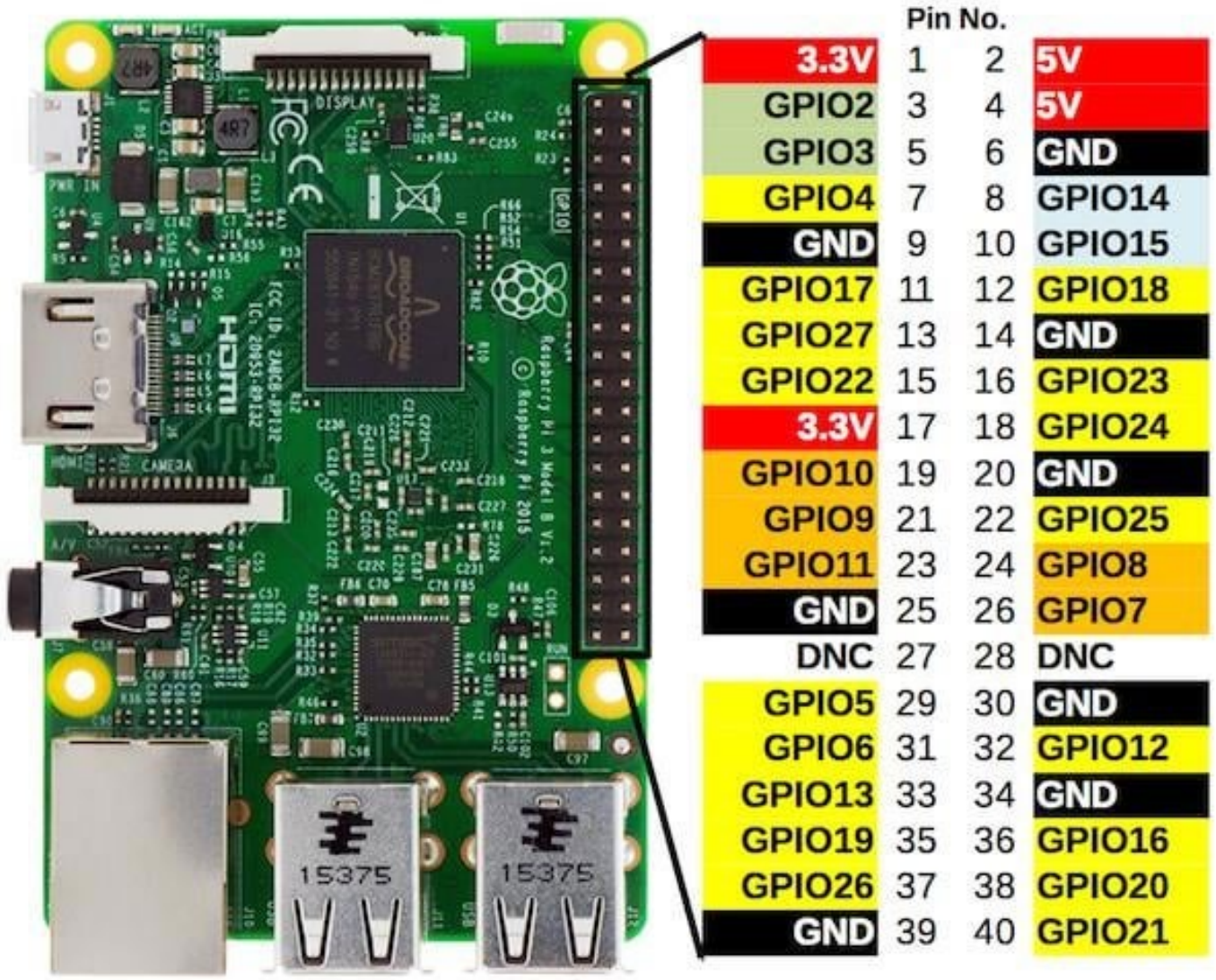
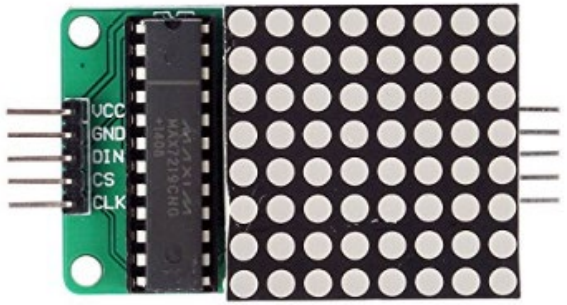
LED display experiment

