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CPE 406

HMW 7

04/23/2021

Assignment Description:

In this assignment we are using a RGB LED, and 220k ohm resistors. The RGB has 3 different pins that are assigned to blue, red, and green. We can generate different colors by adjusting the brightness of each of the three leds that are inside the RGB LED. The twist is having to create our own colors with the scale from 0-100. I used the program provided to determine colors to the modified code. The code will make the RGB Led turn on automatically and switch colors after so many seconds. 5 colors are to be picked and presented in the video. Pin GPIO 17,27, and 18 were connected to the RGB and resistors. Then 3.3v were connected to the left middle pin of the RGB. Pretty simple circuit but the code is more complex in this assignment.

Problems Encountered

My main difficulty for this assignment was me frying my pi on homework 6. I had finished my recording for homework 6 but I wanted to get a better/ closer one and It died. Not sure how. It came in today, the 23rd at 5pm and I had work till 8 pm so I had little time to work on it. However, I did get the circuit to work and display 5 colors, but I did not have time to adjust the right speeds as I want to submit the assignment before the 24th. My other problems were getting the setcolor to work. I had to play around with it a lot till I got the right pieces in place. The time was my main issue for this homework. I had a weird error where every time at the end of the code is about to be done running, the led turns green and I get an error saying r is not defined when I know it is.

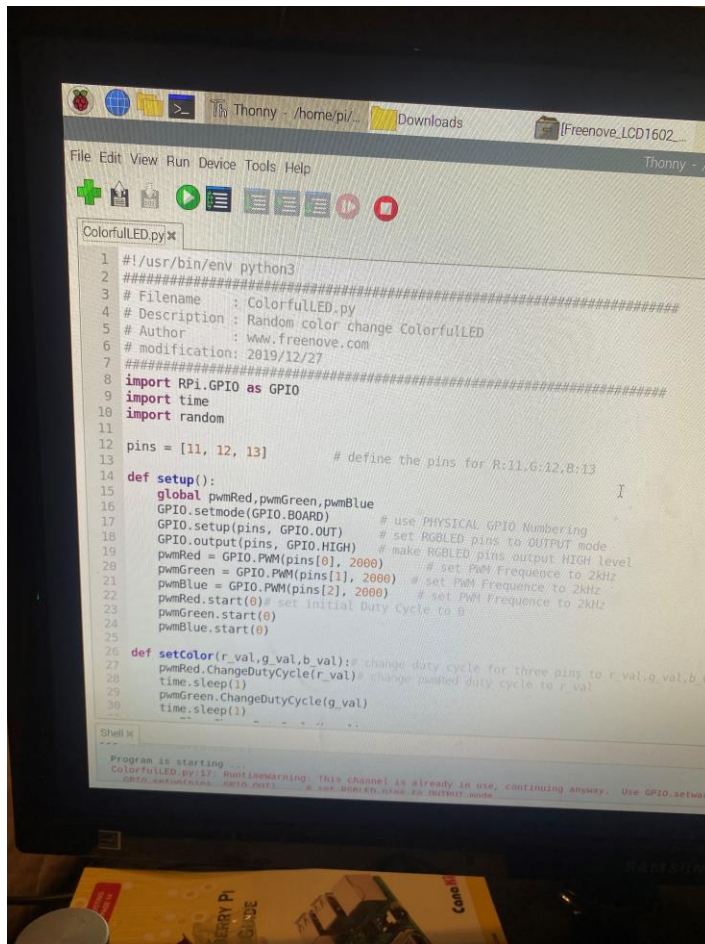
Lesson Learned

I did not know that RGB even exist. I do not think I have ever seen there anymore nor as any teacher showed me this LED. I found it quite astonishing how what it can do. By playing around with the brightness, we could make it change colors and it was a lot of different colors. Every week I find it really interesting on what we are doing, and I am learning a lot of useful material where I will use it in my workplace one day. I feel like I am more comfortable with using python. Every week I have progressed my knowledge in it and I know next week its going to be the same thing.

