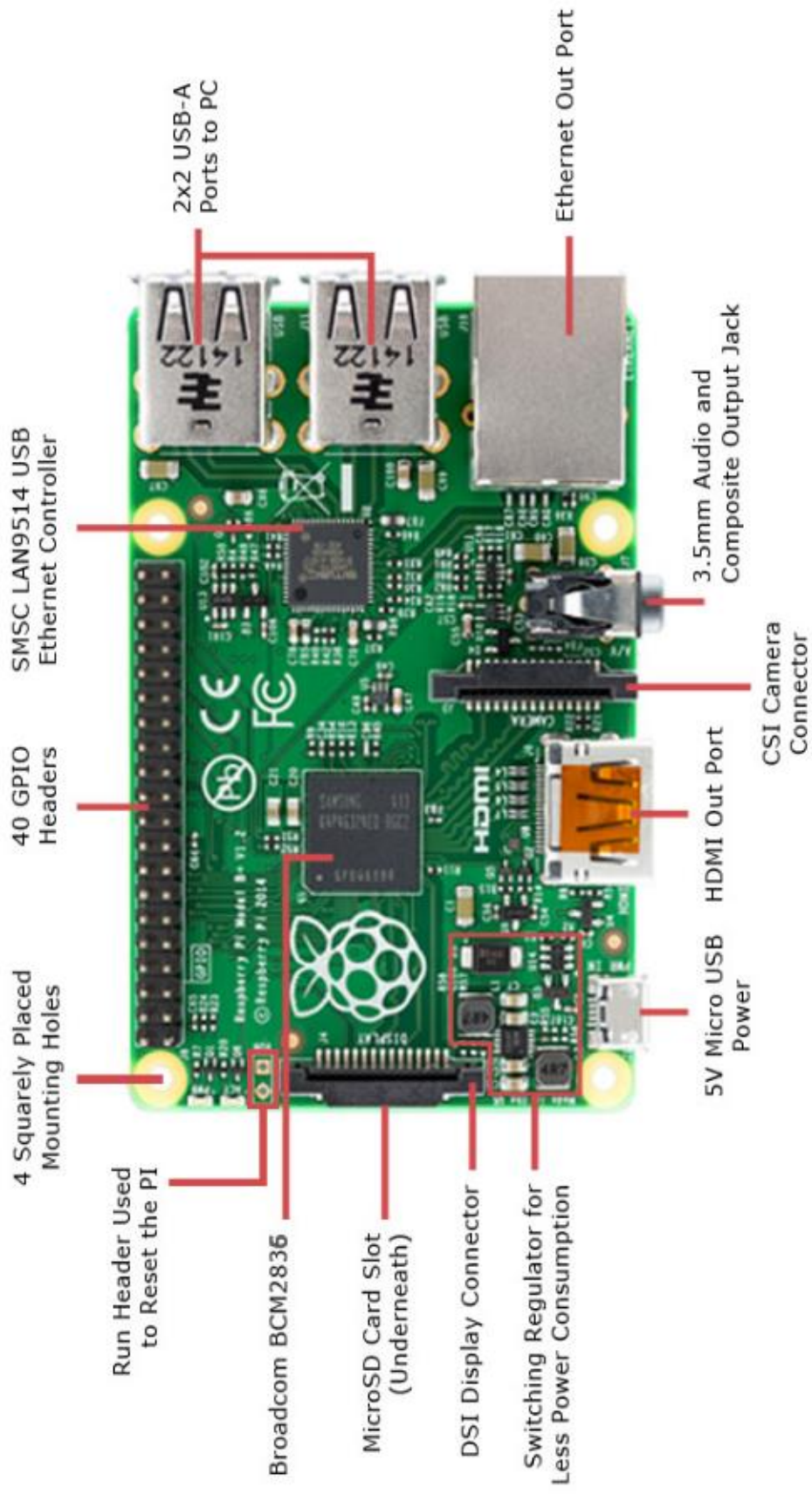


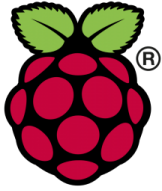

Raspberry Pi

入門體驗

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Raspberry Pi 4 Model B vs Arduino

		
	Micro-computer	Micro-controller
	Has OS Run your program along with many others	No OS Run your program ONLY
	Python, NodeJS, Ruby, Java, C, C++, etc.	C++
	Knowledge of Linux required	Program and debug on Windows
GPIO pins	Digital only	Analog and digital
Processor	BCM2711 (Broadcom)	ATmega (Atmel)
Speed	1.5 GHz, quad-core	8-16 MHz
RAM	2 GB	32-256 KB

Media Center, Music Player

OSMC
RuneAudio
Volumio

LibreELEC

FREE Video Add-ons

The Wall Street Journal
CBC.ca News
TED Talks
DIY Network

FREE Game Add-ons

Netwalk Game
Mr. Boom (Bomberman)
2048

懷舊遊戲機

RetroPie

Recalbox

Lakka

Keys: Arrows, Enter, Backspace, Escape

Main Menu

- ↳ Information
 - ↳ Network Information
 - ↳ System Information

Settings

- ↳ WiFi
- ↳ Service

SSH login: root, root

Load Core

- ↳ 2048

Online Updater

- ↳ Content Downloader
 - ↳ DOS
 - ↳ Wolfenstein 3D
 - ↳ Atari-2600
 - ↳ Sheep It Up
 - ↳ ChaiLove
 - ↳ Floppy Bird

Load Content

- ↳ Downloads
- ↳ Playlists

Raspbian (Raspberry Pi OS)

