

樹莓派入門教學 Raspberry Pi



王啟勳 吳智鴻

國立臺中教育大學 數位內容科技學系

2020/12/08

大綱

- 樹莓派概說
- 樹莓派外觀與硬體功能
- 樹莓派前置作業

樹莓派概說

樹莓派是基於Linux的單晶片電腦，由英國樹莓派基金會開發，目的是以低價硬體及自由軟體促進學校的基本電腦科學教育。

Raspberry（樹莓）源於對微型電腦以水果為基礎命名的傳統。如蘋果機。Pi（派）代表「Python」。因為Python是第一個移植到樹莓派上執行的程式。

樹莓派一顆博通（Broadcom）出產的ARM架構處理器，使用SD卡當作儲存體，樹莓派面積只有一張信用卡大小，體積大概是一個火柴盒大小，操作系統採用開源的Linux系統：Debian、ArchLinux，自帶的Iceweasel、KOffice等軟體，能夠滿足基本的網路瀏覽、文字處理以及電腦學習的需要。分A、B兩種型號。樹莓派支援Python作為主要程式語言，另外支援C語言和Perl等程式語言。

應用：

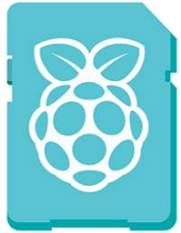
<https://kknews.cc/zh-tw/digital/9o993e8.html>

支援的作業系統



Taiwan Raspberry Pi

<http://www.taiwan-raspberrypi.com/%E4%B8%8B%E8%BC%89/>



NOOBS



RASPBIAN



UBUNTU MATE



SNAPPY UBUNTU CORE



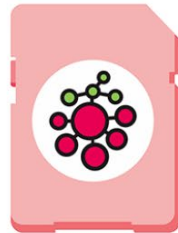
WINDOWS 10 IOT CORE



OSMC



OPENELEC

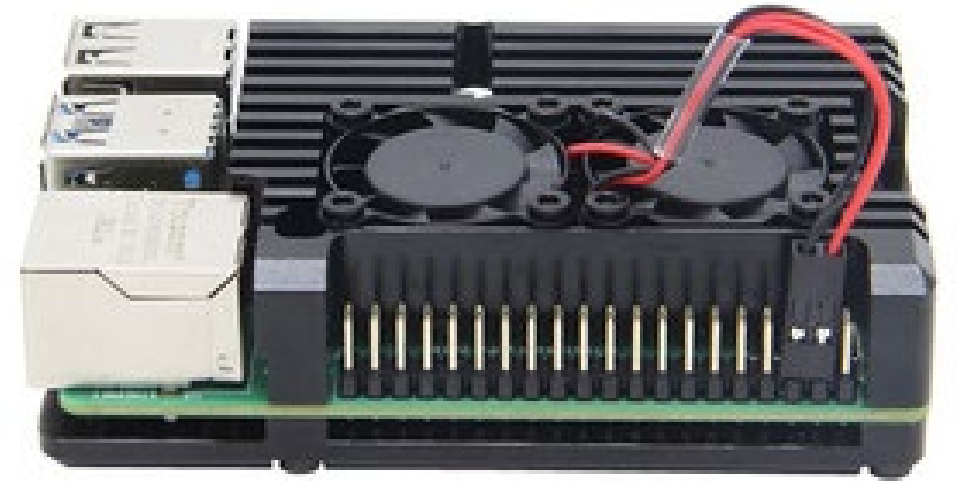
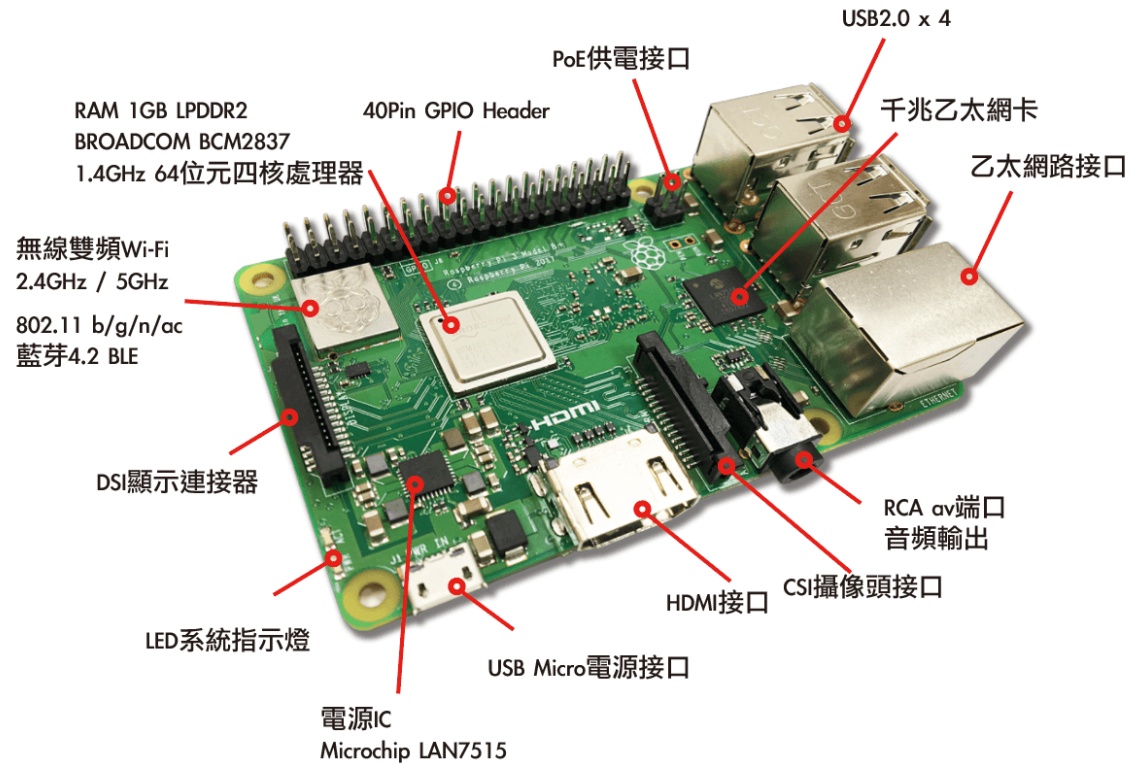


