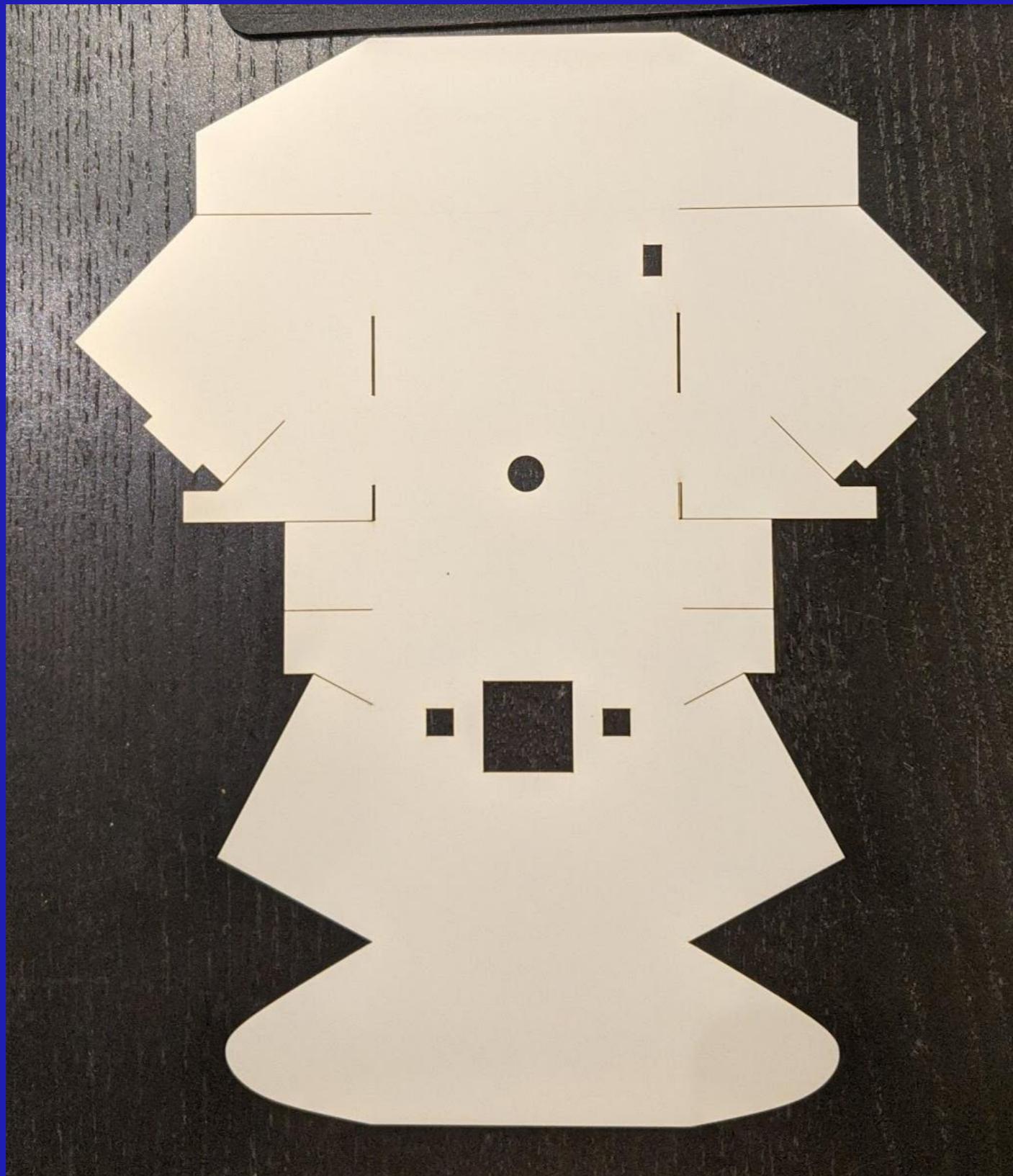
自製額溫槍工作坊 DIY Micro:bit Infrared Thermometer Workshop

