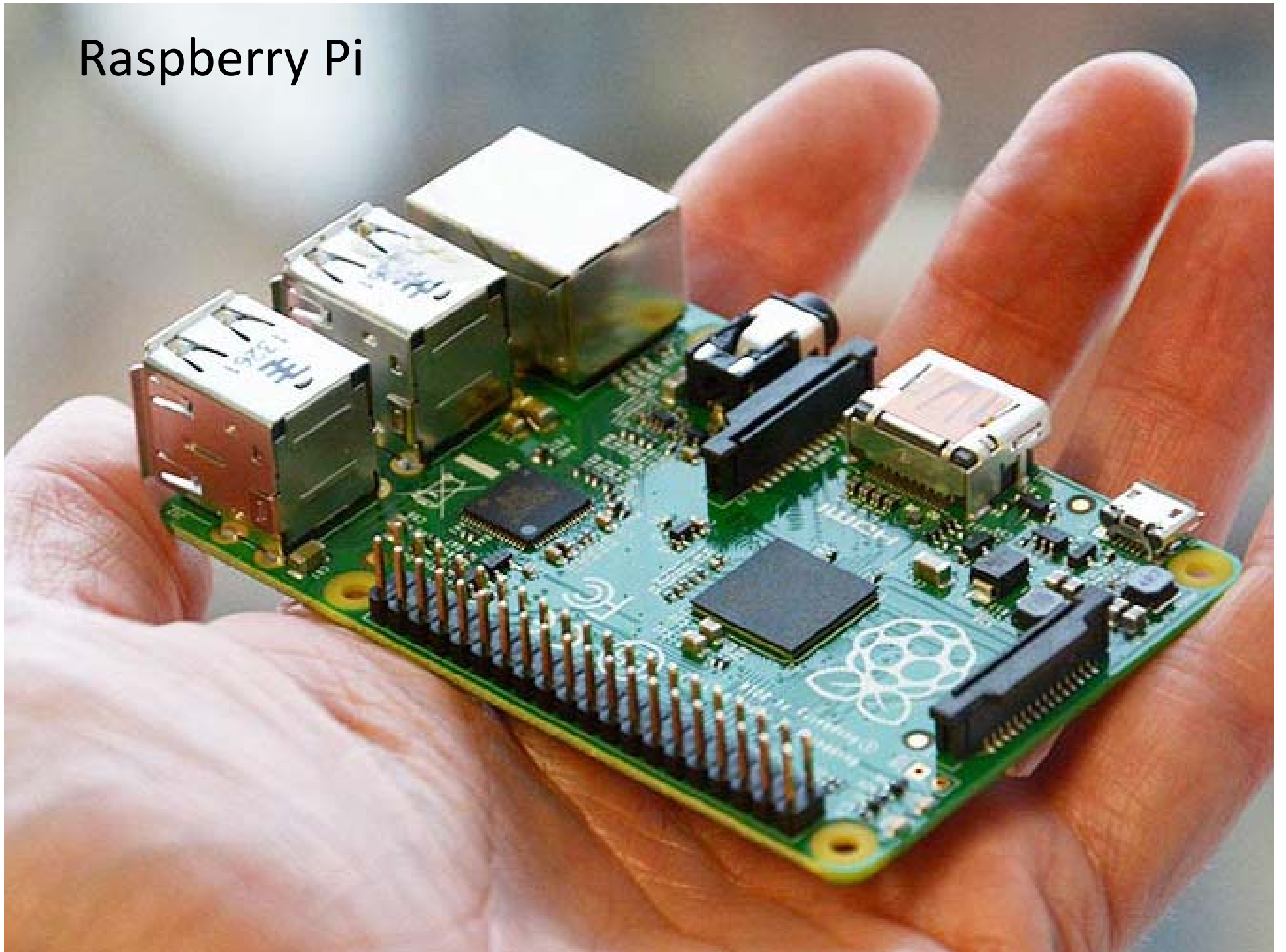


Raspberry Pi



Raspberry Pi 3 Model B

element14

Dimensions
85.6mm x 56mm x 21mm

4 x USB 2 Ports

40 Pin
Extended GPIO

10/100
LAN Port

Broadcom
BCM2837 64bit
Quad Core CPU
at 1.2GHz,
1GB RAM

3.5mm 4-pole
Composite Video
and Audio
Output Jack

On Board
Bluetooth 4.1
Wi-Fi

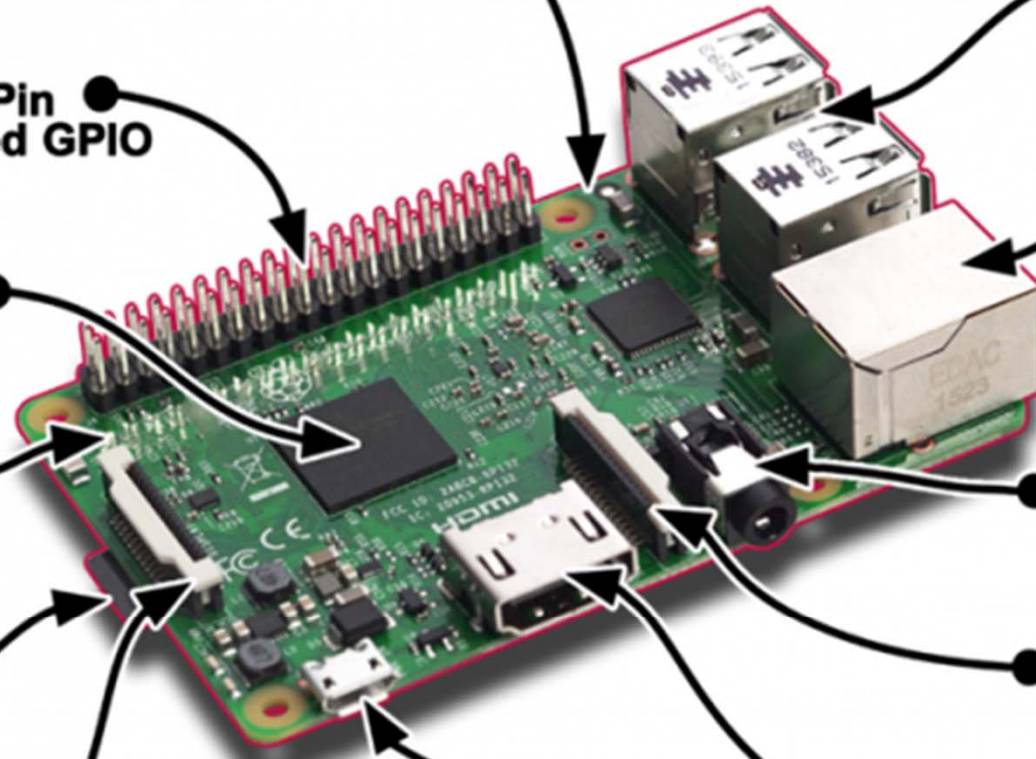
CSI Camera Port

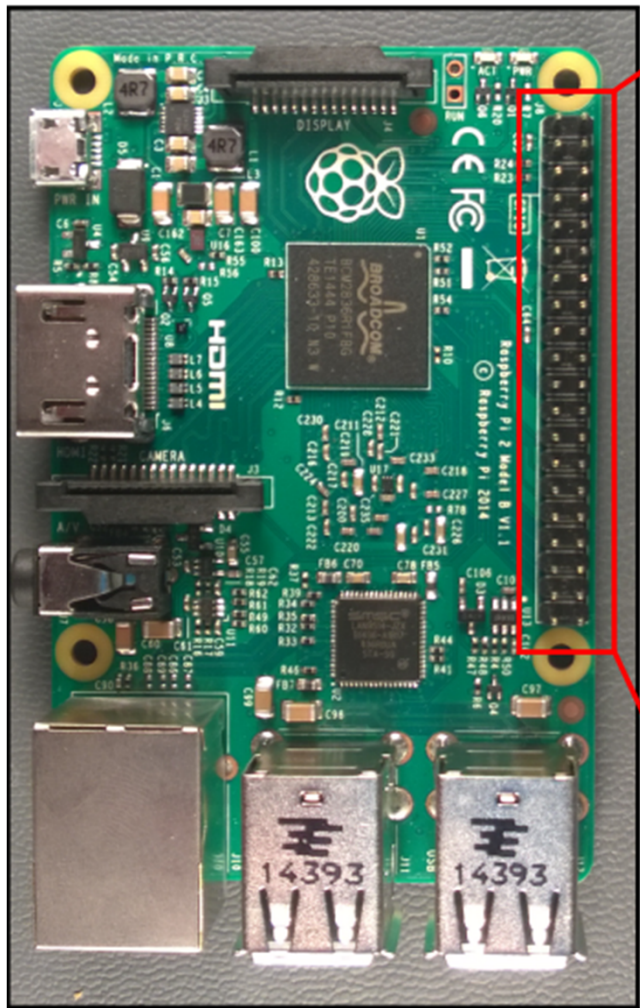
MicroSD
Card Slot

Full Size HDMI
Video Output

DSI Display Port

Micro USB Power Input.
Upgraded switched
power source that can
handle up to 2.5 Amps

