



Go Go Space Ball



Semi & AIOT Coding 智慧物聯- Scratch Fun

以Scrath 聯結 **yabboni** 介紹與操作

Date: 2021 / 4 / 28

Speaker: 宋紹華



Demo Video



Scratch

Go Go
Space Ball

Rabboni

利用Scratch和Rabboni - Go Go Space Ball

報告人：宋紹華

光電系



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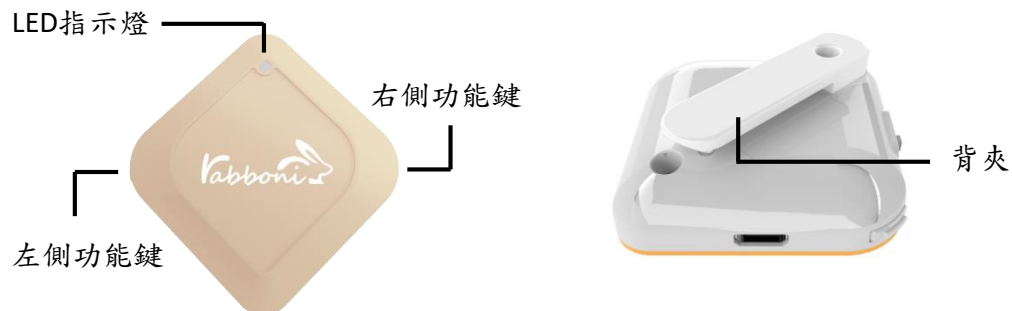
APPENDIX

γabboni-其他應用

<https://12u10.lab.nycu.edu.tw/>



yabboni-介紹



- yabboni內建六軸重力感測器 (IMU: Initial Measurement Unit)、BLE藍芽傳輸及運算元件
- 可即時傳輸感測讀值並提供取樣頻率及動態範圍之多樣選擇
- 配有LED燈，指示yabboni運作狀態及電量顯示。

- yabboni 提供Android感測訊號擷取APP及各式程式教育應用 API
- Scratch, Python, Unity, Java, App Inventor
- 專為 AIoT 程式教育、APP開發、AI智慧感測互聯或各種智慧化應用之動作偵測相關研究開發使用。



yabboni-感測參數介紹

Gyro Full Scale Range	Gyro Sensitivity	Accel Full Scale Range
(°/sec)	(LSB/°/sec)	(g)
±250	65.5	±2
±500	32.8	±4
±1000	16.4	±8
±2000	8.2	±16

電池容量	120mAh 鋰離子充電電池
充電方式	USB mini 充電
無線傳輸	Bluetooth 4.0 BLE
充電時間	30分鐘
待機時間	5天 (電源開關鍵OFF)
連續使用時間	8 小時
支援作業系統	藍芽：Android USB：系統Windows 7以上

為了提高可靠性，還可以為每個軸配備更多的傳感器。一般而言IMU要安裝在被測物體的重心上。



yabboni-操作功能介紹

電源開關鍵	單刀開關	On/off 標示
左側功能鍵	(短按1秒)	計數紀錄開始與結束(LED紅燈)
右側功能鍵	(短按1秒)	藍芽廣播開啟，與藍芽裝置配對(LED綠燈)
	(長按5秒)	電量顯示
LED電量指示燈號	(紅)	錄影指示燈、電量小於30%
	(橘)	關機指示燈、電量小於70%
	(綠)	配對指示燈、電量大於70%



[綠燈閃爍]藍芽廣播中



[紅燈閃爍]計數記錄中



[長按右鍵5秒]可以確認電量狀態



電量大於70%



電量介於70% 到30%



電量小於30%



yabboni-配件介紹



yabboni本體 (正面)



yabboni本體 (背面)

yabboni背夾(拆卸須將螺絲工具)



提供使用者跑步或行進間
yabboni主體與鞋面穩固
結合，確保動作的正確偵測。

魔鬼氈手腕帶 · 寬2公分、長27.5公分



提供使用者跑步或行進間yabboni主體
與鞋面穩固結合，確保動作的正確偵測。

USB轉接線一條



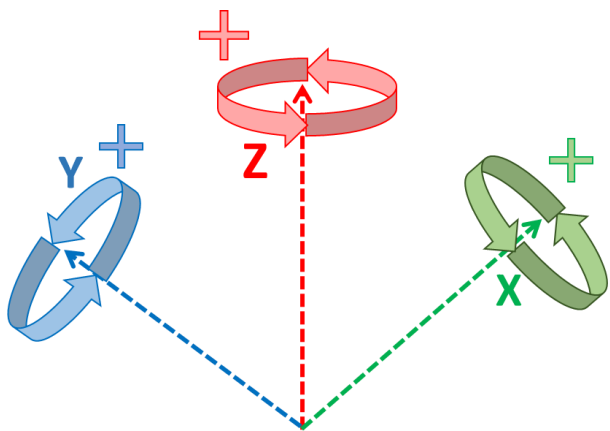
USB Type A轉接 USB mini線 ·
可提供傳輸數據以及充電功能。



yabboni-軸向定義

直線軸：X/Y/Z 加速度 (Acceleration)