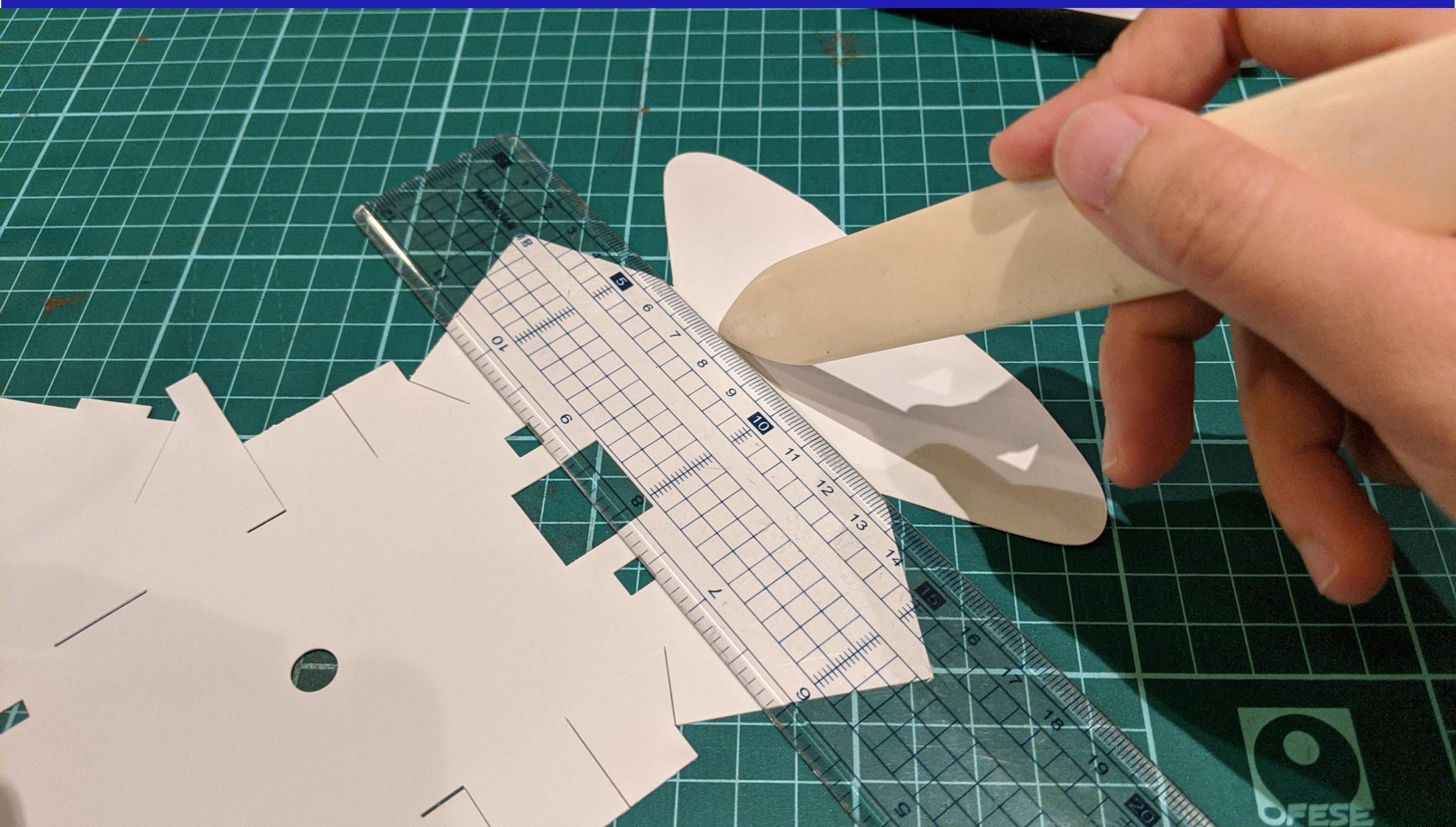
外殼設計

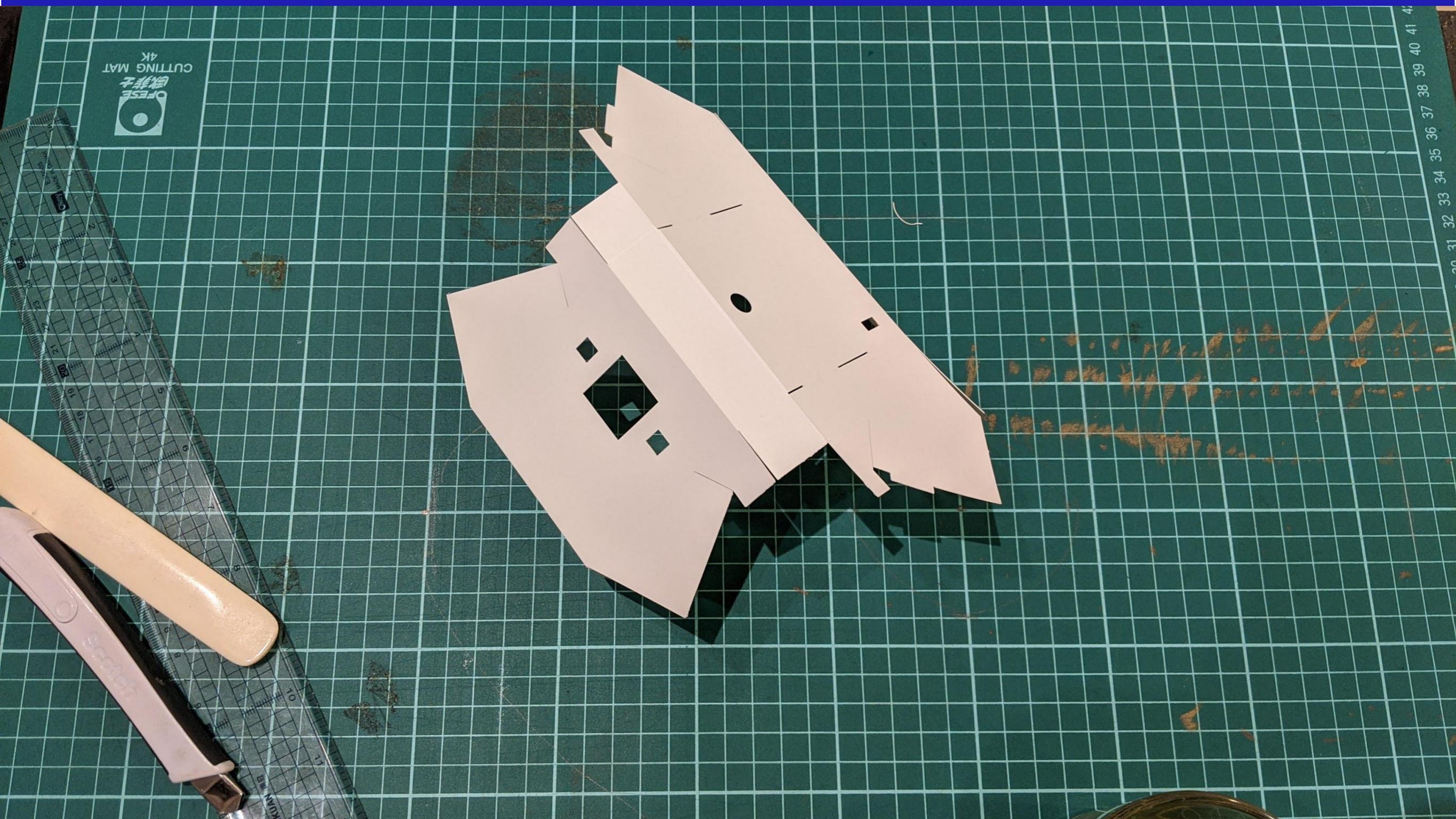


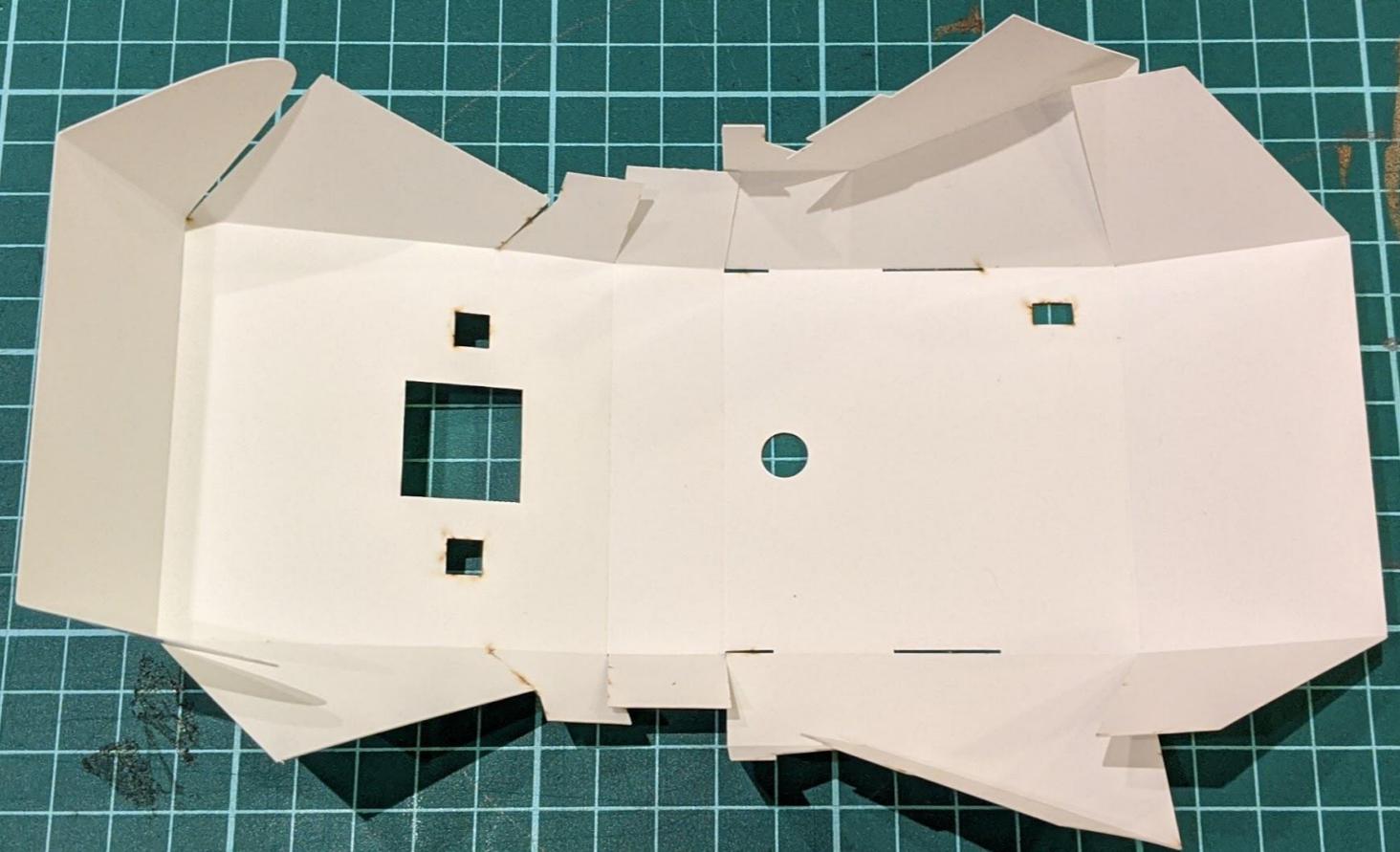
by 黃瑋瑋

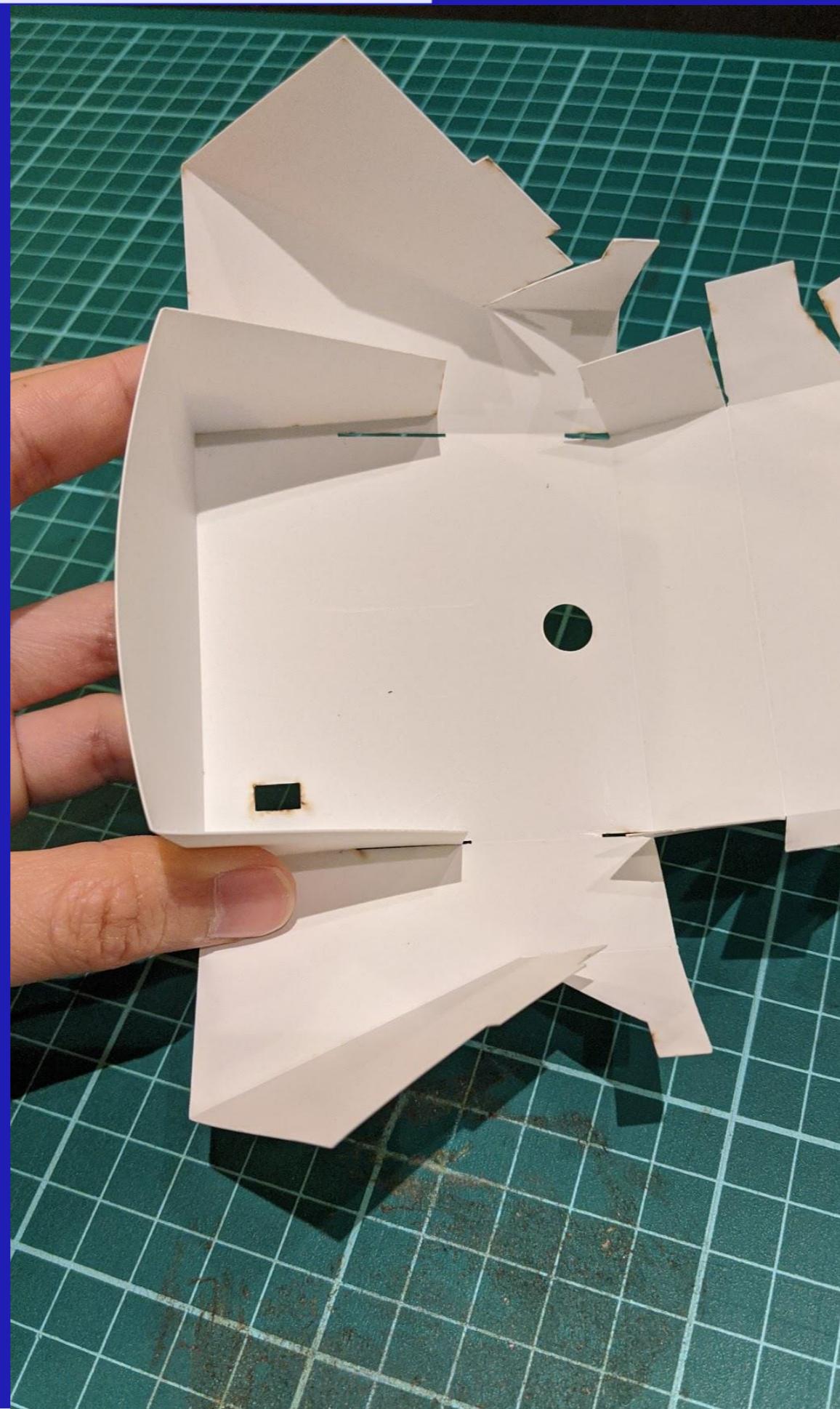




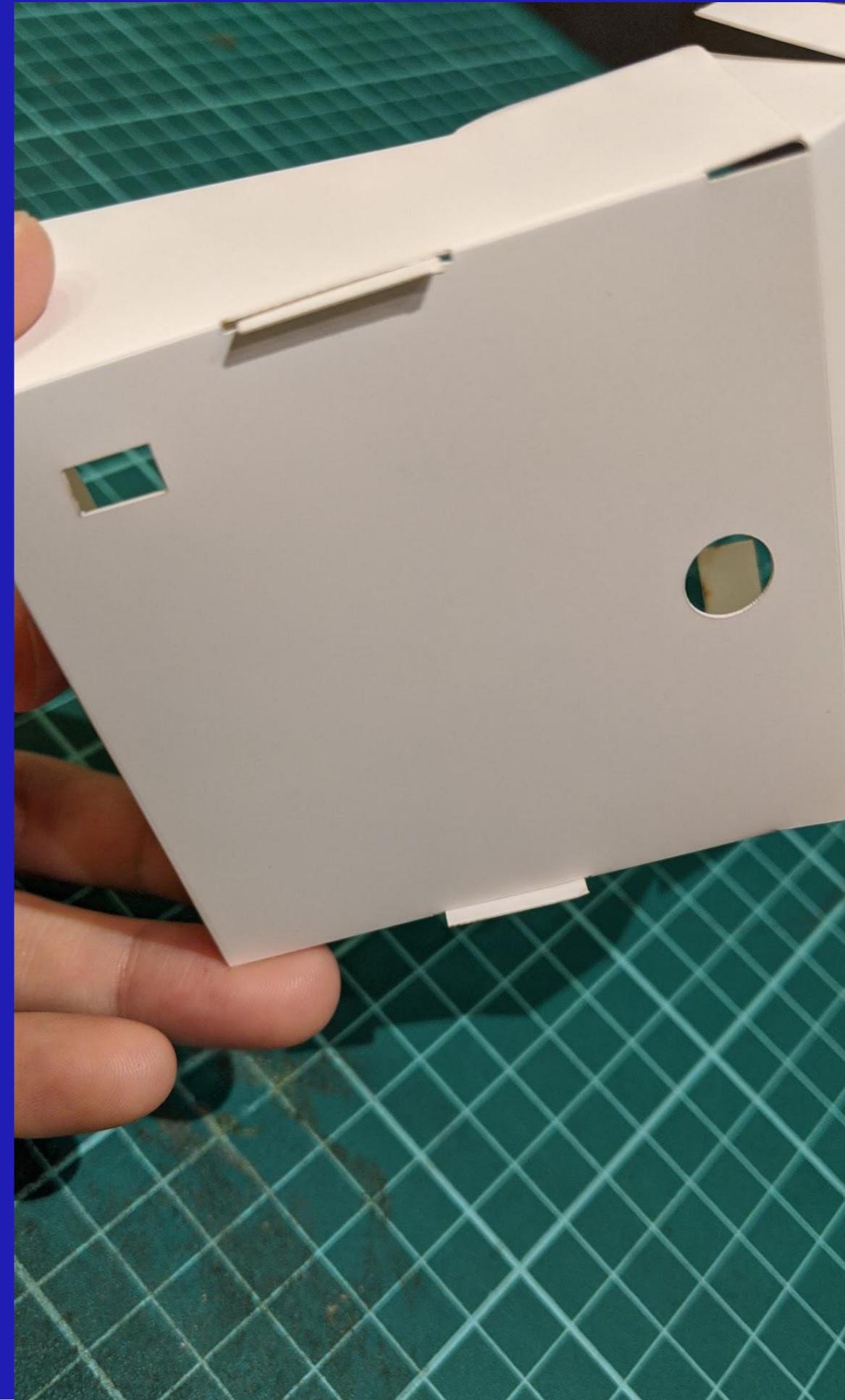
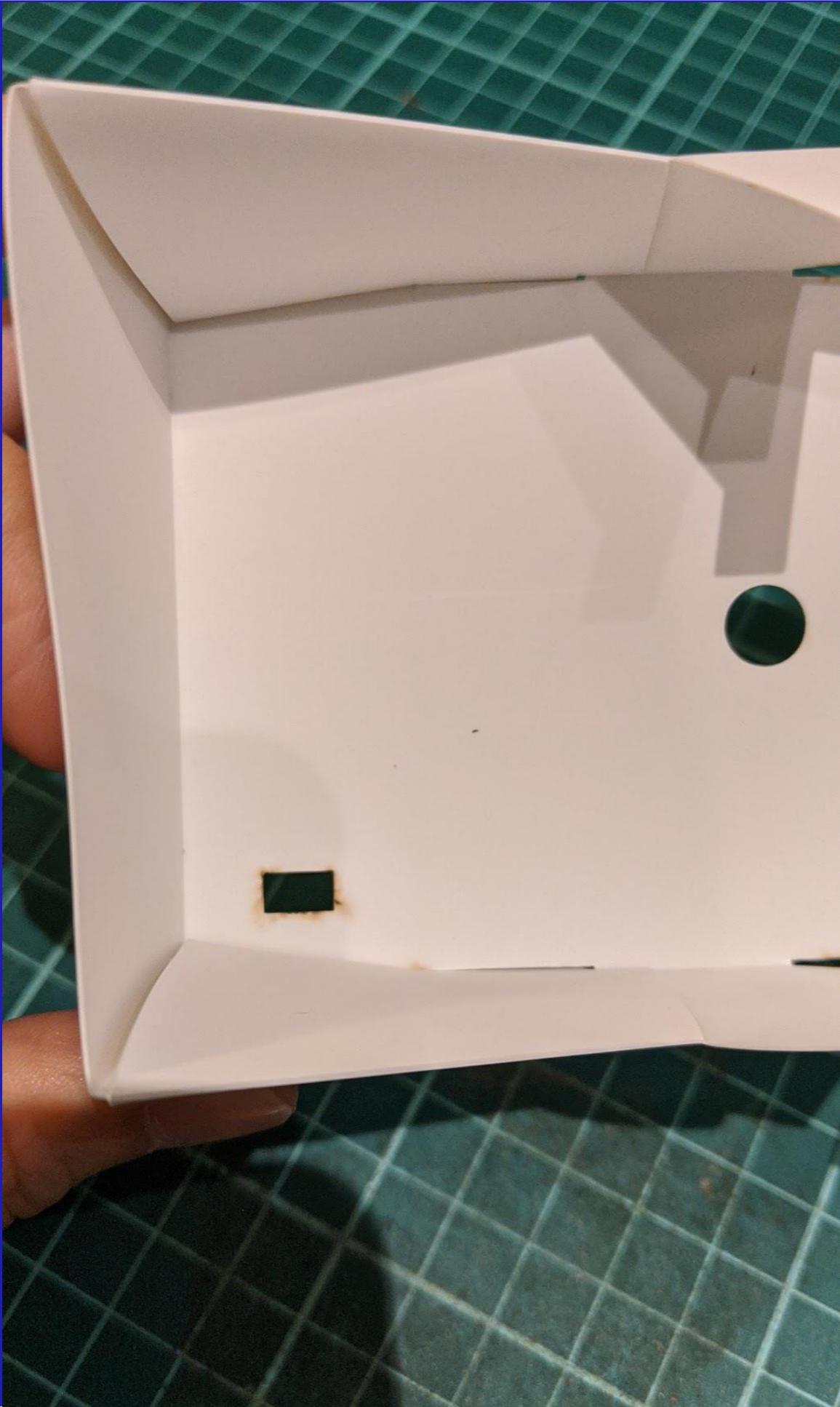




