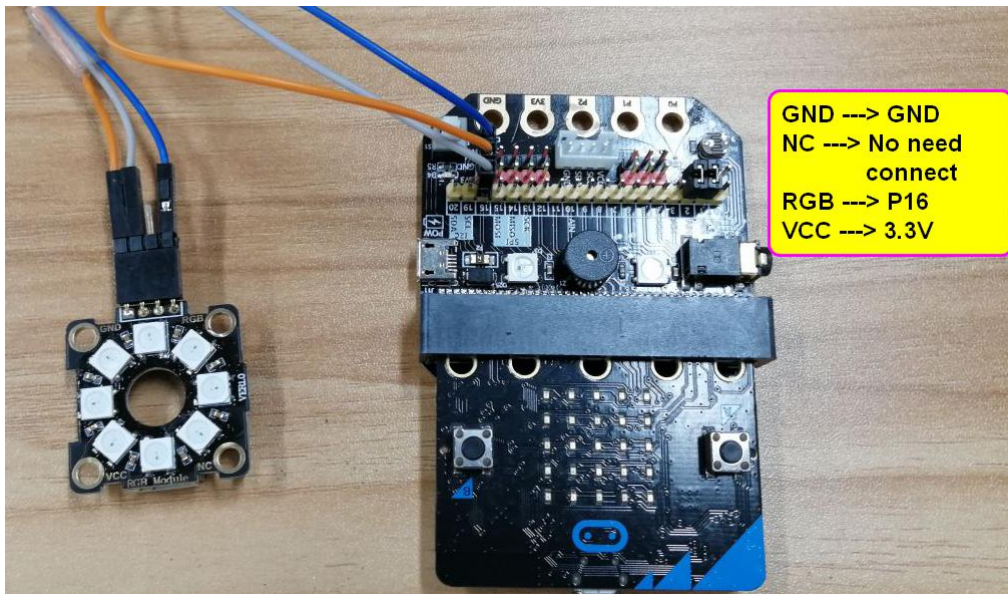## Breathing light

1. Learning target

In this course, we will learn how to use Raspberry Pi Pico and RGB halo module to achieve breathing light.

2. Preparation

Connect the module to Raspberry Pi Pico board by expansion board, as shown below.

GND ---> GND
NC ---> No need connect
RGB ---> P16
VCC ---> 3.3V

3. About code

```python
import time
from ws2812b import ws2812b

num_leds = 8   # Number of NeoPixels
# Pin where NeoPixels are connected
pixels = ws2812b(num_leds, 0,17)

pixels.fill(0,0,0)
pixels.show()

i = 0
brightness = 0
fadeAmount = 1

while True:
    for i in range(num_leds):
        pixels.set_pixel(i,0,brightness,brightness)
    pixels.show()
    brightness = brightness + fadeAmount
    if brightness <= 0 or brightness >= 200:
        fadeAmount = -fadeAmount
    time.sleep(0.005)
```

