# 聯網嵌入式系統

esp32

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助教-徐睿桐

# 什麼是嵌入式系統?

- ➡根據英國電機工程師協會的定義
  - 1.通常執行特定功能
  - 2.以微電腦為周邊構成核心
  - 3.嚴格的時序與穩定度要求
  - 4.全自動操作循環

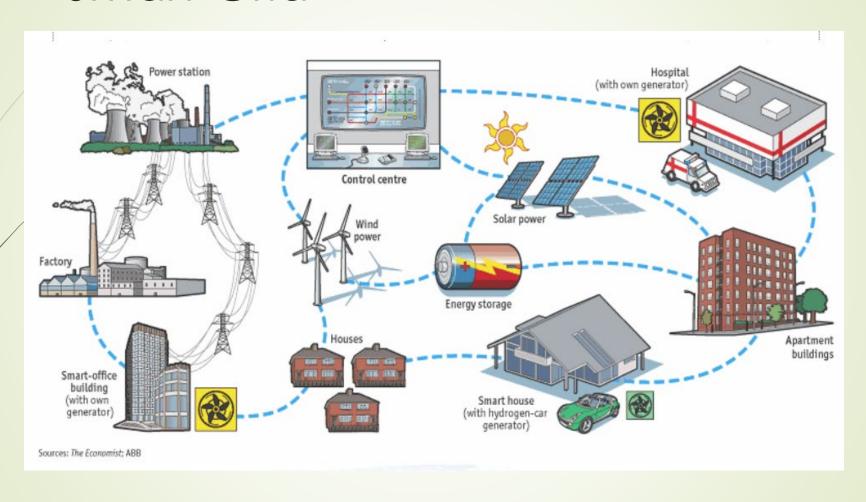
# 嵌入式系統特性

- ●便宜
- ➡體積⅓
- ■省電
- →穩定

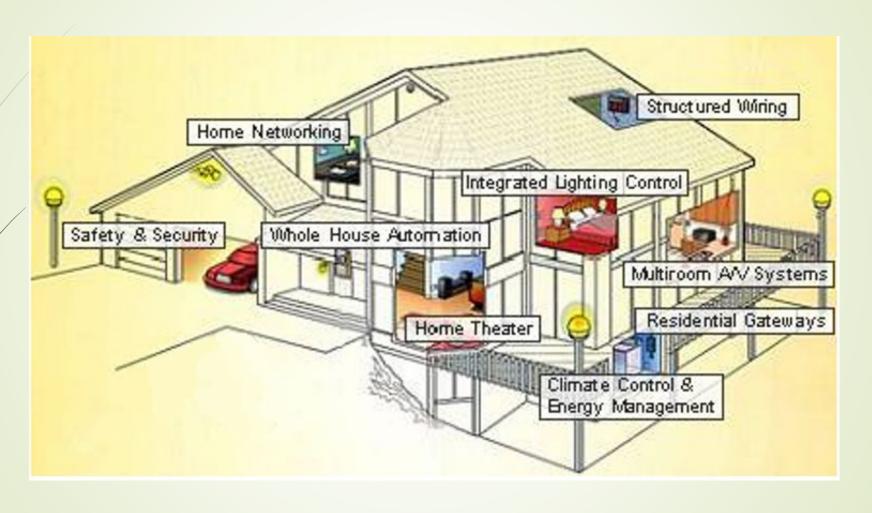
#### eHealth



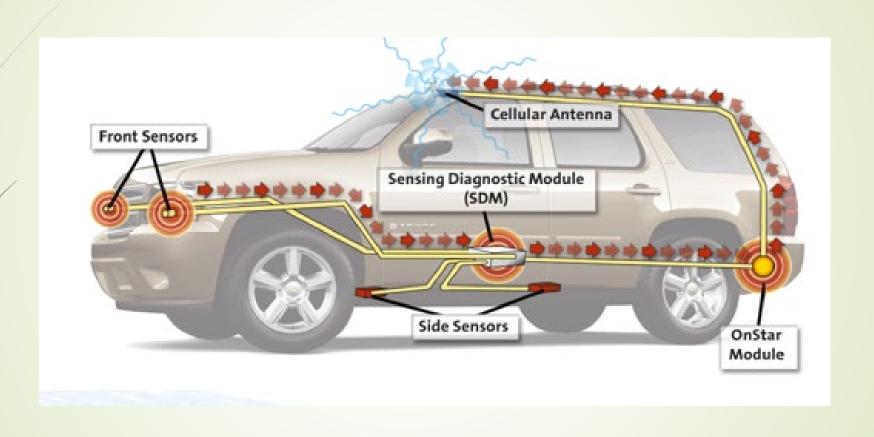
