

Installing and Configuring Raspberry Pi System

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1. Preface

Raspberry Pi is a low cost, **credit card sized computer** that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is an incredibly capable little device that enables people of all ages to explore computing, and to learn how to program in a variety of computer languages like Scratch and Python. It is capable of doing everything you would expect from a desktop computer, such as browsing the internet, playing high-definition video content, creating spreadsheets, performing word-processing, and playing video games. For more information, you can refer to Raspberry Pi official [website](#). For clarification, this tutorial will also reference Raspberry Pi as RPi, RPI and RasPi.

Additionally, if you encounter any issues or have questions about this tutorial , you can always contact us for free technical support at:cokoino@outlook.com

2. Introduction of Raspberry Pi

So far, at this writing, Raspberry Pi has advanced to its fifth generation product offering. Version changes are accompanied by increases in upgrades in hardware and capabilities.

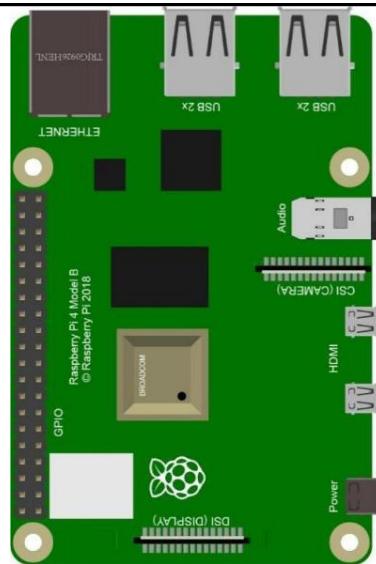
The A type and B type versions of the first generation products have been discontinued due to various reasons. What is most important is that other popular and currently available versions are consistent in the order and number of pins and their assigned designation of function, making compatibility of peripheral devices greatly enhanced between versions.

Below are the raspberry pi pictures and model pictures . They have 40 pins.

Actual image of Raspberry Pi 5	
	
Actual image of Raspberry Pi 4 Model B:	CAD image of Raspberry Pi 4 Model B:



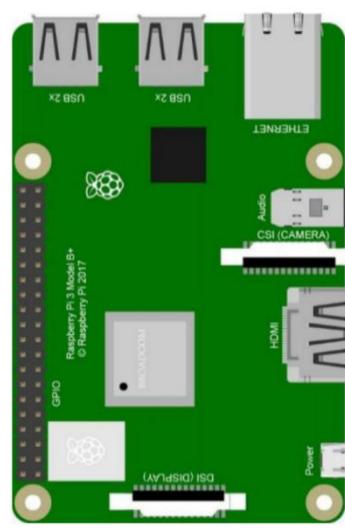
Actual image of Raspberry Pi 3 Model B+:



CAD image of Raspberry Pi 3 Model B+:



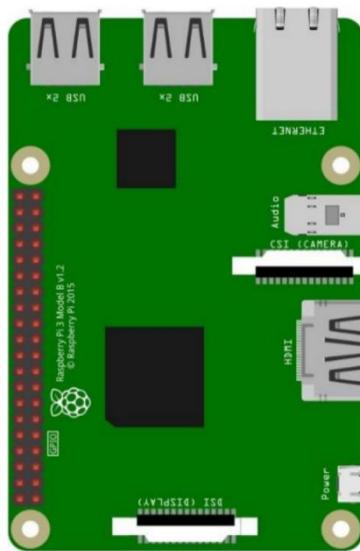
Actual image of Raspberry Pi 3 Model B:



CAD image of Raspberry Pi 3 Model B:



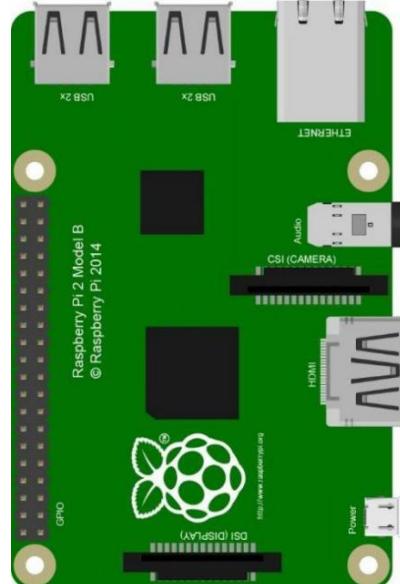
Actual image of Raspberry Pi 2 Model B:



CAD image of Raspberry Pi 2 Model B:



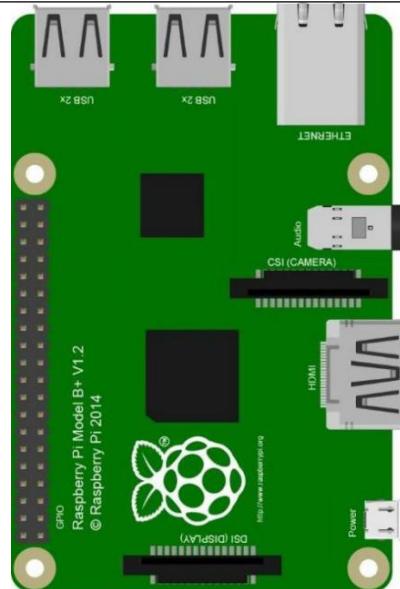
Actual image of Raspberry Pi 1 Model B+:



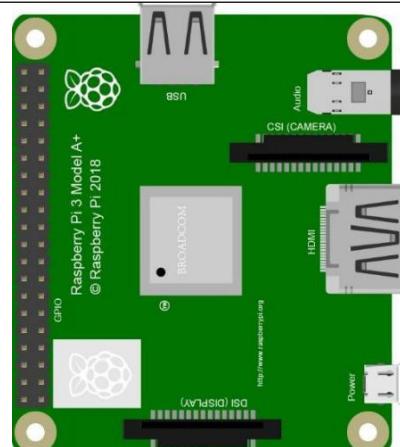
CAD image of Raspberry Pi 1 Model B+:

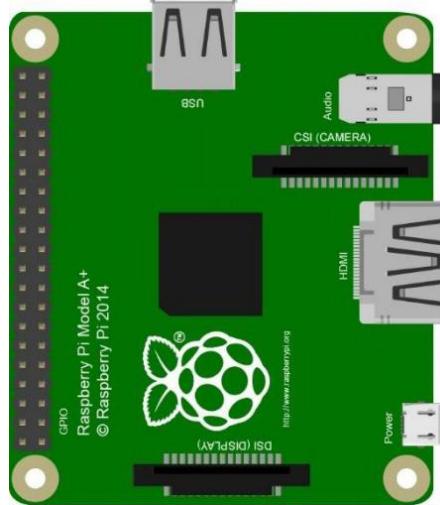
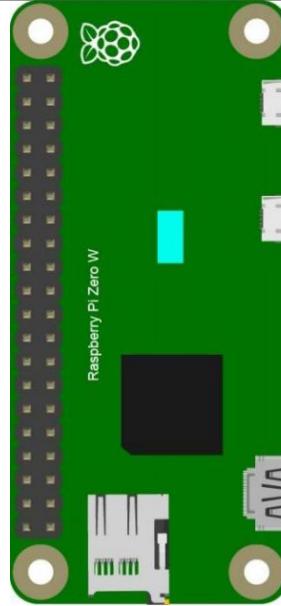
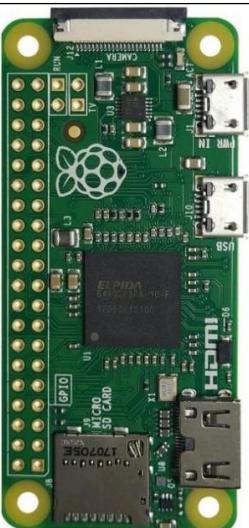
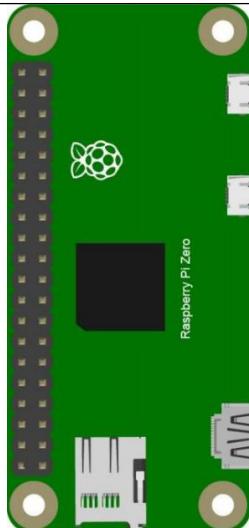


Actual image of Raspberry Pi 3 Model A+:

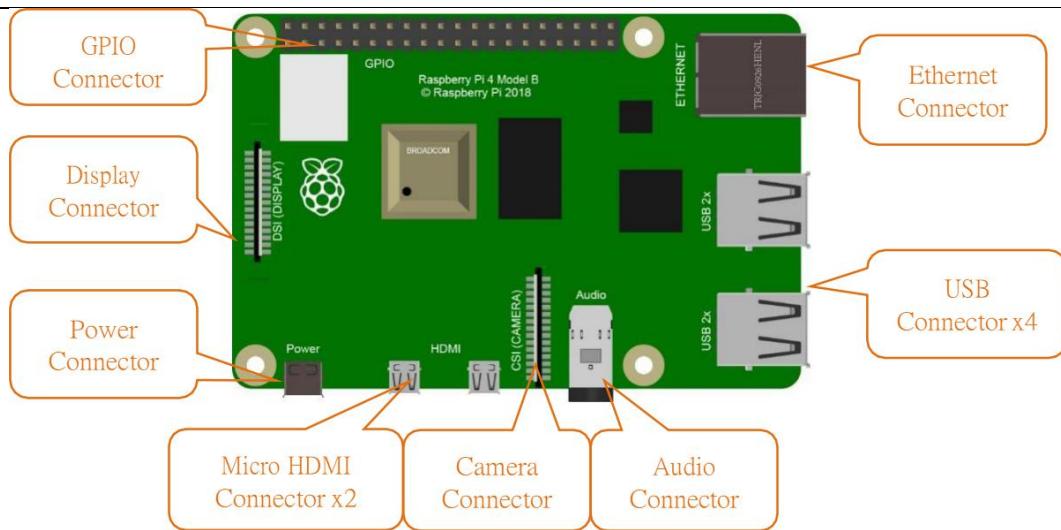


CAD image of Raspberry Pi 3 Model A+:

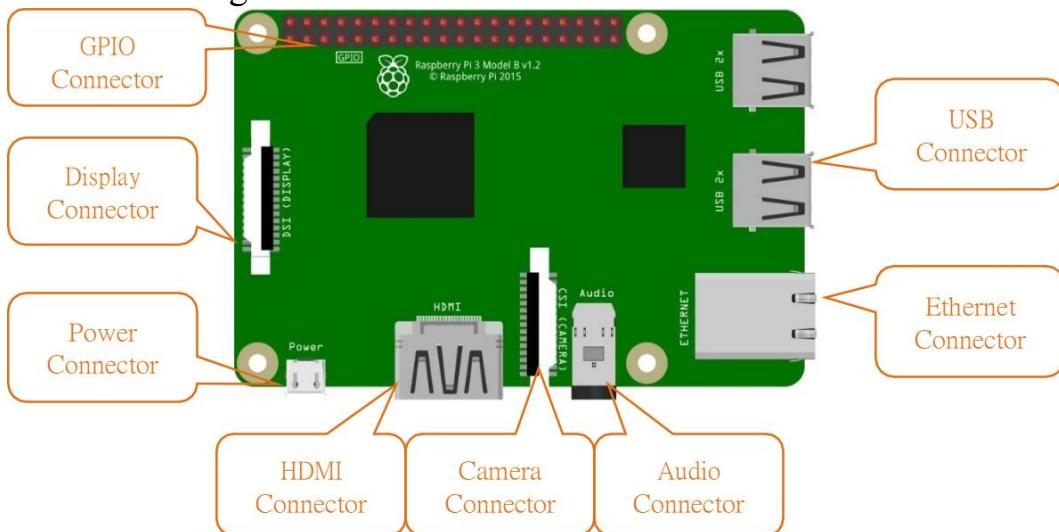


<p>Actual image of Raspberry Pi 1 Model A+:</p> 	<p>CAD image of Raspberry Pi 1 Model A+:</p> 
<p>Actual image of Raspberry Pi Zero W:</p> 	<p>CAD image of Raspberry Pi Zero W:</p> 
<p>Actual image of Raspberry Pi Zero:</p> 	<p>CAD image of Raspberry Pi Zero:</p> 

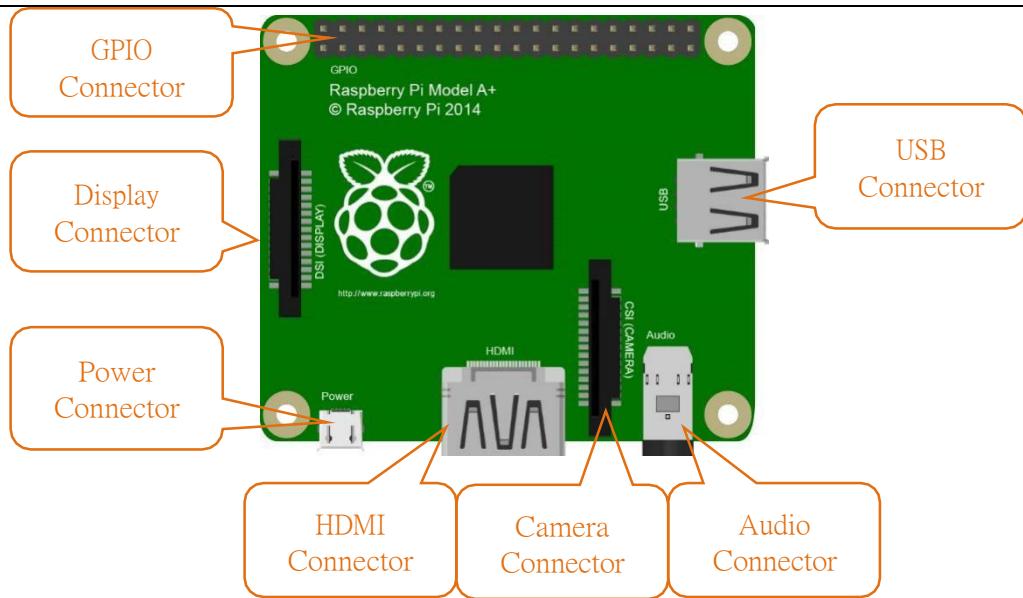
Hardware interface diagram of RPi 4B:



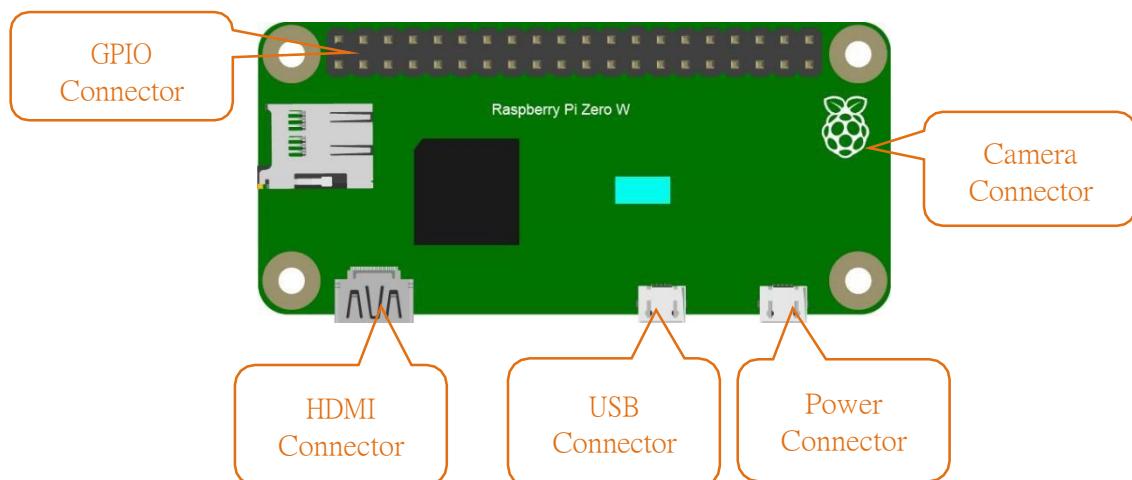
Hardware interface diagram of RPi 3B+/3B/2B/1B+:



Hardware interface diagram of RPi 3A+/A+:



Hardware interface diagram of RPi Zero/Zero W:

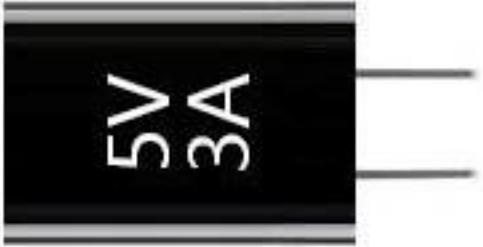
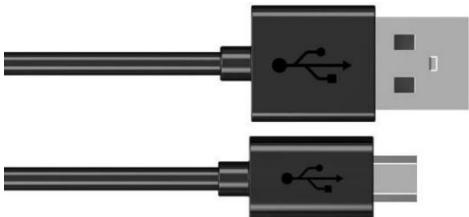


3. Installing an Operating System

The first step is to install an operating system on your RPi so that it can be programmed and function. If you have installed a system in your RPi, you can begin use the raspberry pi .

