

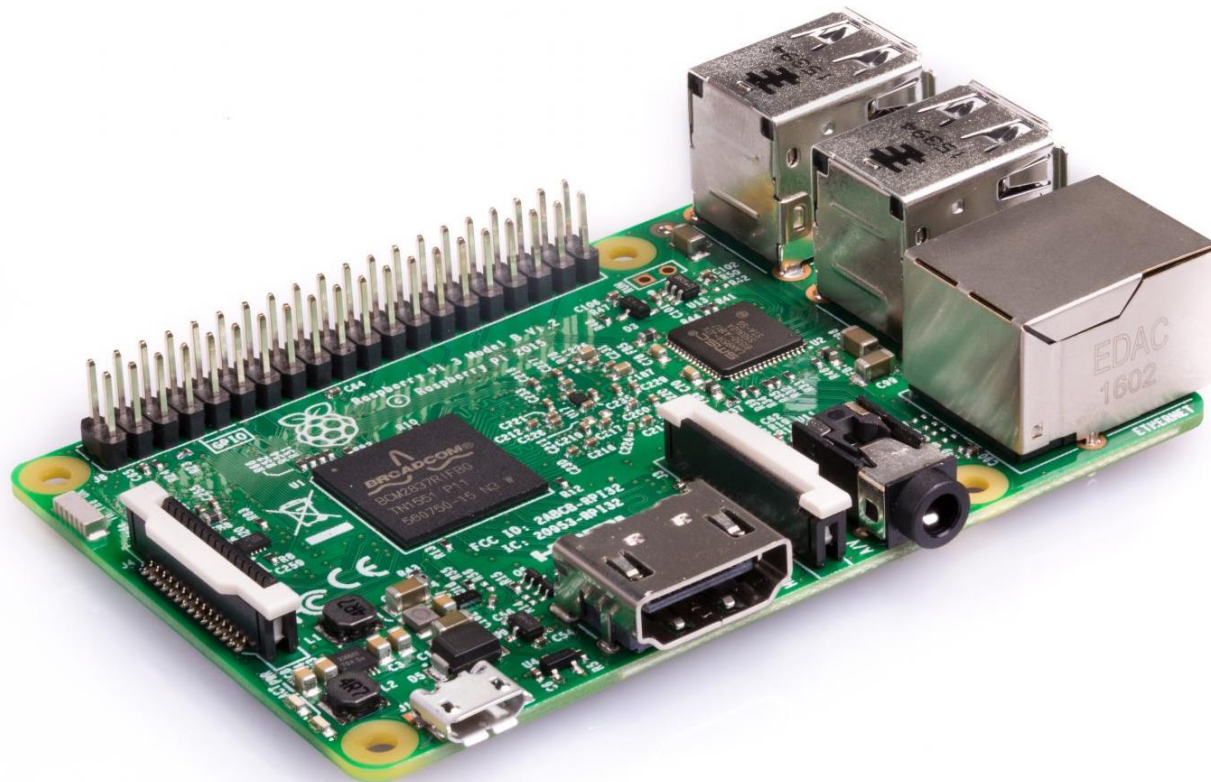


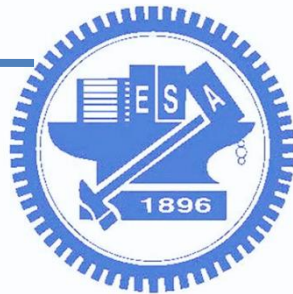
# 1. Raspberry PI Introduction Installation

National Chiao Tung University



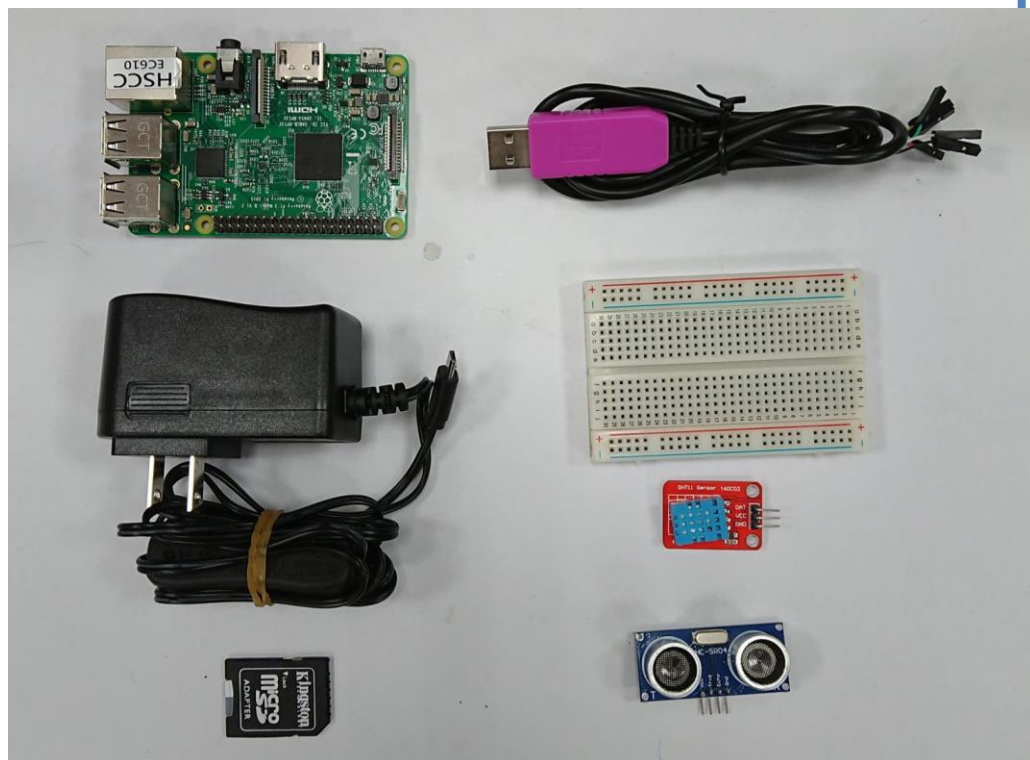
# Raspberry PI

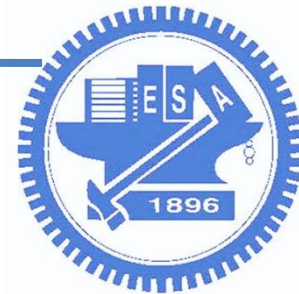




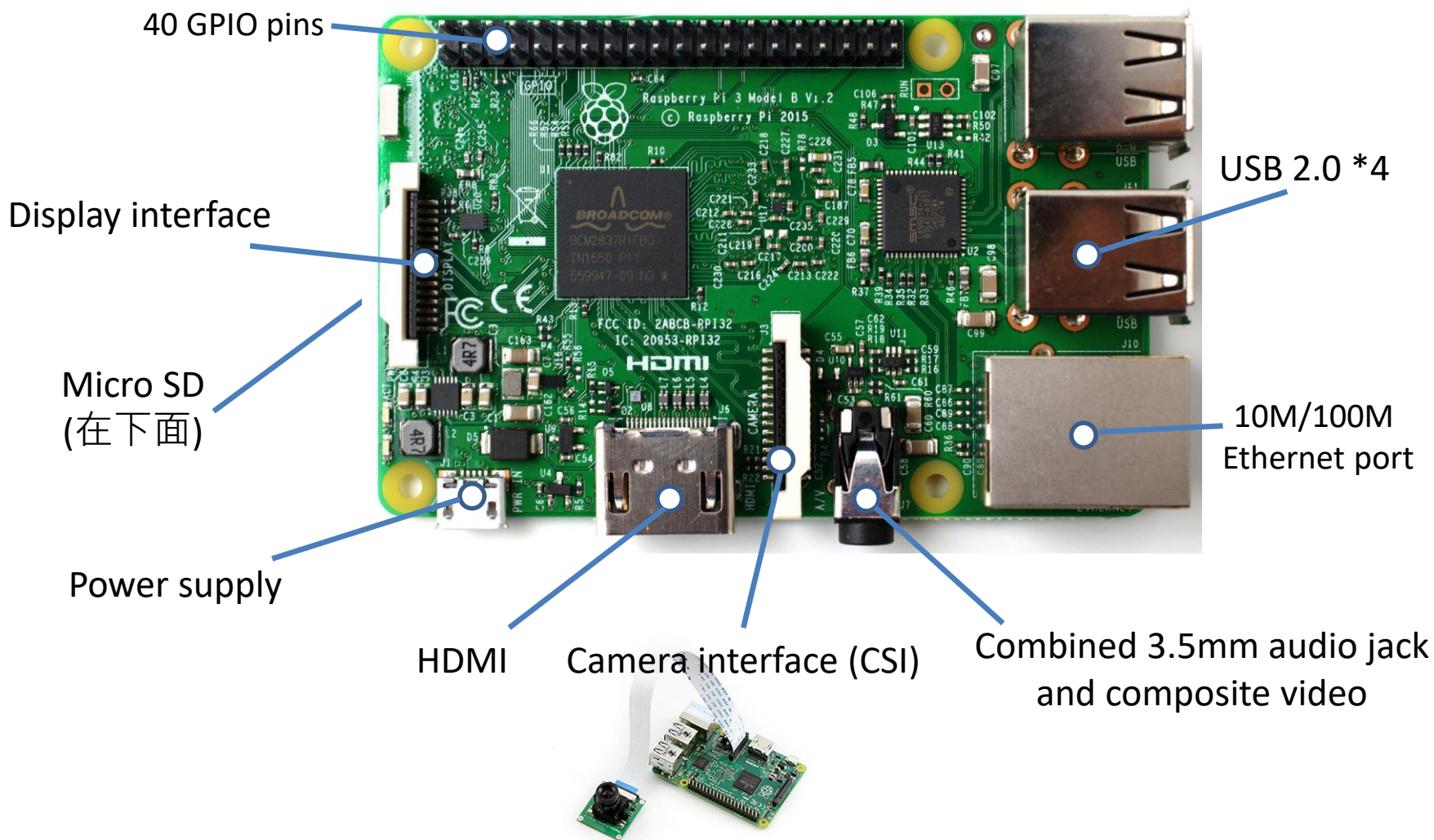
# 發設備~

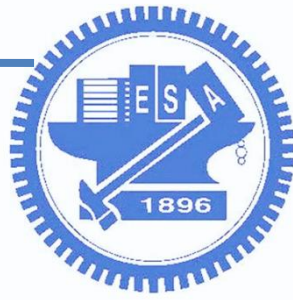
- Raspberry PI 主體
- USB電源供應器
- Micro SD卡
- USB-to-TTL傳輸線
- 麵包版
- 溫溼度感應器
- 超音波感應器





# Raspberry Pi 硬體週邊





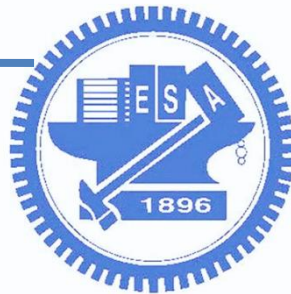
# Raspberry PI 3 Model B

## □ Raspberry PI 3 model B:

### □ 主要有以下功能:

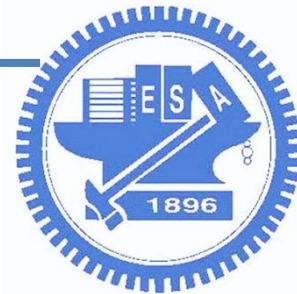
- 1.) SD 卡: 當成內建的硬碟使用，一般來說最少需要要有4GB 的容量，建議用比較穩定的牌子，這樣可以確保讀取資料正常
- 2.) HDMI 輸出顯示
- 3.) USB 的輸入端口: 如滑鼠與鍵盤
- 4.) RJ45網路線端口
- 5.) Micro USB 電源端口: 僅供電, 無資料傳輸用途
- 6.) 內建802.11n Wi-Fi 與 藍牙4.1