# **Smart Grid**



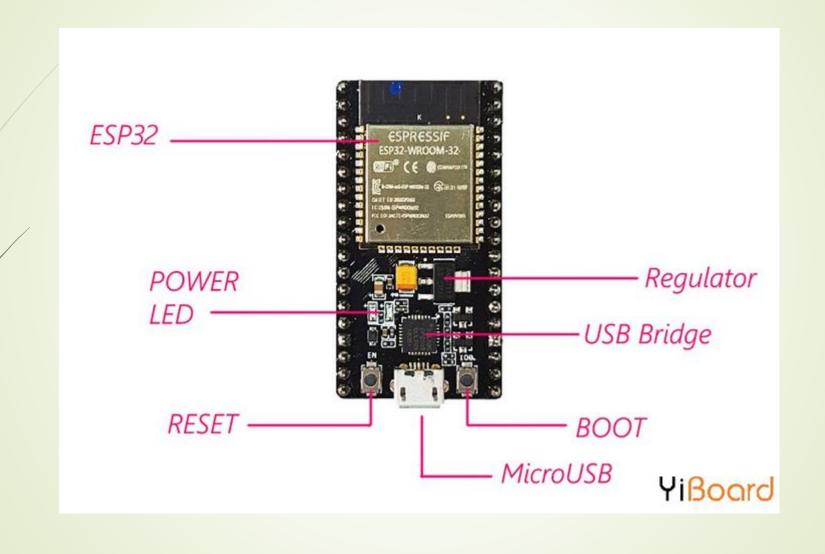
# **Smart Home**



### Connected Car

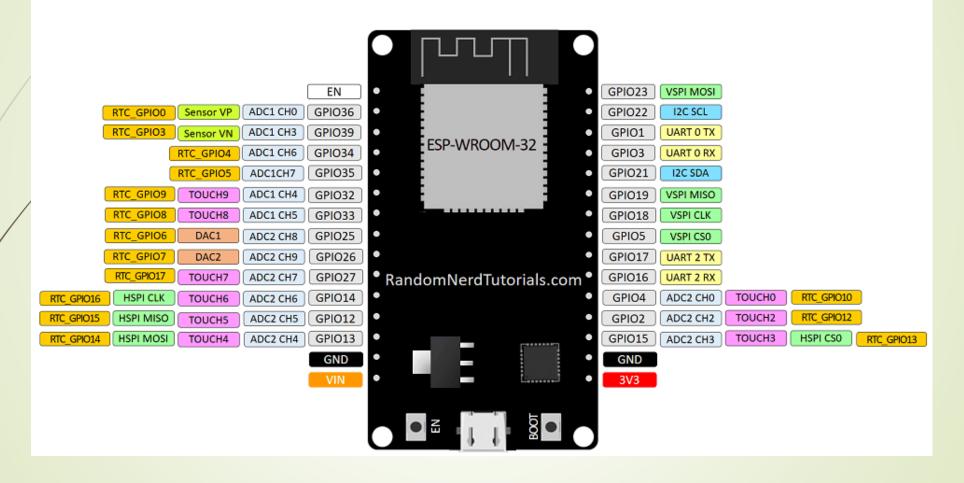


# ESP32



#### **ESP32 DEVKIT V1 - DOIT**

version with 30 GPIOs



# ESP32 無線傳輸

- **→**Wi-Fi
- ■藍芽

### ESP32 有線傳輸

- UART(Universal asynchronous receiver/transmitter)
- ■I<sup>2</sup>C(Inter-Integrated Circuit)
- -SPI(Serial Peripheral Interface Bus)