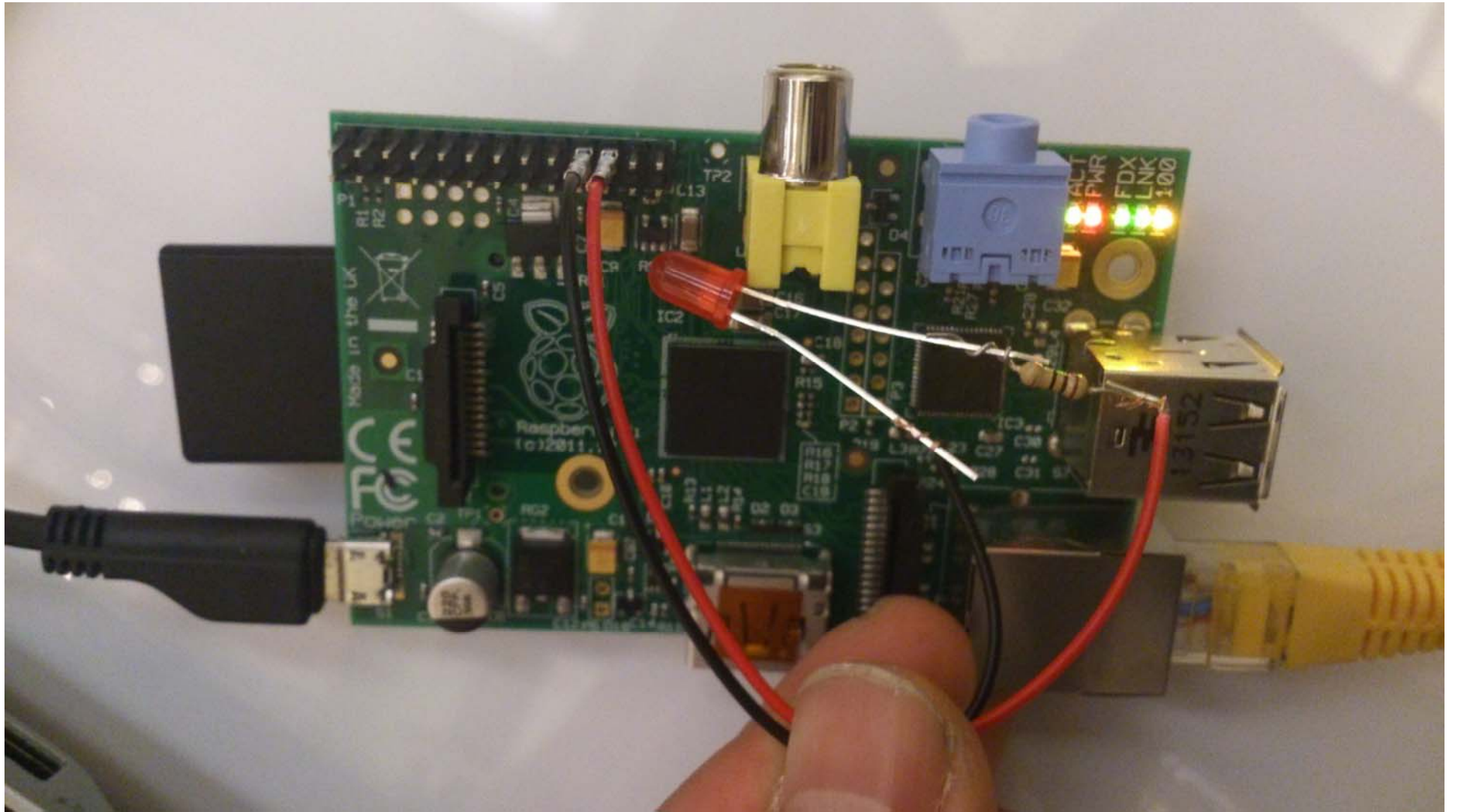


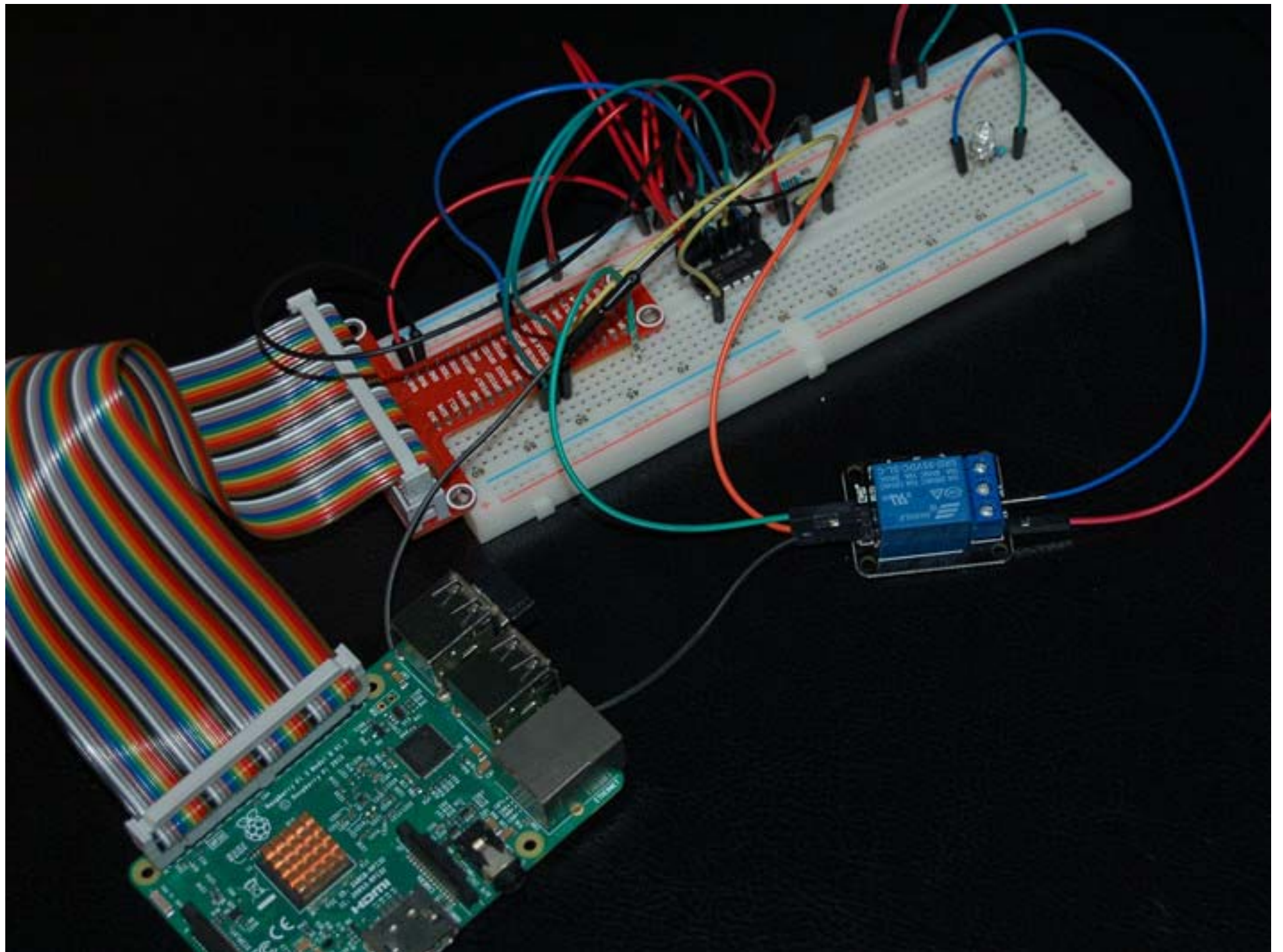


Alternate Function					Alternate Function
	3.3V PWR	1		2	5V PWR
I2C1 SDA	GPIO 2	3		4	5V PWR
I2C1 SCL	GPIO 3	5		6	GND
	GPIO 4	7		8	UART0 TX
	GND	9		10	UART0 RX
	GPIO 17	11		12	GPIO 18
	GPIO 27	13		14	GND
	GPIO 22	15		16	GPIO 23
	3.3V PWR	17		18	GPIO 24
SPI0 MOSI	GPIO 10	19		20	GND
SPI0 MISO	GPIO 9	21		22	GPIO 25
SPI0 SCLK	GPIO 11	23		24	GPIO 8
	GND	25		26	GPIO 7
	Reserved	27		28	Reserved
	GPIO 5	29		30	GND
	GPIO 6	31		32	GPIO 12
	GPIO 13	33		34	GND
SPI1 MISO	GPIO 19	35		36	GPIO 16
	GPIO 26	37		38	GPIO 20
	GND	39		40	GPIO 21
					SPI0 CS0
					SPI0 CS1
					SPI1 CS0
					SPI1 MOSI
					SPI1 SCLK