4. Import library file

4.1 Connect Pico to your computer, as shown below.
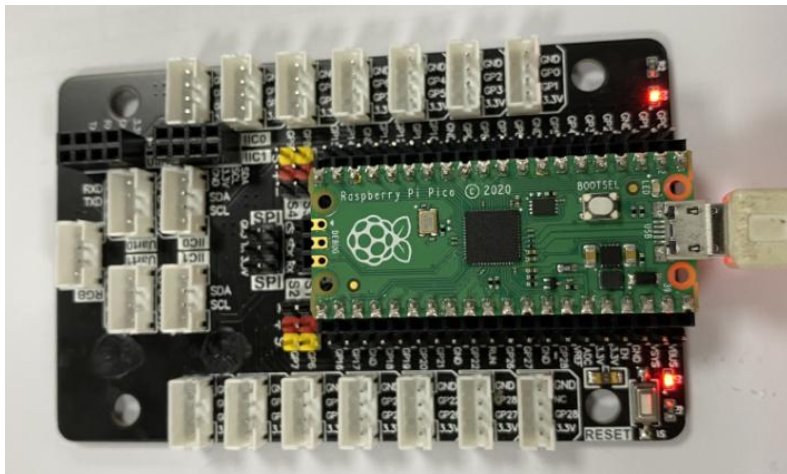
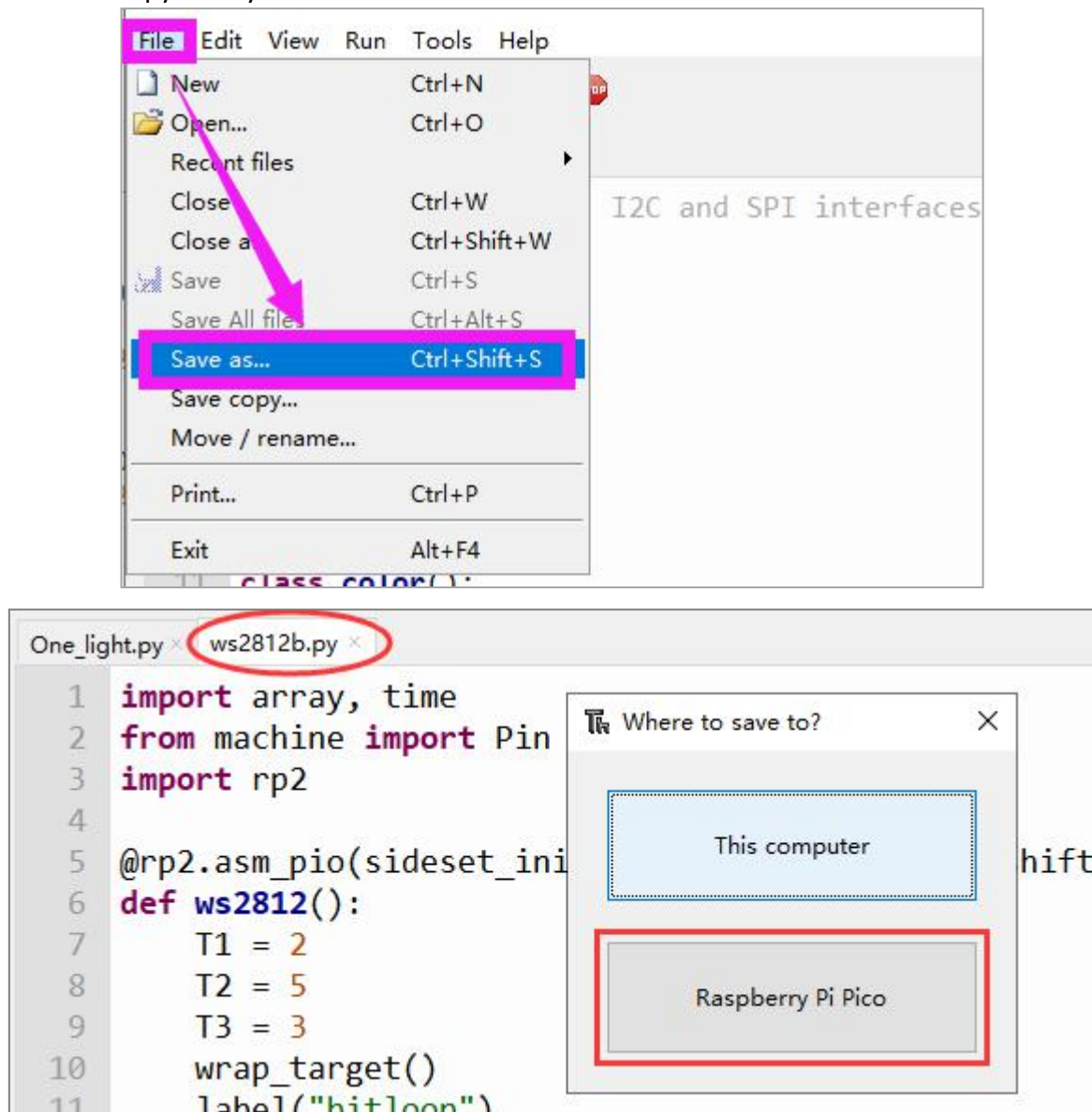4.2 