3.1 Component List

Required Components

Any Raspberry Pi with 40 GPIO 	5V/3A Power Adapter. Note: Different versions of Raspberry Pi have different power requirements (please check the power requirements for yours on the chart in the following page.) 
Micro or Type-C USB Cable x1 	Micro SD Card (TF Card) x1, Card Reader x1 

Power requirements of various versions of Raspberry Pi are shown in following table:

Product	Recommended PSU current capacity	Maximum total USB peripheral current draw	Typical bare-board active current consumption
Raspberry Pi Model A	700mA	500mA	200mA
Raspberry Pi Model B	1.2A	500mA	500mA
Raspberry Pi Model A+	700mA	500mA	180mA
Raspberry Pi Model B+	1.8A	600mA/1.2A (switchable)	330mA
Raspberry Pi 2 Model B	1.8A	600mA/1.2A (switchable)	350mA
Raspberry Pi 3 Model B	2.5A	1.2A	400mA
Raspberry Pi 3 Model A+	2.5A	Limited by PSU, board, and connector ratings only.	350mA
Raspberry Pi 3 Model B+	2.5A	1.2A	500mA
Raspberry Pi 4 Model B	3.0A	1.2A	600mA
Raspberry Pi Zero W	1.2A	Limited by PSU, board, and connector ratings only.	150mA
Raspberry Pi Zero	1.2A	Limited by PSU, board, and connector ratings only	100mA

For more details, please refer to <https://www.raspberrypi.org/help/faqs/#powerReqs>

In addition, RPi also needs an Ethernet network cable used to connect it to a WAN (Wide Area Network).

All these components are necessary for any of your projects to work. Among them, the power supply of at least 5V/2.5A, because a lack of a sufficient power supply may lead to many functional issues and even damage your RPi, we STRONGLY RECOMMEND a 5V/2.5A power supply. We also recommend using a SD Micro Card with a capacity of 16GB or more (which, functions as the RPI's "hard drive") and is used to store the operating system and necessary operational files.

3.2 Optional Components

Under normal circumstances, there are two ways to login to Raspberry Pi: 1) Using a stand-alone monitor. 2) Using a remote desktop or laptop computer monitor “sharing” the PC monitor with your RPi.

Required Accessories for Monitor

If you choose to use an independent monitor, mouse and keyboard, you also need the following accessories:

A display with a HDMI interface

A Mouse and a Keyboard with an USB interface

As to Pi Zero and Pi Zero W, you also need the following accessories:

A Mini-HDMI to HDMI Adapter and Cable.

A Micro-USB to USB-A Adapter and Cable (Micro USB OTG Cable).

A USB HUB.

USB to Ethernet Interface or USB Wi-Fi receiver.

For different Raspberry Pi Modules, the optional items may vary slightly but they all aim to convert the interfaces to Raspberry Pi standards.

	Pi Zero	Pi A+	Pi Zero W	Pi 3A+	Pi B+/2B	Pi 3B/3B+	Pi 4B
Monitor				Yes (All)			
Mouse				Yes (All)			
Keyboard				Yes (All)			
Micro-HDMI to HDMI Adapter & Cable	Yes	No	Yes	No	No	No	No
Micro-HDMI to HDMI Adapter & Cable				No			Yes
Micro-USB to USB-A Adapter & Cable (Micro USB OTG Cable)	Yes	No	Yes			No	
USB HUB	Yes	Yes	Yes	Yes	No	No	
USB to Ethernet Interface	select one from two or select two from two		optional		Internal Integration	Internal Integration	
USB Wi-Fi Receiver			Internal Integration	optional			

Required Accessories for Remote Desktop

If you do not have an independent monitor, or if you want to use a remote desktop, you first need to login to Raspberry Pi through SSH, and then open the VNC or RDP service. This requires the following accessories.

	Pi Zero	Pi Zero W	Pi A+	Pi 3A+	Pi B+/2B	Pi 3B/3B+/4B
Micro-USB to USB-A Adapter & Cable (Micro USB OTG Cable)	Yes	Yes	No			NO
USB to Ethernet interface	Yes	Yes	Yes			

3.3 Raspberry Pi OS

Without Screen - Use Raspberry Pi - under Windows PC: <https://youtu.be/YND0RUuP-to>

With Screen - Use Raspberry Pi - under Windows PC: <https://youtu.be/HEywFsFrj3I>

Automatically Method

You can follow the official method to install the system for raspberry pi via visiting link below:

<https://projects.raspberrypi.org/en/projects/raspberry-pi-setting-up/2>

In this way, the system will be downloaded automatically via the application.

Manually Method

Install Raspberry Pi Imager

Visit the official website of Raspberry Pi to download through a browser:

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

- For Windows OS, click "Download for Windows" to download.
- For Mac OS, click "Download for macOS" to download.
- For Linux OS, Click "Download for Ubuntu for x86" to download.

After the download is complete, install the software and burn the Raspberry Pi OS .

Now take **Windows** as an example.

**Install Raspberry Pi OS using
Raspberry Pi Imager**

Raspberry Pi Imager is the quick and easy way to install Raspberry Pi OS and other operating systems to a microSD card, ready to use with your Raspberry Pi.

Download and install Raspberry Pi Imager to a computer with an SD card reader. Put the SD card you'll use with your Raspberry Pi into the reader and run Raspberry Pi Imager.

Download for Windows (arrow pointing here)

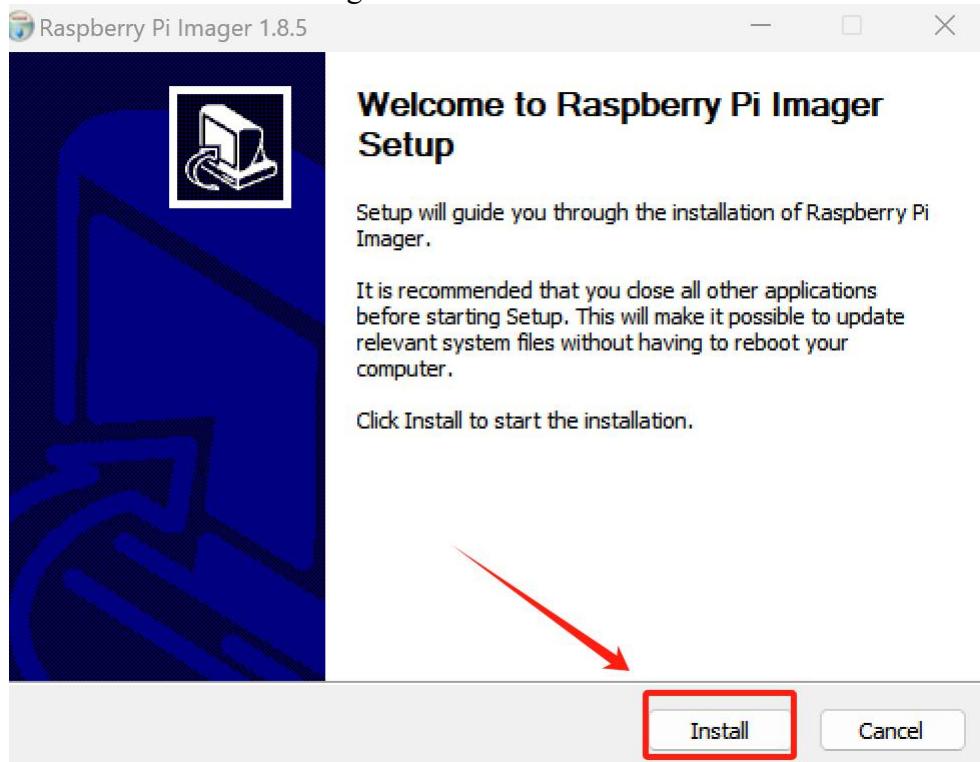
[Download for macOS](#)

[Download for Ubuntu for x86](#)

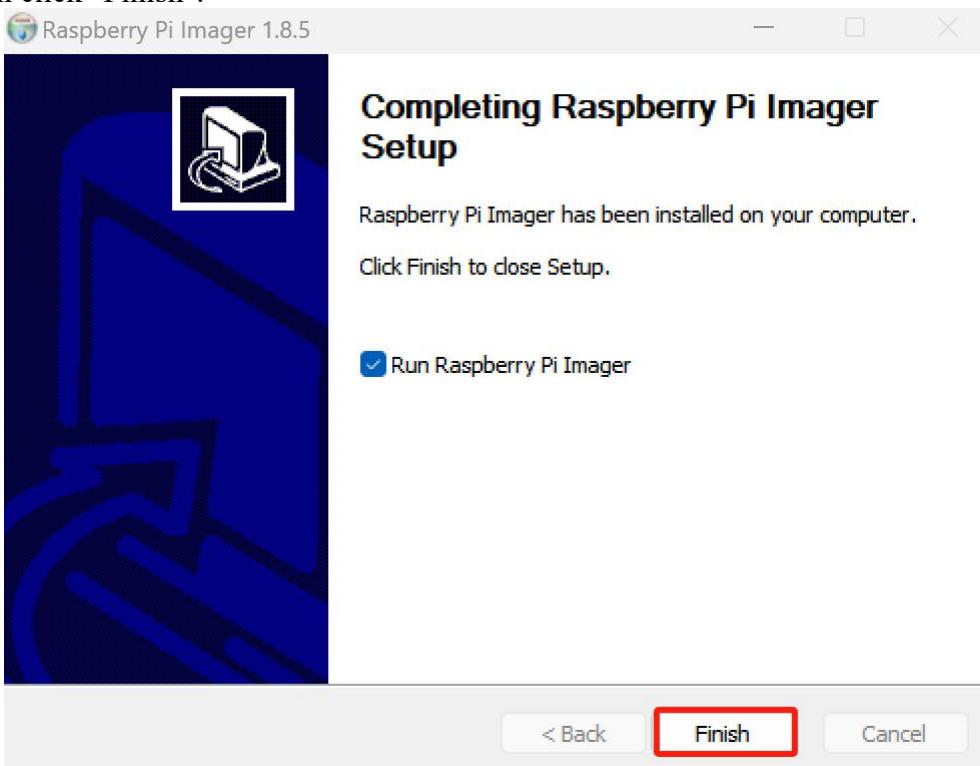
To install on **Raspberry Pi OS**, type
`sudo apt install rpi-imager`
in a Terminal window.



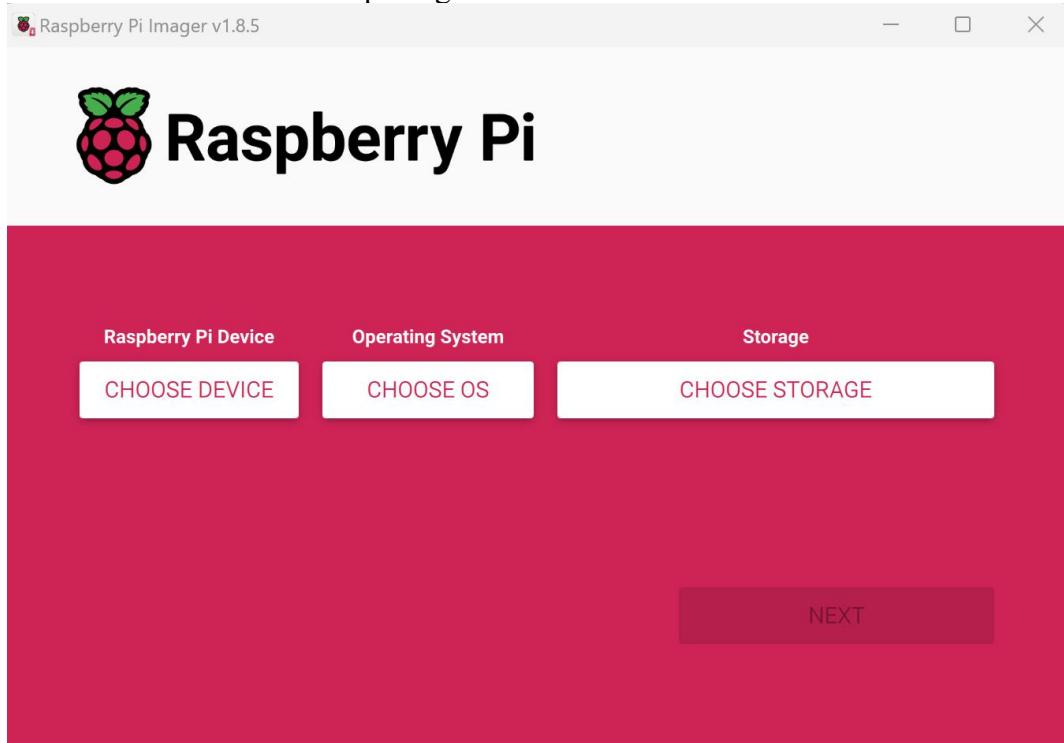
Open the downloaded file "imager.exe" and click "Install".