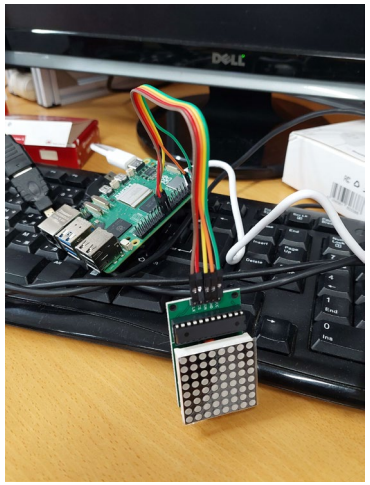
RPi pin



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

MAX7219 Red Light Led Matrix MCU Control LED Display Module





VCC connect to 5V power supply(WHITE)
GND connect to GND (RED)
DIN connect to SPI MOSI(BROWN)(Default Pin: GPIO 10,Pin19)
CS connect to SPI CE0(GRAY)(Default Pin:GPIO 8,Pin24)
CLK connect to SPI SCLK(YELLOW)(Default Pin: GPIO 11,Pin23)

DIN is Serial-Data Input. Data is loaded into the internal 16-bit shift register on CLK's rising edge.
MOSI(Master Output, Slave Input):
Host output slave input signal.
CS is Chip-Select Input. Serial data is loaded into the shift register while CS is low. The last 16 bits of serial data are latched on CS's rising edge.

3v3 Power	1	2	5v Power
GPIO 2 (I2C1 SDA)	3	4	5v Power
GPIO 3 (I2C1 SCL)	5	6	Ground
GPIO 4 (GPCLK0)	7	8	GPIO 14 (UART TX)
Ground	9	10	GPIO 15 (UART RX)
GPIO 17 (SPI1 CE1)	11	12	GPIO 18 (SPI1 CE0)
GPIO 27	13	14	Ground
GPIO 22	15	16	GPIO 23
3v3 Power	17	18	GPIO 24
GPIO 10 (SPI0 MOSI)	19	20	Ground
GPIO 9 (SPI0 MISO)	21	22	GPIO 25
GPIO 11 (SPI0 SCLK)	23	24	GPIO 8 (SPI0 CE0)
Ground	25	26	GPIO 7 (SPI0 CE1)
GPIO 0 (EEPROM SDA)	27	28	GPIO 1 (EEPROM SCL)
GPIO 5	29	30	Ground
GPIO 6	31	32	GPIO 12 (PWM0)
GPIO 13 (PWM1)	33	34	Ground
GPIO 19 (SPI1 MISO)	35	36	GPIO 16 (SPI1 CE2)
GPIO 26	37	38	GPIO 20 (SPI1 MOSI)
Ground	39	40	GPIO 21 (SPI1 SCLK)

Example:show your student ID

- Use terminal=>pip install luma.led_matrix

```
from luma.led_matrix.device import max7219
from luma.core.interface.serial import spi, noop
from luma.core.render import canvas
from luma.core.virtual import viewport
from luma.core.legacy import text, show_message
from luma.core.legacy.font import proportional, CP437_FONT, TINY_FONT, SINCLAIR_FONT, LCD_FONT
Import time
#Create a serial instance and specify SPI bus parameters
serial = spi(port=0, device=0, gpio=noop())
device = max7219(serial, cascaded=1, block_orientation=0)
#cascaded=1 means only one device is connected,  block_orientation=[0, 90, -90], Corrects block orientation when wired vertically.
#show message
time.sleep(1)
msg = "61275041H"
show_message(device, msg, fill="white", font=proportional(LCD_FONT), scroll_delay=0.1) #white means LED is illuminated
time.sleep(1)
```

Install luma.led_metrix problen

```
cirlab@raspberrypi:~ $ pip install luma.led_metrix
error: externally-managed-environment

× This environment is externally managed
╰─> To install Python packages system-wide, try apt install
    python3-xyz, where xyz is the package you are trying to
    install.

    If you wish to install a non-Debian-packaged Python package,
    create a virtual environment using python3 -m venv path/to/venv.
    Then use path/to/venv/bin/python and path/to/venv/bin/pip. Make
    sure you have python3-full installed.

    For more information visit http://rptl.io/venv

note: If you believe this is a mistake, please contact your Python installation
or OS distribution provider. You can override this, at the risk of breaking your
 Python installation or OS, by passing --break-system-packages.
```

- This error message indicates that you are attempting to install luma.led_metrix in an "externally managed environment," which typically refers to a system-level Python installation managed by the operating system's package manager.
- use a virtual environment
  - Create a virtual environment：python3 -m venv myenv
  - Activate the virtual environment：source myenv/bin/activate
  - nstall the required Python package：pip install luma.led_matrix