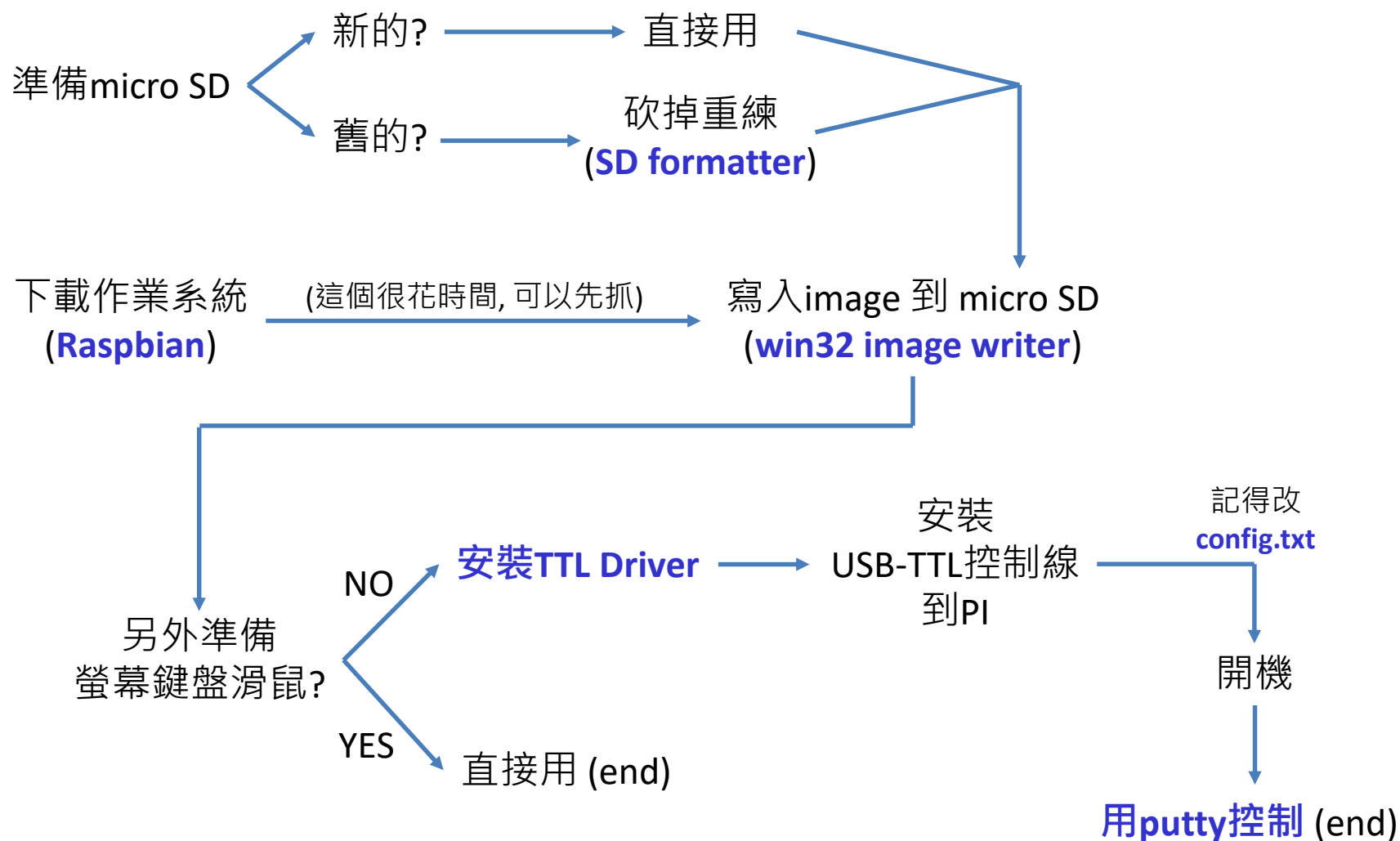


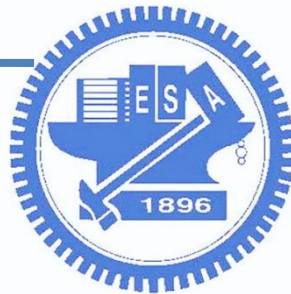
# Installation

- 1. 安裝OS (Raspbian)
- 2. PI的環境設定
  - 擴充SD卡空間
  - 用command line設定Wi-Fi
  - 使用apt-get安裝程式
- 3. 設定遠端桌面連線
  - vnc
- 4. 與電腦互傳檔案



# 準備流程

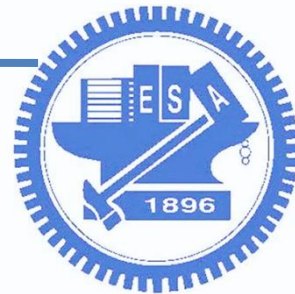




# 準備工具

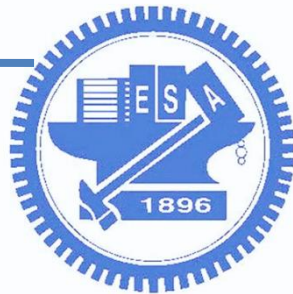
- 下載作業系統(Raspbian)
  - 官方連結 (速度很慢)
    - [https://downloads.raspberrypi.org/raspbian\\_latest](https://downloads.raspberrypi.org/raspbian_latest)
  - ubuntu-tw 分流下載 (2018-11-13-raspbian-stretch)
    - [http://ftp.ubuntu-tw.org/mirror/raspbian-downloads/raspbian\\_full/images/raspbian\\_full-2018-11-15/2018-11-13-raspbian-stretch-full.zip](http://ftp.ubuntu-tw.org/mirror/raspbian-downloads/raspbian_full/images/raspbian_full-2018-11-15/2018-11-13-raspbian-stretch-full.zip)
  - 交大實驗室分流 (2018-11-13-raspbian-stretch)
    - <http://140.113.193.13:7788/raspbian.zip>
    - <http://140.113.144.127/raspbian.zip>





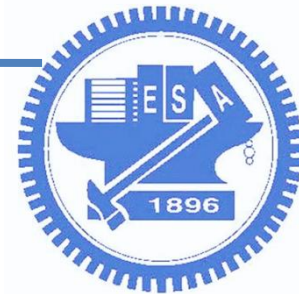
# 準備工具

- SD Formatter (清除SD卡舊有的檔案系統)
  - [https://www.sdcard.org/cht/downloads/formatter\\_4/](https://www.sdcard.org/cht/downloads/formatter_4/)
- Win32 image writer (寫入映像檔到SD卡)
  - <https://sourceforge.net/projects/win32diskimager/>
- Notepad ++ (編輯開機設定檔)
  - <https://notepad-plus-plus.org/download/v7.3.2.html>
- USB TTL driver (TTL控制線驅動程式)
  - [http://www.prolific.com.tw/US/ShowProduct.aspx?p\\_id=225&pcid=41](http://www.prolific.com.tw/US/ShowProduct.aspx?p_id=225&pcid=41)
- Putty (終端機程式)
  - <https://the.earth.li/~sgtatham/putty/latest/x86/putty.exe>



# 安裝Raspbian

- 步驟1：下載映像檔
  - Raspbian
- 步驟2：將映像檔燒錄至SD卡
  - SD formatter, win32 image writer
- 步驟3：調整開機設定檔
  - config.txt
- 步驟4：電腦端準備 USB 轉 TTL 序列傳輸線
  - 安裝TTL Driver
- 步驟5：將SD卡插到Raspberry PI並開機
  - 用putty控制 (by USB-TTL)

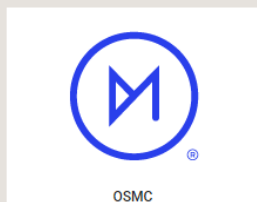
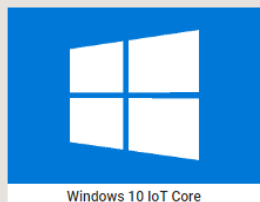
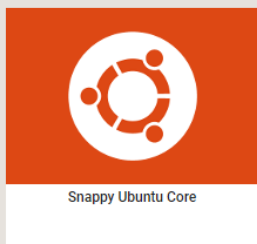
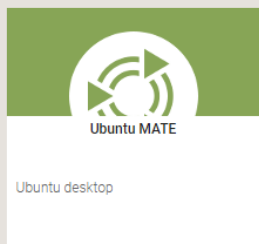


## 步驟1：下載映像檔

- 官方下載網頁
  - <http://www.raspberrypi.org/downloads>
- 選擇映像檔(image)
  - Raspbian(推薦) 


### Third Party Operating System Images

Third-party operating system images for Raspberry Pi are also available:




## Downloads

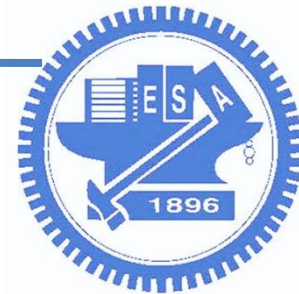
**Raspbian** is our official operating system for **all** models of the Raspberry Pi. Download it here, or use **NOOBS**, our easy installer for Raspbian and more.



NOOBS

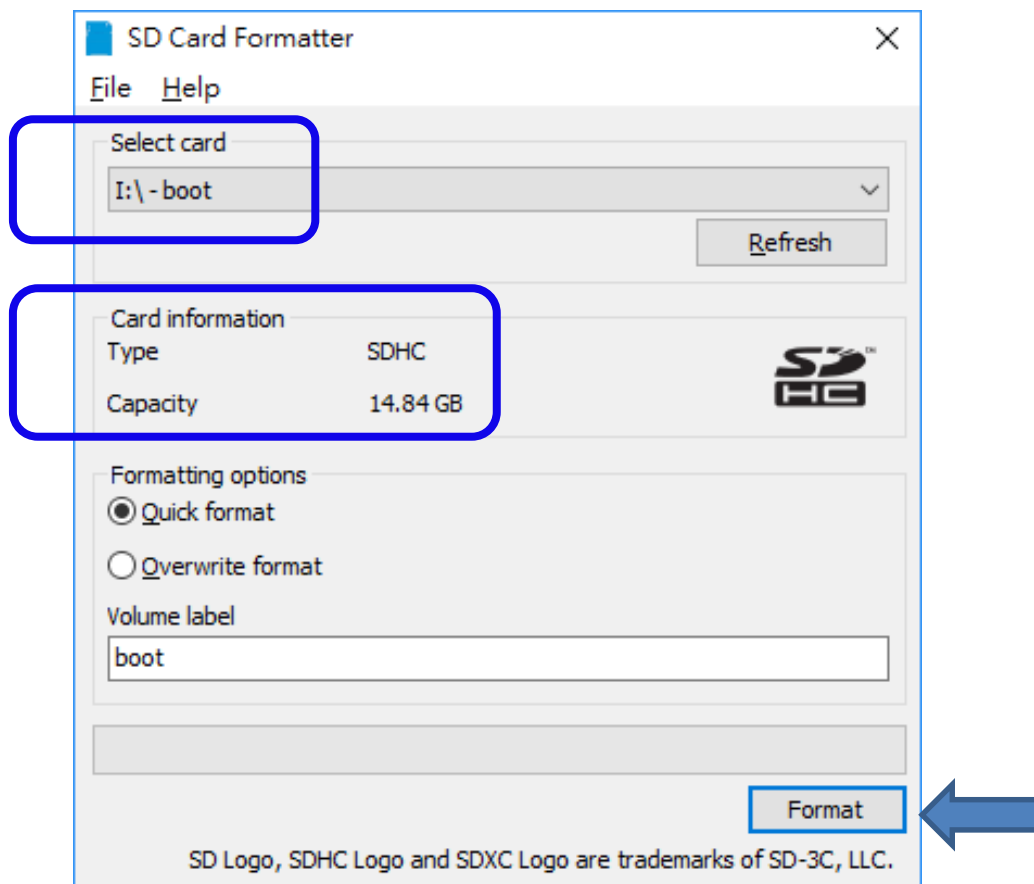


Raspbian

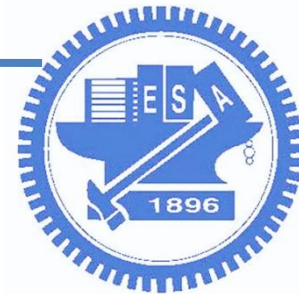


## 步驟2：將映像檔燒錄至SD卡之前

- If the micro SD is used before, use **SD Card Formatter** to erase it!!