Description of Completed Project

Pictures and vidoes below

Fig 1: Code part 1



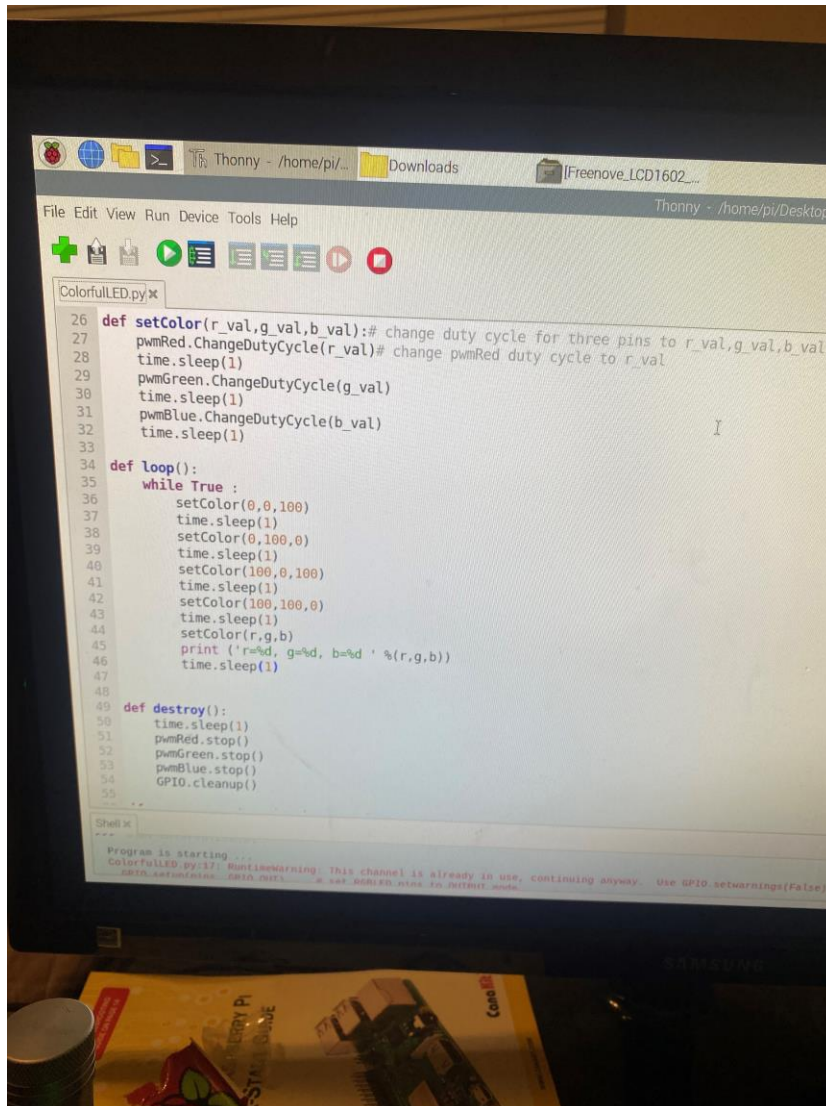
```
1 #!/usr/bin/env python3
2 #####
3 # Filename : ColorfulLED.py
4 # Description : Random color change ColorfulLED
5 # Author : www.freenove.com
6 # modification: 2019/12/27
7 #####
8 import RPi.GPIO as GPIO
9 import time
10 import random
11
12 pins = [11, 12, 13] # define the pins for R:11,G:12,B:13
13
14 def setup():
15     global pwmRed,pwmGreen,pwmBlue
16     GPIO.setmode(GPIO.BOARD) # use PHYSICAL GPIO Numbering
17     GPIO.setup(pins, GPIO.OUT) # set RGBLED pins to OUTPUT mode
18     GPIO.output(pins, GPIO.HIGH) # make RGBLED pins output HIGH level
19     pwmRed = GPIO.PWM(pins[0], 2000) # set PWM Frequency to 2kHz
20     pwmGreen = GPIO.PWM(pins[1], 2000) # set PWM Frequency to 2kHz
21     pwmBlue = GPIO.PWM(pins[2], 2000) # set PWM Frequency to 2kHz
22     pwmRed.start(0) # set initial Duty Cycle to 0
23     pwmGreen.start(0)
24     pwmBlue.start(0)
25
26 def setColor(r_val,g_val,b_val): # change duty cycle for three pins to r_val,g_val,b_val
27     pwmRed.ChangeDutyCycle(r_val) # change pwmled duty cycle to r_val
28     time.sleep(1)
29     pwmGreen.ChangeDutyCycle(g_val)
30     time.sleep(1)
```

Shell X

Program is starting ...
ColorfulLED.py:17: RuntimeWarning: This channel is already in use, continuing anyway. Use GPIO.setwarnings(False) to disable warnings.
GPIO.setwarnings(False)

