Chapter5: PCA9685 control servo

1.Some commands for servo control

1.1 from __future__ import division: allows the current program to be compatible with future versions.

1.2 If you need to manually change the address of i2c for the current program, we can use:

Pwm=Adafruit_PCA9685.PCA9685(address=0x41,busnum=2)

0x41 is the i2c address of the expansion board we found.

1.3 servo_min and servo_max: set the maximum and minimum pulses of the current servo,

1.4 pwm.set_pwm(1,0,args) : this command to control servo

The first parameter specifies the number of the servo. We have previously inserted the test servo on the S1 port of the drive board, so the parameter is 1. The third parameter is the actual rotate angle of the servo. This parameter is defined as any pulse in the interval [servo_min, servo_max].

!!!Note: the third parameter here can only be entered as an integer.

If you want to check whether the servo of the kit device is normal by the following program, you can insert the servo that controls the camera to rotate left and right into S1 with the parameter 1, and the servo that controls the camera to rotate up and down to insert S2 with the parameter 2. The following program allows the two servos to rotate to the specified position for a short time and then return to the position.

1.5 pwm.set_pwm_freq(50) : Define the frequency of the reference pulse as 50hz, which is a period of 20ms. In fact between pulse width can be 0.5 ms and 2.5 ms. Pulse width and the servo rotation angle 0° ~ 180° corresponds, as shown below.

0.5ms-----------------0°
1.0ms-----------------45°
1.5ms-----------------90°
2.0ms-----------------135°
2.5ms-----------------180°

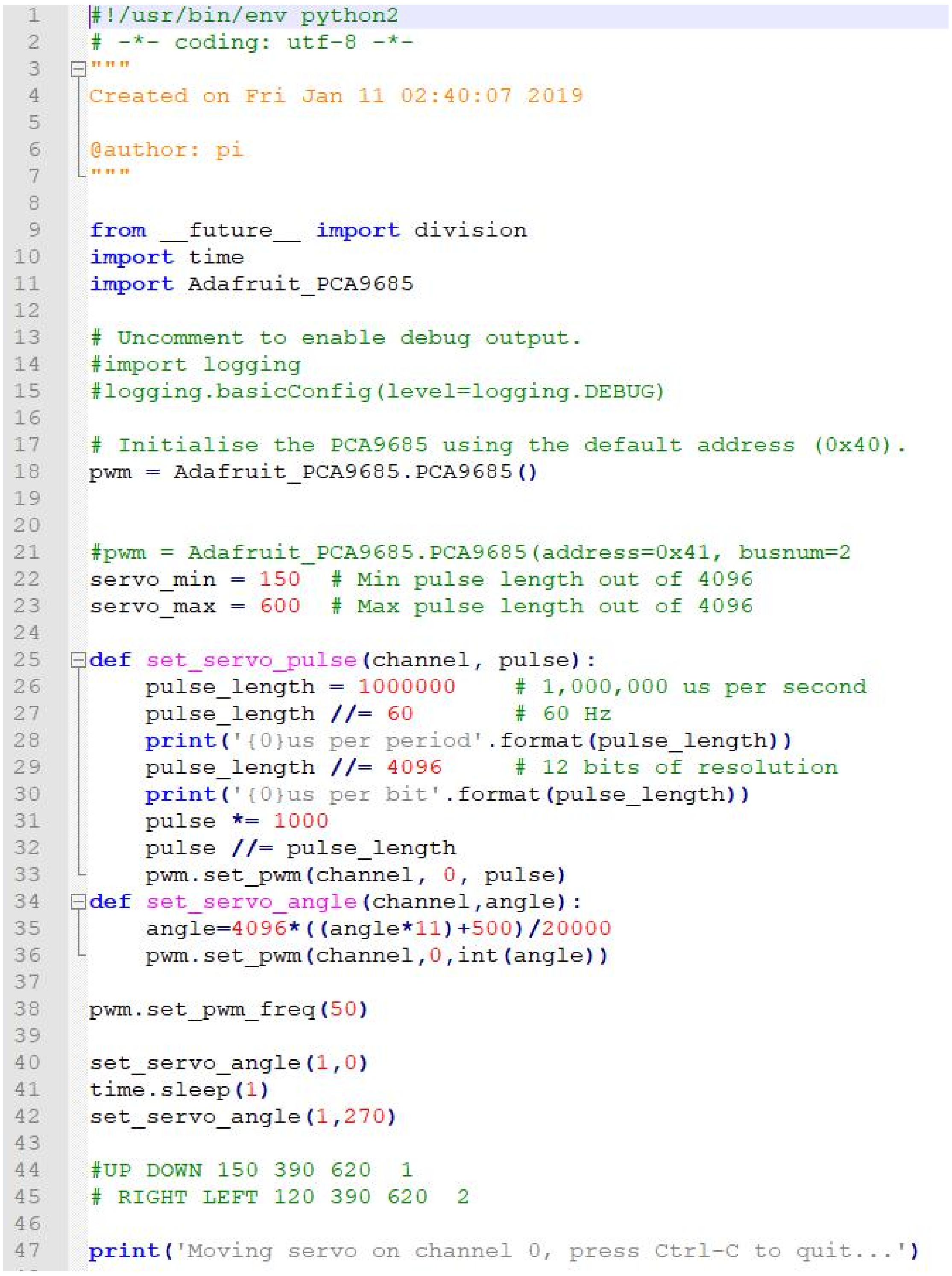
And the maximum frequency of the servo is 4096, so we have a ratio:

((0°*11)+500)/20000=pulse1/4096
((1°*11)+500)/20000=pulse2/4096
...
((180°*11)+500)/20000=pulseN/4096

11 is a value that converts the angle to 12-bit precision. We convert 20ms into 20,000 us, and the pulse calculated in microseconds is the third parameter required by pwm.set_pwm(channel,0,pulse).

2.About code

The program is shown below:



```python
#!/usr/bin/env python2
# -*- coding: utf-8 -*-
"""
Created on Fri Jan 11 02:40:07 2019

@author: pi
"""

from __future__ import division
import time
import Adafruit_PCA9685

# Uncomment to enable debug output.
#import logging
#logging.basicConfig(level=logging.DEBUG)

# Initialise the PCA9685 using the default address (0x40).
pwm = Adafruit_PCA9685.PCA9685()


#pwm = Adafruit_PCA9685.PCA9685(address=0x41, busnum=2
servo_min = 150  # Min pulse length out of 4096
servo_max = 600  # Max pulse length out of 4096

def set_servo_pulse(channel, pulse):
    pulse_length = 1000000    # 1,000,000 us per second
    pulse_length //= 60       # 60 Hz
    print('{0}us per period'.format(pulse_length))
    pulse_length //= 4096     # 12 bits of resolution
    print('{0}us per bit'.format(pulse_length))
    pulse *= 1000
    pulse //= pulse_length
    pwm.set_pwm(channel, 0, pulse)
def set_servo_angle(channel,angle):
    angle=4096*((angle*11)+500)/20000
    pwm.set_pwm(channel,0,int(angle))

pwm.set_pwm_freq(50)

set_servo_angle(1,0)
time.sleep(1)
set_servo_angle(1,270)

#UP DOWN 150 390 620  1
# RIGHT LEFT 120 390 620  2

print('Moving servo on channel 0, press Ctrl-C to quit...')
```