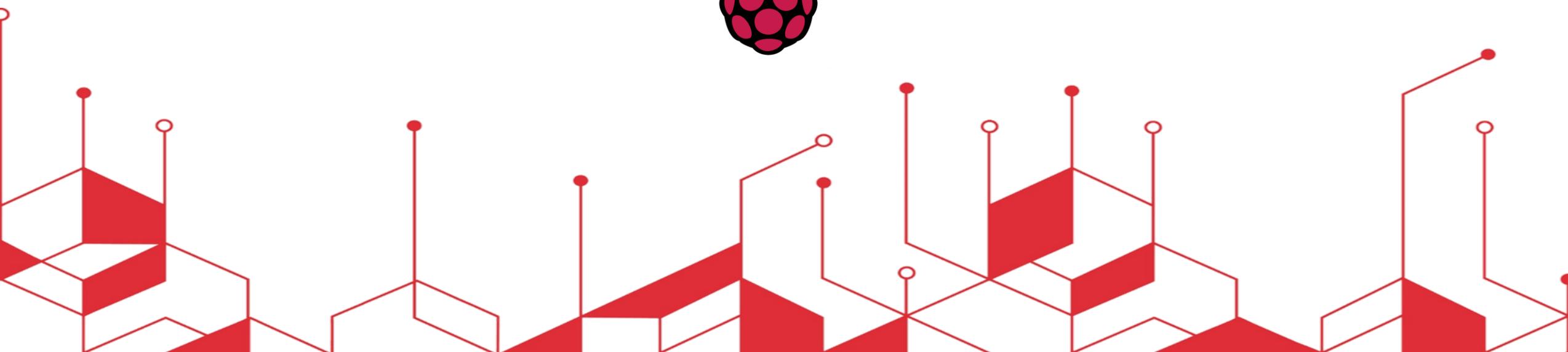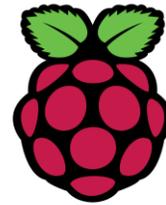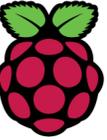Remote Lab For Engineering Project
Erasmus+ Program

Raspberry Pi -Take Home Lab

Lab Experiment # 3

Raspberry Pi- Digital Inputs

Digital Inputs

Digital inputs (DI) are signals or data received by a system in a digital (binary) format, typically as a high (1) or low (0) voltage level. They are used to detect the state of external devices or switches, such as:

➢ Button presses (ON/OFF).
➢ Status signals from sensors (e.g., presence detection, limit switches).
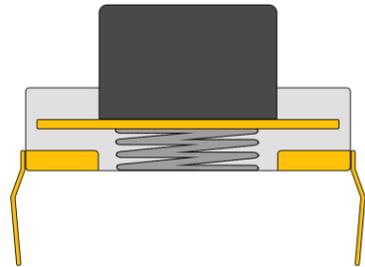➢ Logic-level signals from other systems or microcontrollers.

Voltage Levels:
High state (1) and Low state (0) depend on the voltage threshold, which varies by system (e.g., 0-5V, 0-3.3V).
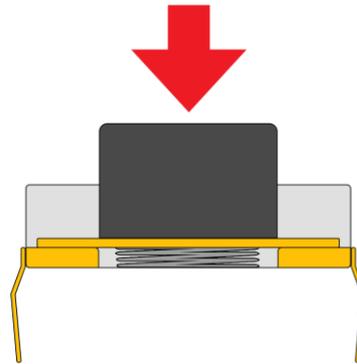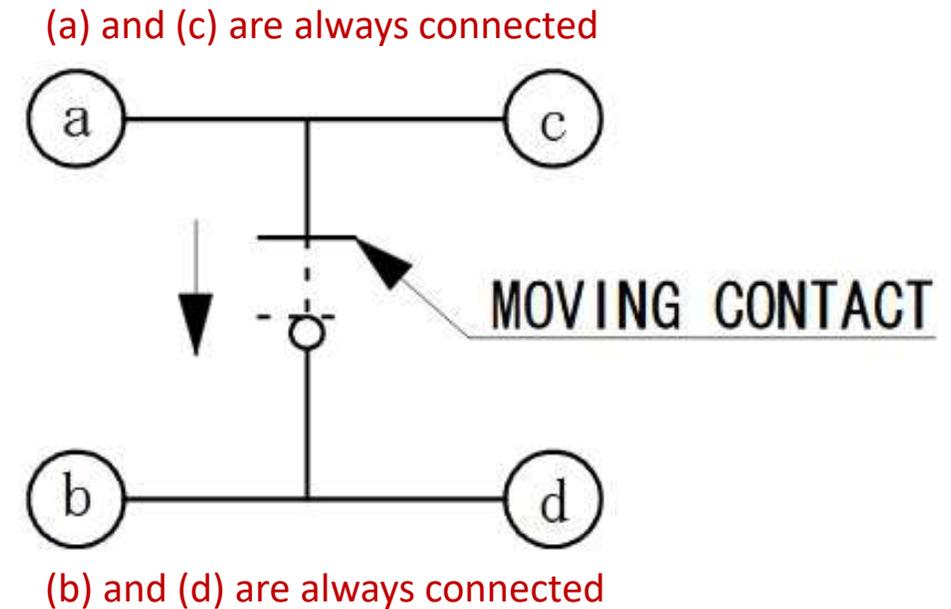
Push Button
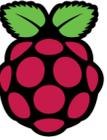
A small button or knob that when pushed connects all terminals together.