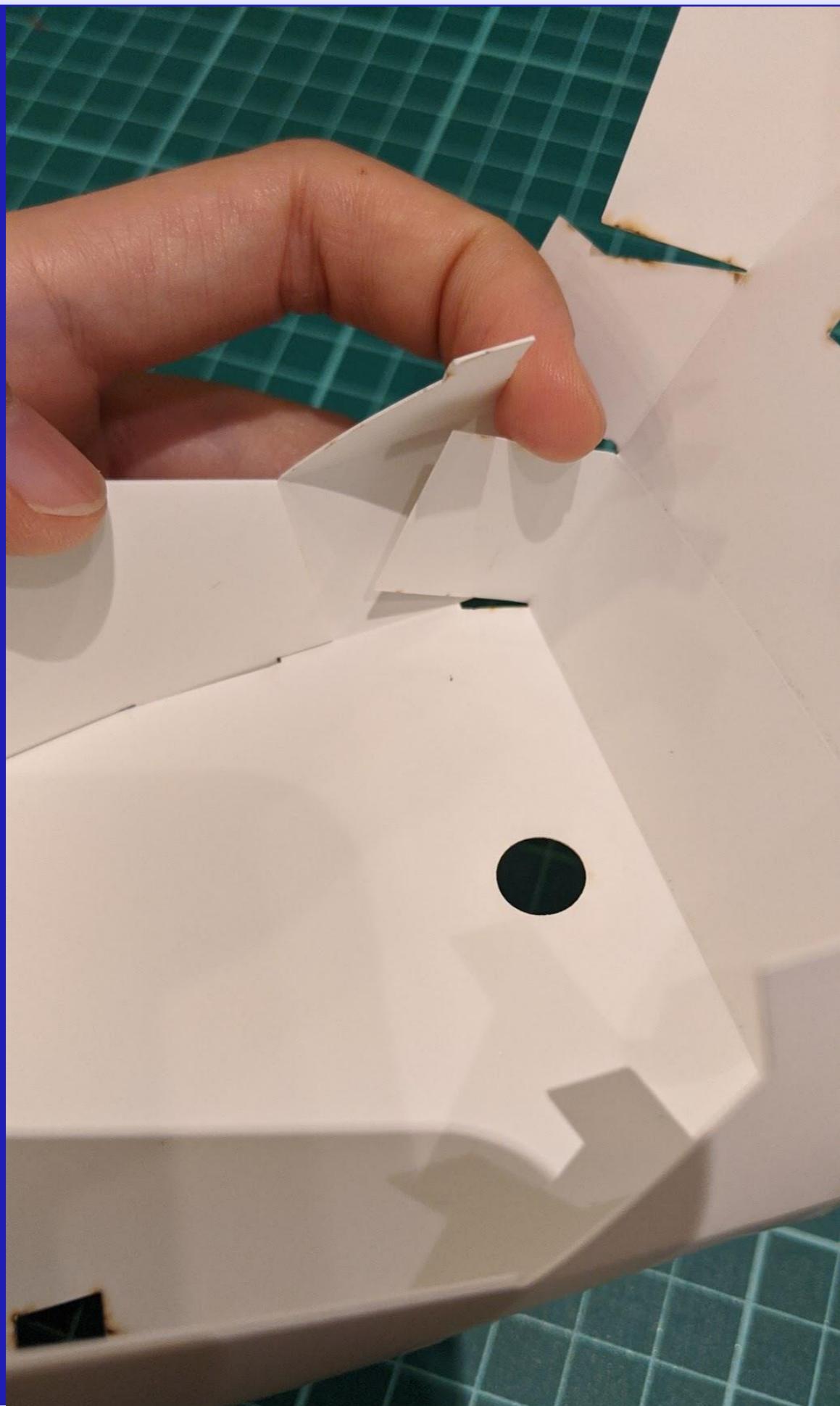


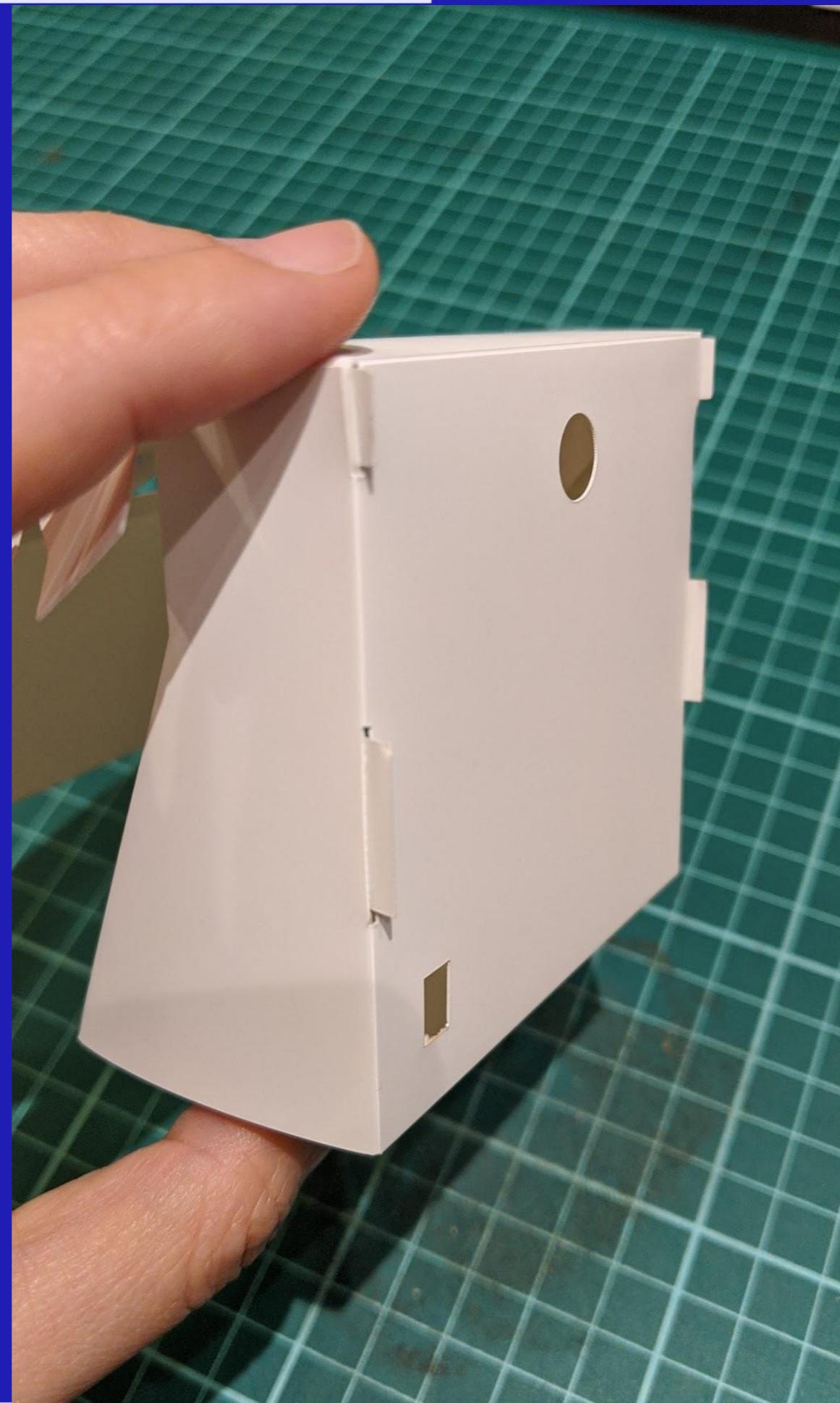


DIY Micro:bit Infrared Thermometer Workshop

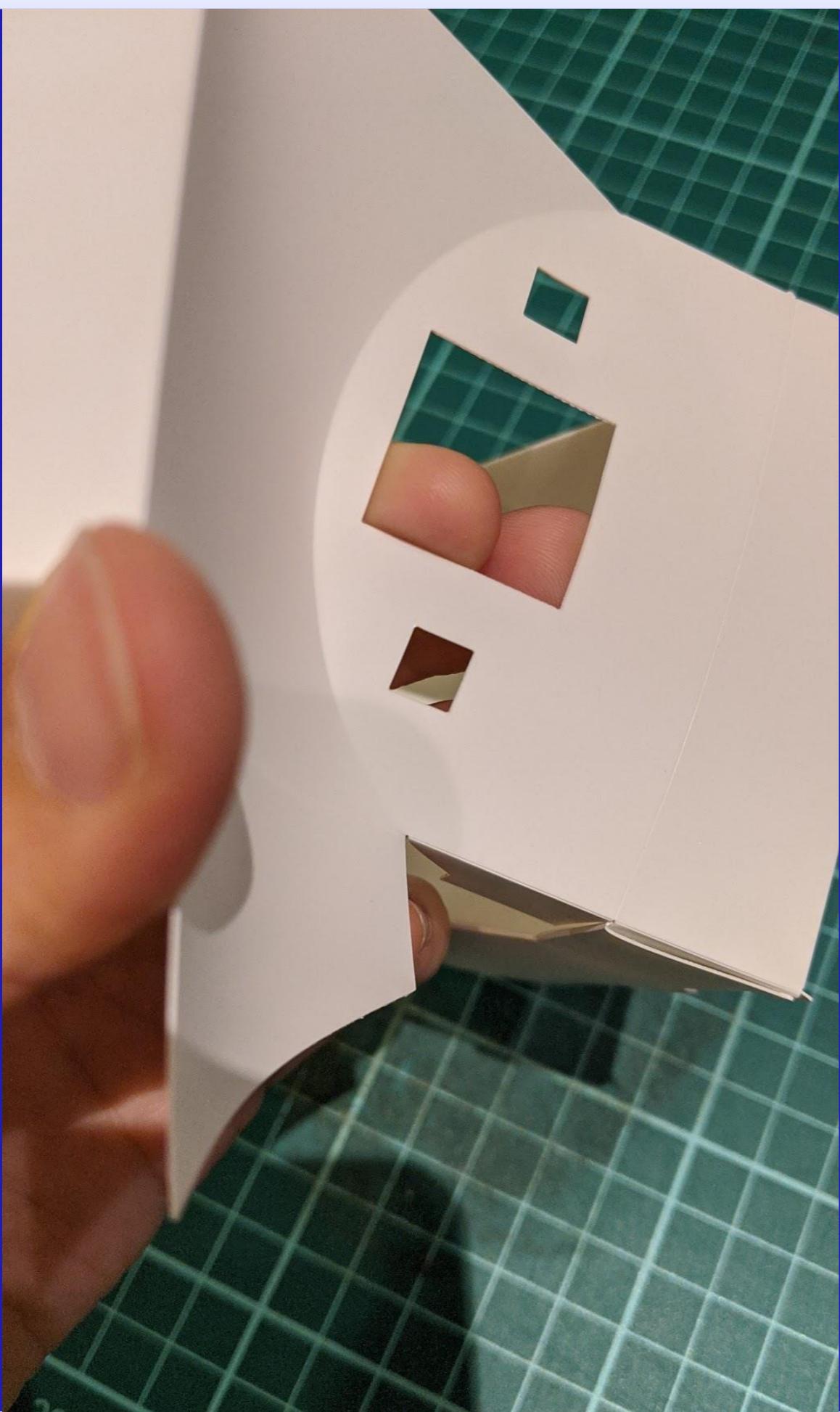
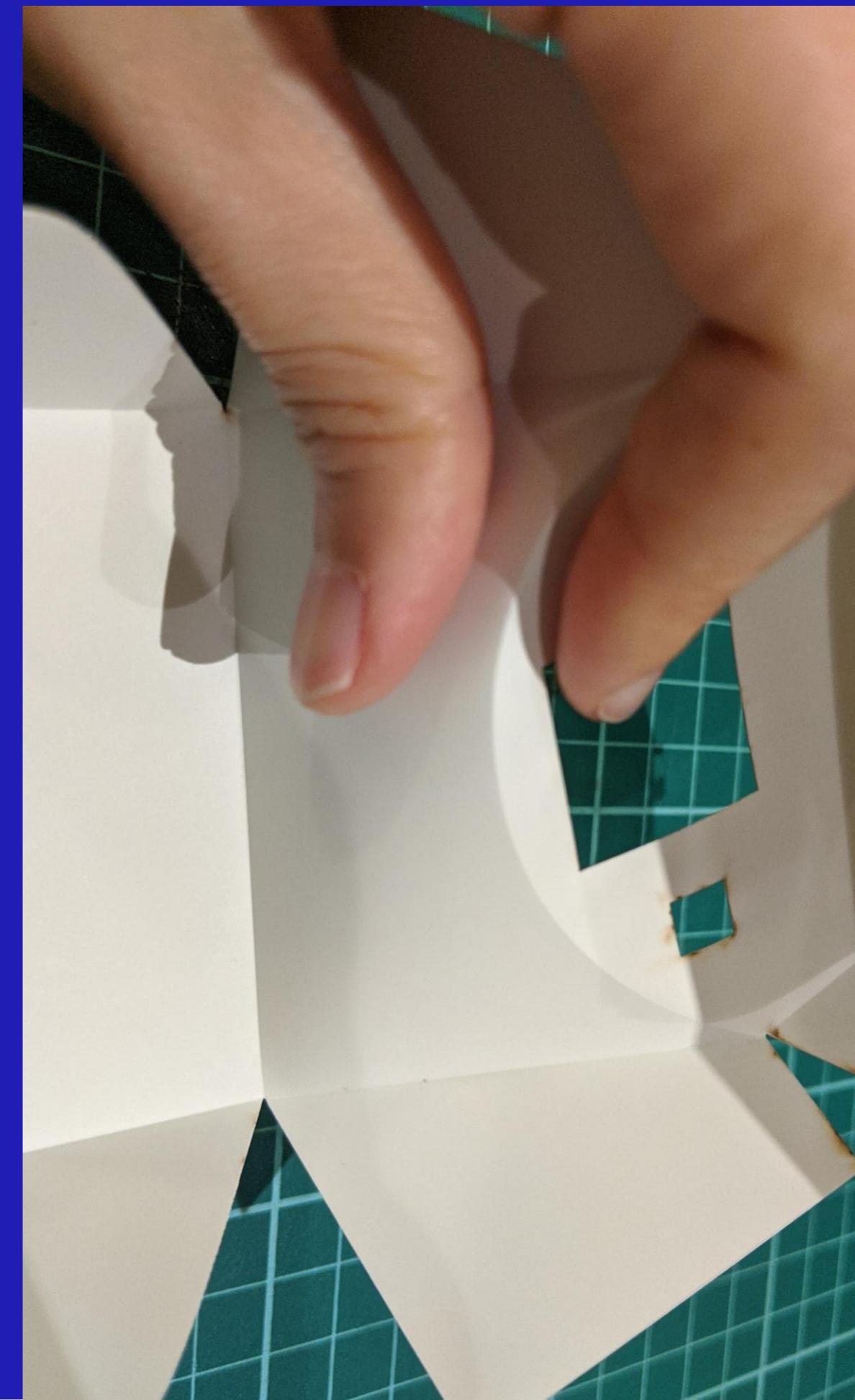


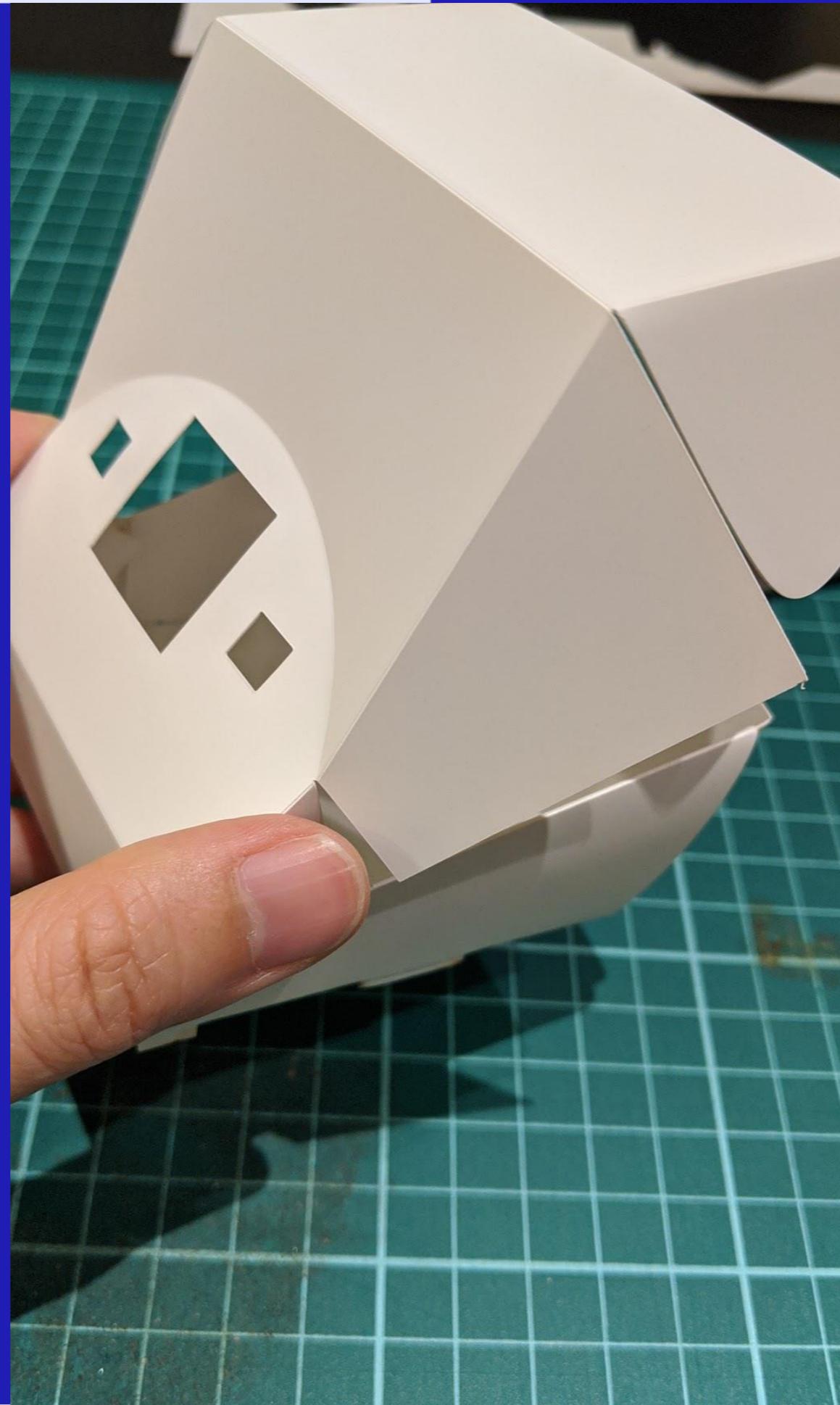
DIY Micro:bit Infrared Thermometer Workshop

