物聯網~空氣盒子

以Micropython實作

謝坤達

Jumbokh@gmail.com

IOT Applications (shorturl.at/gBMW4)

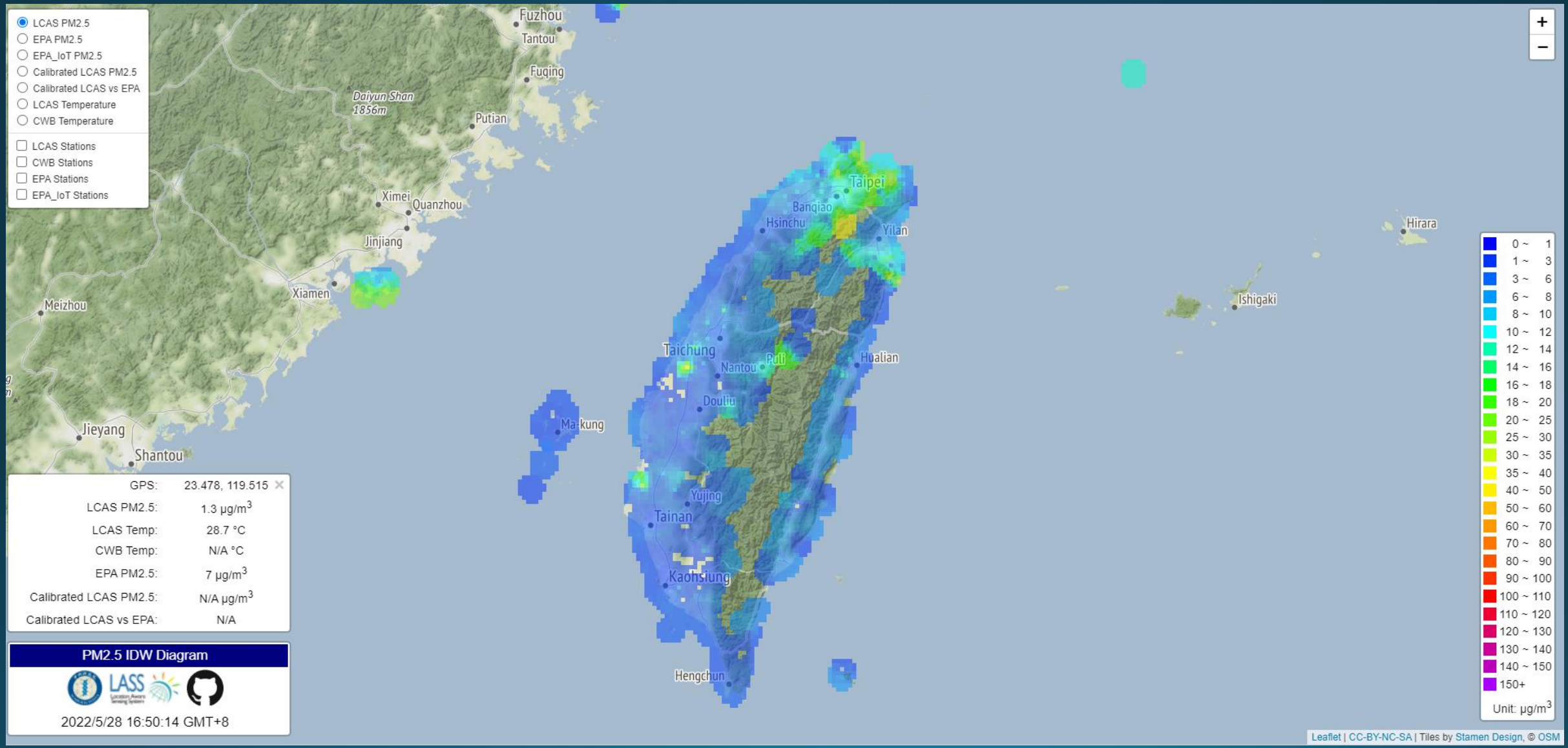
Basic

大綱

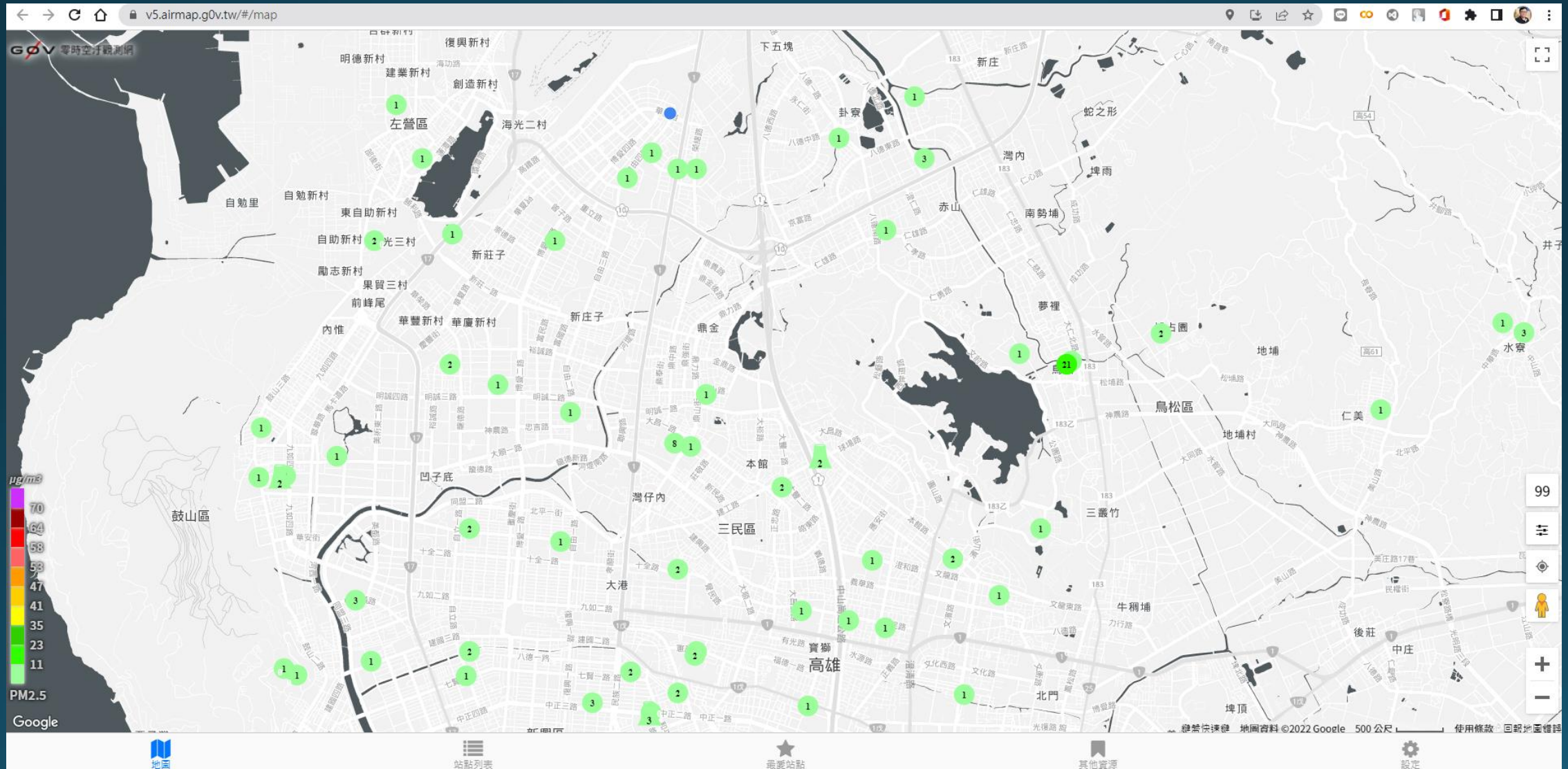
- 氣象資料開放平台
- 行政院環保署資料開放平台
- 空氣品質小時值_高雄市_仁武站
- PM2.5 開放資料入口網站
- g0v
- ESP32 for Micropython and Thonny
- Basic Digital and analog Lab
  - DHT11 Temperature and Humidity sensor
  - I2C ssd1306 OLED display ssd1306 lib
  - Sharp dust sensor GP2Y1010AU0F
- Internet of Things
  - url Request
  - MQTT
  - Air box

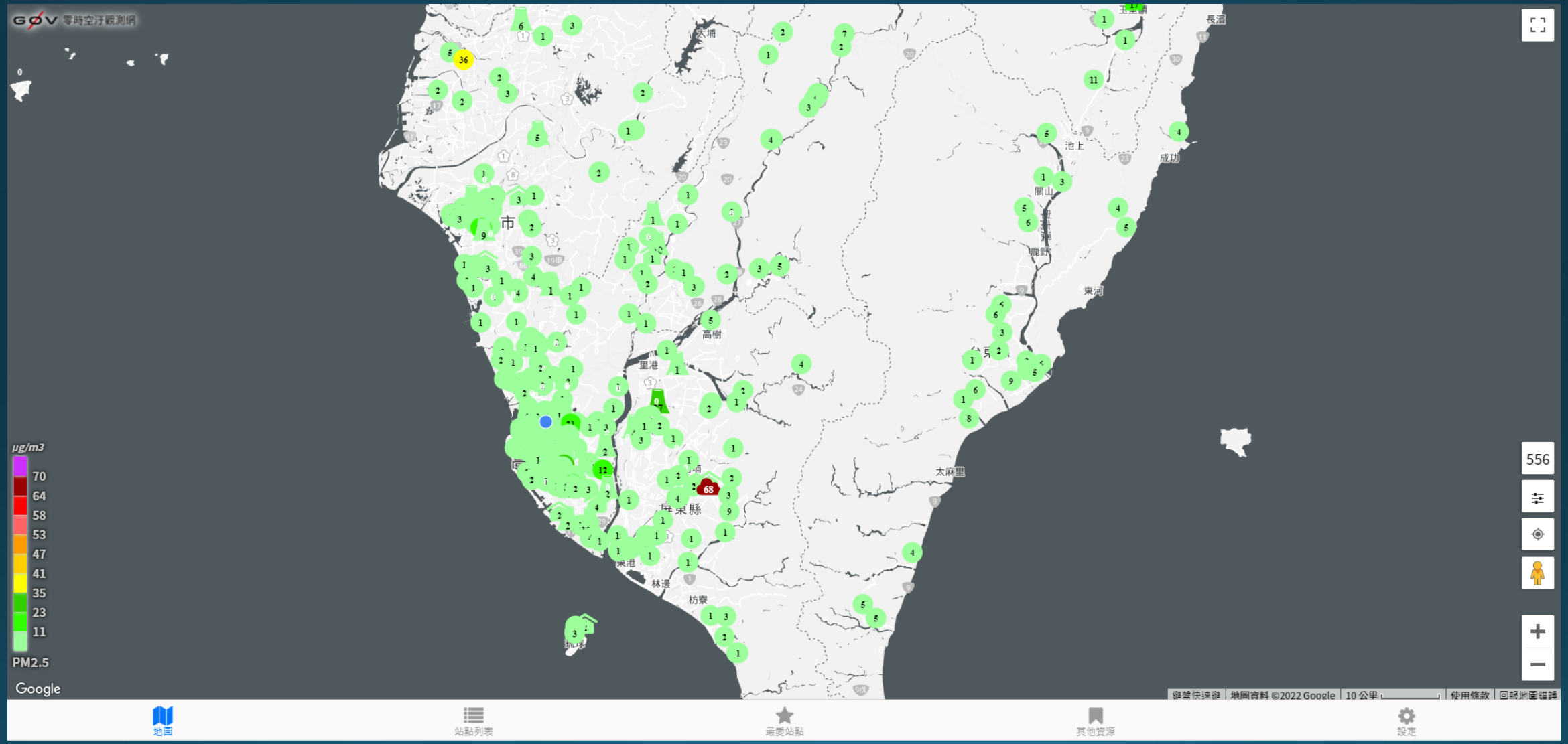
https://pm25.lass-net.org/

https://pm25.lass-net.org/GIS/IDW/


LCAS PM2.5
EPA PM2.5
EPA_IoT PM2.5
Calibrated LCAS PM2.5
Calibrated LCAS vs EPA
LCAS Temperature
CWB Temperature
LCAS Stations
CWB Stations
EPA Stations
EPA_IoT Stations
Fuzhou
Tantou
Fuqing
Daiyun Shan
1856m
Putian
Ximei
Quanzhou
Jinjiang
Xiamen
Meizhou
Jieyang
Shantou
Taipei
Banqiao
Hsinchu
Yilan
Hirara
Ishigaki
Taichung
Nantou
Puli
Hualian
Douliu
Ma-kung
Yujing
Tainan
Kaohsiung
Hengchun
GPS: 23.478, 119.515
LCAS PM2.5: 1.3 μg/m3
LCAS Temp: 28.7 °C
CWB Temp: N/A °C
EPA PM2.5: 7 μg/m3
Calibrated LCAS PM2.5: N/A μg/m3
Calibrated LCAS vs EPA: N/A
PM2.5 IDW Diagram
LASS
2022/5/28 16:50:14 GMT+8
0 ~ 1
1 ~ 3
3 ~ 6
6 ~ 8
8 ~ 10
10 ~ 12
12 ~ 14
14 ~ 16
16 ~ 18
18 ~ 20
20 ~ 25
25 ~ 30
30 ~ 35
35 ~ 40
40 ~ 50
50 ~ 60
60 ~ 70
70 ~ 80
80 ~ 90
90 ~ 100
100 ~ 110
110 ~ 120
120 ~ 130
130 ~ 140
140 ~ 150
150+
Unit: μg/m3
Leaflet | CC-BY-NC-SA | Tiles by Stamen Design, © OSM

https://v5.airmap.gov.tw/#/map




GOV 零時空汙觀測網
μg/m3
70
64
58
53
47
41
35
23
11
PM2.5
Google
556
地圖
站點列表
最愛站點
其他資源
設定

LASS - 警報型態 Alarm mode

警報型態	使用情境	簡易可行的使用方式(舉例)
自我偵測 Self detect mode	感測器值超過限定範圍	發出聲響 改變燈號 ...
中控模式 Central mode	區域感測狀況警報 根據統計資訊智能判斷 於管理前端操作，可以隨時加強演算法	半小時內平均超標 附近區域一起發生異常 發 Email, 簡訊, ...
夥伴模式 Partner mode	監測對象超過限定範圍，需要通知的對象得到警報	老家下雨，桌上點燈 重要觀測對象警報

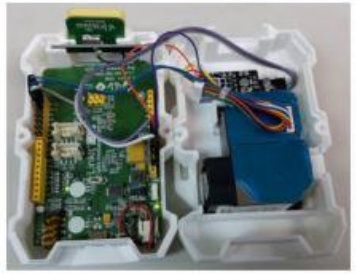
資料格式

Log:

15:31:19|LASS/Test/HELLO_APP|ver_format=1|app=HELLO_APP|ver_app=0.6|device_id=LASS-Hello|tick=68882494|date=2/8/15|time=7:30:45|device=LinkItONE|values=100.00,1.00,0.00,60.48,856.27|gps=$GPGGA,073045.099,4402.0319,N,13124.7264,E,0,0,,128.5,M,21.5,M,,*45