GPIO.BOARD

GPIO.BCM

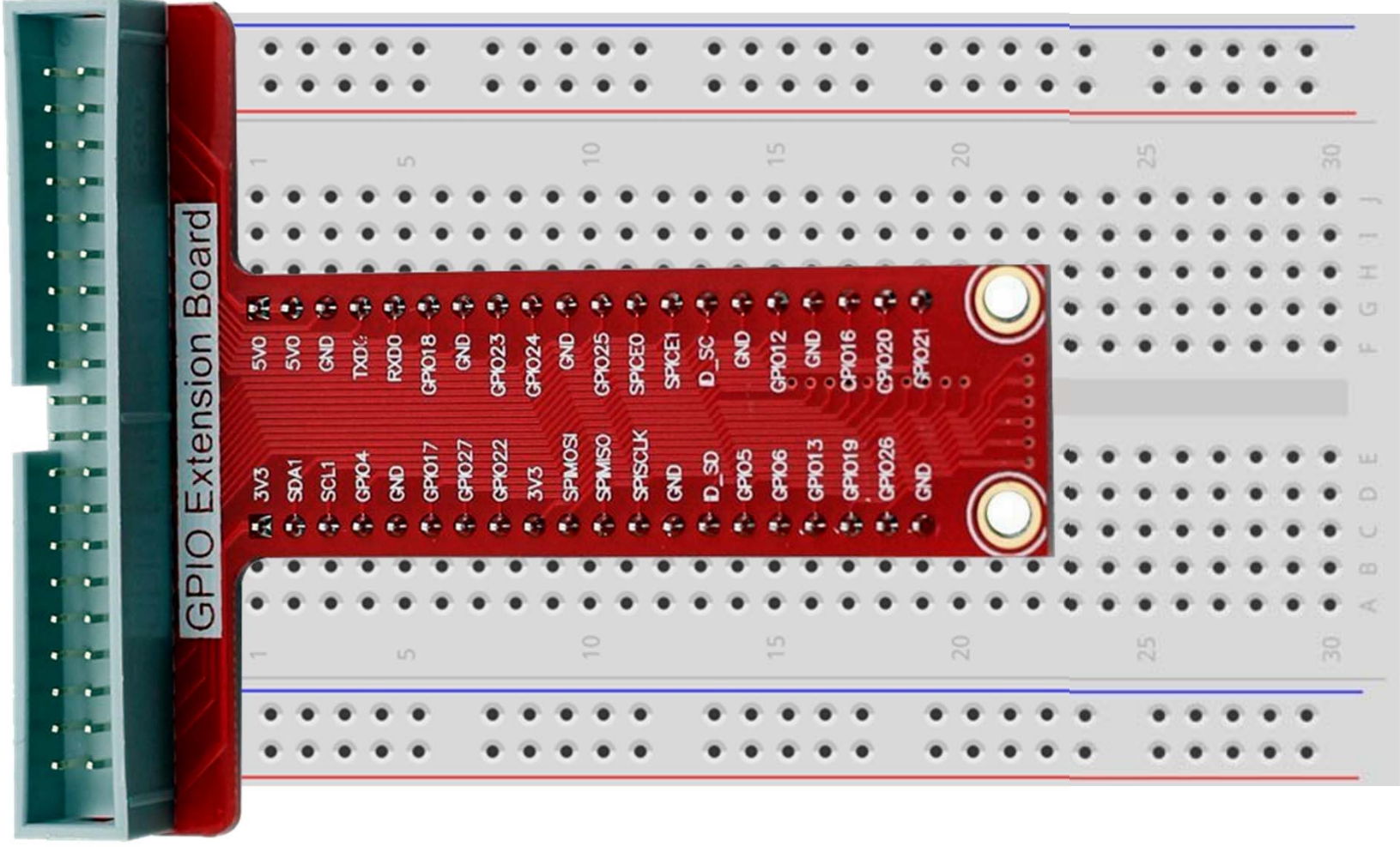


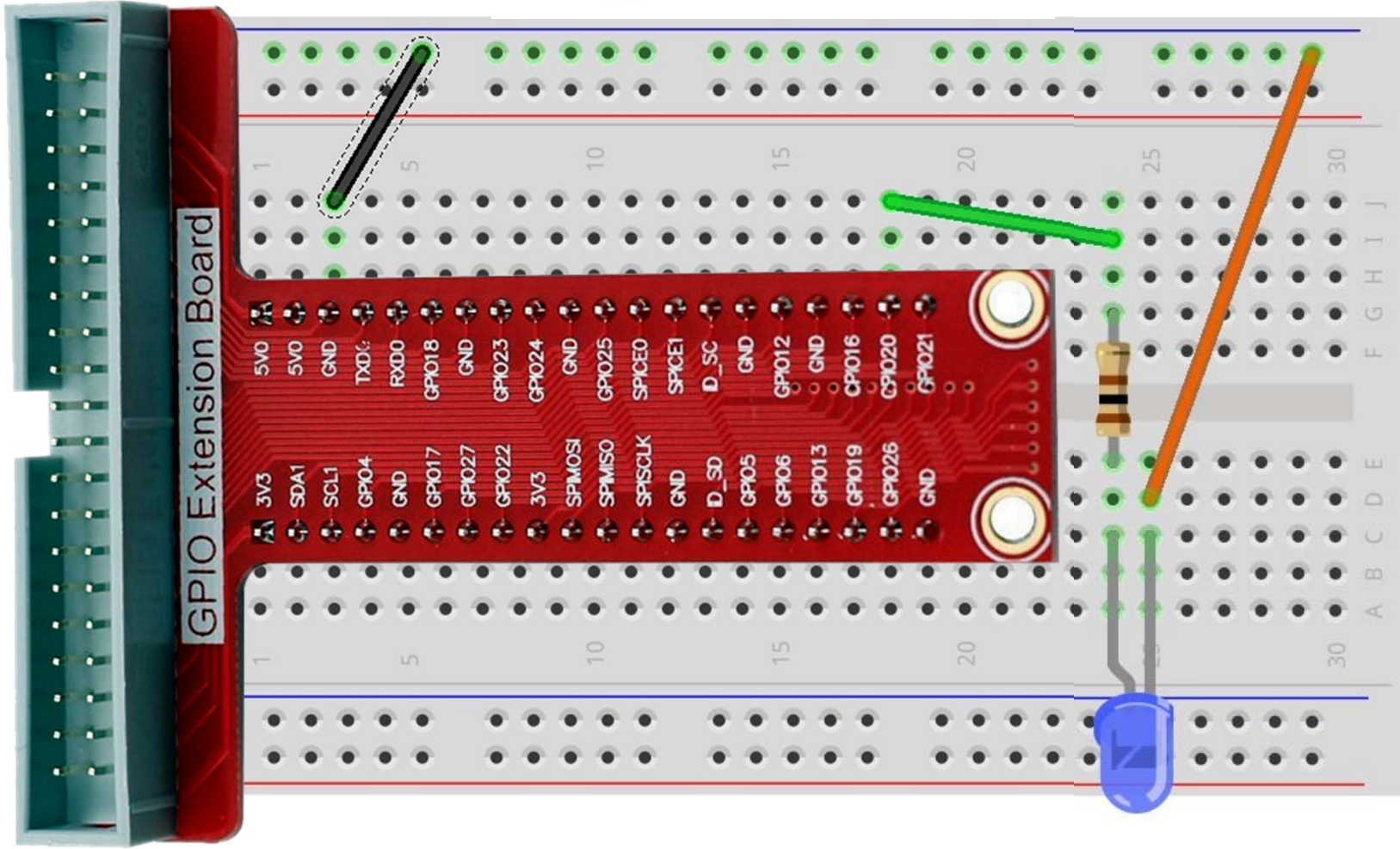




Breadboard



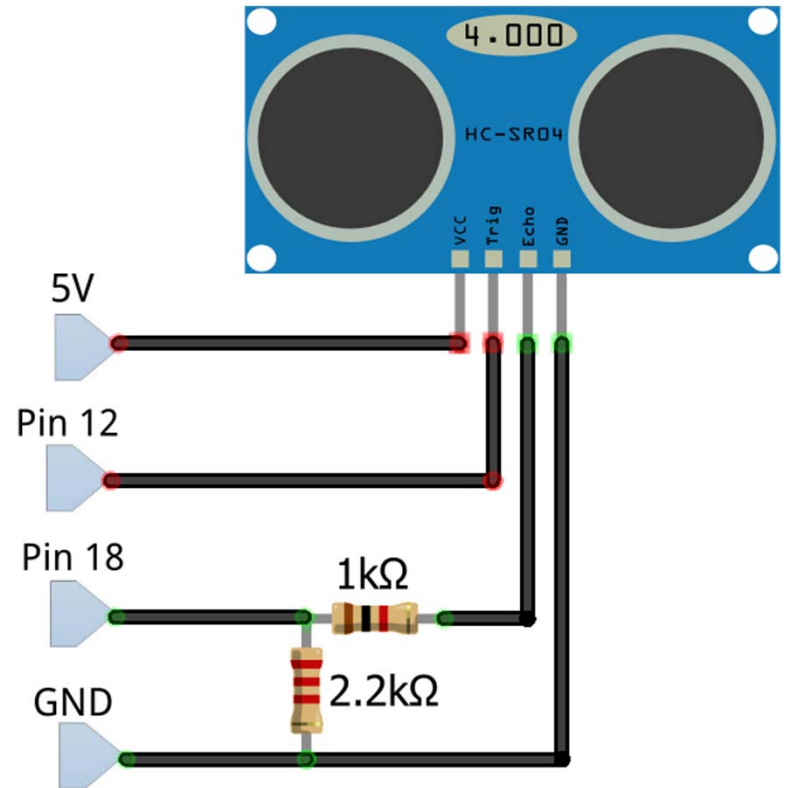
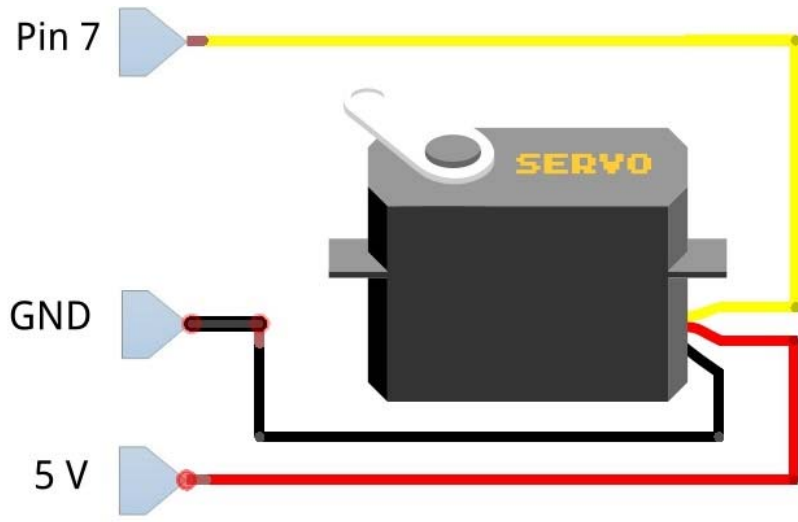
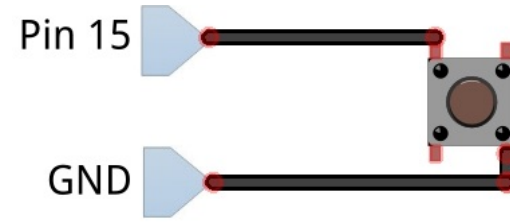
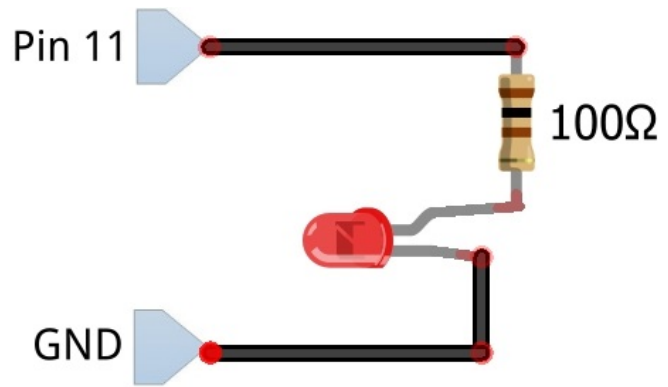