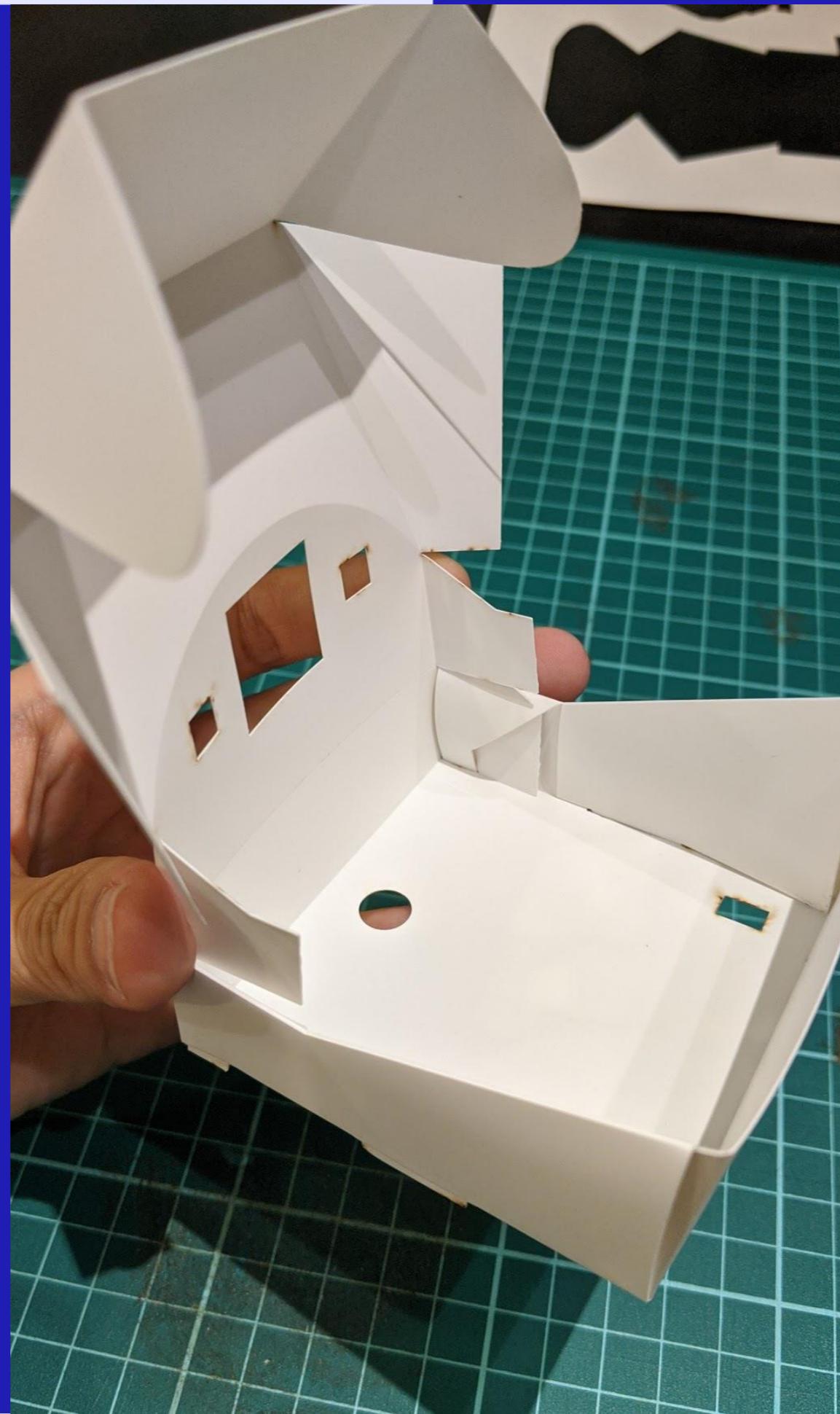




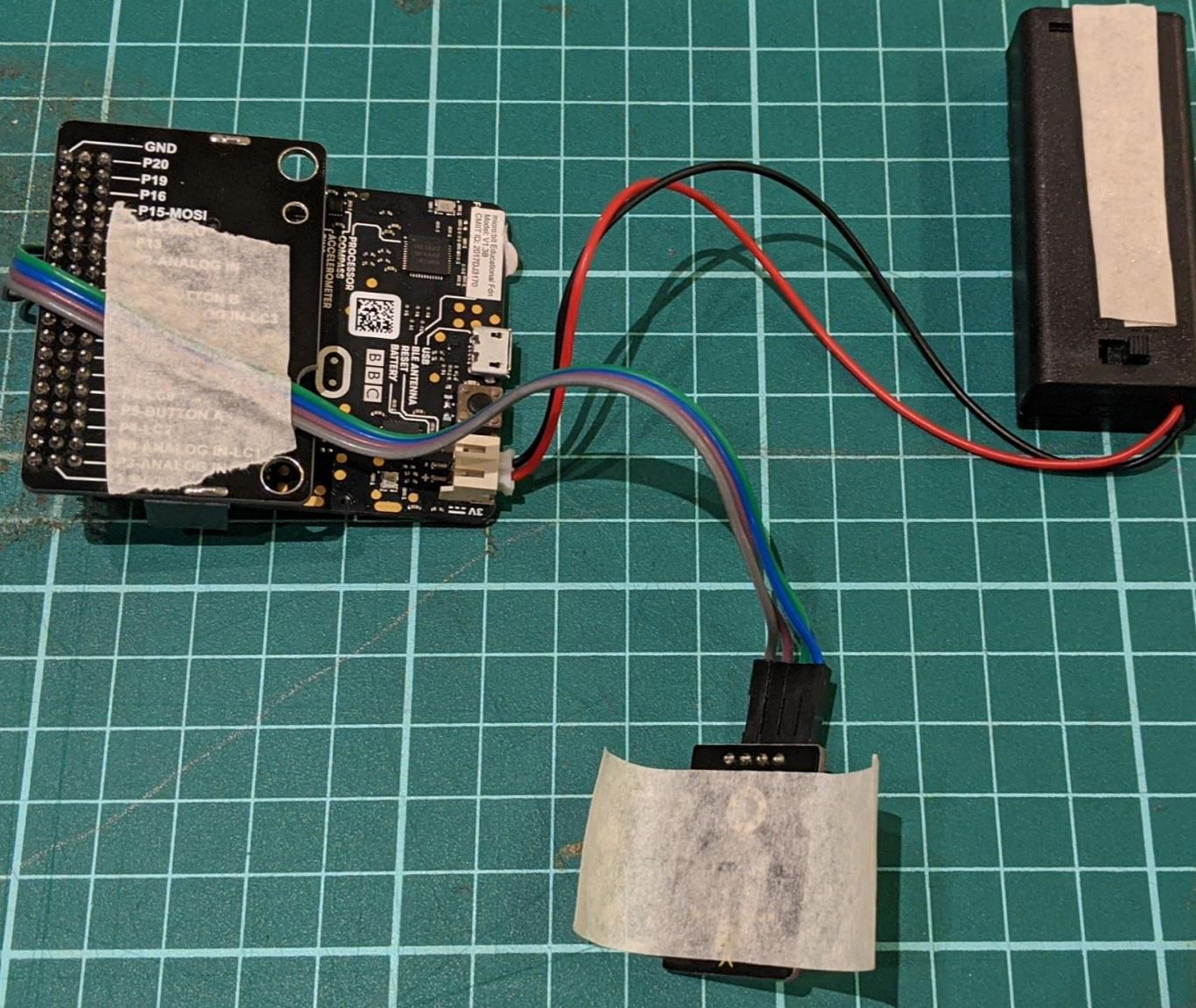
DIY Micro:bit Infrared Thermometer Workshop

