### PYTHON CODE TO BLINK THE LED USING RASBERRY PI:

Before we start writing the software we first need to install the Raspberry Pi GPIO Python module. This is a library that allows us to access the GPIO port directly from Python.

To install the Python library open a terminal and execute the following:

\$ sudo apt-get install python-rpi.gpio python3-rpi.gpio

With the library installed now open your favourite Python IDE (I recommend Thonny Python IDE more information about using it here).

Our script needs to do the following:

- Initialize the GPIO ports
- Turn the LED on and off in 1 second intervals

To initialize the GPIO ports on the Raspberry Pi we need to first import the Python library, the initialize the library and setup pin 8 as an output pin.

import RPi.GPIO as GPIO # Import Raspberry Pi GPIO library

from time import sleep # Import the sleep function from the time module

GPIO.setwarnings(False) # Ignore warning for now

GPIO.setmode(GPIO.BOARD) # Use physical pin numbering

GPIO.setup(8, GPIO.OUT, initial=GPIO.LOW) # Set pin 8 to be an output pin and set initial value to low (off)

Next we need to turn the LED on and off in 1 second intervals by setting the output pin to either high (on) or low (off). We do this inside a infinite loop so our program keep executing until we manually stop it.

while True: # Run forever

GPIO.output(8, GPIO.HIGH) # Turn on

sleep(1) # Sleep for 1 second

GPIO.output(8, GPIO.LOW) # Turn off

sleep(1)

# Sleep for 1 second

Combining the initialization and the blink code should give you the following full Python program:

import RPi.GPIO as GPIO # Import Raspberry Pi GPIO library

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while True: # Run forever

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sleep(1) # Sleep for 1 second

With our program finished, save it as blinking\_led.py and run it either inside your IDE or in the console with:

\$ python blinking\_led.py

#### PYTHON CODE FOR TRAFFIC LIGHT USING RASBERRY PI:

GPIO Zero is a new Python library which provides a simple interface to everyday GPIO component. It comes installed by default in Rasbian.

Open IDLE(Integrated Development Environment), which you can use to write and run code.

Raspbian Menu Icon >> Programming >> Python 3 (IDLE).

- To create a new file in IDLE, You can click on File and then New File in IDLE's menu bar.
- Create a new file by clicking File >> New File
- Save the new file by clicking File >> Save. Save the file as trffic.py
- You'll need the LED Class, and to tell it that the LED is on pin 17. Write the following code in your new file.
- from gpiozero import LED
- 2. led = LED(17)
- To make the LED switch on, type the following and press Enter
- led.on()
- To make it switch off you can type
- 1. led.off()

Your LED should switch on and then off again. But that's not all you can do. Similarly checks the Buzzer and Button. Just import a Buzzer and Button for the header file.

## Making Traffic Light

We need a breadboard, three LEDs, a button, a buzzer, and the necessary jumper cables and registers.

## Wiring

First, you need to understand how each component is connected.

- · A push-button requires 1 ground pin and 1 GPIO pin
- An LED requires 1 ground pin and 1 GPIO pin, with a current limiting register
- A buzzer requires 1 ground pin and 1 GPIO pin

Place the components on the breadboard and connect them to the Raspberry Pi GPIO pins, according to the following diagram.

# Component GPIO pin

Button	21
Red LED	25
Yellow LED	8
Green LED	7
Buzzer	15

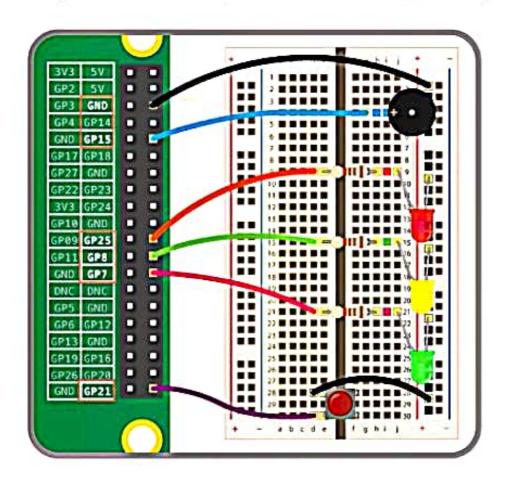
This is the same as the Switching and LED on and off step

- Open Python 3 from the main menu
- Create a new file just save with the project name.py

# Add Traffic Light, Button and Buzzer Code

```
1.
      from gpiozero import Button, TrafficLights, Buzzer
2.
      from time import sleep
3.
      buzzer = Buzzer(15)
4.
5.
      button = Button(21)
      lights = TrafficLights(25, 8, 7)
6.
7.
8.
      while True:
           button.wait_for_press()
9.
           buzzer.on()
10.
11,
           light.green.on()
           sleep(1)
12.
           lights.amber.on()
13.
14.
            sleep(1)
           lights.red.on()
15.
16.
           sleep(1)
           lights.off()
17.
           buzzer.off()
18.
```

Finally, we have successfully created a smart traffic system using a Raspberry Pi.



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