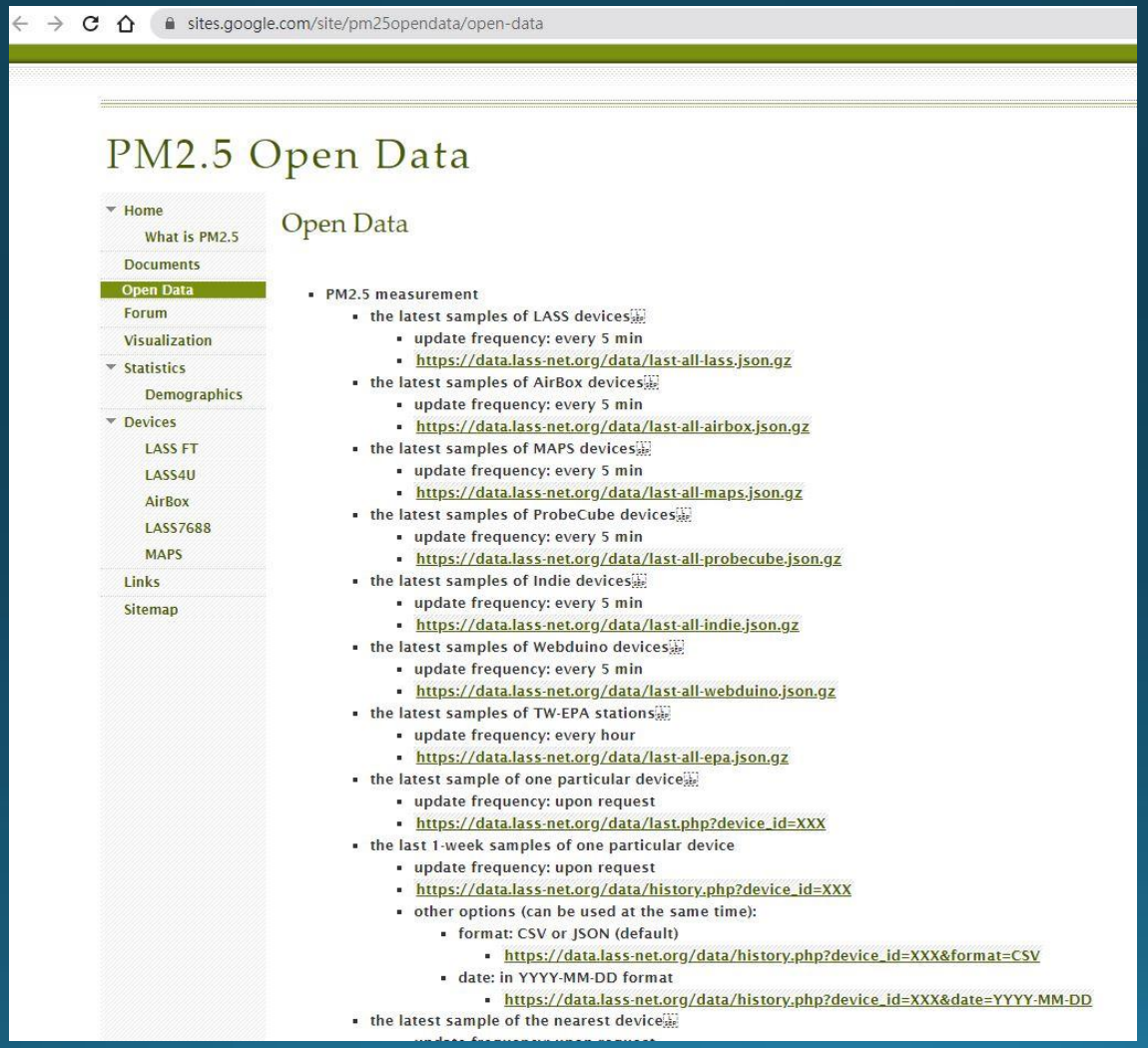
收端時間|MQTT Topic|資料

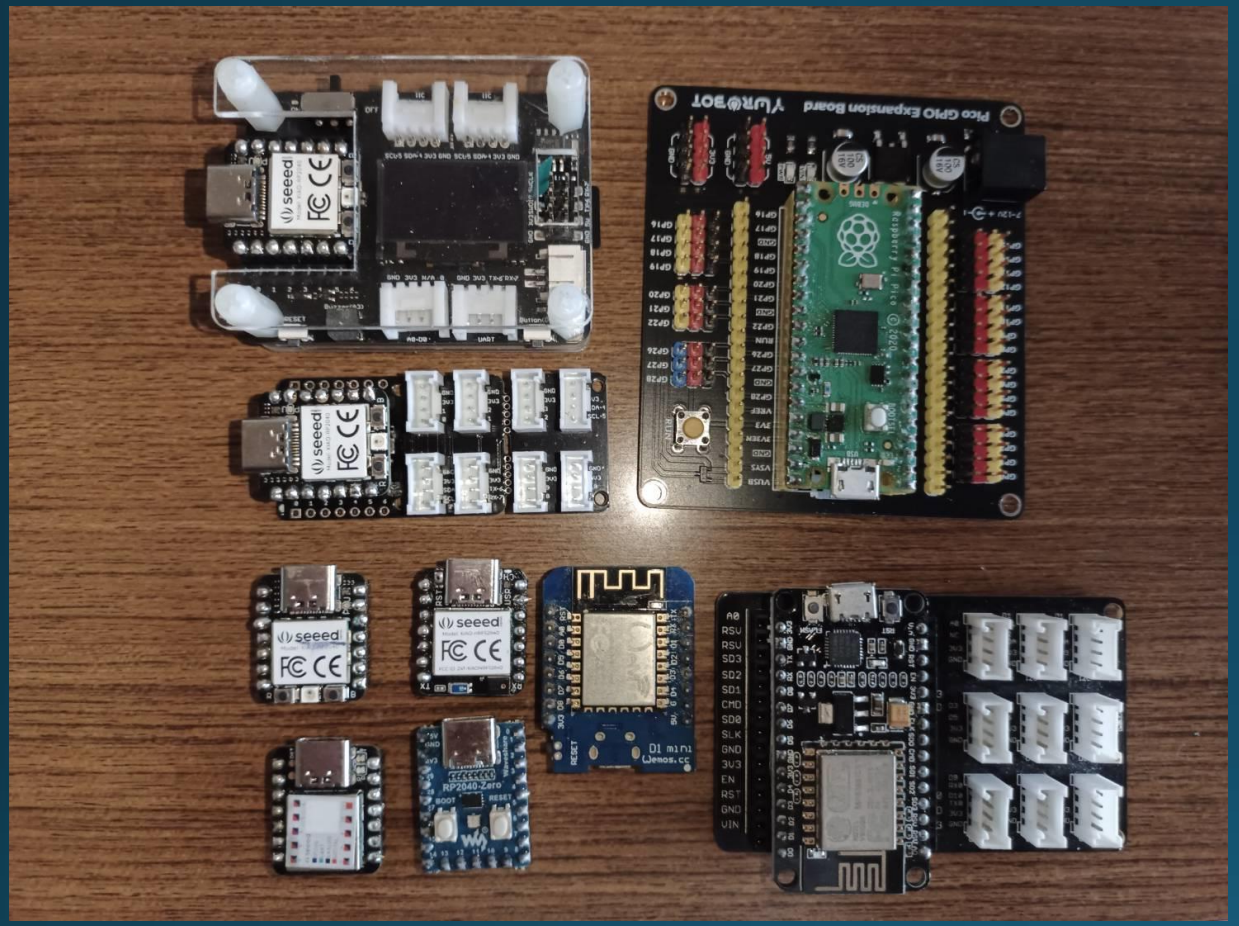
Deployment

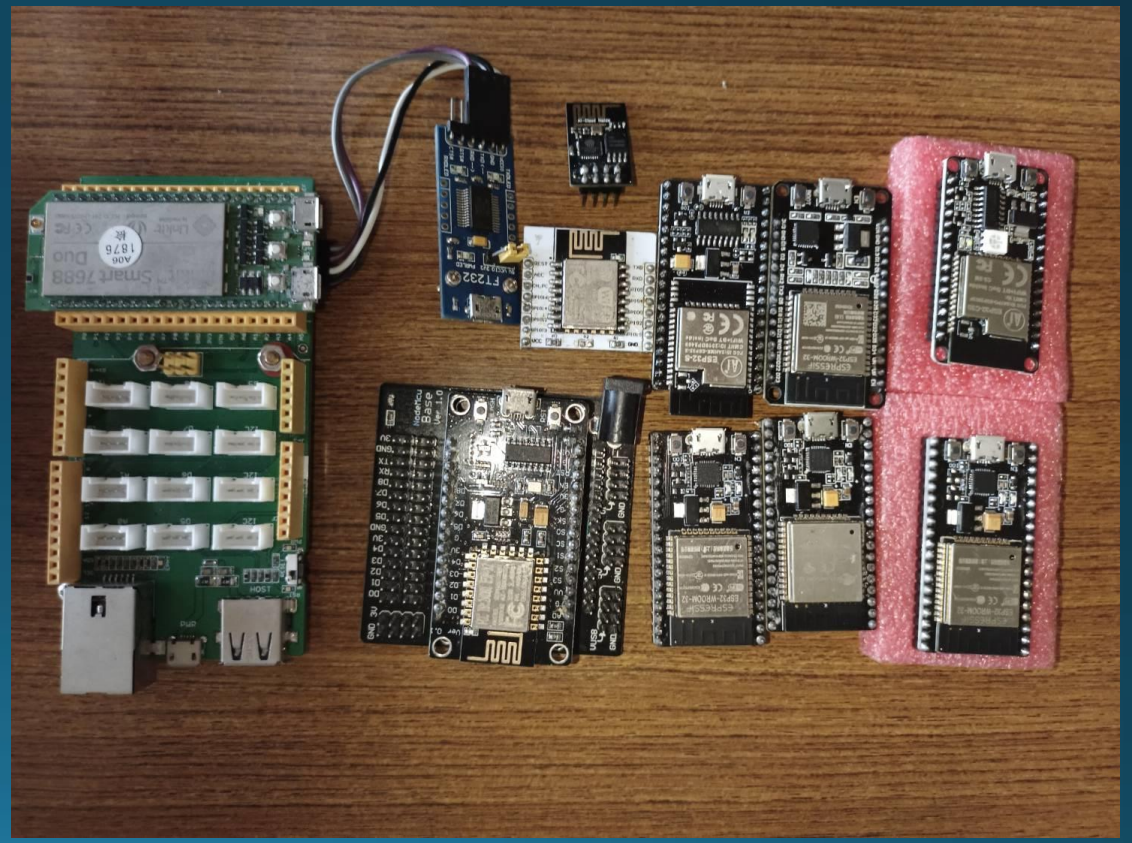


	LASS FT	AirBox	MAPS	LASS4U	87Live
Platform	MediaTek LinkIt One	Realtek Ameba	MediaTek LinkIt Smart 7688 Duo	Realtek Ameba	Realtek Ameba
T/H sensor	DHT22	HTS221	BME280	**SHT31**	**SHT31**
PM sensor	**PMS3003**	**PMS5003**	**PMS5003**	**PMS3003**	**PMS3003**
CO2 sensor	-	-	-	**SenseAir S8**	-
Air pressure	-	-	BME280	-	-
Open source	**YES**	-	**YES**	-	**YES**
Open data	**YES**	**YES**	**YES**	**YES**	**YES**
Phone app	-	**YES**	-	**YES**	**YES**
End user	makers	schools	academia	citizens	makers/citizens
Dimension (cm)	10.2 x 6.5 x 4.8	14.8 x 11.2 x 4.5	12.4 x 8.4 x 5.4	15 x 10 x 5	**12 x 7 x 4.2**
Price (USD)	90	110	90	140	**60**

https://sites.google.com/site/pm25opendata/open-data



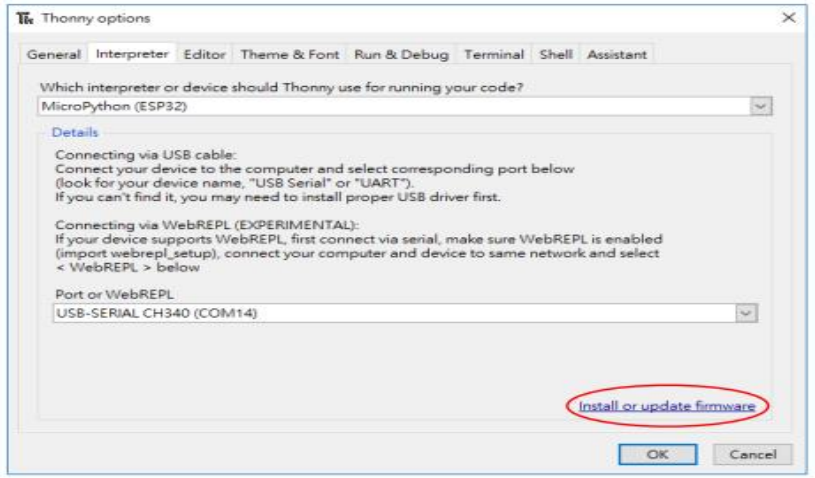

seeed
FC CE
Pico GPIO Expansion Board
Raspberry Pi Pico
D1 mini
Lolin.cc
RP2040-Zero
A0
RSV
RSV
SD3
SD2
SD1
CMD
SD0
SLK
GND
3V3
EN
RST
GND
VIN

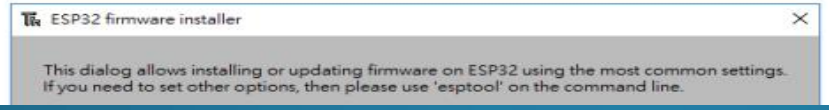

Smart768
Duo
FT232
ESP32-S3
ESP32-WROOM-32
Base
Lolin

Thonny簡介
https://reurl.cc/rDYoxE

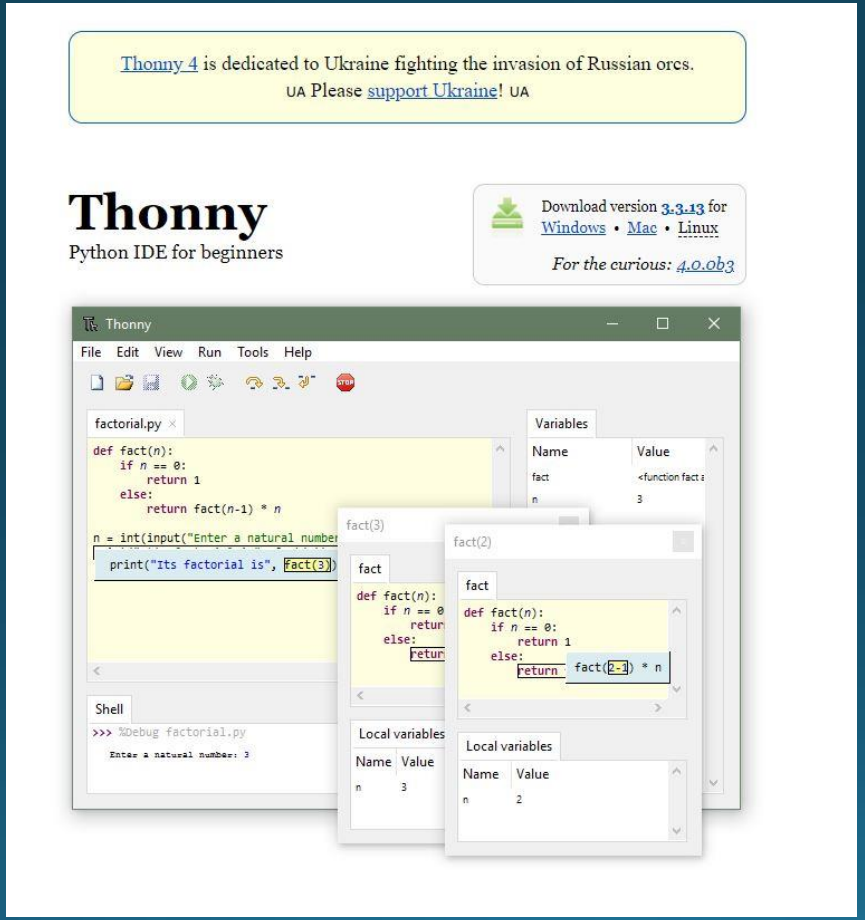
第 1 個 MicroPython 程式(在 Windows 系統下執行)

1. 安裝 Thonny，官網 https://thonny.org/ 。
2. 下載 ESP32 韌體，https://micropython.org/download/esp32/，目前最新版為 esp32-20220117-v1.18.bin。
3. 執行 Thonny >> Run >> Select interpreter，確定埠號(Port)，點擊右下角「Install or update firmware」，清除記憶體、寫入韌體。

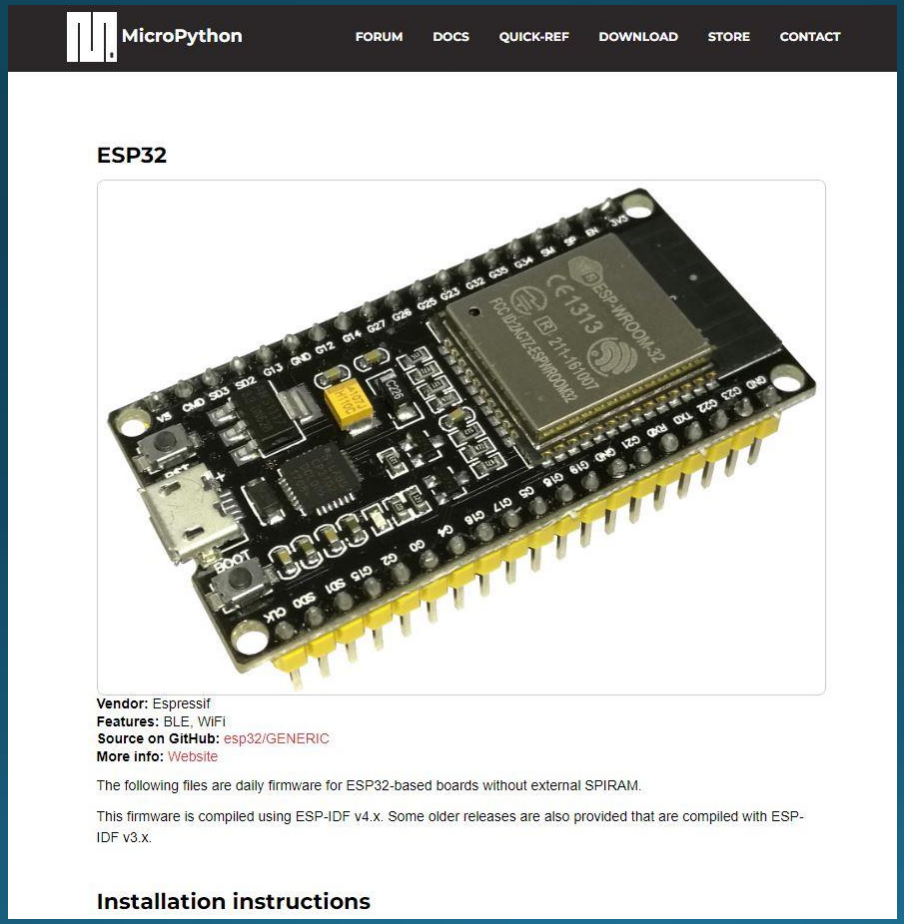


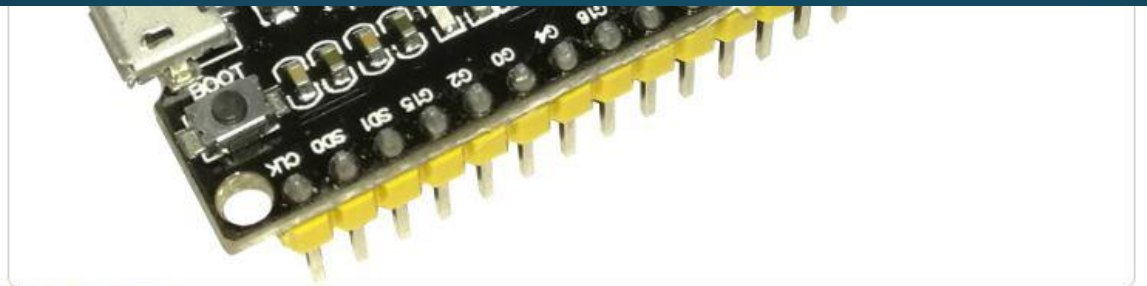


https://thonny.org/



https://reurl.cc/rDYo8E





Vendor: Espressif
Features: BLE, WiFi
Source on GitHub: esp32/GENERIC
More info: Website

The following files are daily firmware for ESP32-based boards without external SPIRAM.

This firmware is compiled using ESP-IDF v4.x. Some older releases are also provided that are compiled with ESP-IDF v3.x.

Installation instructions

Program your board using the esptool.py program, found here.

If you are putting MicroPython on your board for the first time then you should first erase the entire flash using:

```
esptool.py --chip esp32 --port /dev/ttyUSB0 erase_flash
```

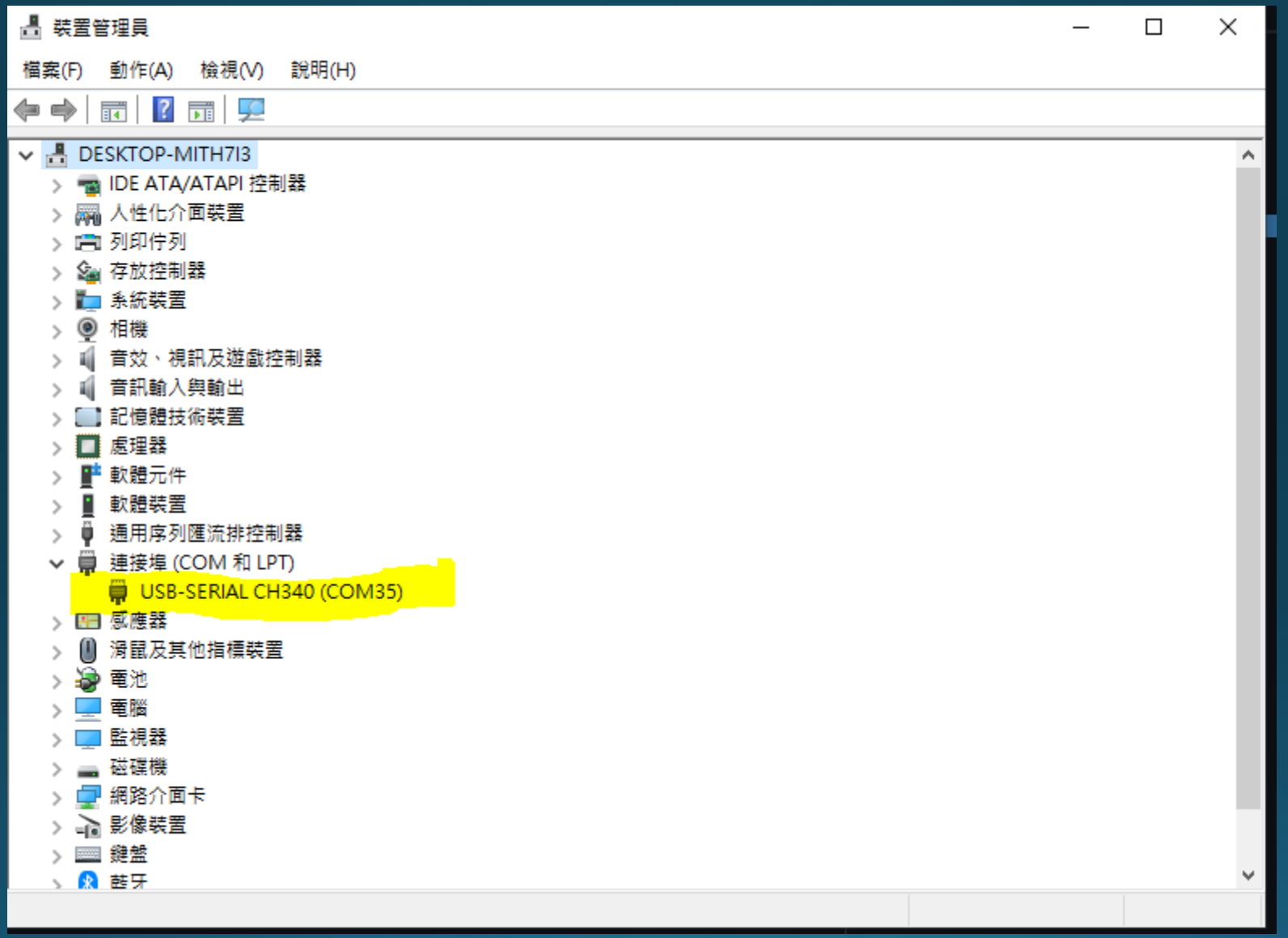
From then on program the firmware starting at address 0x1000:

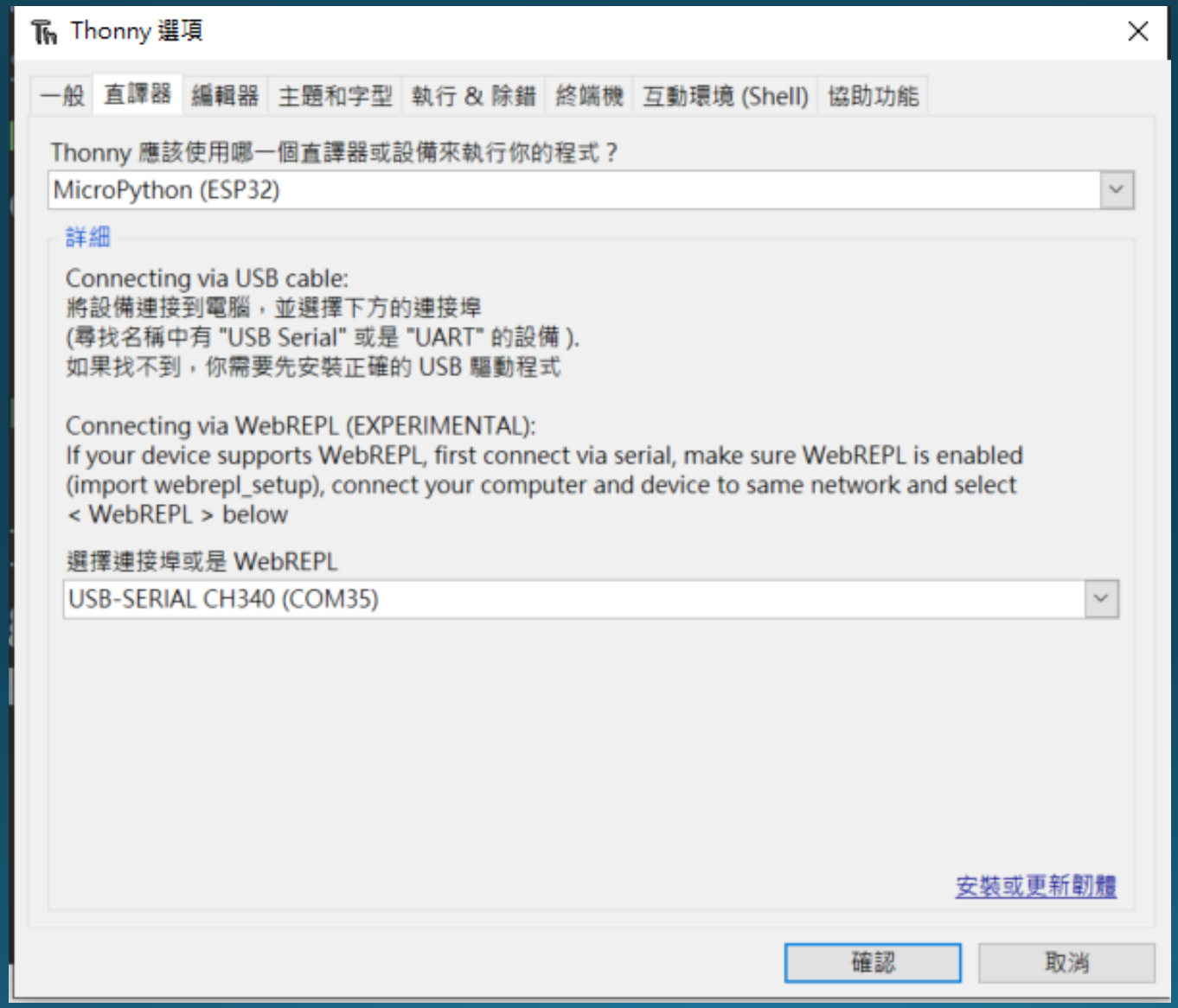
```
esptool.py --chip esp32 --port /dev/ttyUSB0 --baud 460800 write_flash -z 0x1000 esp32-20190125-v1.10.bin
```

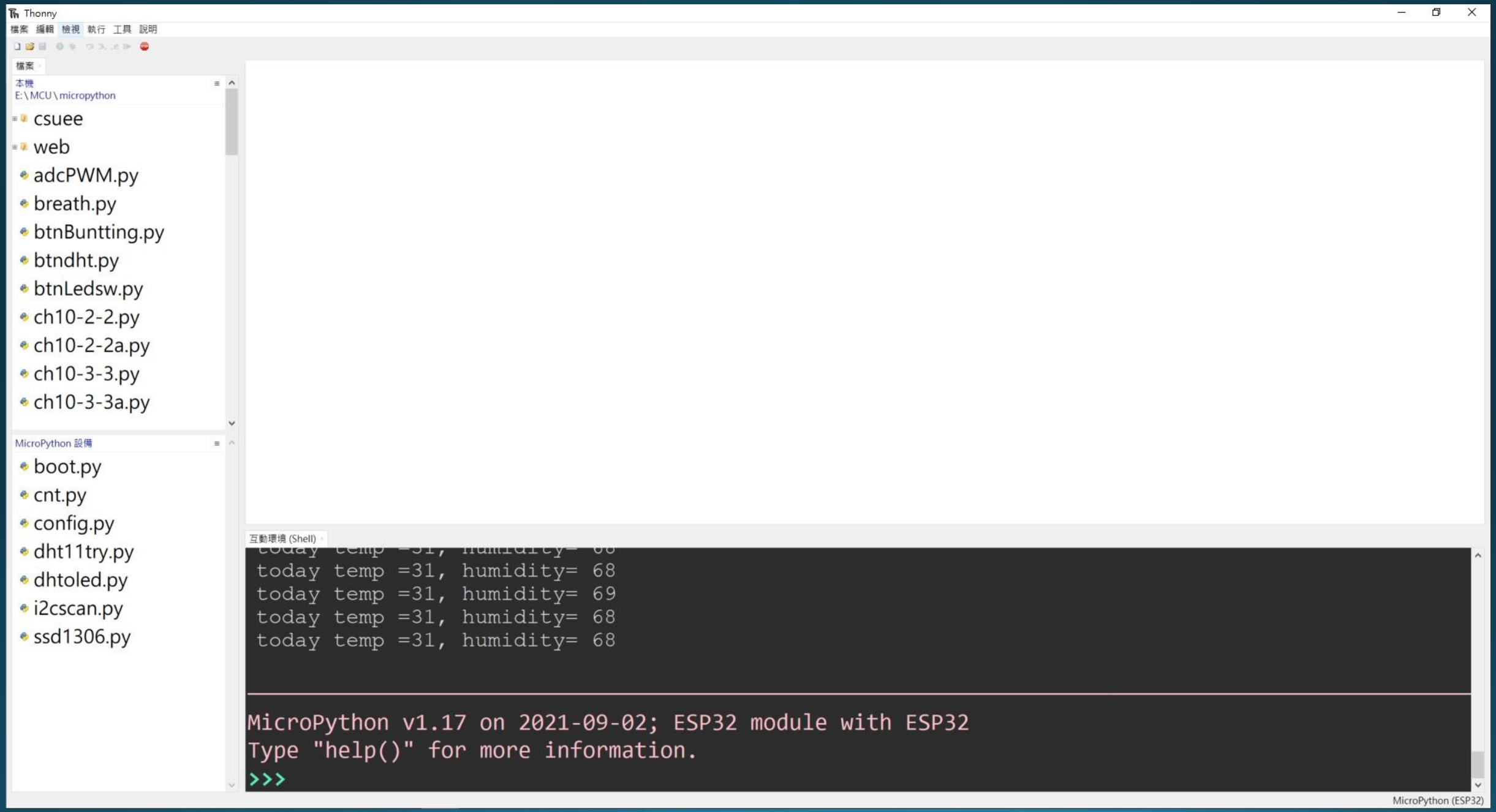
Firmware

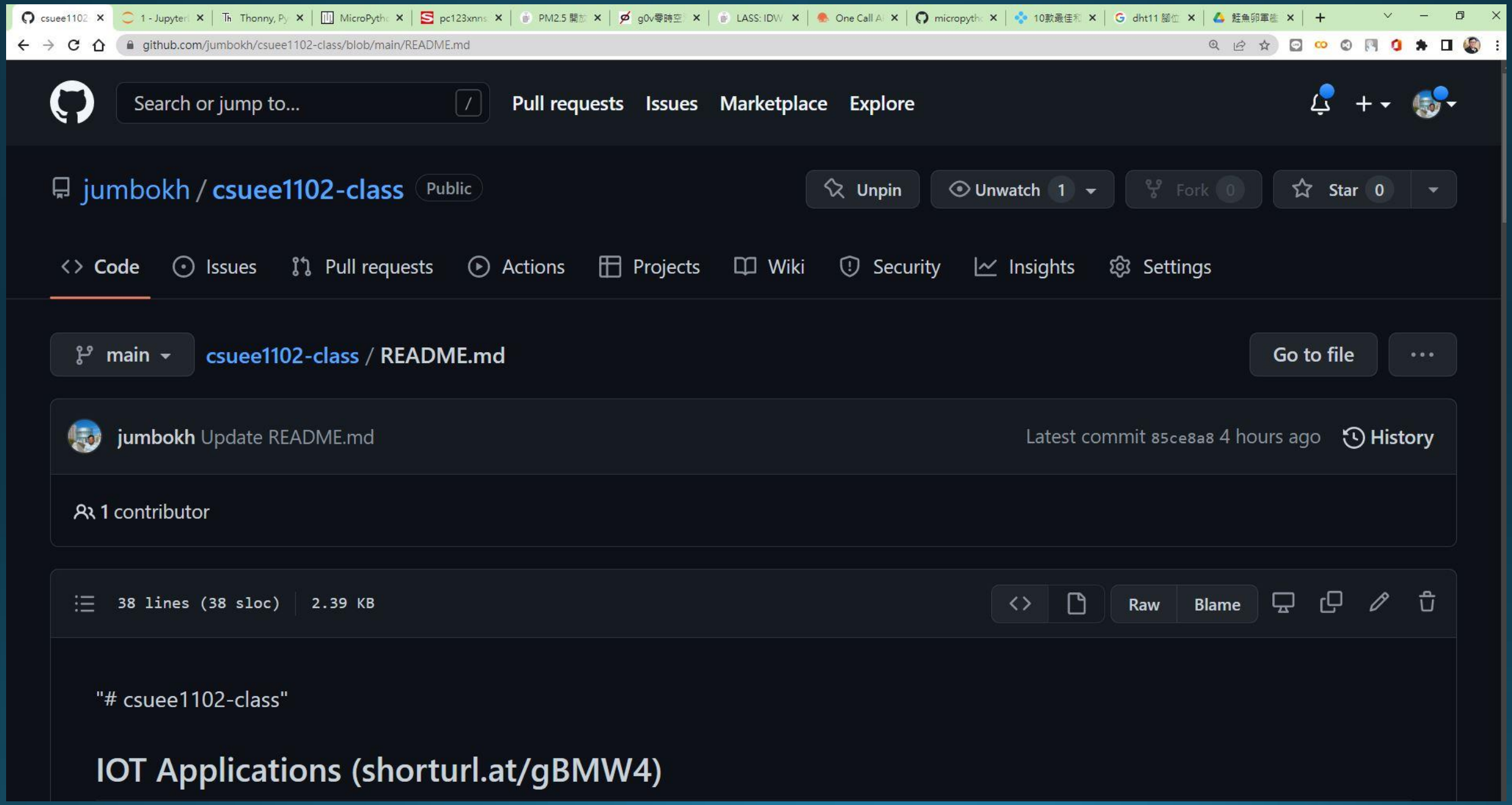
Releases

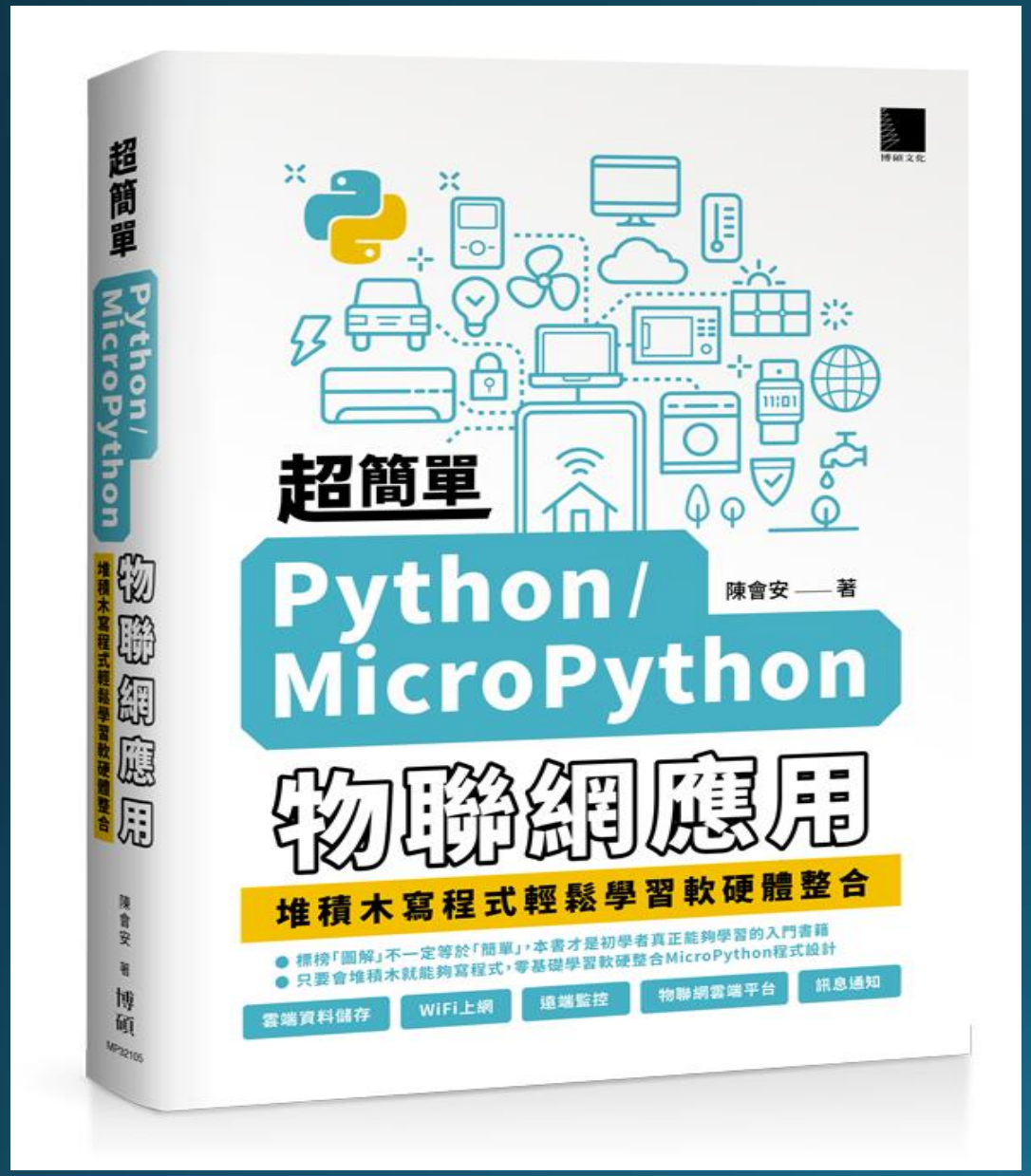
v1.18 (2022-01-17) .bin [.elf] [.map] [Release notes] (latest)
v1.17 (2021-09-02) .bin [.elf] [.map] [Release notes]
v1.16 (2021-06-23) .bin [.elf] [.map] [Release notes]
v1.15 (2021-04-18) .bin [.elf] [.map] [Release notes]
v1.14 (2021-02-02) .bin [.elf] [.map] [Release notes]
v1.13 (2020-09-02) .bin [.elf] [.map] [Release notes]
v1.12 (2019-12-20) .bin [.elf] [.map] [Release notes]


裝置管理員
檔案(F)
動作(A)
檢視(V)
說明(H)
DESKTOP-MITH7I3
IDE ATA/ATAPI 控制器
人性化介面裝置
列印佇列
存放控制器
系統裝置
相機
音效、視訊及遊戲控制器
音訊輸入與輸出
記憶體技術裝置
處理器
軟體元件
軟體裝置
通用序列匯流排控制器
連接埠 (COM 和 LPT)
USB-SERIAL CH340 (COM35)
感應器
滑鼠及其他指標裝置
電池
電腦
監視器
磁碟機
網路介面卡
影像裝置
鍵盤
藍牙


Thonny 選項
一般
直譯器
編輯器
主題和字型
執行 & 除錯
終端機
互動環境 (Shell)
協助功能
Thonny 應該使用哪一個直譯器或設備來執行你的程式？
MicroPython (ESP32)
詳細
Connecting via USB cable:
將設備連接到電腦，並選擇下方的連接埠
(尋找名稱中有 "USB Serial" 或是 "UART" 的設備).
如果找不到，你需要先安裝正確的 USB 驅動程式
Connecting via WebREPL (EXPERIMENTAL):
If your device supports WebREPL, first connect via serial, make sure WebREPL is enabled
(import webrepl_setup), connect your computer and device to same network and select
< WebREPL > below
選擇連接埠或是 WebREPL
USB-SERIAL CH340 (COM35)
安裝或更新韌體
確認
取消


Thonny
檔案 編輯 檢視 執行 工具 說明
檔案
本機
E:\MCU\micropython
csuee
web
adcPWM.py
breath.py
btnBuntting.py
btndht.py
btnLedsw.py
ch10-2-2.py
ch10-2-2a.py
ch10-3-3.py
ch10-3-3a.py
MicroPython 設備
boot.py
cnt.py
config.py
dht11try.py
dhtoled.py
i2cscan.py
ssd1306.py
互動環境 (Shell)
today temp =31, humidity= 68
today temp =31, humidity= 69
today temp =31, humidity= 68
today temp =31, humidity= 68
MicroPython v1.17 on 2021-09-02; ESP32 module with ESP32
Type "help()" for more information.
>>>
MicroPython (ESP32)


github.com/jumbokh/csuee1102-class/blob/main/README.md
Search or jump to...
Pull requests
Issues
Marketplace
Explore
jumbokh / csuee1102-class
Public
Unpin
Unwatch 1
Fork 0
Star 0
Code
Issues
Pull requests
Actions
Projects
Wiki
Security
Insights
Settings
main
csuee1102-class / README.md
Go to file
jumbokh Update README.md
Latest commit 85ce8a8 4 hours ago
History
1 contributor
38 lines (38 sloc)
2.39 KB
Raw
Blame
"# csuee1102-class"
IOT Applications (shorturl.at/gBMW4)



書名：超簡單Python/MicroPython物聯網應用：堆積木寫程式輕鬆學習軟硬體整合

書號：MP32105	作者：陳會安	ISBN：978-986-434-785-8
定價：NT$650元	印刷：單色	頁數：448頁
書籍規格：17*23	上市日：2021/6/2	譯者：(無)
學習定位：初階	本書附件：官網下載	檔案下載
前往購買 >> 天瓏	類別：電腦技術	