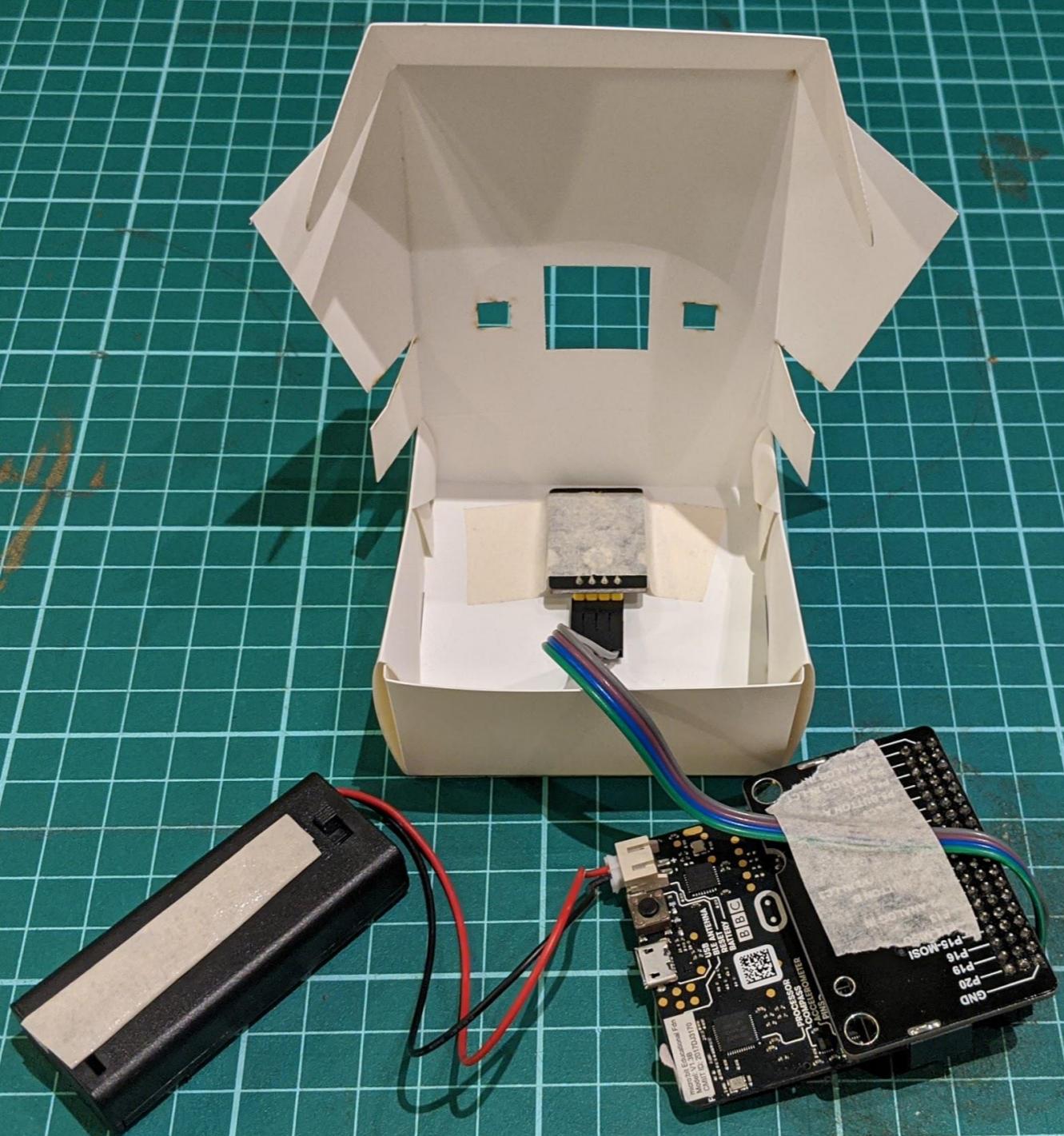


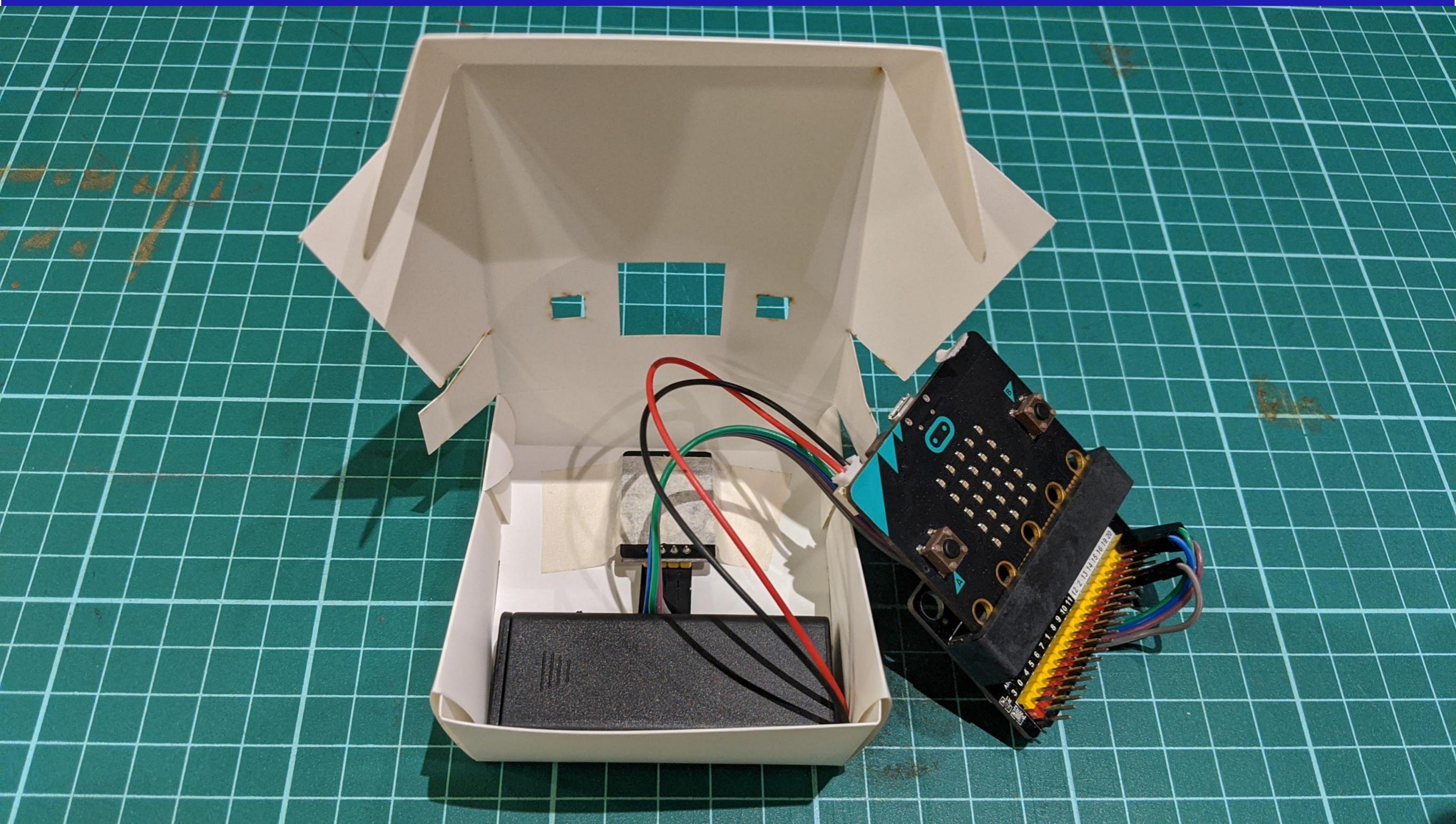






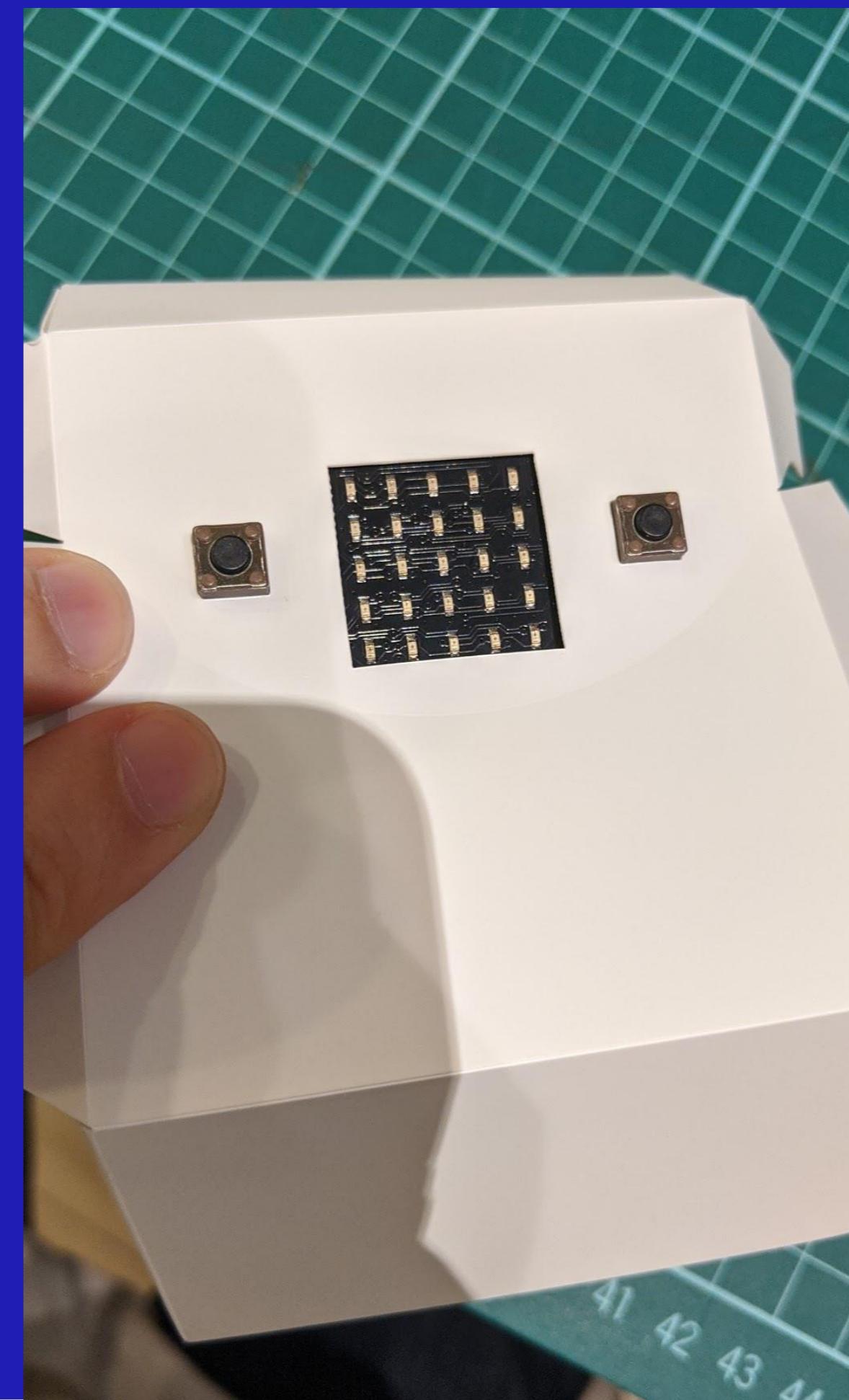
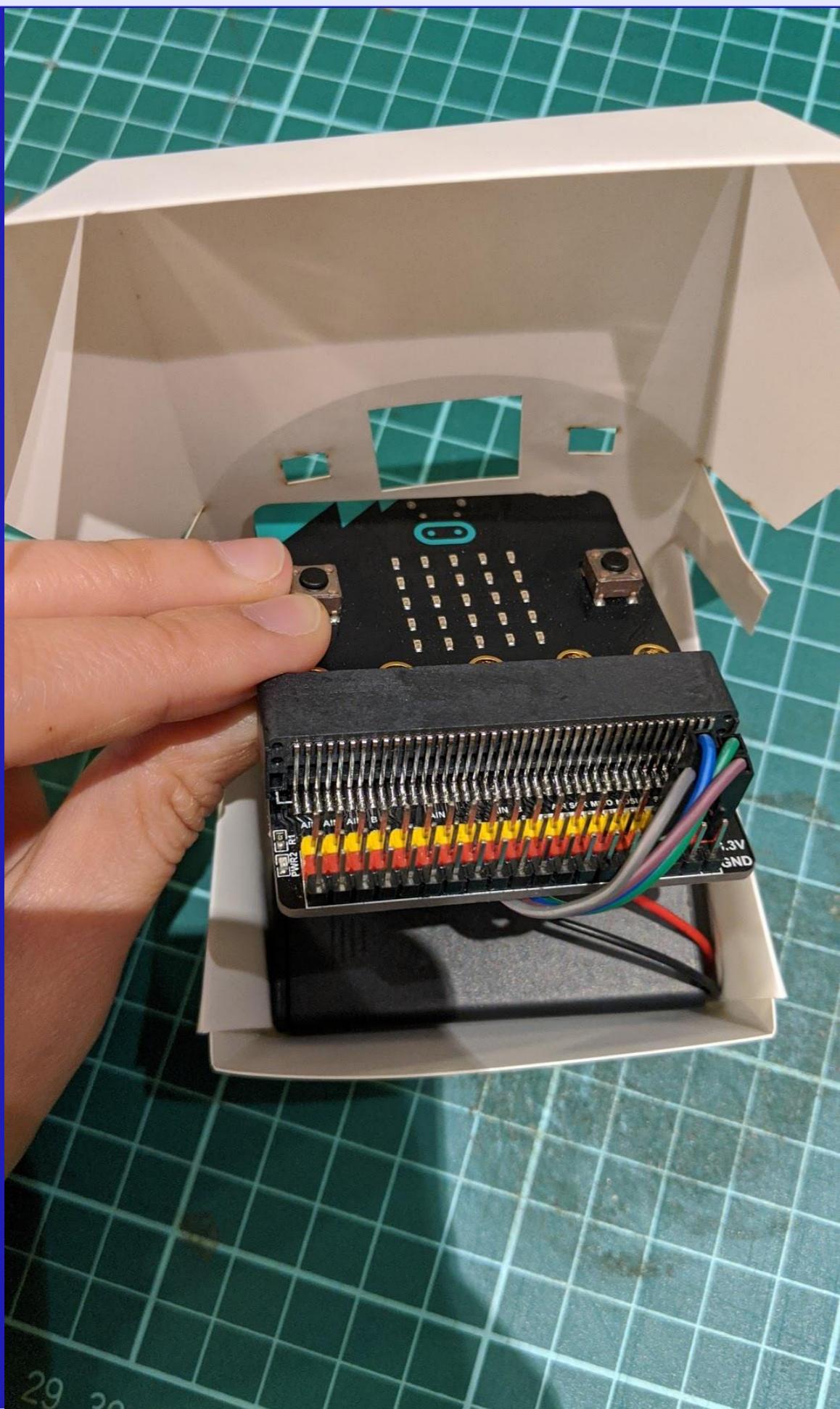