Then click "Finish".



The software interface after opening is as shown below:



After installing the Imager Tool in the link above. You can also download the system manually first. Visit <https://www.raspberrypi.org/downloads/>

Manually install an operating system image

Browse a range of operating systems provided by Raspberry Pi, and download them to install manually.

[See all download options](#)



Operating system images

Many operating systems are available for Raspberry Pi, including Raspberry Pi OS, our official supported operating system, and operating systems from other organisations.

[Raspberry Pi Imager](#) is the quick and easy way to install an operating system to a microSD card ready to use with your Raspberry Pi. Alternatively, choose from the operating systems below, available to download and install manually.

Download:
[Raspberry Pi OS](#)
[Raspberry Pi OS \(64-bit\)](#)
[Raspberry Pi OS \(Legacy\)](#)
[Raspberry Pi OS \(Legacy, 64-bit\)](#)
[Raspberry Pi Desktop](#)

Raspberry Pi OS

Our recommended operating system for most users.

Compatible with:

[All Raspberry Pi models](#)

Raspberry Pi OS with desktop

Release date: December 5th 2023
System: 32-bit
Kernel version: 6.1
Debian version: 12 (bookworm)
Size: 1,254MB
[Show SHA256 file integrity hash](#)
[Release notes](#)

[Download](#)

[Download torrent](#)

[Archive](#)

Raspberry Pi OS with desktop and recommended software

Release date: December 5th 2023
System: 32-bit
Kernel version: 6.1
Debian version: 12 (bookworm)
Size: 2,602MB
[Show SHA256 file integrity hash](#)
[Release notes](#)

[click to download](#)

[Download](#)

[Download torrent](#)

[Archive](#)



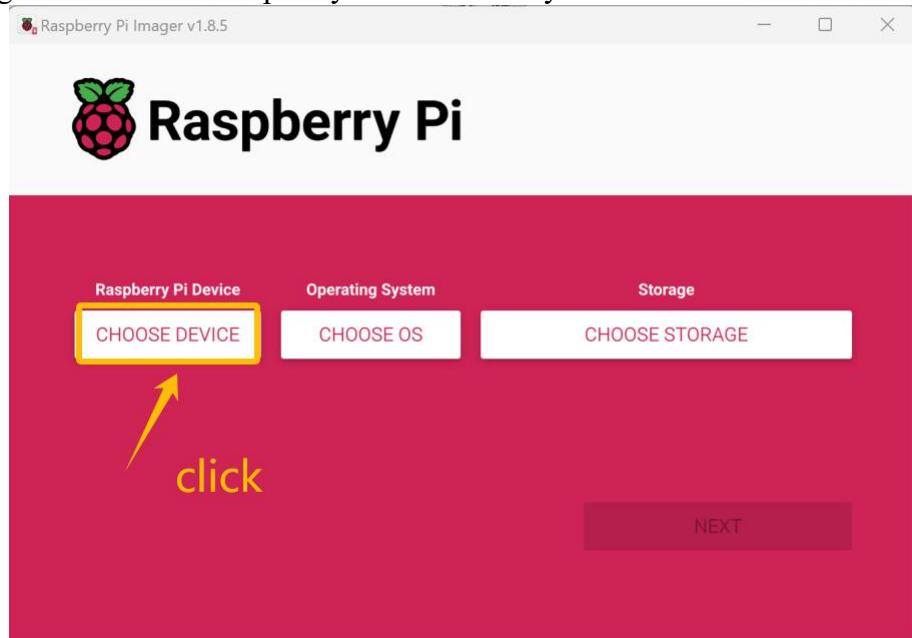
And then the zip file is downloaded.

3.4 Write System to Micro SD Card

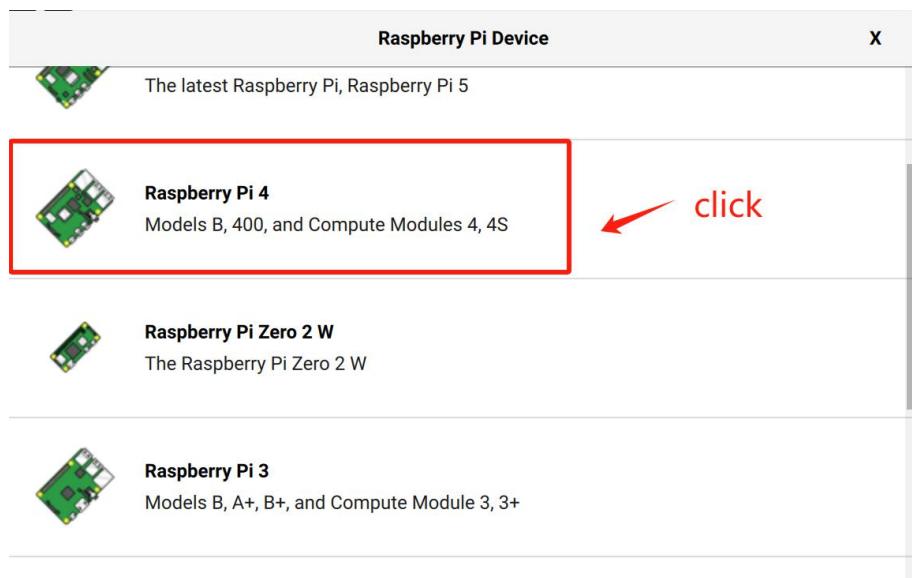
First, put your Micro SD card into card reader and connect it to USB port of PC.



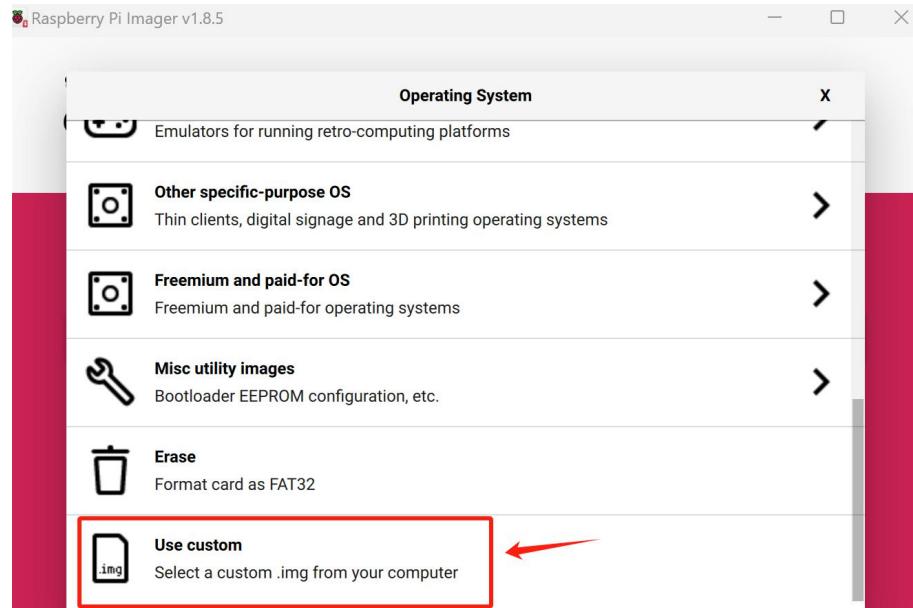
Then open imager tool. Choose Raspberry Pi Device that you want to use.



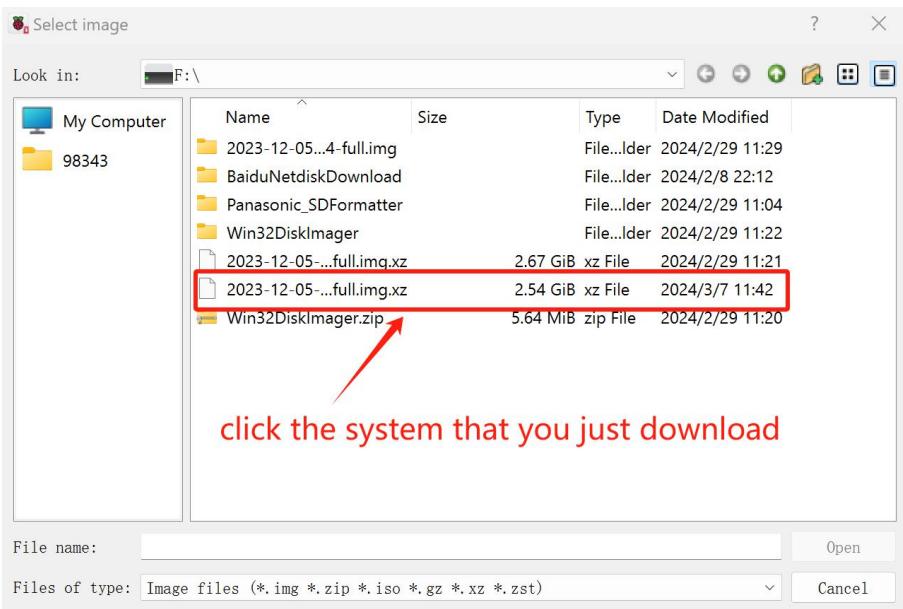
For example, we choose the Raspberry Pi 4 .



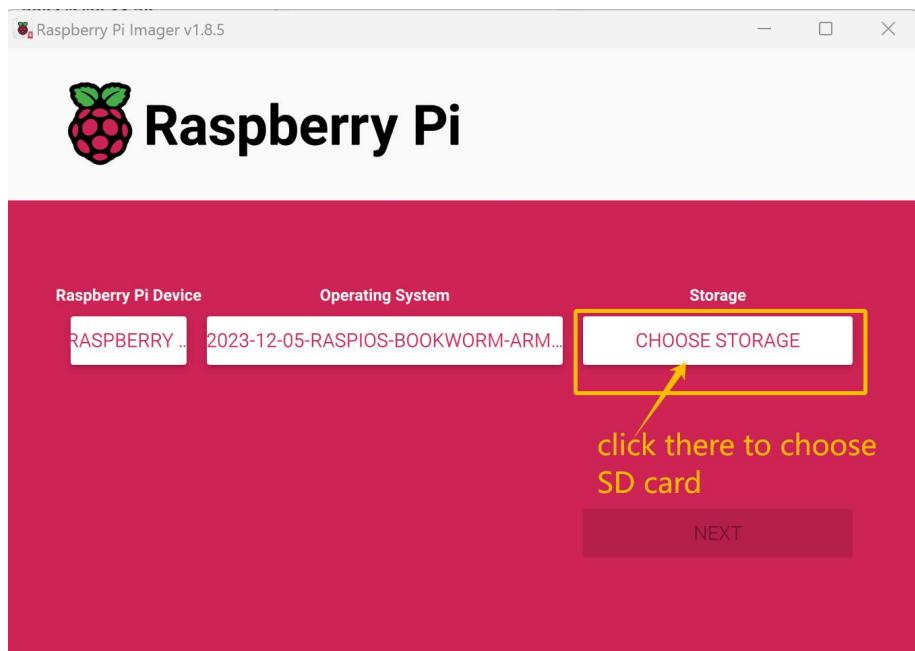
Choose system that you just downloaded in Use custom.



For example, the system that download stored in the F disk of our computer.



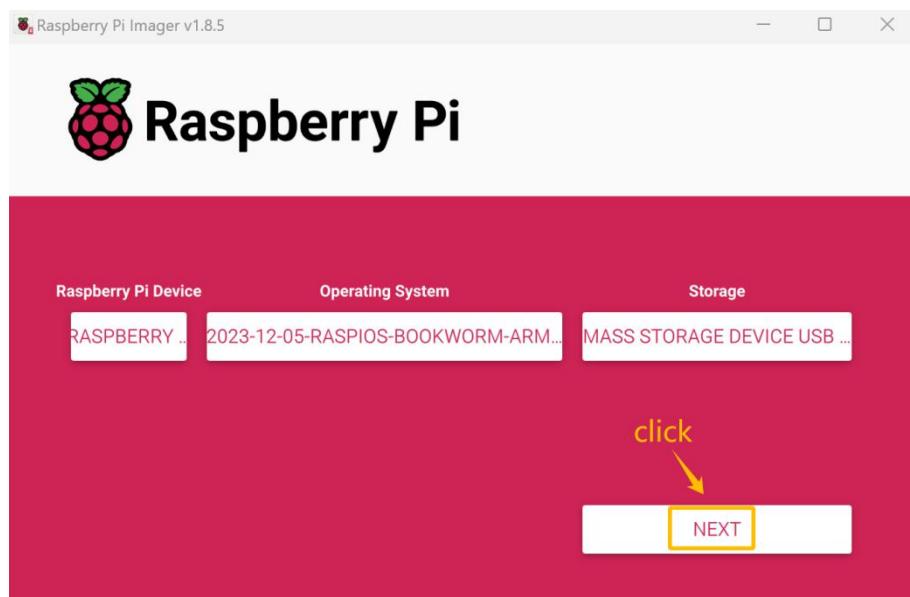
Choose the SD card.



For example, the SD card connect to my computer is H disk, click it to choose.

