

Lesson 2 Controlling an LED by a Button

Introduction

In this lesson, we will learn how to turn an LED on or off by a button.

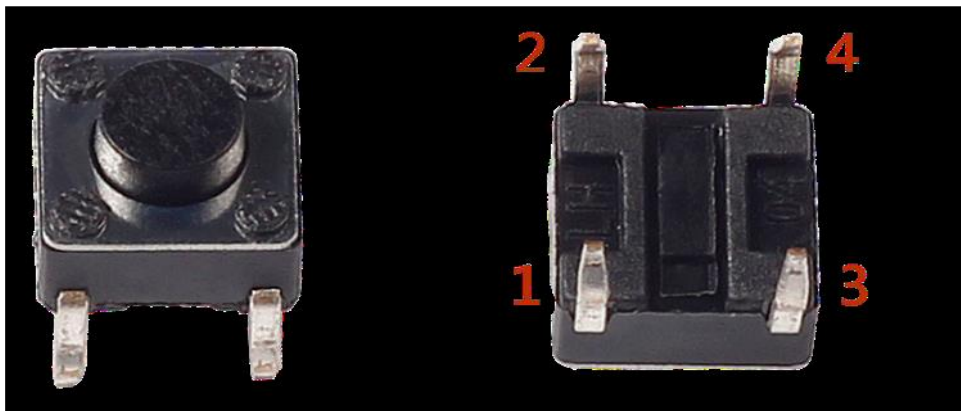
Components Required

- 1 * Raspberry Pi
- 1 * Breadboard
- 1 * LED
- 1 * Button
- 1 * Resistor (220Ω)
- Jumper wires

Principle

Button

Buttons are a common component used to control electronic devices. They are usually used as switches to connect or disconnect circuits. Although buttons come in a variety of sizes and shapes, the one used here is a 6mm mini-button as shown in the following pictures. Pin 1 is connected to pin 2 and pin 3 to pin 4. So, you just need to connect either of pin 1 and pin 2 to pin 3 or pin 4.

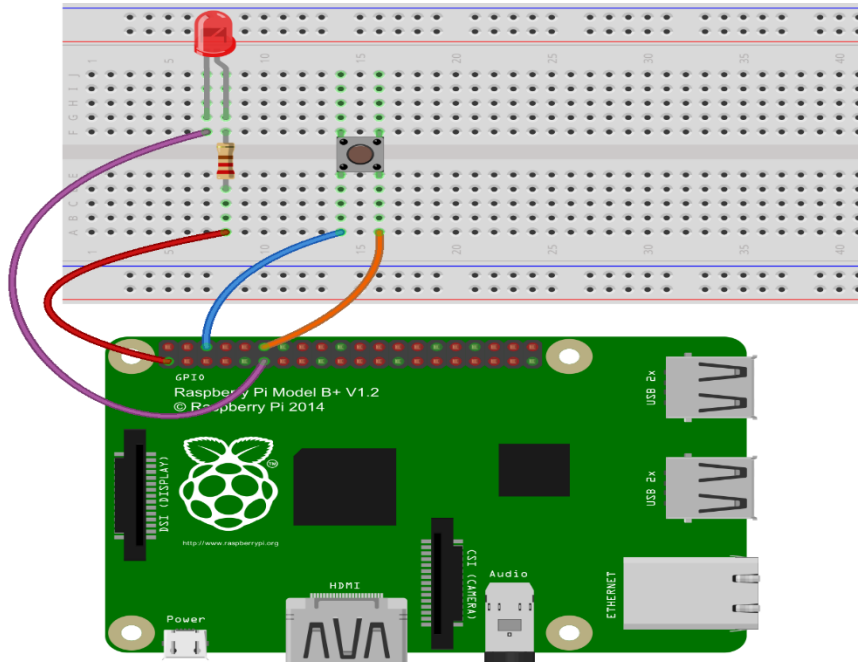


The following is the internal structure of a button. Since the pin 1 is connected to pin 2, and pin 3 to pin 4. The symbol on the right below is usually used to represent a button in circuits.

When the button is pressed, the 4 pins are connected, thus closing the circuit.

Hardware Setup

Use a normally open button as the input of Raspberry Pi. When the button is pressed, the GPIO connected to the button will turn into low level (0V). We can detect the state of the GPIO connected to the button through programming. That is, if the GPIO turns into low level, it means the button is pressed. You can run the corresponding code when the button is pressed, and then the LED will light up.



Python Code

```
import RPi.GPIO as GPIO

import time

GPIO.setmode(GPIO.BCM)

GPIO.setup(23, GPIO.IN, pull_up_down=GPIO.PUD_UP)#Button to GPIO23

GPIO.setup(24, GPIO.OUT) #LED to GPIO24

try:
    while True:
        button_state = GPIO.input(23)
        if button_state == False:
            GPIO.output(24, True)
            print('Button Pressed...')
            time.sleep(0.2)
```

```
        else:
            GPIO.output(24, False)
except:
    GPIO.cleanup()
```

Output

Now, press the button, and the LED will light up; press the button again, and the LED will go out. At the same time, the state of the LED will be printed on the screen.

Application

- Fire Alarm System
- LED/FAN Control
- Quiz Game