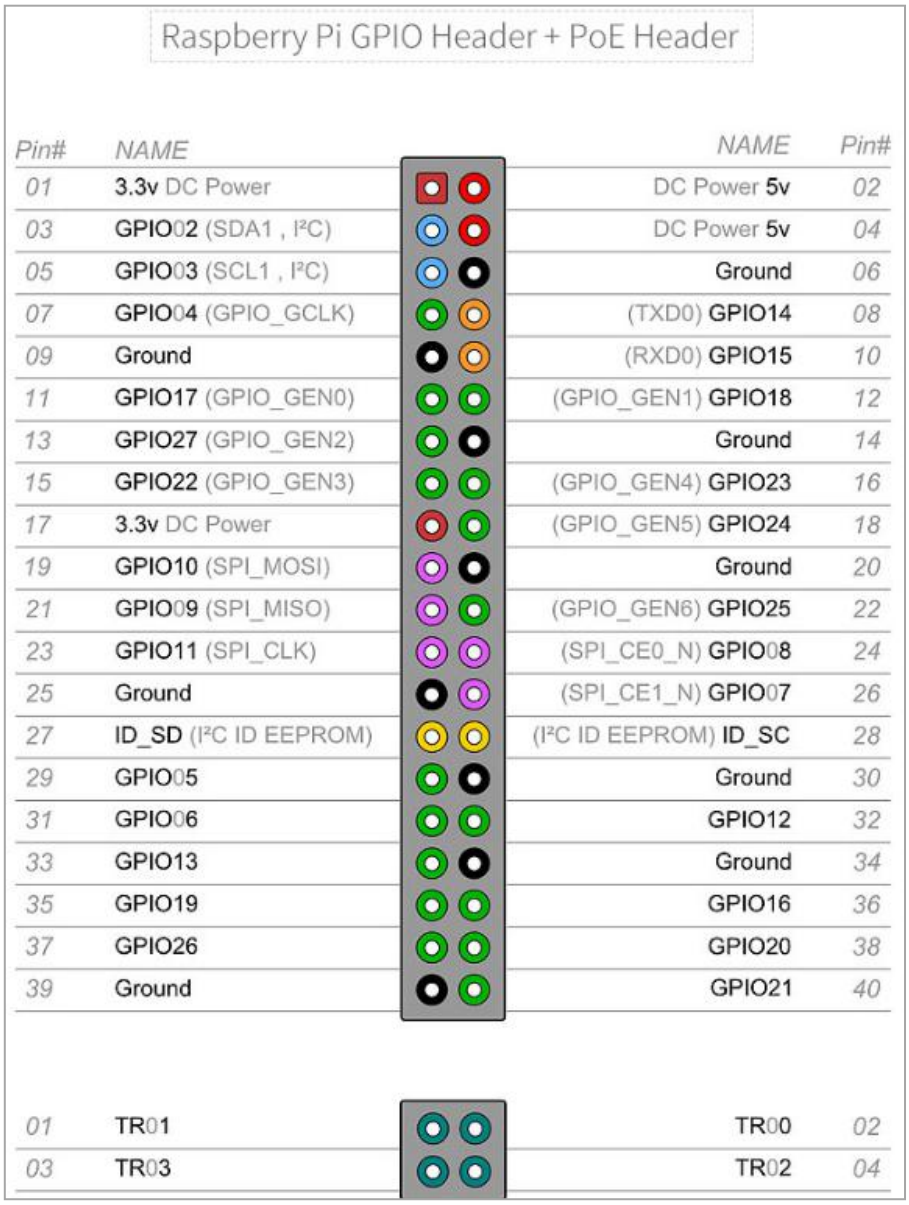
Fingerprint entry

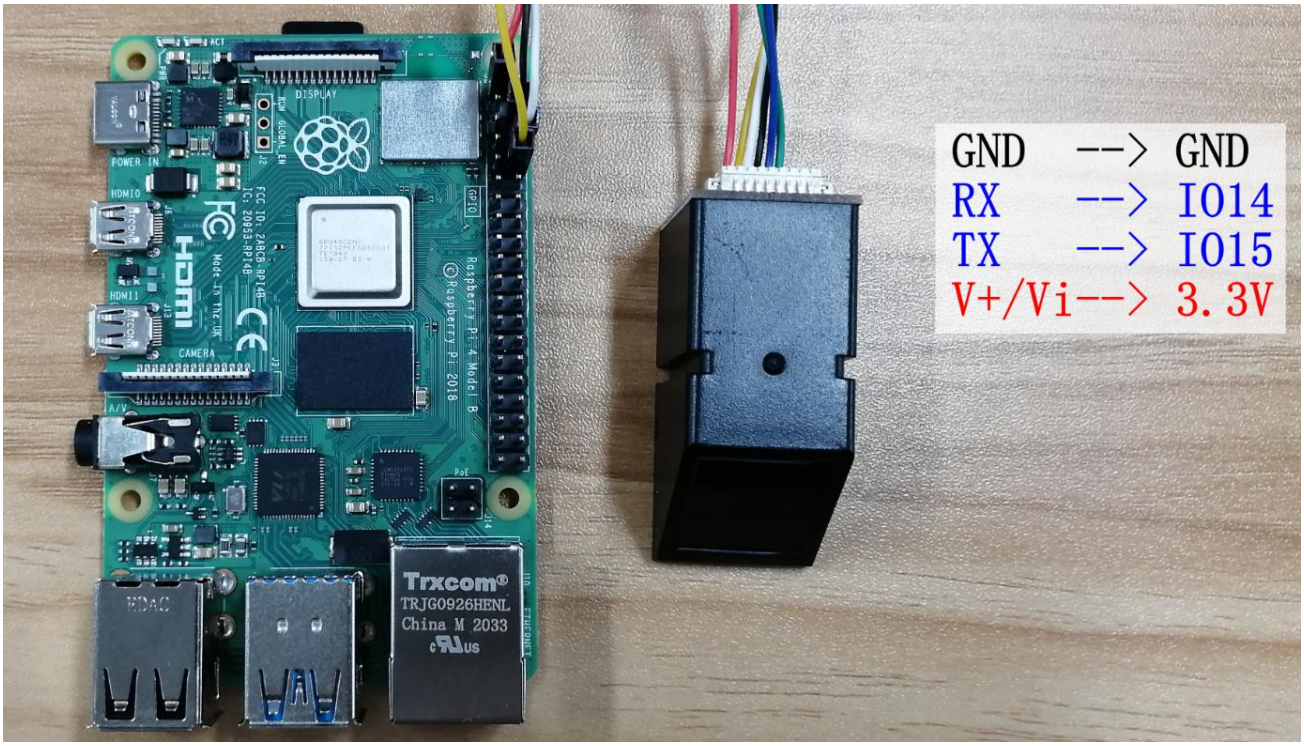
1. Learning target

In this course, we will learn how to use Raspberry Pi and fingerprint recognition module to achieve fingerprint entry function.

2. Preparation

The fingerprint recognition module uses UART communication, and the program uses a virtual serial port. Connect the TX and RX of the module to the IO15 and IO14 pins of the Raspberry Pi board. V+/Vi and GND are connected to 3.3V and GND of Raspberry Pi respectively.