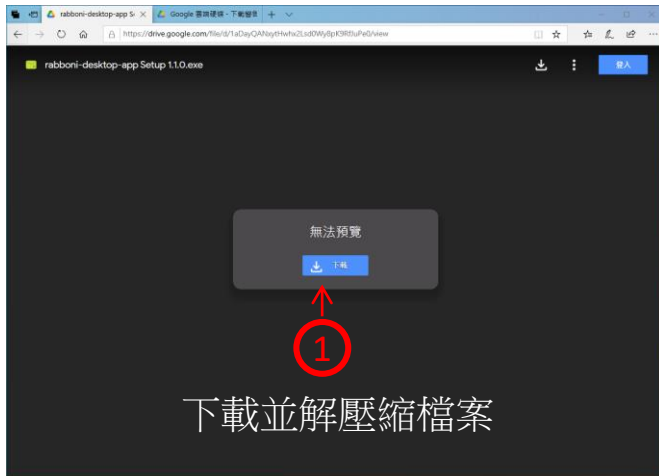
環狀軸：X/Y/Z 角速度 (Gyro)





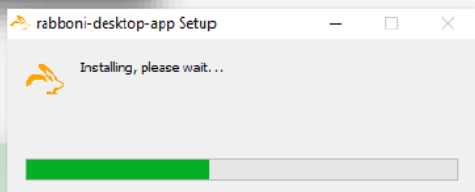
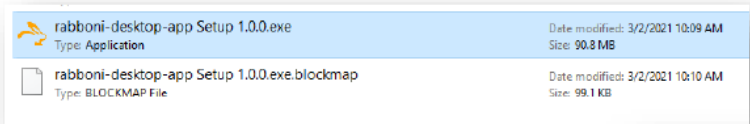
yabboni -Scratch

1. 進入連結：<https://reurl.cc/e9ob4R>
2. 如果出現警告，選擇”仍要下載”
3. 選擇”儲存”