Wheezy

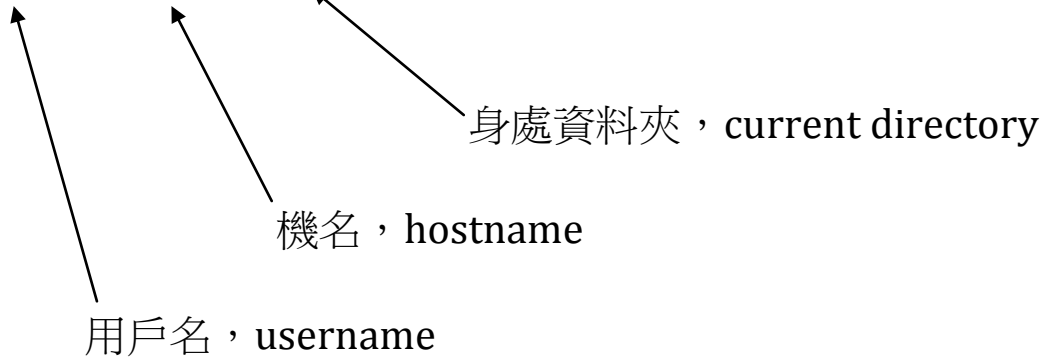
Jessie

Stretch

Buster

SSH login: pi, raspberry

```
pi@raspberrypi:~$ sudo raspi-config
```



如何找出 IP 地址？

1. Router：登入**路由器**管理介面（通常是 192.168.?.1），查看 **DHCP 使用者列表** 之類。
2. `hostname.local`：電腦需要支援 **multicast DNS**
3. Network scan：下載一個**網絡掃描**軟件，掃吓內聯網有什麼電腦、什麼 IP。

掃描軟件可試吓 Advanced Port Scanner 或 Angry IP Scanner，或 Fing 手機應用程式。

4. Plug n Pi：下載 **Plug n Pi** 手機應用程式，以 **USB 線** 連接手機及樹莓批，手機就可查看樹莓批的 IP 地址。

手機必須是 Android。樹莓批必須裝有 Plug n Pi Server 軟件。

VNC

On a PC within the same network:

1. Download **RealVNC viewer**
2. Connect to Pi's IP address

You may find the desktop resolution very small. To make it bigger, you may create a new desktop:

```
$ vncserver -geometry 1000x800
```

Take note of the **IP address:display number** printed out, e.g.
192.168.0.103:1

Connect to that <IP address:display number>.

For more tips on using Raspberry Pi:

<https://www.raspberrypi.org/documentation>

ls

list

ls

What things are there?

ls -l

Give me more details.

ls -a

Show me the hidden stuff (those starting with a dot).

ls -l -a

Chain two options together to double the benefits.

ls -la

You may also chain them like this.

ls -tl

Sort by date.

ls *directory*

What is in that directory?

man ls

Explain this command.

ls --help

Another way to explain this command.

But the output overflows the page, what can I do?

cd

change directory

cd *directory*

Go to a directory.

cd ..

Go up a level.
Double-dot means the parent directory.

cd .

Stay in the same directory.
Single-dot means the current directory.

In practice, you never do this. It is here for educational purposes only.

cd ~

Go back to home directory.
The tilde (~) means home directory.

cd

Go back to home directory. Equivalent to **cd** ~.

pwd

print working directory

pwd

Where am I?

cp

copy

```
cp oldfile newfile
```

Make a copy of *oldfile*, and name it *newfile*.

```
cp -r olddir newdir
```

Copy an entire directory.

“-r” means “recursive”. That is, copy sub-directories, and their sub-directories, and their sub-directories, and so on.

Type **cp --help** or **man cp** to review the options.

mv

move or rename

```
mv oldfile newfile
```

oldfile now becomes *newfile*.

```
mv file dir
```

Move file to directory.

rm

remove

rm *filename*

Delete a file.

rm -r *directory*

Delete a directory.

“-r” means “recursive”. That is, delete sub-directories, and their sub-directories, and their sub-directories, and so on.

mkdir

make directory

mkdir *directory*

Create a new directory.

rmdir

remove directory

rmdir *directory*

You can only remove an empty directory. Delete everything inside first, or use **rm -r**.

nano

a text editor

nano

When you want to write something,
bring up a text editor.

nano *filename*

Edit an existing file.

Two shortcuts you need to know, for
now:

Ctrl-O to save

Ctrl-X to exit

more or less

show text content, or show output page-by-page

less *filename*

Display file content.

If content is longer than one page:

- Use ← ↑ ↓ → **[Page Up/Down]** to navigate
- Type **q** to quit.

ls --help | less

Display the preceding command's output in a page-by-page manner.

"|" is called a "pipe". We will see more of it later.

If you have trouble typing the "|":

1. Enter **sudo raspi-config**
2. Select **Internationalisation options**
3. Select **Change Keyboard Layout**, this may take a while.
4. Linux should have detected the keyboard for you. Press **[enter]**.
5. Then, it asks for Keyboard Layout. Default is English (UK). DO NOT trust that. You should select **Other**, then **English (US)**, then **English (US)** again.
6. Finally, it asks a few more questions. Press **[enter]** to skip all of them.
7. **Finish** and **reboot**.

sudo reboot, sudo halt -h

Reboot and shutdown

`sudo reboot`

“sudo” means “superuser do”. You cannot reboot the machine as an ordinary user. You must turn yourself into a *superuser* first.

`sudo halt -h`

To shutdown the machine, you also have to be a superuser.

Type **halt --help** or **man halt** to review the options.

DO NOT unplug the power until Raspberry Pi is completely shut down. The SD card may be corrupted if power is pulled prematurely.

Pay attention to the **blinking lights** on Raspberry Pi. Wait until only **one steady red light** is left and all other lights are dead. That’s when you can unplug the power safely.

How do you turn it on again? Just re-plug the power.

A Simplified UNIX Family Tree