PINET



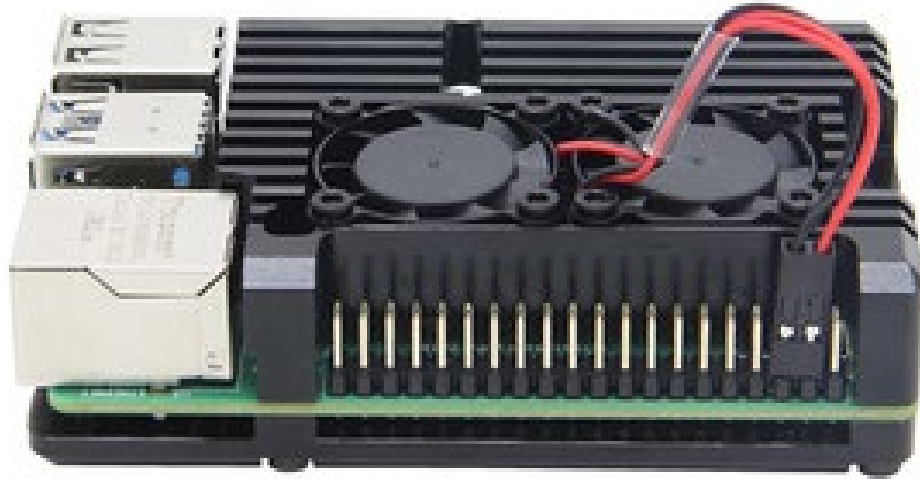
RISC OS

樹莓派外觀與硬體功能



樹莓派前置作業

Step1:首先,將風扇線依圖插入針腳位置



Raspberry Pi B+
B+ J8 GPIO Header

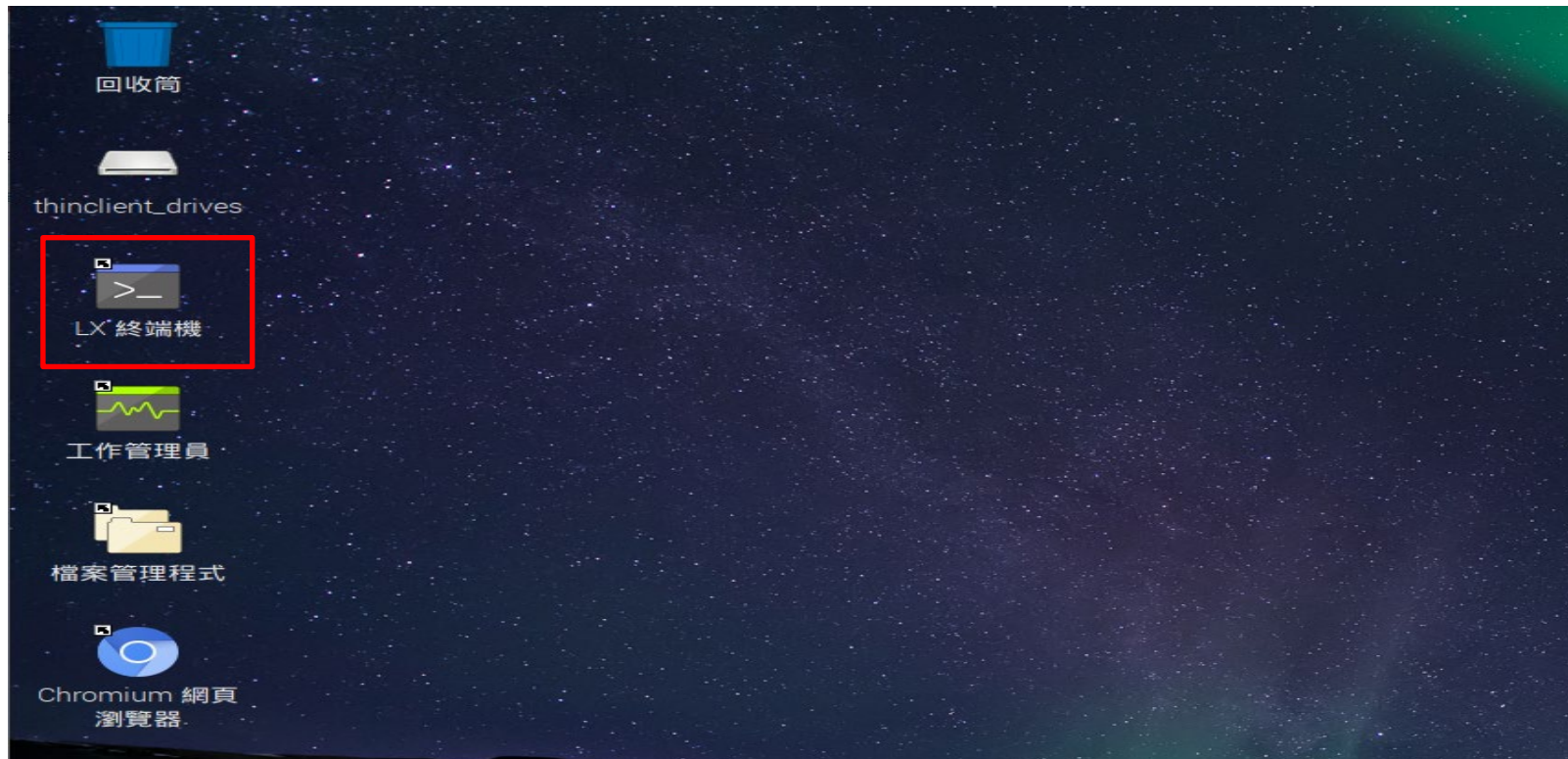
	Pin No.		
3.3V	1	2	5V
GPIO2	3	4	5V
GPIO3	5	6	GND
GPIO4	7	8	GPIO14
GND	9	10	GPIO15
GPIO17	11	12	GPIO18
GPIO27	13	14	GND
GPIO22	15	16	GPIO23
3.3V	17	18	GPIO24
GPIO10	19	20	GND
GPIO9	21	22	GPIO25
GPIO11	23	24	GPIO8
GND	25	26	GPIO7
DNC	27	28	DNC
GPIO5	29	30	GND
GPIO6	31	32	GPIO12
GPIO13	33	34	GND
GPIO19	35	36	GPIO16
GPIO26	37	38	GPIO20
GND	39	40	GPIO21

紅色插入第
4腳位

黑色插入第
6腳位

樹莓派前置作業

Step2:將1.鍵盤滑鼠插入樹莓派中(usb),2.連接螢幕線(HDMI)以及3.插上電源,即可進入樹莓派



樹莓派前置作業

Step3:點選**LX終端機**,進入後,輸入:sudo raspi-config ,鍵入enter

Step4:進入後,選擇 “Change User Password” (就是第一個),選好後鍵入enter

帳號：**pi** 密碼：**pi**



```
pi@raspberrypi: ~  
檔案(F) 編輯(E) 分頁(T) 說明(H)  
pi@raspberrypi:~ $ sudo raspi-config
```

```
Raspberry Pi Software Configuration Tool (raspi-config)  
1 Change User Password Change password for the current user  
2 Network Options Configure network settings  
3 Boot Options Configure options for start-up  
4 Localisation Options Set up language and regional settings to match your location  
5 Interfacing Options Configure connections to peripherals  
6 Overclock Configure overclocking for your Pi  
7 Advanced Options Configure advanced settings  
8 Update Update this tool to the latest version  
9 About raspi-config Information about this configuration tool  
  
<Select> <Finish>
```


樹莓派前置作業

Step5:會告知你要改變新密碼,按enter

Step6:輸入密碼,按enter,再次輸入密碼,按enter,會顯示密碼修改成功,按enter

Step7:按tab到finish,然後按enter跳出

帳號：pi 密碼：pi

```
pi@raspberrypi:~ $ sudo raspi-config
pi@raspberrypi:~ $ sudo raspi-config
輸入新的 UNIX 密碼：
再次輸入新的 UNIX 密碼： █
```

```
Password changed successfully

<確定>
```

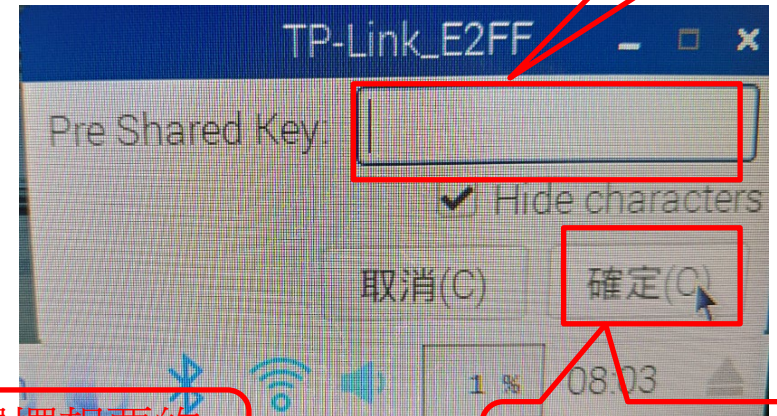
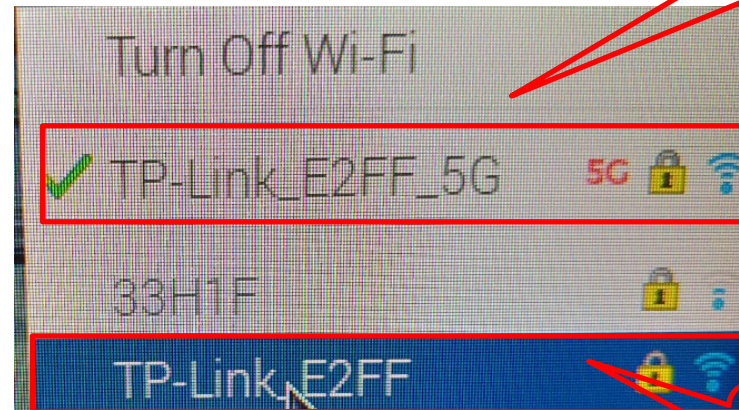
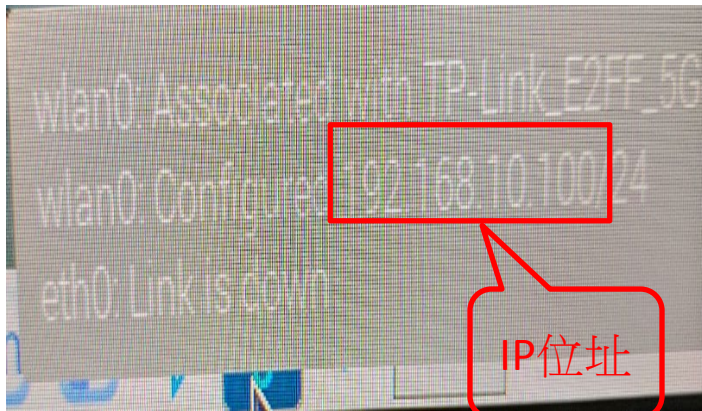
```
raspberrypi |> sudo raspi-config tool (raspi-config) |
1 Change User Password Change password for the current user
2 Network Options Configure network settings
3 Boot Options Configure options for start-up
4 Localisation Options Set up language and regional settings to match your location
5 Interfacing Options Configure connections to peripherals
6 Overclock Configure overclocking for your Pi
7 Advanced Options Configure advanced settings
8 Update Update this tool to the latest version
9 About raspi-config Information about this configuration tool

<Select> <Finish>
```

樹莓派前置作業

Step8:在桌面右下方網路的圖示

- 滑鼠指標在網路圖示上方時會顯示IP位址,請先記下
- 在網路圖示上按滑鼠左鍵,則會顯示現在作用的網路與可選擇的網路
- 選擇k410的網路,然後按左鍵
- 鍵入密碼,按確定
- 觀察是否k410已是作用中的網路



選擇想要的
網路

最後按確定

安裝XRDP遠端桌面

樹莓派前置作業(安裝遠端桌面)

Step9:進入LX終端機,輸入指令

更新套件

`sudo apt-get update`

安裝遠端桌面

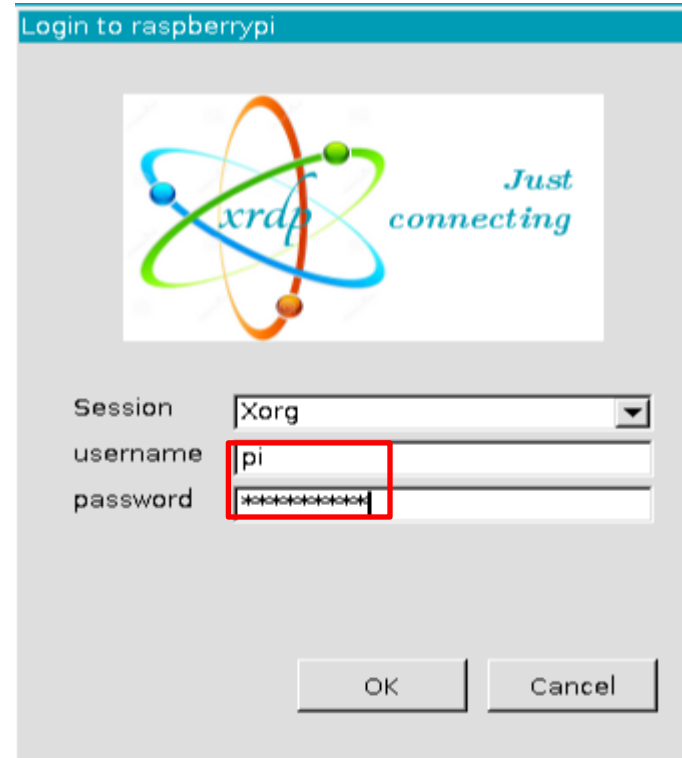
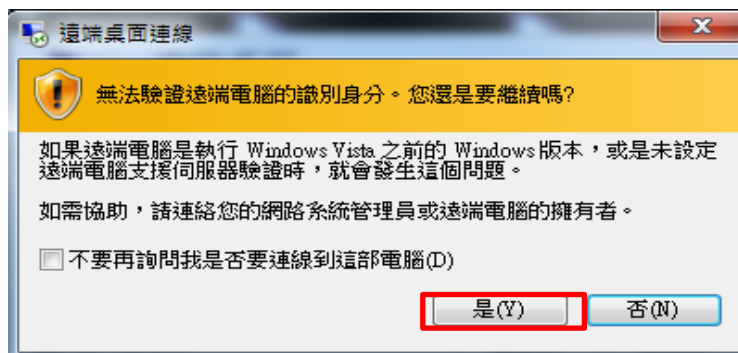
`sudo apt-get install xrdp`

