LAB-5- LED Blinking and Brightness Control

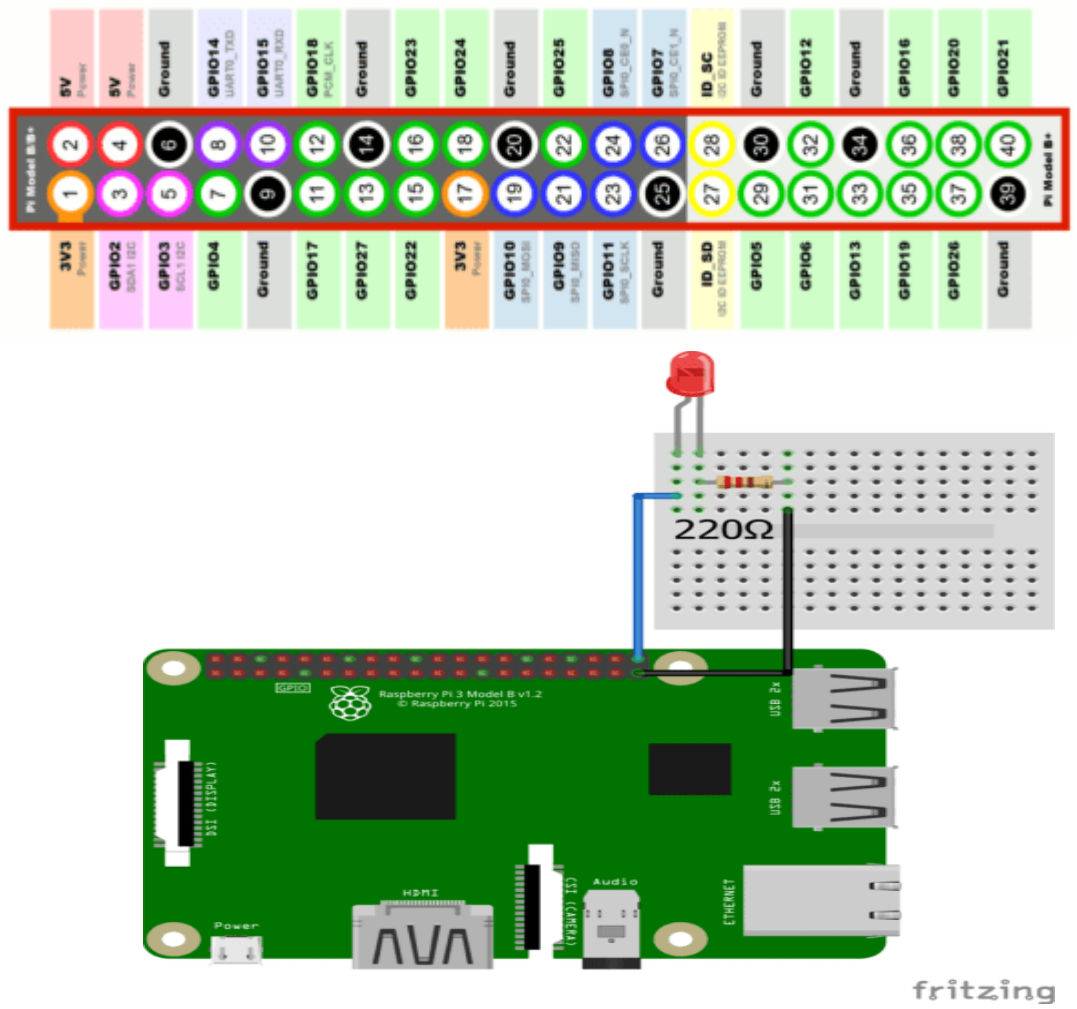
Aim:

To write python code for LED blinking and brightness control using PWM in Raspberry Pi and test it.

Task:

1.Write a Python Program to generate LED Blinking and Brightness Control using PWM in Raspberry Pi and test it.

Pin and Circuit Diagram :



Algorithms:

1. LED Blinking

1.Start
2.Import the **RPI** Python module to control the GPIO on Raspberry Pi.
3. Set the GPIO mode as **BCM** i.e. Broadcom SOC Channel.