讚 成為朋友中第一個說這個讚的人。

Lab3.DustSensor	add mqtt oled
Lab4.WiFi	update config
Lab5. MQTT	add mqtt oled
Lab6. LineBot	commit all lab
Lab7. LASS	commit all lab
Lab8. URL-Request	update config
Lab9. openWeatherMap	add mqtt oled
refers	add mqtt Lass Oled
README.md	Update README.md
esp32-20210902-v1.17.bin	commit all lab

main csuee1102-class / refers / LabPractice.txt

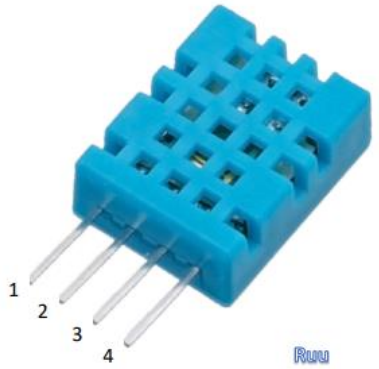
jumbokh add mqtt Lass Oled

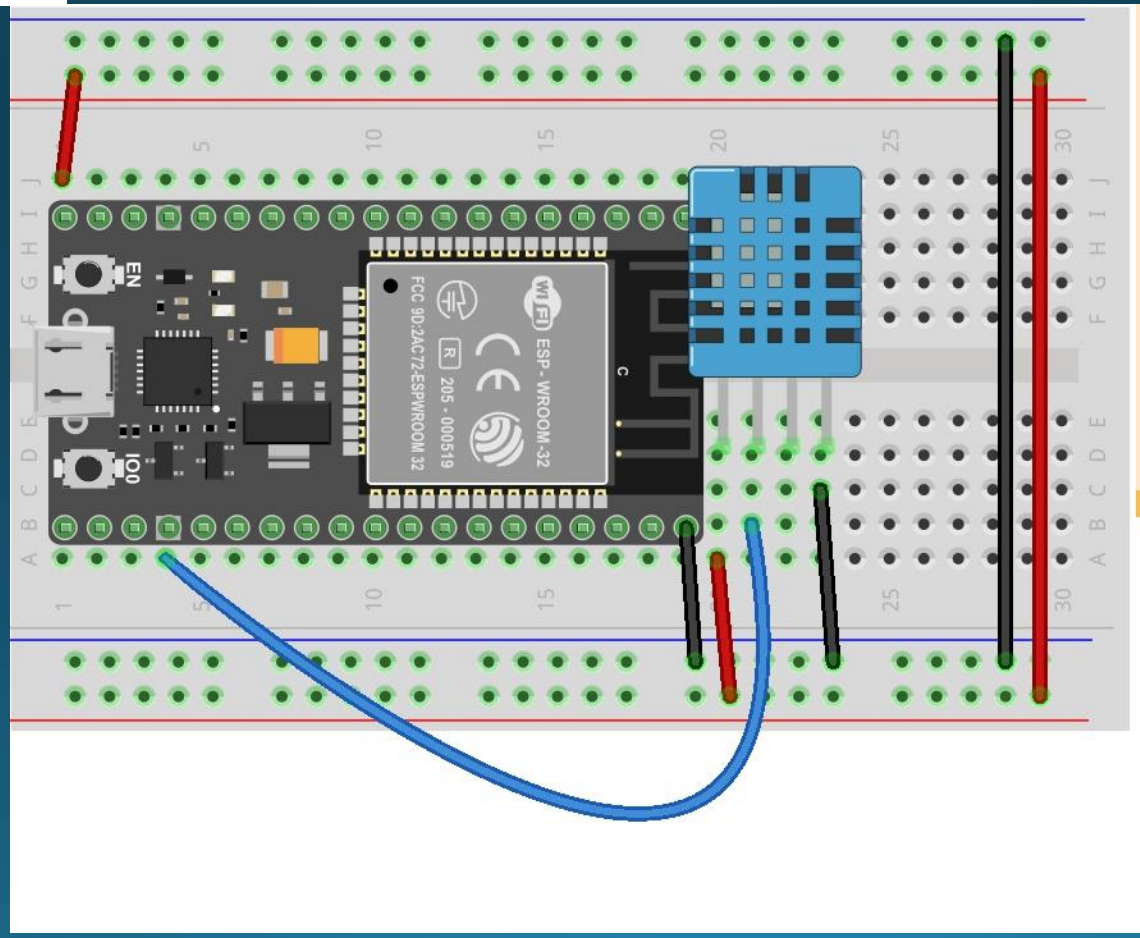
1 contributor

12 lines (12 sloc) | 206 Bytes

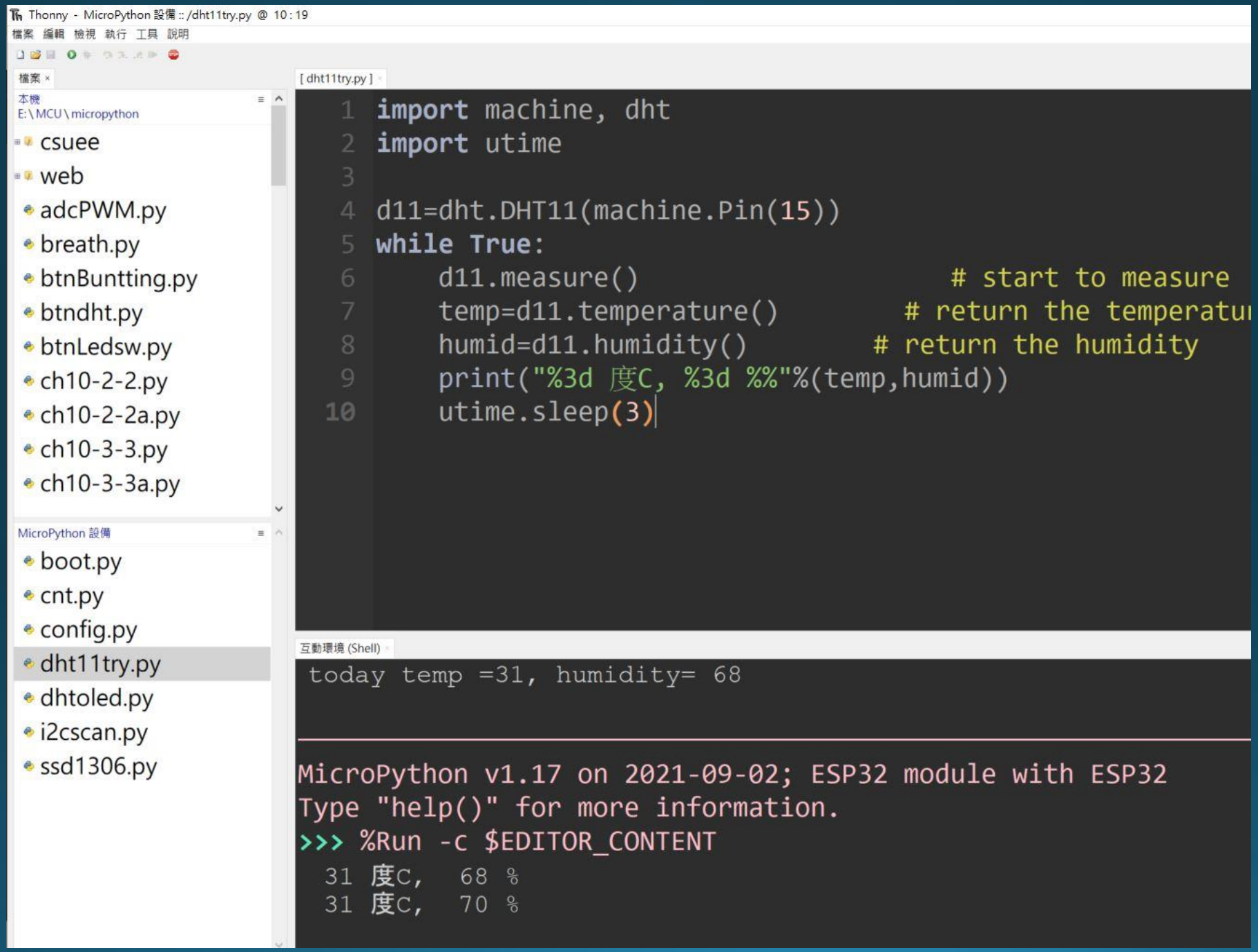
```
1. dht11try.py
2. i2cscan.py
3. oledTest.py
4. dhtoled.py
5. DustValue.py
6. airqoled.py
7. config.py, cnt.py
8. openweathermap.py
9. urllab.py
10. mqttTemp.py
11. mqttLass.py
12. mqttLassOled.py
```

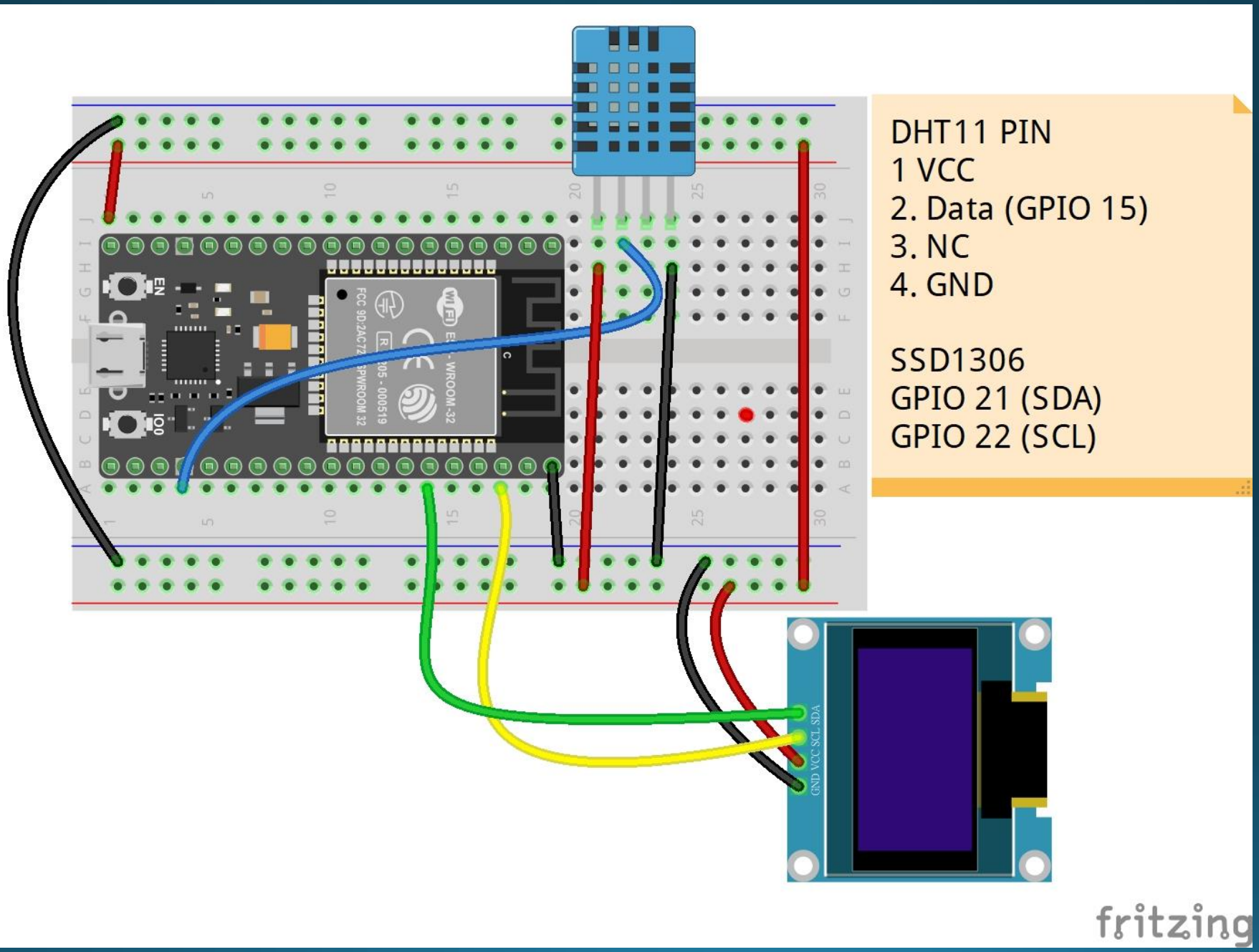
DHT 11 Pin	
1	VCC
2	Data
3	NC
4	GND

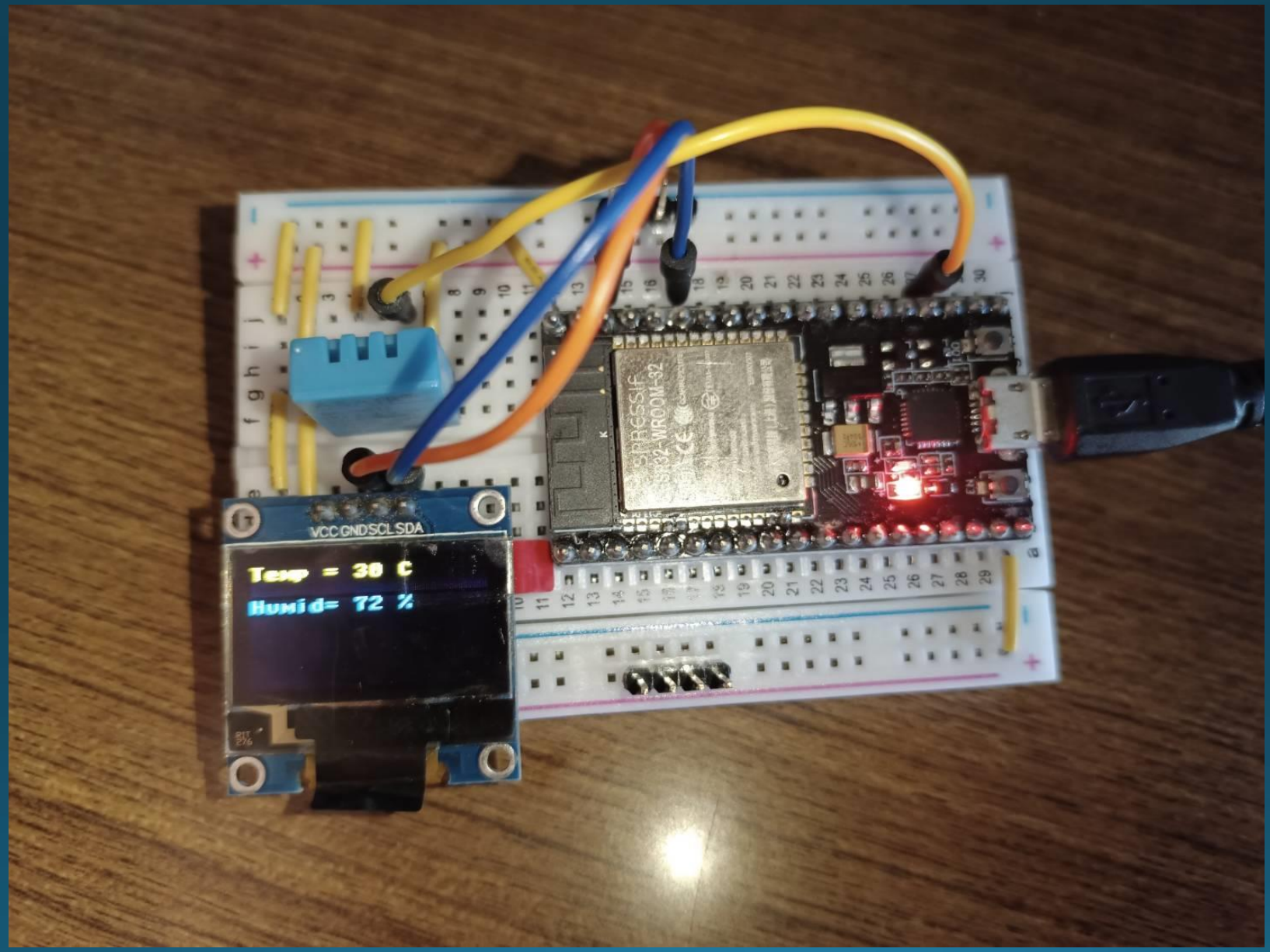


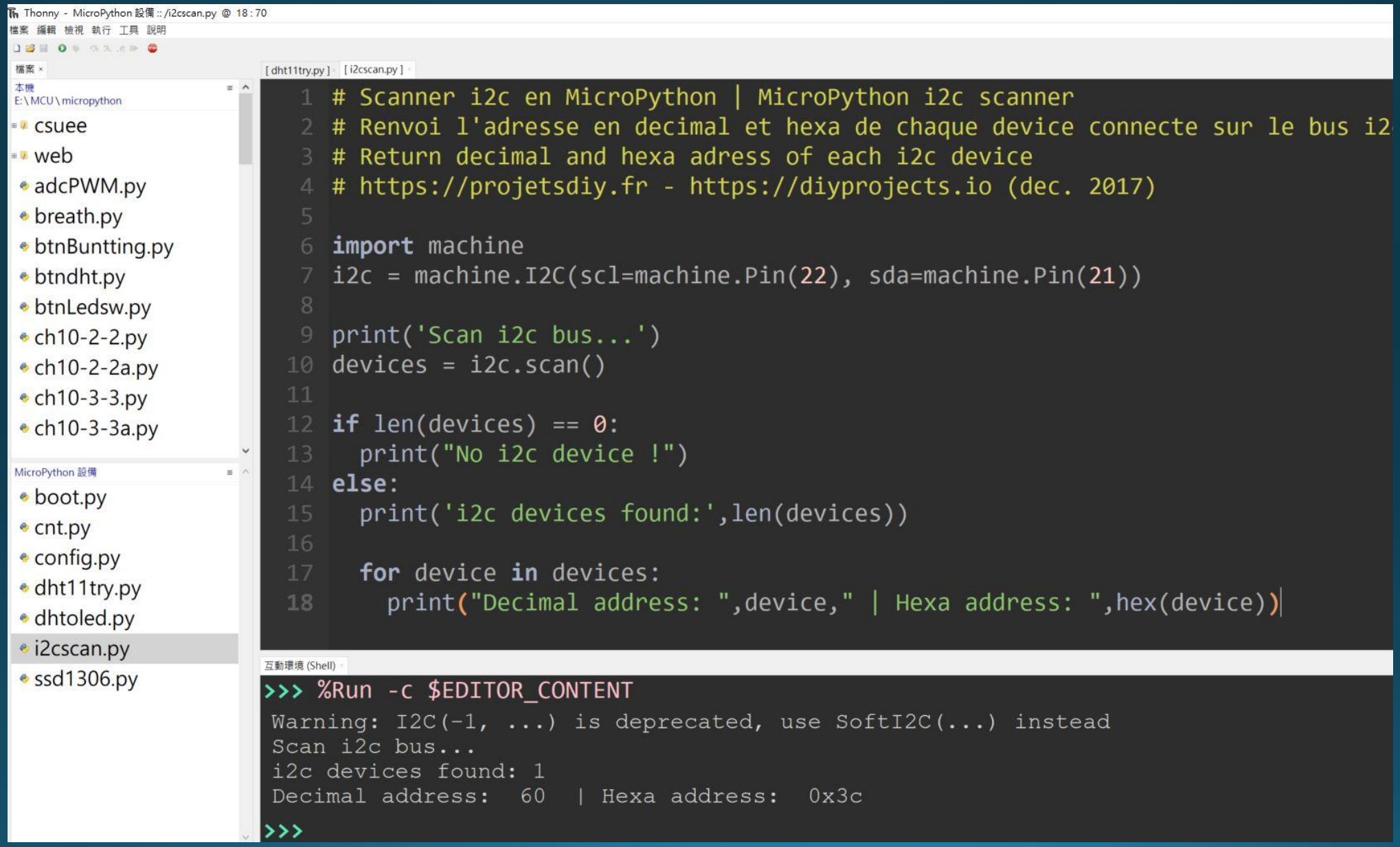


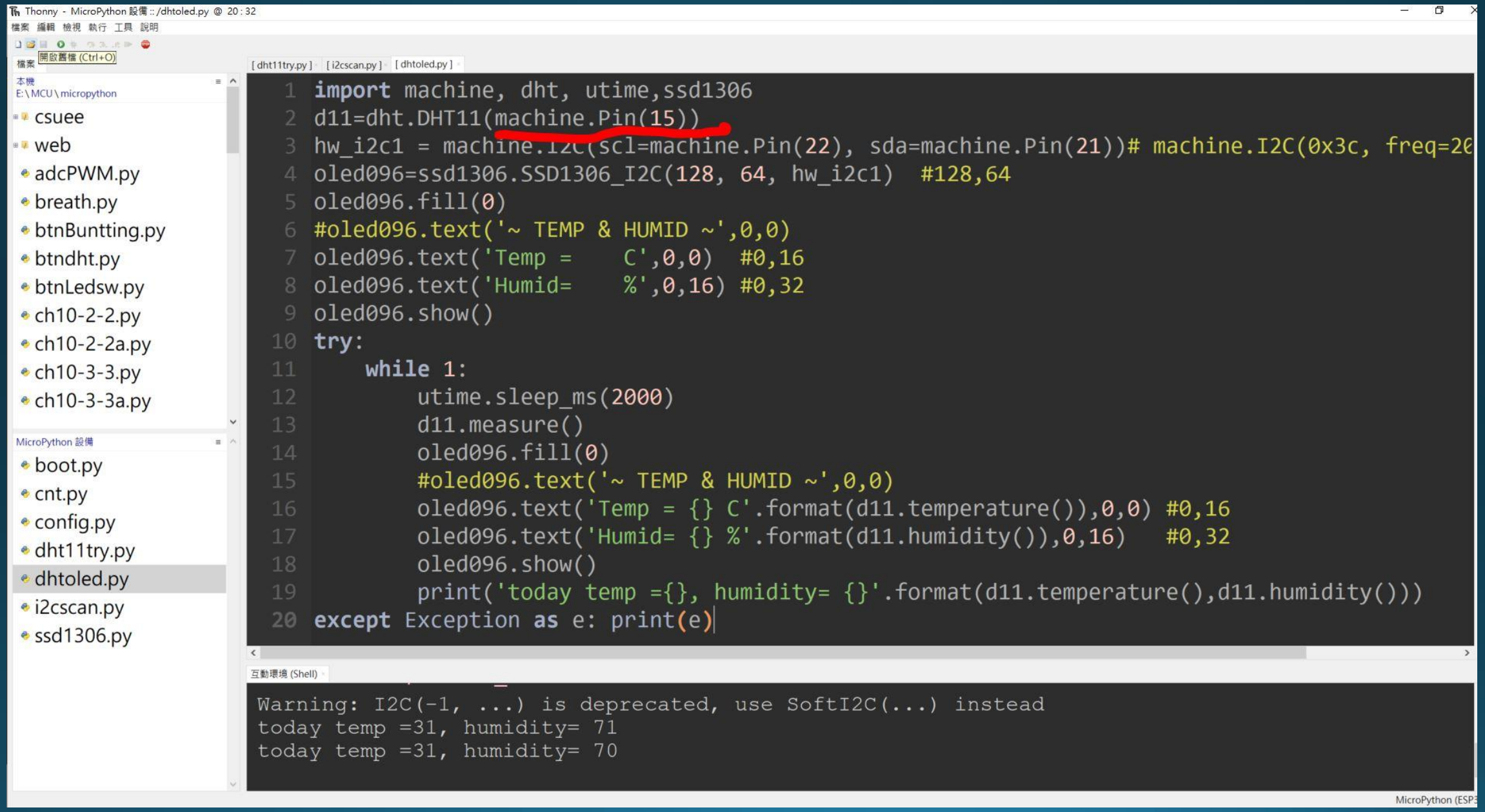
DHT11 PIN
1 VCC
2. Data (GPIO 15)
3. NC
4. GND