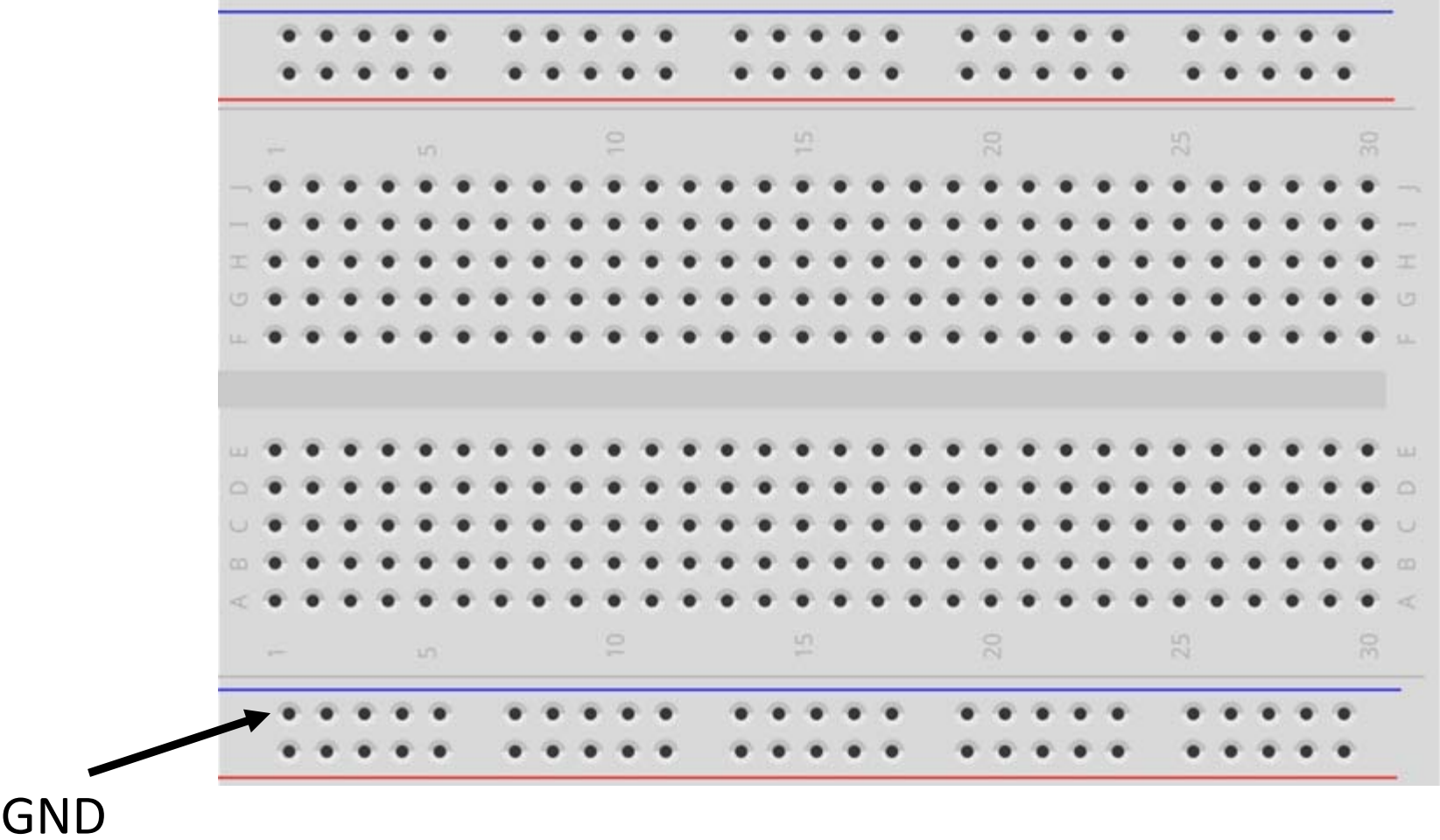
Pin 38

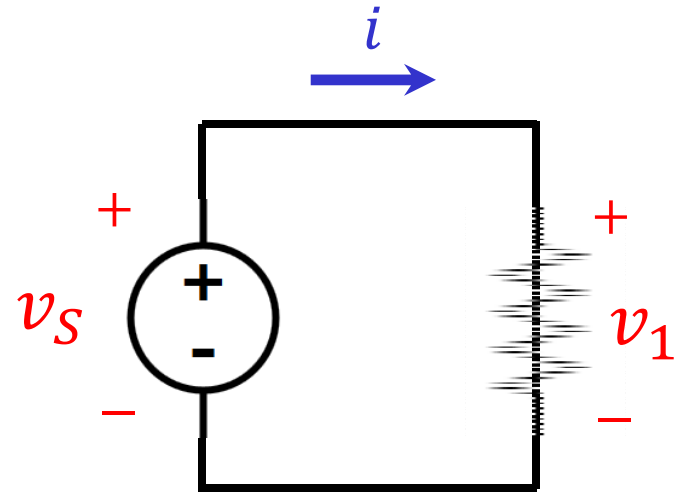
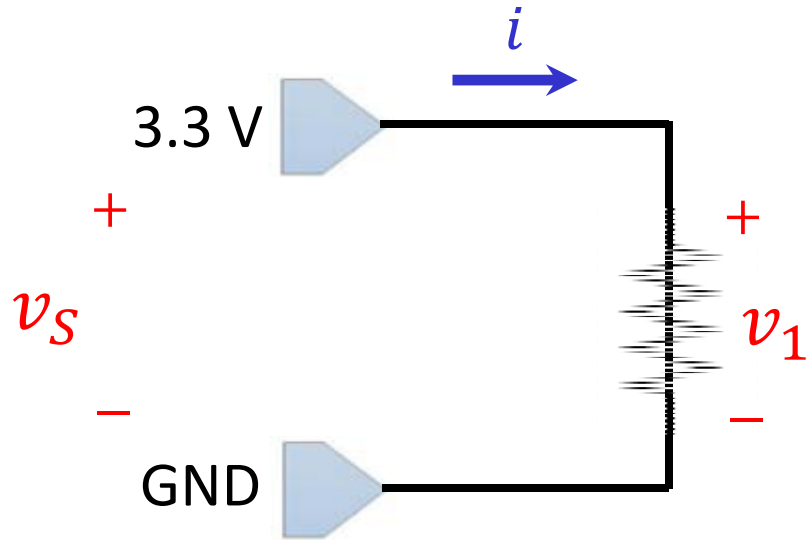
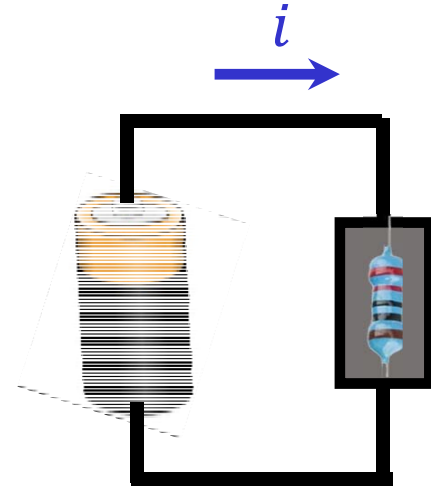
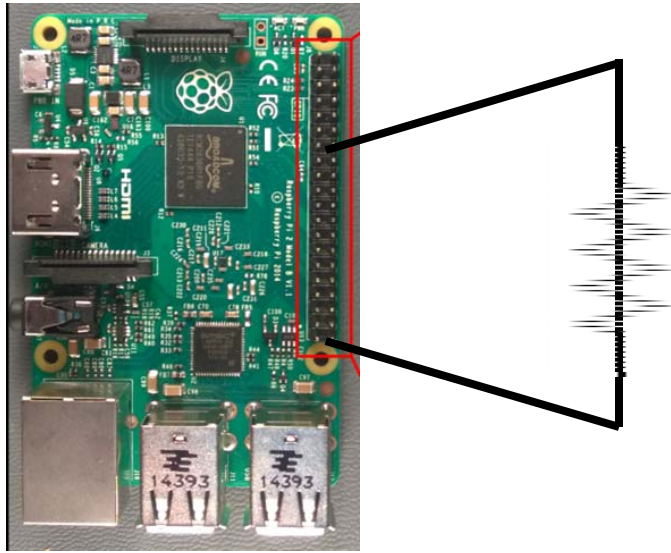
GND

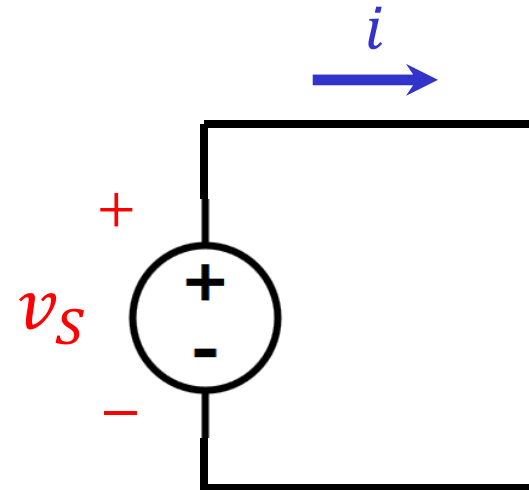
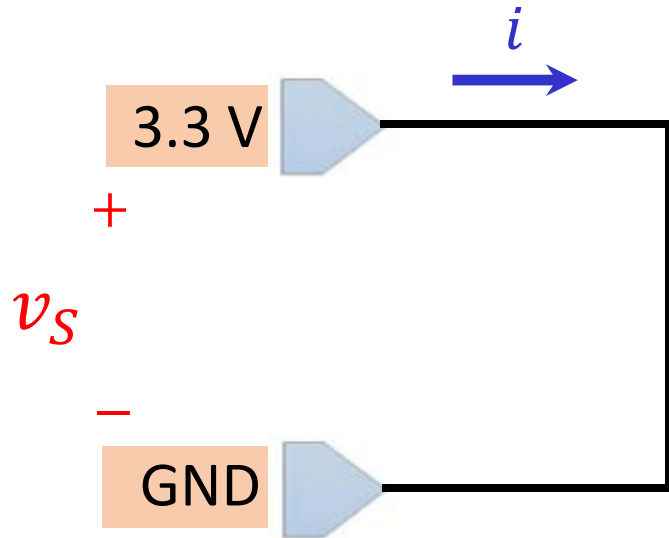
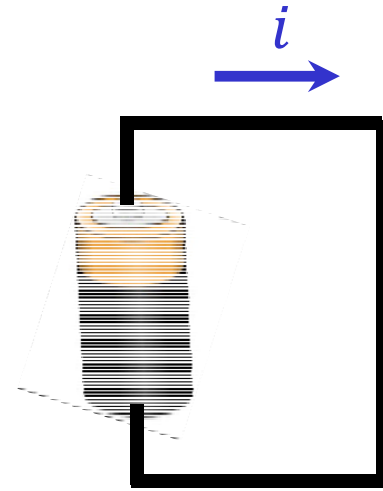
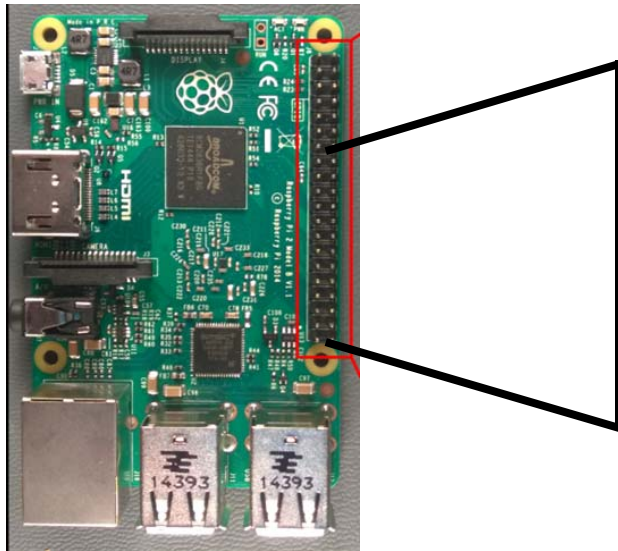
100Ω



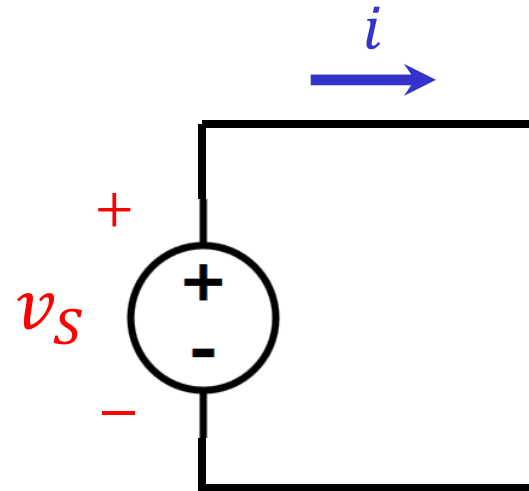
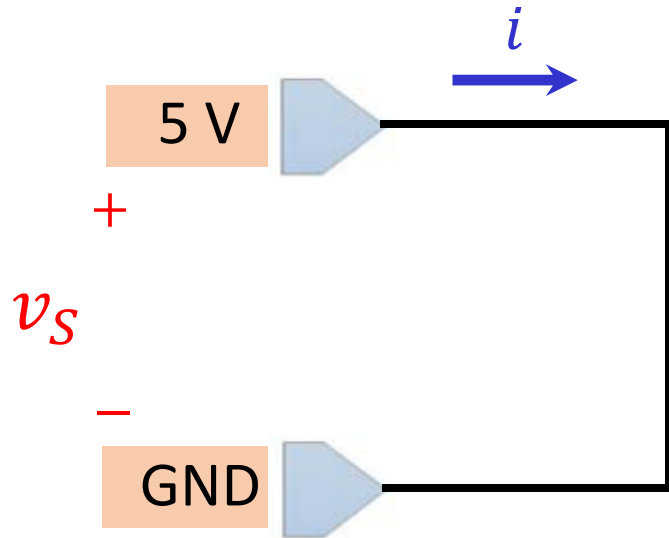
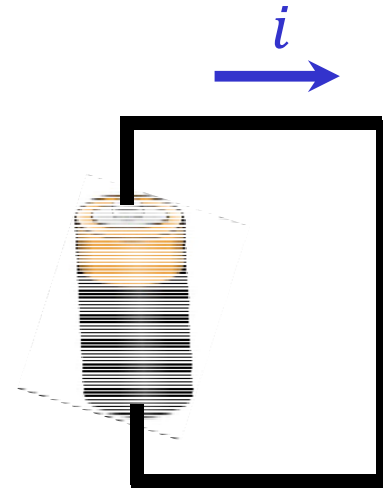
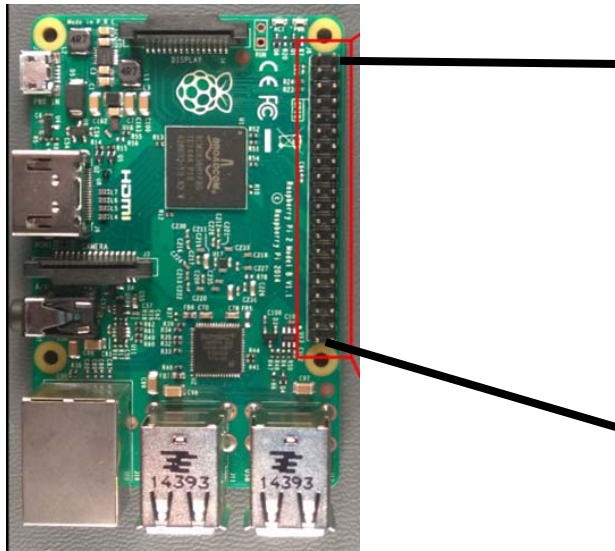
Breadboard