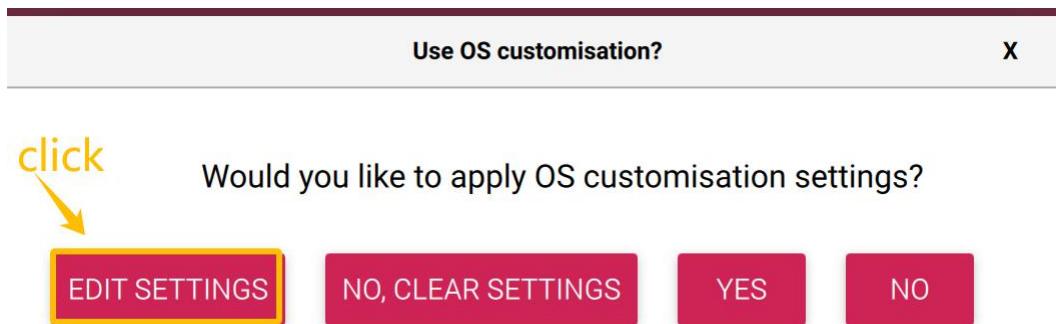


Then, click the "NEXT"

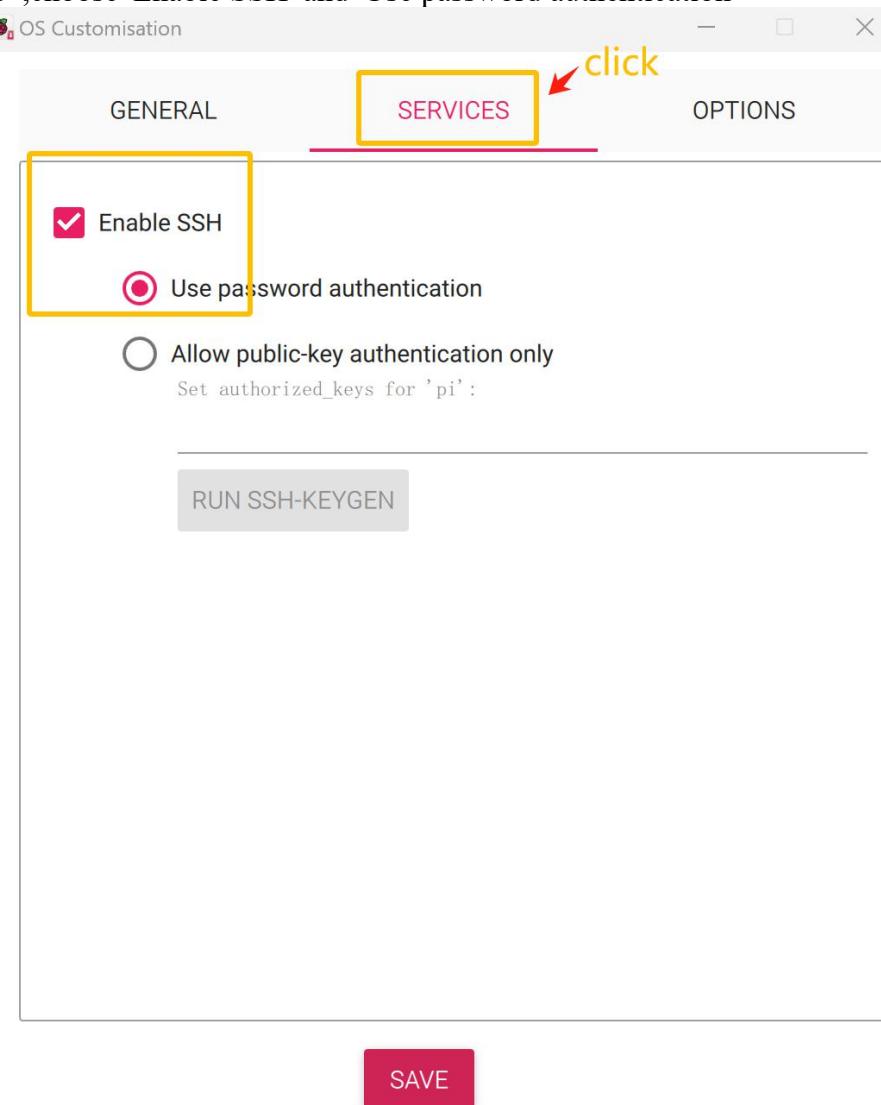


3.5 Enable ssh and configure WiFi

There will pop up prompt “Would you like to apply OS customization settings”, click “EDIT SETTINGS”



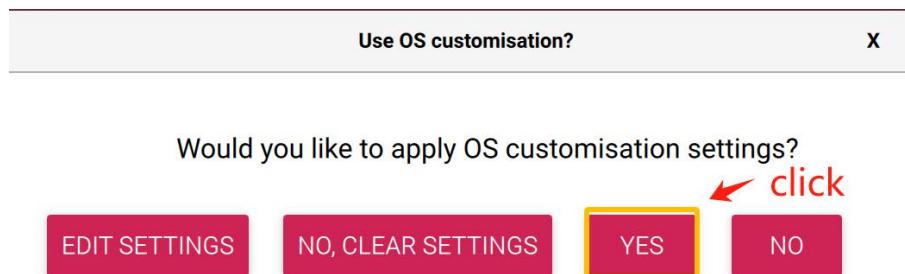
Click “SERVICES”, choose “Enable SSH” and “Use password authentication”



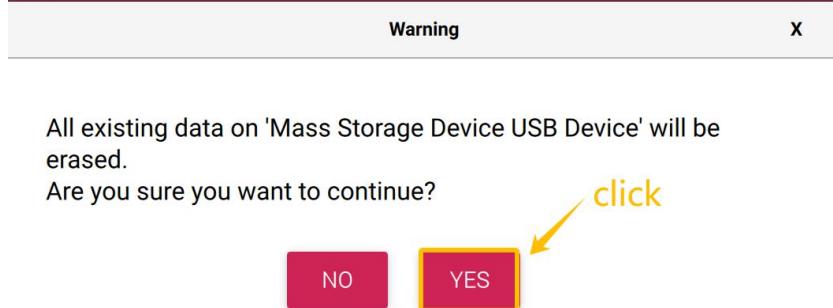
Then click “GENERAL” to set hostname “raspberrypi”, set username and password as “pi” and “raspberrypi”. Then configure wireless LAN, write your WiFi name and WiFi password. Click “SAVE” after all set up.



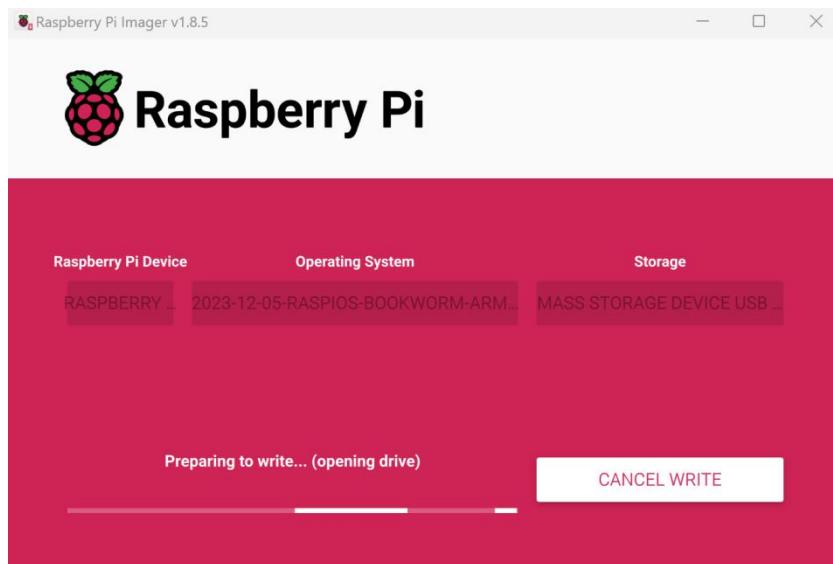
In “Use OS customisation” interface, click the “YES”



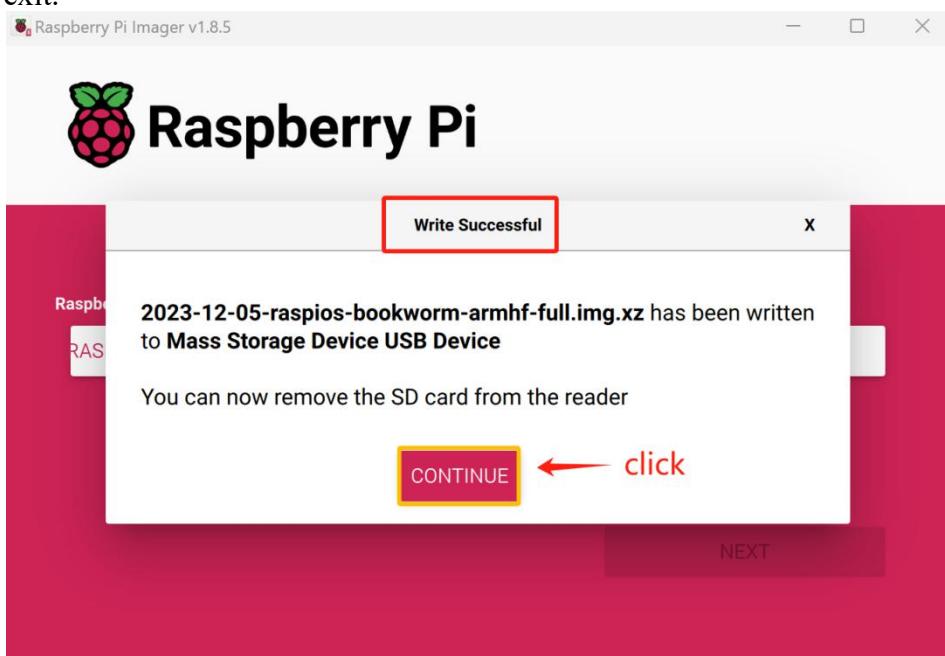
In the pop-up warning interface, click the "YES"



The Raspberry Pi system is writing to the SD card

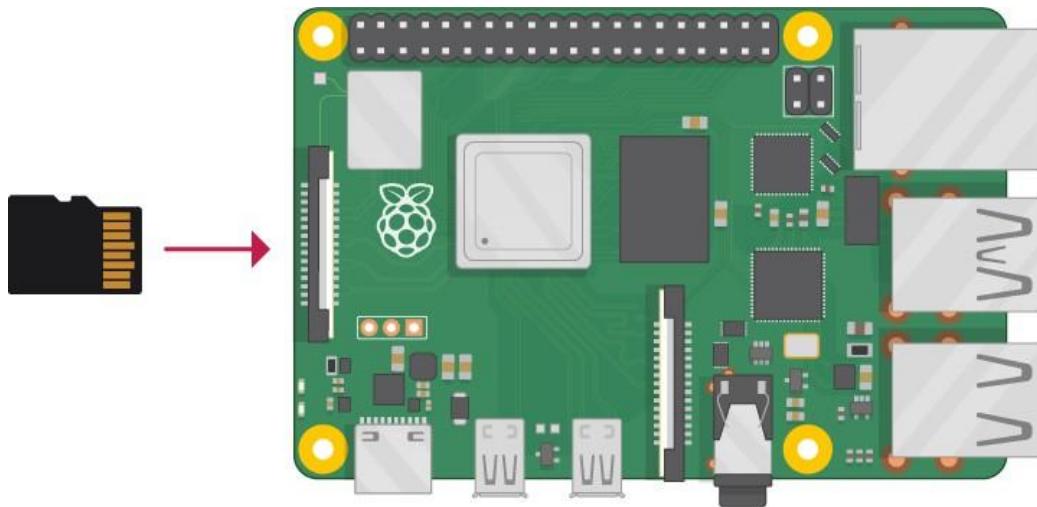


After waiting for about half an hour, the system successfully writes to the SD card and clicks "Continue" to exit.



3.6 Insert SD card

Then remove SD card from card reader and insert it into Raspberry Pi.

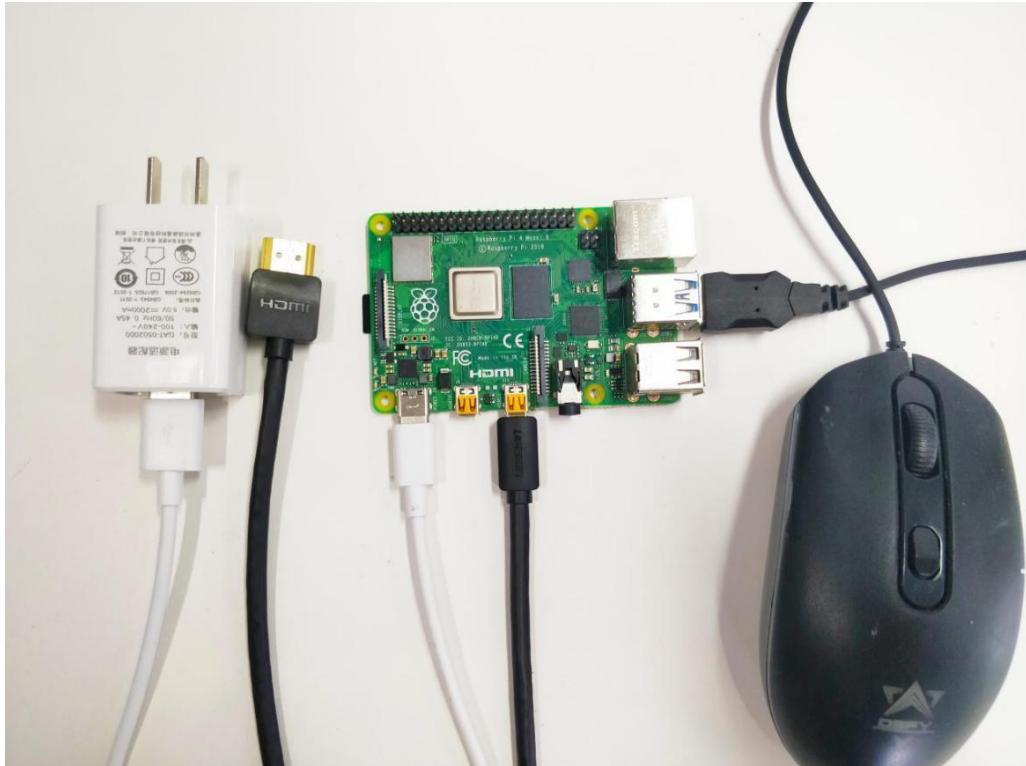


4. Getting Started with Raspberry Pi

4.1 Monitor desktop

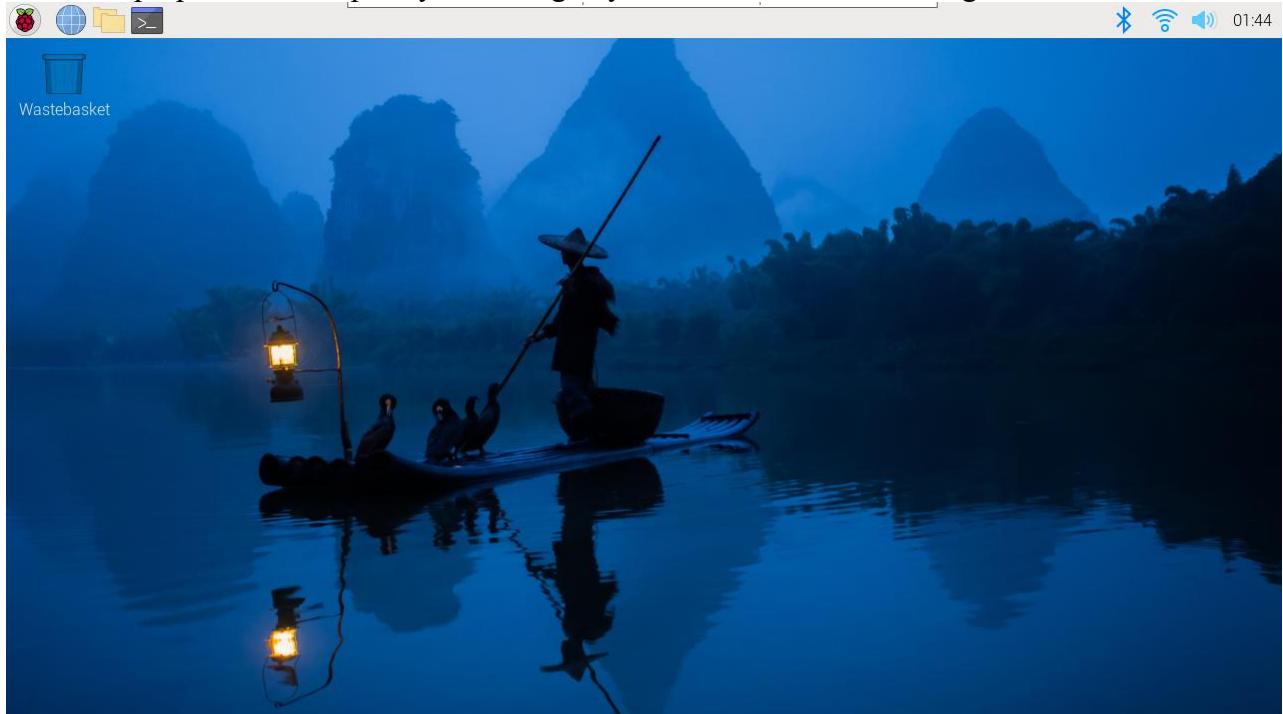
If you do not have a spare monitor, please skip to next section [Remote desktop & VNC](#). If you have a spare monitor, please follow the steps in this section.