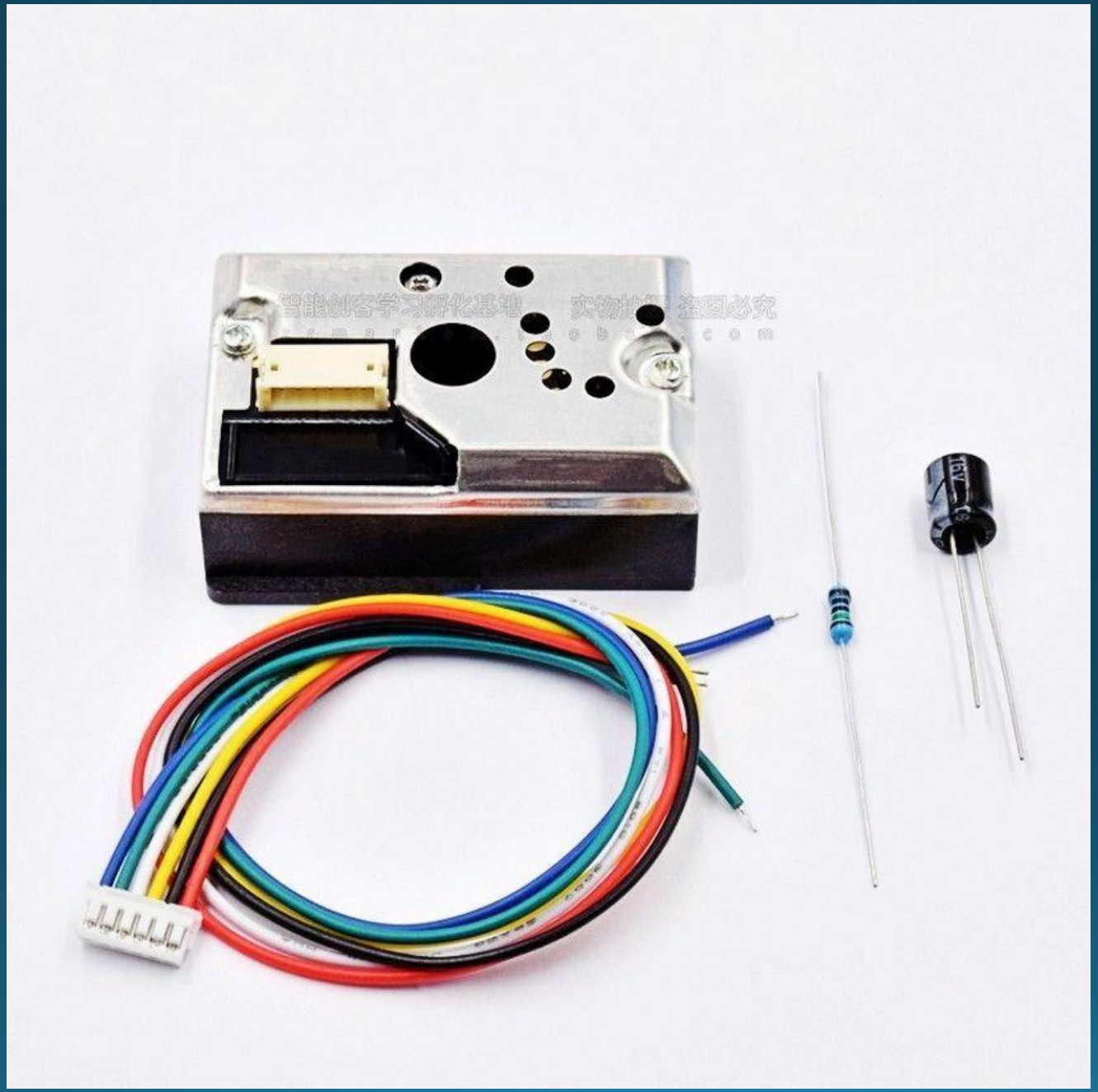

Thonny - MicroPython 設備 :: /dht11try.py @ 10 : 19
檔案 編輯 檢視 執行 工具 說明
檔案
本機
E:\MCU\micropython
csuee
web
adcPWM.py
breath.py
btnBuntting.py
btndht.py
btnLedsw.py
ch10-2-2.py
ch10-2-2a.py
ch10-3-3.py
ch10-3-3a.py
MicroPython 設備
boot.py
cnt.py
config.py
dht11try.py
dhtoled.py
i2cscan.py
ssd1306.py
[dht11try.py]
1 import machine, dht
2 import utime
3
4 d11=dht.DHT11(machine.Pin(15))
5 while True:
6 d11.measure() # start to measure
7 temp=d11.temperature() # return the temperatu
8 humid=d11.humidity() # return the humidity
9 print("%3d 度C, %3d %%"%(temp,humid))
10 utime.sleep(3)
互動環境 (Shell)
today temp =31, humidity= 68
MicroPython v1.17 on 2021-09-02; ESP32 module with ESP32
Type "help()" for more information.
>>> %Run -c $EDITOR_CONTENT
31 度C, 68 %
31 度C, 70 %

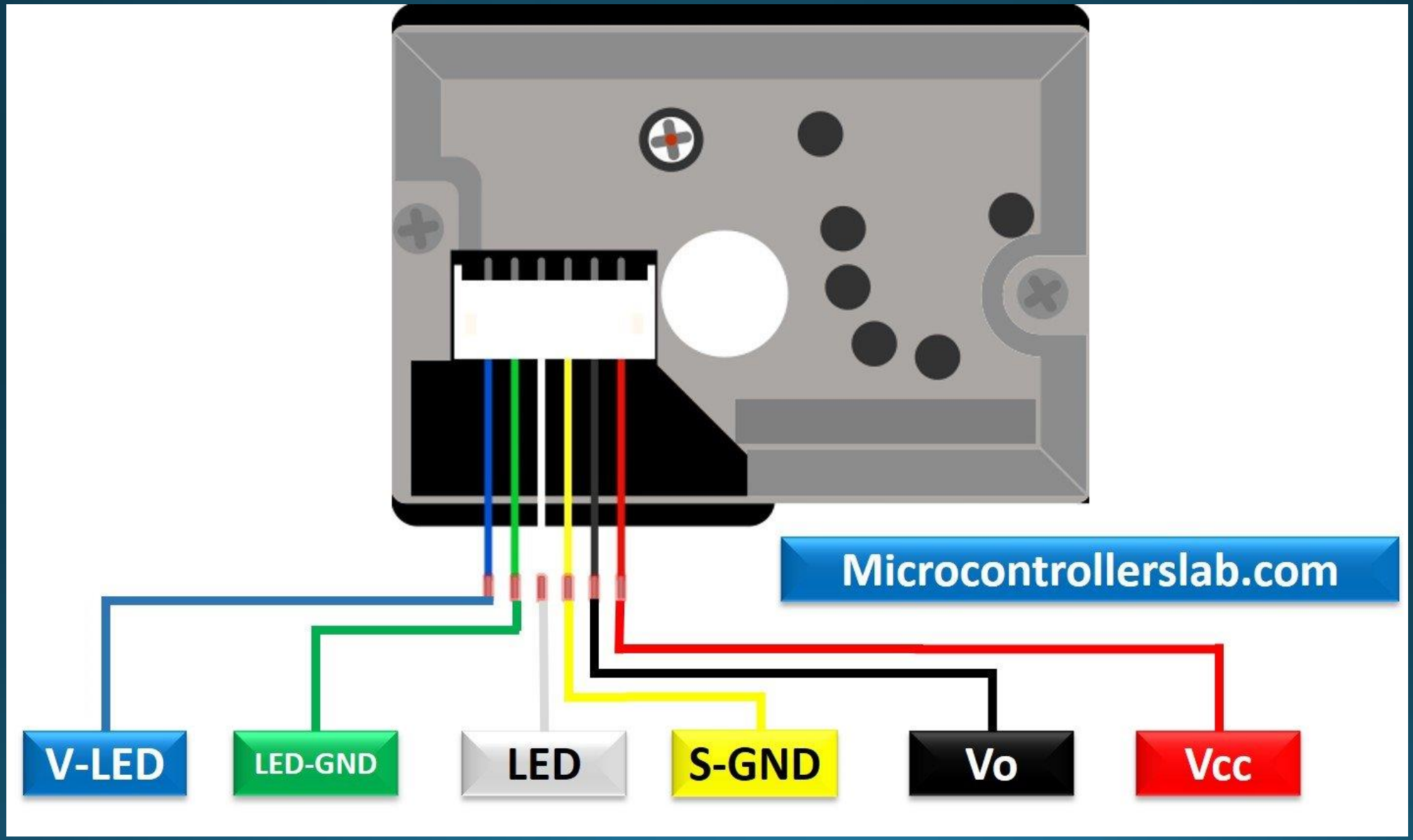

DHT11 PIN
1 VCC
2. Data (GPIO 15)
3. NC
4. GND
SSD1306
GPIO 21 (SDA)
GPIO 22 (SCL)
EN
IO0
GND VCC SCL SDA
fritzing

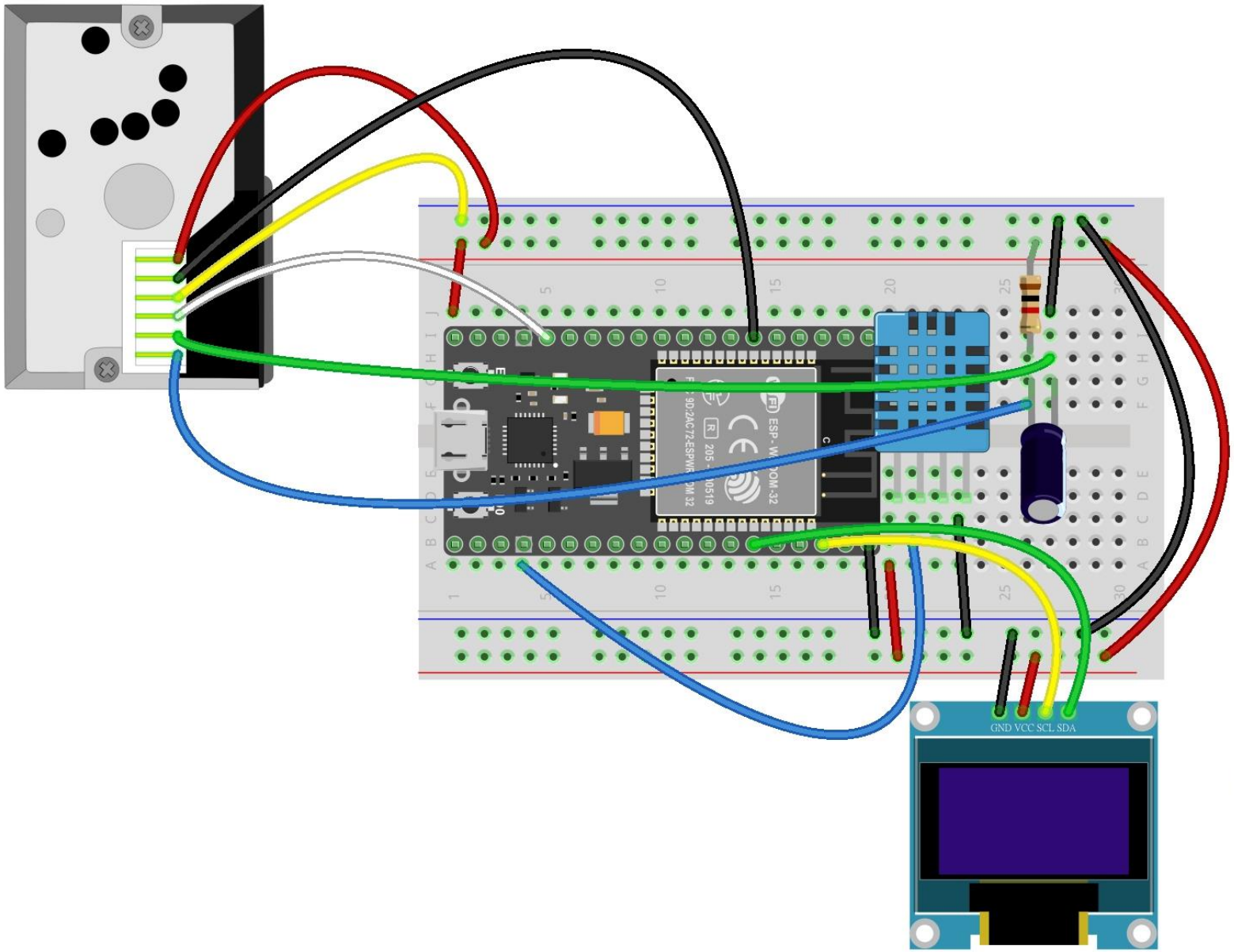

VCC GND SCL SDA
Temp = 30 C
Humid= 72 %
ESPRESSIF
ESP32-WROOM-32


Thonny - MicroPython 設備 :: /i2cscan.py @ 18 : 70
檔案 編輯 檢視 執行 工具 說明
檔案
本機
E:\MCU\micropython
csuee
web
adcPWM.py
breath.py
btnBuntting.py
btndht.py
btnLedsw.py
ch10-2-2.py
ch10-2-2a.py
ch10-3-3.py
ch10-3-3a.py
MicroPython 設備
boot.py
cnt.py
config.py
dht11try.py
dhtoled.py
i2cscan.py
ssd1306.py
[dht11try.py]
[i2cscan.py]
1 # Scanner i2c en MicroPython | MicroPython i2c scanner
2 # Renvoi l'adresse en decimal et hexa de chaque device connecte sur le bus i2
3 # Return decimal and hexa adress of each i2c device
4 # https://projetsdiy.fr - https://diyprojects.io (dec. 2017)
5
6 import machine
7 i2c = machine.I2C(scl=machine.Pin(22), sda=machine.Pin(21))
8
9 print('Scan i2c bus...')
10 devices = i2c.scan()
11
12 if len(devices) == 0:
13 print("No i2c device !")
14 else:
15 print('i2c devices found:',len(devices))
16
17 for device in devices:
18 print("Decimal address: ",device," | Hexa address: ",hex(device))
互動環境 (Shell)
>>> %Run -c $EDITOR_CONTENT
Warning: I2C(-1, ...) is deprecated, use SoftI2C(...) instead
Scan i2c bus...
i2c devices found: 1
Decimal address: 60 | Hexa address: 0x3c
>>>


Thonny - MicroPython 設備 :: /dhtoled.py @ 20 : 32
檔案 編輯 檢視 執行 工具 說明
開啟舊檔 (Ctrl+O)
本機
E:\MCU\micropython
csuee
web
adcPWM.py
breath.py
btnBuntting.py
btndht.py
btnLedsw.py
ch10-2-2.py
ch10-2-2a.py
ch10-3-3.py
ch10-3-3a.py
MicroPython 設備
boot.py
cnt.py
config.py
dht11try.py
dhtoled.py
i2cscan.py
ssd1306.py
[dht11try.py] [i2cscan.py] [dhtoled.py]
1 import machine, dht, utime,ssd1306
2 d11=dht.DHT11(machine.Pin(15))
3 hw_i2c1 = machine.I2C(scl=machine.Pin(22), sda=machine.Pin(21))# machine.I2C(0x3c, freq=20
4 oled096=ssd1306.SSD1306_I2C(128, 64, hw_i2c1) #128,64
5 oled096.fill(0)
6 #oled096.text('~ TEMP & HUMID ~',0,0)
7 oled096.text('Temp = C',0,0) #0,16
8 oled096.text('Humid= %',0,16) #0,32
9 oled096.show()
10 try:
11 while 1:
12 utime.sleep_ms(2000)
13 d11.measure()
14 oled096.fill(0)
15 #oled096.text('~ TEMP & HUMID ~',0,0)
16 oled096.text('Temp = {} C'.format(d11.temperature()),0,0) #0,16
17 oled096.text('Humid= {} %'.format(d11.humidity()),0,16) #0,32
18 oled096.show()
19 print('today temp ={}, humidity= {}'.format(d11.temperature(),d11.humidity()))
20 except Exception as e: print(e)
互動環境 (Shell)
Warning: I2C(-1, ...) is deprecated, use SoftI2C(...) instead
today temp =31, humidity= 71
today temp =31, humidity= 70
MicroPython (ESP




