

3 Get CPU temperature, Adjust fan speed

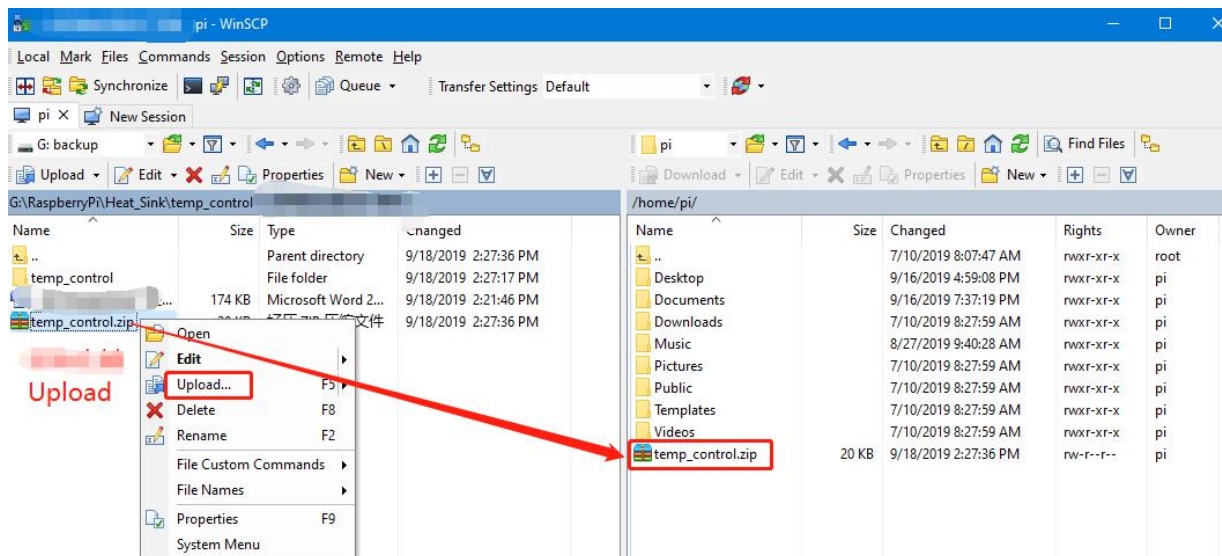
The Raspberry Pi RGB_Cooling_HAT needs to be properly plugged into the GPIO port of the Raspberry Pi and open the Raspberry Pi system I2C function.

The experimental phenomenon is to read and print the Raspberry Pi CPU temperature, and adjust the speed of the fan rotation according to the temperature. The higher the temperature, the faster the rotation speed.

1. File transfer

1.1 Install **WinSCP** tool on the computer side, connect the Raspberry Pi and transfer the **temp_control.zip** package to the pi directory of the Raspberry Pi.

Path of WinSCP: [Raspberry Pi RGB_Cooling_HAT]---[Tools]---[winscp556_setup.1416364912.exe]



1.2 Extract file

Open the Raspberry Pi terminal and input command **ls** to find the RGB_Cooling_HAT.zip file. As shown below:

```
pi@raspberrypi:~ $ ls
Bookshelf Documents Music Public RGB_Cooling_HAT.zip Templates WiringPi
```

Input command to extract file:

unzip RGB_Cooling_HAT.zip

```
pi@raspberrypi:~ $ unzip RGB_Cooling_HAT.zip
Archive:  RGB_Cooling_HAT.zip
  creating: RGB_Cooling_HAT/
  inflating: RGB_Cooling_HAT/RGB_Cooling_HAT.py
  inflating: RGB_Cooling_HAT/fan.py
  inflating: RGB_Cooling_HAT/fan_temp.py
  inflating: RGB_Cooling_HAT/install.sh
  inflating: RGB_Cooling_HAT/oled.py
  inflating: RGB_Cooling_HAT/rgb.py
  inflating: RGB_Cooling_HAT/rgb_effect.py
  inflating: RGB_Cooling_HAT/rgb_temp.py
  extracting: RGB_Cooling_HAT/start.desktop
  inflating: RGB_Cooling_HAT/start.sh
```

2. Compiling and running program

2.1 Input command to enter temp_control find file:

```
cd RGB_Cooling_HAT/
ls
```

```
pi@raspberrypi:~/RGB_Cooling_HAT $ ls
fan.py  fan_temp.py  oled.py  RGB_Cooling_HAT.py  rgb_effect.py  rgb.py  rgb_temp.py  start.desktop  start.sh
pi@raspberrypi:~/RGB_Cooling_HAT $
```

2.2 2.2 Input command to run program.

```
python fan_temp.py
```

```
pi@raspberrypi:~/RGB_Cooling_HAT $ python fan_temp.py
46.0
45.0
48.0
47.0
```

After run this program, we can see the Raspberry Pi CPU temperature will be printed, and adjust the speed of the fan rotation according to the temperature. The higher the temperature, the faster the rotation speed.

3. About code

3.1 Initialize Raspberry Pi I2C configuration, import smbus module for I2C communication, import time module for delay, and import os module for access to operating system services

```
import smbus
import time
import os
bus = smbus.SMBus(1)

addr = 0x0d
fan_reg = 0x08
state = 0
temp = 0
level_temp = 0
```

3.2 In the loop, use `os.popen` to obtain the temperature using the command `vcgencmd measure_temp` to obtain the CPU temperature, and intercept the temperature value and assign it to `temp`.

```
cmd = os.popen('vcgencmd measure_temp').readline()
CPU_TEMP = cmd.replace("temp=", "").replace("\n", "")
print(CPU_TEMP)
temp = float(CPU_TEMP)
```

Get the temperature, then judge the temperature value and modify the fan speed. It can be modified according to actual needs.

```
if abs(temp - level_temp) >= 1:
    if temp <= 45:
        level_temp = 45
        bus.write_byte_data(addr, fan_reg, 0x00)
    elif temp <= 47:
        level_temp = 47
        bus.write_byte_data(addr, fan_reg, 0x04)
    elif temp <= 49:
        level_temp = 49
        bus.write_byte_data(addr, fan_reg, 0x06)
    elif temp <= 51:
        level_temp = 51
        bus.write_byte_data(addr, fan_reg, 0x08)
    elif temp <= 53:
        level_temp = 53
        bus.write_byte_data(addr, fan_reg, 0x09)
    else:
        level_temp = 55
        bus.write_byte_data(addr, fan_reg, 0x01)

time.sleep(1)
```