Open the Thonny software, click the lower right corner to connect the Pico board.
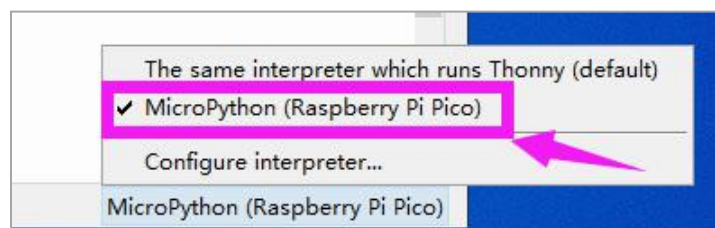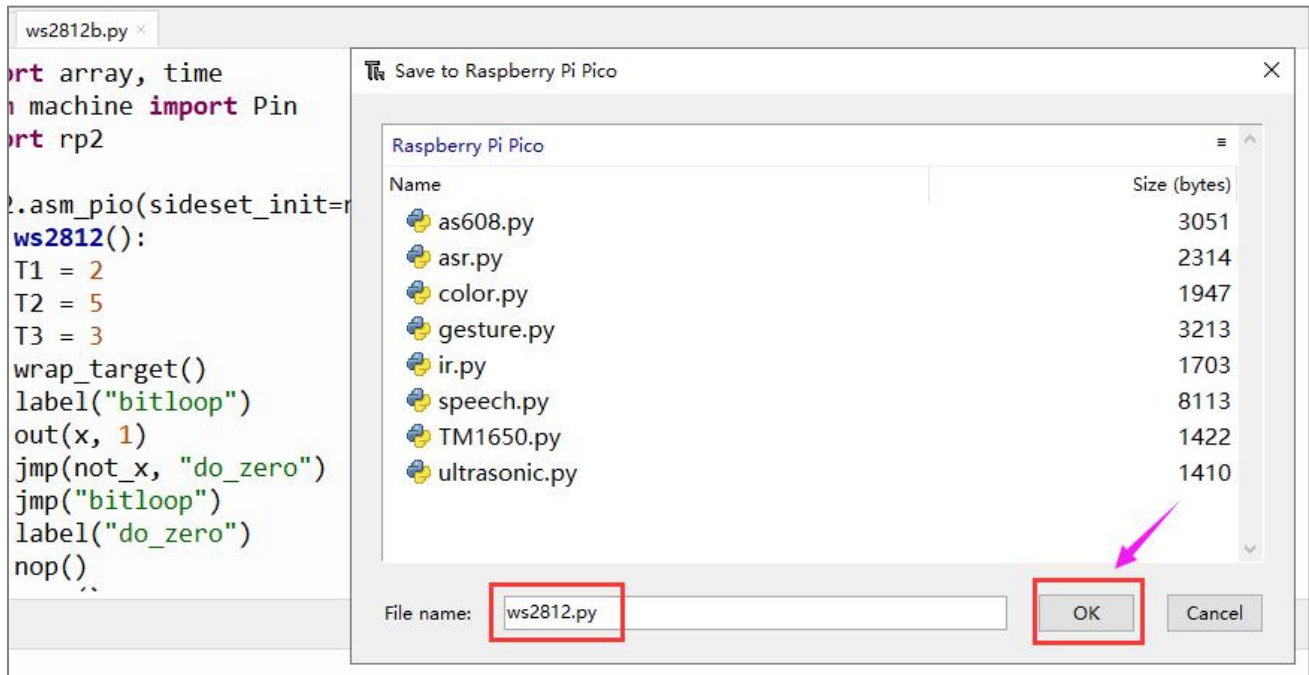