Microcontrollerslab.com
V-LED
LED-GND
LED
S-GND
Vo
Vcc



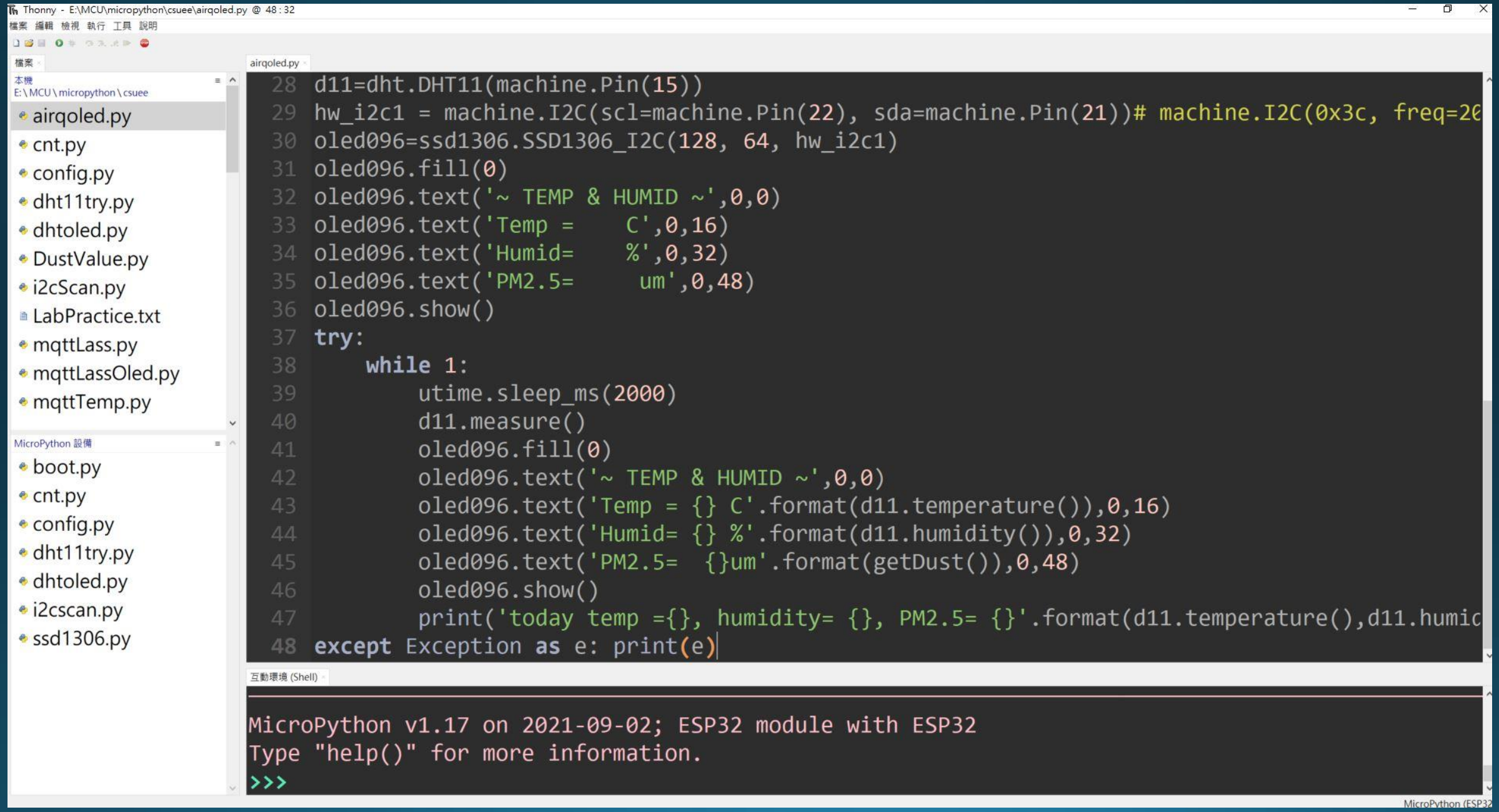
DHT11 PIN
1 VCC
2. Data (GPIO 15)
3. NC
4. GND

GP2Y1010AU0F (L--R)
(654321)
1. 5V (Red)
2. AO (GPIO35) (Black)
3. GND (yellow)
4. LED (GPIO13) (White)
5. GND (Green)
6. 5V (1K,10uF,5V) (Blue)

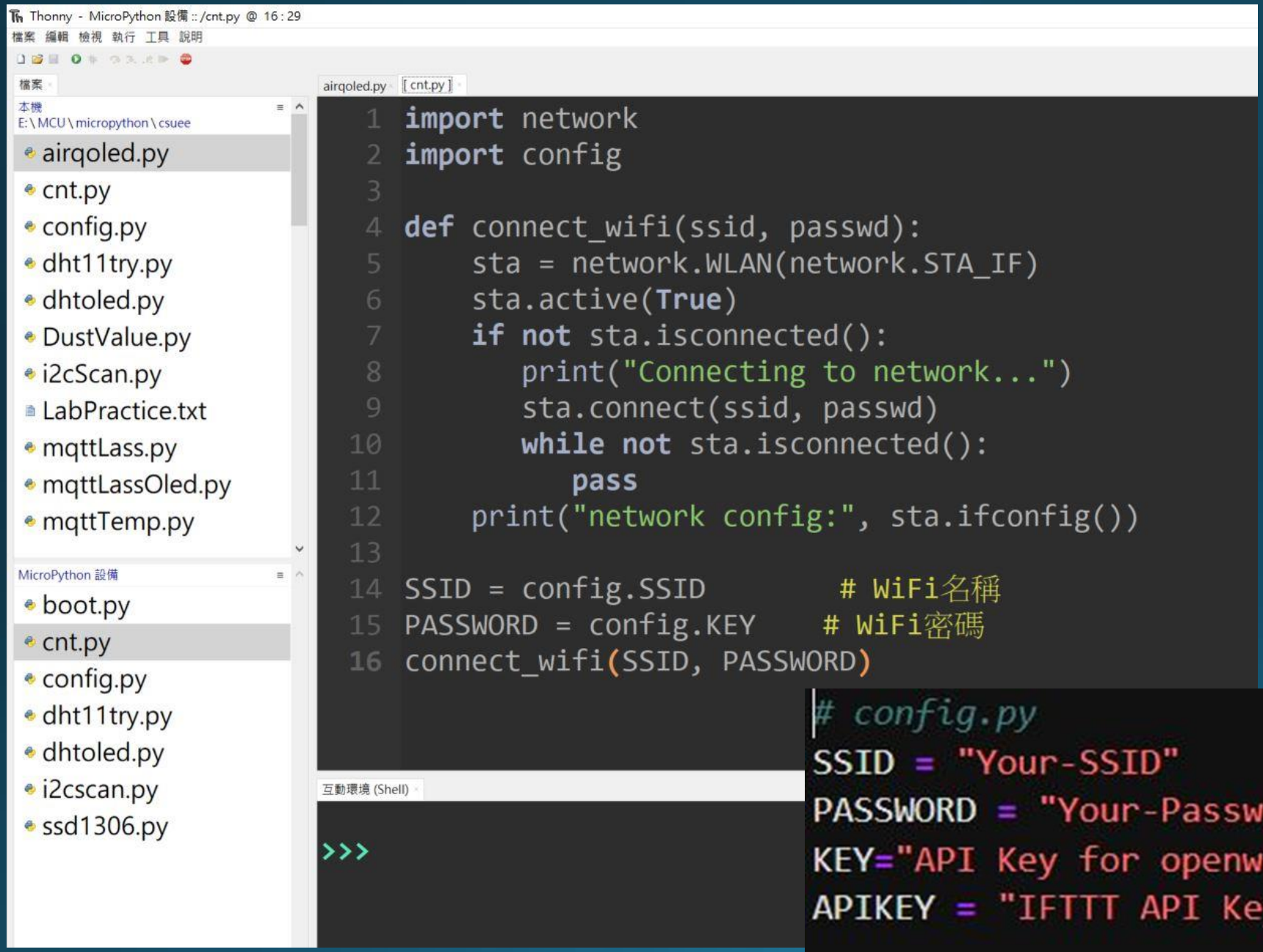
SSD1306
1. GND
2. 5V
3. SCL (GPIO22)
4. SDA (GPIO21)

```
# ADC : 34
# ILED : GPIO13
#=====================================================================
from machine import Pin, ADC
import time
p0 = Pin(13, Pin.OUT)
adc = ADC(Pin(34))
def measure():
 p0.value(1)                          # d?but du cr?neau
 time.sleep_us(280)           # les 0.28 ms
 readvalue = adc.read()     # lecture de l'adc
 time.sleep_us(40)             # compl?ment du cr?neau ? 0.32 ms
 p0.value(0)                           # fin du cr?neau
 time.sleep_us(9680)         # compl?ment du cycle ? 10 ms
 return readvalue
#-------------------------------------
print('PM2.5 Result:')
t,tot,t1=0,0,0
ppm=0.0
t1=measure()
print('Test measure Value :  ',t1,'---- this value always too low')
for i in range(10):  # on fait 10 mesures
 t=measure()
 print(i,"---",t)
 tot=tot+t
ppm=tot/10
tot2='PM2.5 Value = '+str(ppm)[:5]
print(tot2)
print('Finish.....')
```

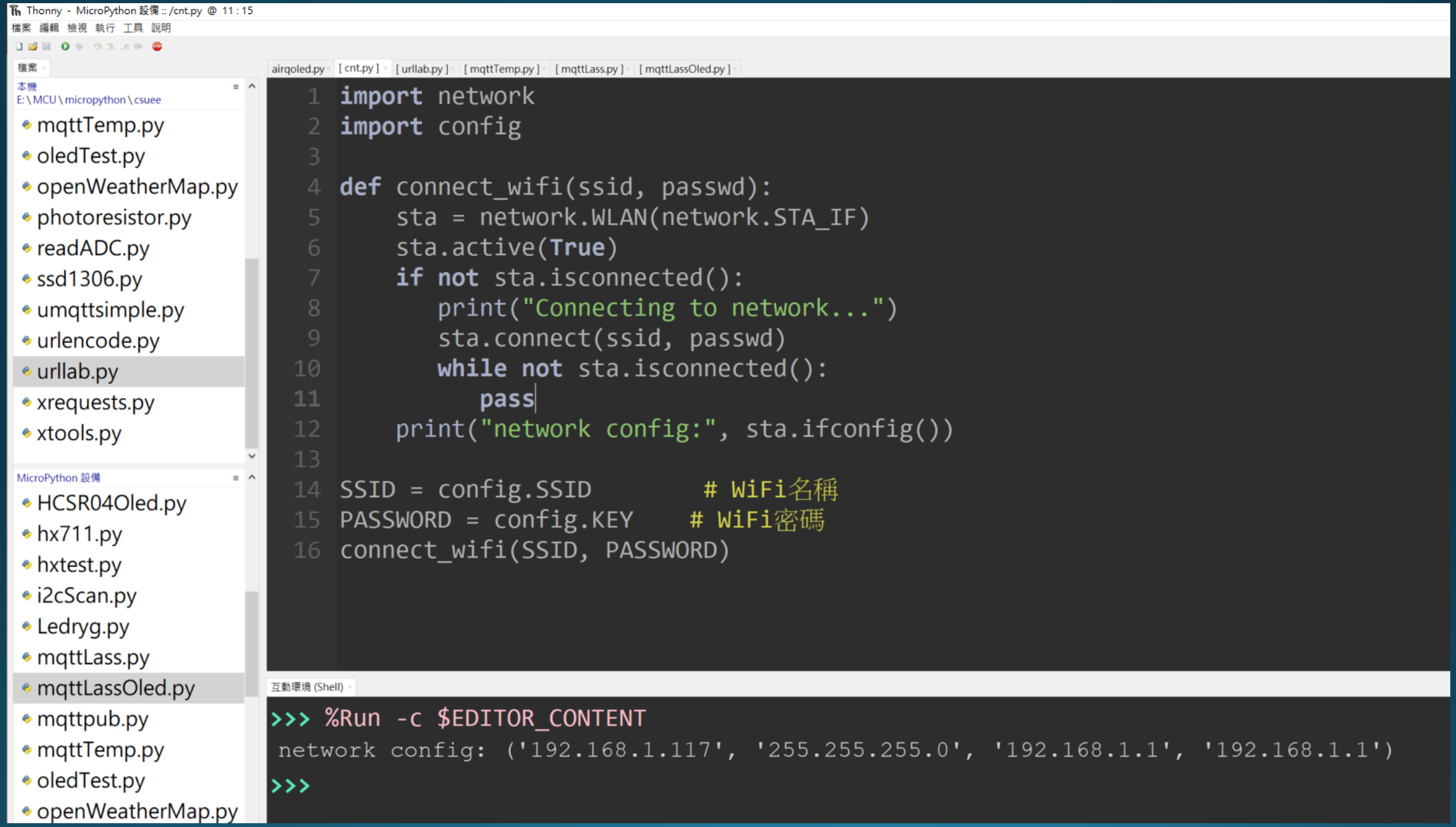
```
# ADC : 34
# ILED : GPIO13
#=====================================================================
from machine import Pin, ADC
import time
p0 = Pin(13, Pin.OUT)
adc = ADC(Pin(34))
def measure():
 p0.value(1)                          # d?but du cr?neau
 time.sleep_us(280)           # les 0.28 ms
 readvalue = adc.read()     # lecture de l'adc
 time.sleep_us(40)             # compl?ment du cr?neau ? 0.32 ms
 p0.value(0)                           # fin du cr?neau
 time.sleep_us(9680)         # compl?ment du cycle ? 10 ms
 return readvalue
#-------------------------------------
print('PM2.5 Result:')
t,tot,t1=0,0,0
ppm=0.0
t1=measure()
print('Test measure Value :  ',t1,'---- this value always too low')
for i in range(10):  # on fait 10 mesures
 t=measure()
 print(i,"---",t)
 tot=tot+t
ppm=tot/10
tot2='PM2.5 Value = '+str(ppm)[:5]
print(tot2)
print('Finish.....')
```

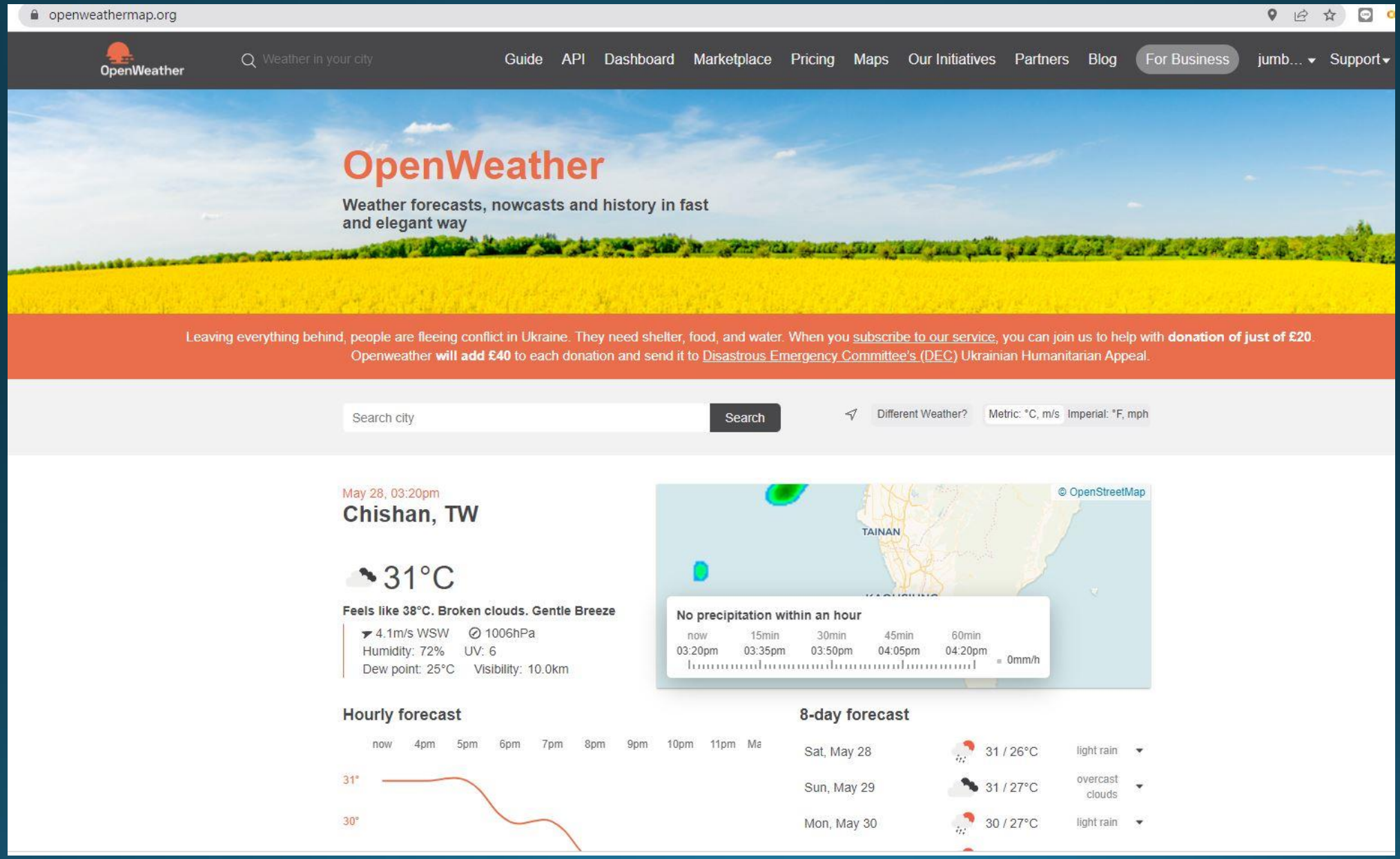

Thonny - E:\MCU\micropython\csuee\airqoled.py @ 48 : 32
檔案 編輯 檢視 執行 工具 說明
檔案
本機
E:\MCU\micropython\csuee
airqoled.py
cnt.py
config.py
dht11try.py
dhtoled.py
DustValue.py
i2cScan.py
LabPractice.txt
mqttLass.py
mqttLassOled.py
mqttTemp.py
MicroPython 設備
boot.py
cnt.py
config.py
dht11try.py
dhtoled.py
i2cscan.py
ssd1306.py
airqoled.py
28 d11=dht.DHT11(machine.Pin(15))
29 hw_i2c1 = machine.I2C(scl=machine.Pin(22), sda=machine.Pin(21))# machine.I2C(0x3c, freq=20
30 oled096=ssd1306.SSD1306_I2C(128, 64, hw_i2c1)
31 oled096.fill(0)
32 oled096.text('~ TEMP & HUMID ~',0,0)
33 oled096.text('Temp =   C',0,16)
34 oled096.text('Humid=   %',0,32)
35 oled096.text('PM2.5=   um',0,48)
36 oled096.show()
37 try:
38   while 1:
39   utime.sleep_ms(2000)
40   d11.measure()
41   oled096.fill(0)
42   oled096.text('~ TEMP & HUMID ~',0,0)
43   oled096.text('Temp = {} C'.format(d11.temperature()),0,16)
44   oled096.text('Humid= {} %'.format(d11.humidity()),0,32)
45   oled096.text('PM2.5= {}um'.format(getDust()),0,48)
46   oled096.show()
47   print('today temp ={}, humidity= {}, PM2.5= {}'.format(d11.temperature(),d11.humic
48 except Exception as e: print(e)
互動環境 (Shell)
MicroPython v1.17 on 2021-09-02; ESP32 module with ESP32
Type "help()" for more information.
>>>
MicroPython (ESP32

```
# config.py
SSID = "Your-SSID"          # WiFi名稱
PASSWORD = "Your-Password"    # WiFi密碼
KEY="API Key for openweathermap" #openweathermap
APIKEY = "IFTTT API Key" # iFTTT Key
```




```python
# config.py
SSID = "Your-SSID"              # WiFi名稱
PASSWORD = "Your-Password"      # WiFi密碼
KEY="API Key for openweathermap" #openweathermap
APIKEY = "IFTTT API Key" # iFTTT Key
```


Thonny - MicroPython 設備 :: /cnt.py @ 11 : 15
檔案 編輯 檢視 執行 工具 說明
檔案
本機
E:\MCU\micropython\csuee
mqttTemp.py
oledTest.py
openWeatherMap.py
photoresistor.py
readADC.py
ssd1306.py
umqttsimple.py
urlencode.py
urllab.py
xrequests.py
xtools.py
MicroPython 設備
HCSR04Oled.py
hx711.py
hxtest.py
i2cScan.py
Ledryg.py
mqttLass.py
mqttLassOled.py
mqttpub.py
mqttTemp.py
oledTest.py
openWeatherMap.py
airqoled.py
[cnt.py]
[urllab.py]
[mqttTemp.py]
[mqttLass.py]
[mqttLassOled.py]
1 import network
2 import config
3
4 def connect_wifi(ssid, passwd):
5 sta = network.WLAN(network.STA_IF)
6 sta.active(True)
7 if not sta.isconnected():
8 print("Connecting to network...")
9 sta.connect(ssid, passwd)
10 while not sta.isconnected():
11 pass
12 print("network config:", sta.ifconfig())
13
14 SSID = config.SSID # WiFi名稱
15 PASSWORD = config.KEY # WiFi密碼
16 connect_wifi(SSID, PASSWORD)
互動環境 (Shell)
>>> %Run -c $EDITOR_CONTENT
network config: ('192.168.1.117', '255.255.255.0', '192.168.1.1', '192.168.1.1')
>>>


openweathermap.org
OpenWeather
Weather in your city
Guide
API
Dashboard
Marketplace
Pricing
Maps
Our Initiatives
Partners
Blog
For Business
jumb...
Support
OpenWeather
Weather forecasts, nowcasts and history in fast and elegant way
Leaving everything behind, people are fleeing conflict in Ukraine. They need shelter, food, and water. When you subscribe to our service, you can join us to help with donation of just of £20.
Openweather will add £40 to each donation and send it to Disastrous Emergency Committee's (DEC) Ukrainian Humanitarian Appeal.
Search city
Search
Different Weather?
Metric: °C, m/s
Imperial: °F, mph
May 28, 03:20pm
Chishan, TW
31°C
Feels like 38°C. Broken clouds. Gentle Breeze
4.1m/s WSW
1006hPa
Humidity: 72%
UV: 6
Dew point: 25°C
Visibility: 10.0km
© OpenStreetMap
TAINAN
No precipitation within an hour
now 03:20pm
15min 03:35pm
30min 03:50pm
45min 04:05pm
60min 04:20pm
0mm/h
Hourly forecast
now
4pm
5pm
6pm
7pm
8pm
9pm
10pm
11pm
31°
30°
8-day forecast
Sat, May 28
31 / 26°C
light rain
Sun, May 29
31 / 27°C
overcast clouds
Mon, May 30
30 / 27°C
light rain

Weather API

Please, sign up to use our fast and easy-to-work weather APIs. As a start to use OpenWeather products, we recommend our One Call API 3.0. For more functionality, please consider our products, which are included in professional collections.