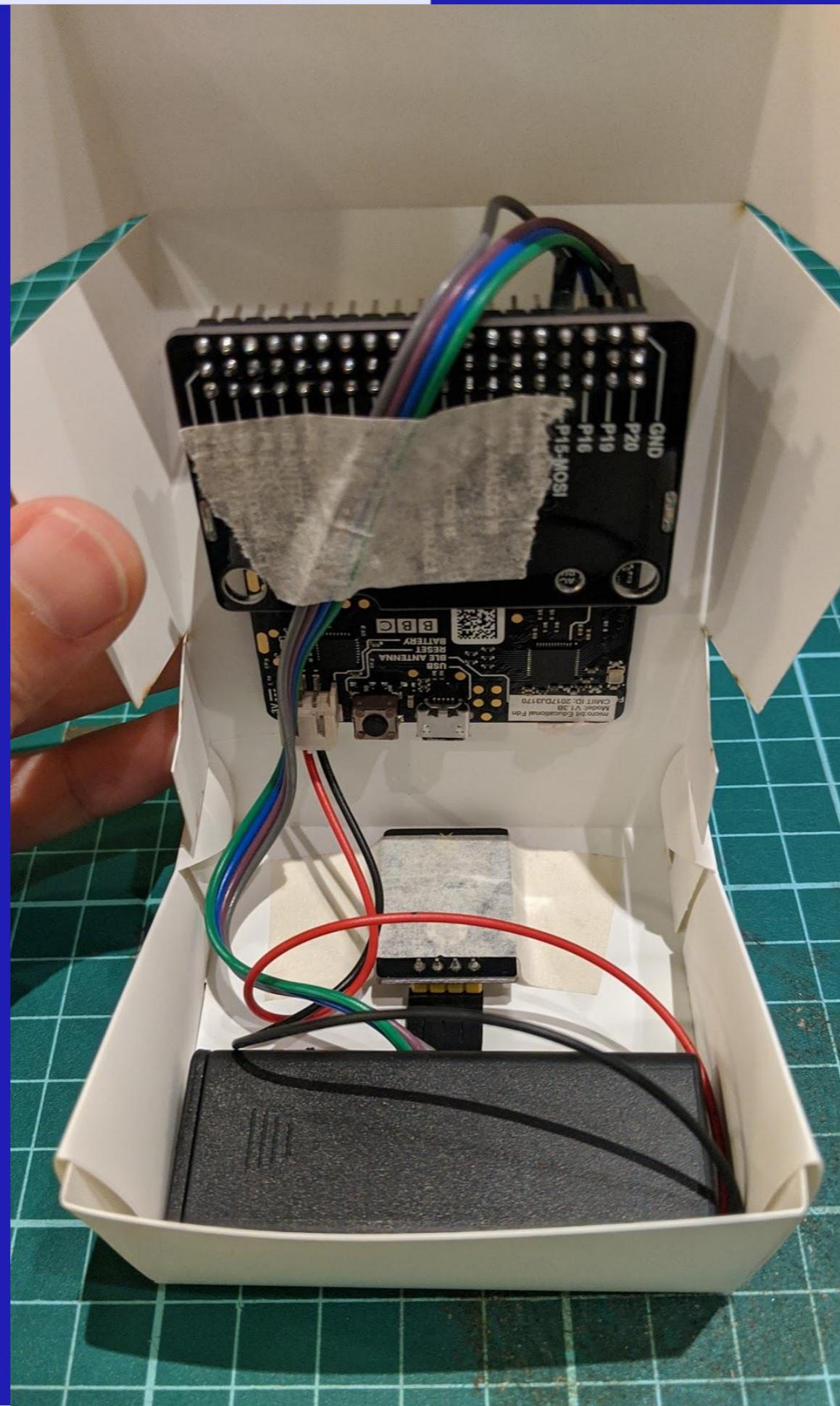




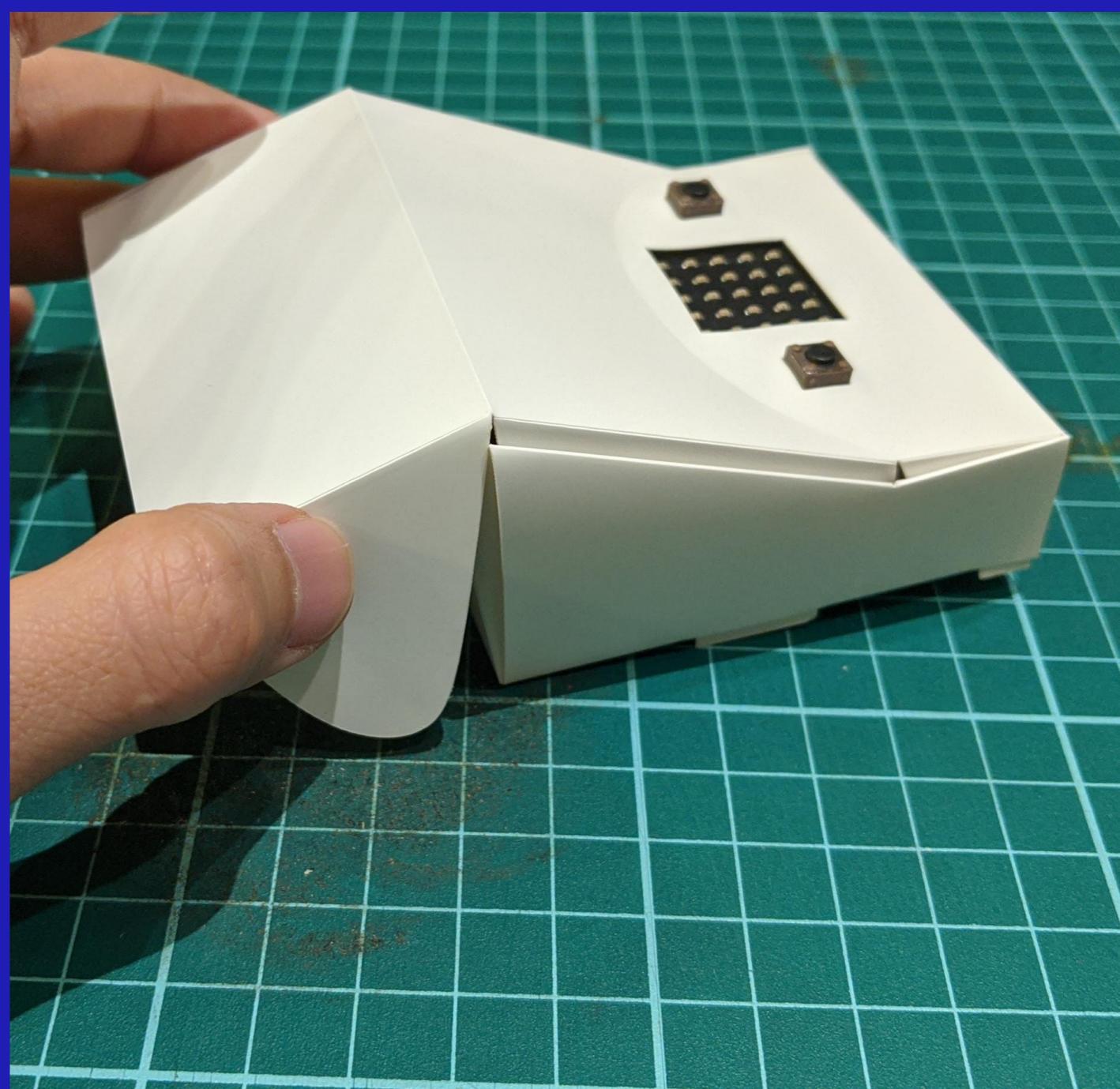
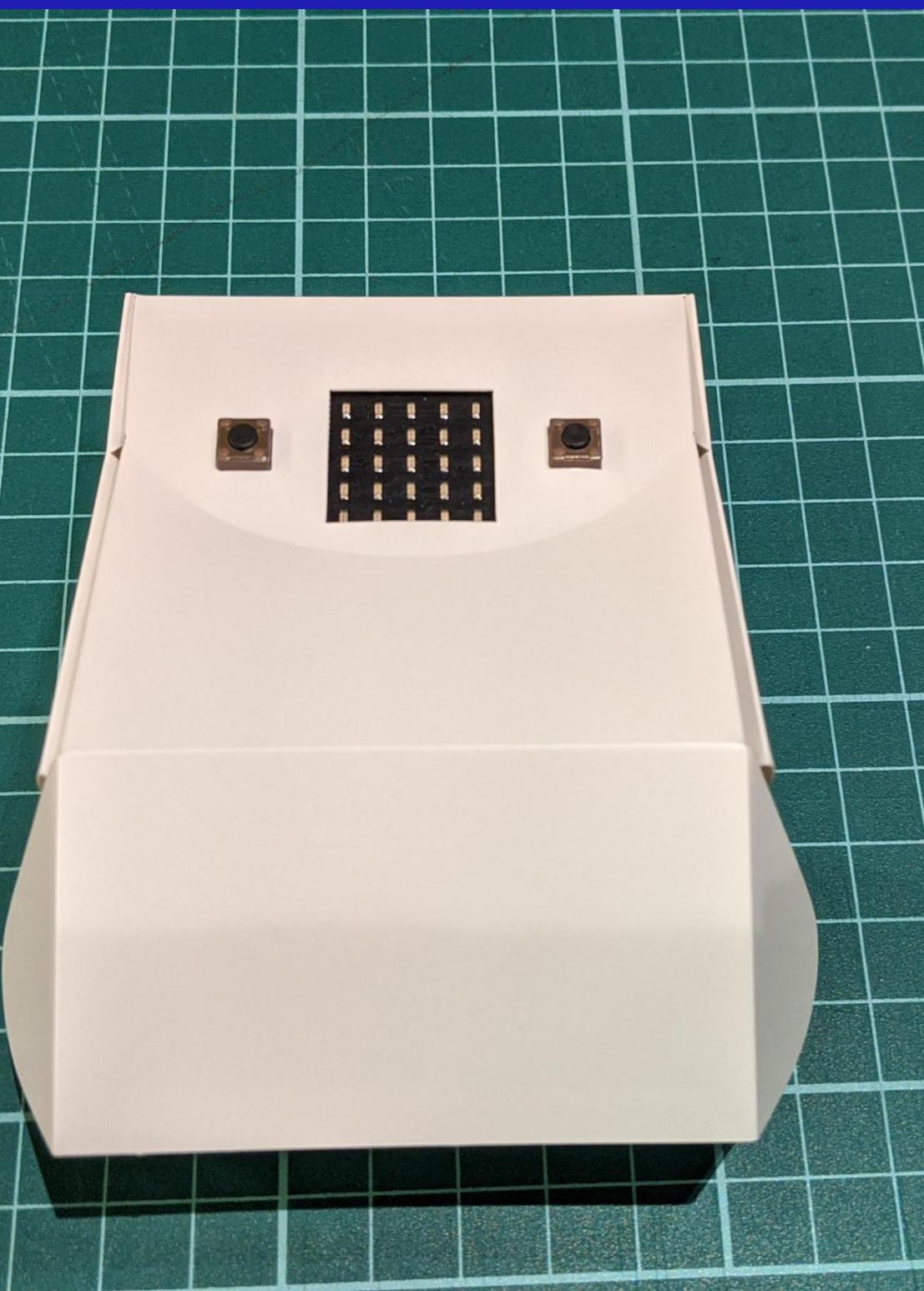


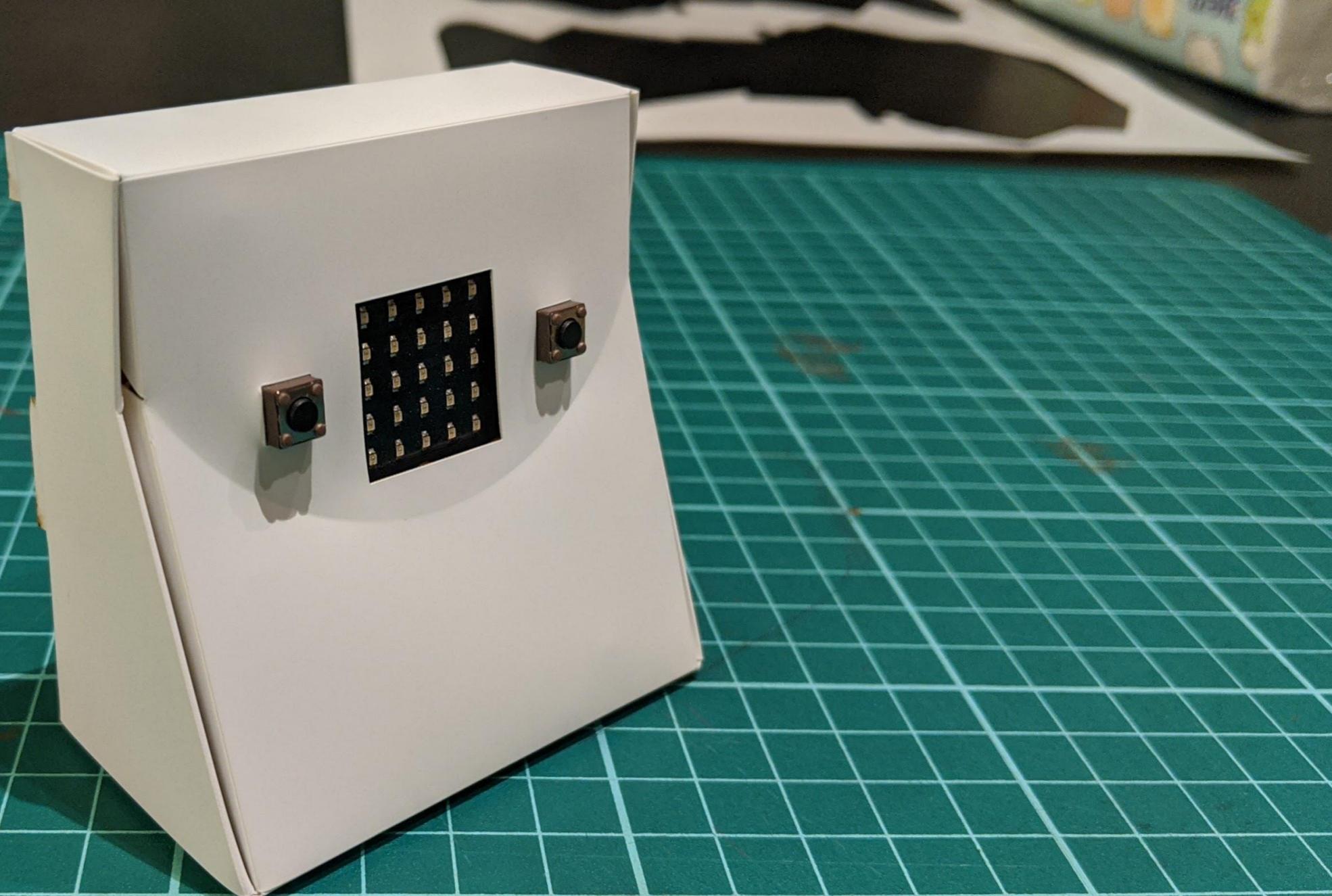
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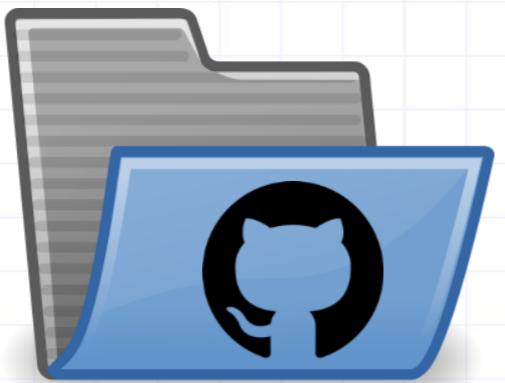




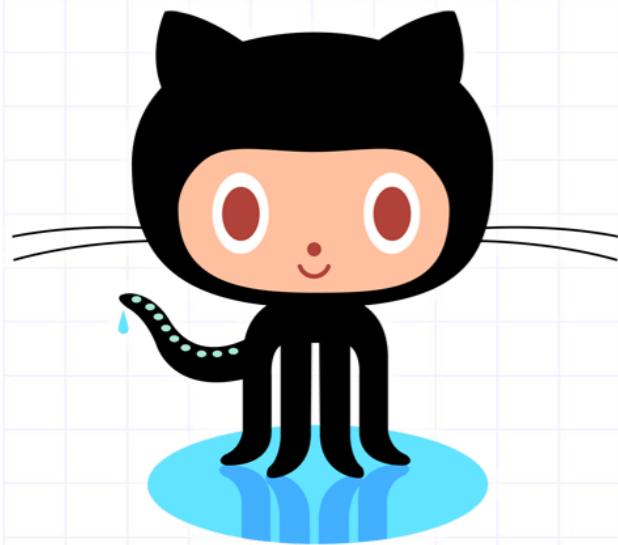
臺灣當代文化實驗場
Taiwan Contemporary Culture Lab

自製額溫槍工作坊 DIY Micro:bit Infrared Thermometer Workshop

資源介紹

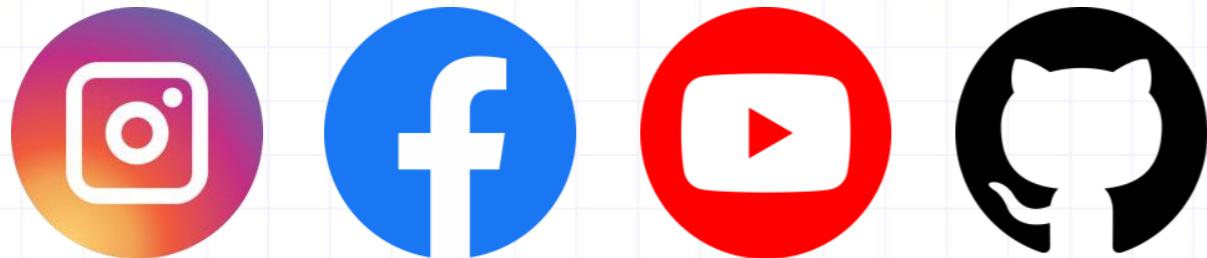


GitHub



OctoCat (章魚貓)