After the system is written successfully, take out Micro SD Card and put it into the SD card slot of RPi. Then connect your RPi to the monitor through the HDMI port, attach your mouse and keyboard through the USB ports, attach a network cable to the network port and finally, connect your power supply





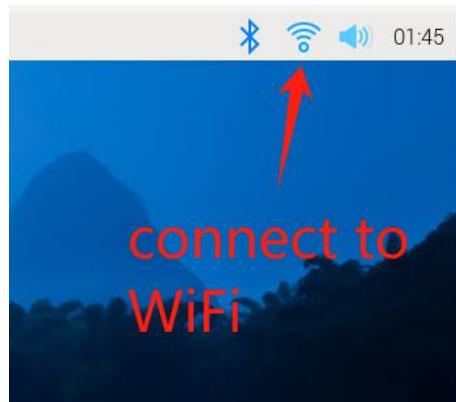
(making sure that it meets the specifications required by your RPi Module Version. Your RPi should start (power up). Later, after setup, you will need to enter your user name and password to login. The default user name: pi; password: raspberry. After login, you should see the following screen.



Congratulations! You have successfully installed the RASPBERRY PI OS operating system on your RPi.

Raspberry Pi 4B, 3B+/3B integrates a Wi-Fi adaptor. You can use it to connect to your Wi-Fi. Then you

can use the wireless remote desktop to control your RPi. This will be helpful for the following work. Raspberry Pi of other models can use wireless remote desktop through accessing an external USB wireless card.



4.2 Remote desktop & VNC

If you have logged in Raspberry Pi via display, you can skip to [VNC Viewer](#).

If you don't have a spare display, mouse and keyboard for your RPi, you can use a remote desktop to share a display, keyboard, and mouse with your PC. Below is how to use:

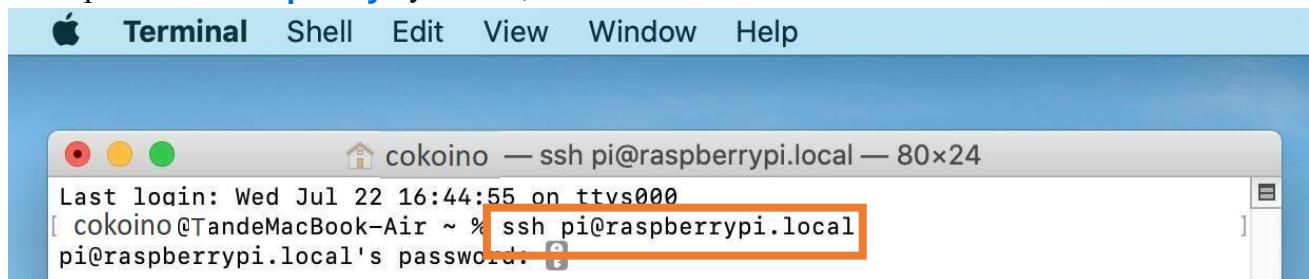
[MAC OS remote desktop](#) and [Windows OS remote desktop](#).

4.2.1 MAC OS Remote Desktop

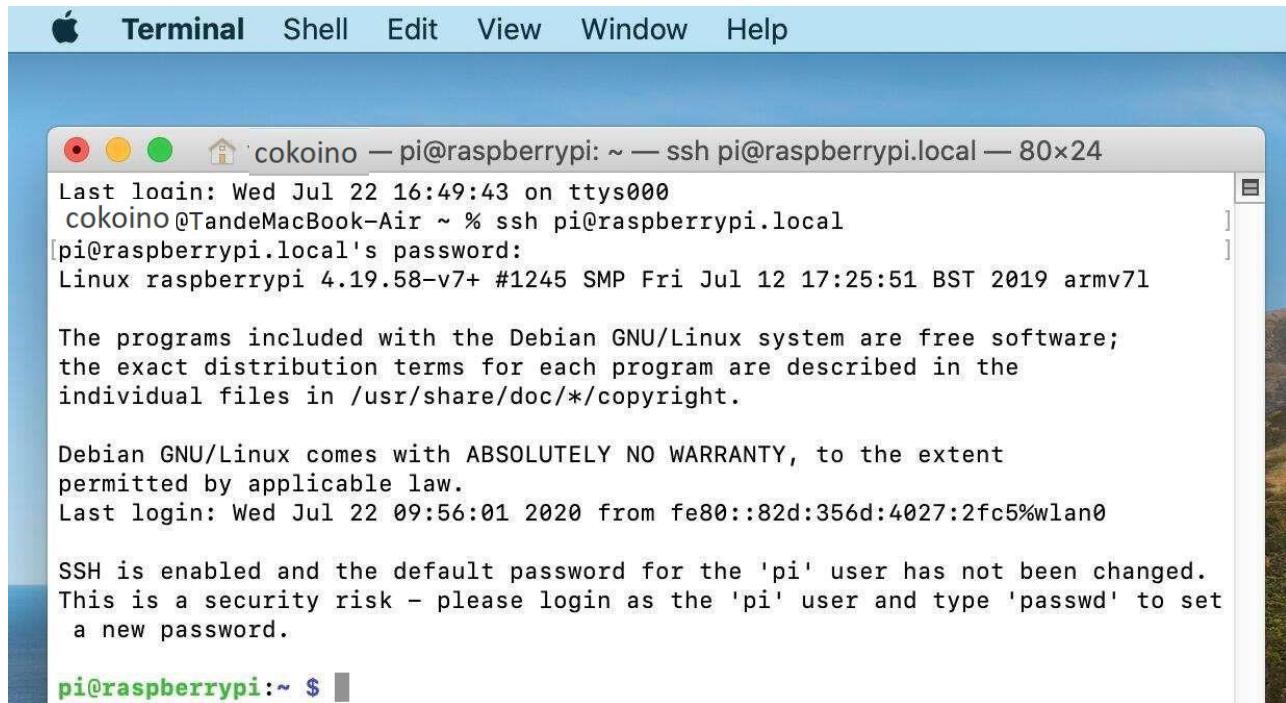
Open the terminal and type following command. **If this command doesn't work, please move to next page.**

```
ssh pi@raspberrypi.local
```

The password is **raspberry** by default, case sensitive.



You may need to type **yes** during the process.



You can also use the IP address to log in Pi.

Enter **router** client to **inquiry IP address** named “raspberry pi”. For example, I have inquired to **my RPi IP address, and it is “192.168.1.131”**.

Open the terminal and type following command.

```
ssh pi@192.168.1.131
```

When you see **pi@raspberrypi:~ \$**, you have logged in Pi successfully. Then you can skip to next section.

The screenshot shows a macOS Terminal window titled "Terminal". The title bar includes the Apple logo, the word "Terminal", and menu items for Shell, Edit, View, Window, and Help. The main pane of the terminal displays the following text:

```
cokoino — pi@raspberrypi: ~ — ssh pi@192.168.1.131 — 81x44
[cokoino @TandeMacBook-Air ~ % ssh pi@192.168.1.131
The authenticity of host '192.168.1.131 (192.168.1.131)' can't be established.
ECDSA key fingerprint is SHA256:95hc76ISxQ/+z9TGG57136senETX60yaAaqds1ENpE4.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.1.131' (ECDSA) to the list of known hosts.
[pi@192.168.1.131's password:
Linux raspberrypi 4.19.58-v7+ #1245 SMP Fri Jul 12 17:25:51 BST 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.
Last login: Wed Jul 22 09:56:32 2020 from fe80::82d:356d:4027:2fc5%wlan0

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk – please login as the 'pi' user and type 'passwd' to set
a new password.

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

Below the terminal window, a separate window titled "Raspberry Pi Software Configuration Tool (raspi-config)" is open. This window lists various configuration options:

Option Number	Description
1	Change User Password (highlighted in red)
2	Network Options
3	Boot Options
4	Localisation Options
5	Interfacing Options
6	Overclock
7	Advanced Options
8	Update
9	About raspi-config

At the bottom of the configuration tool window, there are two buttons: "<Select>" and "<Finish>".

Then you can skip to [VNC Viewer](#).

4.2.2 Windows OS Remote Desktop

If you are using win10, you can use follow way to login Raspberry Pi without desktop.

Press **Win+R**. Enter **cmd**. Then use this command to check IP:

```
ping -4 raspberrypi.local
```

```
C:\Users\98343>ping -4 raspberrypi.local
Pinging raspberrypi.local [192.168.1.14] with 32 bytes of data:
Reply from 192.168.1.14 bytes=32 time=6ms TTL=64
Reply from 192.168.1.14 bytes=32 time=4ms TTL=64
Reply from 192.168.1.14 bytes=32 time=5ms TTL=64
Reply from 192.168.1.14 bytes=32 time=3ms TTL=64

Ping statistics for 192.168.1.14:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 6ms, Average = 4ms
```

Then 192.168.1.14 is my Raspberry Pi IP.

Or enter **router** client to **inquiry IP address** named "**raspberrypi**". For example, I have inquired to **my RPi IP address, and it is "192.168.1.14"**.

```
ssh pi@xxxxxxxxxxxxx(IP address)
```

Enter the following command:

```
ssh pi@192.168.1.14
```

```
C:\Users\98343>ssh pi@192.168.1.14
pi@192.168.1.14's password:
Linux raspberrypi 6.1.0-rpi7-rpi-v8 #1 SMP PREEMPT Debian 1:6.1.63-1+rpi1 (2023-11-24) aarch64

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.