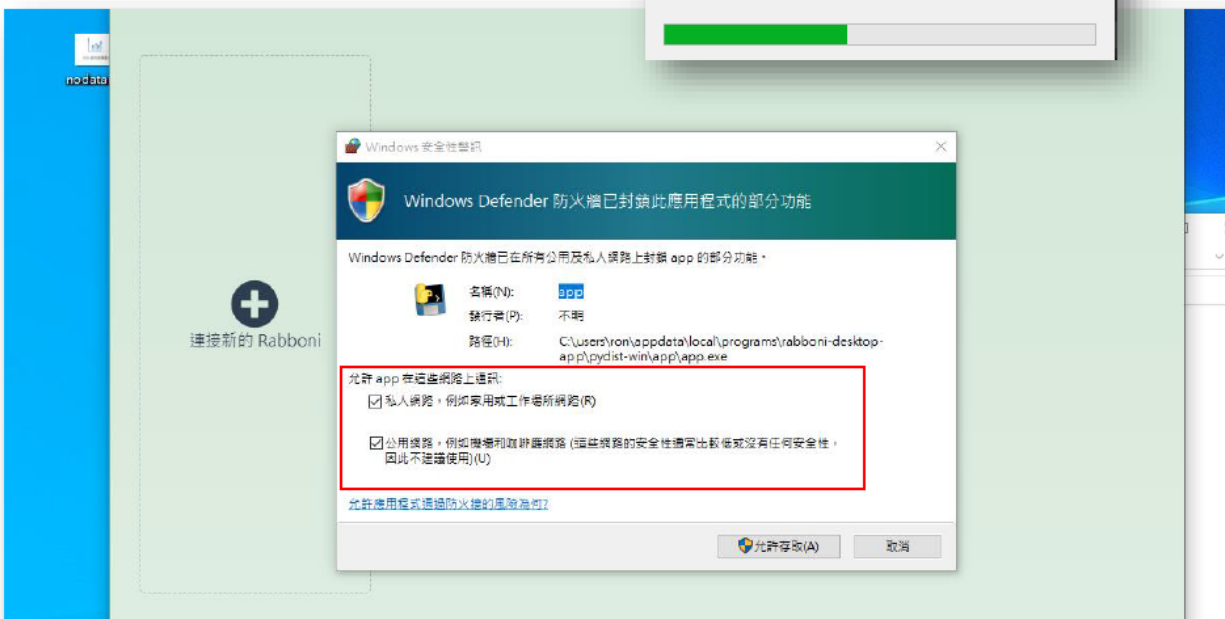




安裝



- 點擊兩下 rabboni-desktop-app Setup 1.0.0.exe 進行安裝
- 初次安裝程式時，勾選允許 app 在網路上的通訊。





App 說明 - 主畫面



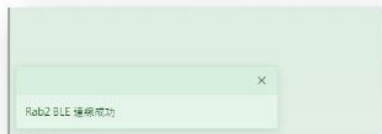
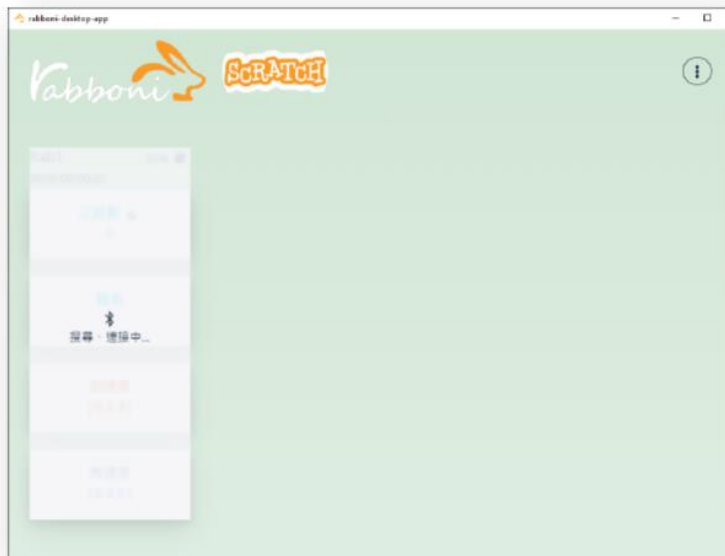
- 1) 裝置連線(最多四個)
- 2) 開啟 Scratch
- 3) 更多功能

PROVIDED BY AIWill Lab Co. Ltd.





App 說明 - 裝置連線



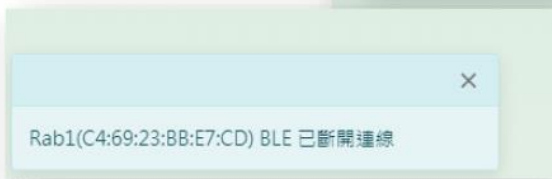
- 將 Rabboni 進入 BLE 連線模式
- 搜尋連接你的 Rabboni 裝置
- 連線成功時，左下方會出現連線成功訊息



App 說明 - 裝置斷開連線

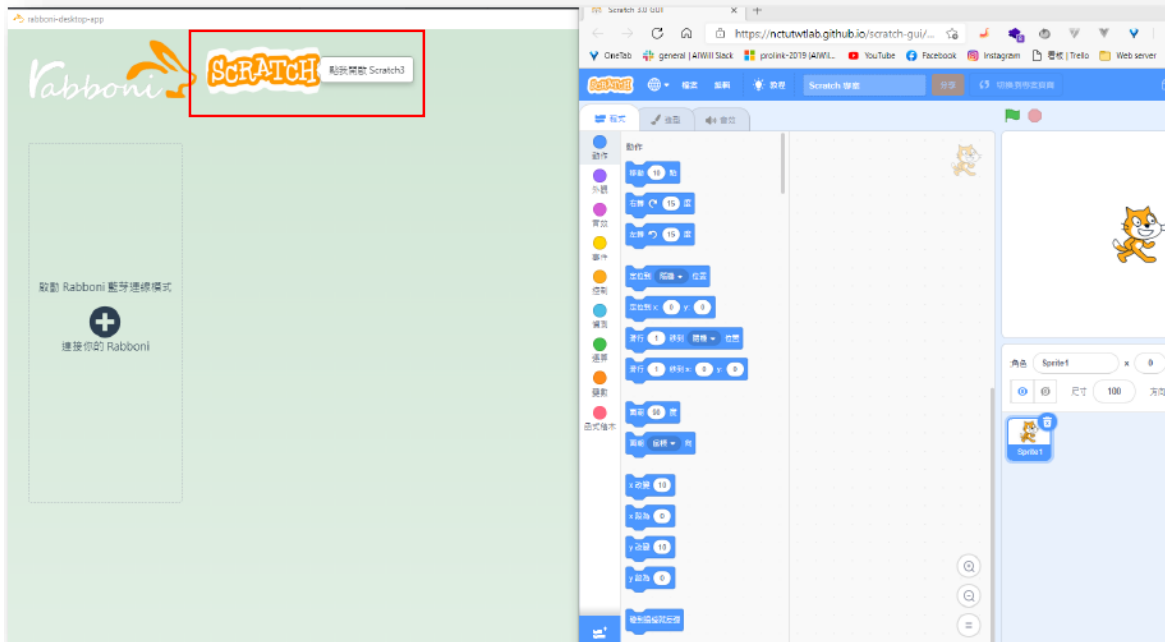


- 裝置斷開連線方式
 - 按下斷線的按鈕
 - 將 Rabboni 裝置開關 ON->OFF
 - 裝置沒電時，會自動斷線
- 成功斷開連線時，左下方會出現訊息





App 說明 - 開啟 Scratch

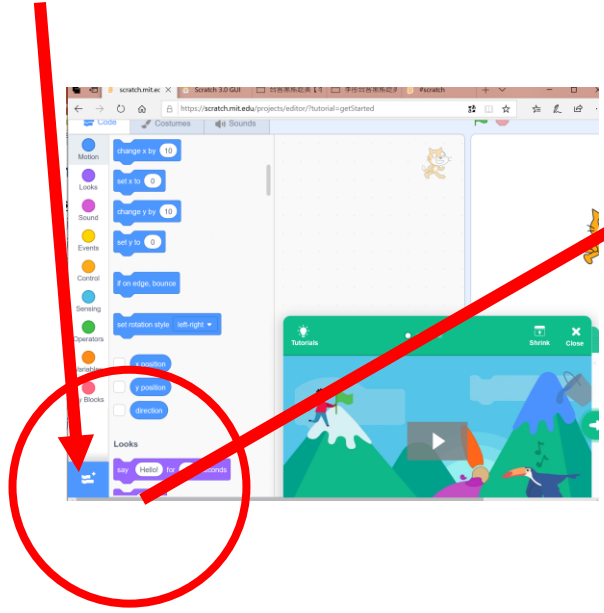


- 點擊 Scratch 圖示將另外開啟 Scratch 3.0 GUI 視窗
- 載入擴充功能 Sipp Rabboni 後可在 Scratch 上獲取 Rabboni 資訊