`sudo reboot`重新開機

```
pi@raspberrypi:~ $ sudo apt-get install xrdp -y
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  guacamole
The following NEW packages will be installed:
  xrdp
0 upgraded, 1 newly installed, 0 to remove and 1 not upgraded.
Need to get 0 B/402 kB of archives.
After this operation, 2,728 kB of additional disk space will be used.
Selecting previously unselected package xrdp.
(Reading database ... 162536 files and directories currently installed.)
Preparing to unpack .../xrdp_0.9.1-9+deb9u2_armhf.deb ...
Unpacking xrdp (0.9.1-9+deb9u2) ...
Processing triggers for libc-bin (2.24-11+deb9u3) ...
Setting up xrdp (0.9.1-9+deb9u2) ...
Processing triggers for systemd (232-25+deb9u2) ...
Processing triggers for man-db (2.7.6.1-2) ...
Processing triggers for libc-bin (2.24-11+deb9u3) ...
pi@raspberrypi:~ $
```


樹莓派前置作業

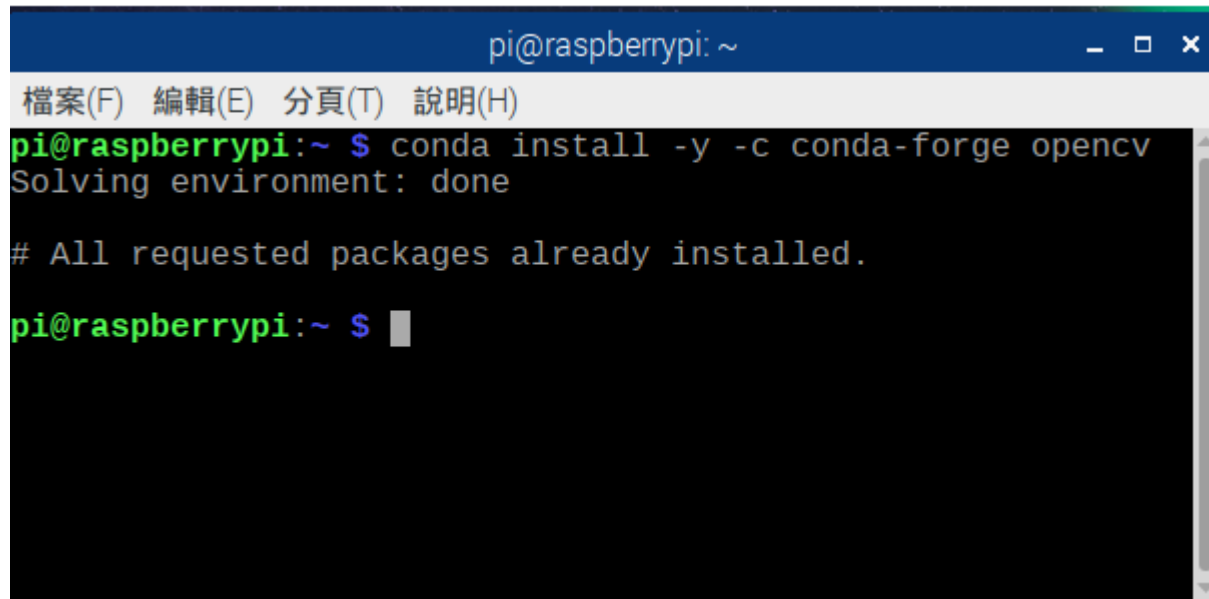
Step10: 打開windows的遠端桌面連線(開始---附屬應用程式中), 輸入剛剛記的ip位址, 以及帳號pi以及自己更改的密碼登入, 現在就可以用鍵盤跟滑鼠還有樹莓派的圖形化介面了。



測試Jupyter 與Opencv

樹莓派前置作業(測試Jupyter 與Opencv)

Step11:打開LX終端機,打入 `conda install -y -c conda-forge opencv`

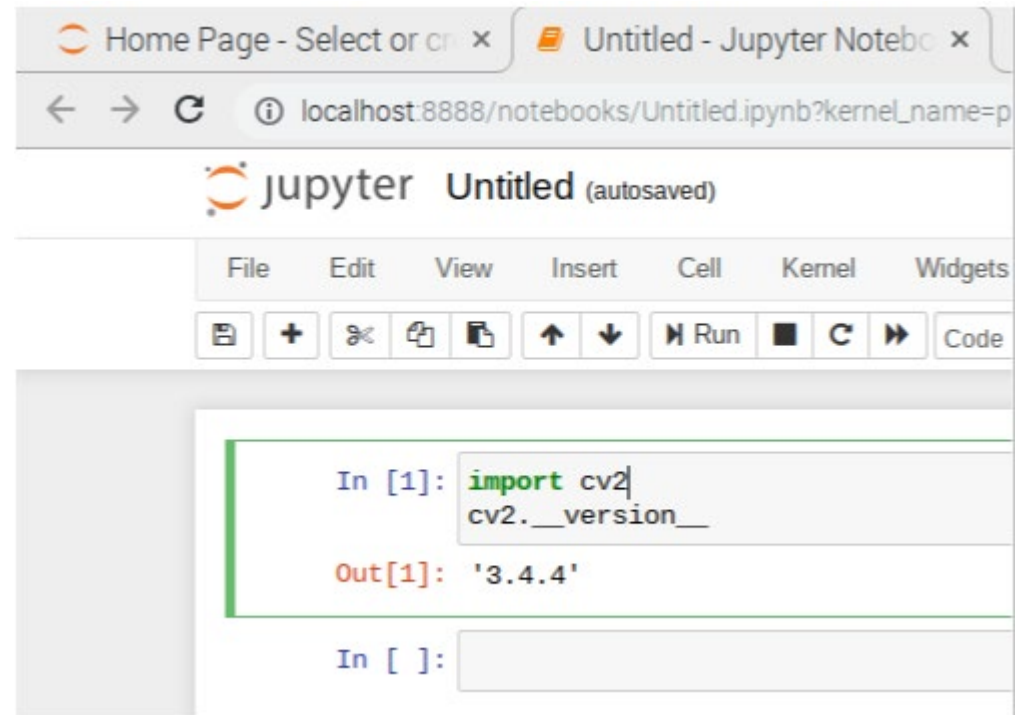


```
pi@raspberrypi: ~  
檔案(F) 編輯(E) 分頁(T) 說明(H)  
pi@raspberrypi:~ $ conda install -y -c conda-forge opencv  
Solving environment: done  
  
# All requested packages already installed.  
pi@raspberrypi:~ $ █
```

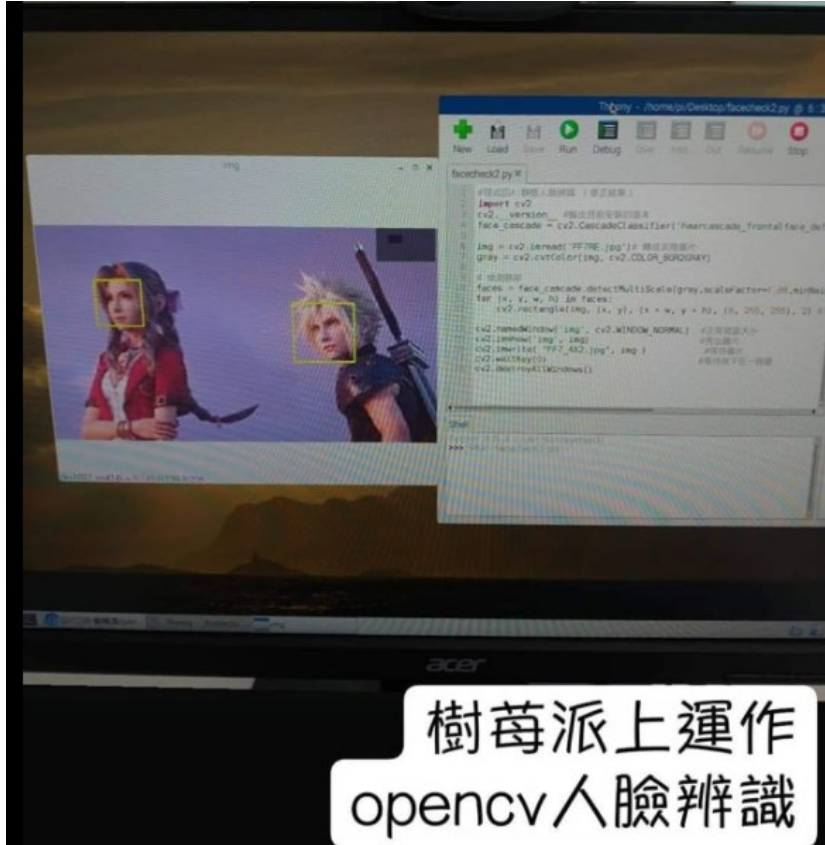

樹莓派前置作業(測試Jupyter 與Opencv)

Step12:打入jupyter notebook
進入jupyter後.. 打入測試程式,看有無錯誤

```
pi@raspberrypi: ~  
檔案(F) 編輯(E) 分頁(T) 說明(H)  
pi@raspberrypi:~ $ conda install -y -c conda-forge opencv  
Solving environment: done  
  
# All requested packages already installed.  
  
pi@raspberrypi:~ $ jupyter notebook  
[I 21:11:59.929 NotebookApp] Serving notebooks from local d  
irectory: /home/pi  
[I 21:11:59.930 NotebookApp] The Jupyter Notebook is runnin  
g at:  
[I 21:11:59.930 NotebookApp] http://localhost:8888/?token=0  
bb96648243f793da27f51e6af277653c0a45ee4089d4797  
[I 21:11:59.930 NotebookApp] or http://127.0.0.1:8888/?tok
```



成功畫面



練習一

第二種連接樹莓派的方式

原因:常常會出現一種情況,就是鍵盤滑鼠並不是USB介面而是PS/2介面的,在這種情況下,需要會排解問題.