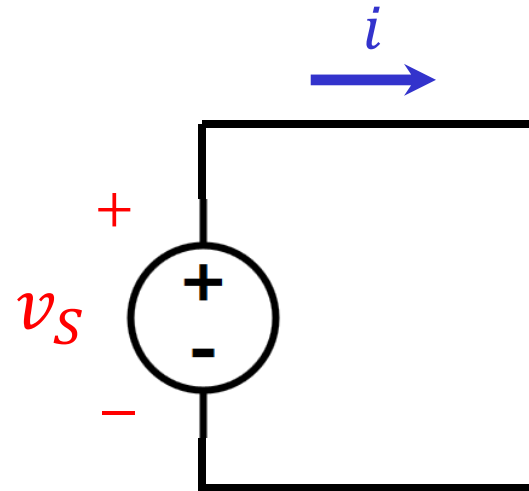
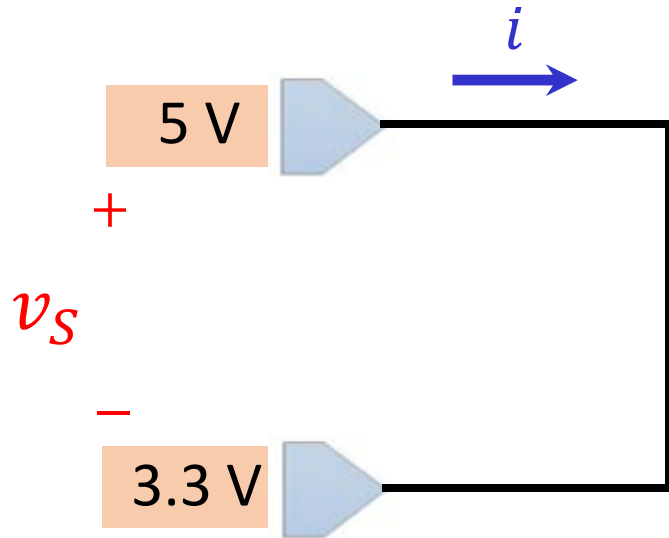
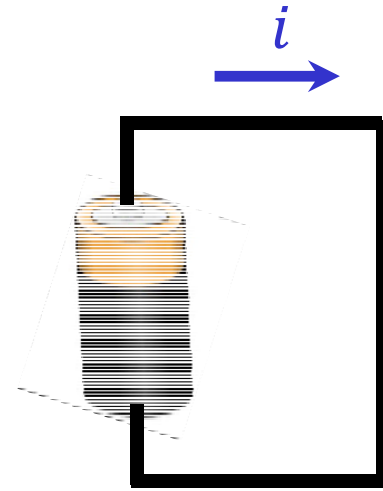
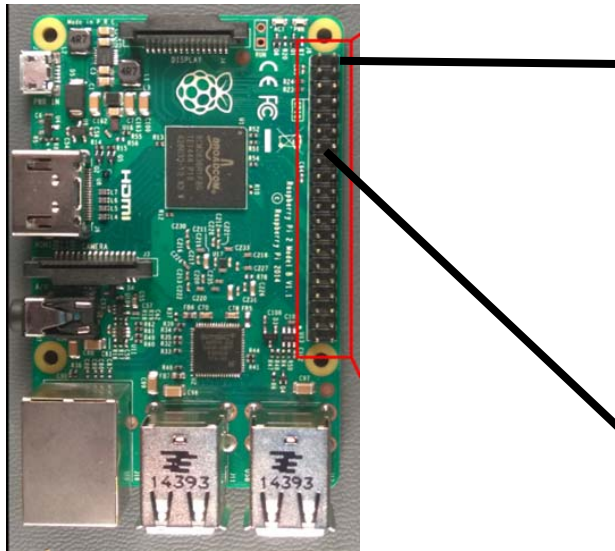




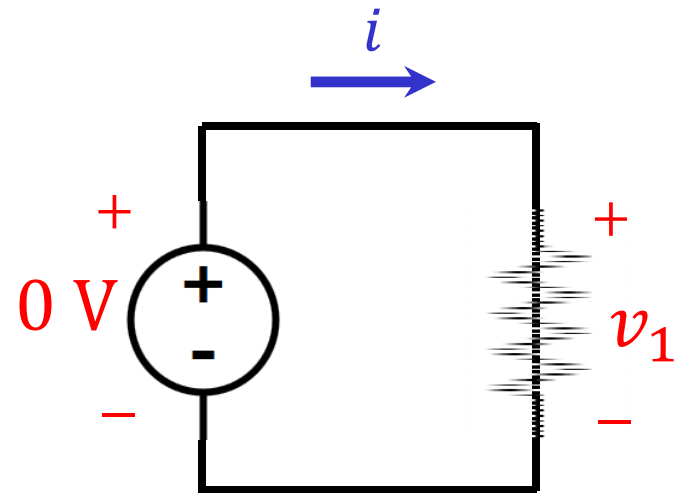
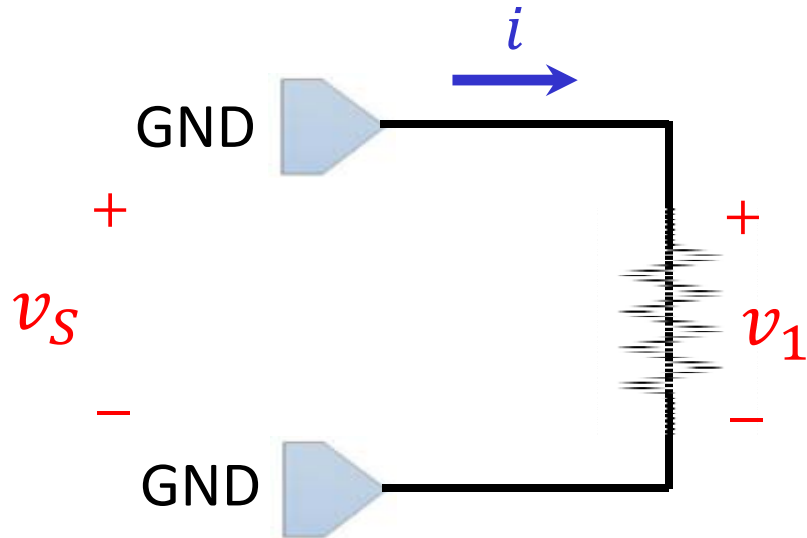
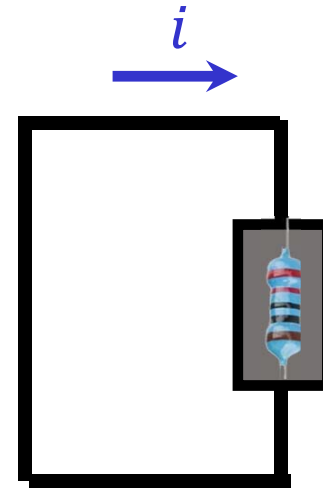
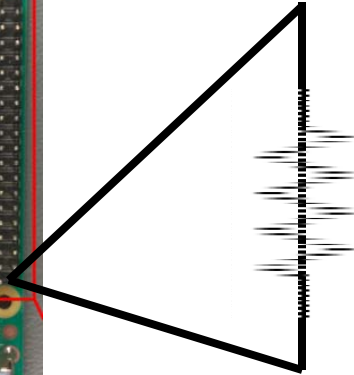
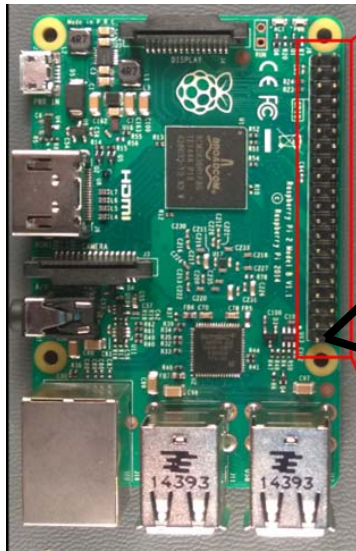
Very bad!



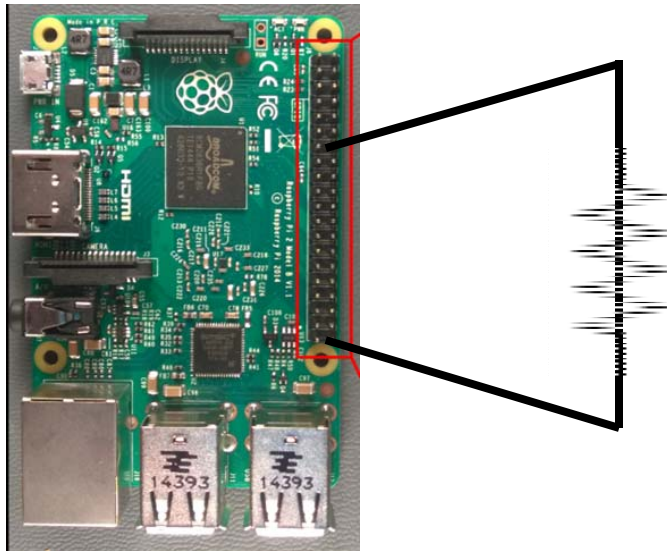
Very bad!