rabboni 參數匯入

1. 點選 more Block



2 點選 Rabboni



3 參數匯入



- [RAB] 記錄數
- [RAB] 加速度 [X/Y/Z]
- [RAB] 角速度 [X/Y/Z]



[RAB] 要彈對應名稱

PROVIDED BY AIWill Lab Co. Ltd.

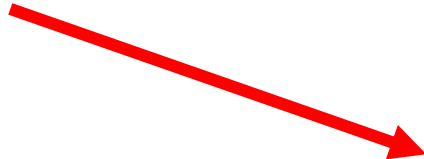


yabboni-Scratch 連線

點擊" SIPP Rabboni "出現yabbonie感測值
作為程式設計用

Trigger : 驅動
CurrentCount : 新紀錄數
AccX : X方向加速度
AccY : Y方向加速度
AccZ : Z方向加速度
GyroX : X方向角速度
GyroY : Y方向角速度
GyroZ : Z方向角速度

RAB :改成對應Rabboni的名字





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報告人：宋紹華

光電系





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發想



遊戲簡介



遊戲影片



程式介紹



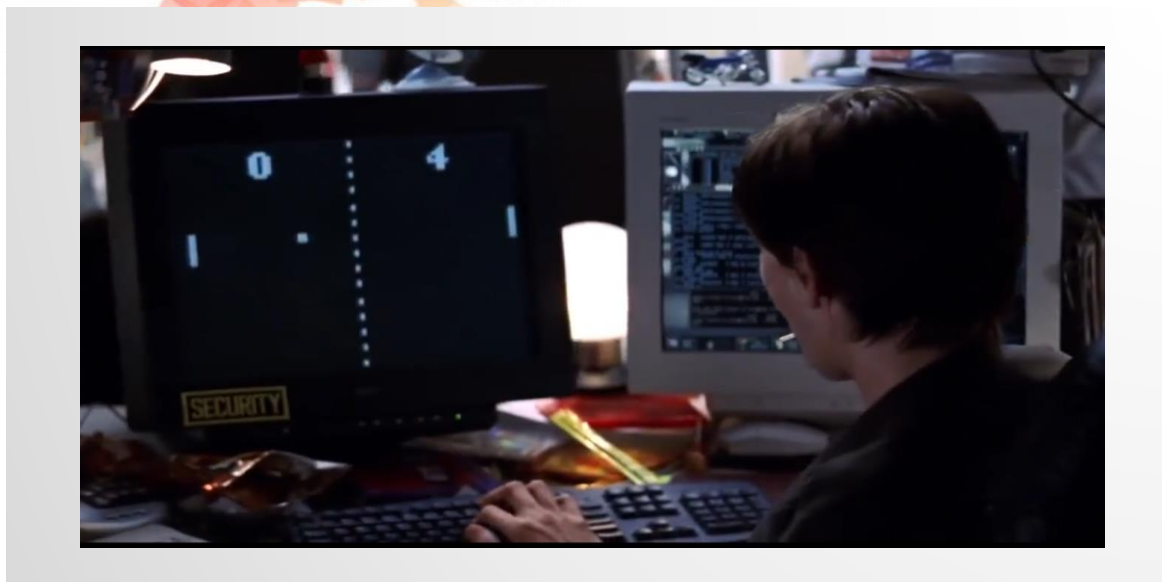
01

發想



製作原因

會製作這個遊戲的想法是因為很久以前有看過一部叫「地心毀滅」的電影，下圖就是電影其中的一個片段，駭客在玩推球遊戲，看上去感覺就是非常樸素簡單的畫風與操作，利用scratch配合Rabboni感測器來做應該不是很困難，因此「Go Go Space Ball」的想法就萌芽了。



圖片來源: 電影內容截圖



02 遊戲簡介



遊戲玩法簡介



雙方玩家利用Rabboni的Y軸加速度方向來控制板子的移動，目標是把行星球球推進敵方球門，時間限制為60秒，不同模式的球球數量與速度會不同，達成指定分數或在時間結束後分數較高者獲勝。



