Lab - 09
Connecting a Push Switch

Problem

You want to connect a switch to your Raspberry Pi so that when you press it, some Python code is run.

Solution

Connect a switch to a GPIO pin and use the RPi.GPIO library in your Python program to detect the button press.

To make this recipe, you will need:

- Breadboard and jumper wires
- Tactile push switch

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

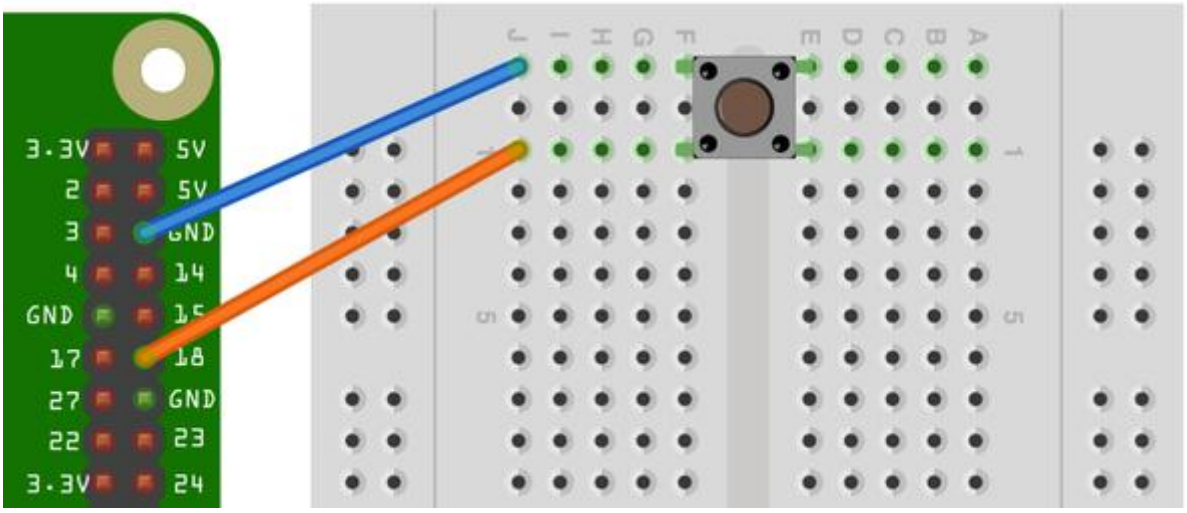

Figure. Connecting a push switch to a Raspberry Pi

An alternative to using a breadboard and tactile switch is to use a Squid Button (Figure). This is a push switch with female header leads soldered to the end, which can be connected directly to the GPIO connector.

Figure. A Squid Button

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

This example code displays a message when the button is pressed:

```
import RPi.GPIO as GPIO
import time

GPIO.setmode(GPIO.BCM)

GPIO.setup(18, GPIO.IN, pull_up_down=GPIO.PUD_UP)

while True:
    input_state = GPIO.input(18)
    if input_state == False:
        print 'Button Pressed'
        time.sleep(0.2)
```

You will need to run the program as superuser:

```
pi@raspberrypi ~ $ sudo python switch.py
Button Pressed
Button Pressed
Button Pressed
Button Pressed
```

Discussion

You will notice that the switch is wired so that when it is pressed, it will connect pin 18 configured as an input to GND. The input pin is normally pulled up to 3.3V by the optional argument pull_up_down=GPIO.PUD_UP in GPIO.setup. This means that when you read the input value using GPIO.input, False will be returned if the button is pressed. This is a little counterintuitive.

Each GPIO pin has software-configurable pull-up and pull-down resistors. When using a GPIO pin as an input, you can configure these resistors so that one, either, or neither of the resistors is enabled, using the optional pull_up_down parameter to GPIO.setup. If this parameter is omitted, then neither resistor will be enabled. This leaves the input *floating*, which means that its value cannot be relied upon and it will drift between high and low depending on what it picks up in the way of electrical noise.

If it is set to GPIO.PUD_UP, the pull-up resistor is enabled; if it is set to GPIO.PUD_DOWN, the pull-down resistor is enabled.

You might expect the push switch to have just two connections, which are either open or closed.