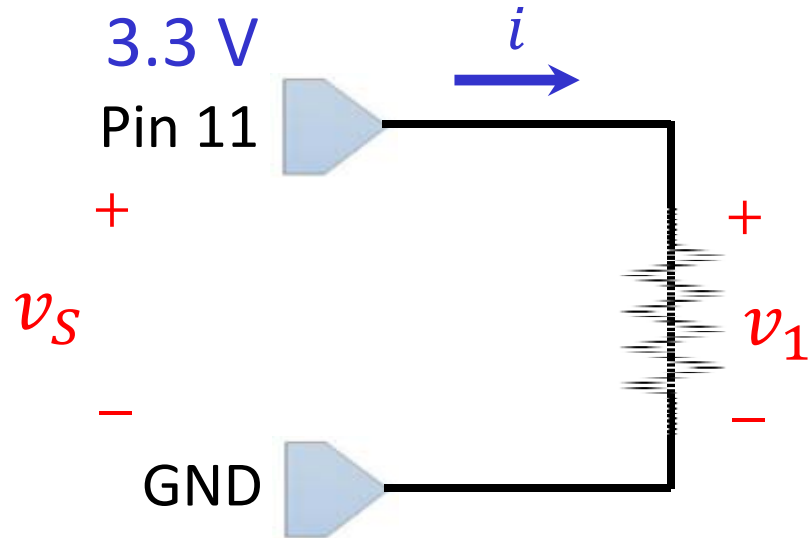
Very bad!



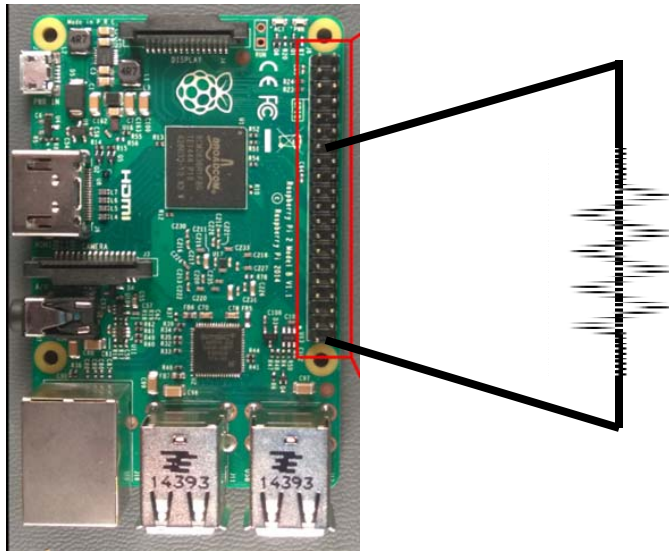
No current



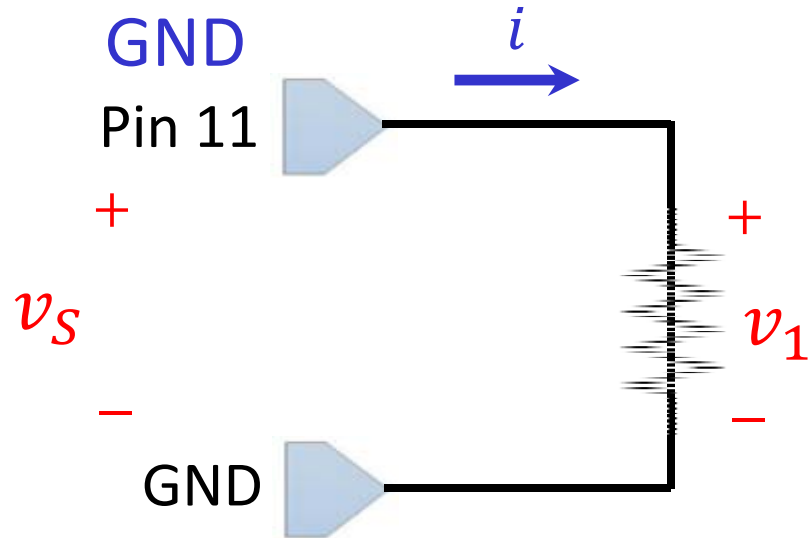
```
GPIO.setup(11, GPIO.OUT)
```



```
GPIO.output(11, GPIO.HIGH)
```