Check Device ID and capacity



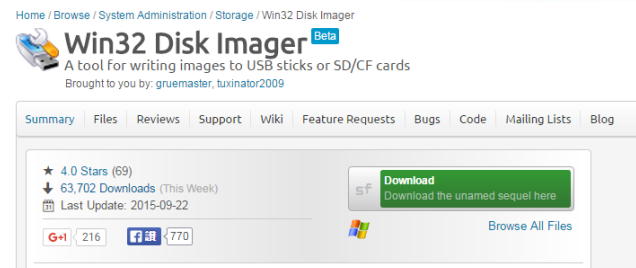
## 步驟2：將映像檔燒錄至SD卡

### 下載燒錄軟體

#### Win32 Disk Imager



■ <http://sourceforge.net/projects/win32diskimager/>



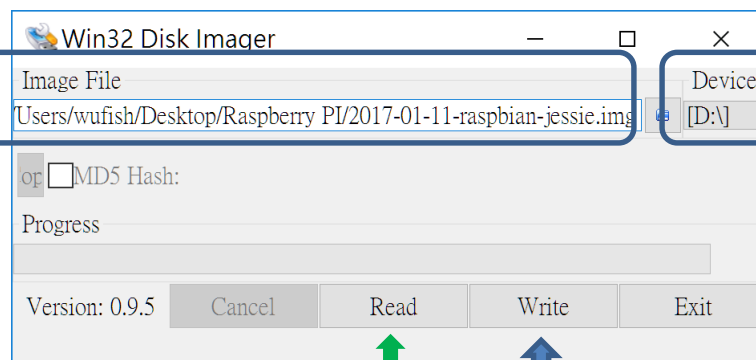
### 燒錄映像檔

#### 開啟Win32DiskImager

#### 選取映像檔及欲燒入SD卡路徑並開始燒錄

選擇image位置

選擇SD卡位置

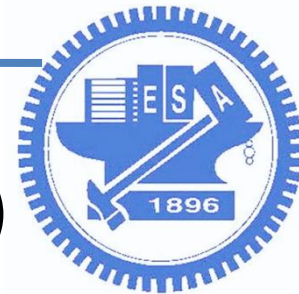


Read: 將SD卡儲存至image路徑, 可備份整個系統

Write: 將image寫入至SD卡



## 步驟2：將映像檔燒錄至SD卡 (MAC user)



### □ For MAC OS

- Use “**diskutil list**” to check the device number of your SD card

- Ex: /dev/disk2

- After insert SD card, remember to unmount it
- **diskutil unmountDisk /dev/diskX** (change **diskX** to above ID)

- Write image to SD card

- **sudo dd bs=1m if=2017-01-11-raspbian-jessie.img of=/dev/diskX**



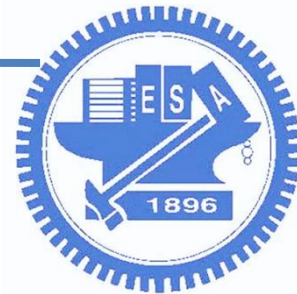
Raspbian image path



Your SD card ID

- You can use **Ctrl+T** to check the progress (It would take a long time)

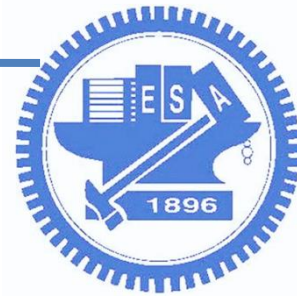




## 步驟3：調整開機設定檔

- 拿到 Pi 3, 想使用序列埠連線, 會發現出現亂碼, 該怎麼辦？  
(使用螢幕鍵盤滑鼠就可以忽略這問題)

因為原本 Pi 3 內建的硬體 UART 被 BCM2837 SoC 拿去給 Bluetooth 晶片組使用，而原本的 UART 輸出腳位(GPIOs 14 & 15)改成用 mini-uart port。意思是原本硬體 UART 有獨立的 clock divisor，因此 baud rate 可以維持在 115200，可是 mini-uart 使用系統核心時脈，實際只能跑到 72000 左右的 baud rate，因此當使用 115200 的 baud rate 連線就會出現亂碼



## 步驟3：調整開機設定檔

- 用notepad++修改/**boot/config.txt**,新增三行

- dtoverlay=pi3-miniuart-bt
- core\_freq=250
- enable\_uart=1

新增 {

```
# Enable audio (loads snd_bcm2835)
dtparam=audio=on
dtoverlay=pi3-miniuart-bt
core_freq=250
enable_uart=1
```

- 修改/**boot/cmdline.txt**,將quiet splash的quiet移除

```
dwc_otg.lpm_enable=0 console=serial0,115200
console=tty1 root=PARTUUID=6b3a87b5-02 rootfstype=ext4
elevator=deadline fsck.repair=yes rootwait quiet
init=/usr/lib/raspi-config/init_resize.sh splash
plymouth.ignore-serial- consoles
```

SD卡插入windows電腦後, 會出現一個磁碟機. 修改磁碟機裡面的config.txt即可!



## 步驟4：電腦端準備 USB 轉 TTL 序列傳輸線

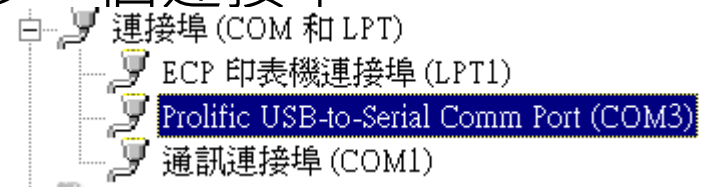
- 從序列埠登入到 Raspberry Pi
  - 透過 USB 轉 TTL 序列傳輸線，就可以在不需螢幕和鍵盤滑鼠的情況下登入 Raspberry Pi
- 晶片組PL2303HXD:支援Windows 8/10, MAC
  - Windows Driver:
    - [http://www.prolific.com.tw/US/ShowProduct.aspx?p\\_id=225&pcid=41](http://www.prolific.com.tw/US/ShowProduct.aspx?p_id=225&pcid=41)
  - MAC driver:
    - [http://www.prolific.com.tw/US/ShowProduct.aspx?p\\_id=229&pcid=41](http://www.prolific.com.tw/US/ShowProduct.aspx?p_id=229&pcid=41)
    - <https://www.ftdichip.com/Drivers/VCP.htm>



## 步驟4：電腦端準備 USB 轉 TTL 序列傳輸線

- 安裝完驅動, 在裝置管理員可發現多一個連接埠 (下圖為 COM3)

- 我的電腦 -> 右鍵-> 內容-> 裝置管理員

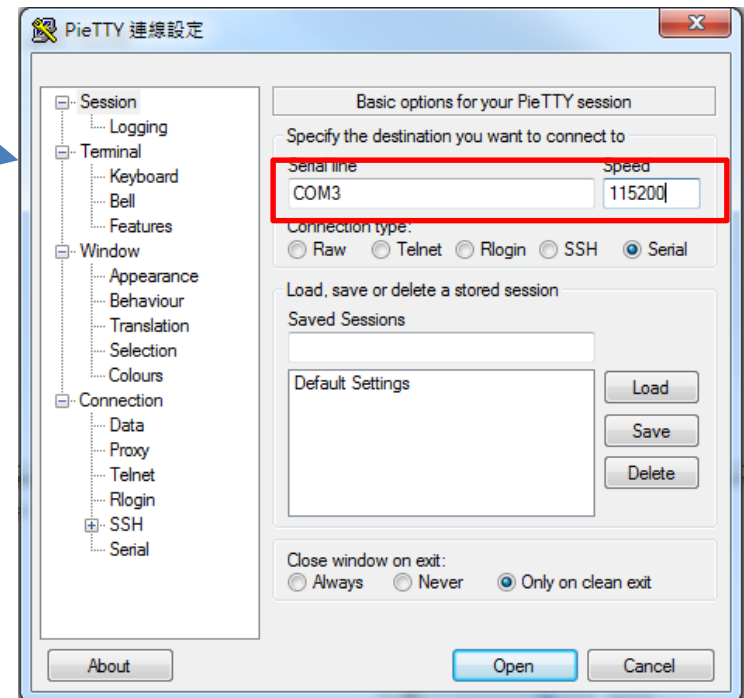


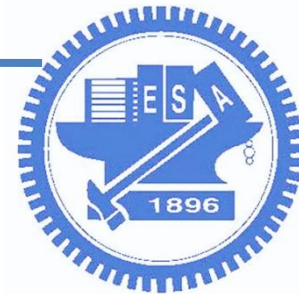
- 使用putty連線 (設定Serial port 與 Speed)



Mac OS

- For MAC OS
  - Use terminal, enter the command
  - screen /dev/cu.usbserial 115200**





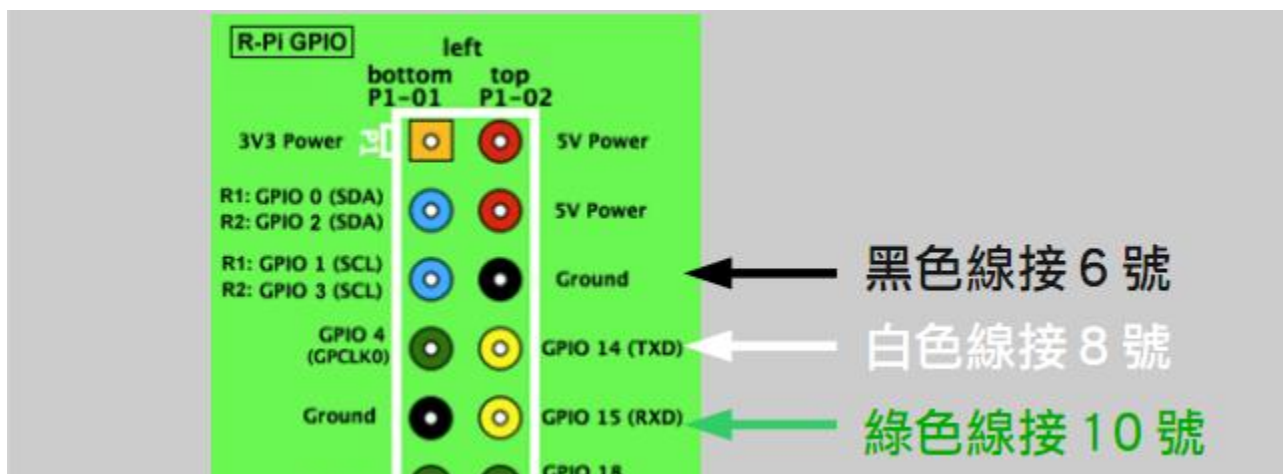
## 步驟5：將SD卡插到Raspberry Pi並開機

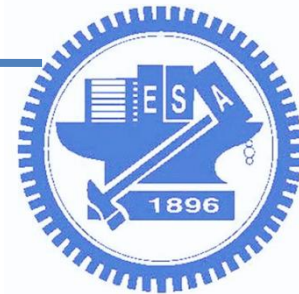
### □ 從序列埠登入到 Raspberry Pi

- 透過 USB 轉 TTL 序列傳輸線，就可以在不需螢幕和鍵盤滑鼠的情況下登入 Raspberry Pi

### □ 預設登入帳密

- ID: pi
- PW: raspberry



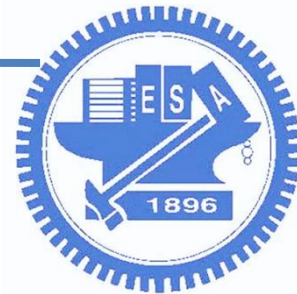


## 步驟5：將SD卡插到Raspberry PI並開機

```
COM3 - PuTTY  
Raspbian GNU/Linux 8 raspberrypi ttyAMA0  
raspberrypi login: █
```

還是沒有畫面? -> 按一下Enter鍵 or 電腦重開機試試





## 2. PI的環境設定

### □ 擴充SD卡空間

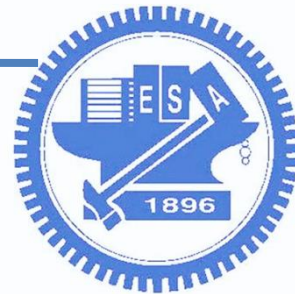
- 預設只有使用約2G的空間 -> 可是SD卡有16G -> 浪費了10G的空間
- 在terminal下輸入: **sudo raspi-config** -> 選擇「**Expand Filesystem**」
- Reboot後系統所能使用的空間就為SD卡所擁有的空間

```
COM3 - PuTTY

Raspberry Pi Software Configuration Tool (raspi-config)

1 Expand Filesystem          Ensures that all of the SD card s
2 Change User Password       Change password for the default u
3 Boot Options               Configure options for start-up
4 Internationalisation Options Set up language and regional sett
5 Enable Camera              Enable this Pi to work with the R
6 Overclock                  Configure overclocking for your P
7 Advanced Options           Configure advanced settings
8 About raspi-config          Information about this configurat

<Select>                    <Finish>
```



## 2. PI的環境設定

### □ 設定Wi-Fi

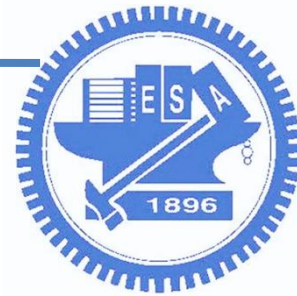
- 使用螢幕鍵盤滑鼠, 可以直接點選Wi-Fi  
-> 在純文字介面要怎麼設定Wi-Fi?