# 軟體說明

#### Arduino

• Arduino是一套嵌入式處理器的軟體開發工具,透過這套軟體可以將程式碼編譯並燒錄到 開發版當中執行。

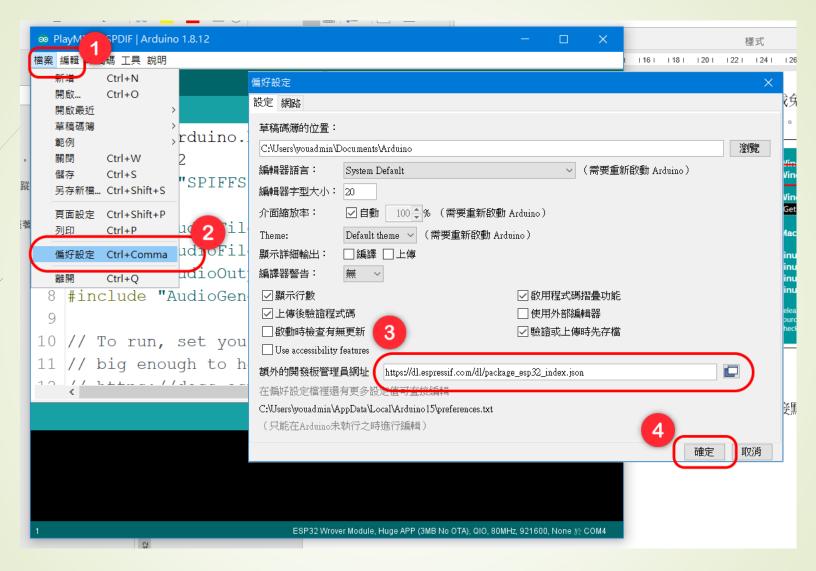
### Arduino

▶ 解壓縮至C:\ 或D:\

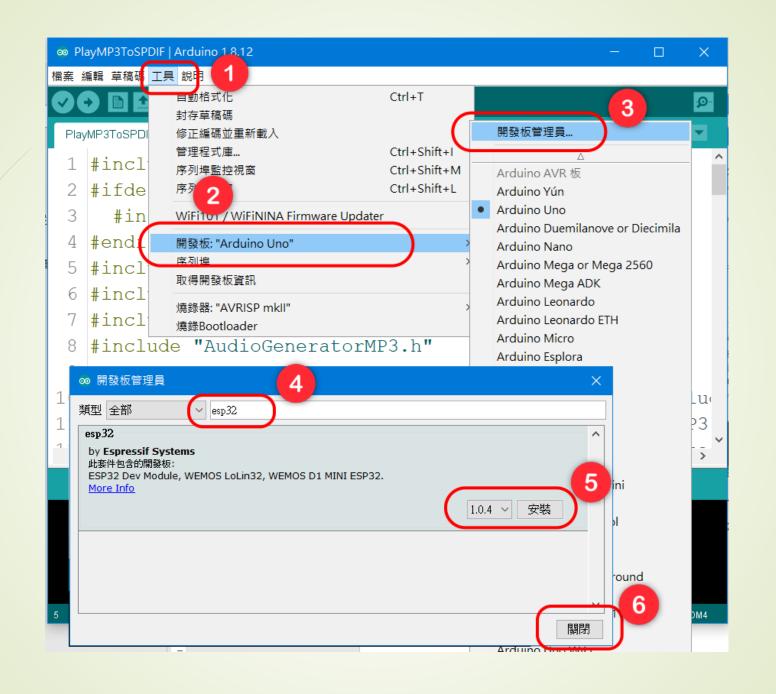
🕕 arduino-1.8.15-windows	110/6/3 下午 11:	壓縮的 (zipped)	208,111 KB
esp_http_line_api	110/5/27 上午 12	Arduino file	3 KB
🜈 putty-64bit-0.71-installer	110/6/3 下午 11:	Windows Installe	3,084 KB
TridentTD_LineNotify-master	110/5/26 下午 10	壓縮的 (zipped)	452 KB