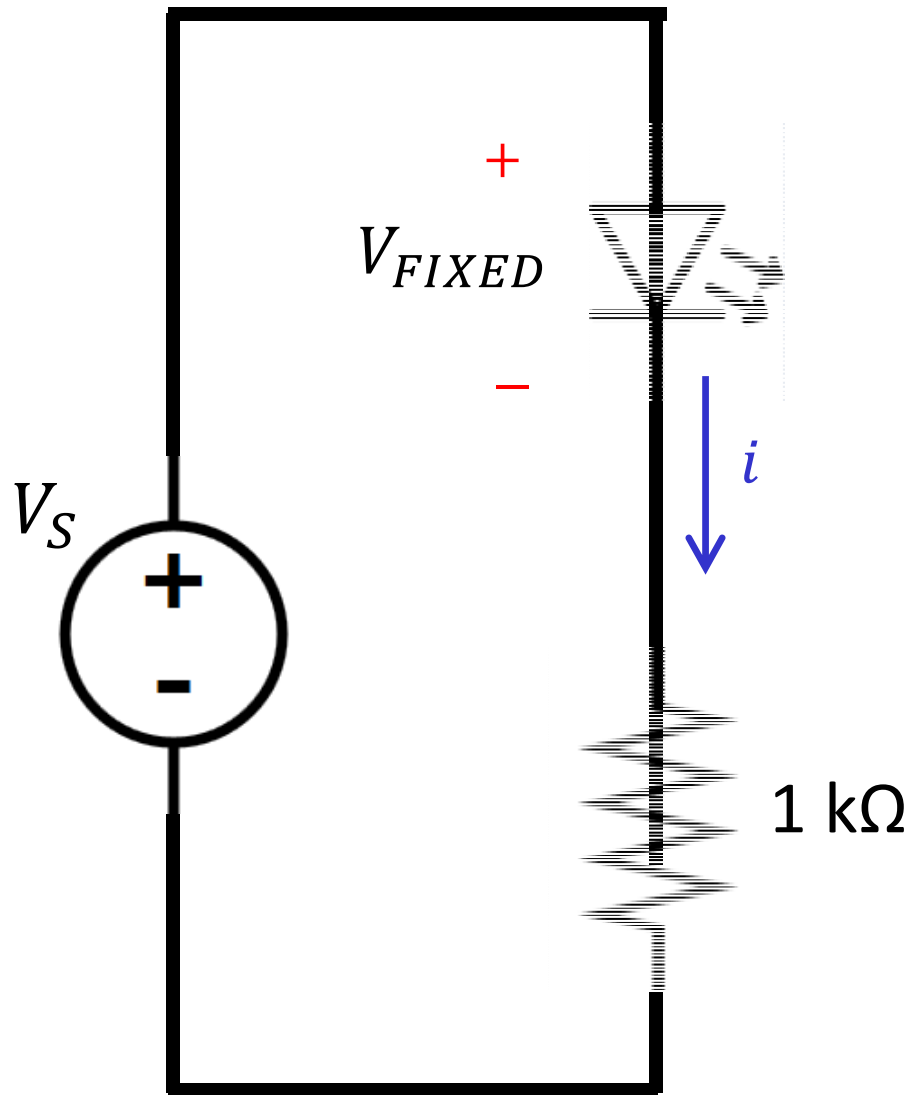



```
GPIO.setup(11, GPIO.OUT)
```

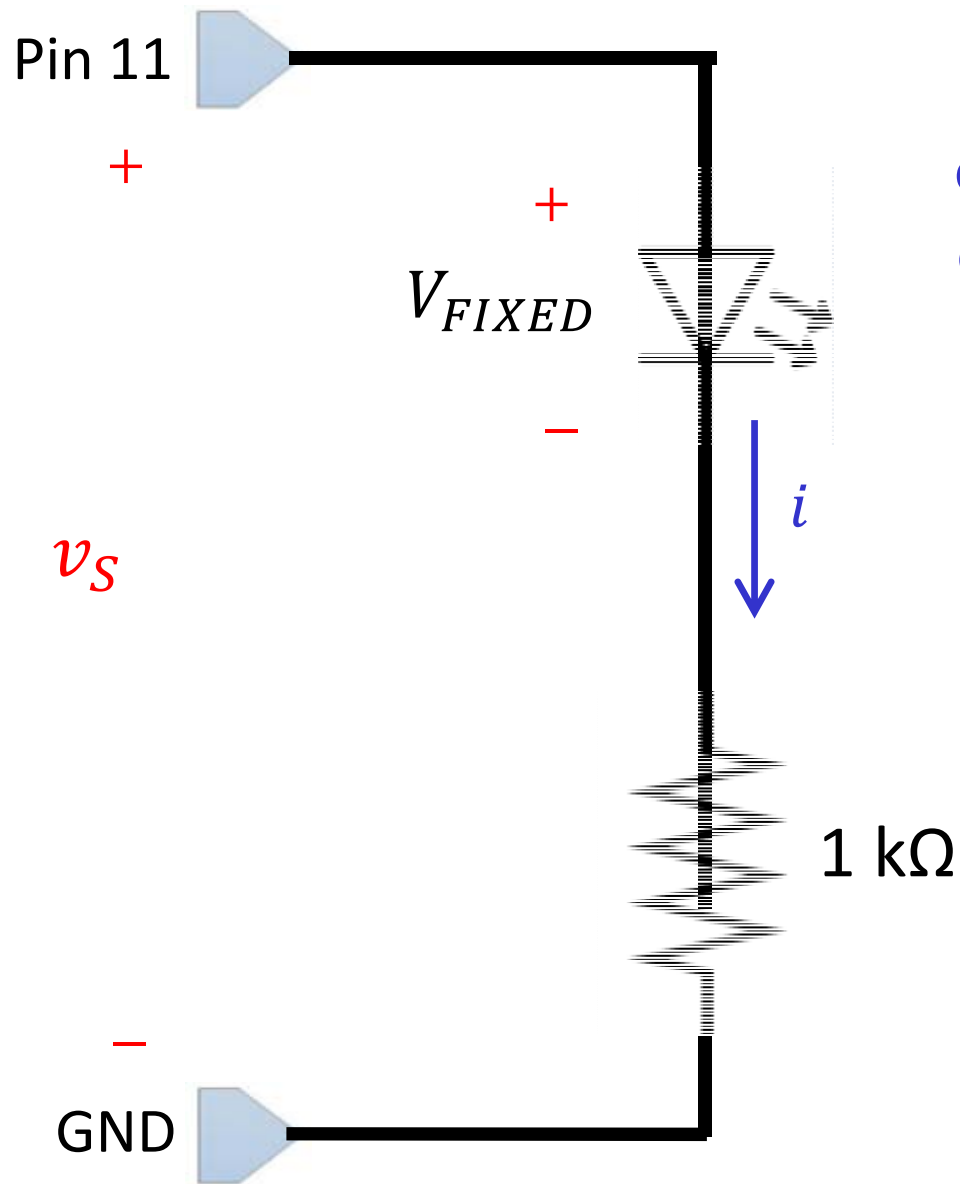


```
GPIO.output(11, GPIO.LOW)
```

Generate V_S

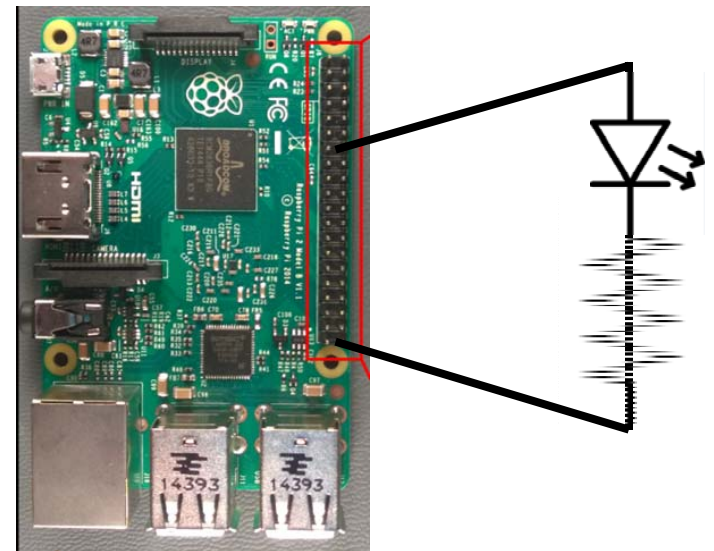


HIGH: light on
LOW: light off



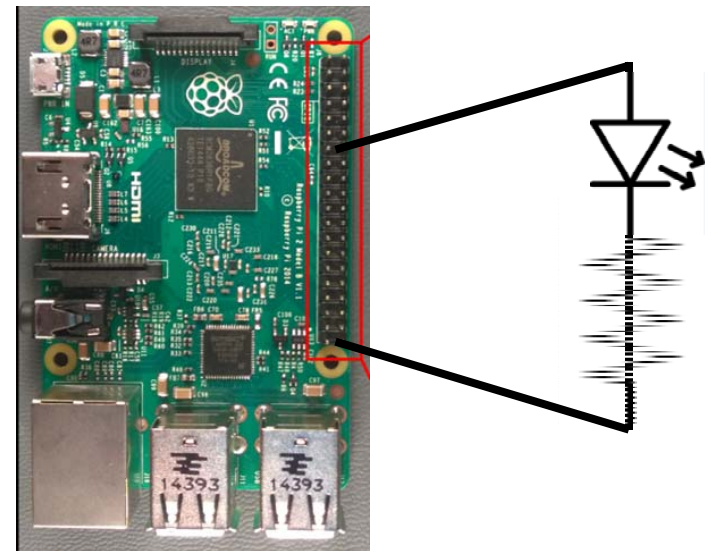
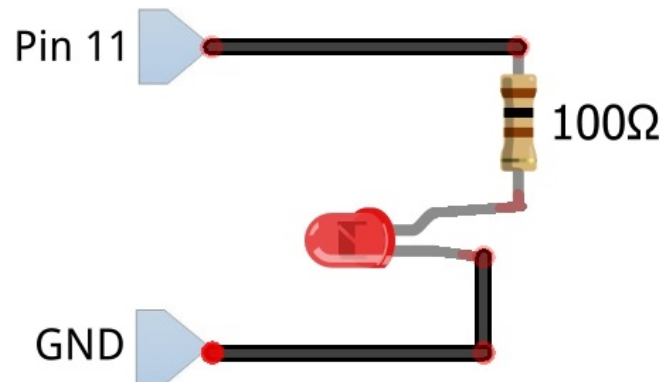
Generate V_S

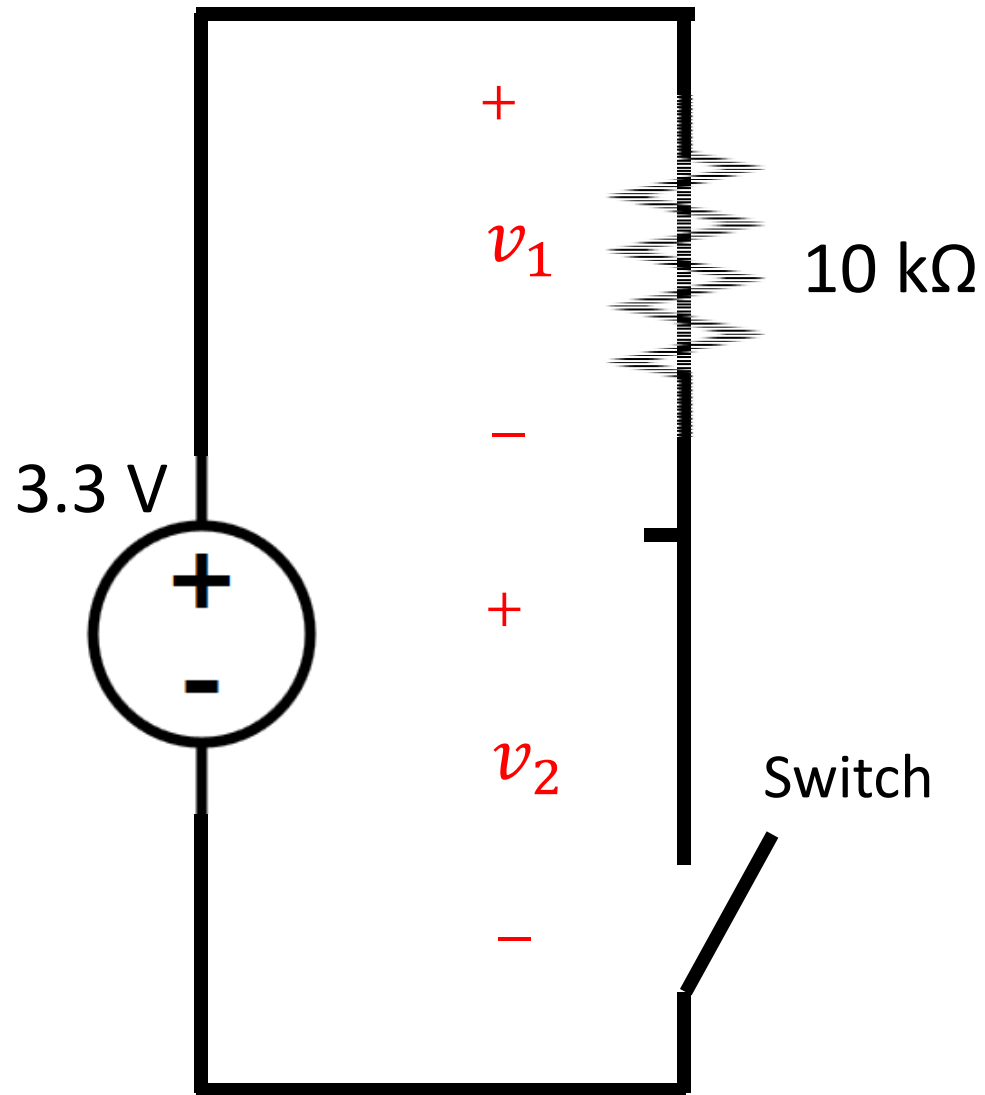
GPIO.output(11, GPIO.HIGH) : light on
 GPIO.output(11, GPIO.LOW) : light off



Generate V_S

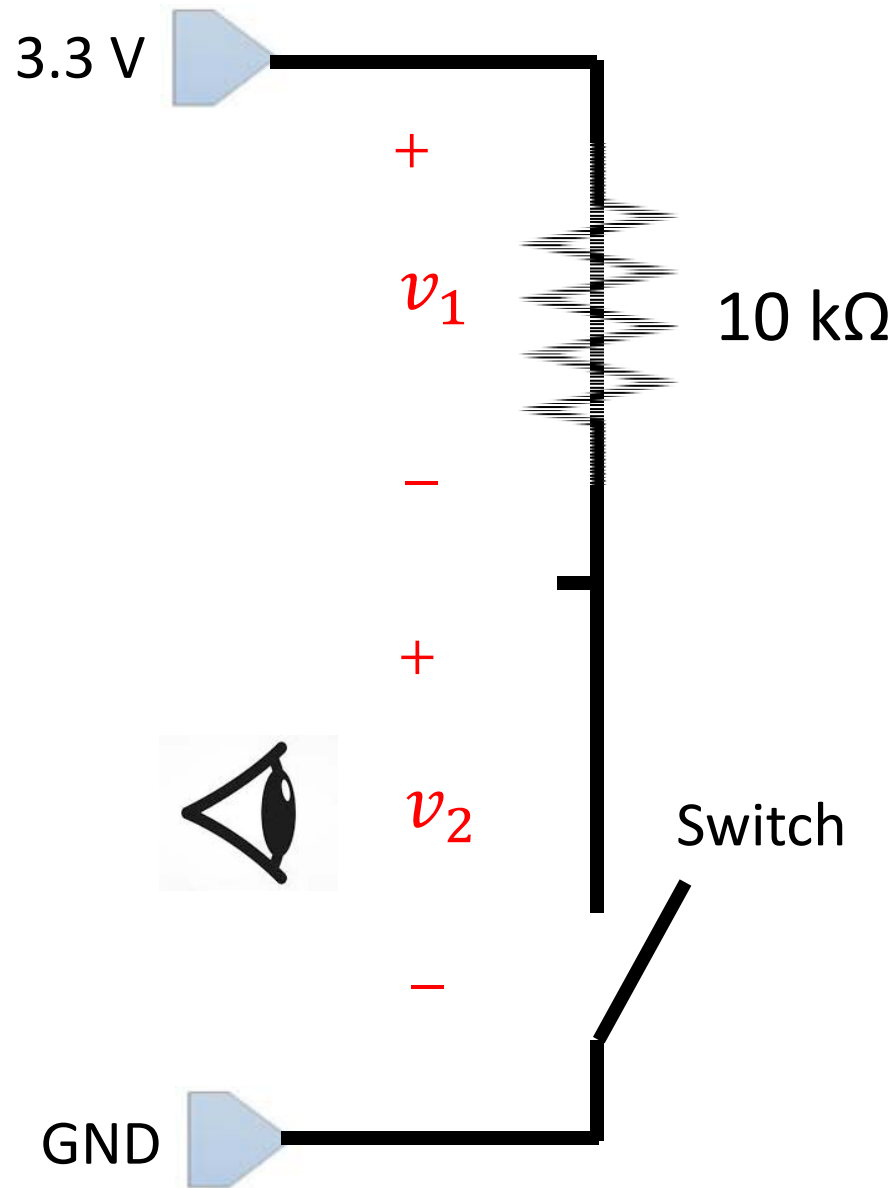
GPIO.output(11, GPIO.HIGH) : light on
GPIO.output(11, GPIO.LOW) : light off