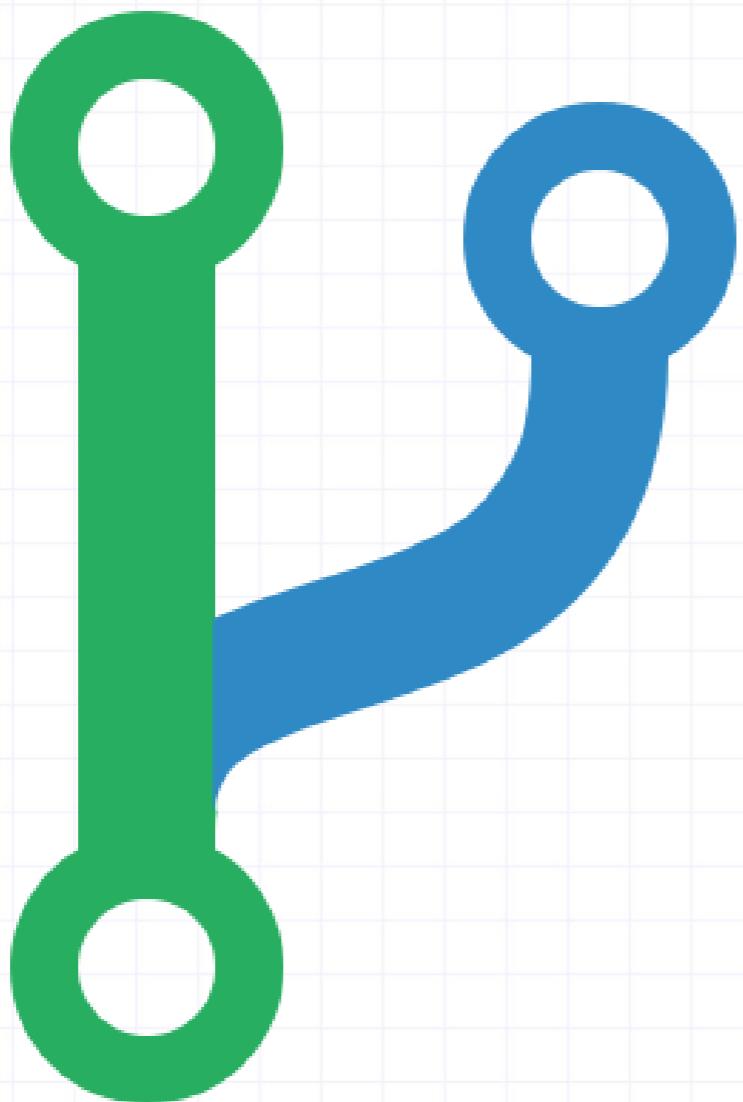
雲端的儲存空間
有點像





GitHub

V2.0

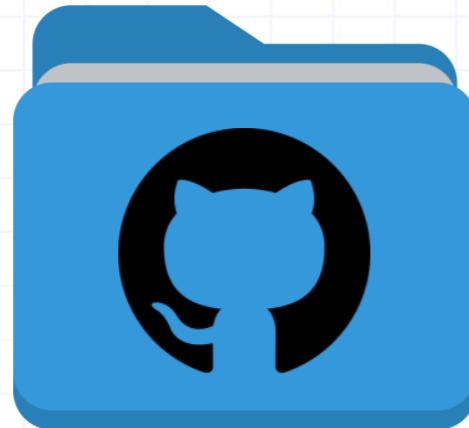


V1.0b

V1.0

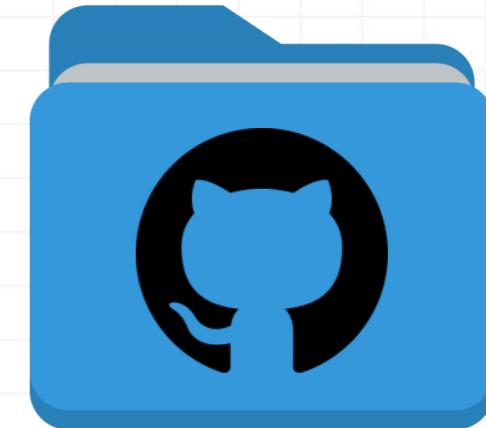
版本管理

GitHub



整個
複製

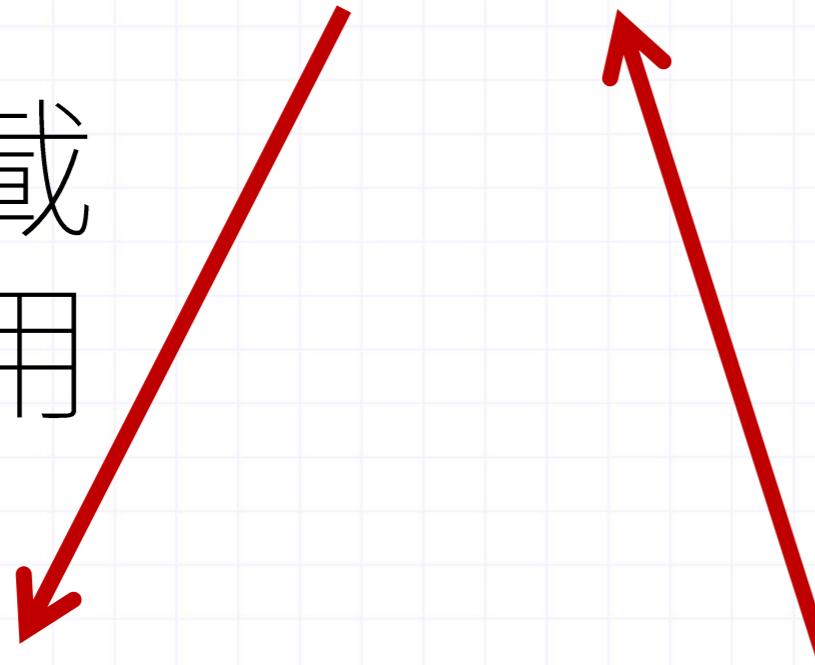
GitHub



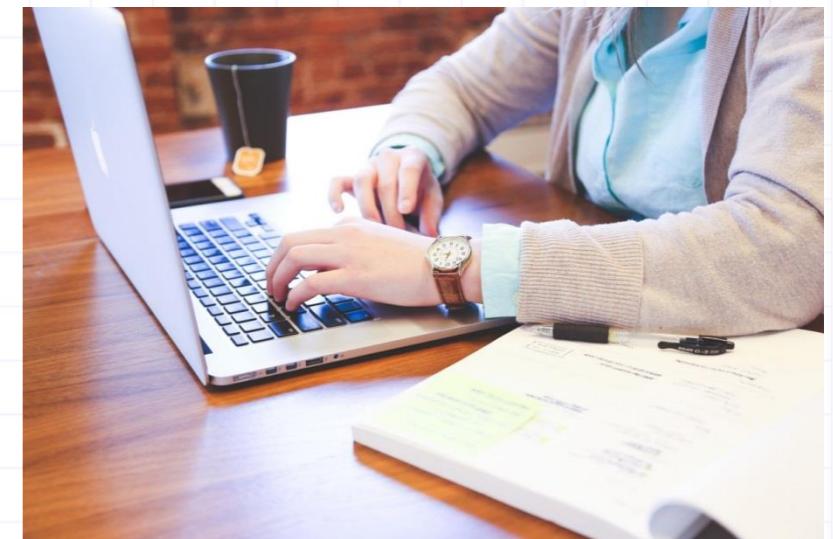
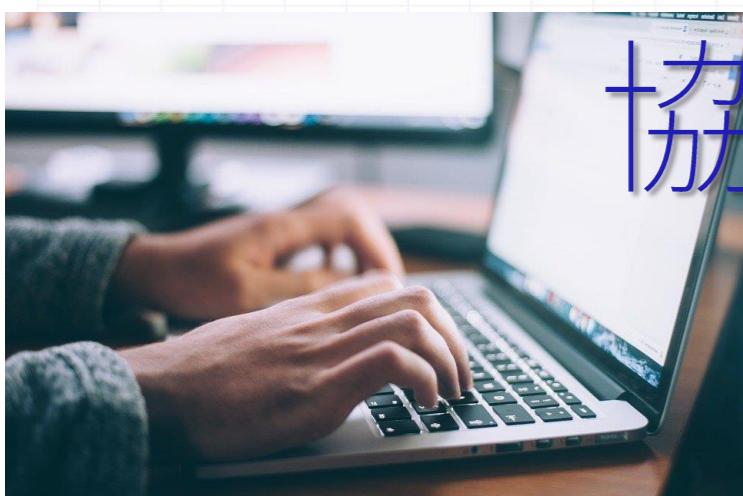
(分享成果)

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使用

上傳
修改



協同作業



知識分享

空總臺灣當代文化實驗場 C-LAB GitHub:

<https://github.com/clab-cetm>

儲存庫

[Overview](#)[Repositories 1](#)[Projects 0](#)[Stars 0](#)[Followers 1](#)[Following 0](#)

Popular repositories

[DIY-Thermometer-Using-Microbit](#)

防疫時尚，救國也要有型 -- 頭溫盒計畫

1

2

3 contributions in the last year



Contribution activity

[2020](#)[March 2020](#)

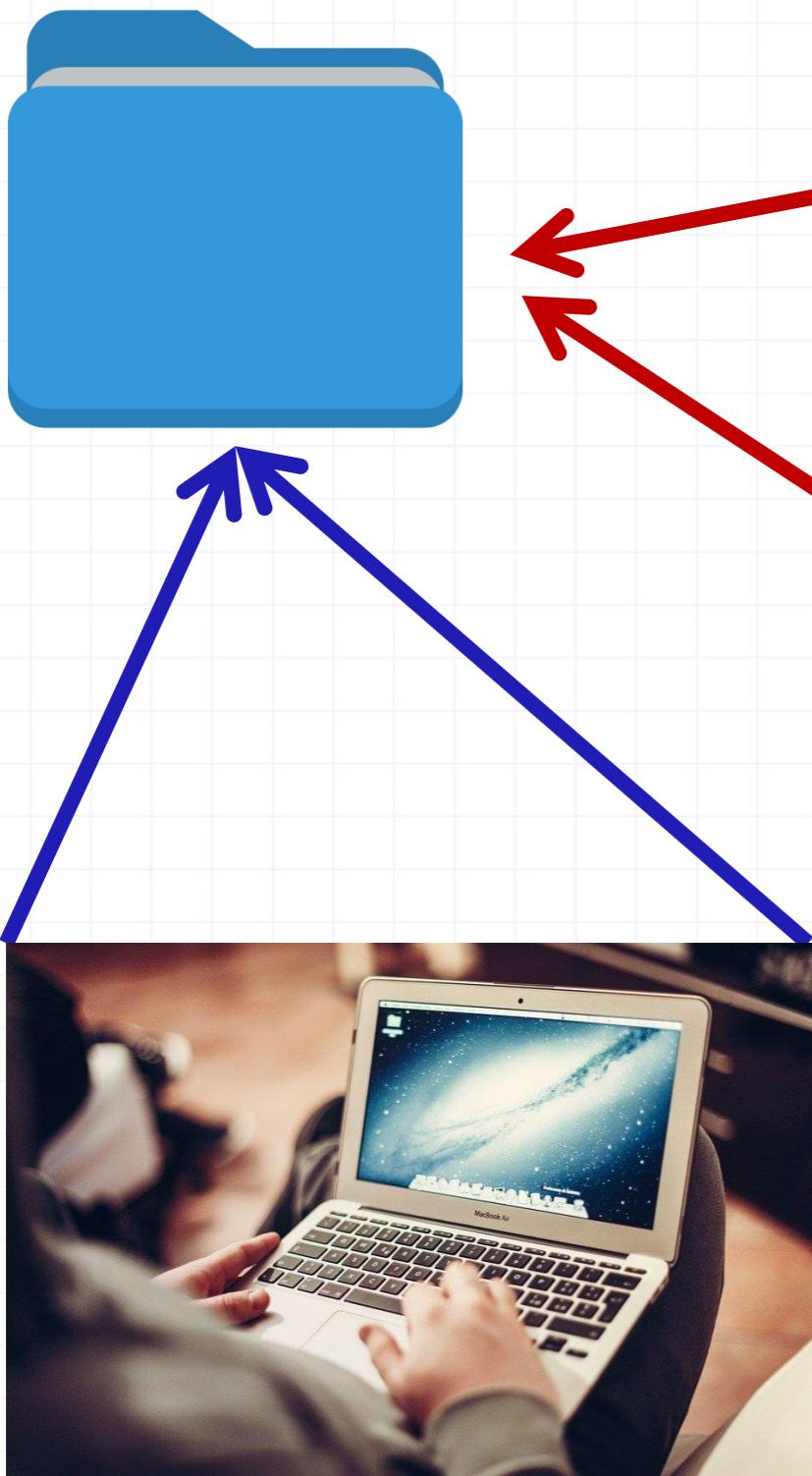
Created 1 commit in 1 repository

[clab-ctm/DIY-Thermometer-Using-Microbit](#) 1 commit

Created their first repository

Mar 21

C-LAB GitHub



生物醫學、電子工程、科技藝術家、建築等人員....



自造



教學

[Code](#)[Issues 0](#)[Pull requests 0](#)[Actions](#)[Projects 0](#)[Wiki](#)[Security](#)[Insights](#)

防疫時尚，救國也要有型 -- 額溫盒計畫

25 commits

1 branch

0 packages

0 releases

4 contributors

Branch: master

New pull request

Create new file

Upload files

Find file

Clone or download

 andrewintw Update 10-minute-microbit-guide.md

Latest commit ea777fe 5 hours ago

 case-design

Add files via upload

21 hours ago

 images

add workshop-info.md

yesterday

 makecode

Update 10-minute-microbit-guide.md

5 hours ago

 video

add case-designs/lego/ video/ visual-design/

yesterday

 visual-design

add case-designs/lego/ video/ visual-design/

yesterday

 .gitignore

Create .gitignore

7 hours ago

 README.md

add workshop-info.md

yesterday

 README_en.md

add README_en.md

yesterday

 README.md

額溫盒計畫

Language: [English]