One Call API 3.0 NEW

API doc Subscribe

Make one API call and recieve all essential weather data in one response:

- Minute forecast for 1 hour
- Hourly forecast for 48 hours
- Daily forecast for 8 days
- Historical data for 40+ years back by timestamp
- National weather alerts

Read more about this API and subscription plan in the FAQ.

Pay as you call

1,000 API calls per day for free
0.0012 GBP per API call over the daily limit

Subscribe to One Call by Call

This is a separate subscription plan, which include only One Call API.

Professional collections

For professionals and specialists with middle sized project, we recommend our Professional collections, which included Current & Forecasts collection, Historical weather data collection, Weather Maps collection and other APIs.

For Enterprise level projects we provide Enterprise license, which is included all forecast products and current state, along with alerts, maps, and other products. Learn more

You can read the How to Start guide and enjoy using our powerful weather APIs right now.

Current & Forecast weather data collection

Current Weather Data

API doc Subscribe

Hourly Forecast 4 days

API doc Subscribe

One Call API 1.0

API doc Subscribe

One Call API 3.0

Make just one API call and get all your essential weather data for a specific location with our new OpenWeather **One Call API 3.0**.

The One Call API provides the following weather data for any geographical coordinates:

- Current weather
- Minute forecast for 1 hour
- Hourly forecast for 48 hours
- Daily forecast for 8 days
- National weather alerts
- Historical weather data for 40+ years back (since January 1, 1979)

Current and forecast weather data

To get access to current weather, minute forecast for 1 hour, hourly forecast for 48 hours, daily forecast for 8 days and government weather alerts, please use this section of the documentation.

If you are interested in **historical weather data**, please read the "Historical weather data" section.

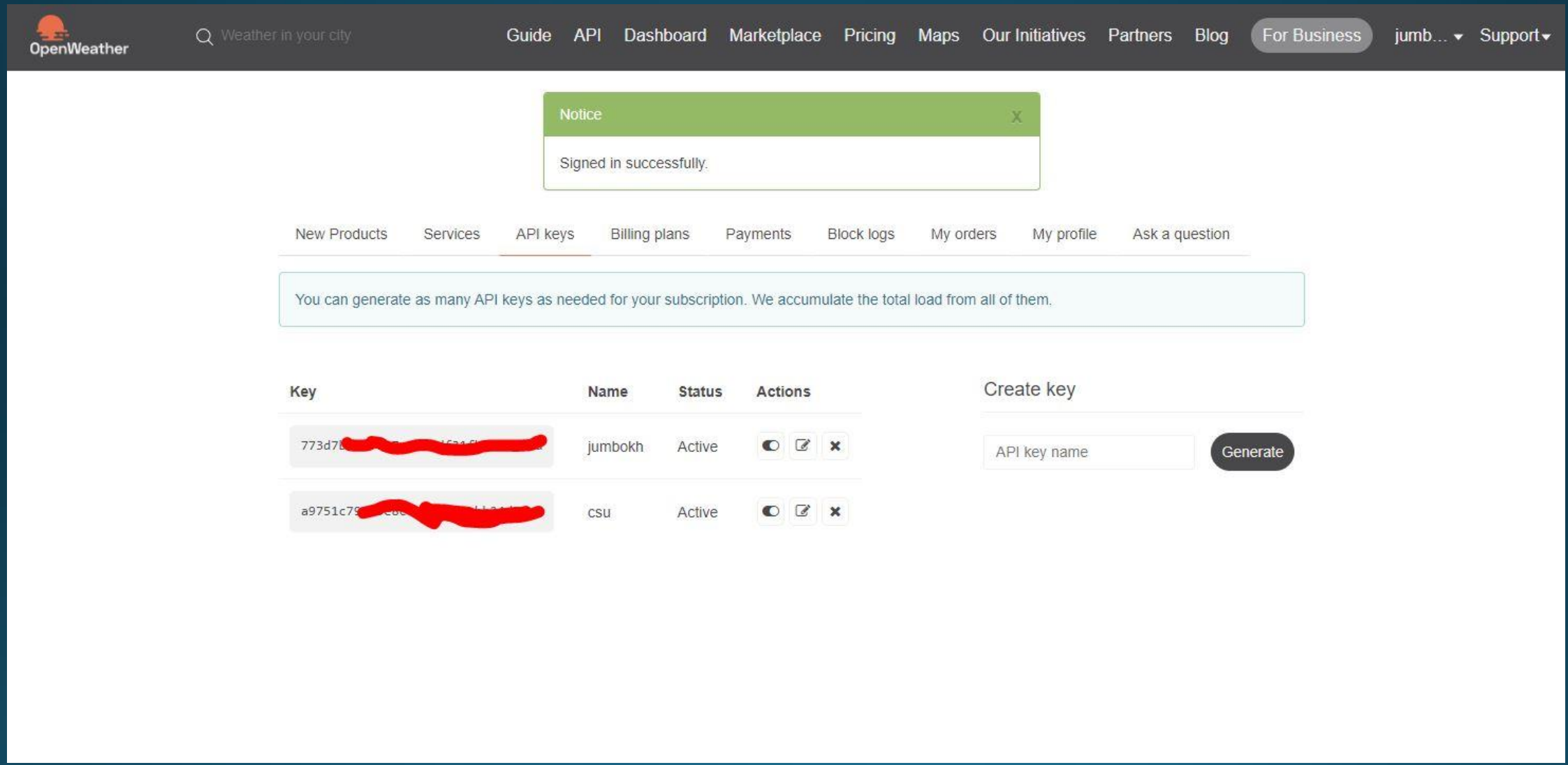
How to make an API call

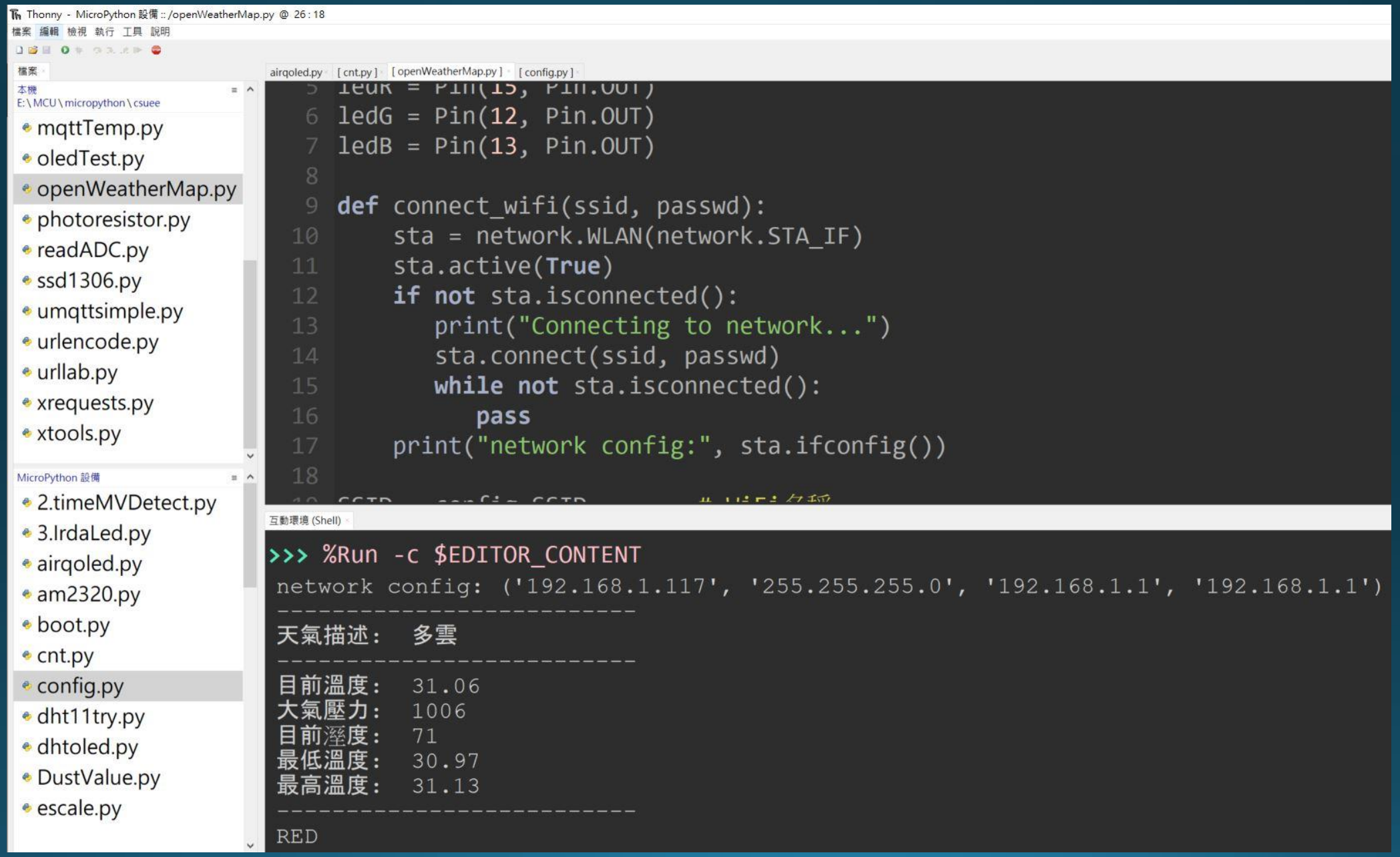
API call

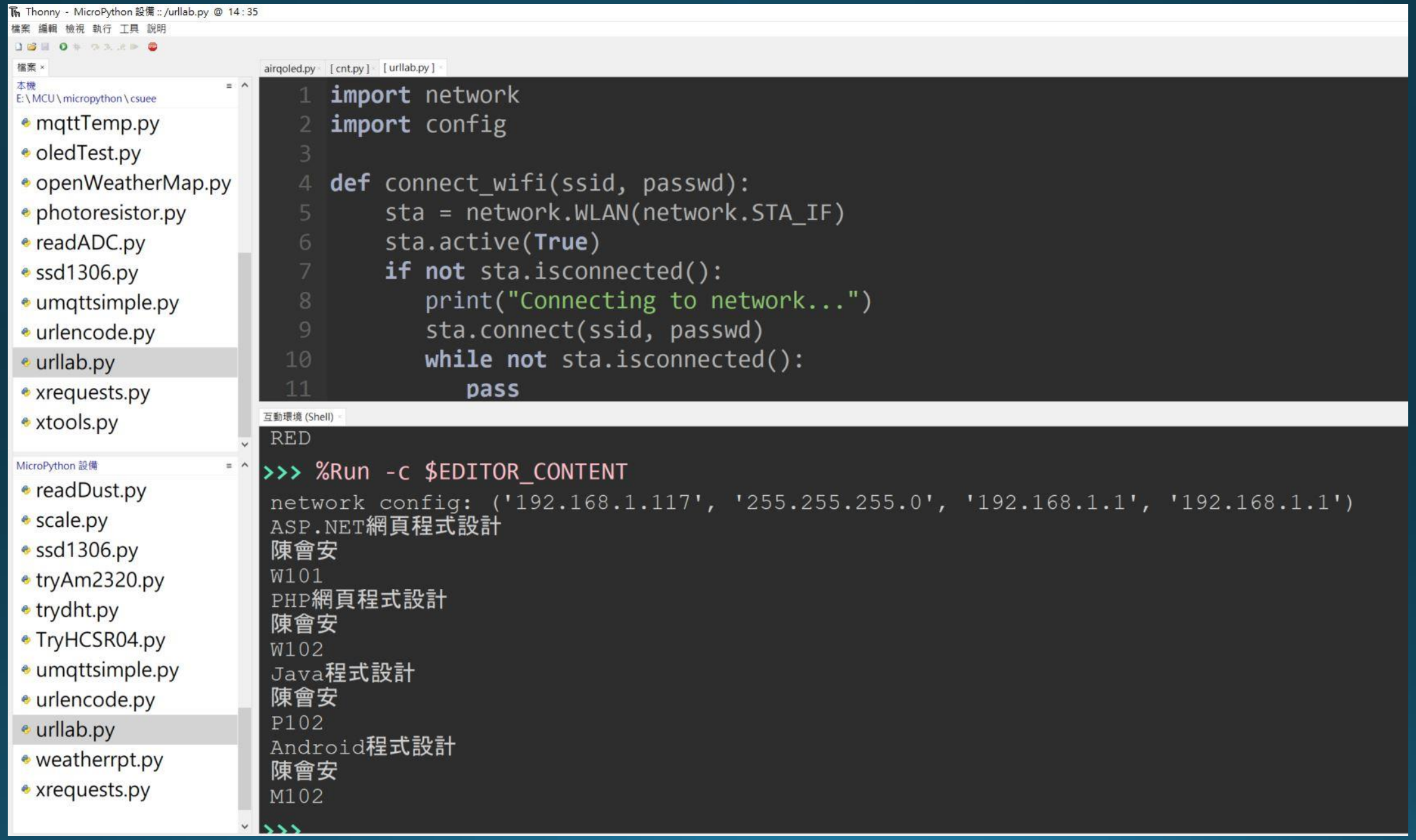
```
https://api.openweathermap.org/data/3.0/onecall?lat=
{lat}&lon={lon}&exclude={part}&appid={API key}
```

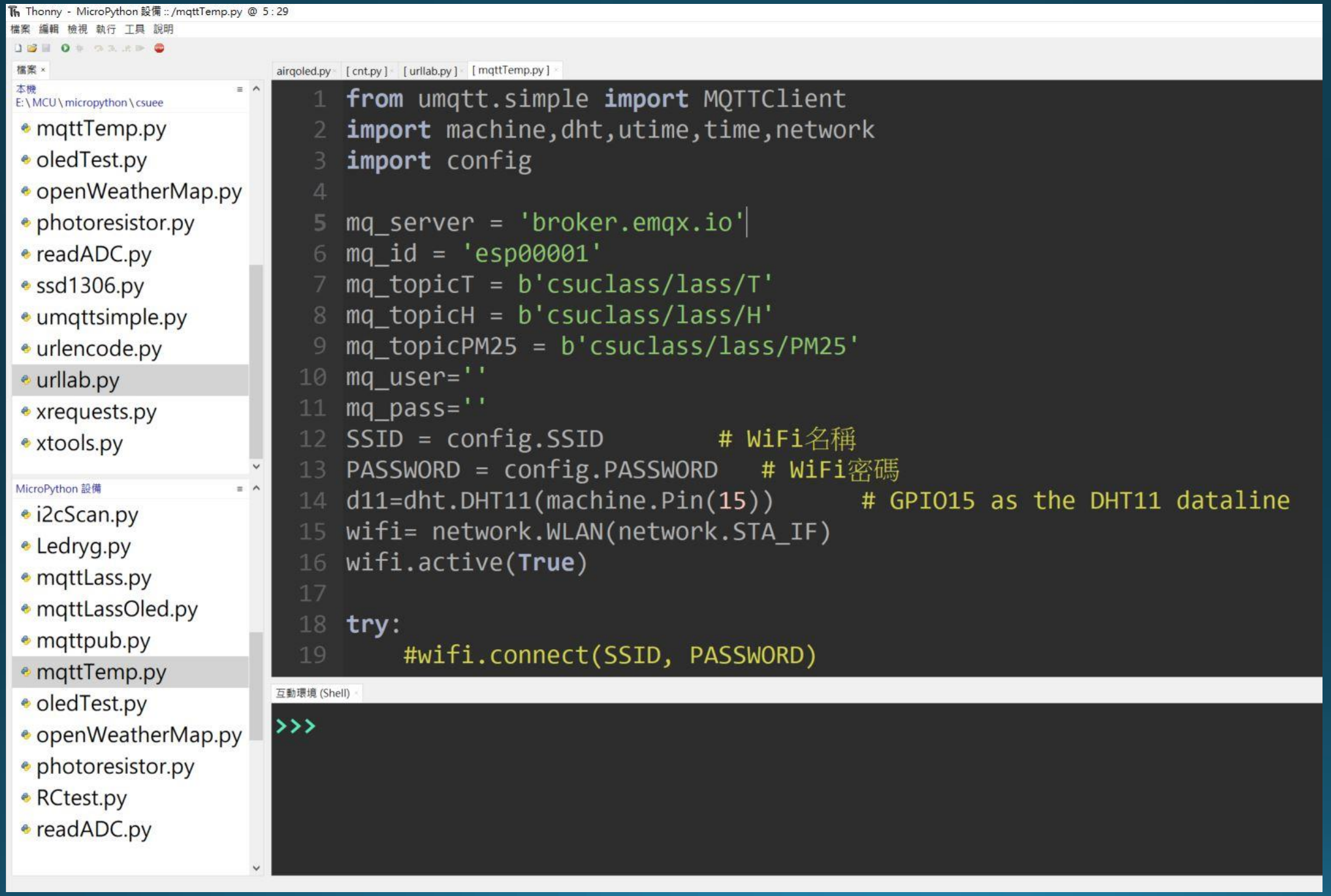
Parameters

`lat, lon`	`required`	Geographical coordinates (latitude, longitude)
`appid`	`required`	Your unique API key (you can always find it on your account page under the "API key" tab)