第二種連接樹莓派的方式

step1將樹莓派的SD卡拔出插入卡套中,在插入主機的讀卡機中,打開sd卡裡面的config.txt檔案(用純文件檔打開),在最後一行加入dtoverlay=pi3-disable-bt 然後存檔再將sd卡重新插回樹莓派中



```
D:\config.txt - Notepad++
# config.txt
26
27 # uncomment to force a specific HDMI mode (this will force VGA)
28 #hdmi_group=1
29 #hdmi_mode=1
30
31 # uncomment to force a HDMI mode rather than DVI. This can make audio work in
32 # DMT (computer monitor) modes
33 #hdmi_drive=2
34
35 # uncomment to increase signal to HDMI, if you have interference, blanking, or
36 # no display
37 #config_hdmi_boost=4
38
39 # uncomment for composite PAL
40 #sdtv_mode=2
41
42 #uncomment to overclock the arm. 700 MHz is the default.
43 #arm_freq=800
44
45 # Uncomment some or all of these to enable the optional hardware interfaces
46 #dtparam=i2c_arm=on
47 #dtparam=i2s=on
48 #dtparam=spi=on
49
50 # Uncomment this to enable the lirc-rpi module
51 #dtoverlay=lirc-rpi
52
53 # Additional overlays and parameters are documented /boot/overlays/README
54
55 # Enable audio (loads snd_bcm2835)
56 dtparam=audio=on
57 dtoverlay=pi3-disable-bt

Normal text file      length: 1,614  lines: 57      Ln: 57  Col: 1  Sel: 24 | 1      Unix (LF)      UTF-8      IN$
```

第二種連接樹莓派的方式

Usb轉ttl傳輸線(USB-TTL線)的六條線代表的意義:

紅色:VCC(5V)

黑色:GND

白色:RXD(In 下載 , RS232)

綠色:TXD(Out 上傳 , RS232)

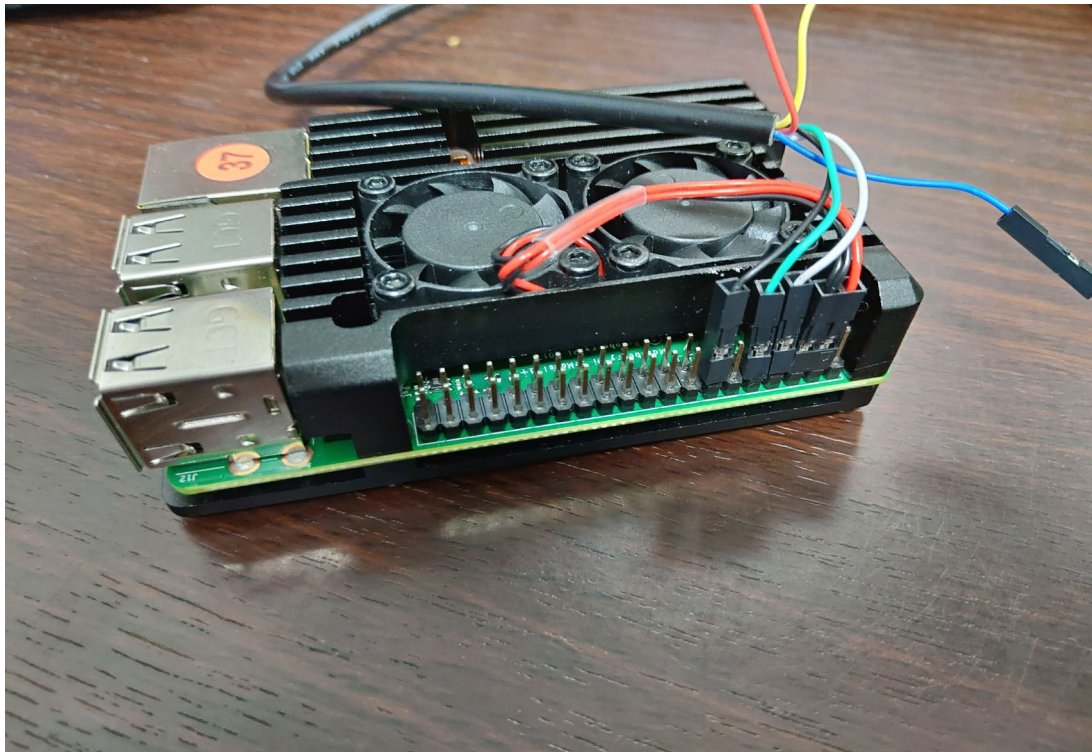
黃色:RTS (IEEE 802.11的Request to send)

藍色:CTS (IEEE 802.11的Clear to send)



第二種連接樹莓派的方式

Step2:將usb轉ttl傳輸線 白色 綠色 黑色線插好



Raspberry Pi B+
B+ J8 GPIO Header

	Pin No.		
3.3V	1	2	5V
GPIO2	3	4	5V
GPIO3	5	6	GND
GPIO4	7	8	GPIO14
GND	9	10	GPIO15
GPIO17	11	12	GPIO18
GPIO27	13	14	GND
GPIO22	15	16	GPIO23
3.3V	17	18	GPIO24
GPIO10	19	20	GND
GPIO9	21	22	GPIO25
GPIO11	23	24	GPIO8
GND	25	26	GPIO7
DNC	27	28	DNC
GPIO5	29	30	GND
GPIO6	31	32	GPIO12
GPIO13	33	34	GND
GPIO19	35	36	GPIO16
GPIO26	37	38	GPIO20
GND	39	40	GPIO21