Open SPI interface

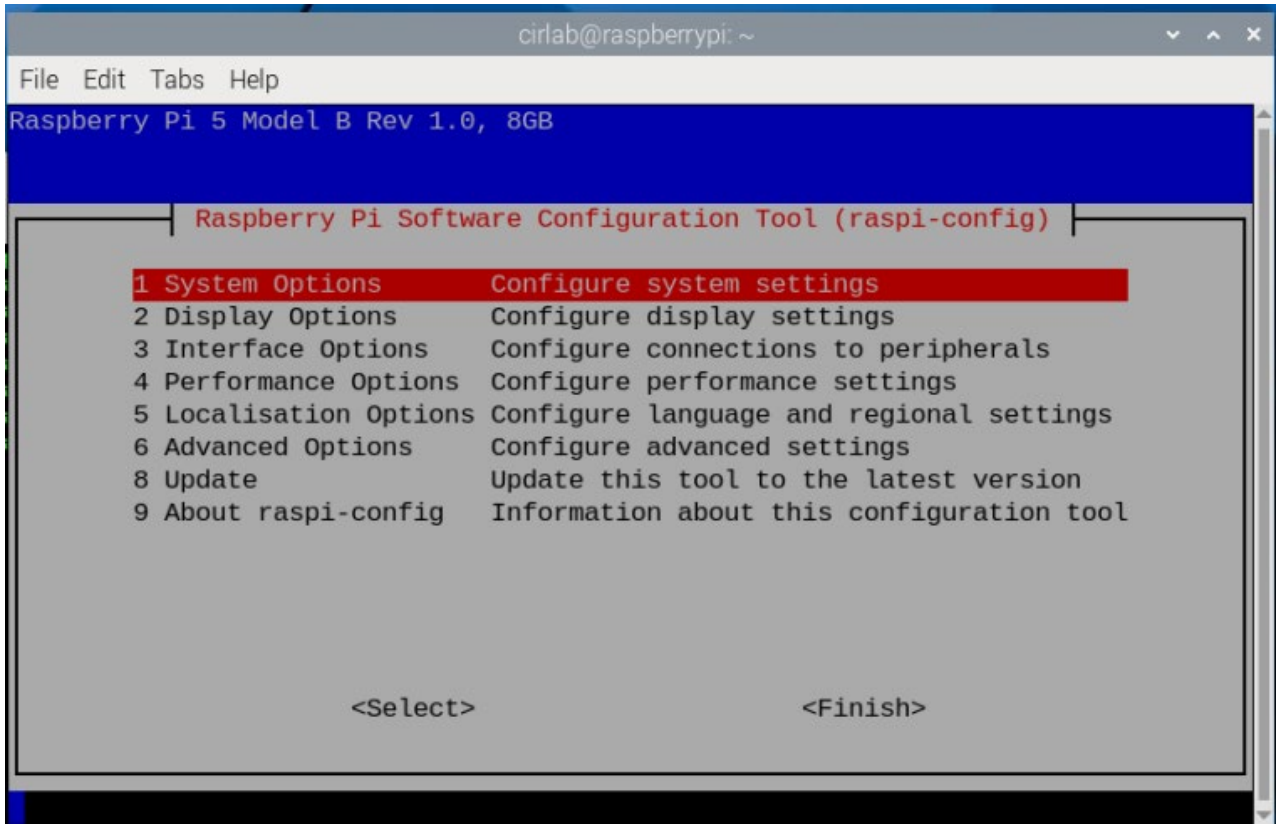
```
>>> %Run aaa.py
  Traceback (most recent call last):
    File "/home/pi/.local/lib/python3.7/site-packages/luma/core/interface/serial.py", line 306, in __init__
      self._spi.open(port, device)
  FileNotFoundError: [Errno 2] No such file or directory

  During handling of the above exception, another exception occurred:

  Traceback (most recent call last):
    File "/home/pi/Desktop/example/aaa.py", line 8, in <module>
      serial = spi(port=0, device=0)
    File "/home/pi/.local/lib/python3.7/site-packages/luma/core/interface/serial.py", line 317, in __init__
      raise luma.core.error.DeviceNotFoundError('SPI device not found')
  luma.core.error.DeviceNotFoundError: SPI device not found
```