### □ 用文字編輯器修改設定檔

1. `sudo nano /etc/wpa_supplicant/wpa_supplicant.conf` (編輯設定檔)
2. 填寫SSID與密碼
3. 重開機
  - `sudo reboot`
4. 使用 `ifconfig` 與 `iwconfig` 檢查連線狀態

```
network={  
    ssid= "your_ap"  
    key_mgmt=NONE  
} // open system
```

```
network={  
    ssid= "your_ap"  
    psk= "your_passwd"  
} // with password
```



## 2. PI的環境設定

### □ [設定Wi-Fi] 修改設定檔

#### □ sudo nano /etc/wpa\_supplicant/wpa\_supplicant.conf

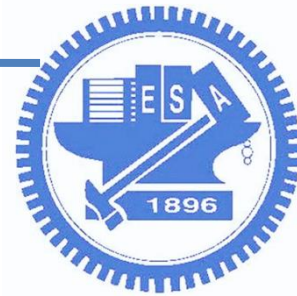
```
COM3 - PuTTY
GNU nano 2.2.6 File: /etc/wpa_supplicant/wpa_supplicant.conf

country=GB
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1

network={
    ssid=" "
    psk=" "
}

[ Read 8 lines ]
^G Get Help  ^O WriteOut  ^R Read File  ^Y Prev Page  ^K Cut Text    ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is   ^V Next Page  ^U UnCut Text ^T To Spell
```

network={  
    ssid="SSID"  
    psk="your\_pw"  
}  
  
network={  
    ssid="SSID\_open"  
    key\_mgmt=NONE  
}



## 2. PI的環境設定

### □ [設定Wi-Fi] 文字編輯器 nano

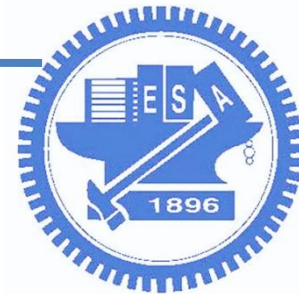
#### □ 編輯結束按 **ctrl + x** 離開

■ 若有變動, 會問你是否存檔, 輸入 **Y** 即可

```
COM3 - PuTTY
GNU nano 2.2.6  File: /etc/wpa_supplicant/wpa_supplicant.conf  Modified
country=GB
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1

network={
    ssid="XXXXXXXXXX"
    psk="XXXXXXXXXX"
}

Save modified buffer (ANSWERING "No" WILL DESTROY CHANGES) ?
Y Yes
N No  ^C Cancel
```



## 2. PI的環境設定

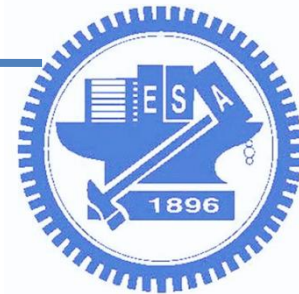
- [設定Wi-Fi] 重新啟動
  - 在終端機打 `sudo reboot`

```
(COM3) [80x24]
連線(C) 編輯(E) 檢視(V) 視窗(W) 選項(O) 說明(H)
#       psk="12345678"
#}

network={

}

pi@raspberrypi:~$ reboot
Failed to set wall message, ignoring: Interactive authentication required.
Failed to reboot system via logind: Interactive authentication required.
Failed to open /dev/initctl: Permission denied
Failed to talk to init daemon.
pi@raspberrypi:~$ sudo reboot
[71643.595503] reboot: Restarting system
```



## 2. PI的環境設定

### □ [設定Wi-Fi] 確認是否已連到網路

#### ▣ 指令: ifconfig 或 iwconfig

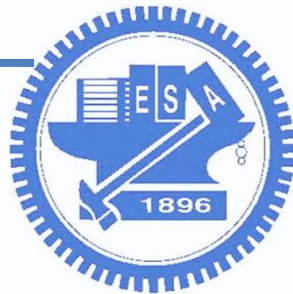
##### ■ ifconfig 執行結果

```
wlan0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.1.20 netmask 255.255.255.0 broadcast 192.168.1.255
    inet6 fe80::bdbc:cb97:93ed:4516 prefixlen 64 scopeid 0x20<link>
    ether b8:27:eb:ea:da:f8 txqueuelen 1000 (Ethernet)
    RX packets 10 bytes 1575 (1.5 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 34 bytes 5841 (5.7 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

##### ■ iwconfig 執行結果

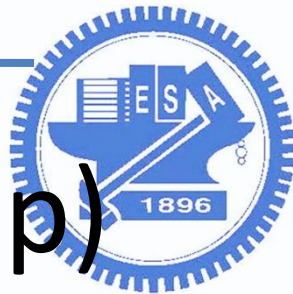
```
wlan0 IEEE 802.11 ESSID:"hsc_wu56"
    Mode:Managed Frequency:2.437 GHz Access Point: AC:9E:17:8E:9A:AC
    Bit Rate=65 Mb/s Tx-Power=31 dBm
    Retry short limit:7 RTS thr:off Fragment thr:off
    Power Management:on
    Link Quality=70/70 Signal level=-33 dBm
    Rx invalid nwid:0 Rx invalid crypt:0 Rx invalid frag:0
    Tx excessive retries:0 Invalid misc:0 Missed beacon:0
```



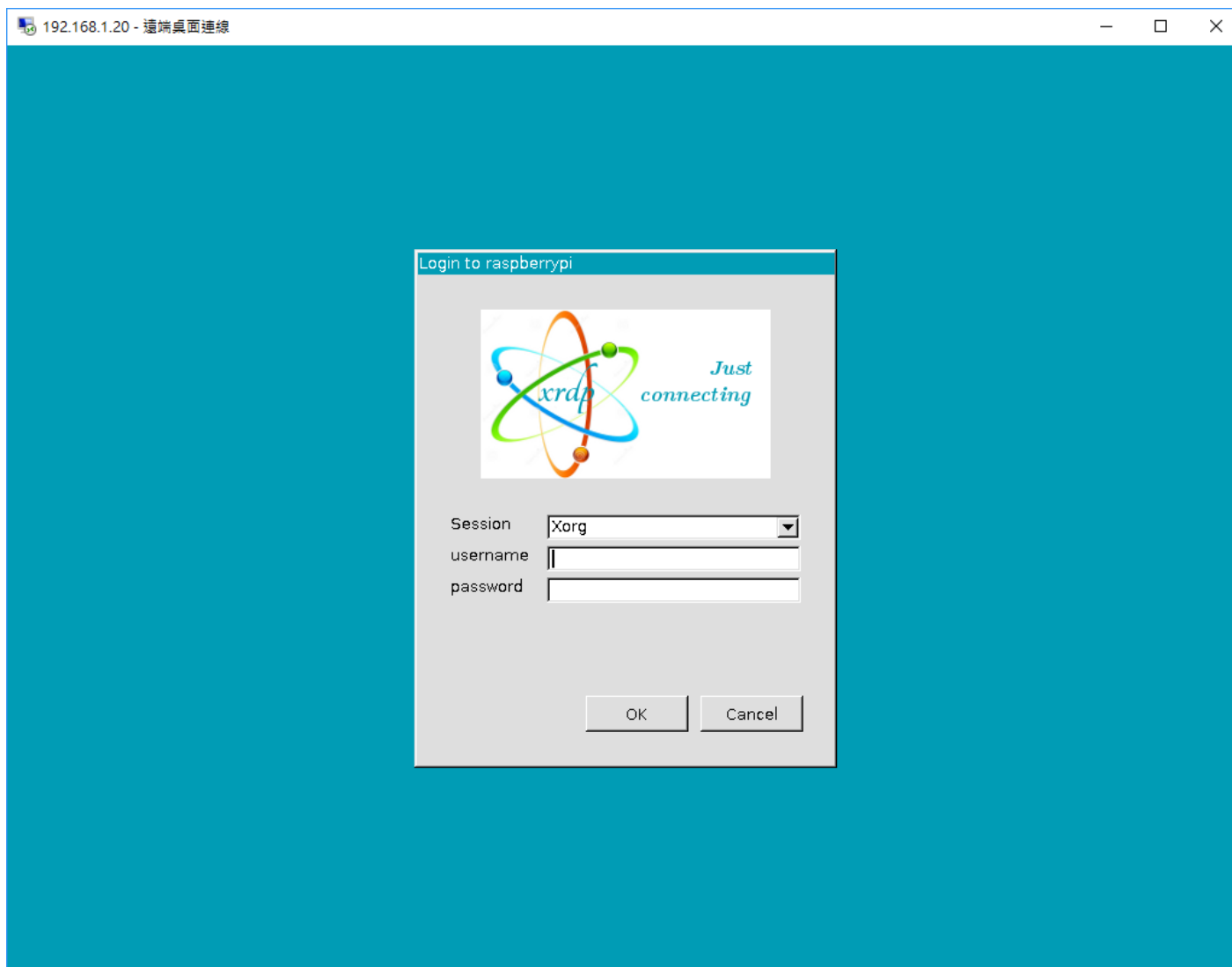


## 2. PI的環境設定

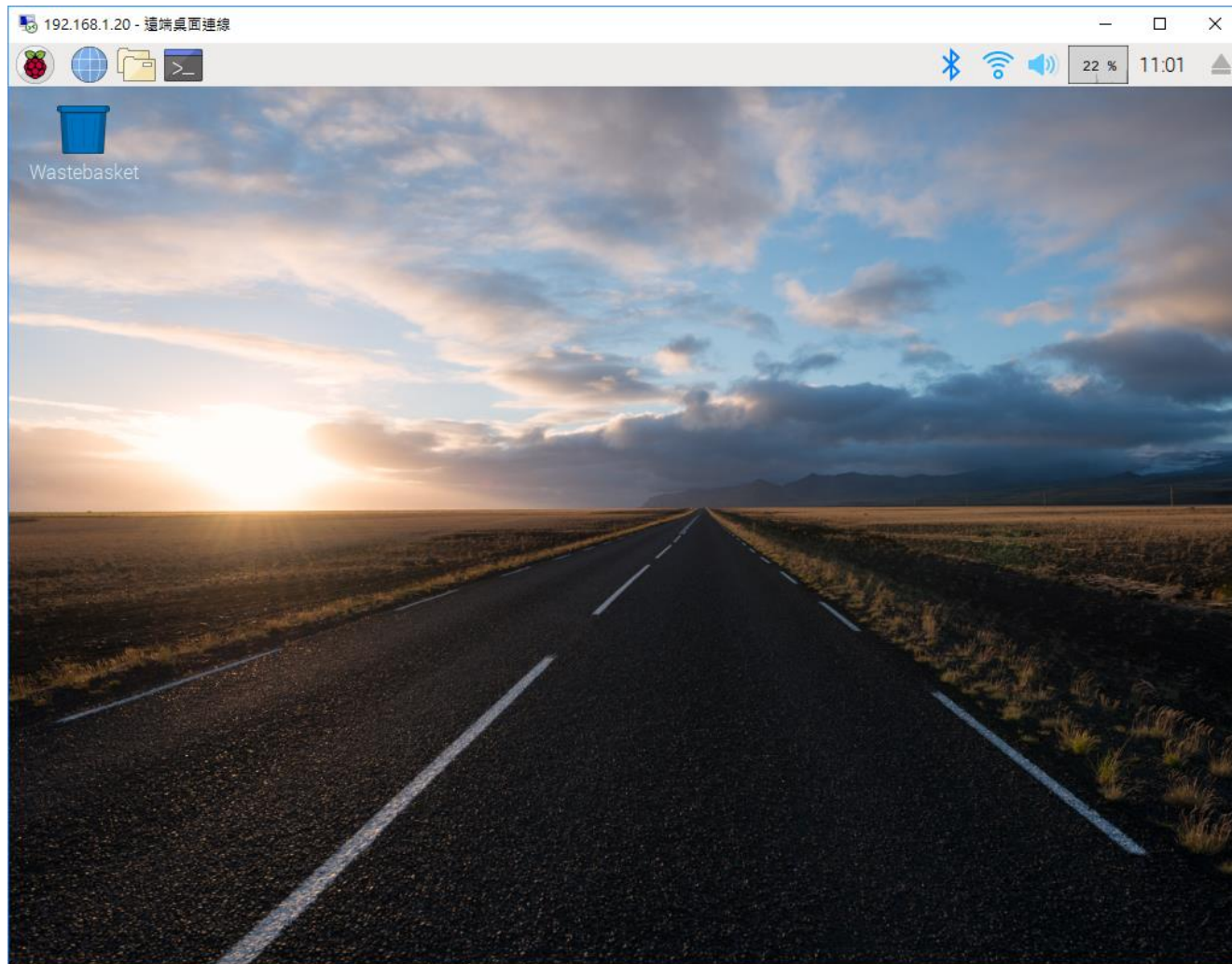
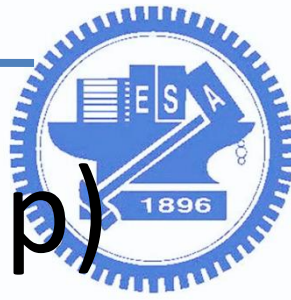
- 網路設定好之後, 可以開始建立想要的服務 or 下載程式
- 建立服務: 使用apt-get安裝程式
  - APT = Advanced Packaging Tools
  - 連上網路自動下載程式來安裝
    - 已編譯好, 不須從source code重新編譯
    - 類似Appstore與Google play線上商店的概念
- Ex: `sudo apt-get install xrdp -y`
  - 安裝遠端桌面服務(xrdp)

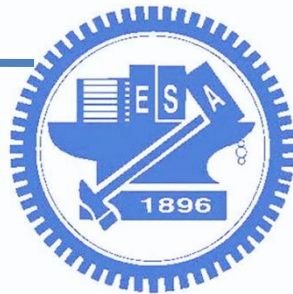


# Ex: 安裝遠端桌面服務(xrdp)



# Ex: 安裝遠端桌面服務(xrdp)





# 使用apt-get安裝程式

- 更新套件清單: `sudo apt-get update`
- 安裝套件: `sudo apt-get install <pkg_name>`
- 搜尋套件: `sudo apt-cache search <keyword>`
- 移除套件: `sudo apt-get remove <pkg_name>`
- 升級套件: `sudo apt-get upgrade`
- 彩蛋: `sudo apt-get moo`