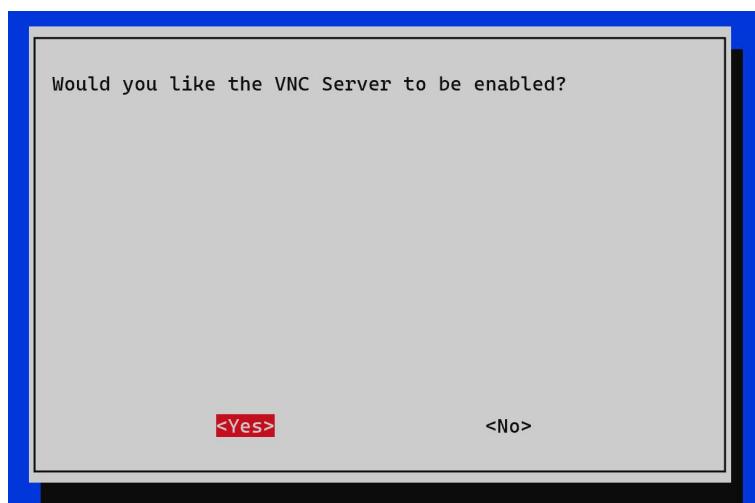
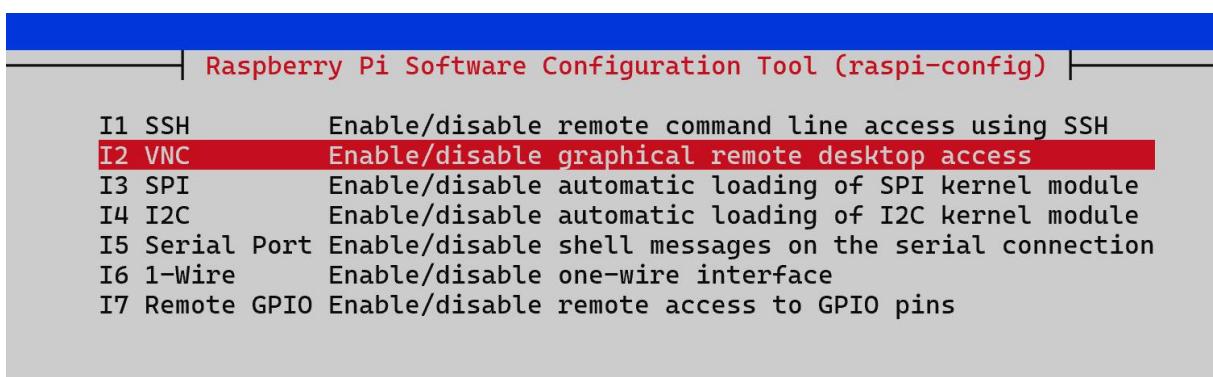
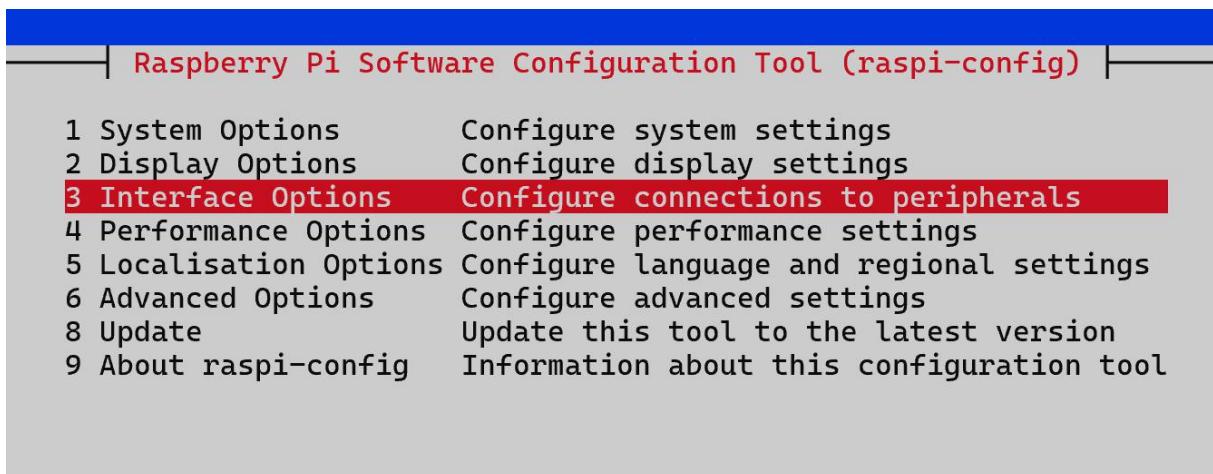
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Fri Mar  8 09:58:26 2024
pi@raspberrypi:~ $ |
```

VNC Viewer & VNC

Enable VNC

Type the following command. And select Interface Options P3 VNC Enter Yes OK. Here Raspberry Pi may need be restarted, and choose ok. Then open VNC interface.

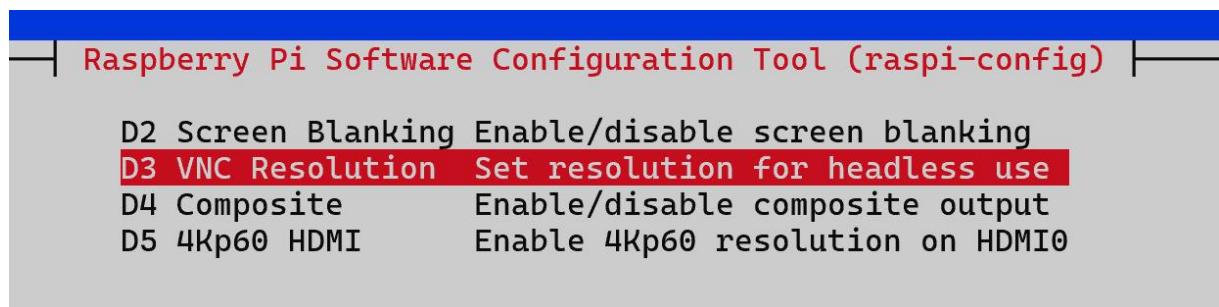
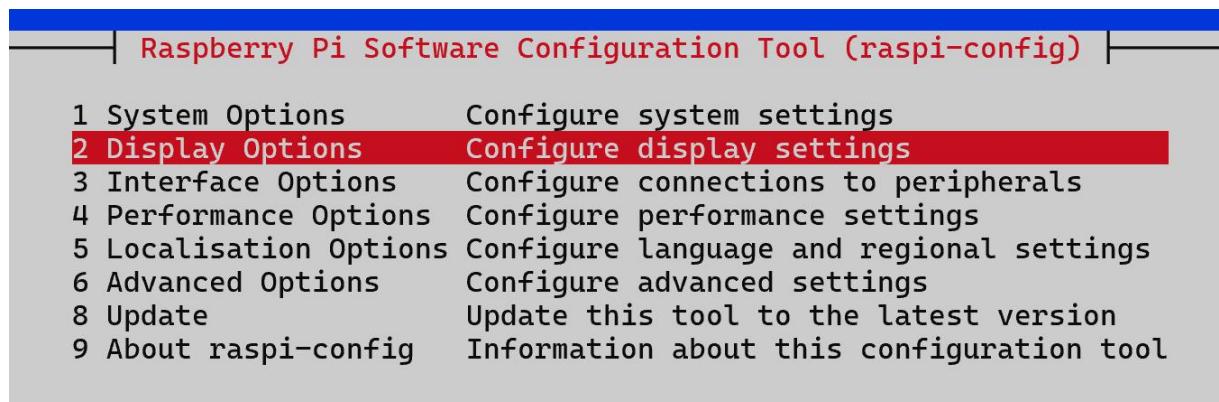
```
sudo raspi-config
```

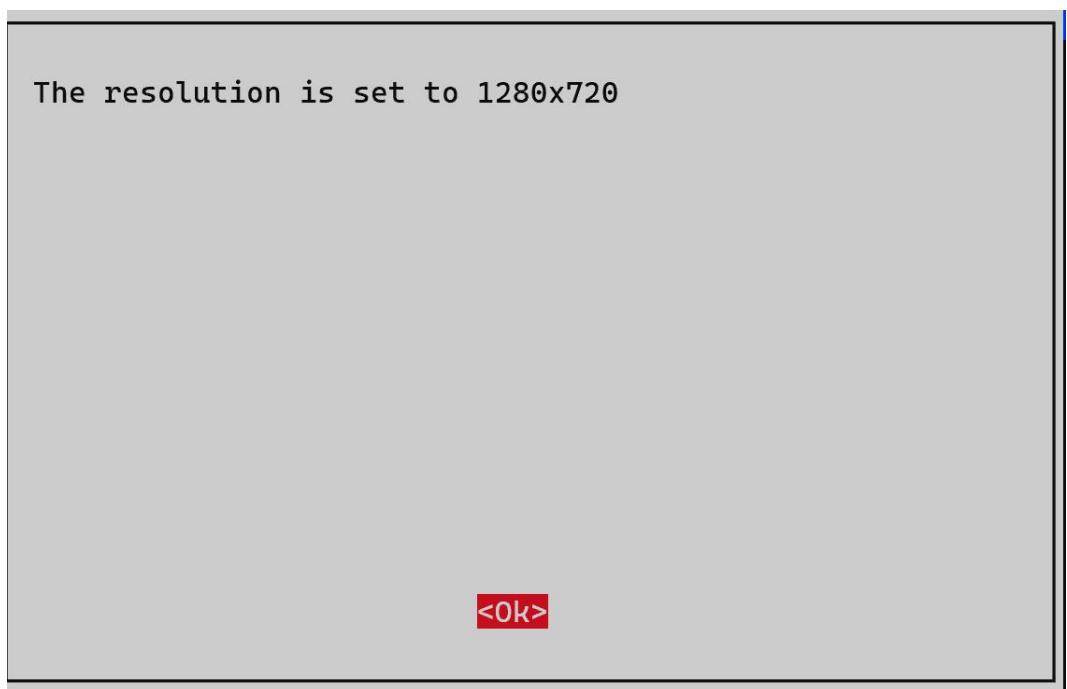
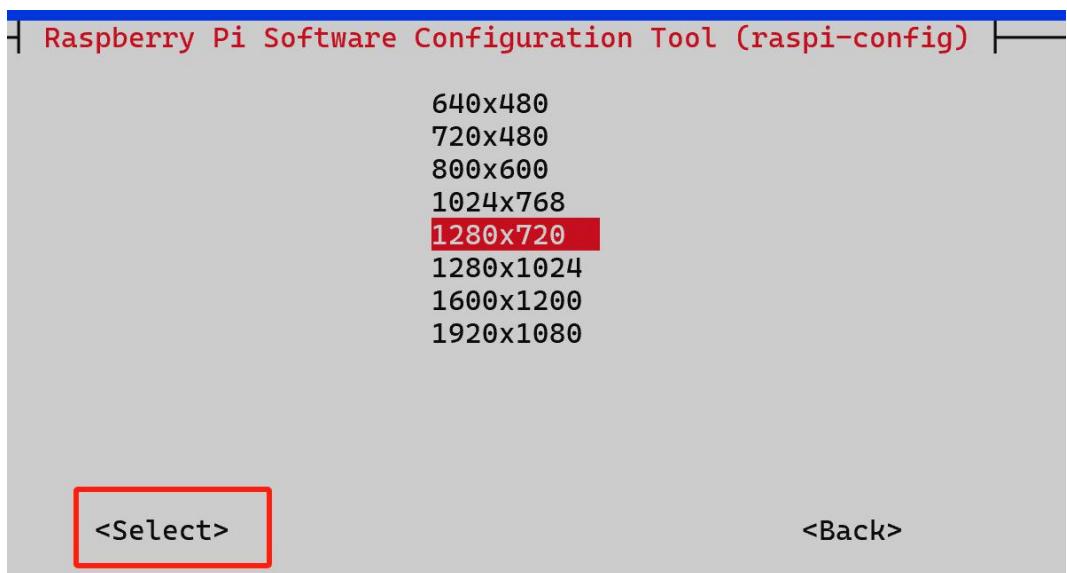




Set Resolution

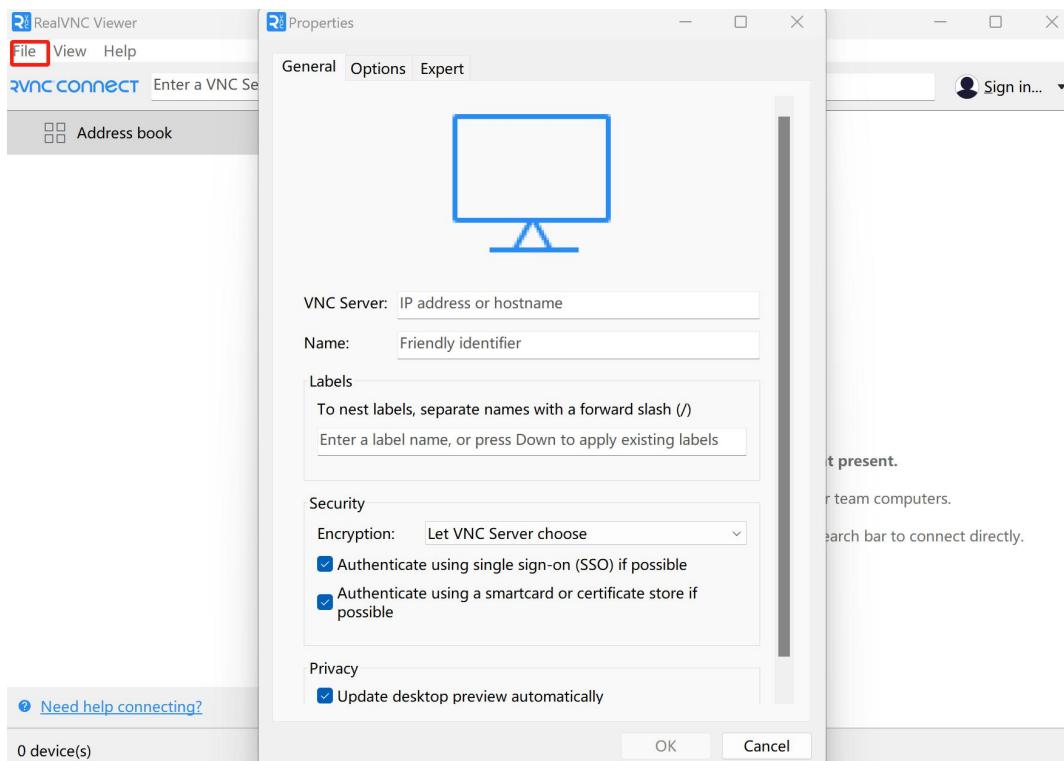
You can also set other resolutions. If you don't know what to set, you can set it as 1280x720 first.

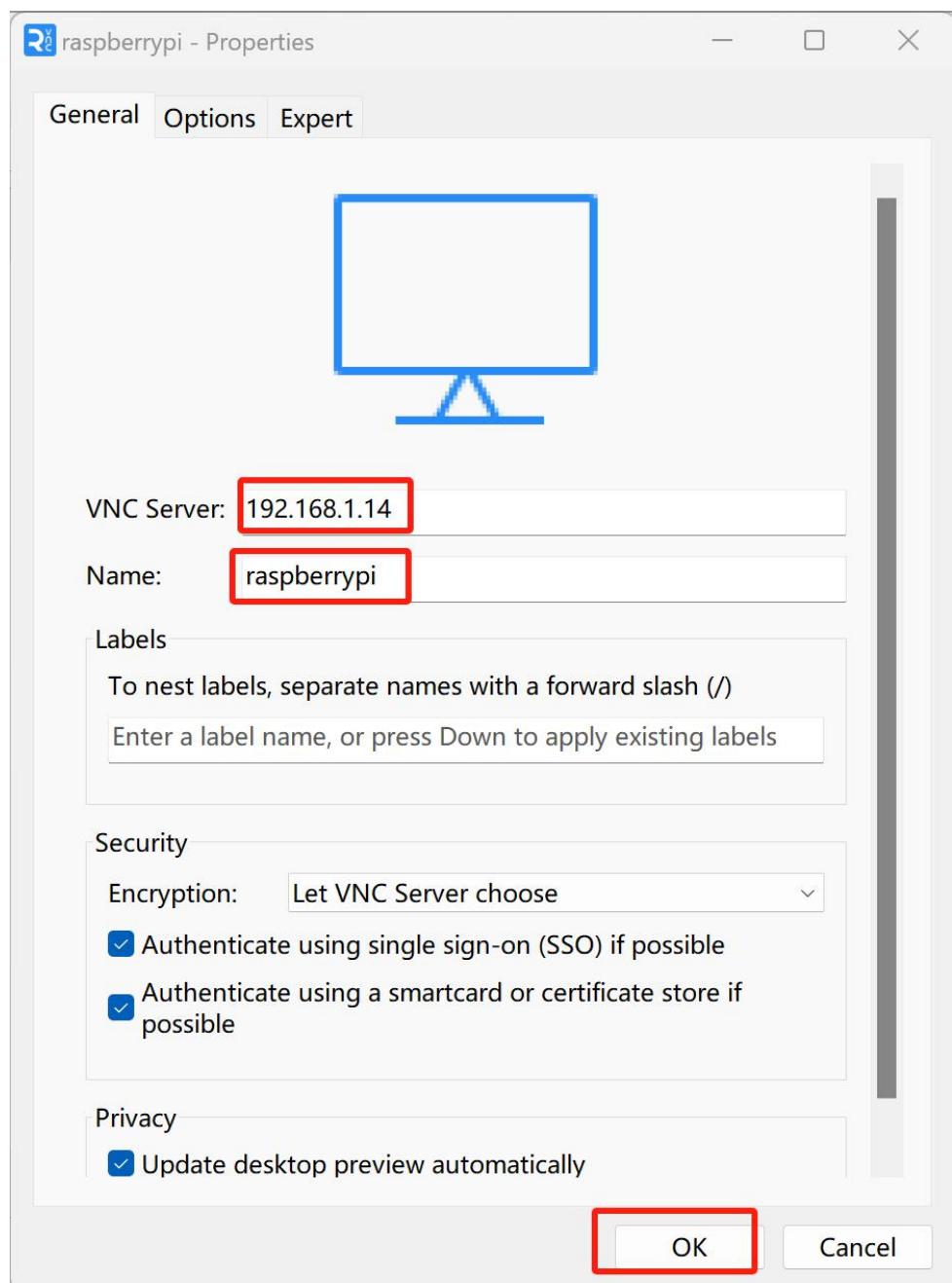




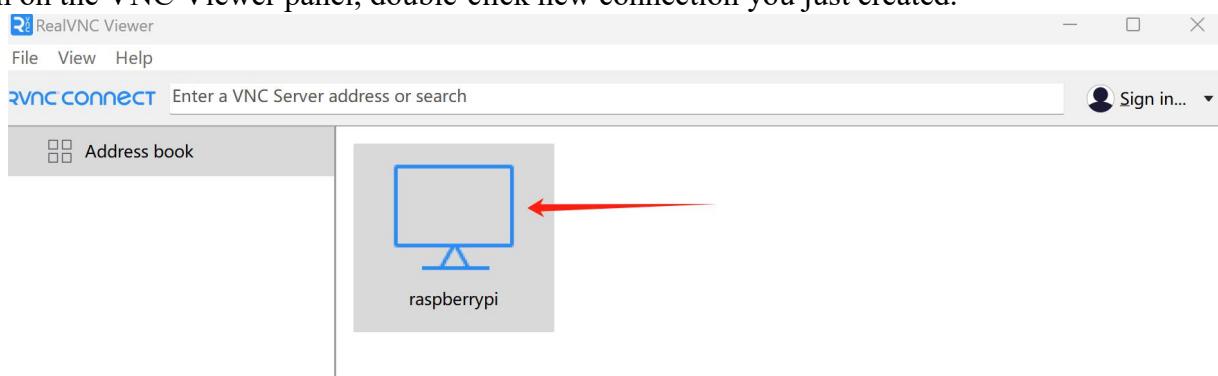
Then download and install VNC Viewer according to your computer system by click following link:
<https://www.realvnc.com/en/connect/download/viewer/>

After installation is completed, open VNC Viewer. And click “File”---“New Connection”. Then the interface is shown below.

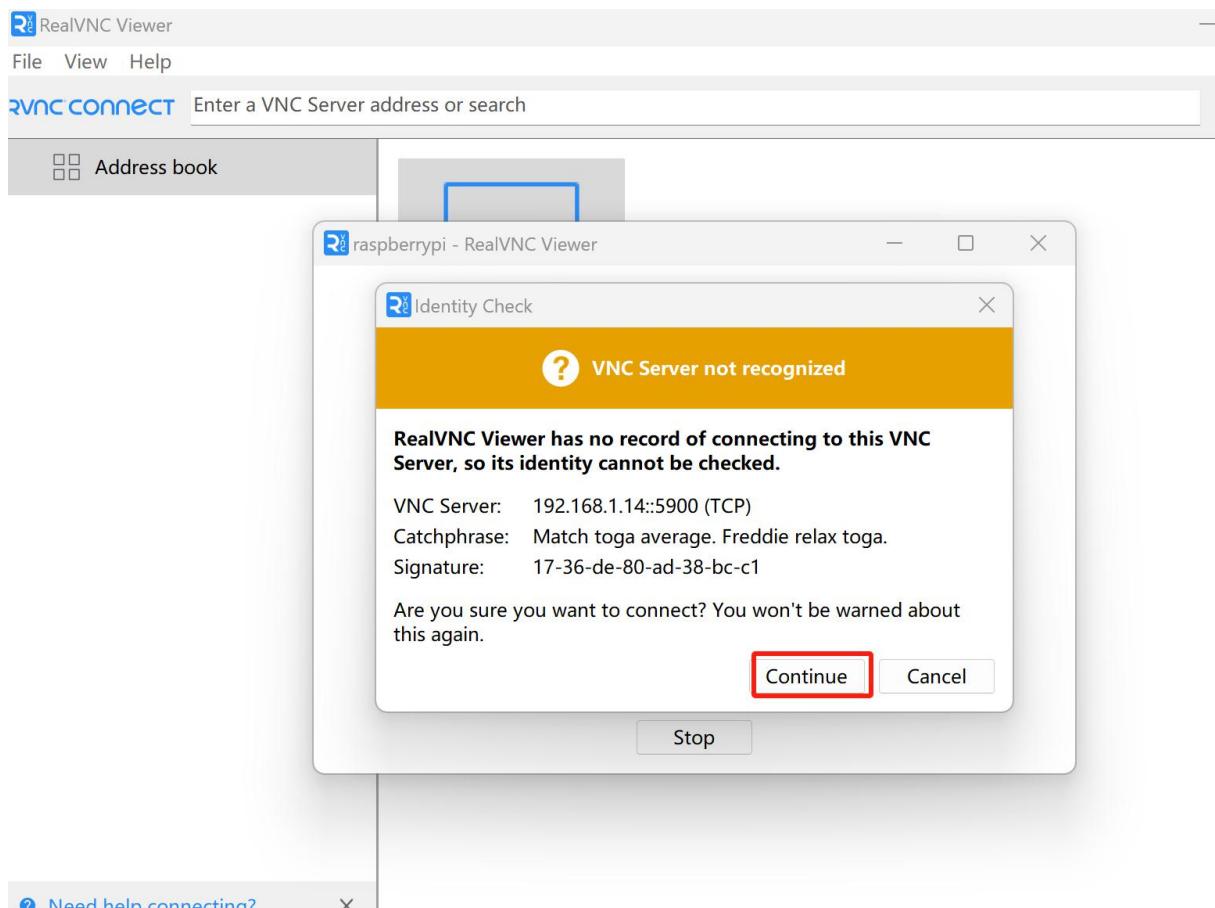




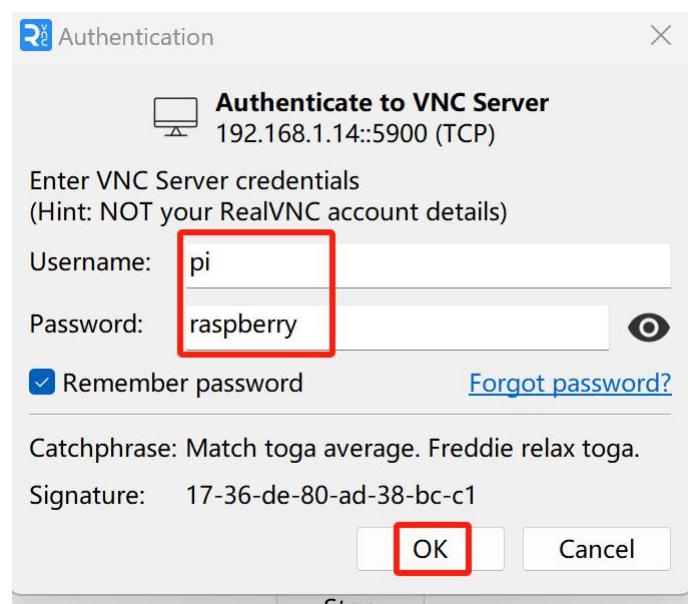
Enter ip address of your Raspberry Pi and fill in a name. Then click OK.
Then on the VNC Viewer panel, double-click new connection you just created.



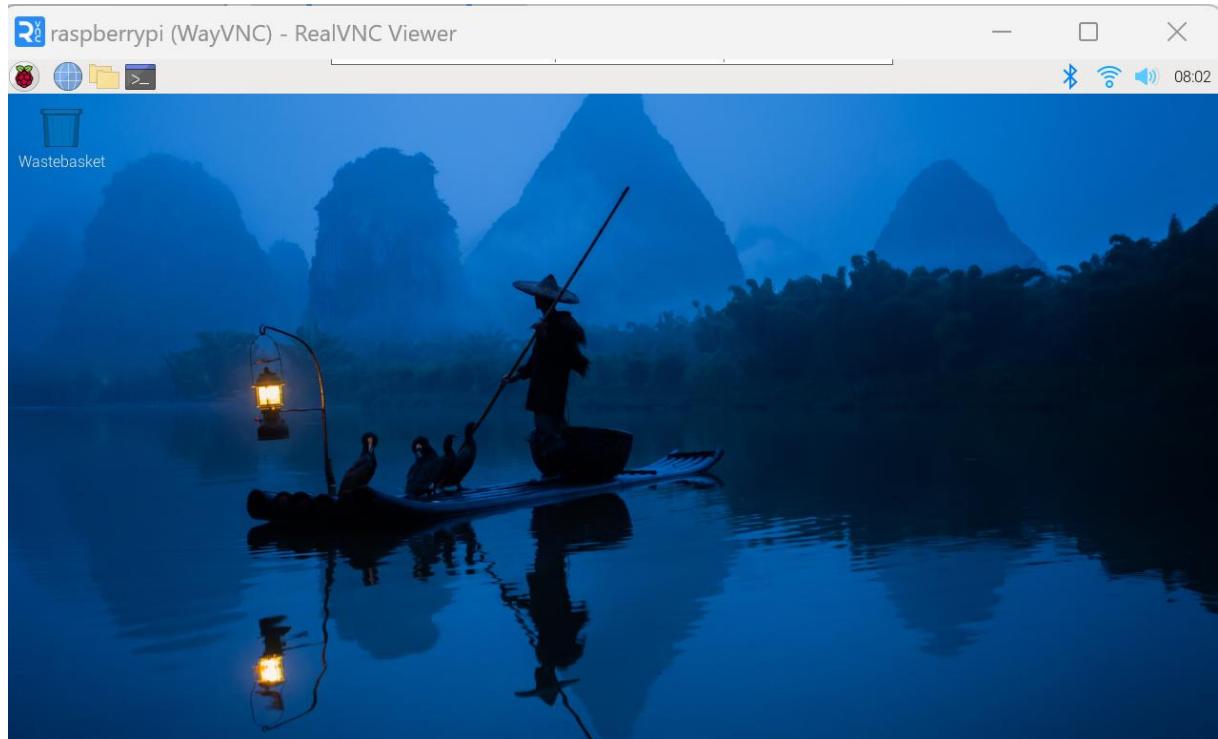
If there pop-up notification“VNC Server not recognized”,click“Continue”



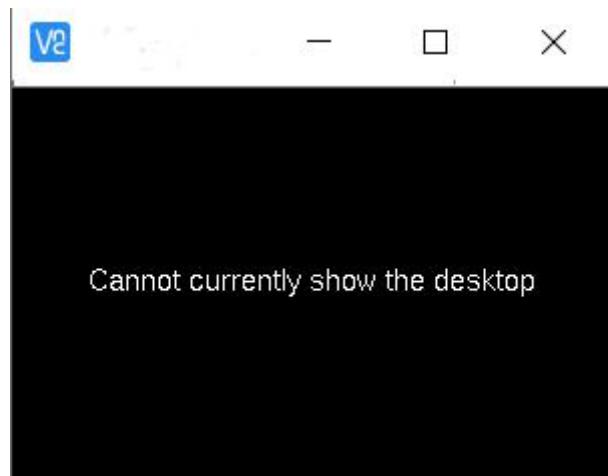
and the following dialog box pops up.



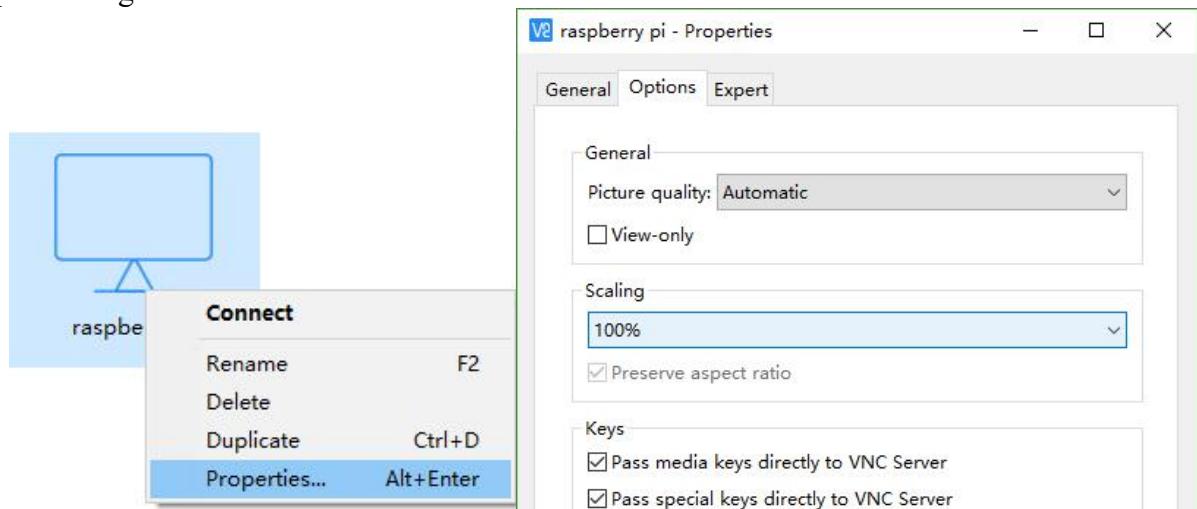
Enter username: **pi** and Password: **raspberry**. And click OK. Then the raspberry pi remote desktop is show on your computer like below.



Here, you have logged in to Raspberry Pi successfully by using VNC Viewer. If there is black window, please [set another resolution](#).



In addition, your VNC Viewer window may zoom your Raspberry Pi desktop. You can change it. On your VNC View control panel, click right key. And select Properties->Options label->Scaling. Then set proper scaling.



Here, you have logged in to Raspberry Pi successfully by using VNC Viewer and operated proper setting.

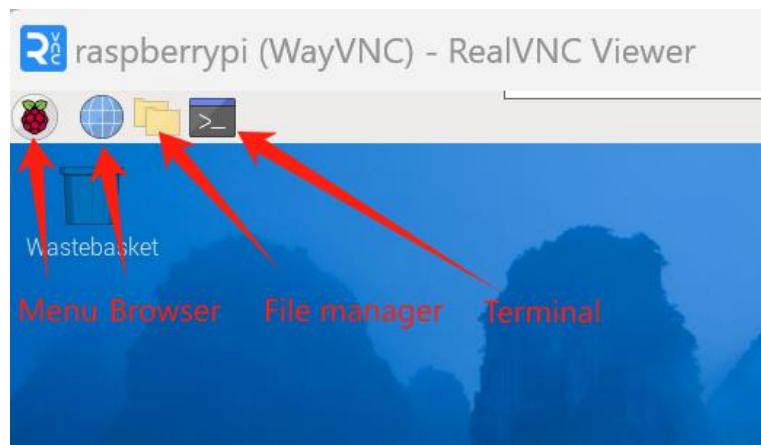
5. Starting Preparation

We should do some necessary foundational preparation work: Start your Raspberry Pi and install some necessary libraries.

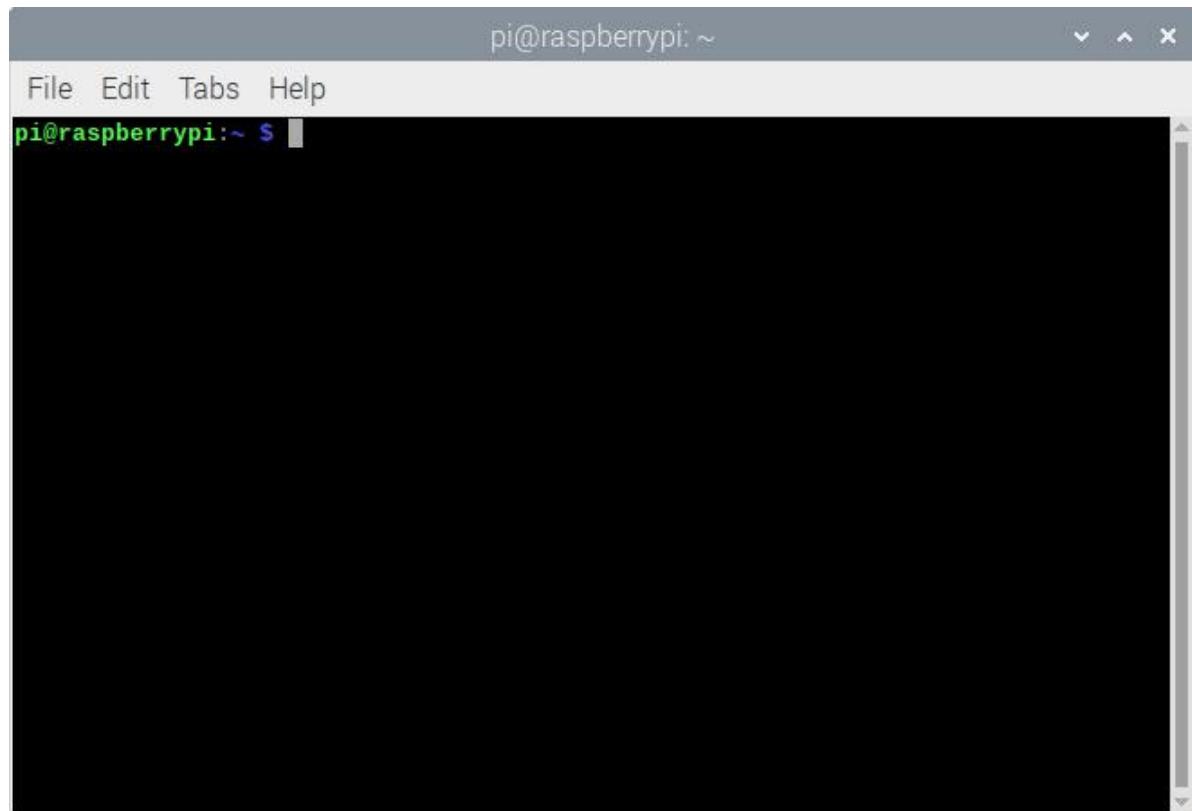
5.1 Linux Command

Raspberry Pi OS is based on the Linux Operation System. Now we will introduce you to some frequently used Linux commands and rules.

First, open the Terminal. All commands are executed in Terminal.

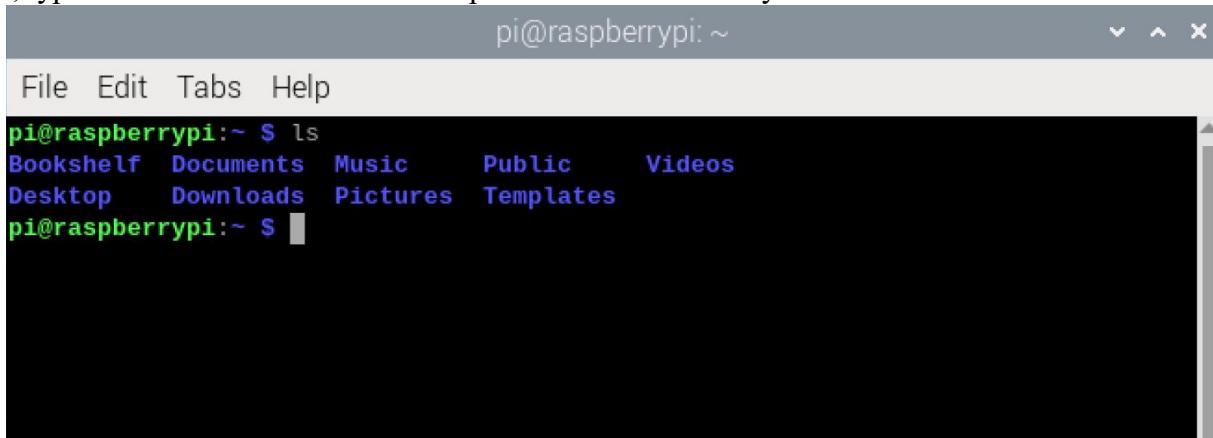


When you click the Terminal icon, following interface appears.



Note: The Linux is case sensitive.

First, type “ls” into the Terminal and press the “Enter” key. The result is shown below:



A screenshot of a terminal window titled "pi@raspberrypi: ~". The window has standard window controls (minimize, maximize, close) at the top right. The menu bar includes "File", "Edit", "Tabs", and "Help". The terminal itself shows the command "pi@raspberrypi:~ \$ ls" followed by a list of directories: Bookshelf, Documents, Music, Public, Videos, Desktop, Downloads, Pictures, and Templates. The prompt "pi@raspberrypi:~ \$" appears again at the bottom.

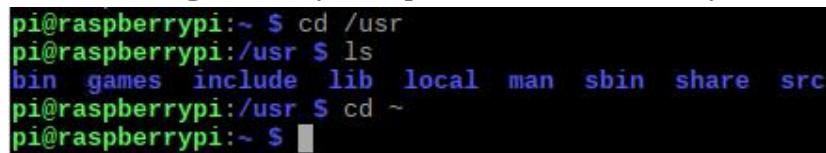
The “ls” command lists information about the files (the current directory by default).

Content between “\$” and “pi@raspberrypi:” is the current working path. “~” represents the user directory, which refers to “/home/pi” here.



A screenshot of a terminal window showing the command "pi@raspberrypi:~ \$ pwd" followed by the output "/home/pi". The prompt "pi@raspberrypi:~ \$" appears at the bottom.

“cd” is used to change directory. “/” represents the root directory.



A screenshot of a terminal window showing the command "pi@raspberrypi:~ \$ cd /usr" followed by "pi@raspberrypi:/usr \$ ls" and a list of sub-directories: bin, games, include, lib, local, man, sbin, share, and src. The prompt "pi@raspberrypi:/usr \$" appears at the bottom, followed by "pi@raspberrypi:~ \$" at the very bottom.

Later in this Tutorial, we will often change the working path. Typing commands under the wrong directory may cause errors and break the execution of further commands.

Many frequently used commands and instructions can be found in the following reference table.

Command instruction	
ls	Lists information about the FILES (the current directory by default) and entries alphabetically.
cd	Changes directory
sudo + cmd	Executes cmd under root authority
./	Under current directory
gcc	GNU Compiler Collection
git clone URL	Use git tool to clone the contents of specified repository, and URL in the repository address.

There are many commands, which will come later. For more details about commands. You can refer to: <http://www.linux-commands-examples.com>

5.2 Shortcut Key

Now, we will introduce several commonly used shortcuts that are very useful in Terminal.

1. **Up and Down Arrow Keys:** Pressing “↑” (the Up key) will go backwards through the command history and pressing “↓” (the Down Key) will go forwards through the command history.

2. **Tab Key:** The Tab key can automatically complete the command/path you want to type. When there is only one eligible option, the command/path will be completely typed as soon as you press the Tab key even you only type one character of the command/path.

As shown below, under the '~' directory, you enter the Documents directory with the “cd” command. After typing “cd D”, pressing the Tab key (there is no response), pressing the Tab key again then all the files/folders that begin with “D” will be listed. Continue to type the letters “oc” and then pressing the Tab key, the “Documents” is typed automatically.