(a) and (c) are always connected

MOVING CONTACT

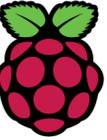(b) and (d) are always connected

Button not pushed
(i.e., released)
a and c are not connected to
b and d

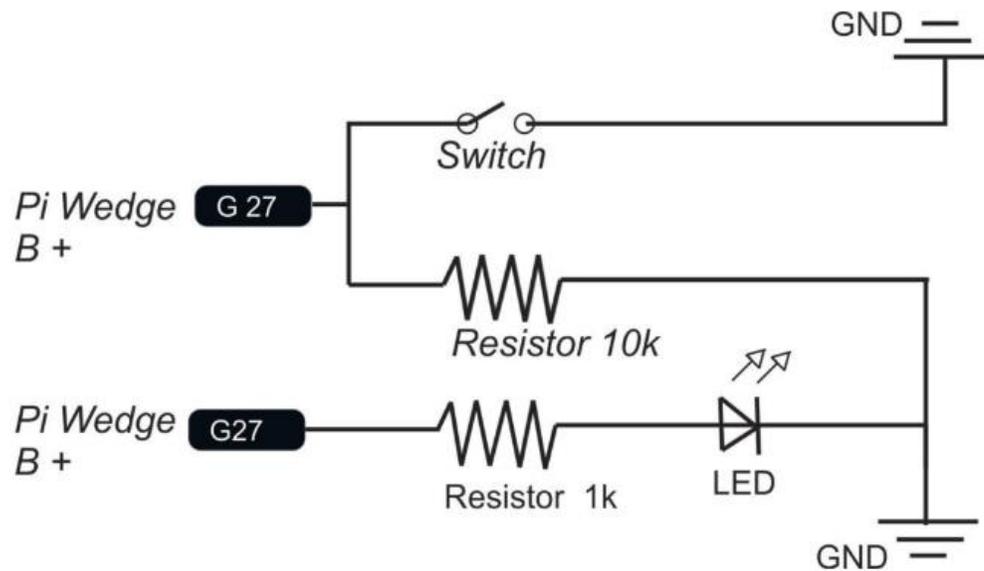Button pushed
(i.e., pressed)
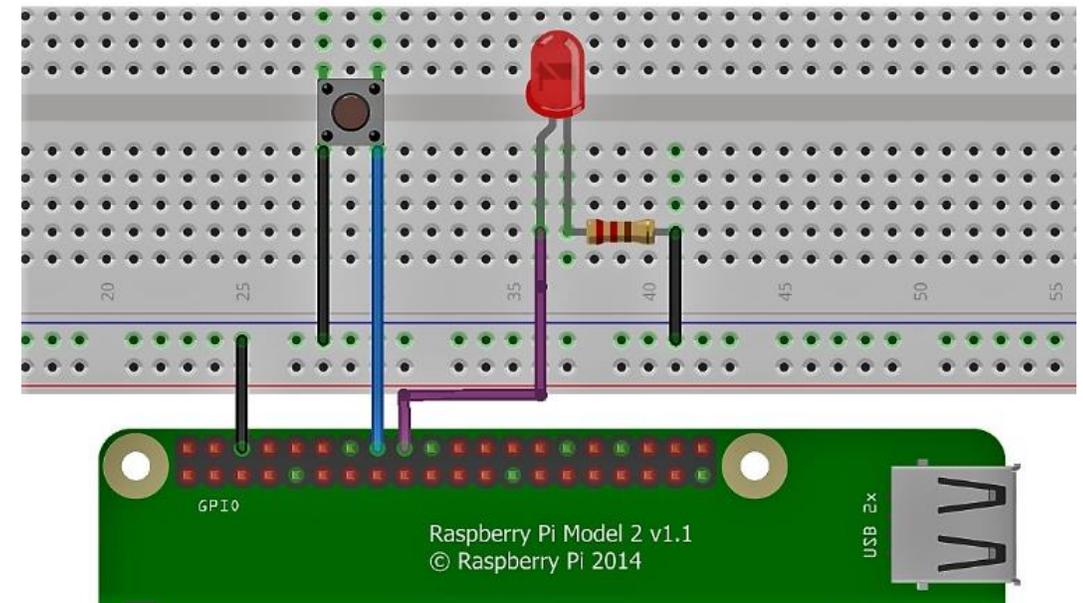a and c are connected to
b and d
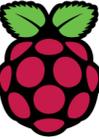
Pushbutton & LED