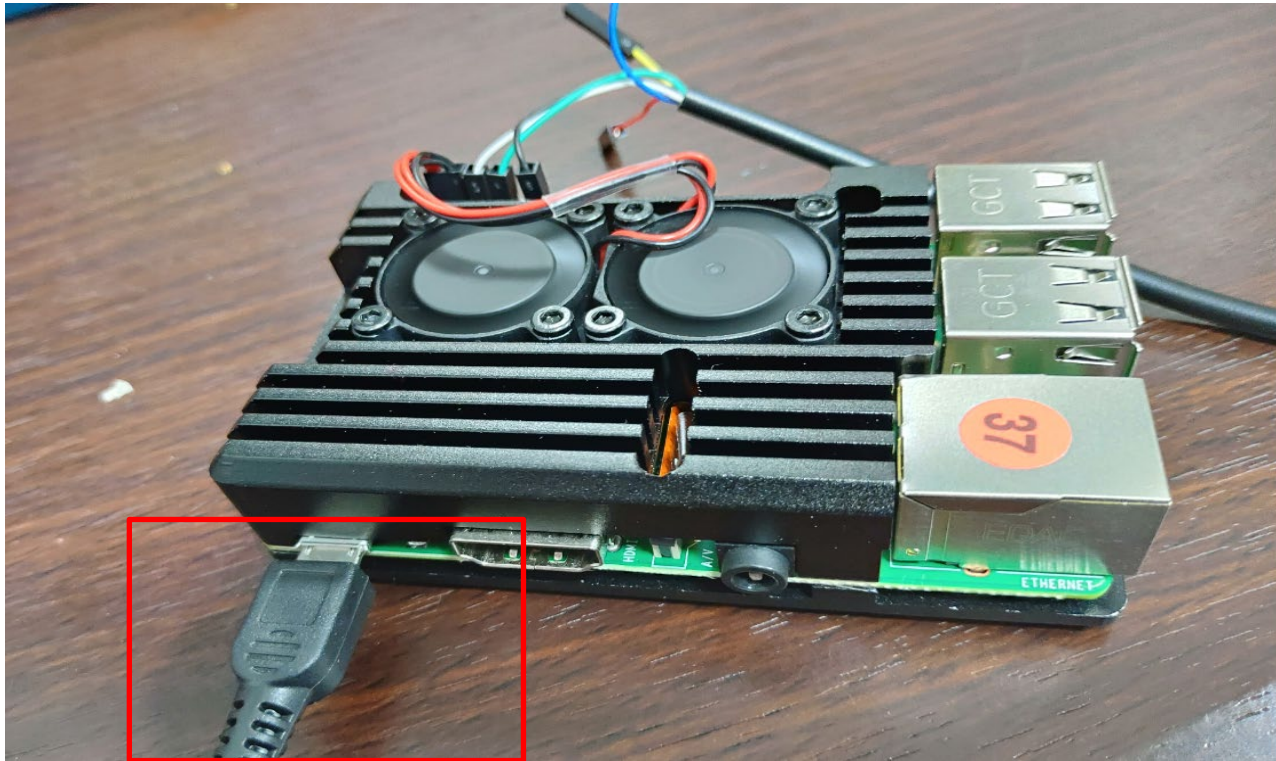
白色插入第
8腳位

綠色插入第
10腳位

黑色插入第
14腳位

第二種連接樹莓派的方式

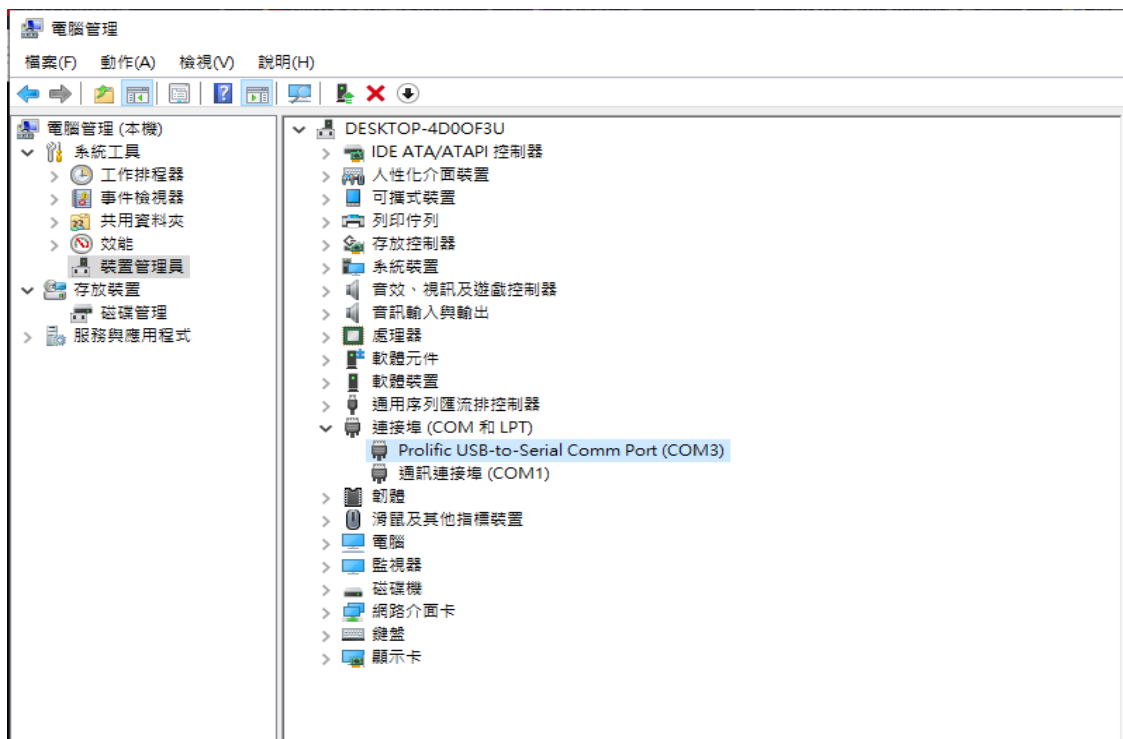
Step3:將usb-ttl連接到主機,並且將樹莓派的電源線接好,最後插上電源



設定USB-TTL連線

第二種連接樹莓派的方式 (設定USB-TTL連線)

Step4:在我的本機按右鍵—點選管理—選擇裝置管理員,檢查是否有新連接的com(此圖示表示樹莓派連接在COM3),如果沒有安裝驅動程式,請[按此下載](#)安裝









The screenshot shows the Prolific website's product page for the PL2303 Windows Driver. The 'Products' dropdown menu is open, showing 'SIO (Smart-IO)', 'Power IoT', and 'FxH (Fan & Hall)'. The 'SIO (Smart-IO)' option is selected, leading to the 'USB to UART/Serial/Printer > PL2303 Windows Driver Download' page. The page features a table of driver files, with the 'PL23XX_Prolific_DriverInstaller_v200.zip' file highlighted by a red box. Below the table, there is a section for 'Windows Driver Installer Setup Program' with detailed version and build information.

File Name	Release Date	Version	File Size
PL23XX_Prolific_DriverInstaller_v200.zip	2019/08/15	2.0.0	10951.67KB

Windows Driver Installer Setup Program
(For PL2303 HXD, SA, TA, TB, RA GC, GS, GT, GL, GE, GD versions)
Installer version & Build date: 2.0.0 (2019-08-15)
Windows Vista/7/8.1/10 (32 & 64-bit) WDF WHQL Driver: v3.8.31.0 (08/11/2019) / v5.0.8.0 (07/03/2019)
- Windows 10 Certified WHQL Driver (TH1 1507, TH2 1511, RS1 1607, RS2 1703, RS3 1709, RS4 1803, RS5 1809, 19H1 1903 versions)
- Windows Vista, 7, 8.1 Certified WHQL Driver
- Compatible with Windows Server 2016, Server2008, 2008R2, 2012, 2012R2
- Auto-download driver via Windows Update (Windows 7, 8.1, 10)
Windows XP (32 & 64-bit) WDM WHQL Driver: v3.8.31.1 (08/11/2019) / v5.0.8.1 (07/08/2019)
- Windows XP Certified WHQL Driver
- Compatible with Windows 2000SP4 & Server2003

第二種連接樹莓派的方式 (設定USB-TTL連線)---解壓縮後檔案

安裝驅動

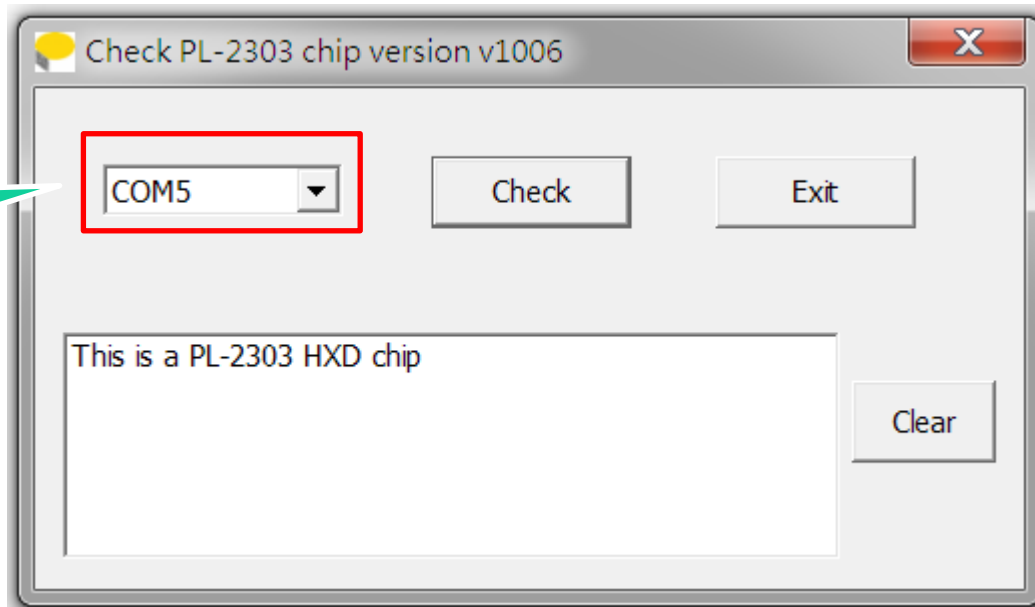
 PL23XX-M_LogoDriver_Setup_v200_2...	2019/8/15 下午 0...	應用程式	9,974 KB
 PL2303 Windows Driver Manual v1.23.0	2019/6/17 下午 0...	Adobe Acrobat 文...	1,815 KB
 PL2303_CheckChipVersion_v1006	2013/1/15 下午 0...	應用程式	208 KB
 PL2303_DriverInstallerv1.23.0_Release..	2019/8/15 下午 0...	文字文件	15 KB
 PL2303CheckChipVersion_ReadMe	2015/6/17 下午 1...	文字文件	2 KB
 PL2303G_DriverInstallerv1.4.0_Relea	2019/7/16 下午 0...	文字文件	5 KB

檢查程式

第二種連接樹莓派的方式(設定USB-TTL 連線)---檢查在哪一個COM

出現這個就是成功

表示在
COM5



第二種連接樹莓派的方式(設定USB-TTL 連線)---下載PUTTY

Step5:下載 PUTTY

[按此下載](#)

Alternative binary files

The installer packages above will provide versions of all of these (except PuTTYtel), but you can download the binaries directly from the links below. (Not sure whether you want the 32-bit or the 64-bit version? Read the [FAQ entry](#).)

putty.exe (the SSH and Telnet client itself)

32-bit:	putty.exe	(or by FTP)	(signature)
64-bit:	putty.exe	(or by FTP)	(signature)

pscp.exe (an SCP client, i.e. command-line secure file copy)

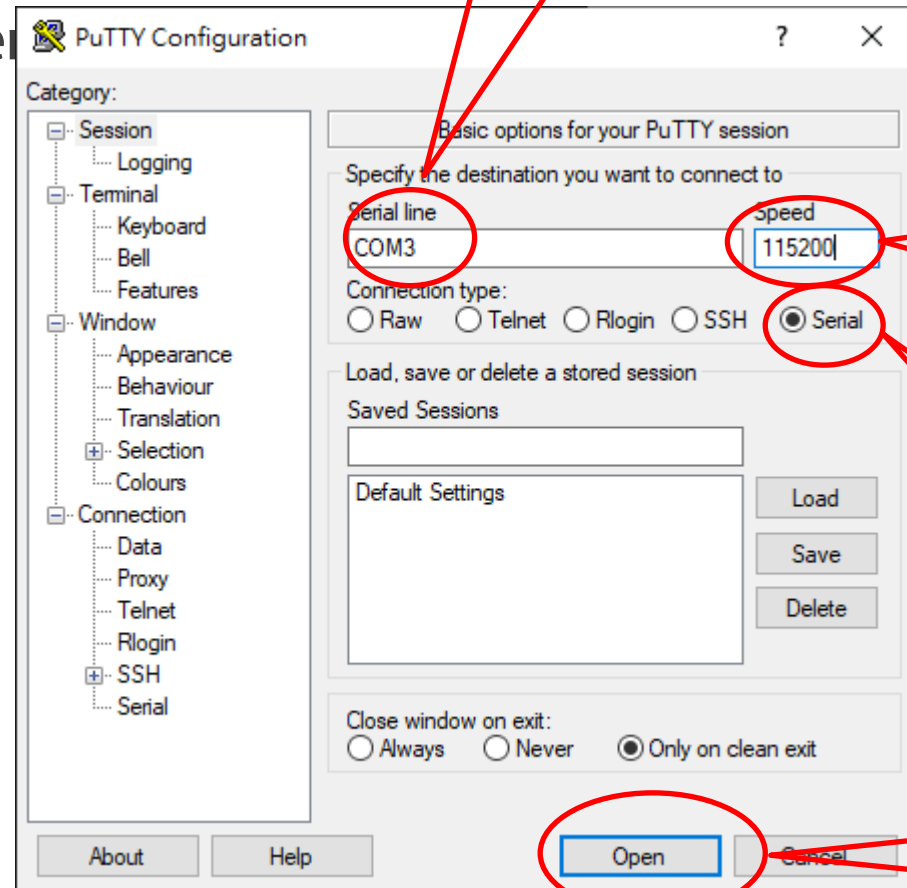
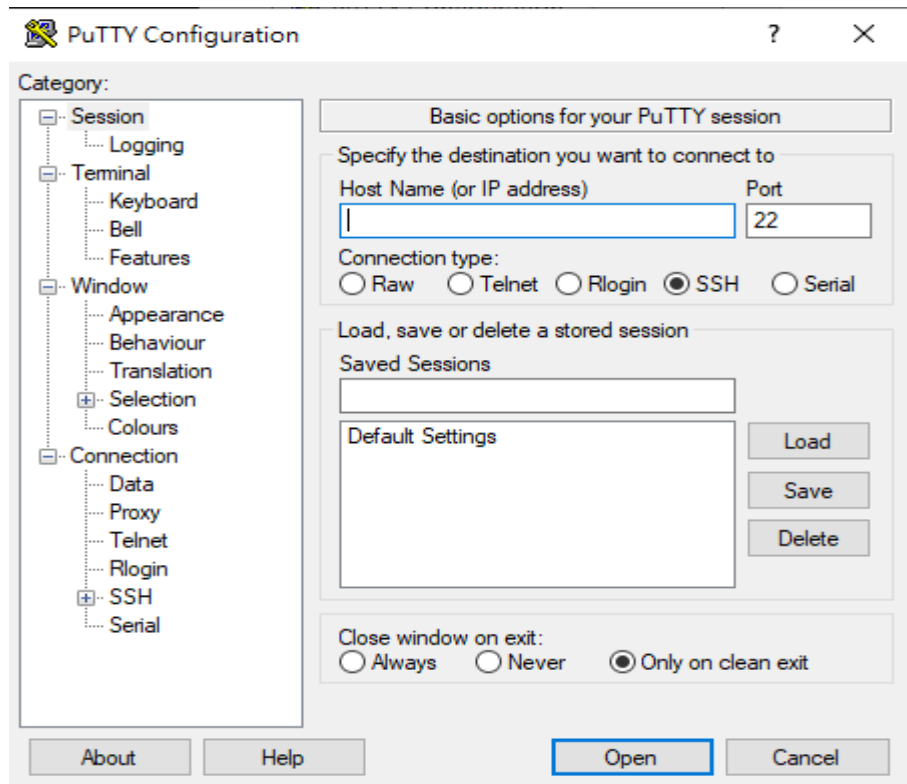
32-bit:	pscp.exe	(or by FTP)	(signature)
64-bit:	pscp.exe	(or by FTP)	(signature)