```
pi@raspberrypi:~$ sudo apt-get moo
          (__)
         (oo)
      /-----\
     /   |   |   \
    *  /\----/\
        ~~    ~~
... "Have you mooed today?" ...
```

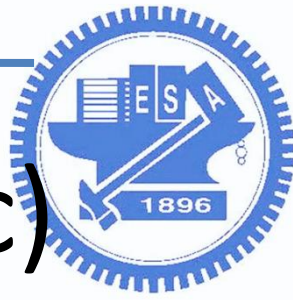


- [illegible]



- [illegible]

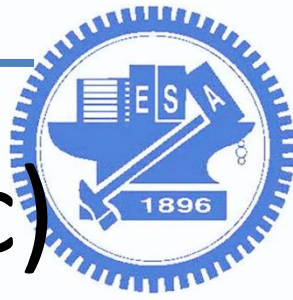




# 3. 設定遠端桌面連線(vnc)

- 執行指令: `sudo raspi-config`

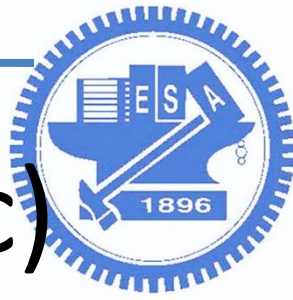
The screenshot shows a terminal window titled "(COM3) [80x24]" with a menu bar containing "連線(C)", "編輯(E)", "檢視(V)", "視窗(W)", "選項(O)", and "說明(H)". The terminal displays the text "Would you like the VNC Server to be enabled?" with a green cursor on the first line. Below the question, there are two options: "<Yes>" and "<No>". The terminal also shows some garbled text, likely due to the VNC connection.



# 3. 設定遠端桌面連線(vnc)

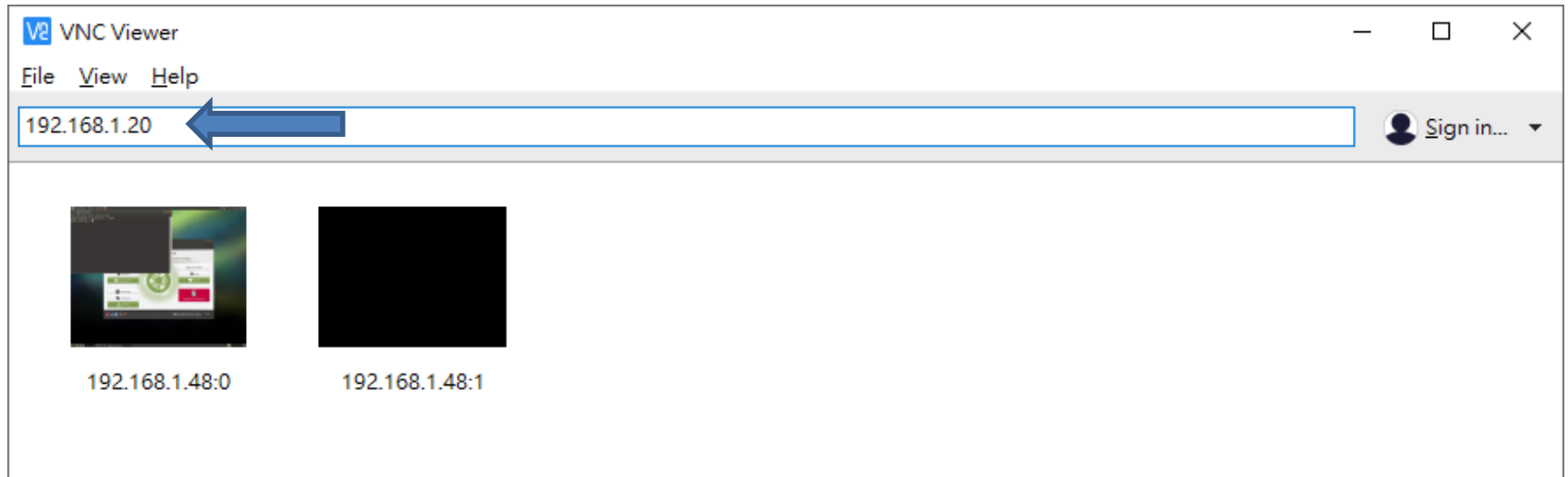
- 執行指令: `sudo raspi-config`

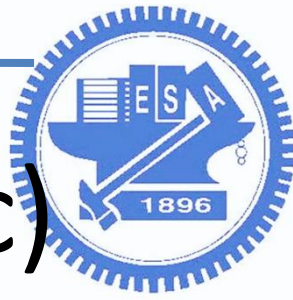
The screenshot shows a terminal window titled "(COM3) [80x24]" with a menu bar containing "連線(C)", "編輯(E)", "檢視(V)", "視窗(W)", "選項(O)", and "說明(H)". The terminal content displays a message "The VNC Server is enabled" surrounded by a decorative border of question marks. At the bottom center, there is a green cursor and the text "<Ok>".



# 3. 設定遠端桌面連線(vnc)

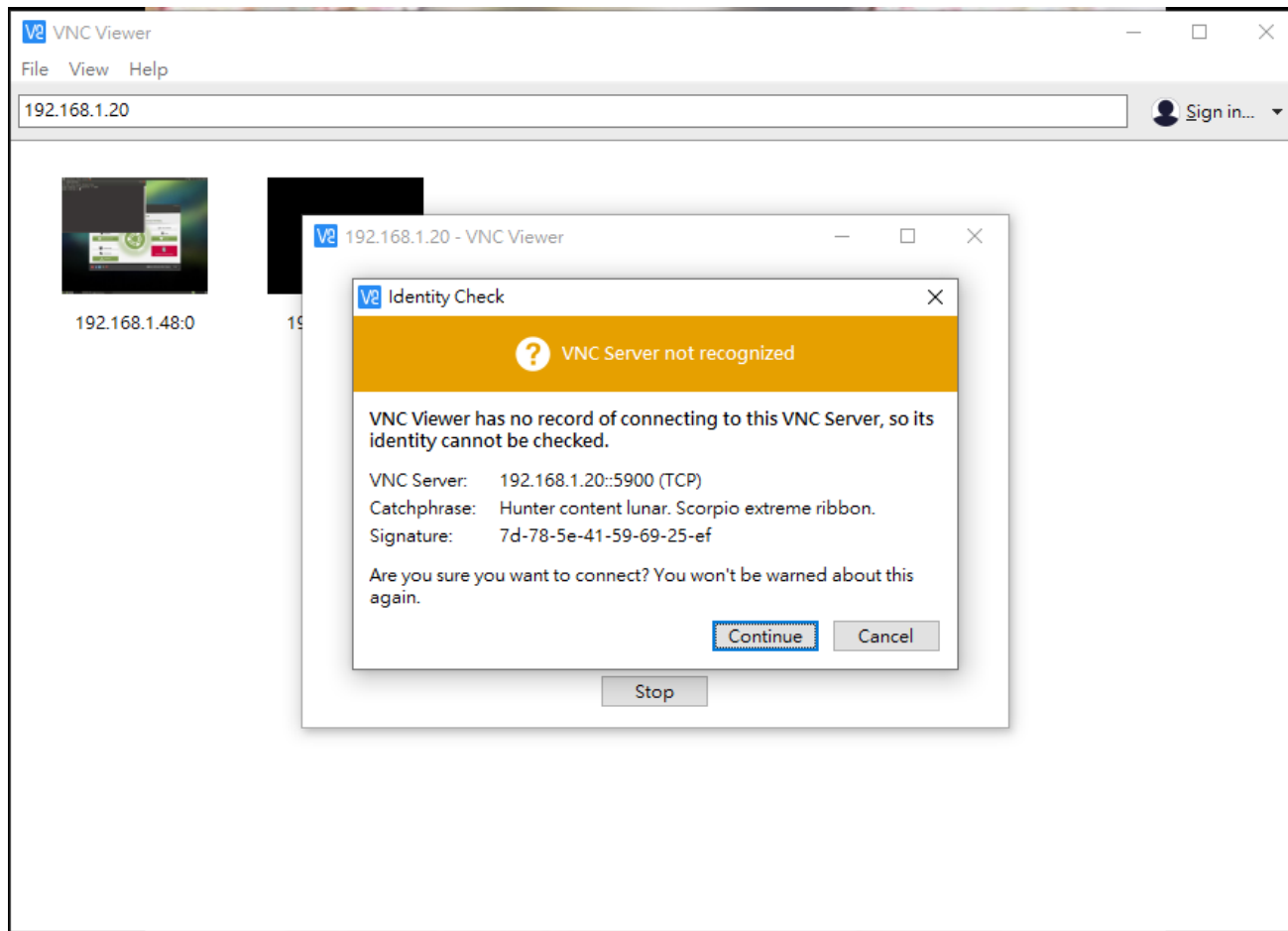
## □ 電腦端執行vncviewer

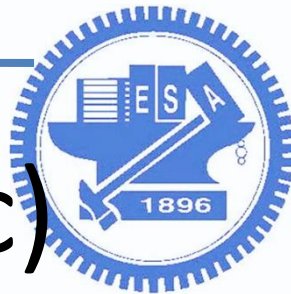




# 3. 設定遠端桌面連線(vnc)

## □ 電腦端執行vncviewer





# 3. 設定遠端桌面連線(vnc)

## □ 電腦端執行vncviewer

**V2 Authentication** [X]

Enter the credentials expected by VNC Server running on the remote computer.  
Note these are not your RealVNC account credentials.

VNC Server: 192.168.1.20::5900 (TCP)

Username:

Password:

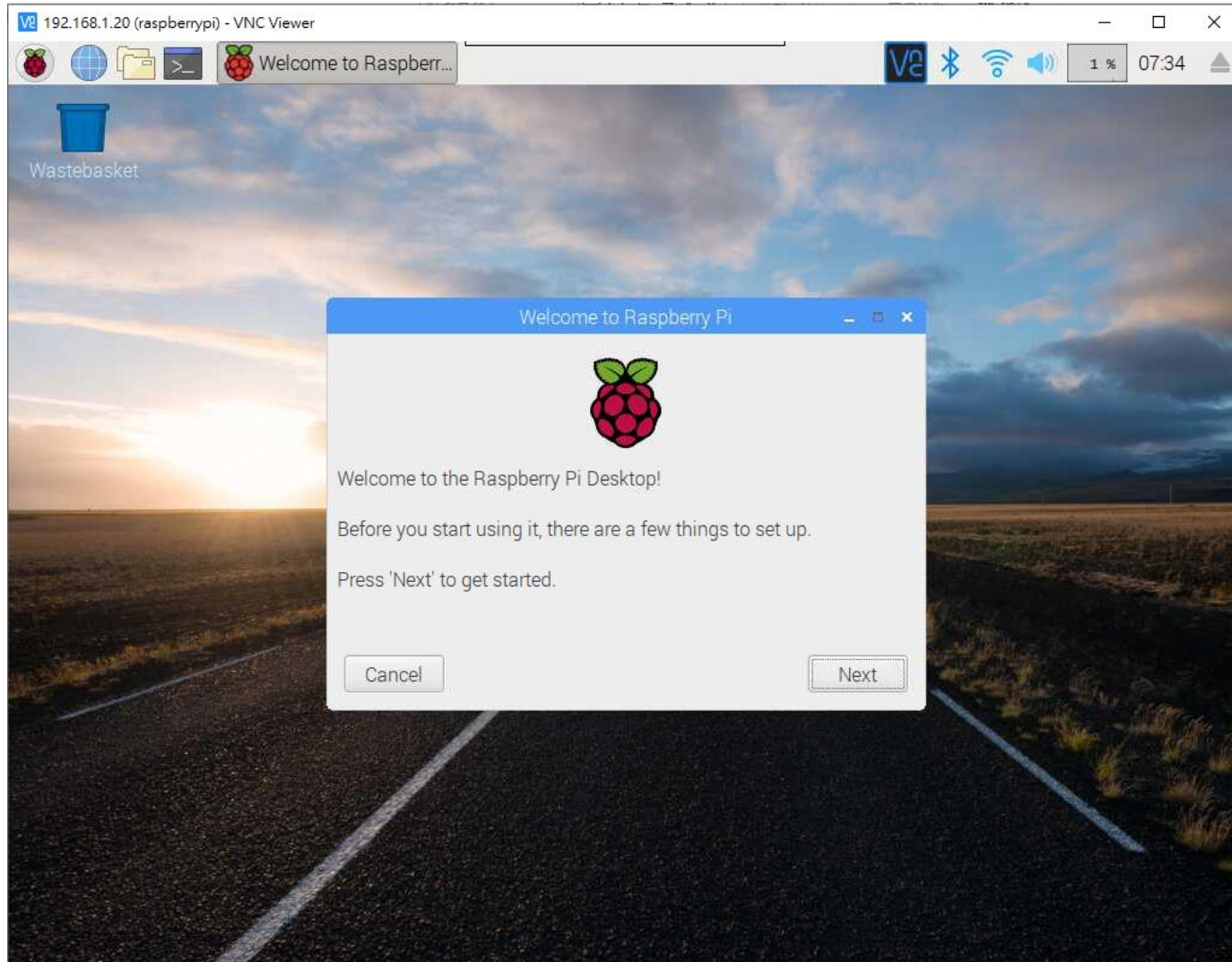
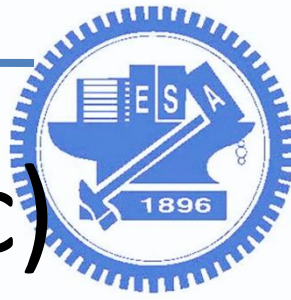
☐ Remember password

---

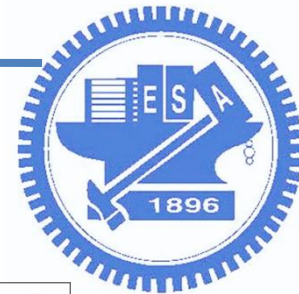
Catchphrase: Hunter content lunar. Scorpio extreme ribbon.

Signature: 7d-78-5e-41-59-69-25-ef