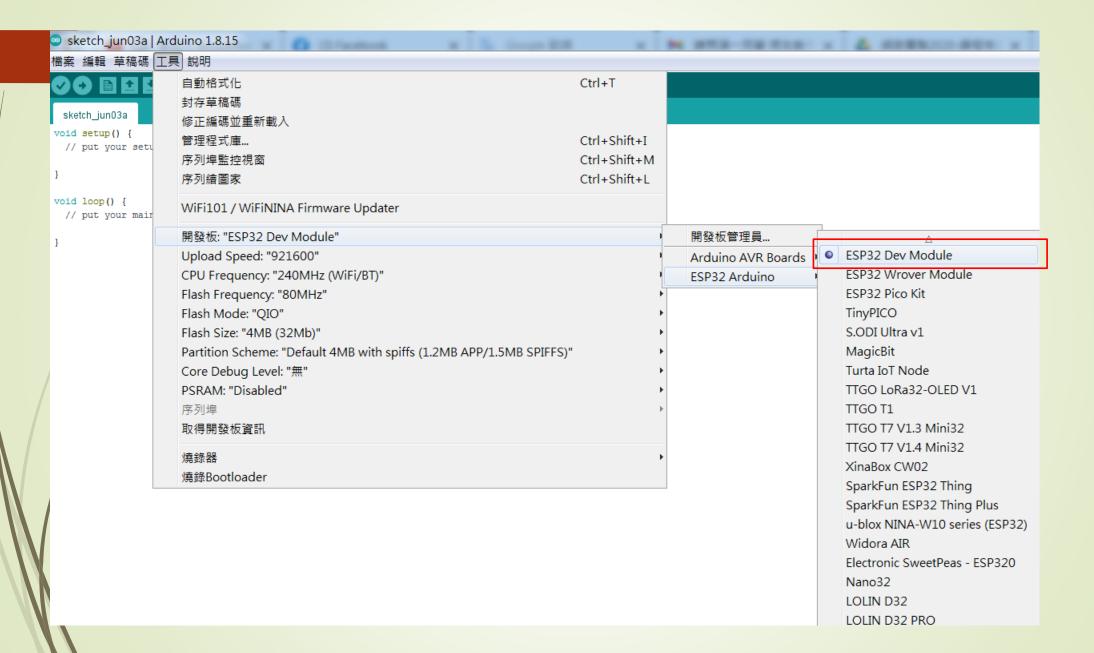
- 非windows
  - https://www.arduino.cc/en/software

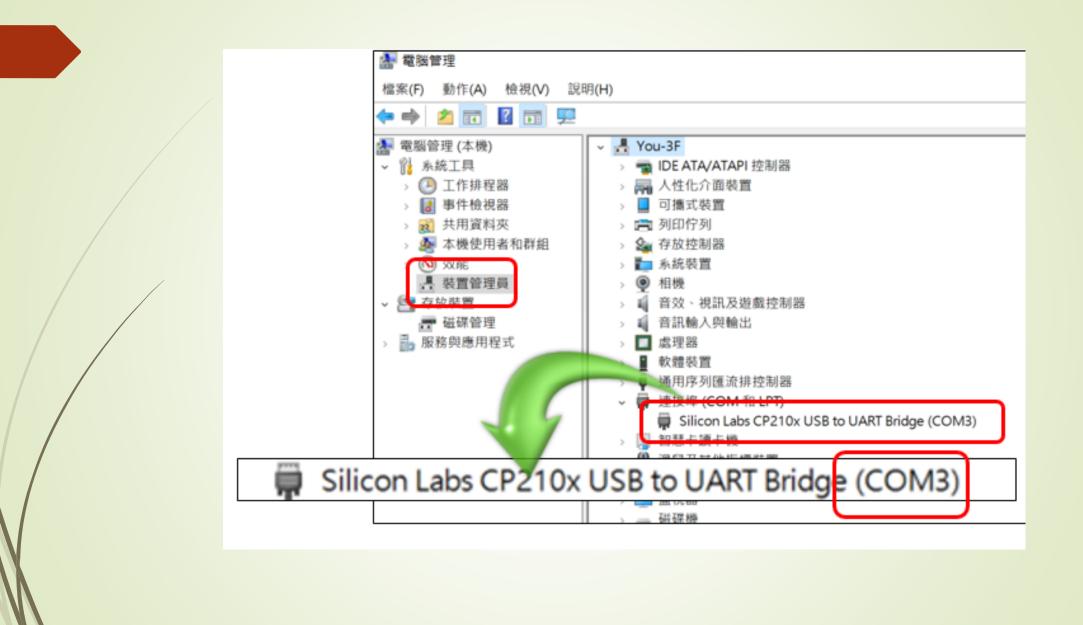
L drivers	110/5/14 下午 04	檔案資料夾	
📗 examples	110/5/14 下午 04	檔案資料夾	
👢 hardware	110/5/14 下午 04	檔案資料夾	
📗 java	110/5/14 下午 04	檔案資料夾	
<u></u> lib	110/5/14 下午 04	檔案資料夾	
L libraries	110/5/14 下午 04	檔案資料夾	
k reference	110/5/14 下午 04	檔案資料夾	
↓ tools	110/5/14下午04	檔案資料夾	
📗 tools-builder	110/5/14 下午 04	檔案資料夾	
💿 arduino	110/5/14 下午 04	應用程式	72 KB
🚳 arduino.l4j	110/5/14 下午 04	組態設定	1 KB
arduino_debug	110/5/14 下午 04	應用程式	69 KB
🚳 arduino_debug.l4j	110/5/14 下午 04	組態設定	1 KB
🖭 arduino-builder	110/5/14 下午 04	應用程式	23,156 KB
ibusb0.dll	110/5/14 下午 04	應用程式擴充	43 KB
msvcp100.dll	110/5/14 下午 04	應用程式擴充	412 KB
msvcr100.dll	110/5/14 下午 04	應用程式擴充	753 KB
revisions	110/5/14 下午 04	文字文件	96 KB
🖆 wrapper-manifest	110/5/14 下午 04	XML Document	1 KB