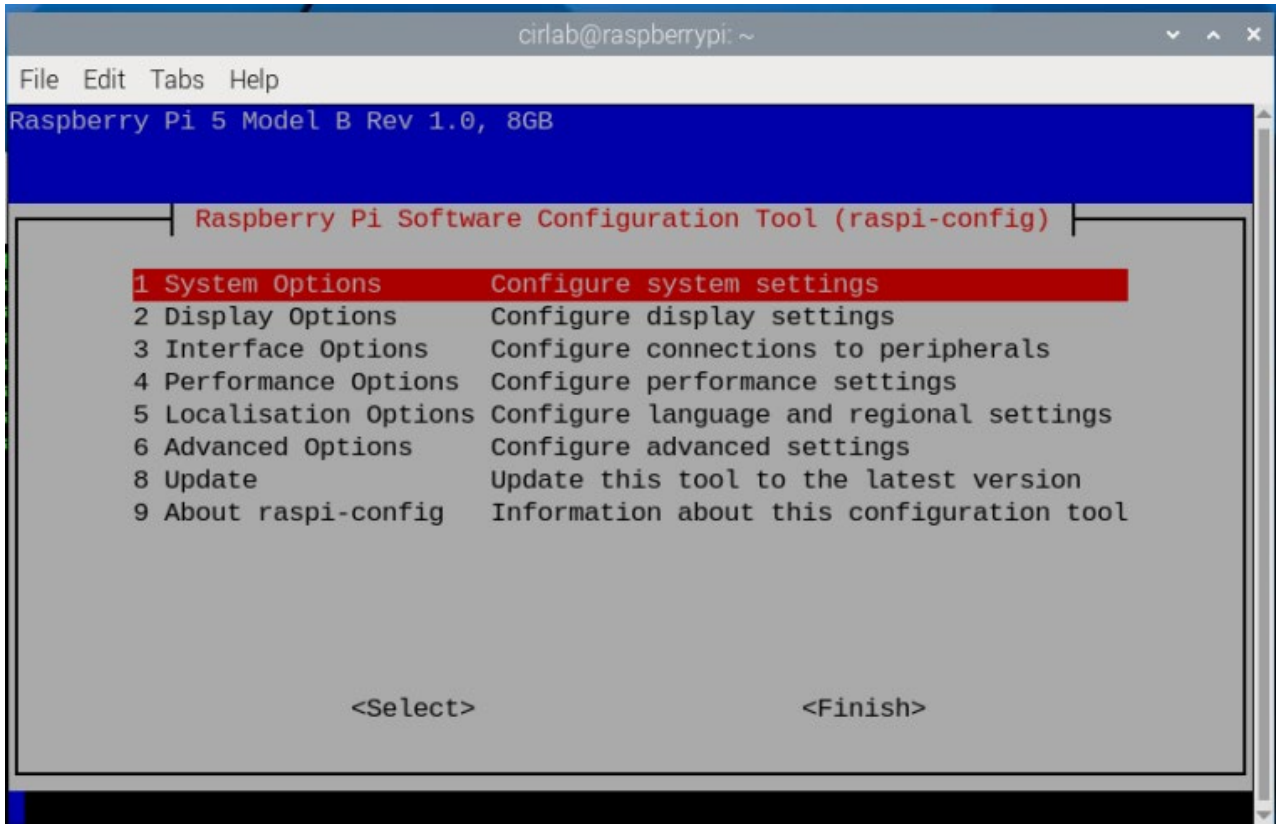
Open SPI interface

1. Enter the sudo raspi-config command in the terminal to start the Raspberry Pi configuration tool



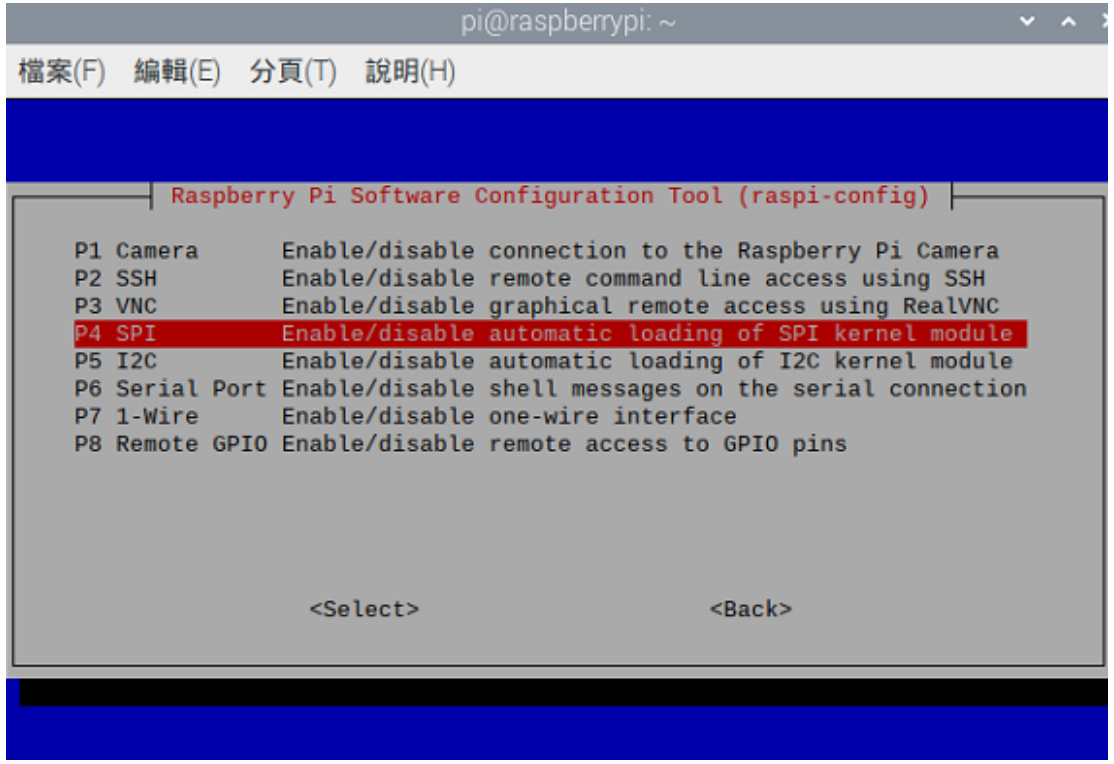