4.3 Open the gesture.py in library folder by Thonny software.

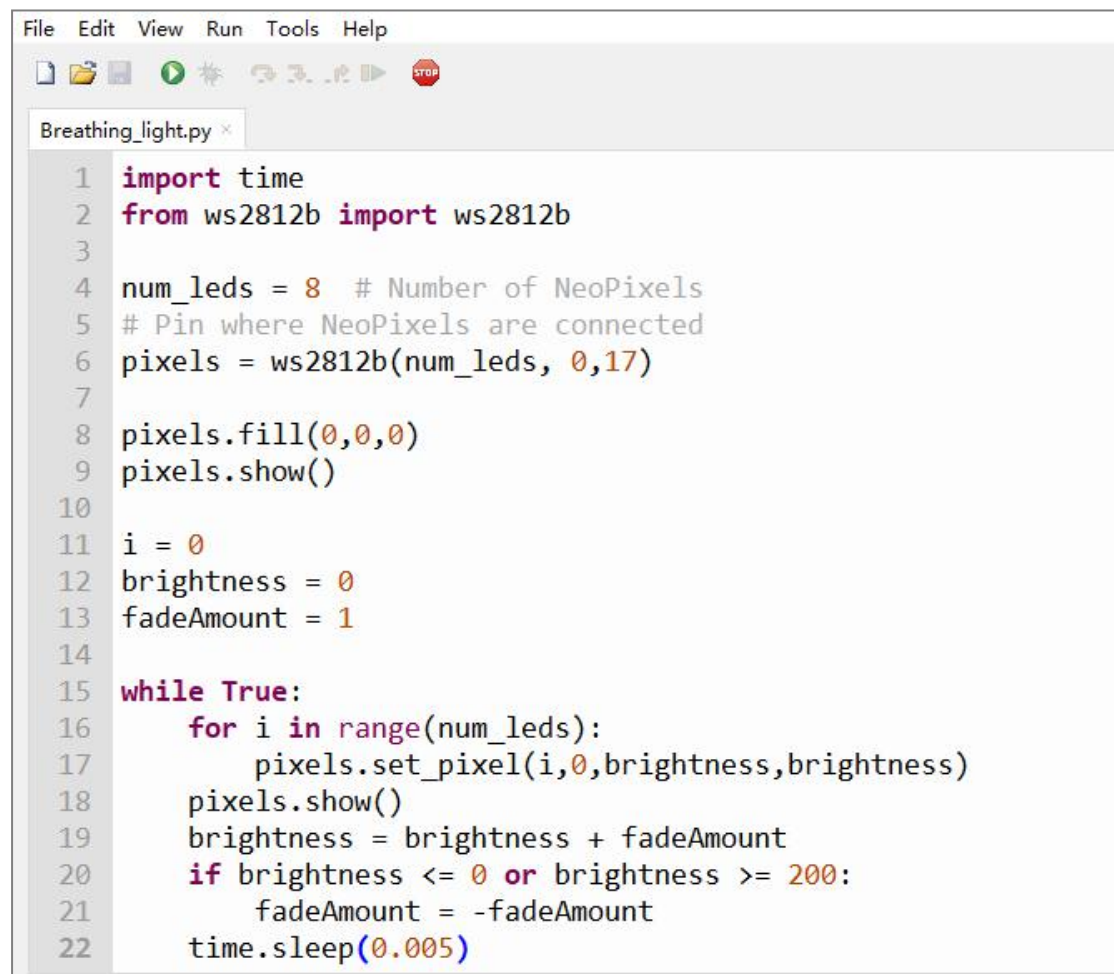4.4 Save as this .py library file into Pico.

4.5 Enter the same file name as the library file. Then, click "OK".

5. Compiling and downloading code

5.1 We can open the Breathing light.py file by Thonny software.

```python
import time
from ws2812b import ws2812b

num_leds = 8  # Number of NeoPixels
# Pin where NeoPixels are connected
pixels = ws2812b(num_leds, 0,17)

pixels.fill(0,0,0)
pixels.show()

i = 0
brightness = 0
fadeAmount = 1

while True:
    for i in range(num_leds):
        pixels.set_pixel(i,0,brightness,brightness)
    pixels.show()
    brightness = brightness + fadeAmount
    if brightness <= 0 or brightness >= 200:
        fadeAmount = -fadeAmount
    time.sleep(0.005)
```

5.2 In Thonny menu bar, we need to click run button to run this program.
"%Run -c $EDITOR_CONTENT" will be displayed. As shown below.

```
MicroPython v1.13-290-g556ae7914 on 2021-01-21; Raspberry Pi Pico with RP2040
Type "help()" for more information.
>>> %Run -c $EDITOR_CONTENT
>>>
```

6. Phenomenon

After the program is run successfully. All RGB lights from on to off, and then from off to on, keep looping in this state, realizing the effect of breathing light.