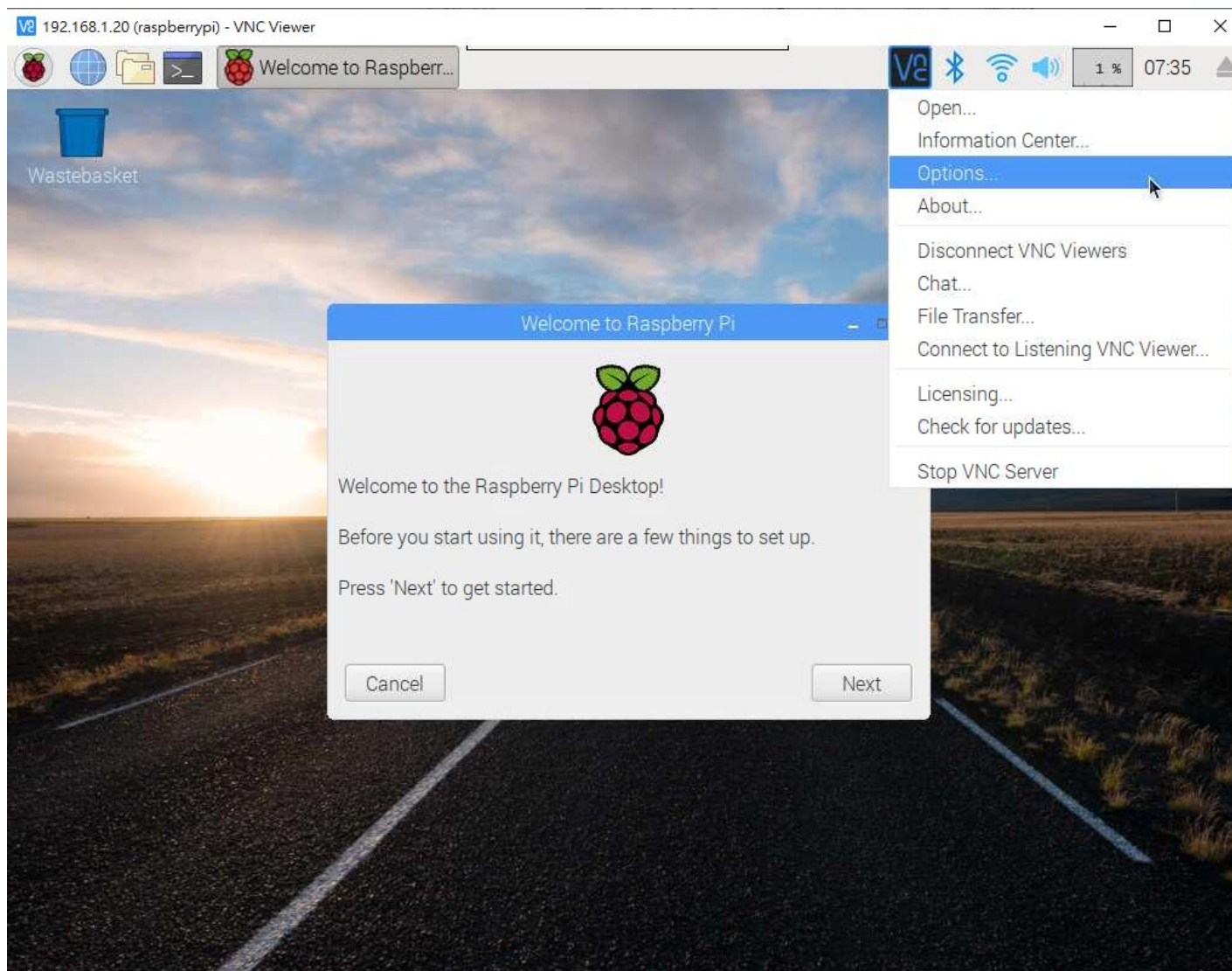
### 3. 設定遠端桌面連線(vnc)

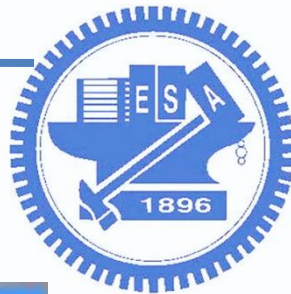




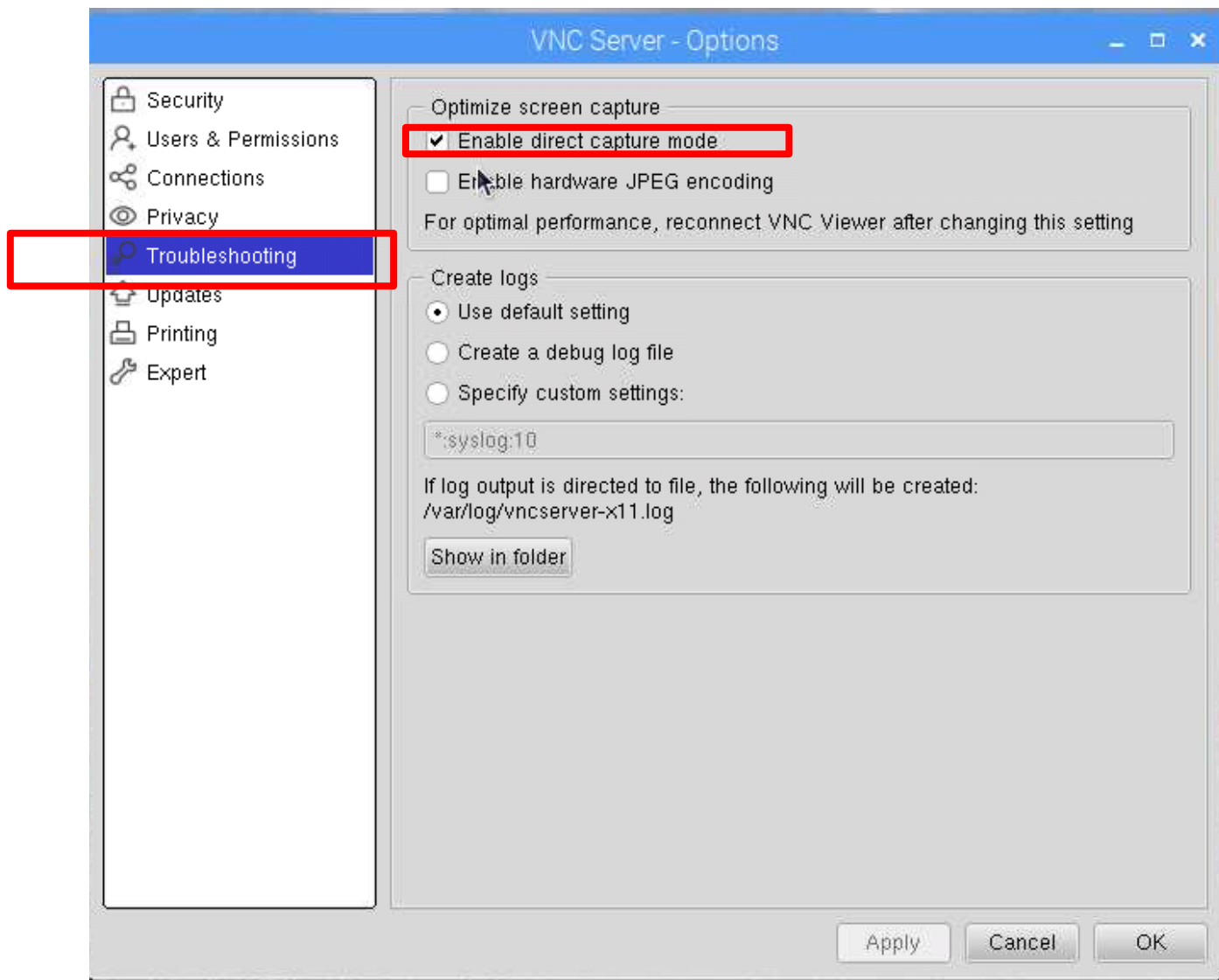


# 3. VNC額外設定

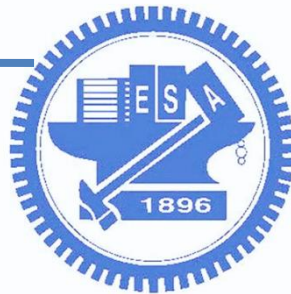




### 3. VNC額外設定

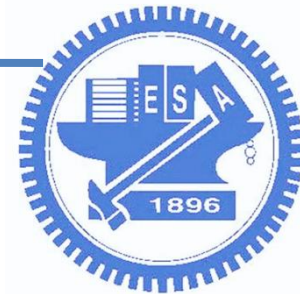






## 4. 與電腦互傳檔案

- Ex: 下載溫溼度library
  - [https://github.com/adafruit/Adafruit\\_Python\\_DHT](https://github.com/adafruit/Adafruit_Python_DHT)
- A. 直接用PI下載檔案
  - wget, git clone
- B. 在電腦下載, 透過網路傳輸
  - python, winscp
- C. 在電腦下載, 用USB隨身碟複製過去
  - Linux操作指令, mount



# A. 直接用PI下載檔案

adafruit / Adafruit\_Python\_DHT

Watch 97 Star 765 Fork 607

Code Issues 9 Pull requests 10 Projects 0 Insights

Join GitHub today

GitHub is home to over 28 million developers working together to host and review code, manage projects, and build software together.

Sign up

Python library to read the DHT series of humidity and temperature sensors on a Raspberry Pi or Beaglebone Black.

71 commits 4 branches 3 releases 16 contributors MIT

Branch: master New pull request Find file Clone or download

Brennen Bearnes version bump to 1.4.0 in setup.py

.github	Add GitHub pull request template
Adafruit_DHT	add Pi 3b+ support
examples	Improve error message
source	Issue #49 - fix long cable read delay on DHT sensor with RPI 1
.gitignore	Update version after merging pulls.
LICENSE	Initial commit
MANIFEST.in	Prepared for installation with pip.
README.md	updated install instructions per @juliogonzalez suggestions
setup.py	version bump to 1.4.0 in setup.py

Clone with HTTPS ?

Use Git or checkout with SVN using the web URL.

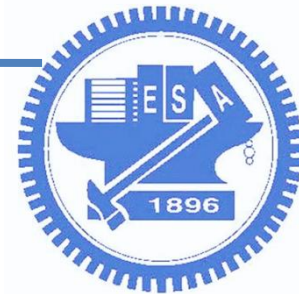
https://github.com/adafruit/Adafruit\_PyDHT

Open in Desktop Download ZIP

在新分頁中開啟連結(T)  
在新視窗中開啟連結(W)  
在無框式視窗中開啟連結(G)  
另存連結為(E)...  
複製連結網址(E)  
檢查(N)

2 months ago

複製下載連結



# A. 直接用PI下載檔案

## □ 在終端機執行 wget 指令

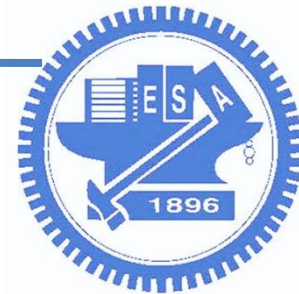
□ Ex: `wget https://github.com/adafruit/Adafruit_Python_DHT/archive/master.zip`

