Ex - 10
Toggling with a Push Switch

Problem

You want to turn something on and off with a push switch so that it toggles between on and off each time you press it.

Solution

Record the last *state* of the button and invert that value each time the button is pressed.

The following example toggles an LED on and off as you press the switch.

To make this recipe, you will need:

- Breadboard and jumper wires
- Tactile push switch
- LED
- 470Ω resistor

Figure shows how to connect a tactile push switch and LED, using a breadboard and jumper wires.

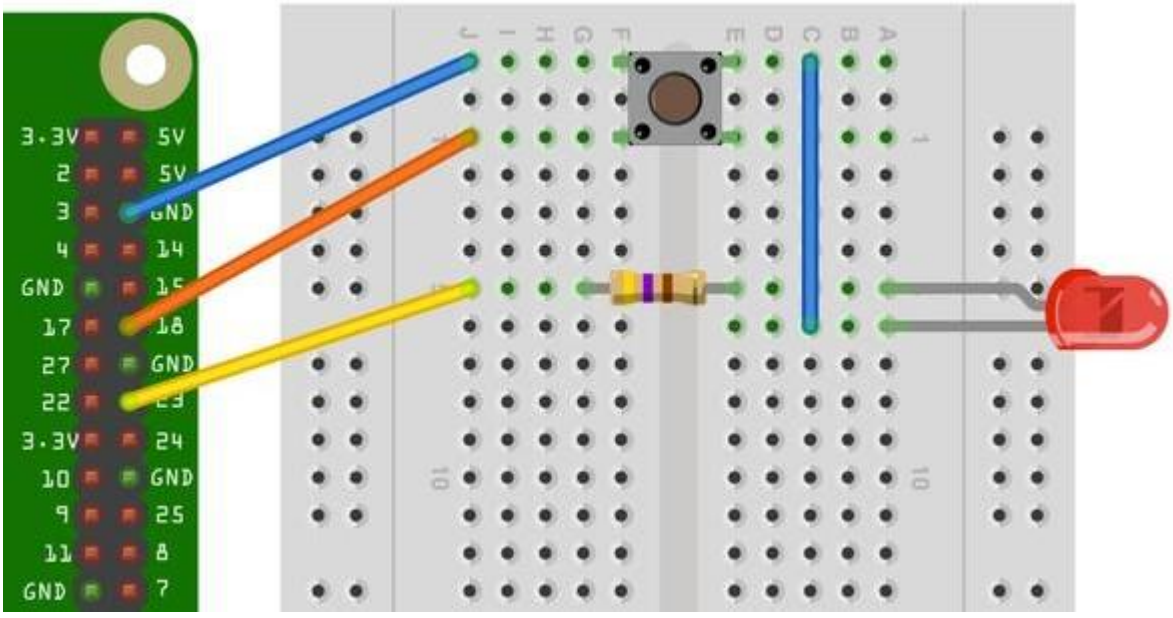

Figure. Connecting a push switch and LED to a Raspberry Pi

In addition to the male-to-female jumper wires connecting the Raspberry Pi to the breadboard, you will also need one male-to-male jumper wire or solid core wire.

Open an editor (nano or IDLE) and type in the following code *switch_on_off.py*:

```
import RPi.GPIO as GPIO
import time

GPIO.setmode(GPIO.BCM)

switch_pin = 18
led_pin =  23

GPIO.setup(switch_pin, GPIO.IN, pull_up_down=GPIO.PUD_UP)
GPIO.setup(led_pin,  GPIO.OUT)

led_state = False
old_input_state = True # pulled-up

while  True:
    new_input_state =  GPIO.input(switch_pin)
    if  new_input_state == False and old_input_state == True:
        led_state = not led_state
    old_input_state = new_input_state
    GPIO.output(led_pin, led_state)
```

Discussion

The variable led_state contains the current state of the LED (True for on and False for off). Whenever the button is pressed, the following line is run:

```
led_state = not led_state
```

The not command inverts the value of led_state, so if led_state is True, it becomes False and vice versa.

The variable old_input_state is used to remember the button position so that a button press is defined as occurring only when the input state changes from being True(switch not pressed) to False (switch pressed).