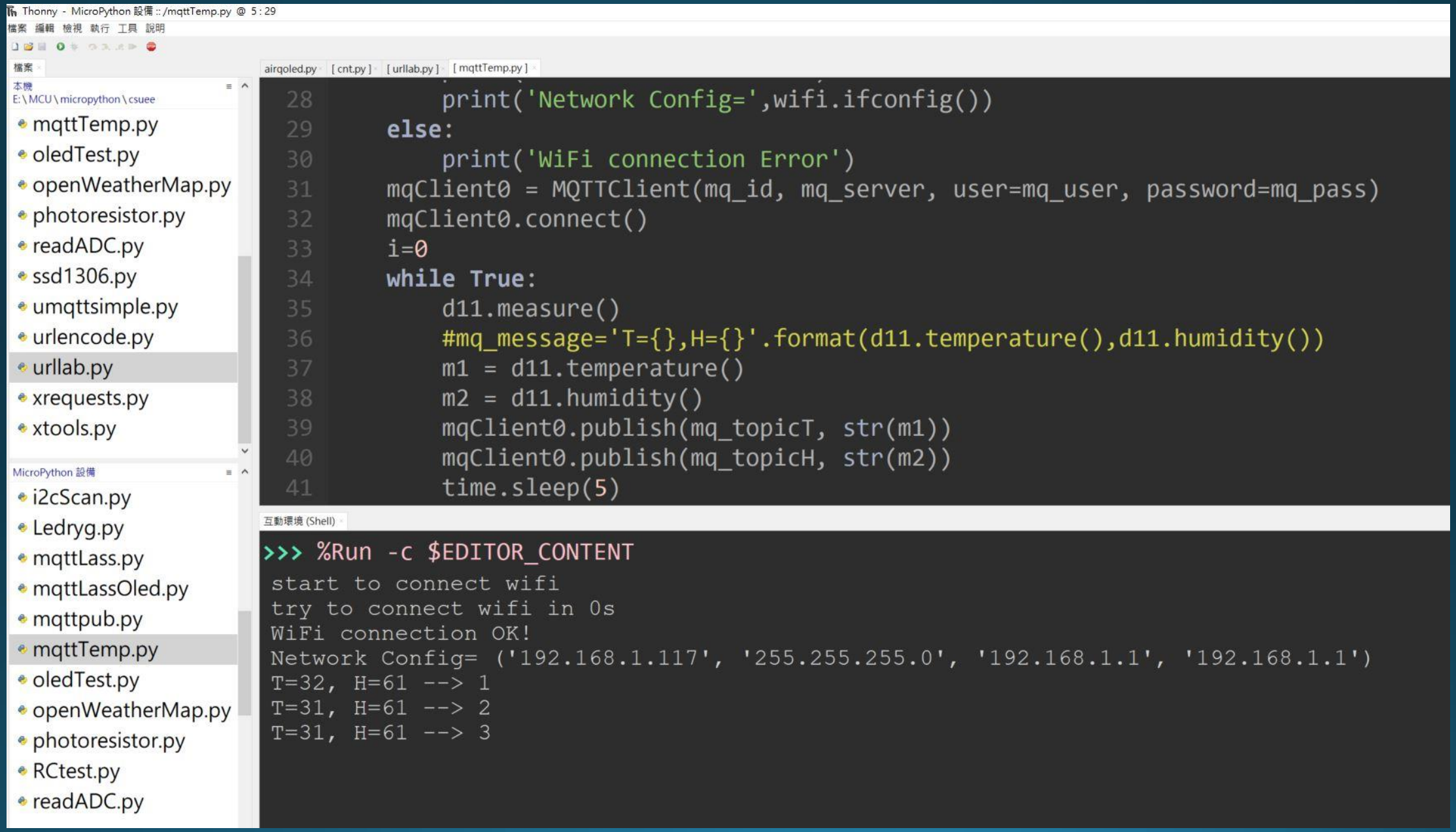

OpenWeather
Weather in your city
Guide
API
Dashboard
Marketplace
Pricing
Maps
Our Initiatives
Partners
Blog
For Business
jumb...
Support
Notice
X
Signed in successfully.
New Products
Services
API keys
Billing plans
Payments
Block logs
My orders
My profile
Ask a question
You can generate as many API keys as needed for your subscription. We accumulate the total load from all of them.
Key
Name
Status
Actions
773d7
jumbokh
Active
a9751c79
csu
Active
Create key
API key name
Generate

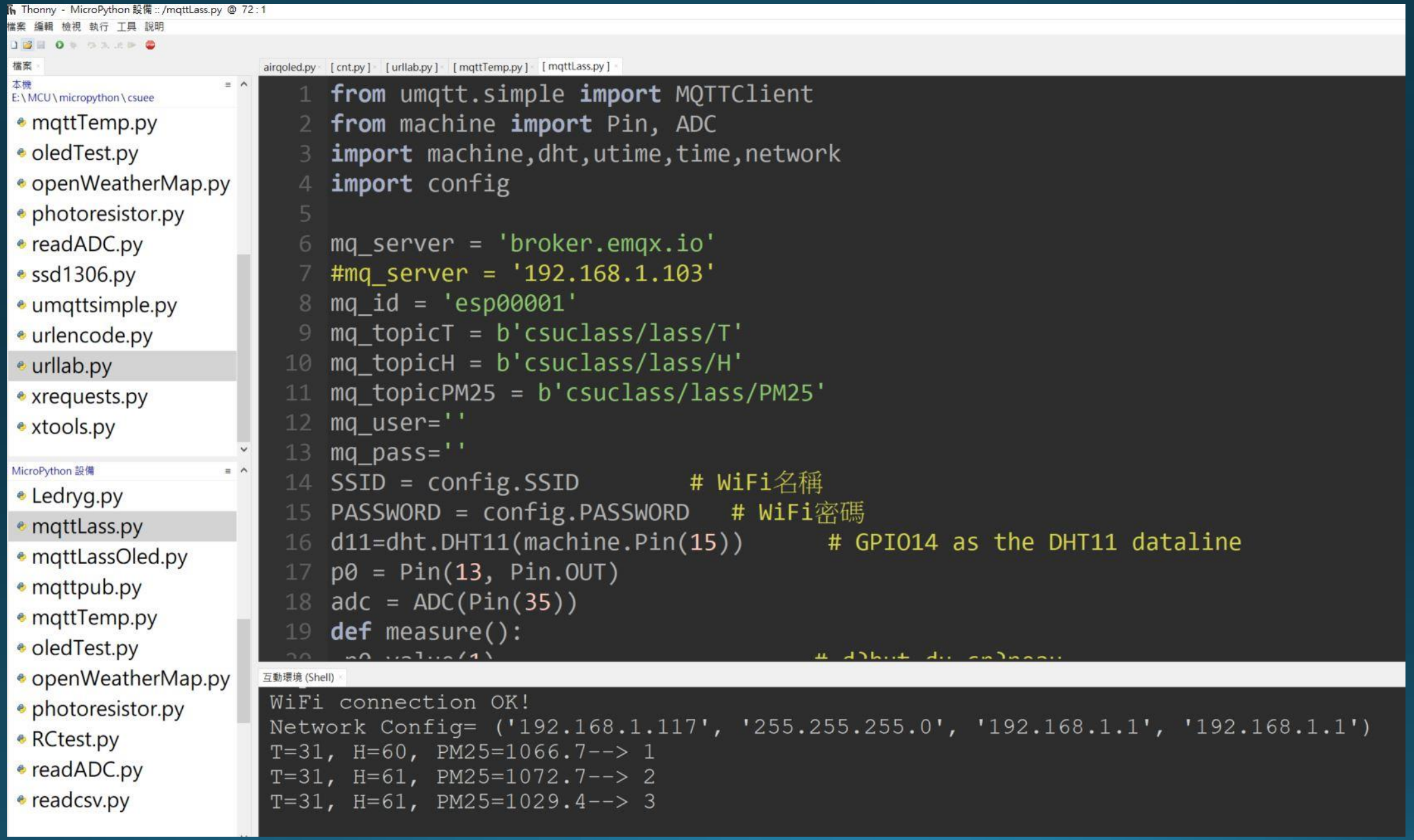

Thonny - MicroPython 設備 :: /openWeatherMap.py @ 26 : 18
檔案 編輯 檢視 執行 工具 說明
檔案
本機
E:\MCU\micropython\csuee
mqttTemp.py
oledTest.py
openWeatherMap.py
photoresistor.py
readADC.py
ssd1306.py
umqttsimple.py
urlencode.py
urllab.py
xrequests.py
xtools.py
MicroPython 設備
2.timeMVDetect.py
3.IrdaLed.py
airqoled.py
am2320.py
boot.py
cnt.py
config.py
dht11try.py
dhtoled.py
DustValue.py
escale.py
airqoled.py
[cnt.py]
[openWeatherMap.py]
[config.py]
ledR = Pin(15, Pin.OUT)
ledG = Pin(12, Pin.OUT)
ledB = Pin(13, Pin.OUT)
def connect_wifi(ssid, passwd):
sta = network.WLAN(network.STA_IF)
sta.active(True)
if not sta.isconnected():
print("Connecting to network...")
sta.connect(ssid, passwd)
while not sta.isconnected():
pass
print("network config:", sta.ifconfig())
互動環境 (Shell)
>>> %Run -c $EDITOR_CONTENT
network config: ('192.168.1.117', '255.255.255.0', '192.168.1.1', '192.168.1.1')
天氣描述: 多雲
目前溫度: 31.06
大氣壓力: 1006
目前溼度: 71
最低溫度: 30.97
最高溫度: 31.13
RED


Thonny - MicroPython 設備 :: /urllab.py @ 14 : 35
檔案 編輯 檢視 執行 工具 說明
檔案
本機
E:\MCU\micropython\csuee
mqttTemp.py
oledTest.py
openWeatherMap.py
photoresistor.py
readADC.py
ssd1306.py
umqttsimple.py
urlencode.py
urllab.py
xrequests.py
xtools.py
MicroPython 設備
readDust.py
scale.py
ssd1306.py
tryAm2320.py
trydht.py
TryHCSR04.py
umqttsimple.py
urlencode.py
urllab.py
weatherrpt.py
xrequests.py
airqoled.py
[cnt.py]
[urllab.py]
1 import network
2 import config
3
4 def connect_wifi(ssid, passwd):
5 sta = network.WLAN(network.STA_IF)
6 sta.active(True)
7 if not sta.isconnected():
8 print("Connecting to network...")
9 sta.connect(ssid, passwd)
10 while not sta.isconnected():
11 pass
互動環境 (Shell)
RED
>>> %Run -c $EDITOR_CONTENT
network config: ('192.168.1.117', '255.255.255.0', '192.168.1.1', '192.168.1.1')
ASP.NET網頁程式設計
陳會安
W101
PHP網頁程式設計
陳會安
W102
Java程式設計
陳會安
P102
Android程式設計
陳會安
M102
>>>


Thonny - MicroPython 設備 :: /mqttTemp.py @ 5 : 29
檔案 編輯 檢視 執行 工具 說明
檔案
本機
E:\MCU\micropython\csuee
mqttTemp.py
oledTest.py
openWeatherMap.py
photoresistor.py
readADC.py
ssd1306.py
umqttsimple.py
urlencode.py
urllab.py
xrequests.py
xtools.py
MicroPython 設備
i2cScan.py
Ledryg.py
mqttLass.py
mqttLassOled.py
mqttpub.py
mqttTemp.py
oledTest.py
openWeatherMap.py
photoresistor.py
RCtest.py
readADC.py
airqoled.py
[cnt.py]
[urllab.py]
[mqttTemp.py]
1 from umqtt.simple import MQTTClient
2 import machine,dht,utime,time,network
3 import config
4
5 mq_server = 'broker.emqx.io'
6 mq_id = 'esp00001'
7 mq_topicT = b'csuclass/lass/T'
8 mq_topicH = b'csuclass/lass/H'
9 mq_topicPM25 = b'csuclass/lass/PM25'
10 mq_user=''
11 mq_pass=''
12 SSID = config.SSID # WiFi名稱
13 PASSWORD = config.PASSWORD # WiFi密碼
14 d11=dht.DHT11(machine.Pin(15)) # GPIO15 as the DHT11 dataline
15 wifi= network.WLAN(network.STA_IF)
16 wifi.active(True)
17
18 try:
19 #wifi.connect(SSID, PASSWORD)
互動環境 (Shell)
>>>

```
    while True:
        d11.measure()
        #mq_message='T={},H={}'.format(d11.temperature(),d11.humidity())
        m1 = d11.temperature()
        m2 = d11.humidity()
        mqClient0.publish(mq_topicT, str(m1))
        mqClient0.publish(mq_topicH, str(m2))
        time.sleep(5)
        i=i+1
        print("T={}, H={} --> {}".format(m1,m2,i))
        if i>20: break
except Exception as e:
    print('mqtt exception error: ',e)
```


Thonny - MicroPython 設備 :: /mqttTemp.py @ 5 : 29
檔案 編輯 檢視 執行 工具 說明
檔案
本機
E:\MCU\micropython\csuee
mqttTemp.py
oledTest.py
openWeatherMap.py
photoresistor.py
readADC.py
ssd1306.py
umqttsimple.py
urlencode.py
urllab.py
xrequests.py
xtools.py
MicroPython 設備
i2cScan.py
Ledryg.py
mqttLass.py
mqttLassOled.py
mqttpub.py
mqttTemp.py
oledTest.py
openWeatherMap.py
photoresistor.py
RCtest.py
readADC.py
airqoled.py
[cnt.py]
[urllab.py]
[mqttTemp.py]
print('Network Config=',wifi.ifconfig())
else:
print('WiFi connection Error')
mqClient0 = MQTTClient(mq_id, mq_server, user=mq_user, password=mq_pass)
mqClient0.connect()
i=0
while True:
d11.measure()
#mq_message='T={},H={}'.format(d11.temperature(),d11.humidity())
m1 = d11.temperature()
m2 = d11.humidity()
mqClient0.publish(mq_topicT, str(m1))
mqClient0.publish(mq_topicH, str(m2))
time.sleep(5)
互動環境 (Shell)
>>> %Run -c $EDITOR_CONTENT
start to connect wifi
try to connect wifi in 0s
WiFi connection OK!
Network Config= ('192.168.1.117', '255.255.255.0', '192.168.1.1', '192.168.1.1')
T=32, H=61 --> 1
T=31, H=61 --> 2
T=31, H=61 --> 3


Thonny - MicroPython 設備 :: /mqttLass.py @ 72 : 1
檔案 編輯 檢視 執行 工具 說明
檔案
本機
E:\MCU\micropython\csuee
mqttTemp.py
oledTest.py
openWeatherMap.py
photoresistor.py
readADC.py
ssd1306.py
umqttsimple.py
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urllab.py
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MicroPython 設備
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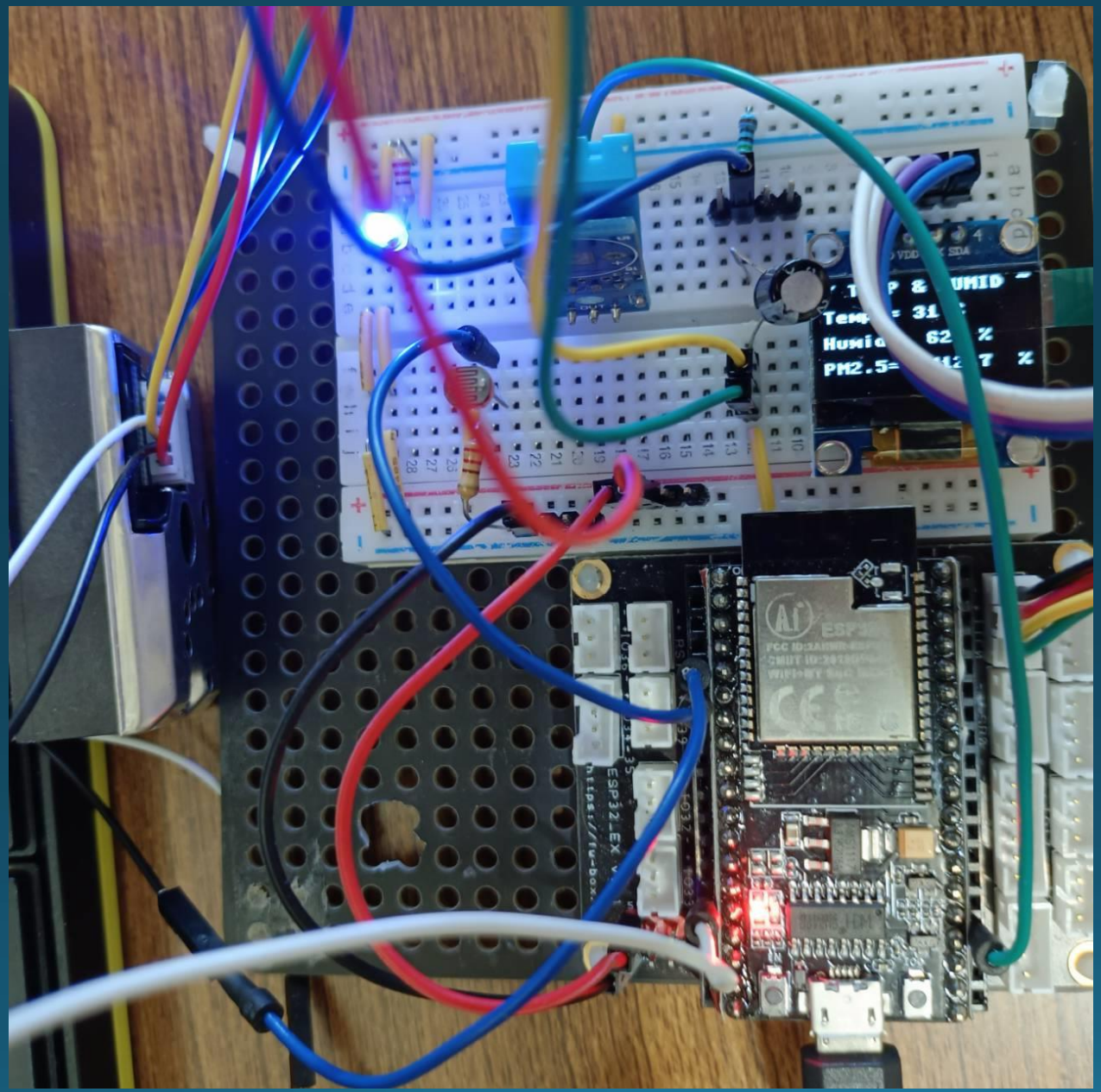
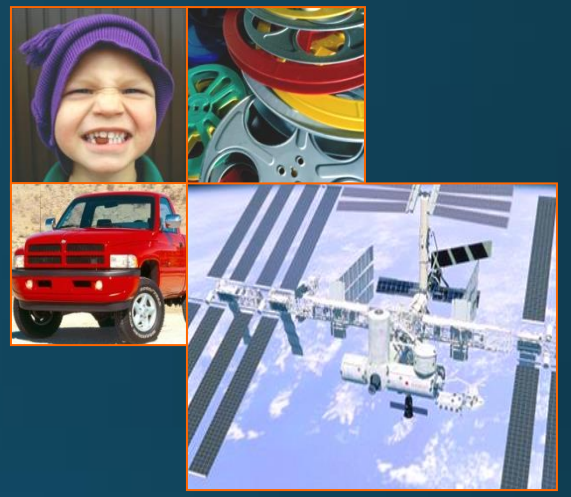
mqttpub.py
mqttTemp.py
oledTest.py
openWeatherMap.py
photoresistor.py
RCtest.py
readADC.py
readcsv.py
airqoled.py
[cnt.py]
[urllab.py]
[mqttTemp.py]
[mqttLass.py]
1 from umqtt.simple import MQTTClient
2 from machine import Pin, ADC
3 import machine,dht,utime,time,network
4 import config
5
6 mq_server = 'broker.emqx.io'
7 #mq_server = '192.168.1.103'
8 mq_id = 'esp00001'
9 mq_topicT = b'csuclass/lass/T'
10 mq_topicH = b'csuclass/lass/H'
11 mq_topicPM25 = b'csuclass/lass/PM25'
12 mq_user=''
13 mq_pass=''
14 SSID = config.SSID # WiFi名稱
15 PASSWORD = config.PASSWORD # WiFi密碼
16 d11=dht.DHT11(machine.Pin(15)) # GPIO14 as the DHT11 dataline
17 p0 = Pin(13, Pin.OUT)
18 adc = ADC(Pin(35))
19 def measure():
互動環境 (Shell)
WiFi connection OK!
Network Config= ('192.168.1.117', '255.255.255.0', '192.168.1.1', '192.168.1.1')
T=31, H=60, PM25=1066.7--> 1
T=31, H=61, PM25=1072.7--> 2
T=31, H=61, PM25=1029.4--> 3


Humid 62 %
PM2.5=
7 %

敬請指導



Q/A

THANK YOU FOR YOUR ADVISE!