```
(COM8) [80x24]
連線(C) 編輯(E) 檢視(V) 視窗(W) 選項(O) 說明(H)
pi@raspberrypi:~$ wget https://github.com/adafruit/Adafruit_Python_DHT/archive/master.zip
--2019-01-14 07:57:02-- https://github.com/adafruit/Adafruit_Python_DHT/archive/master.zip
Resolving github.com (github.com)... 192.30.253.112, 192.30.253.113
Connecting to github.com (github.com)|192.30.253.112|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://codeload.github.com/adafruit/Adafruit_Python_DHT/zip/master [following]
--2019-01-14 07:57:04-- https://codeload.github.com/adafruit/Adafruit_Python_DHT/zip/master
Resolving codeload.github.com (codeload.github.com)... 192.30.253.121, 192.30.253.120
Connecting to codeload.github.com (codeload.github.com)|192.30.253.121|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: unspecified [application/zip]
Saving to: ? 黄aster.zip? ?

master.zip          [  <=>          ] 54.30K  125KB/s   in 0.4s

2019-01-14 07:57:05 (125 KB/s) - ? 黄aster.zip? ? saved [55607]

pi@raspberrypi:~$
```



# A. 直接用PI下載檔案

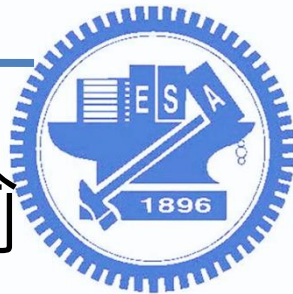
## □ 下載完畢

```
(COM8) [80x24]
連線(C) 編輯(E) 檢視(V) 視窗(W) 選項(O) 說明(H)
Connecting to codeload.github.com (codeload.github.com) |192.30.253.121|:443... c
connected.
HTTP request sent, awaiting response... 200 OK
Length: unspecified [application/zip]
Saving to: ? 黄aster.zip? ?

master.zip          [  <=>          ] 54.30K  125KB/s   in 0.4s

2019-01-14 07:57:05 (125 KB/s) - ? 黄aster.zip? ? saved [55607]

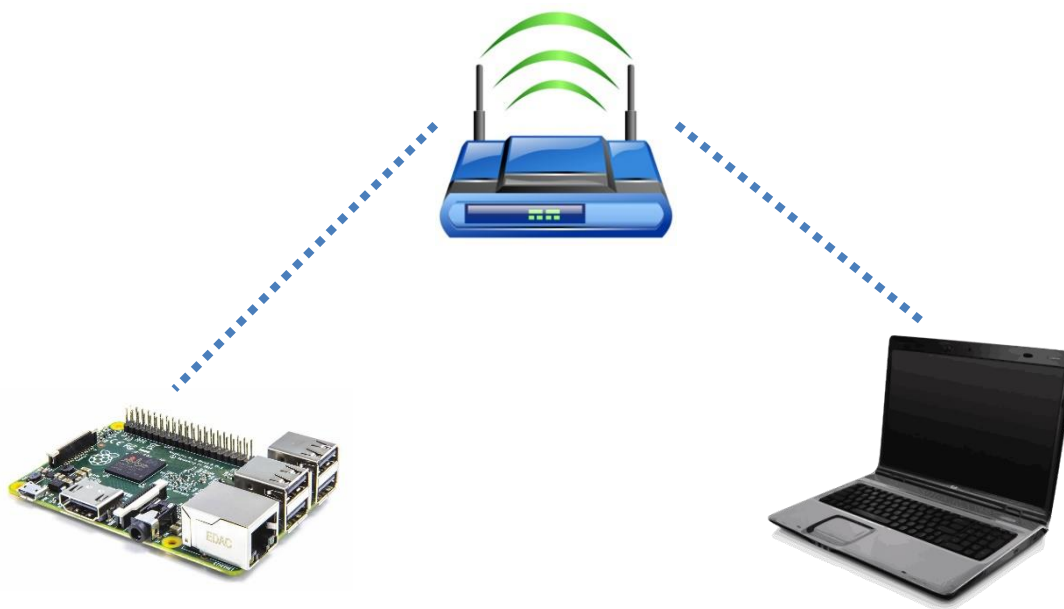
pi@raspberrypi:~$ ls -l
total 96
drwxr-xr-x 2 pi pi 4096 Nov 13 14:25 Desktop
drwxr-xr-x 2 pi pi 4096 Nov 13 14:25 Documents
drwxr-xr-x 2 pi pi 4096 Nov 13 14:25 Downloads
drwxr-xr-x 2 pi pi 4096 Nov 13 13:45 MagPi
-rw-r--r-- 1 pi pi 55607 Jan 14 07:57 master.zip
drwxr-xr-x 2 pi pi 4096 Nov 13 14:25 Music
drwxr-xr-x 2 pi pi 4096 Nov 13 14:25 Pictures
drwxr-xr-x 2 pi pi 4096 Nov 13 14:25 Public
drwxr-xr-x 2 pi pi 4096 Nov 13 14:25 Templates
drwxr-xr-t 2 pi pi 4096 Jan 10 11:00 thinclient_drives
drwxr-xr-x 2 pi pi 4096 Nov 13 14:25 Videos
pi@raspberrypi:~$
```

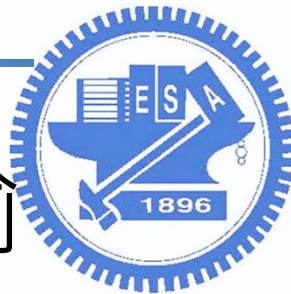


## B. 在電腦下載, 透過網路傳輸

### □ 網路架構:

- Case 1: PI 有 Public IP address (通常不可能)
- Case 2: 電腦與PI在同一個子網路 (較常見)





## B. 在電腦下載, 透過網路傳輸

### □ 1. python有內建simple http server

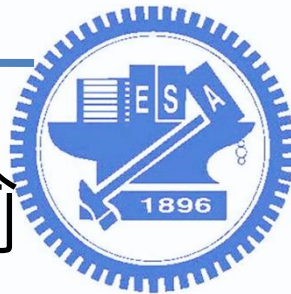
- 指令: `python -m SimpleHTTPServer 8000`
- 電腦端可以直接透過網頁下載PI裡面的檔案

```
(COM8) [80x24]
連線(C) 編輯(E) 檢視(V) 視窗(W) 選項(O) 說明(H)
pi@raspberrypi:~$ python -m SimpleHTTPServer 8000
Serving HTTP on 0.0.0.0 port 8000 ...
192.168.1.80 - - [14/Jan/2019 08:01:15] "GET / HTTP/1.1" 200 -
192.168.1.80 - - [14/Jan/2019 08:01:16] code 404, message File not found
192.168.1.80 - - [14/Jan/2019 08:01:16] "GET /favicon.ico HTTP/1.1" 404 -
192.168.1.80 - - [14/Jan/2019 08:01:26] "GET /Desktop/ HTTP/1.1" 200 -
192.168.1.80 - - [14/Jan/2019 08:01:26] "GET /Desktop/ HTTP/1.1" 200 -
-----
Exception happened during processing of request from ('192.168.1.80', 64505)
Traceback (most recent call last):
  File "/usr/lib/python2.7/SocketServer.py", line 290, in _handle_request_noblock
    self.process_request(request, client_address)
  File "/usr/lib/python2.7/SocketServer.py", line 318, in process_request
    self.finish_request(request, client_address)
  File "/usr/lib/python2.7/SocketServer.py", line 331, in finish_request
    self.RequestHandlerClass(request, client_address, self)
  File "/usr/lib/python2.7/SocketServer.py", line 654, in __init__
    self.finish()
  File "/usr/lib/python2.7/SocketServer.py", line 713, in finish
    self.wfile.close()
  File "/usr/lib/python2.7/socket.py", line 283, in close
    self.flush()
  File "/usr/lib/python2.7/socket.py", line 307, in flush
```

← → ↺ ⌂ ⓘ 不安全 | 192.168.1.48:8000

#### Directory listing for /

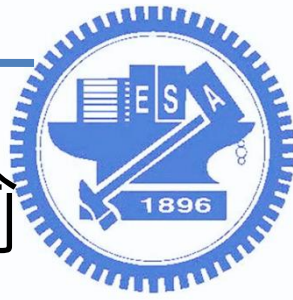
- [.bash\\_history](#)
- [.bash\\_logout](#)
- [.bashrc](#)
- [.cache/](#)
- [.config/](#)
- [.gnupg/](#)
- [.local/](#)
- [.nano/](#)
- [.profile](#)
- [.wget-hsts](#)
- [.Xauthority](#)
- [.xsession-errors](#)
- [.xsession-errors.old](#)
- [Desktop/](#)
- [Documents/](#)
- [Downloads/](#)
- [MagPi/](#)
- [master.zip](#)
- [Music/](#)
- [Pictures/](#)
- [Public/](#)
- [Templates/](#)
- [thinclient\\_drives/](#)
- [Videos/](#)



## B. 在電腦下載, 透過網路傳輸

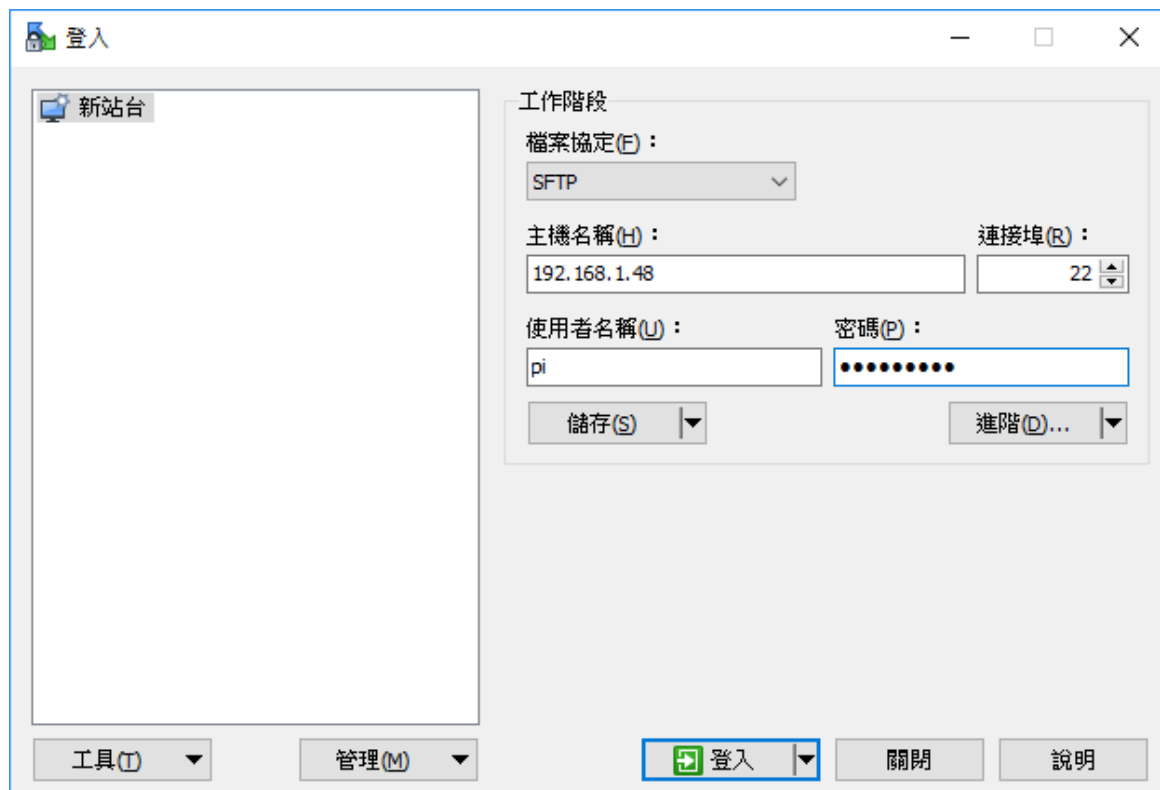
- 2. 在電腦上安裝winscp, 輸入IP的ip address與帳密, 即可連線傳輸資料 (如同ftp介面)
  - 需先啟用ssh login功能
    - 直接在 /boot/ 裡面新增空白檔案, 檔名為ssh
  - 設定指令: `sudo touch /boot/ssh`

For headless setup, SSH can be enabled by placing a file named `ssh`, without any extension, onto the boot partition of the SD card from another computer. When the Pi boots, it looks for the `ssh` file. If it is found, SSH is enabled and the file is deleted. The content of the file does not matter; it could contain text, or nothing at all.

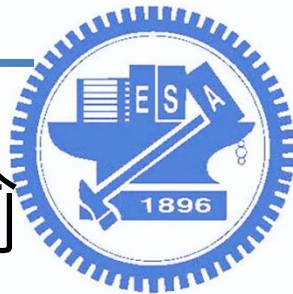


## B. 在電腦下載, 透過網路傳輸

- 2. winscp: 輸入IP的ip address與帳密, 即可連線傳輸資料 (如同ftp介面)

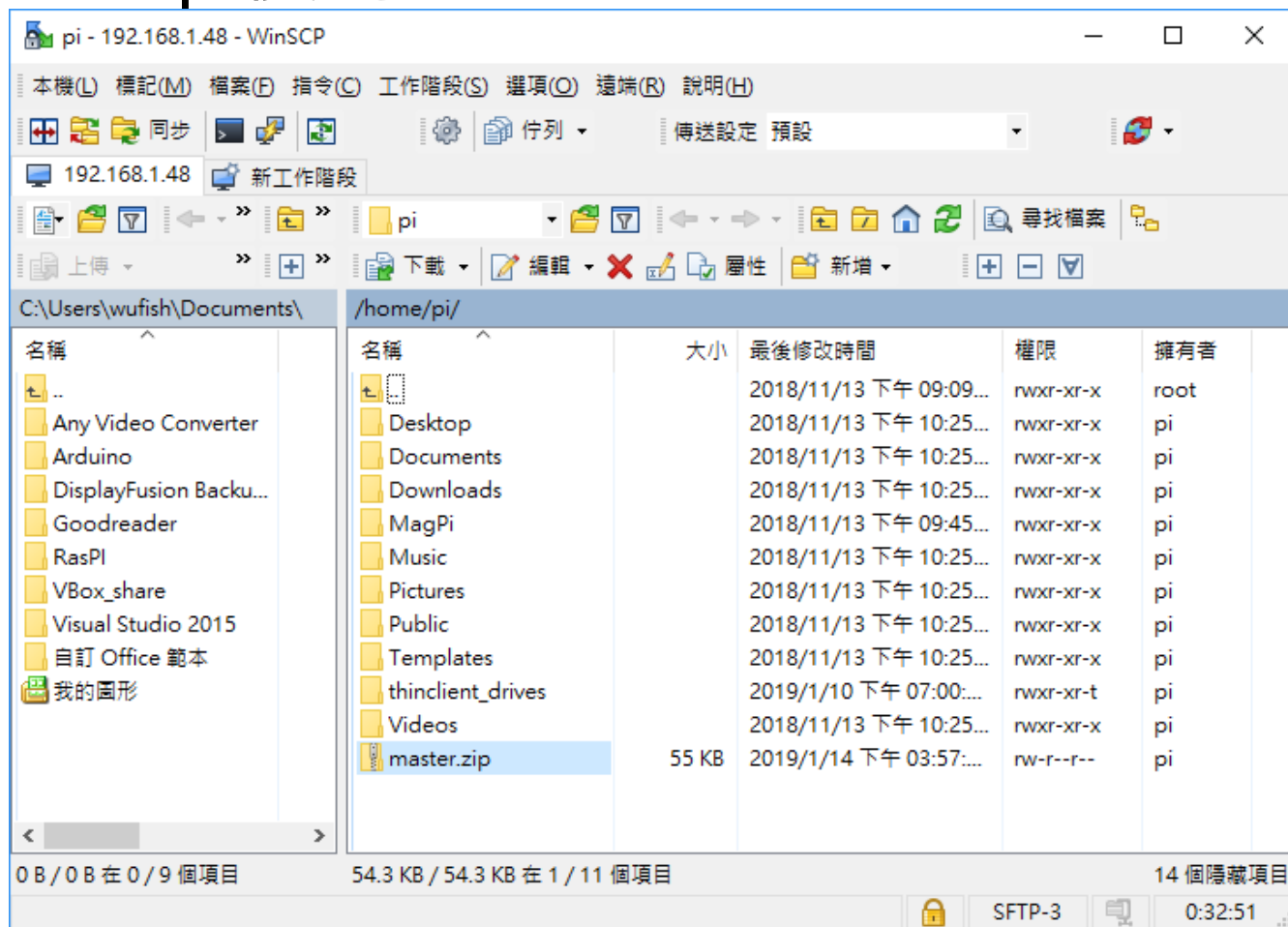


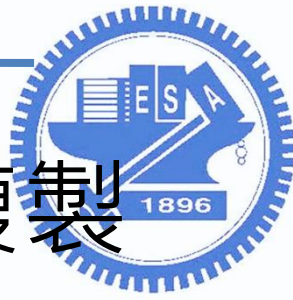




## B. 在電腦下載, 透過網路傳輸

### □ 2. winscp 使用畫面





# C. 在電腦下載, 用USB隨身碟複製

- 指令: mount
  - 較複雜, 適用於有linux操作經驗的使用者
  - 優點: 沒有網路也可複製

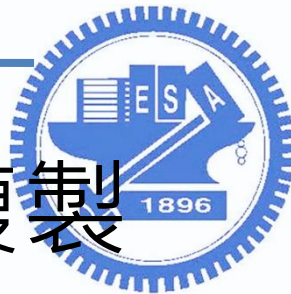
```
(COM8) [80x24]
連線(C) 編輯(E) 檢視(V) 視窗(W) 選項(O) 說明(H)