03

遊戲影片



遊戲影片





遊戲影片





04 程式介紹



程式介紹

球門

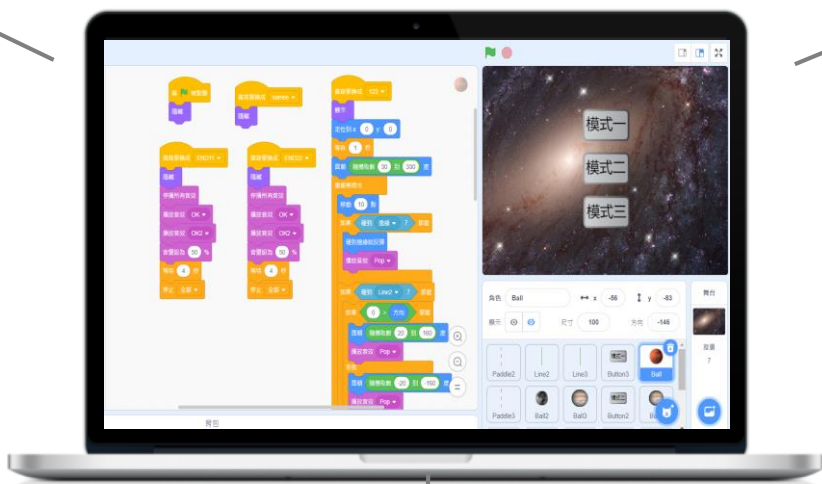
當行星球碰到球門
會被吸收並從遊戲
中央吐出，敵方加
分

檔板

玩家需要利用Rabboni
控制檔板阻擋行星球
進入自己的球門

遊戲開始

按下綠色播放按鈕
開始遊戲，跳出三
種遊戲模式選擇。



遊戲背景

負責計時，紀錄分數
與場景的切換。

特殊行星球球

與普通行星球最大
的差異在於普通行
星球撞到它會反彈。

普通行星球球

會在遊戲介面中不
斷移動的球，碰到
牆壁或是擋板會反
彈。



遊戲開始

模式一

模式二

模式三

The image displays three panels of Scratch code blocks, each representing a different game mode. The code is organized into two columns per panel. The left column contains the initial setup logic, and the right column contains the logic for when a character is clicked.

- Mode 1:** The left column starts with a 'When green flag clicked' event, followed by 'hide', 'show', 'play sound' (輕鬆音樂-黃金傳說), 'set volume to 60%', 'go to x: 0, y: 0', and 'change background to Galaxy'. The right column starts with 'when character clicked', followed by 'play sound' (pop), 'hide', and 'change background to 2'.
- Mode 2:** The left column starts with 'When green flag clicked', followed by 'hide', 'show', 'play sound' (輕鬆音樂-黃金傳說), 'set volume to 60%', 'go to x: 0, y: 0', and 'change background to Galaxy'. The right column starts with 'when character clicked', followed by 'hide', 'play sound' (pop), and 'change background to 321'.
- Mode 3:** The left column starts with 'When green flag clicked', followed by 'hide', 'show', 'play sound' (輕鬆音樂-黃金傳說), 'set volume to 60%', 'go to x: 0, y: 0', and 'change background to Galaxy'. The right column starts with 'when character clicked', followed by 'hide', 'play sound' (pop), and 'change background to 321'.

順序: 綠色按鈕→遊戲開始→播放音樂→選擇模式→跳至模式場景



特殊行星球

The code blocks are as follows:

- Initialization:** When clicked, hide the ball, set background to 'samee', and set volume to 50%.
- Ball Movement Loop:** A loop that repeats indefinitely. It moves the ball 10 units, checks for collision with Line2. If collision, set direction to 0 and play 'Pop' sound. If direction > 0, set direction to random (20 to 160) and play 'Pop' sound. If collision with Line3, set direction to random (-20 to -160) and play 'Pop' sound. If direction < 0, set direction to random (-20 to -160) and play 'Pop' sound.
- Paddle Collision:** If collision with Paddle2, increase right score by 1, play 'Boing' sound, and reset ball to (0,0). If collision with Paddle3, increase left score by 1, play 'Boing' sound, and reset ball to (0,0).
- Game Over:** If left score = 10, set background to 'END22' and stop. If right score = 10, set background to 'END11' and stop.

順序: 定位座標→隨機方向亂跑→碰到檔板反彈→碰到牆壁反彈→碰到球門從新回到定位座標並加分



普通行星球

特殊行星球程式

+



順序: 定位座標→隨機方向亂跑→碰到檔板反彈→碰到牆壁反彈→碰到球門從新回到定位座標並加分

+

→碰到特殊球反彈



檔板

The image shows a Scratch script for a robot simulation. The script begins with a 'when clicked' event block, followed by a 'hide' block. It then sets the robot's position to x: -60 and y: -10. An 'infinite loop' block contains two conditional blocks: 'if Rab1 acceleration Y < -0.1 then y change -25' and 'if 0.1 < Rab1 acceleration Y then y change 25'. The script concludes with a 'show' block and another 'set position to x: -60 y: -10' block. The code is presented in three columns, likely representing different stages or views of the same script.