psftp.exe (an SFTP client, i.e. general file transfer sessions much like FTP)

32-bit:	psftp.exe	(or by FTP)	(signature)
64-bit:	psftp.exe	(or by FTP)	(signature)

第二種連接樹莓派的方式(設定USB-TTL連線)---修改PUTTY設定

Step6:開啟PUTTY,修改如右圖,然後按Open



第二步:改埠號

第三步:改鮑率

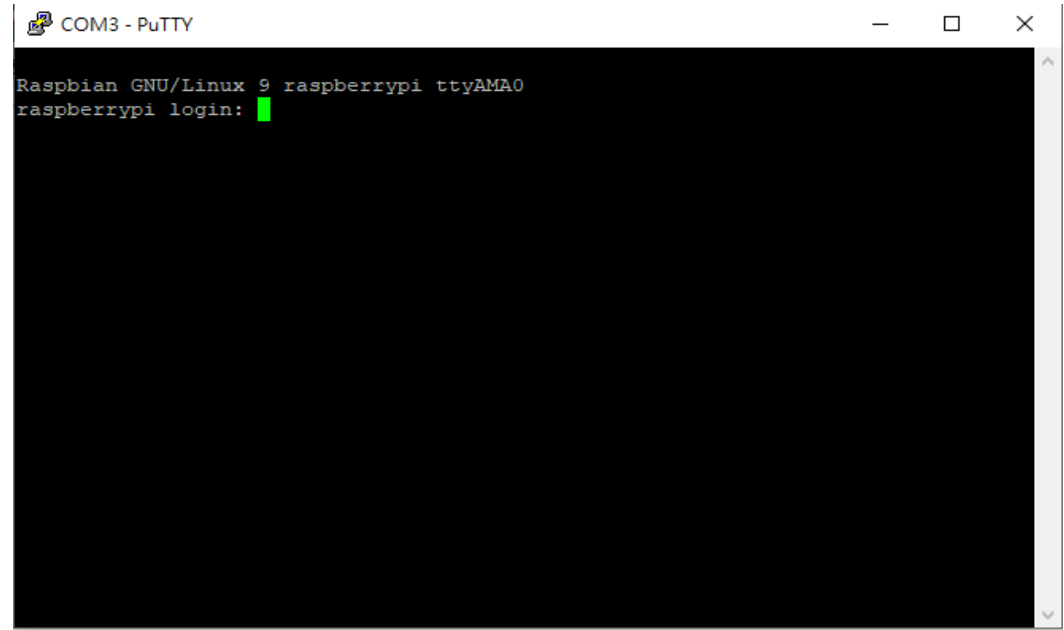
第一步:改成Serial

第四步:按Open

設定WIFI

第二種連接樹莓派的方式(設定WIFI)

Step7:會出現如下圖,此時按Enter會出現如右圖,表示可以跟樹莓派進行TTL傳輸了



第二種連接樹莓派的方式(設定WIFI)

Step8:接著將手機設為基地台(密碼設為無),在putty的連線畫面中登入帳號:pi密碼:pi,接著打入一行指令:

Ifconfig 以確認無線網路的ip位址(在wlan0:)

```
COM3 - PuTTY
Raspbian GNU/Linux 9 raspberrypi ttyAMA0
raspberrypi login: pi
密碼:
上一次登入: 二 12月 3 20:22:36 CST 2019在 ttyAMA0
Linux raspberrypi 4.14.98-v7+ #1200 SMP Tue Feb 12 20:27:48 GMT 2019 armv7l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
pi@raspberrypi:~$
```

```
COM3 - PuTTY
TX packets 0 bytes 0 (0.0 B)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
inet 127.0.0.1 netmask 255.0.0.0
inet6 ::1 prefixlen 128 scopeid 0x10<host>
loop txqueuelen 1000 (Local Loopback)
RX packets 9 bytes 524 (524.0 B)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 9 bytes 524 (524.0 B)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlan0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
inet 192.168.43.194 netmask 255.255.255.0 broadcast 192.168.43.255
inet6 2402:7500:452:b29:a621:541b:5f21:4979 prefixlen 64 scopeid 0x0<g
lobal>
inet6 fe80::1a7b:9429:a371:40ed prefixlen 64 scopeid 0x20<link>
ether b8:27:eb:c1:b1:52 txqueuelen 1000 (Ethernet)
RX packets 20 bytes 1972 (1.9 KiB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 53 bytes 8287 (8.0 KiB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

pi@raspberrypi:~$
```

第二種連接樹莓派的方式 (設定Wifi)

Step9: 鍵入 `sudo raspi-config` 以開始設定wifi

Step10: 上下鍵選擇 2 Network Options 按Enter

Step11: 上下鍵選擇 N2 wi-fi 按Enter

```
COM3 - PuTTY
Raspbian GNU/Linux 9 raspberrypi ttyAMA0
raspberrypi login: pi
密碼:
上一次登入: 三 12月  4 09:08:54 CST 2019在 ttyAMA0
Linux raspberrypi 4.14.98-v7+ #1200 SMP Tue Feb 12 20:27:48 GMT 2019 armv7l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
pi@raspberrypi:~$ sudo raspi-config
```

```
COM3 - PuTTY
Raspberry Pi 3 Model B Plus Rev 1.3

| Raspberry Pi Software Configuration Tool (raspi-config) |
+-----+
1 Change User Password      Change password for the current u
2 Network Options           Configure network settings
3 Boot Options              Configure options for start-up
4 Localisation Options      Set up language and regional sett
5 Interfacing Options       Configure connections to peripher
6 Overclock                 Configure overclocking for your P
7 Advanced Options          Configure advanced settings
8 Update                    Update this tool to the latest ve
9 About raspi-config        Information about this configurat

<Select>                    <Finish>
```

```
COM3 - PuTTY

| Raspberry Pi Software Configuration Tool (raspi-config) |
+-----+
N1 Hostname                  Set the visible name for this Pi
N2 Wi-fi                     Enter SSID and passphrase
N3 Network interface names   Enable/Disable predictable networ

<Select>                    <Back>
```

第二種連接樹莓派的方式(設定Wifi)

Step12:鍵入wifi名稱,按下鍵移到確定,按enter

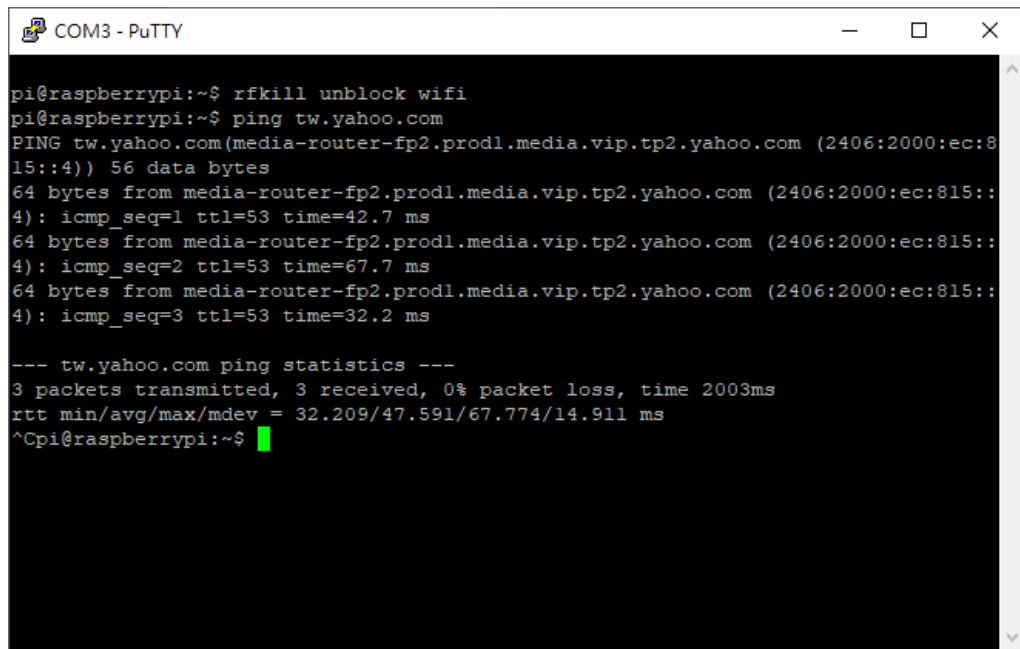
Step13:鍵入密碼,如果沒有密碼就空白,按下鍵移到確定,按enter,接著按兩下Tab選到Finish
按Enter跳出