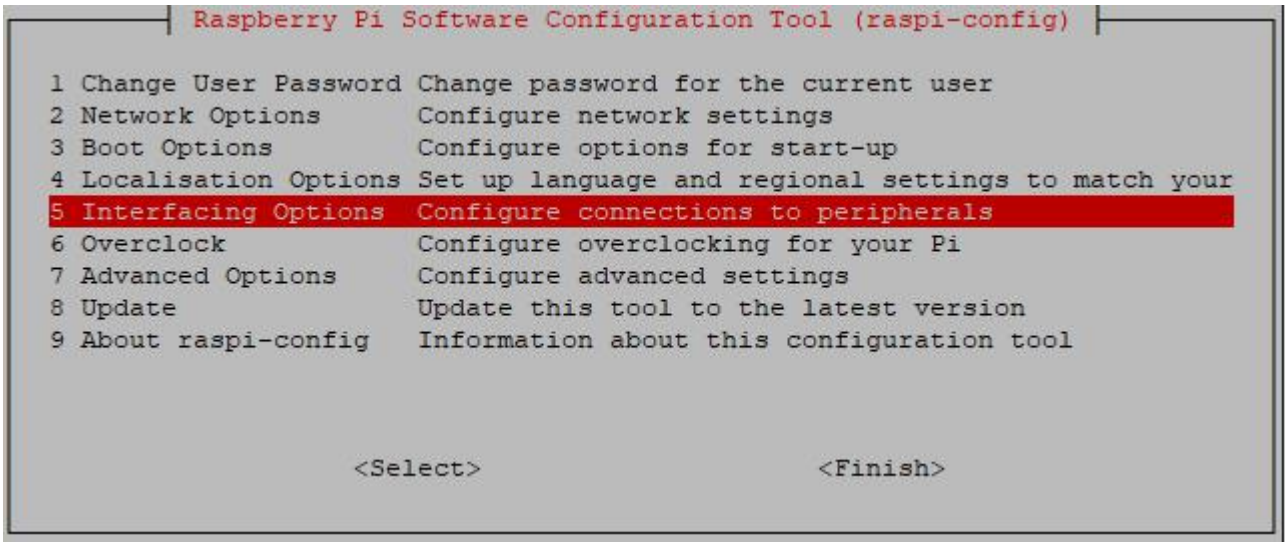


3. Configure the serial port of Raspberry Pi

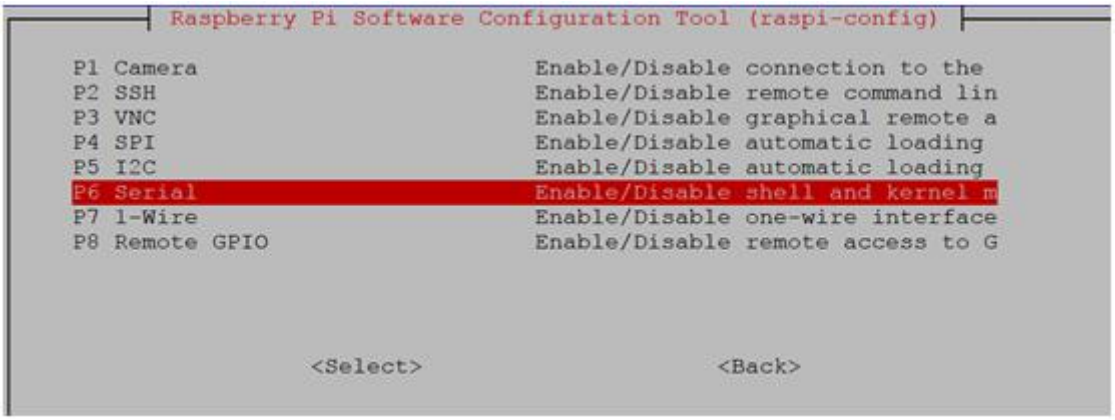
3.1 Raspberry Pi needs to assign ttyAMA0 port to GPIO serial port TXD0, RXD0.

Input **sudo raspi-config** in the command terminal.