順序: 定位座標→Y軸加速度大於0.1改變Y軸座標向上 or Y軸加速度小於於-0.1改變Y軸座標向下



球門

順序: 定位座標→不斷向上向下移動



遊戲背景

背景要乘3次，因為有三種模式

The image displays a Scratch script for game background management. It is organized into three main sections:

- Start Section:** Triggered by a green flag click, it sets the background to 'Galaxy', hides the 'Right Score' and 'Left Score' variables, and sets the 'Time' variable to 0.
- Initial Setup Section:** It switches the background to 'END22', stops all sounds, plays 'OK' and 'OK2' sounds at 50% volume, and waits for 4 seconds before stopping all sounds.
- Main Game Loop Section:** It switches the background to '321', displays the 'Right Score' and 'Left Score' variables, and sets both to 0. A 60-second timer is set. A loop repeats for 60 times, decreasing the 'Time' variable by 1 each iteration. After the loop, it checks if 'Left Score' is greater than 'Right Score'. If true, it switches the background to 'END11'. If 'Right Score' is greater than 'Left Score', it switches the background to 'END11'. If they are equal, it switches the background to 'samee' and stops the program.

順序: 綠色按鈕開始遊戲→設定兩邊分數歸0→設定時間60秒→設定結束後的場景轉換



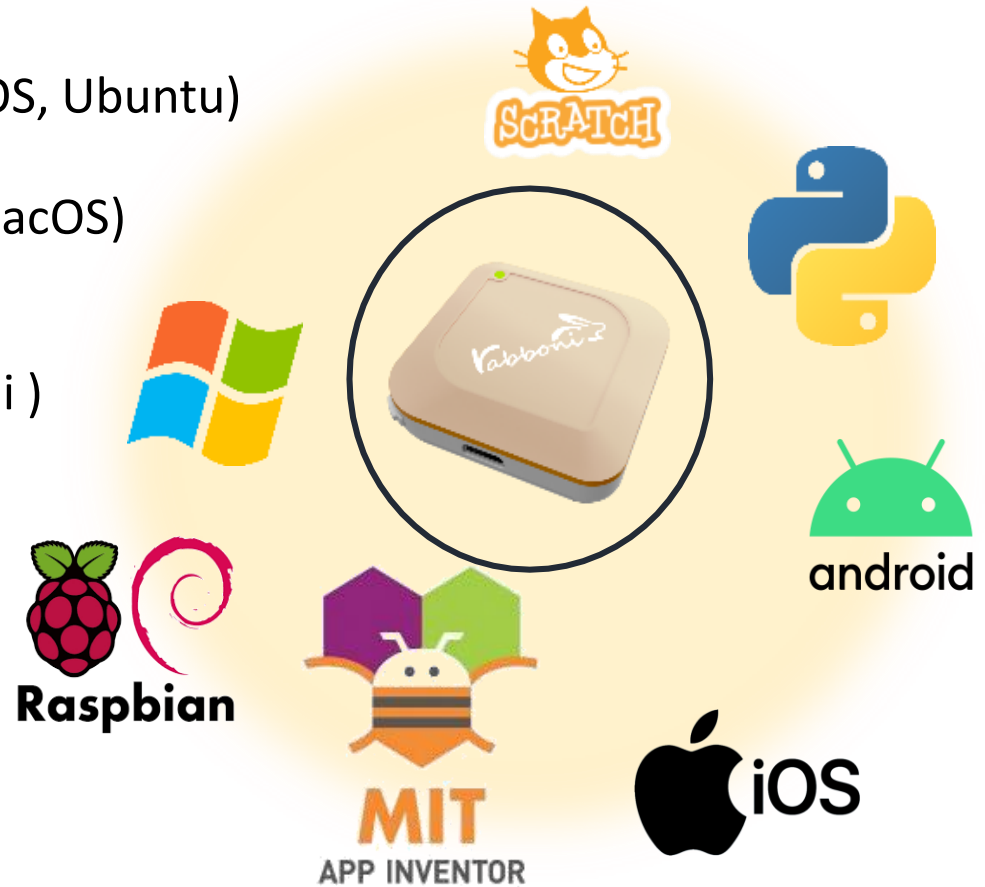
感謝聆聽!





APPENDIX γabboni-其他應用

1. Python (系統支援 Windows, MacOS, Ubuntu)
2. Scratch 3.0 (系統支援 windows, MacOS)
3. Android APP以及iOS APP
(App Store 或Play store 搜尋 rabboni)
4. API for Raspberry Pi
5. APPINVENTOR 2.0
6. API for Unity

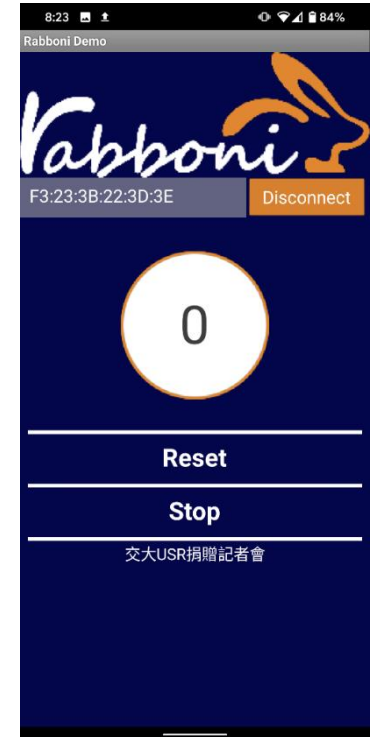




yabboni vs. APP inventor for APP Development

```
when BluetoothLE1 .Connected
do
  set ConnectButton . Text to "Disconnect"
  set ConnectButton . Enabled to true
  set Clock1 . TimerEnabled to true
  call BluetoothLE1 .RegisterForShorts
    serviceUuid "00001600-0000-1000-8000-00805f9b34fb"
    characteristicUuid "00001602-0000-1000-8000-00805f9b34fb"
    signed true
```