第二種連接樹莓派的方式(設定Wifi)

Step14:鍵入rfkill unblock wifi 啟用wifi

Step15:鍵入ping tw.yahoo.com 測試有無成功

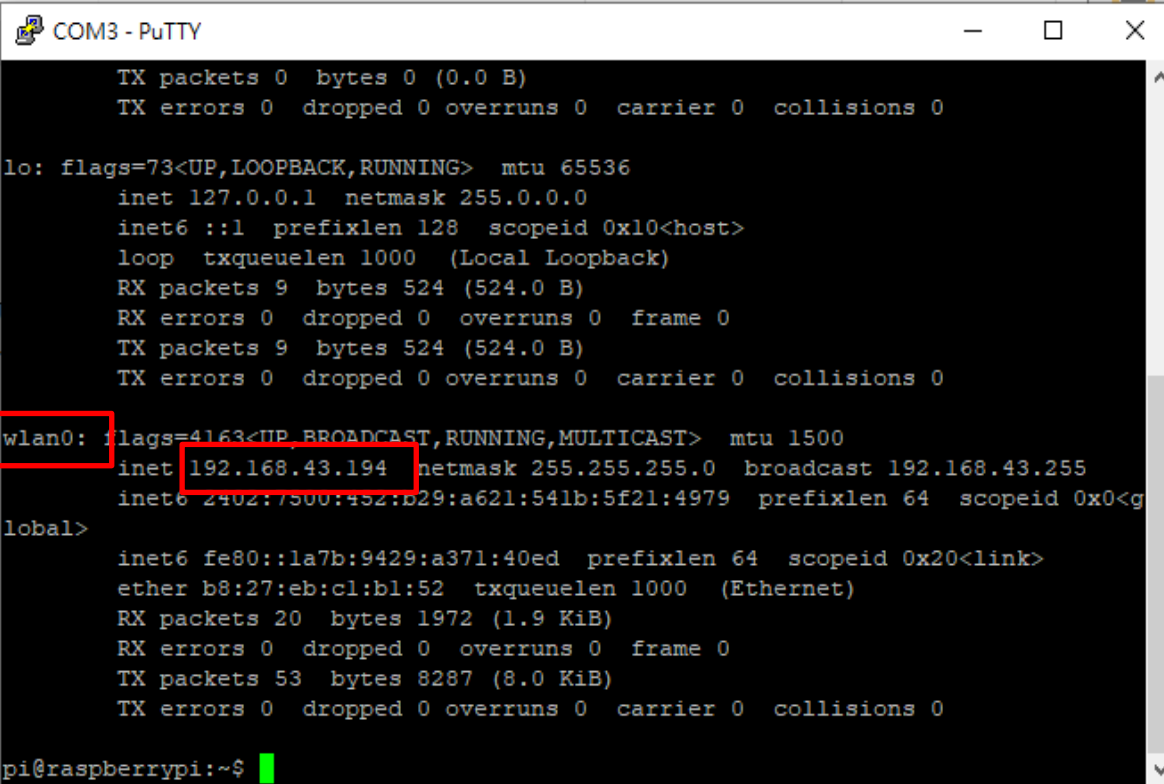


```
COM3 - PuTTY
pi@raspberrypi:~$ rfkill unblock wifi
pi@raspberrypi:~$ ping tw.yahoo.com
PING tw.yahoo.com(media-router-fp2.prodl.media.vip.tp2.yahoo.com (2406:2000:ec:815::4)) 56 data bytes
64 bytes from media-router-fp2.prodl.media.vip.tp2.yahoo.com (2406:2000:ec:815::4): icmp_seq=1 ttl=53 time=42.7 ms
64 bytes from media-router-fp2.prodl.media.vip.tp2.yahoo.com (2406:2000:ec:815::4): icmp_seq=2 ttl=53 time=67.7 ms
64 bytes from media-router-fp2.prodl.media.vip.tp2.yahoo.com (2406:2000:ec:815::4): icmp_seq=3 ttl=53 time=32.2 ms

--- tw.yahoo.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 32.209/47.591/67.774/14.911 ms
^Cpi@raspberrypi:~$
```

第二種連接樹莓派的方式(設定Wifi)

Step16:鍵入ifconfig 查詢wlan0的ip,並記住



```
COM3 - PuTTY
TX packets 0 bytes 0 (0.0 B)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
inet 127.0.0.1 netmask 255.0.0.0
inet6 ::1 prefixlen 128 scopeid 0x10<host>
loop txqueuelen 1000 (Local Loopback)
RX packets 9 bytes 524 (524.0 B)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 9 bytes 524 (524.0 B)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlan0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
inet 192.168.43.194 netmask 255.255.255.0 broadcast 192.168.43.255
inet6 2402:7500:452:b29:a621:541b:5f21:4979 prefixlen 64 scopeid 0x0<g
lobal>
inet6 fe80::1a7b:9429:a371:40ed prefixlen 64 scopeid 0x20<link>
ether b8:27:eb:c1:b1:52 txqueuelen 1000 (Ethernet)
RX packets 20 bytes 1972 (1.9 KiB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 53 bytes 8287 (8.0 KiB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

pi@raspberrypi:~$
```

開啟ssh供遠端連線

```
$ sudo update-rc.d -f ssh defaults 20
```


後續處理

第二種連接樹莓派的方式(後續處理)-- -安裝遠端桌面

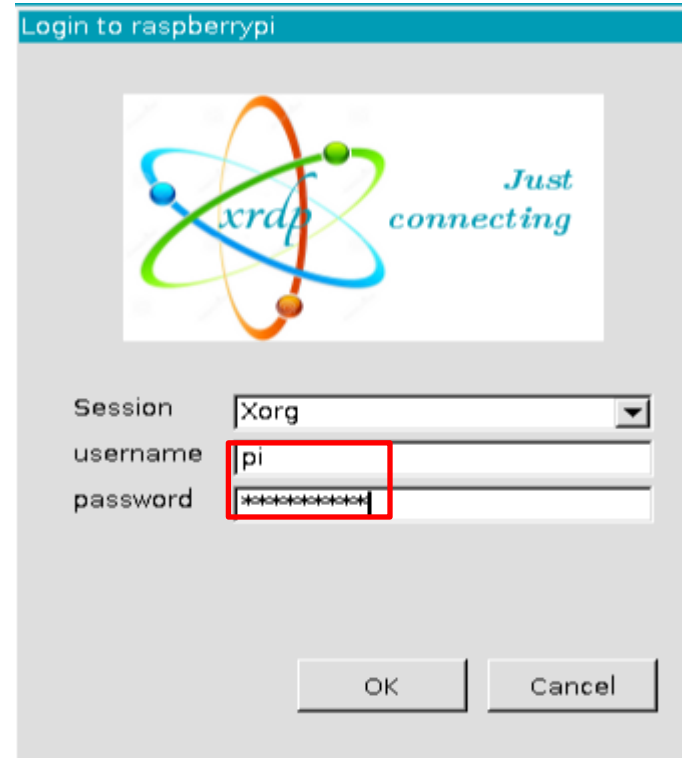
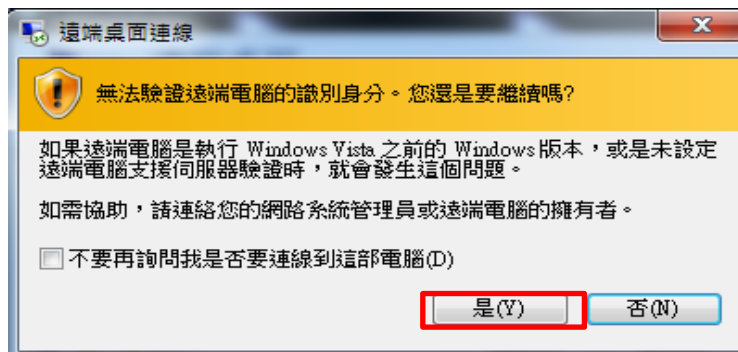
Step17:輸入指令

`sudo apt-get install xrdp`

```
pi@raspberrypi:~ $ sudo apt-get install xrdp -y
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  guacamole
The following NEW packages will be installed:
  xrdp
0 upgraded, 1 newly installed, 0 to remove and 1 not upgraded.
Need to get 0 B/402 kB of archives.
After this operation, 2,728 kB of additional disk space will be used.
Selecting previously unselected package xrdp.
(Reading database ... 162536 files and directories currently installed.)
Preparing to unpack .../xrdp_0.9.1-9+deb9u2_armhf.deb ...
Unpacking xrdp (0.9.1-9+deb9u2) ...
Processing triggers for libc-bin (2.24-11+deb9u3) ...
Setting up xrdp (0.9.1-9+deb9u2) ...
Processing triggers for systemd (232-25+deb9u2) ...
Processing triggers for man-db (2.7.6.1-2) ...
Processing triggers for libc-bin (2.24-11+deb9u3) ...
pi@raspberrypi:~ $
```