```
pi@raspberrypi:~ $ cd /usr
pi@raspberrypi:/usr $ ls
bin games include lib libexec local sbin share src
pi@raspberrypi:/usr $ cd ~
pi@raspberrypi:~ $ █
```

```
pi@raspberrypi:~ $ ls cd D
Desktop/ Documents/ Downloads/
pi@raspberrypi:~ $ ls cd D
Desktop/ Documents/ Downloads/
```

5.3 Install WiringPi

WiringPi is a GPIO access library written in C language for the used in the Raspberry Pi.

WiringPi Installation Steps

To install the WiringPi library, please open the Terminal and then follow the steps and commands below. Note: For a command containing many lines, execute them one line at a time.

Enter the following commands **one by one** in the “terminal” to install WiringPi:

```
sudo apt-get update  
git clone https://github.com/WiringPi/WiringPi  
cd WiringPi  
.build
```

```
pi@raspberrypi:~ $ sudo apt-get update  
Reading package lists... Done
```

```
pi@raspberrypi:~ $ git clone https://github.com/WiringPi/WiringPi  
Cloning into 'WiringPi'...  
remote: Enumerating objects: 1926, done.  
remote: Counting objects: 100% (802/802), done.  
remote: Compressing objects: 100% (194/194), done.  
remote: Total 1926 (delta 670), reused 670 (delta 598), pack-reused 1124  
Receiving objects: 100% (1926/1926), 865.66 KiB | 1.63 MiB/s, done.  
Resolving deltas: 100% (1303/1303), done.
```

```
pi@raspberrypi:~ $ cd WiringPi  
pi@raspberrypi:~/WiringPi $ ./build  
wiringPi Build script  
=====
```

```
All Done.
```

```
NOTE: To compile programs with wiringPi, you need to add:  
      -lwiringPi  
      to your compile line(s) To use the Gertboard, MaxDetect, etc.  
      code (the devLib), you need to also add:  
      -lwiringPiDev  
      to your compile line(s).
```

```
pi@raspberrypi:~/WiringPi $
```

Run the gpio command to check the installation:

```
gpio -v
```

Input the “[gpio -v](#)” command,if there show the gpio version,it indicate that the installation is successed.

```
pi@raspberrypi:~/WiringPi $ gpio -v
gpio version: 3.0
Copyright (c) 2012-2024 Gordon Henderson and contributors
This is free software with ABSOLUTELY NO WARRANTY.
For details type: gpio -warranty

Raspberry Pi Details:
Type: Pi 4B, Revision: 05, Memory: 4096MB, Maker: Sony
* Device tree is enabled.
*--> Raspberry Pi 4 Model B Rev 1.5
* This Raspberry Pi supports user-level GPIO access.
pi@raspberrypi:~/WiringPi $
```

5.4 Obtain the Project Code

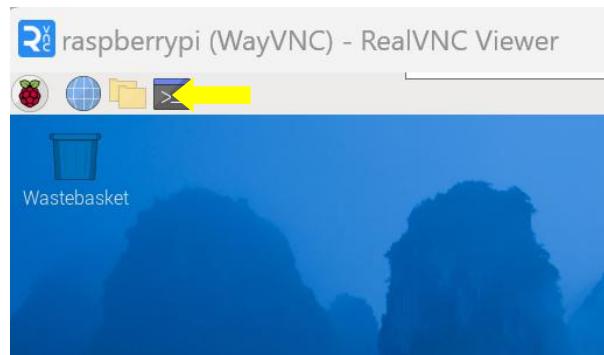
After the above installation is completed, you can visit our GitHub resources at (<https://github.com/cokoino>) to download the latest available project code. We provide **Python** language code for this project .

This is the method for obtaining the code:

In the pi directory of the RPi terminal, enter the following command.

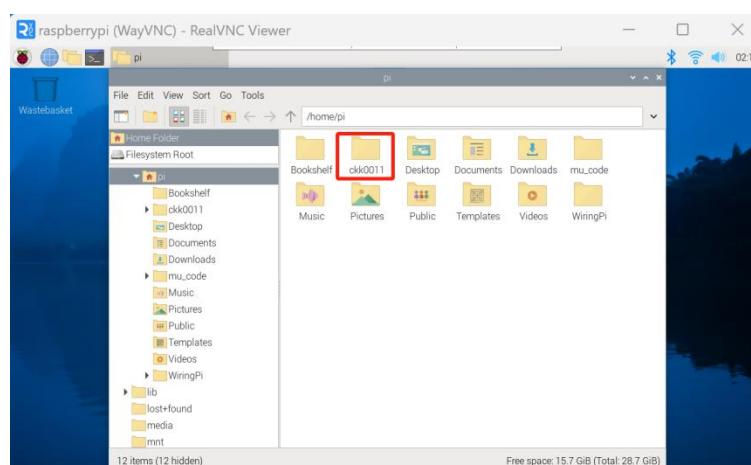
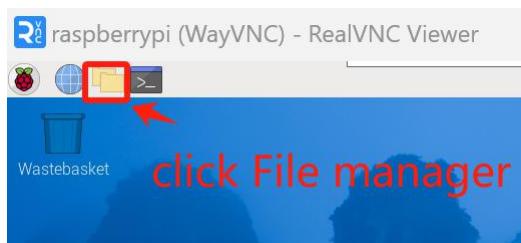
```
cd  
git clone --depth 1 https://github.com/cokoino/ckk0011
```

(**There is no need for a password. If you get some errors, please check your commands.**)



After the download is completed, a new folder "ckk0011" is generated, which contains all of the tutorials and required code.

Click File manager,you will find the folder "ckk0011"



If you have no experience with Python, we suggest that you refer to this website for basic information and knowledge.

<https://python.swaroopch.com/basics.html>

6. Python2 & Python3

If you only use C/C++, you can skip this section.

Python code, used in our kits, can now run on Python2 and Python3. [Python3 is recommend](#). If you want to use Python2, please make sure your Python version is 2.7 or above. Python2 and Python3 are not fully compatible. However, Python2.6 and Python2.7 are transitional versions to python3, therefore you can also use Python2.6 and 2.7 to execute some Python3 code.

You can type “python2” or “python3” respectively into Terminal to check if python has been installed. Press Ctrl-Z to exit.

```
pi@raspberrypi:~ $ python2
Python 2.7.13 (default, Nov 24 2017, 17:33:09)
[GCC 6.3.0 20170516] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>>
[2]+  Stopped                  python2
pi@raspberrypi:~ $ python3
Python 3.5.3 (default, Jan 19 2017, 14:11:04)
[GCC 6.3.0 20170124] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> █
```

Type “python”, and Terminal shows that it links to python2.

```
pi@raspberrypi:~ $ python
Python 2.7.13 (default, Nov 24 2017, 17:33:09)
[GCC 6.3.0 20170516] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> █
```

If you want to use Python3 in Raspberry Pi, it is recommended to set python3 as default Python by following the steps below.

Enter directory /usr/bin

```
cd /usr/bin
```

1. Delete the old python link.

```
sudo rm python
```

2. Create new python links to python3.

```
sudo ln -s python3 python
```

3. Execute python to check whether the link succeeds.

```
python
```

```
pi@raspberrypi:/usr/bin $ sudo rm python
pi@raspberrypi:/usr/bin $ sudo ln -s python3 python
pi@raspberrypi:/usr/bin $ python
Python 3.5.3 (default, Jan 19 2017, 14:11:04)
[GCC 6.3.0 20170124] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

If you want to use Python2, repeat the steps above and just change the third command to the following:

```
sudo ln -s python2 python
```

```
pi@raspberrypi:/usr/bin $ sudo rm python
pi@raspberrypi:/usr/bin $ sudo ln -s python2 python
pi@raspberrypi:/usr/bin $ python
Python 2.7.13 (default, Nov 24 2017, 17:33:09)
[GCC 6.3.0 20170516] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> 
```

We will only use the term “Python” without reference to Python2 or Python3. You can choose to use either. Finally, all the necessary preparations have been completed! Next, we will combine the RPi and electronic components to build a series of projects from easy to the more challenging and difficult as we focus on learning the associated knowledge of each electronic circuit.