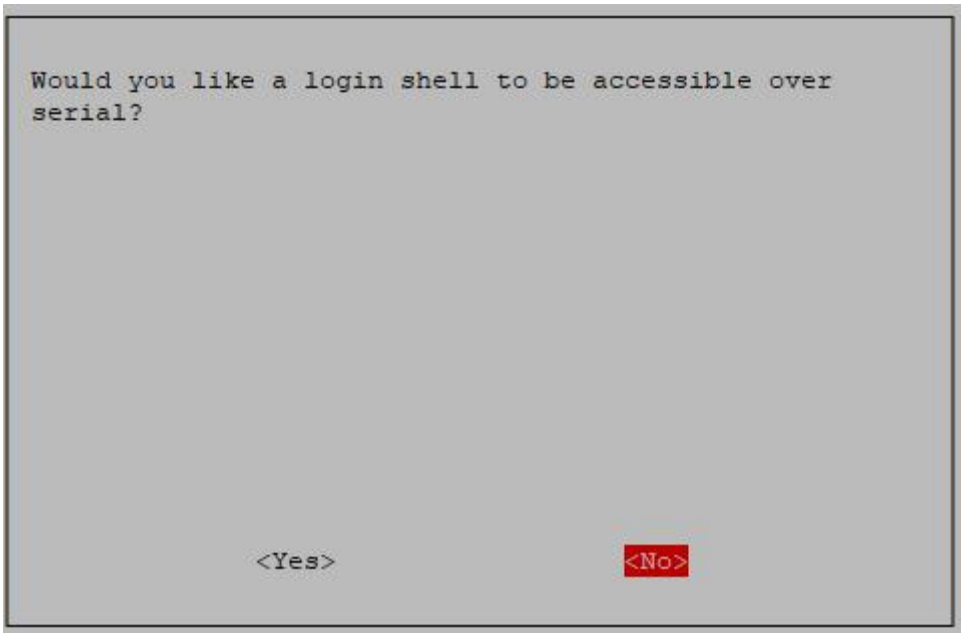
3.2 You enter the Raspberry Pi system configuration interface, and select the fifth **[Interfacing Options]**.