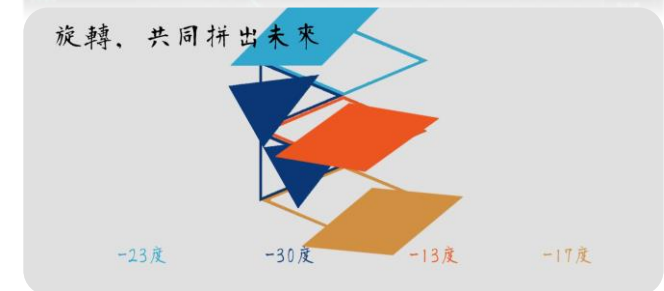
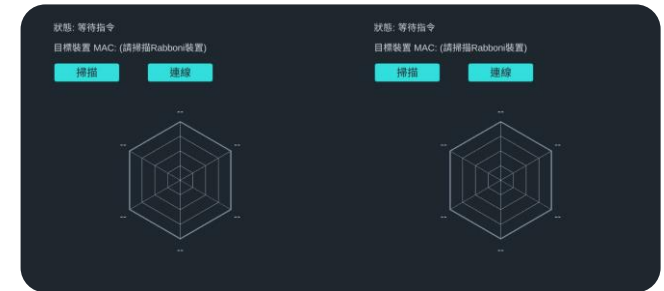
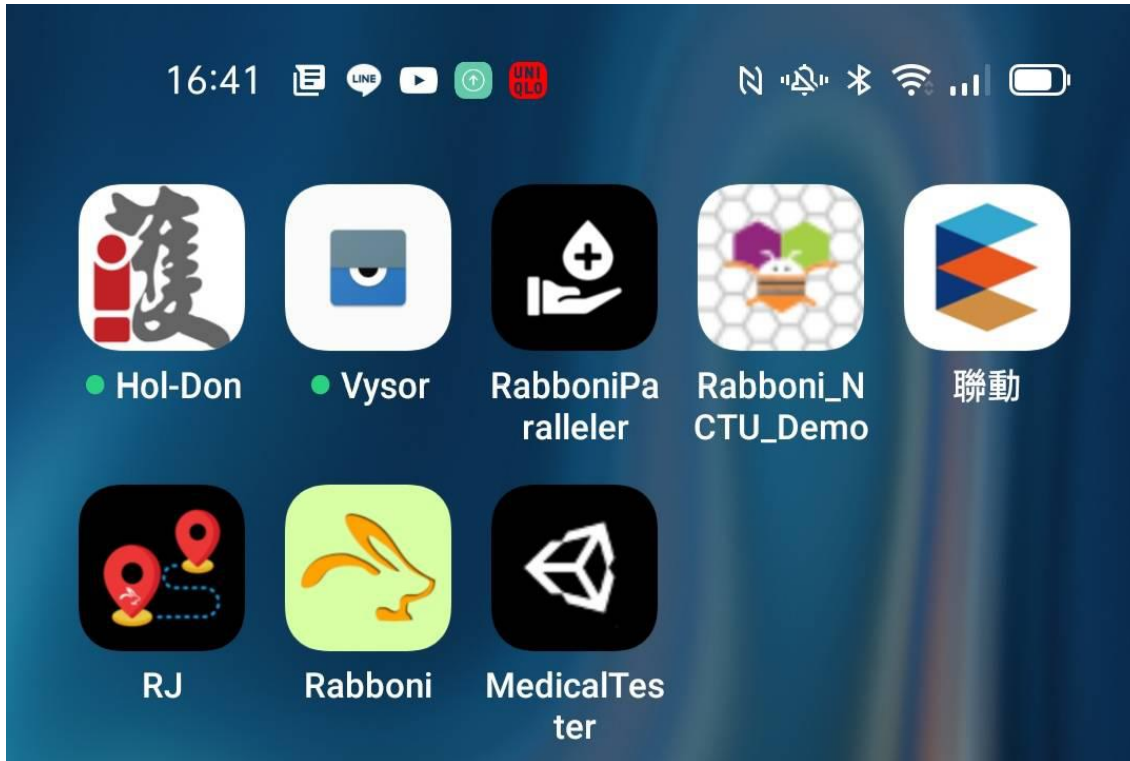
```
when BluetoothLE1 .ShortsReceived
  serviceUuid characteristicUuid shortValues
do
  set ByteLength . Text to join "Length: "
    length of list list get shortValues
  set ByteData . Text to get shortValues
```