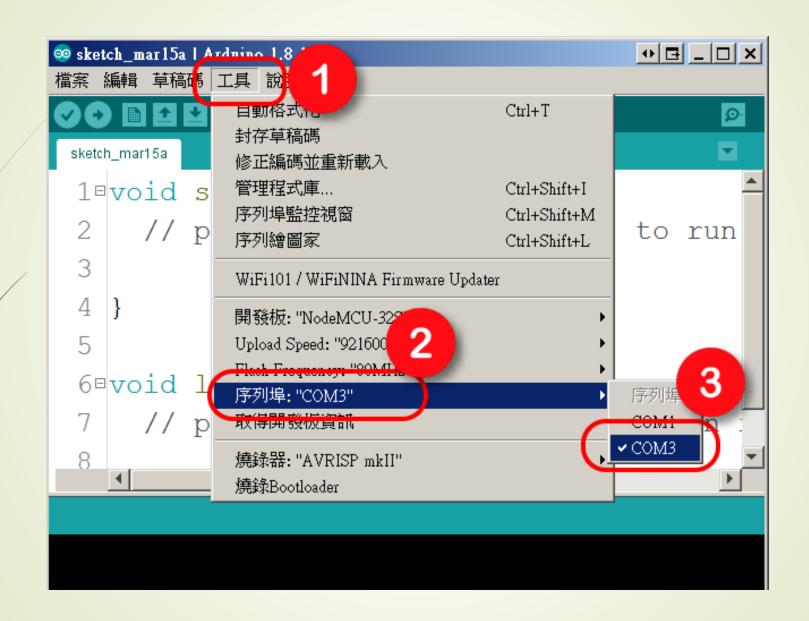


https://dl.espressif.com/dl/package\_esp32\_index.json

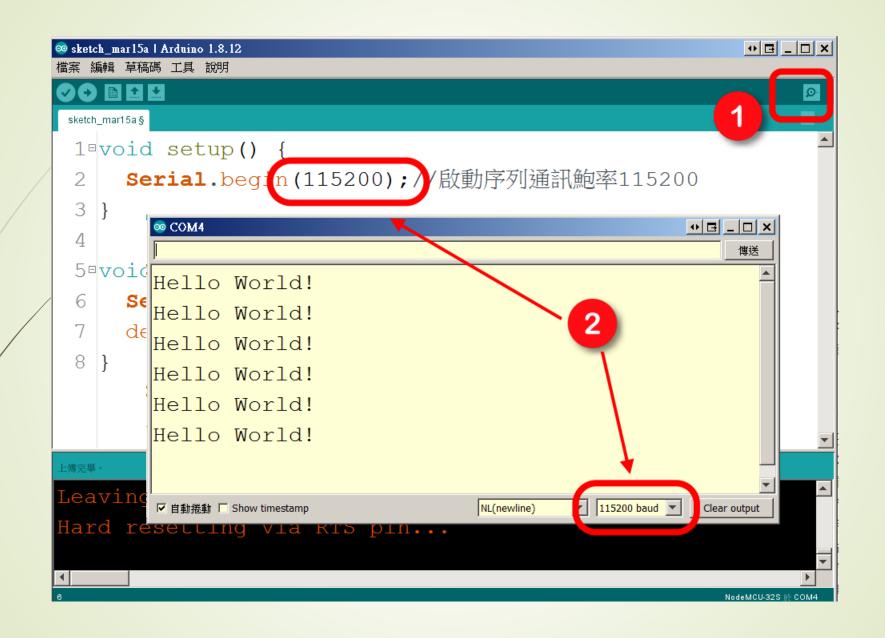


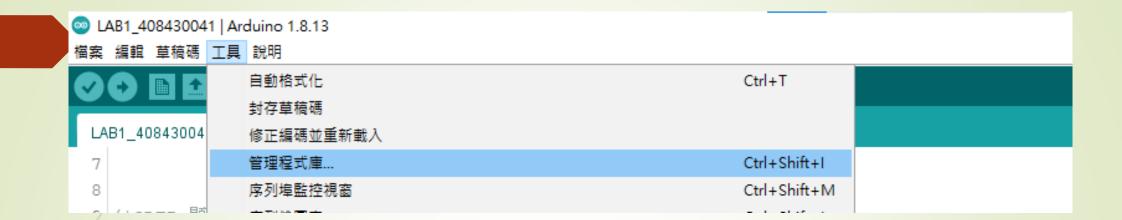






```
↔ 🖪 💶 🗙
∞ sketch_mar15a | Arduino 1.8.12
檔案 綽暢 草稿碼 工具 說明
 1 void setup() {
     Serial.begin (115200);//啟動序列通訊
 3
 5 void loop() {
     Serial.println("Hello World!");//
                                                      World!
     delay(1000);//休息1秒
                                                          AIIIIIIIIII
esptool.py v2.6-beta1
Serial port COM3
Connecting....
                                                         NodeMCU-32S 於 COM3
```







by Benoit Blanchon 版本6.19.4 INSTALLED

A simple and efficient JSON library for embedded C++. ArduinoJson supports ✓ serialization, ✓ deserialization, ✓ MessagePack, ✓ fixed allocation, ✓ zero-copy, ✓ streams, ✓ filtering, and more. It is the most popular Arduino library on GitHub ♥♥♥♥♥. Check out arduinojson.org for a comprehensive documentation.