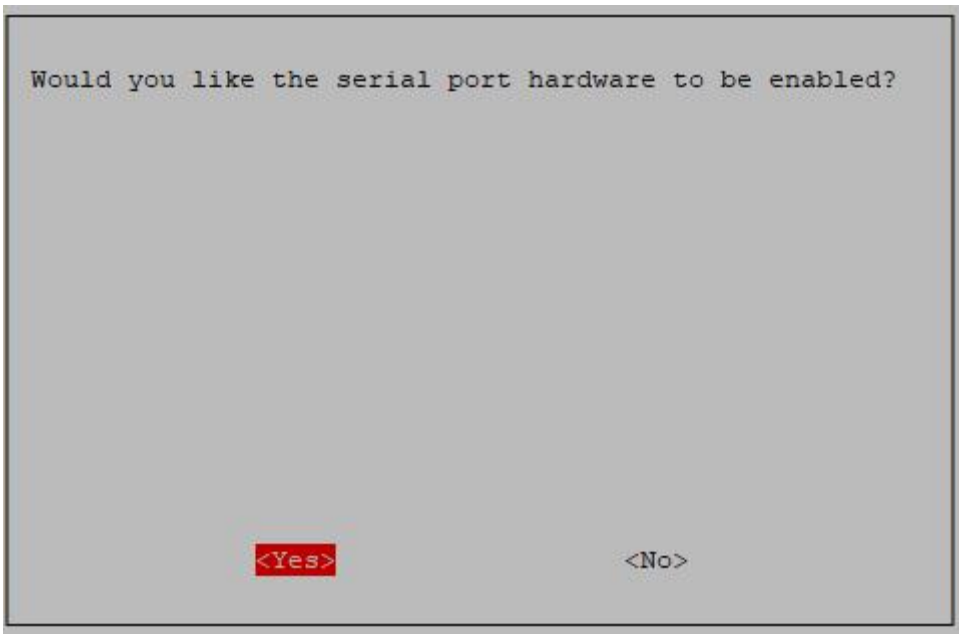


3.3 Choose **[P6 Serial]**

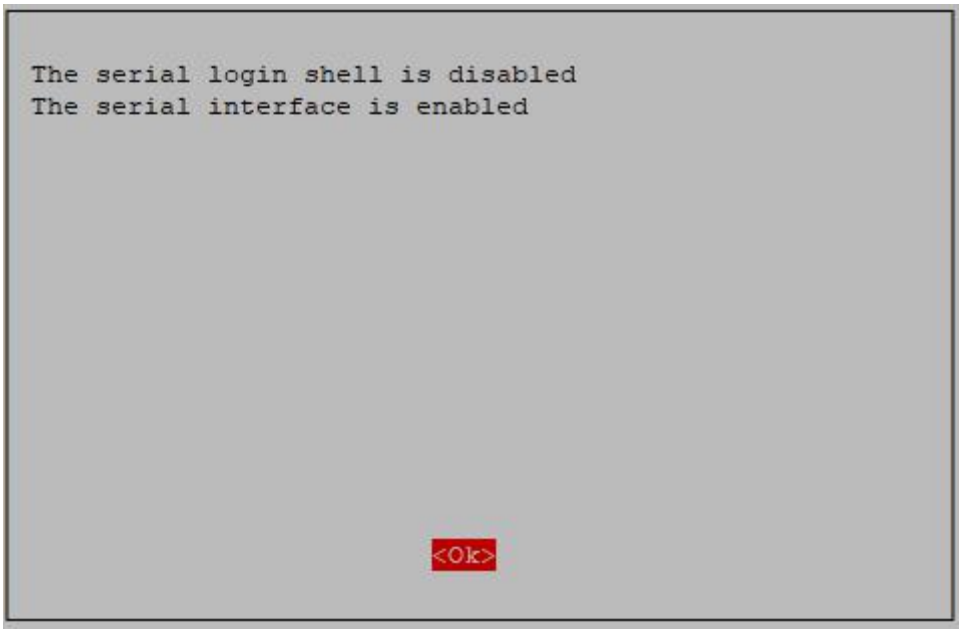


3.4 Choose to close the serial port login function and turn on the hardware serial port debugging function.





3.5 After finishing, the system will show the following prompt.



3.6 Exit raspi-config settings, and restart the Raspberry Pi according to the prompts.
Edit the config.txt file in the /boot directory.

sudo nano /boot/config.txt

Add the following two lines to the end:

dtoverlay=pi3-miniuart-bt
force_turbo=1

As shown below.

```
 GNU nano 3.2                        /boot/config.txt

#dtoverlay=lirc-rpi

# Additional overlays and parameters are documented /boot/overlays/README

# Enable audio (loads snd_bcm2835)
dtparam=audio=on
start_x=1
gpu_mem=128

dtoverlay=pi3-miniuart-bt

force_turbo=1
```

3.7 Press **Ctrl+O** to save, press **Ctrl+X** to exit.
3.8 Input following command to restart Raspberry Pi board.
sudo reboot

3.9 After restarting the Raspberry Pi. Input following command, you can see that the two serial ports have changed positions.
ls /dev -al again

```
drwxr-xr-x   2 root root          60 Jan  1  1970 raw
crw-rw-r--   1 root netdev    10,  57 Aug 26 11:55 rfkill
lrwxrwxrwx   1 root root           7 Aug 26 11:55 serial0 -> ttyAMA0
lrwxrwxrwx   1 root root           5 Aug 26 11:55 serial1 -> ttyS0
drwxrwxrwt   2 root root          40 Feb 14  2019 shm
drwxr-xr-x   3 root root         160 Aug 26 11:55 snd
crw-rw----   1 root spi     153,   0 Aug 26 11:55 spidev0.0
crw-rw----   1 root spi     153,   1 Aug 26 11:55 spidev0.1
```

4. About code
Please view **finger_save.py** file.

5. Running code
Input following command to this code.
python finger_save.py

6. Phenomenon
After the program is run successfully. System will start to initialize the fingerprint recognition module.
If the initialize is successfully, it will display "Initialized successfully". Otherwise, please check the baud rate or wiring of the module.
When the Shell window prints "Press your finger", please put your finger on the fingerprint recognition module. When the Shell window prints "Press your finger again", release your finger and put your finger on the fingerprint recognition module again.

The system will automatically compare the previous and next fingerprints. If they are the same, the Shell window will print "Saved successfully" and automatically set the fingerprint ID to 3.
After we run the fingerprint recognition program, when we put our finger on the fingerprint recognition module, the Shell window will print the ID of the fingerprint.