<http://iot.appinventor.mit.edu/#/bluetoothle/bluetoothleintro>

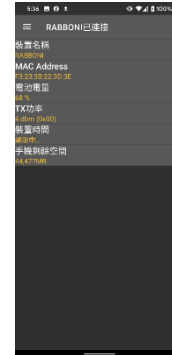


Unity APPs

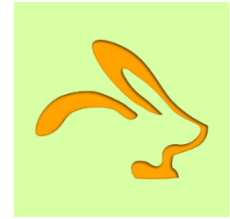




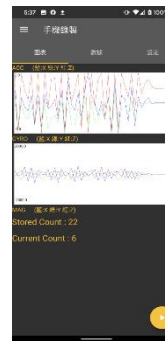
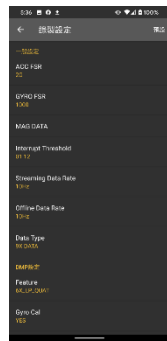
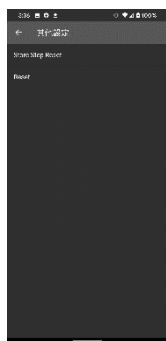
γabboni sensing data collection APP @ Android



rabboni APP



藍芽連線



```

File!
Start time: 2019/10/30 16:58:45
===== CONFIGURATION START =====
ACC FSR:100
GYRO FSR:1000
Interrupt Threshold:0112
Data Rate:10Hz
Data Type:9X_DATA
Feature:6X_LP_QUAT
Gyro Cal:YES
Gyro Data:RAM
Acc Data:NO_RAM
===== CONFIGURATION END =====

===== DATA START =====
0.0095825195,-0.0120239258,0.9849853516,-8.3923339844,1.4038085938,0.4272460938
0.0079345703,-0.0108642578,0.9680175781,-8.4533691406,1.3122558594,0.3662109375
0.0088500977,-0.0113525391,0.9683937891,-8.7280273498,1.7089843750,0.5187968281
-0.1133517578,-0.2105102539,0.9716184823,22.2167968750,-39.2436054688,195.5564406250
-0.0891113281,0.1757812500,1.2626953125,-89.9353027344,-125.7019042969,19.2565917869
0.1848754883,-0.5296875000,1.6973876953,-686.1572265625,863.2507324219,-61.6149902344
0.0284423828,-0.1090087891,0.8095975596,284.4848632813,351.3793945313,-196.9905667969
0.3045654297,-1.7523193359,-1.7758789063,-652.0996093750,-335.5712890625,-211.4257812500
-0.0033569336,-2.0000000000,1.9843139648,98.2360839844,421.6003417969,180.8776855469
-0.029682617,-2.0000000000,-2.0000000000,-541.7480468750,-251.7395019531,-0.2441406250
0.0099876953,-2.0000000000,1.9843139648,125.6713867188,336.6699218750,3.0822753906
0.5819702148,-1.9611206055,-2.0000000000,-239.7766113281,-304.1667011719,-36.8652343750
0.575987695,-2.0000000000,1.9843139648,52.7038574219,180.9082031250,-99.7619428906
0.9665827344,-2.0000000000,-2.0000000000,203.0029296875,-174.9572753906,-116.0278320313

```




1. 南港高中學生作品展

<https://youtu.be/b8XSZO6kvbc>

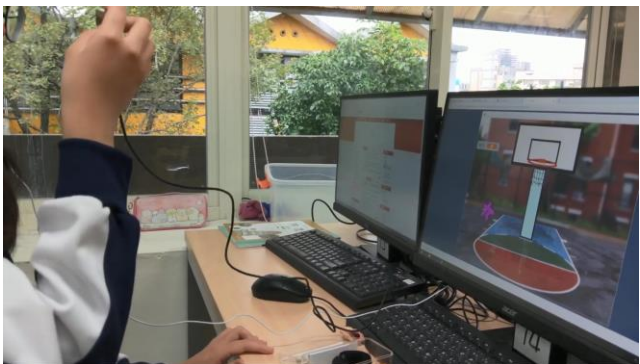
星際戰機

<https://youtu.be/mWAisna1U7Q>



翻滾吧!海星

<https://youtu.be/NuMpi2LE0aY>



聖誕禮物

<https://youtu.be/0oRvezZ4ap4>



子彈的冒險

<https://youtu.be/pizErn00TIA>



星際戰機

<https://youtu.be/mWAisna1U7Q>

聖誕禮物

<https://youtu.be/0oRvezZ4ap4>

翻滾吧!海星

<https://youtu.be/NuMpi2LE0aY>

子彈的冒險

<https://youtu.be/pizErn00TIA>



yabboni-Resources

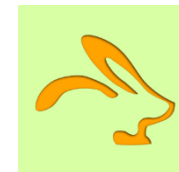
NCTUUSR
12&10



USR12u10粉絲專頁



Resource

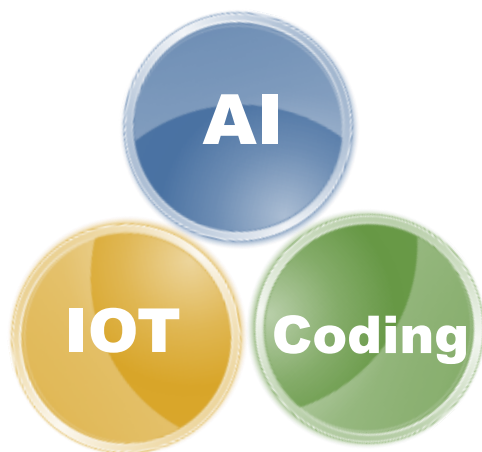


yabboni APP

復動



Hol-don 平台



WITH **FUN!**