More info

選擇版本 🗸 安裝

更新

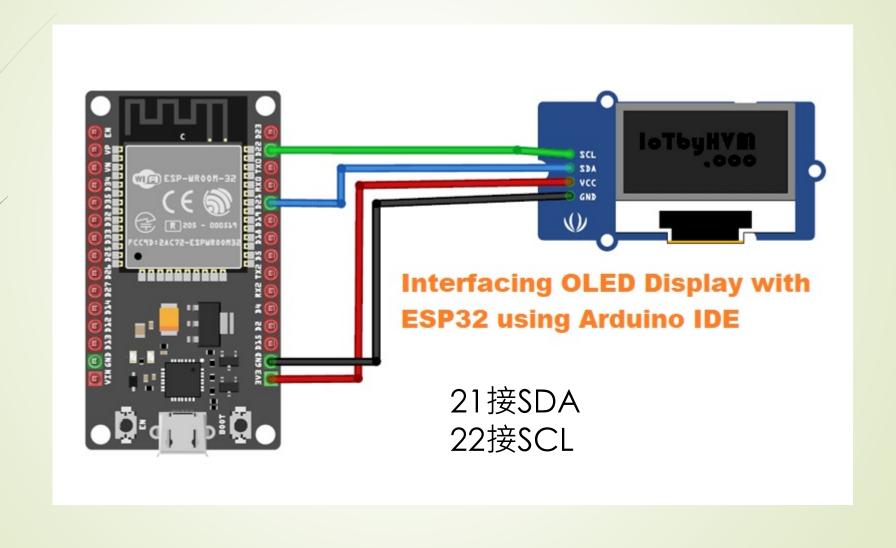
#### ESP8266 and ESP32 OLED driver for SSD1306 displays

by ThingPulse, Fabrice Weinberg 版本4.3.0 INSTALLED

I2C display driver for SSD1306 OLED displays connected to ESP8266, ESP32, Mbed-OS The following geometries are currently supported: 128×64, 128×32, 64×48. The init sequence was inspired by Adafruit's library for the same display.

More info

#### OLED



### 實驗一,比特幣價錢

BTC:

38842.17

CONTROLLENCE DATE OF SECURITY OF THE PROPERTY OF THE PROPERTY

- 連線到WI-FI
- ─ 從Yahoo 股市上抓取比特幣.json檔
- https://tw.stock.yahoo.com/\_td-stock/api/resource/StockServices.stockList;autoRefresh=1659720073465;fields=avgPrice,orderbook;symbols=BTC-USD?bkt=&device=desktop&ecma=modern&feature=ecmaModern,useNewQuoteTabColor&intl=tw&lang=zh-Hant-TW&partner=none&prid=3ec7fd9heqk4r&region=TW&site=finance&tz=Asia/Taipei&ver=1.2.1432&returnMeta=true
- ► 從.json檔中抓取實時價錢
- ▶ 將比特幣價錢顯示在OLED上

# 器材

■麻煩各位做完實驗當天繳回給助教們

# 問題

➡鼓勵大家上網多多探索

or

現場問助教