Disk /dev/mmcblk0: 14.9 GiB, 15931539456 bytes, 31116288 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xf292df1d

Device          Boot Start      End  Sectors  Size Id Type
/dev/mmcblk0p1    8192    98045    89854 43.9M  c W95 FAT32 (LBA)
/dev/mmcblk0p2   98304 31116287 31017984 14.8G 83 Linux

Disk /dev/sda: 3.6 GiB, 3880452096 bytes, 7579008 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xc3072e18

Device      Boot Start      End  Sectors  Size Id Type
/dev/sda1   *    8064 7579007 7570944  3.6G  c W95 FAT32 (LBA)
pi@raspberrypi:~$
```



## C. 在電腦下載, 用USB隨身碟複製

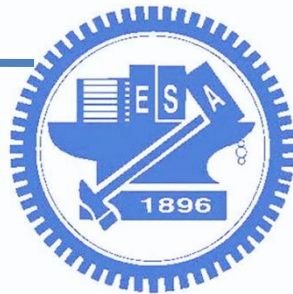
- 掛載: `sudo mount /dev/sda1 /mnt`
- 卸載: `sudo umount /mnt`

```
(COM8) [80x24]
連線(C) 編輯(E) 檢視(V) 視窗(W) 選項(O) 說明(H)

Device          Boot Start      End  Sectors  Size Id Type
/dev/mmcblk0p1   8192      98045    89854  43.9M  c W95 FAT32 (LBA)
/dev/mmcblk0p2   98304 31116287 31017984 14.8G  83 Linux

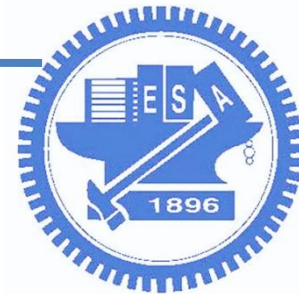
Disk /dev/sda: 3.6 GiB, 3880452096 bytes, 7579008 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xc3072e18

Device          Boot Start      End  Sectors  Size Id Type
/dev/sda1 *      8064 7579007 7570944   3.6G  c W95 FAT32 (LBA)
pi@raspberrypi:~$ sudo mount /dev/sda1 /mnt/
pi@raspberrypi:~$ ls /mnt/
autorun.inf  isolinux      preseed                                ubnkern
boot         ldlinux.sys  README.diskdefines                    ubnpath1.txt
casper       md5sum.txt   syslinux.cfg                          wubi.exe
dists        menu.c32     System Volume Information
EFI          pics         ubnfile1.txt
install      pool         ubninit
pi@raspberrypi:~$
```



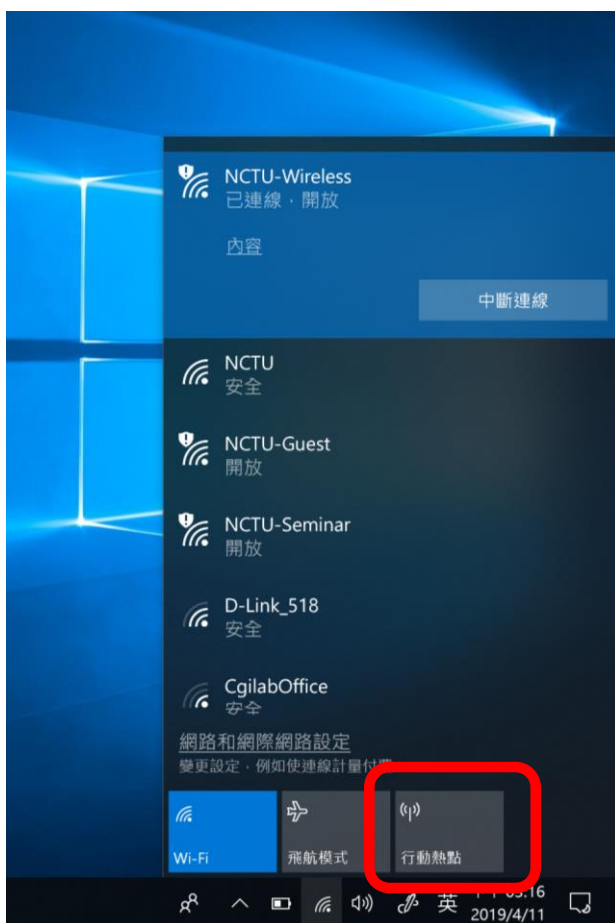
# Summary

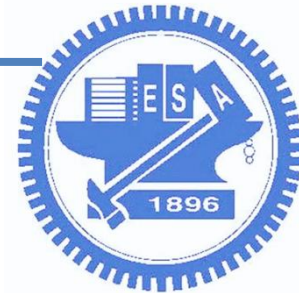
- 1. 根據安裝步驟, 使用TTL控制樹莓派
- 2. 建立VNC遠端桌面, 需開啟 “direct capture mode”
- 3. 練習wget、simpleHTTPserver與winscp傳輸檔案



# Appendix 1

- Create your own Wi-Fi hotspot on windows 10





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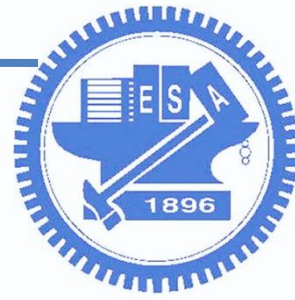
The image shows the Windows 10 Settings application. On the left, the 'Mobile Hotspot' (行動熱點) option is highlighted with a red rectangle. A red arrow points from this option to the 'Edit Network Information' (編輯網路資訊) dialog box that is open on the right.

**Mobile Hotspot Settings:**

- 行動熱點**
- 與其他裝置共用我的網際網路連線
- ☒ 開啟
- 從下列來源共用我的網際網路連線
- Wi-Fi
- 透過下列來源共用我的網際網路連線
- ☒ Wi-Fi
- ☐ 藍牙
- 網路名稱: DESKTOP-N7N29HF 2820
- 網路密碼: wufish5566
- 網路頻帶: 2.4 GHz
- 編輯
- 裝置已連接: 0 個 (共 8 個)

**Edit Network Information Dialog:**

- 編輯網路資訊**
- 變更其他人使用您分享的連線時所需的網路名稱與密碼。
- 網路名稱: DESKTOP-N7N29HF 2820
- 網路密碼 (至少 8 個字元): [Redacted]
- 網路頻帶: 2.4 GHz
- 儲存
- 取消



# Appendix 2

## Create Wi-Fi hotspot on Pi

- ❑ `wget https://raw.githubusercontent.com/raspberrypi-tw/sh/master/dual_mode.sh`
- ❑ `chmod +x dual_mode.sh`
- ❑ `sudo ./dual_mode.sh on` # it will install related packages and reboot
- ❑ `sudo ./dual_mode.sh off` # it will reboot

```
(COM8) [80x24]
連線(C) 編輯(E) 檢視(V) 視窗(W) 選項(O) 說明(H)
pi@raspberrypi:~/Pictures$ sudo ./dual_mode.sh on
Check Pi 3 OK
Dual mode on...

Input a number from [3] to [252]...> 4

=====
SSID: [RPi-4]
PSK:  [1234567890]
=====
After connect to [RPi-4], you can SSH 'pi@192.168.[4].1' to your Pi

Confirm the setting? [yes/no] > yes
```