第二種連接樹莓派的方式(後續處理)-- -使用遠端桌面連線

Step17:重複前面的遠端登入即可達成

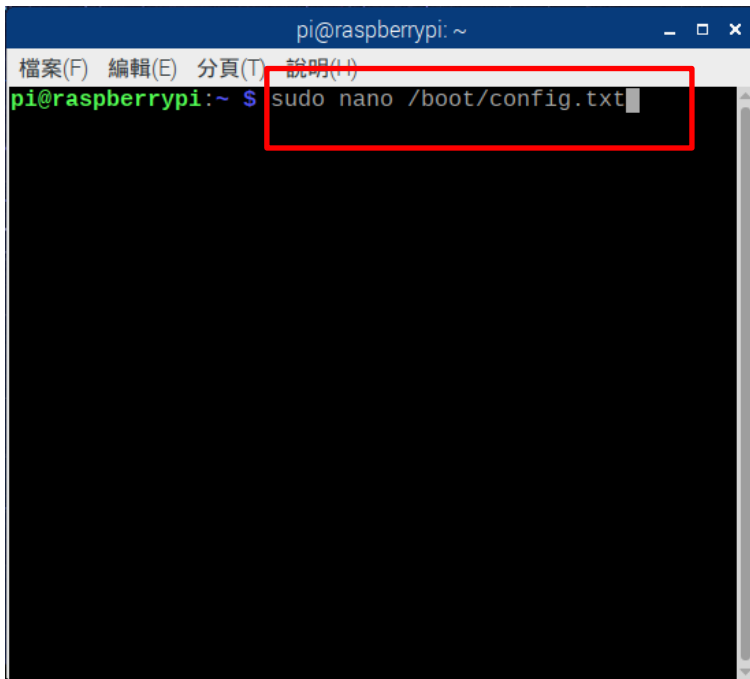


練習二：在樹莓派編輯config 檔之方法

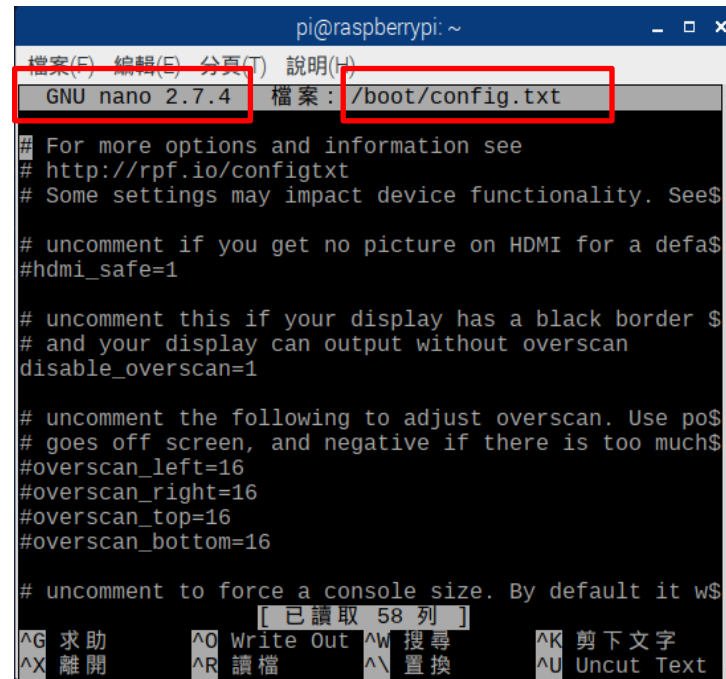
在樹莓派編輯config檔之方法

Step1:在LX終端機畫面下,輸入sudo nano /boot/config.txt 使用GNU nano文字編輯器打開config檔

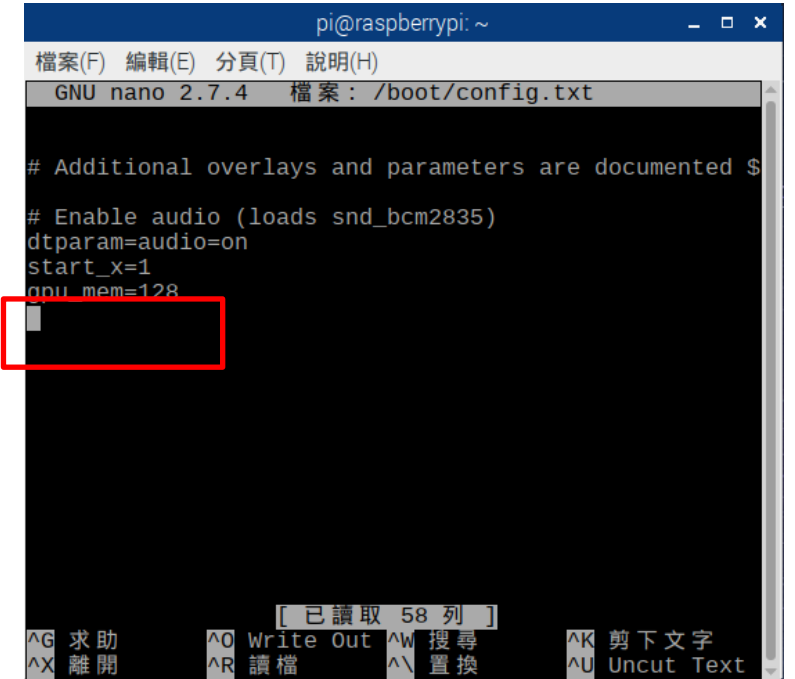
Step2:用上下鍵或pagedown將游標移到最後一行



```
pi@raspberrypi: ~  
檔案(F) 編輯(E) 分頁(T) 說明(H)  
pi@raspberrypi:~ $ sudo nano /boot/config.txt
```



```
pi@raspberrypi: ~  
檔案(F) 編輯(E) 分頁(T) 說明(H)  
GNU nano 2.7.4 檔案: /boot/config.txt  
# For more options and information see  
# http://rpf.io/configtxt  
# Some settings may impact device functionality. See$  
# uncomment if you get no picture on HDMI for a defa$  
#hdmi_safe=1  
# uncomment this if your display has a black border $  
# and your display can output without overscan  
disable_overscan=1  
# uncomment the following to adjust overscan. Use po$  
# goes off screen, and negative if there is too much$  
#overscan_left=16  
#overscan_right=16  
#overscan_top=16  
#overscan_bottom=16  
# uncomment to force a console size. By default it w$  
[ 已讀取 58 列 ]  
^G 求助      ^O Write Out  ^W 搜尋      ^K 剪下文字  
^X 離開      ^R 讀檔       ^\ 置換      ^U Uncut Text
```



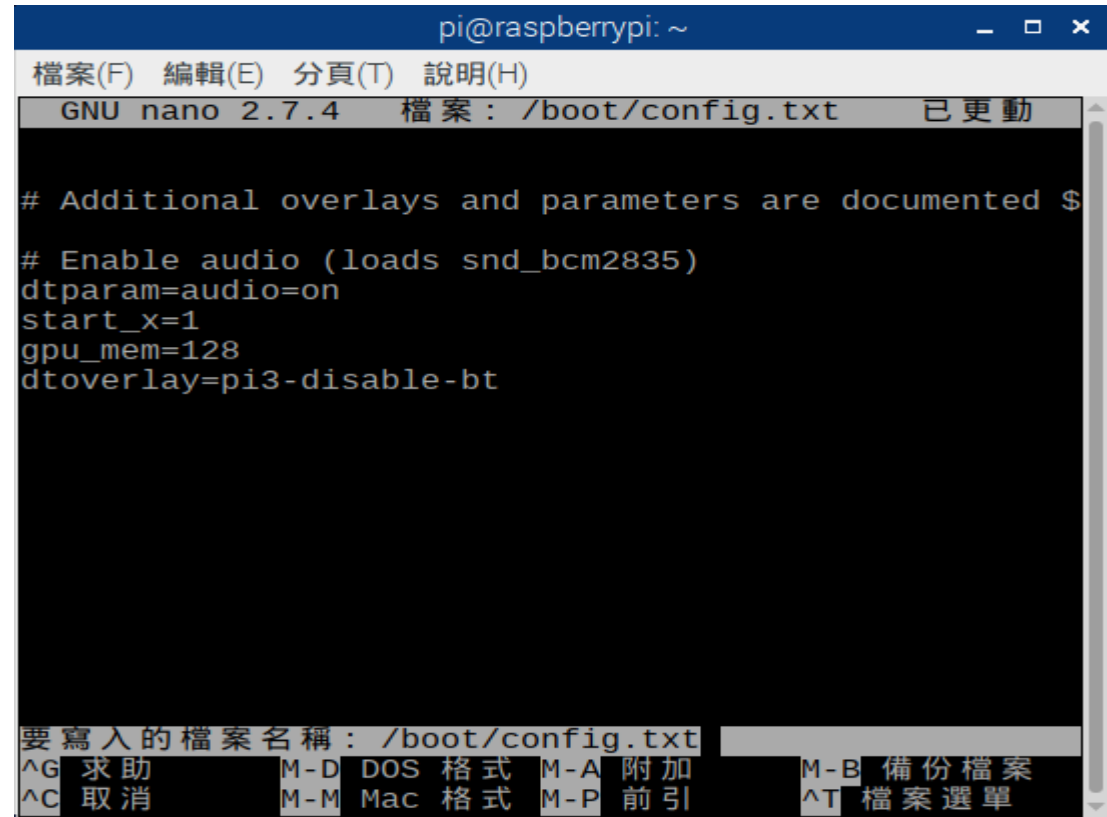
```
pi@raspberrypi: ~  
檔案(F) 編輯(E) 分頁(T) 說明(H)  
GNU nano 2.7.4 檔案: /boot/config.txt  
# Additional overlays and parameters are documented $  
# Enable audio (loads snd_bcm2835)  
dtparam=audio=on  
start_x=1  
gpu_mem=128  
[ 已讀取 58 列 ]  
^G 求助      ^O Write Out  ^W 搜尋      ^K 剪下文字  
^X 離開      ^R 讀檔       ^\ 置換      ^U Uncut Text
```

在樹莓派編輯config檔之方法

Step3:輸入dtoverlay=pi3-disable-bt

Step4:按ctrl+x,按y

Step5:按enter確定儲存,完成



```
pi@raspberrypi: ~
檔案(F) 編輯(E) 分頁(T) 說明(H)
GNU nano 2.7.4 檔案: /boot/config.txt 已更動

# Additional overlays and parameters are documented $
# Enable audio (loads snd_bcm2835)
dtparam=audio=on
start_x=1
gpu_mem=128
dtoverlay=pi3-disable-bt

要寫入的檔案名稱: /boot/config.txt
^G 求助      M-D DOS 格式  M-A 附加      M-B 備份檔案
^C 取消      M-M Mac 格式  M-P 前引      ^T 檔案選單
```


練習三:

1. 將config檔刪除後用PUTTY連連看,
 2. config檔再加入dtoverlay=pi3-disable-bt
 3. 用PUTTY連連看(用windows或樹莓派編輯文字檔皆可)
-

練習四:

將之前的opencv的六個程式拷貝
到樹莓派並執行

[程式網址](#)