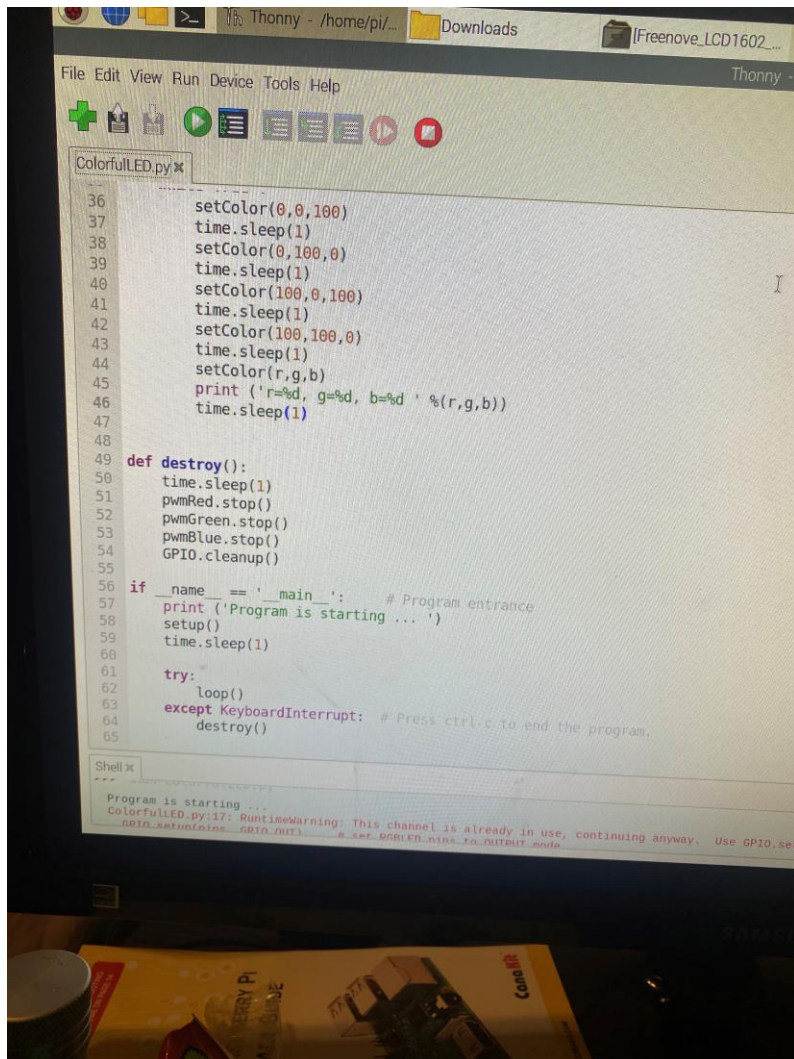
This picture above is the code is used and its from the freenove folder. In this section of the code, I did not have to change anything. There was no reason to. I thought at one point I must list every color and declare it but that is not true. Playing around with the brightness is how we change colors of the led.

Fig 2: Code part 2



The picture above illustrates the setColor functions I used. The code also has the scale from 0-255 and that is how the brightness is divided into. I didn't really have time to go in depth in all the colors but I got 5 colors that will be shown in the video below. A lot of time.sleep were used but I didn't have enough time to get it perfect as the assignment wanted.