clab-ctm / DIY-Thermometer-Using-Microbit

Unwatch 4 Unstar 1 Fork 2

Code Issues 0 Pull requests 0 Actions Projects 0 Wiki Security Insights

Branch: master DIY-Thermometer-Using-Microbit / case-design /

Create new file Upload files Find file History

jasonlee2357 Add files via upload Latest commit e2fe979 21 hours ago

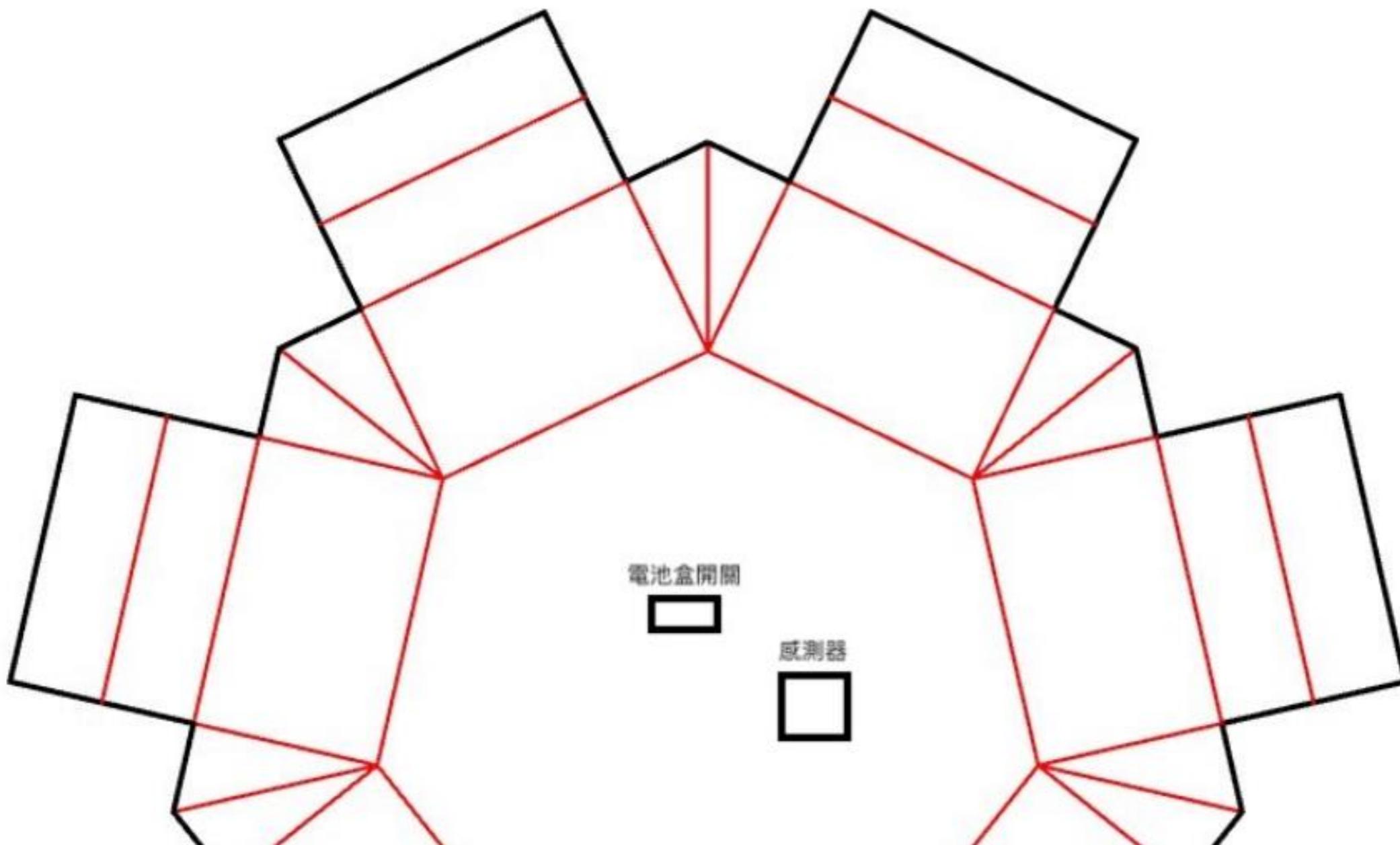
..

lego update README.md yesterday

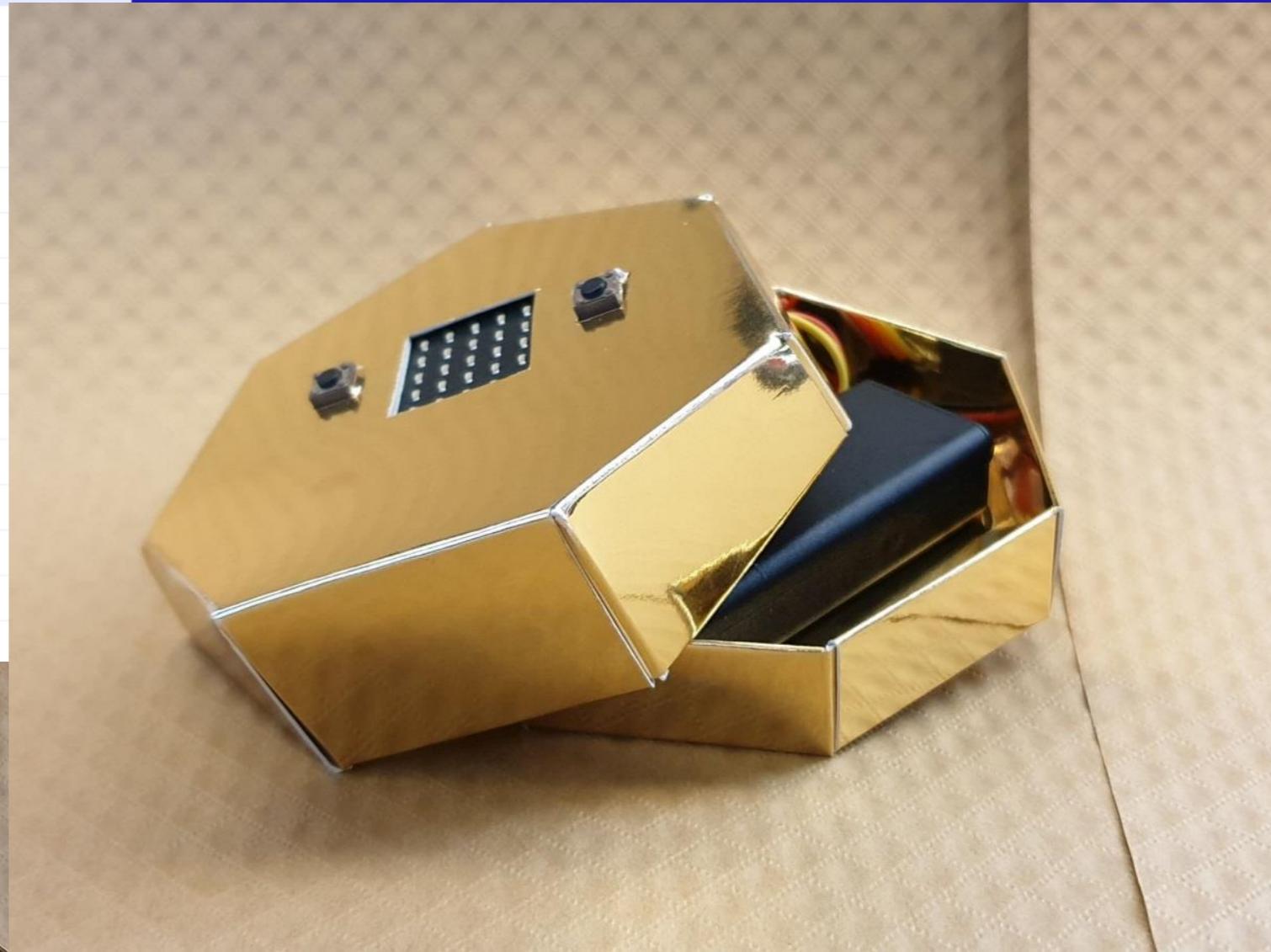
multicore Add files via upload 21 hours ago

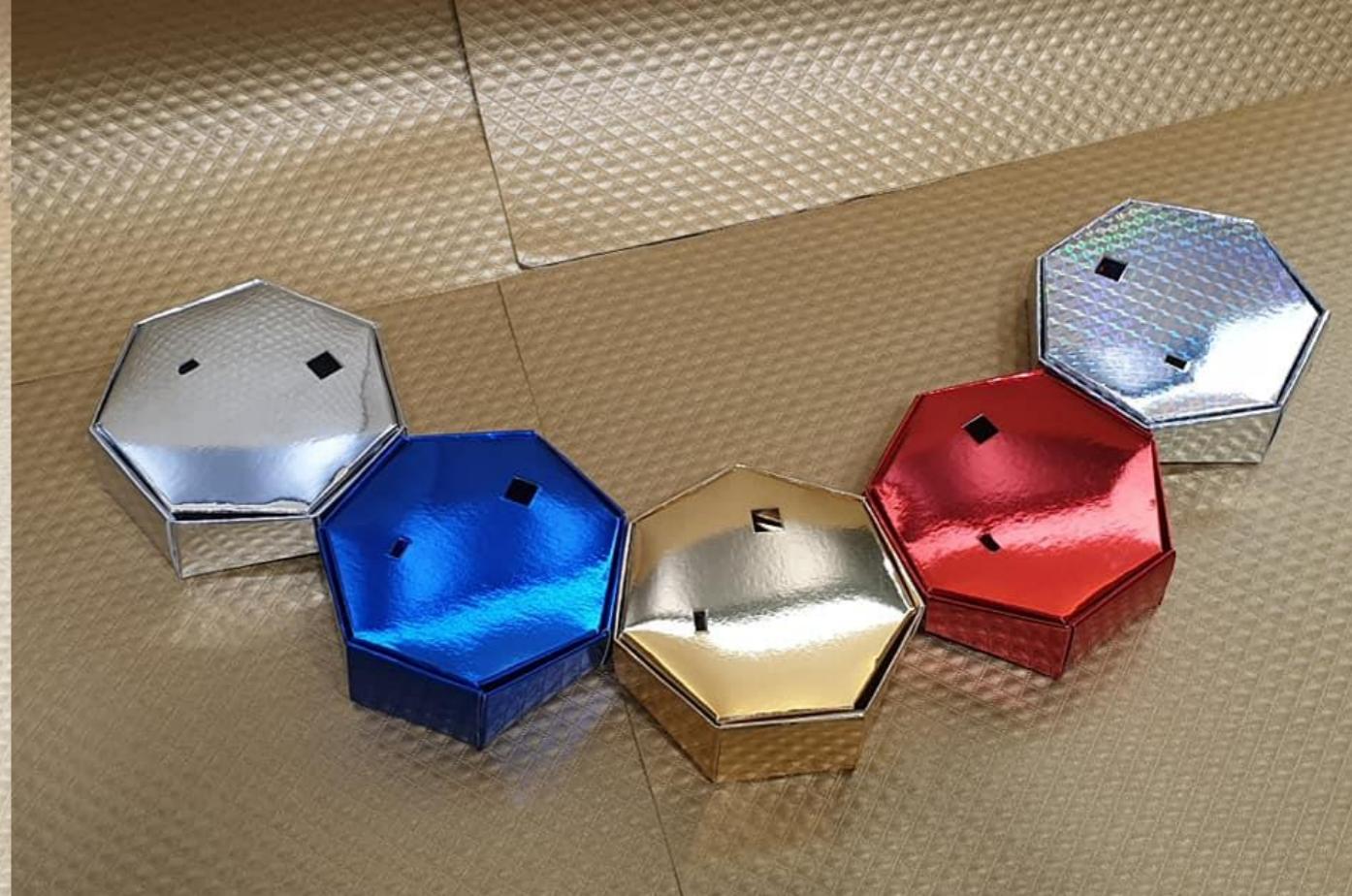
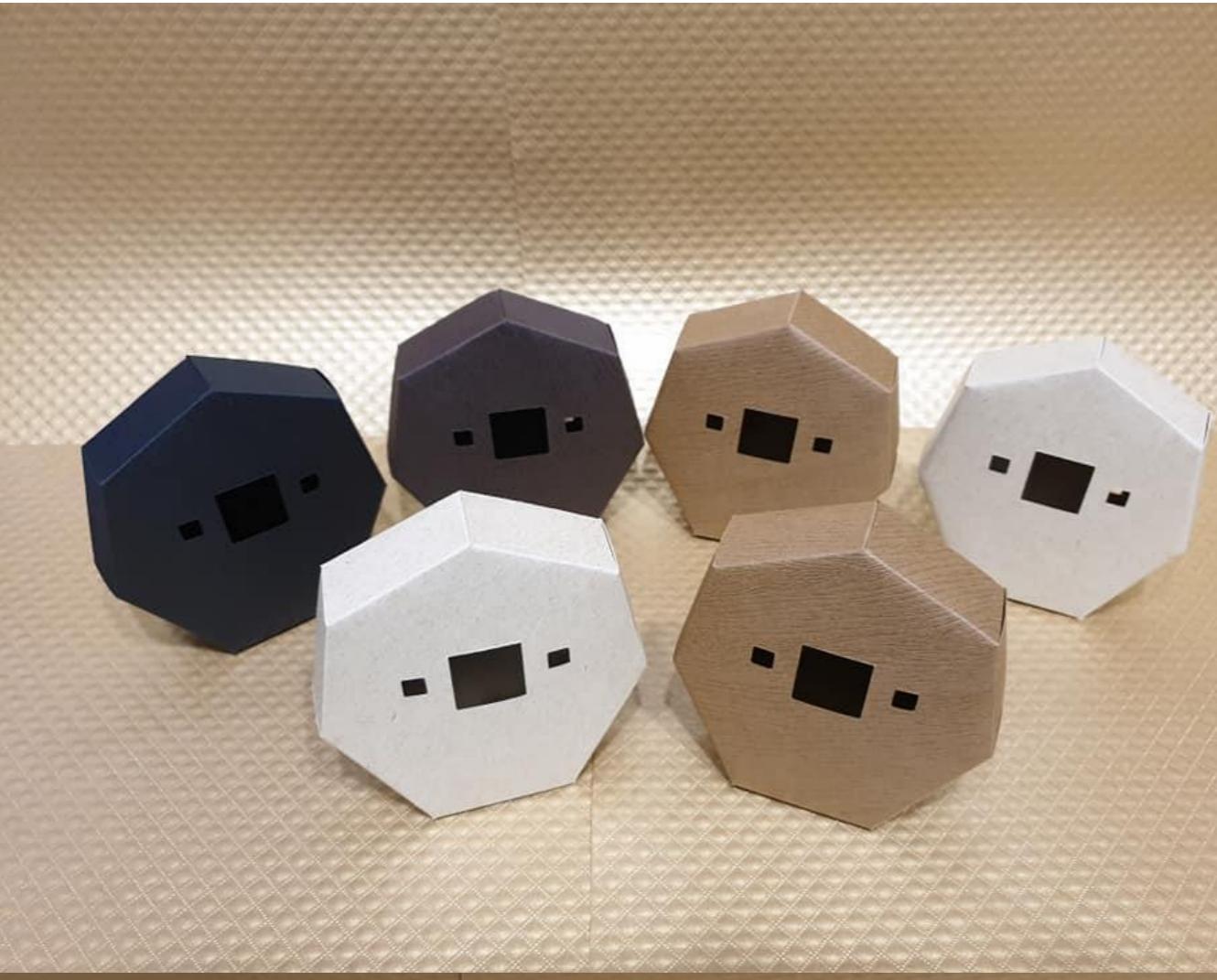
1. border_base.jpg 是外形盒之底盒的摺線圖，黑線是裁切線，紅線是摺線，可以先用壓線筆劃一下摺線再摺。底盒主要是放電池盒及感應器的部份，可以對準開孔處，用雙面膠帶固定在底盒內側。

[base] Multicore
black line: cut
red line: fold



DIY Micro:bit Infrared Thermometer Workshop





計畫參與人員名單

概念統籌：蔡宏賢

生物講師：曹存慧

電子工程講師：蔡奇宏、林彥璋

科技藝術講師：謝佑承

程式設計：林彥璋

硬體設計：蔡奇宏、林彥璋

造型設計：李家祥、黃瑋瑋

企劃執行：陳品伊、蔣孟涵、謝澤旻

行銷推廣：劉郁青、黃怡翔、洪凱祥

主視覺設計：邱璽民

攝影執行：桑杉學、黃柏超

直播執行：陳韋均、詹佳儒

授權顧問：莊庭瑞