4.Specify the GPIO Pin through which the LED is connected.
5.Run an infinite while loop to control the LED by setting the GPIO Pin to either **True** or **False** .
6.Give a sleep cycle of 0.5s.
7.Exit

2. LED Brightness Control using PWM

1.Start
2.Import the **RPI** Python module to control the GPIO on Raspberry Pi.
3.Set the GPIO mode as **BCM** i.e. Broadcom SOC Channel.
4.Specify the GPIO Pin through which the LED is connected.
5.Create a PWM object on the GPIO Pin with a maximum range of 100 i.e. the duty cycle .
6.Start the PWM signal with an initial duty cycle of 0.
7.In an infinite while loop increment and decrement the LED brightness gradually with a sleep cycle of 0.5s and set the duty cycle of the PWM signal to ‘i’.
8.The loop results in LED fading in and out continuously.
9.Stop the PWM signal.
10.Exit

Programs:

1. LED Blinking

led_blink.py

```
1  import RPi.GPIO as GPIO
2  from time import sleep
3  GPIO.setmode(GPIO.BCM)
4  GPIO.setup(23,GPIO.OUT)
5  while True:
6    GPIO.output(23,True)
7    sleep(0.5)
8    GPIO.output(23,False)
9    sleep(0.5)
```

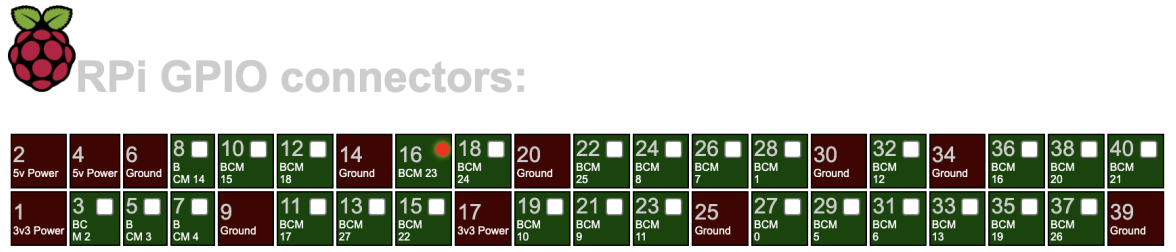
2. LED Brightness Control using PWM

led_brightness.py

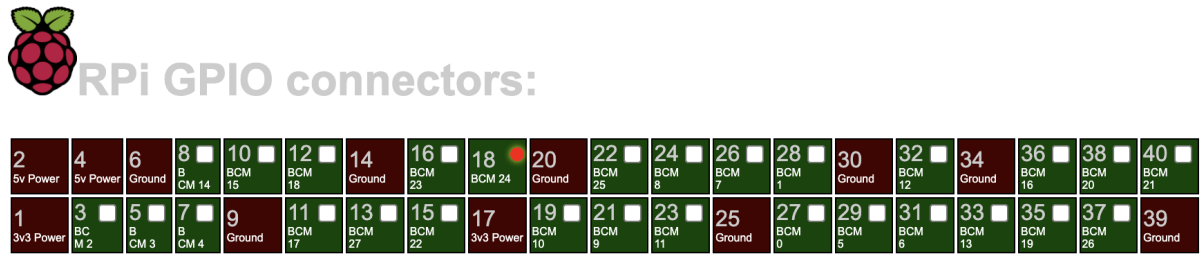
```
import RPi.GPIO as GPIO
from time import sleep
GPIO.setmode(GPIO.BCM)
GPIO.setup(24,GPIO.OUT)
pwm=GPIO.PWM(24,100)
pwm.start(0)
while True:
  for i in range(0,100):
    pwm.ChangeDutyCycle(i)
    sleep(0.5)
  for i in range(100,0,-1):
    pwm.ChangeDutyCycle(i)
    sleep(0.5)
pwm.stop()
```

Output:

1. LED Blinking



2. LED Brightness Control using PWM



Pre Lab Questions:

1. How can power control be done using PWM?
2. Write the function related to PWM generation in Raspberry Pi

Post Lab Questions:

1. What is the impact of the change of frequency PWM on the blinking effect of the LED?

2. Write python code in which LED only make blinking with medium and highest brightness.

brightness_control.py

```
import RPi.GPIO as GPIO
from time import sleep
GPIO.setmode(GPIO.BCM)
GPIO.setup(18, GPIO.OUT)
pwm = GPIO.PWM(18, 1000)
pwm.start(50)
while True:
        pwm.ChangeDutyCycle(100)
        sleep(1)
        pwm.ChangeDutyCycle(50)
        sleep(1)
pwm.stop()
```

Result:

Thus,the python code for LED blinking and brightness control using PWM in Raspberry Pi were written and successfully tested.