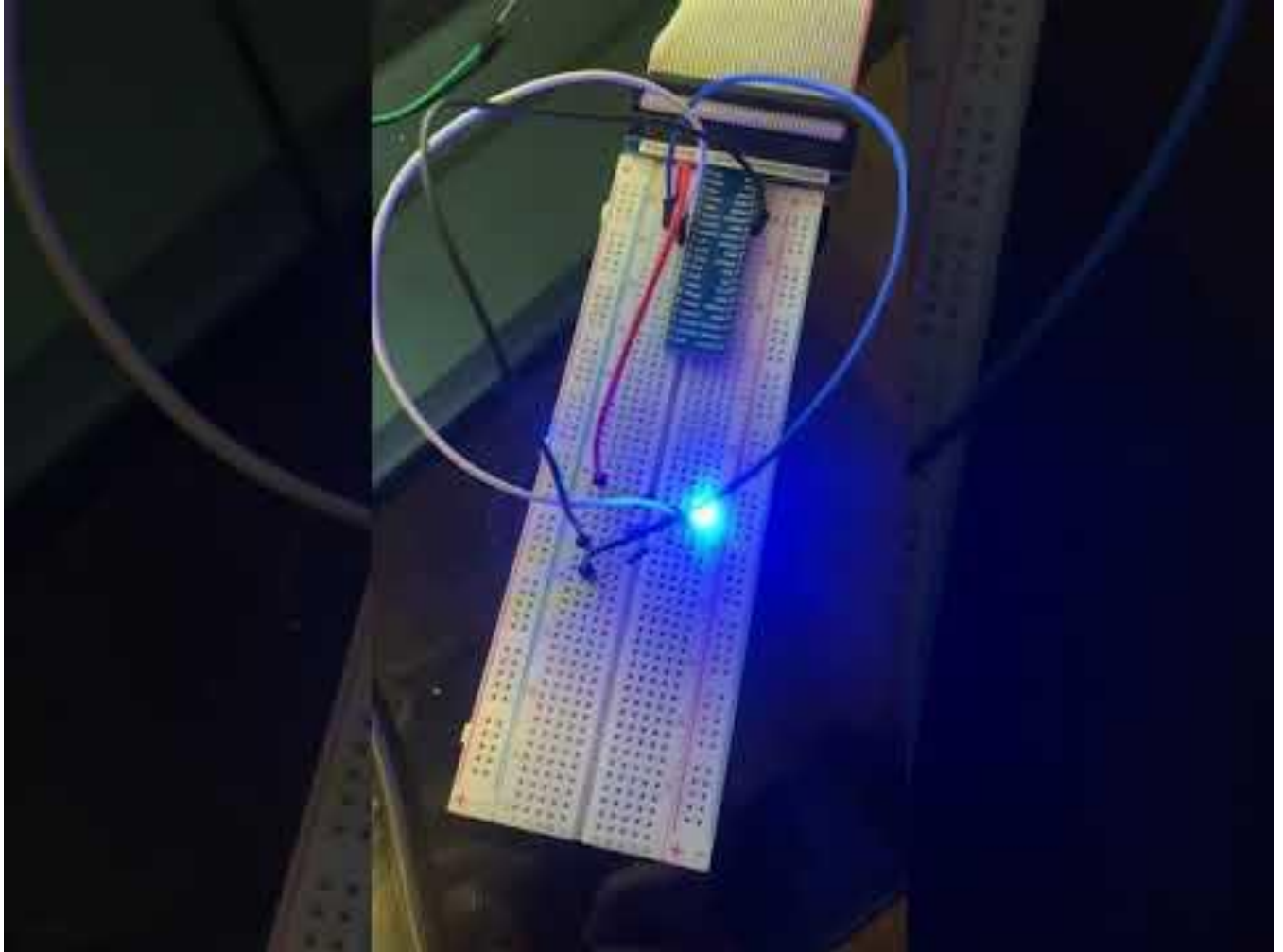
Fig 3: Code part 3



```
File Edit View Run Device Tools Help
ColorfulLED.py
36 setColor(0,0,100)
37 time.sleep(1)
38 setColor(0,100,0)
39 time.sleep(1)
40 setColor(100,0,100)
41 time.sleep(1)
42 setColor(100,100,0)
43 time.sleep(1)
44 setColor(r,g,b)
45 print ('r=%d, g=%d, b=%d' %(r,g,b))
46 time.sleep(1)
47
48
49 def destroy():
50     time.sleep(1)
51     pwmRed.stop()
52     pwmGreen.stop()
53     pwmBlue.stop()
54     GPIO.cleanup()
55
56 if __name__ == '__main__': # Program entrance
57     print ('Program is starting ... ')
58     setup()
59     time.sleep(1)
60
61     try:
62         loop()
63     except KeyboardInterrupt: # Press ctrl-c to end the program.
64         destroy()
65
Shell X
Program is starting ...
ColorfulLED.py:17: RuntimeWarning: This channel is already in use, continuing anyway. Use GPIO.setmode(GPIO.BOARD) or GPIO.setwarnings(False) to suppress this warning.
  GPIO.setmode(GPIO.BOARD) # set GPIO pins to output mode
```

Only thing I added in last part of the code is the time.sleep function.

Video: Demonstrating my circuit and code



This video shows the demo of my circuit and led light. The colors are white, light green (lime), red, purple, and light blue. The green light at the end is related to my error I wrote in the problems encountered section, so I am not counting that last green light.