Open SPI interface

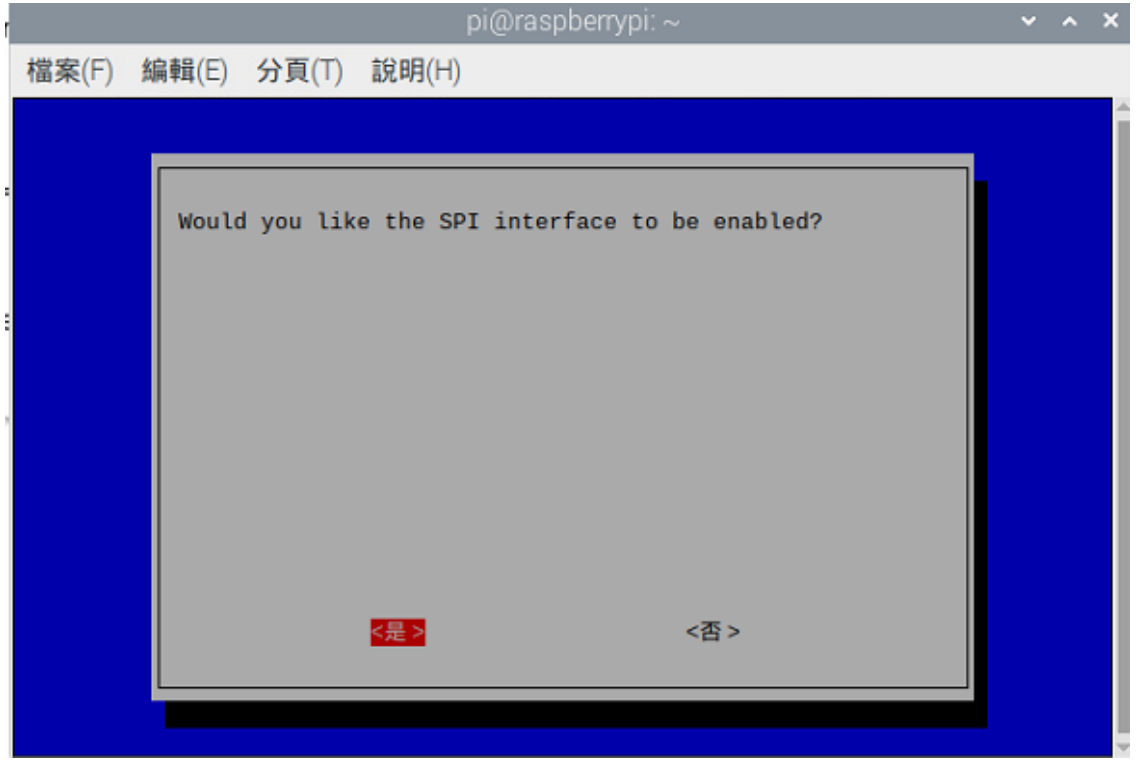
2. Use arrow keys to select Interfacing Options ◦



Open SPI interface

3.Choose SPI ◦ Choose Yes to open SPI interface





Result