❖ Try to build the shown circuit

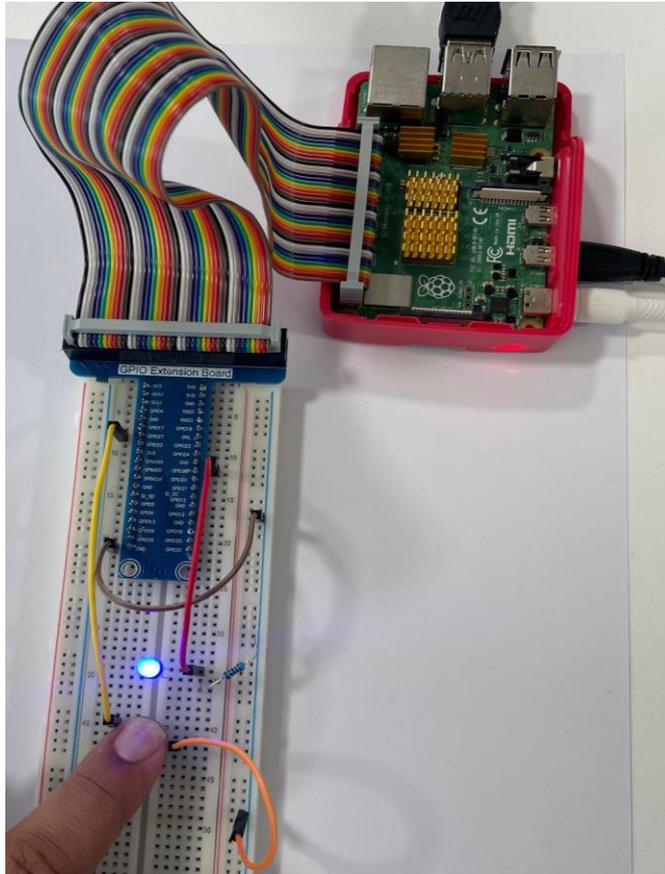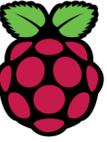**Schematic Diagram**

Wiring Diagram

Code

```python
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()
```
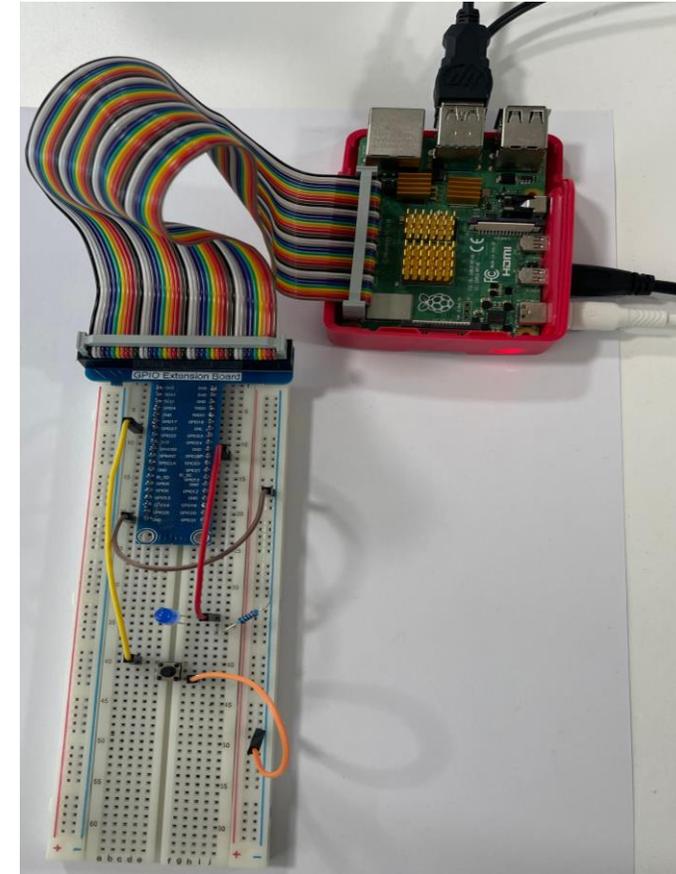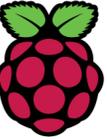
Push button is pressed

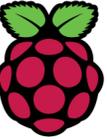
Push button is released

Practice 1- Combination of two LEDs

Build a circuit where the push button is used to turn a green LED off and a red LED on

➢ If button is not pressed,
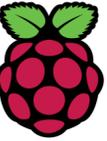green ON, red OFF

➢ When button is pressed,
green OFF, red ON

Practice 2 – Two push buttons in series

Build a circuit where two push buttons in series are used to turn the LED on:

➢ When one of the buttons is not pressed (or both), the LED is OFF

➢ When both buttons are pressed at the same time, the LED is ON

Take-home Task

Build a circuit where push button is used to turn a relay on and off.