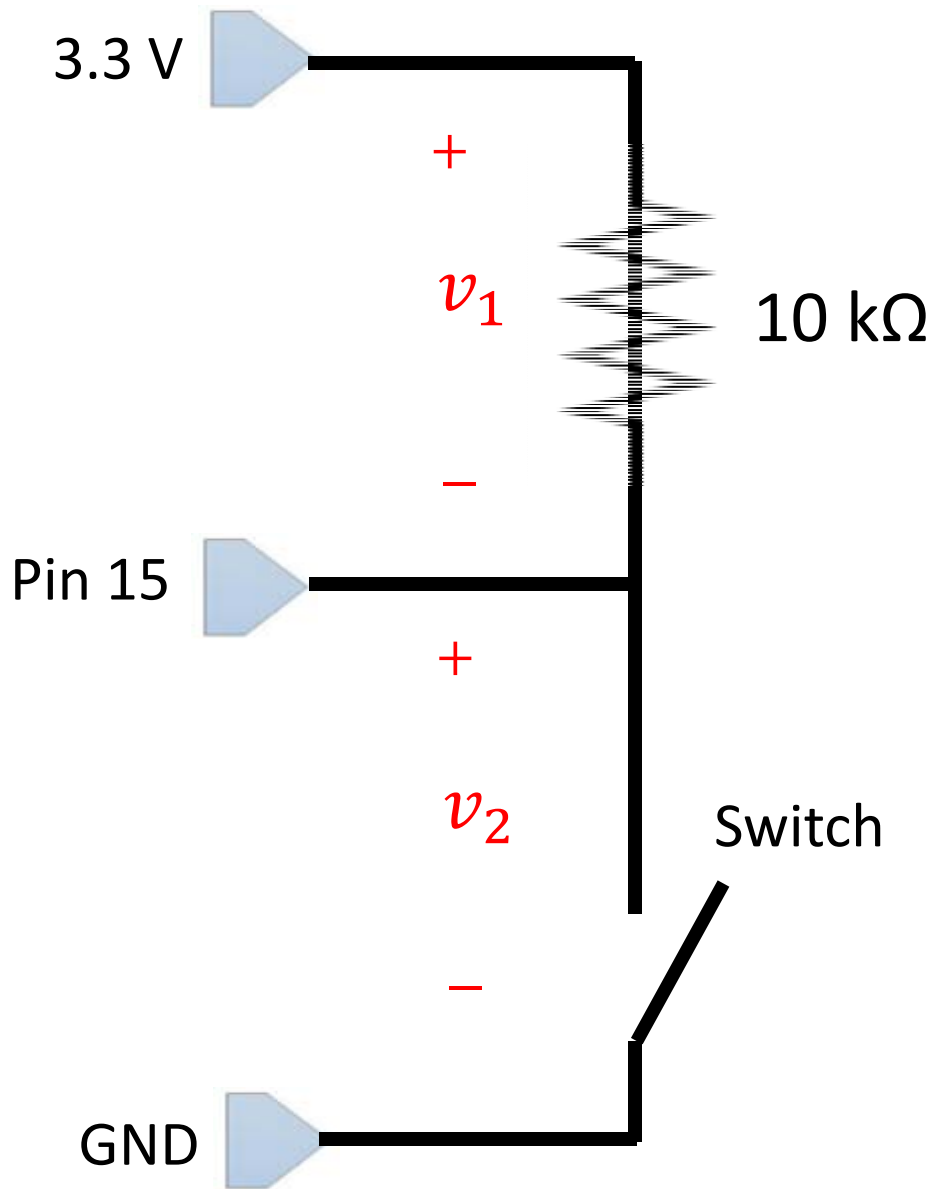
Switch open: $v_2 = 3.3 \text{ V}$

Switch closed: $v_2 = 0 \text{ V}$



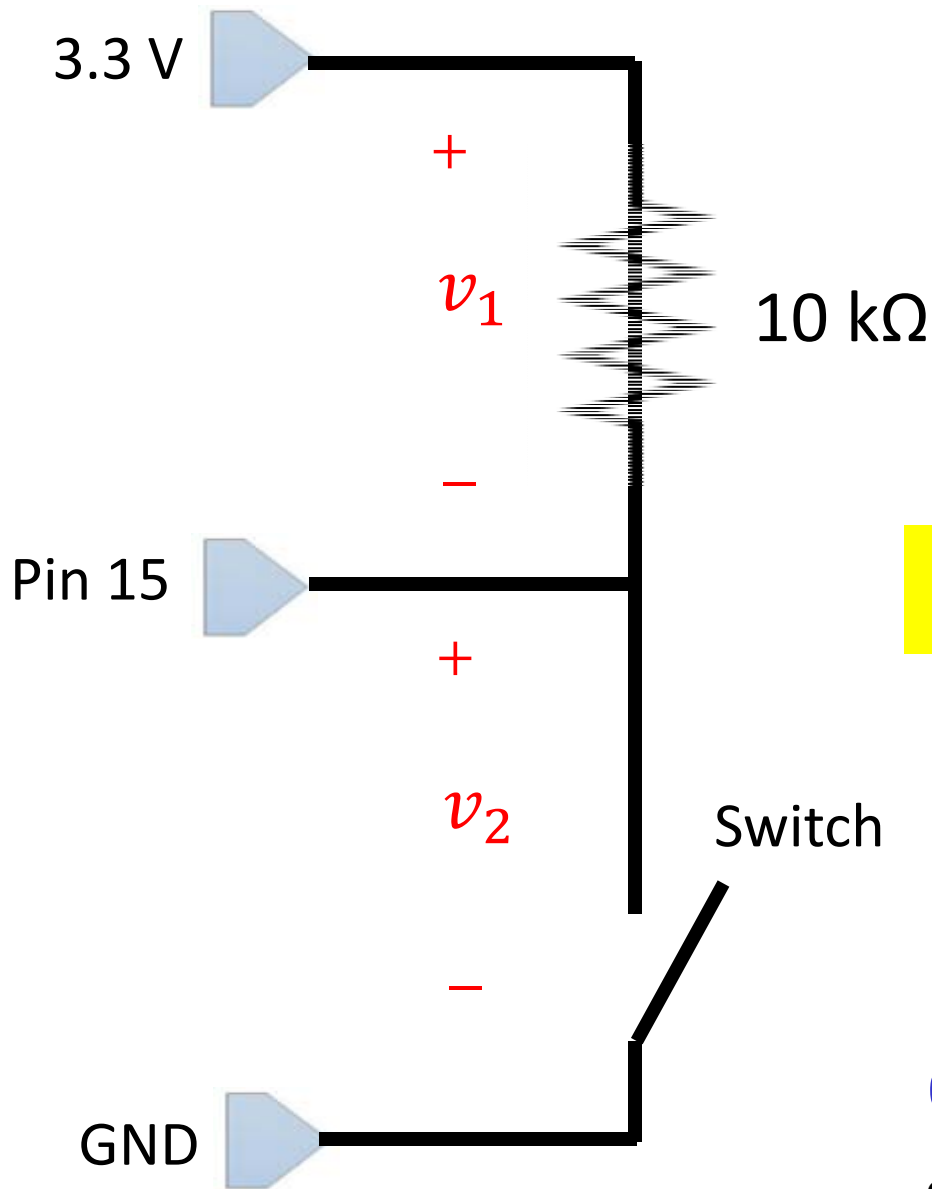
Switch open: $v_2 = 3.3 \text{ V}$

Switch closed: $v_2 = 0 \text{ V}$



Switch open: $v_2 = 3.3 \text{ V}$

Switch closed: $v_2 = 0 \text{ V}$



Switch open: $v_2 = 3.3 \text{ V}$

Switch closed: $v_2 = 0 \text{ V}$

`GPIO.setup(15, GPIO.IN)`

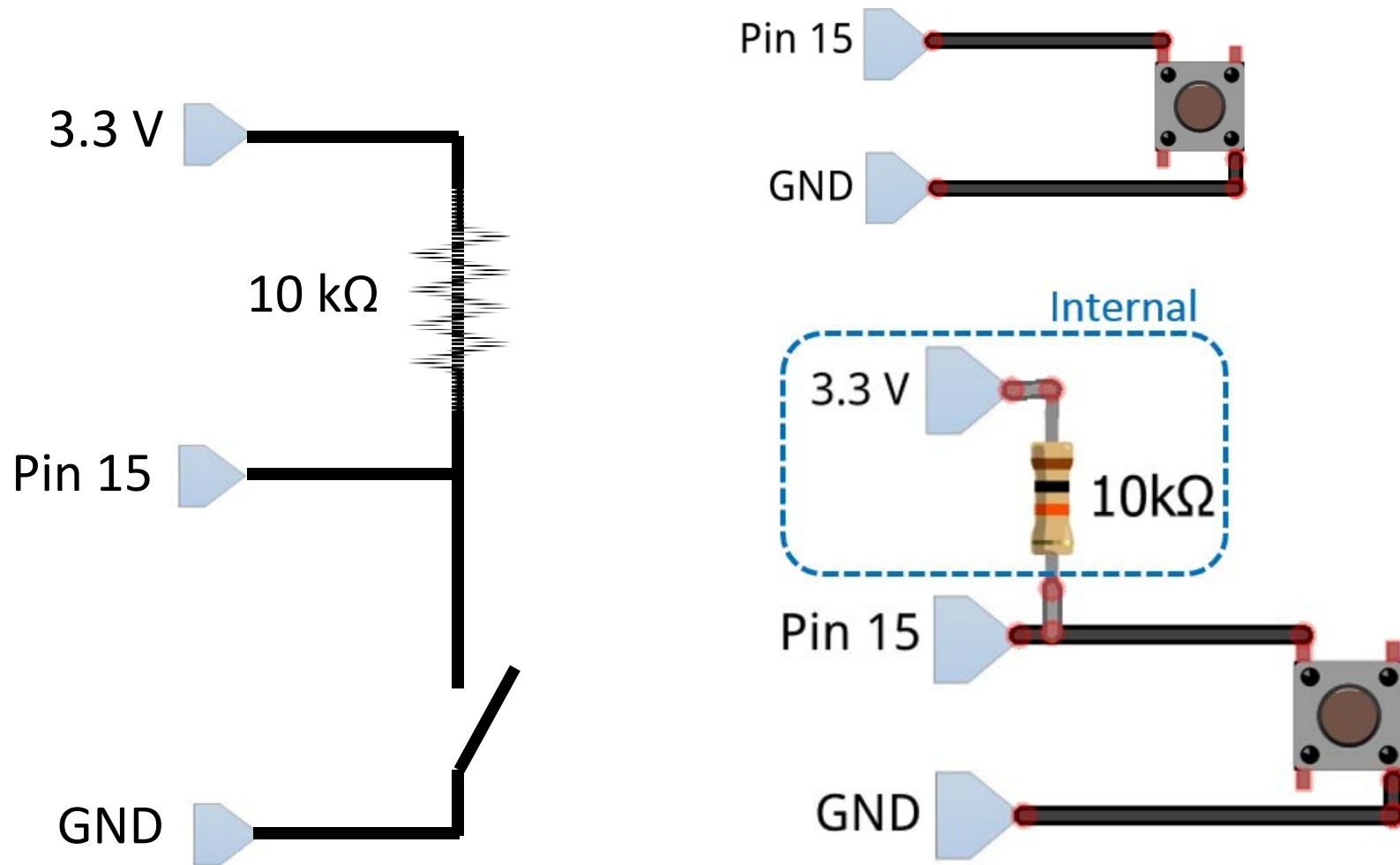
`result = GPIO.input(15)`

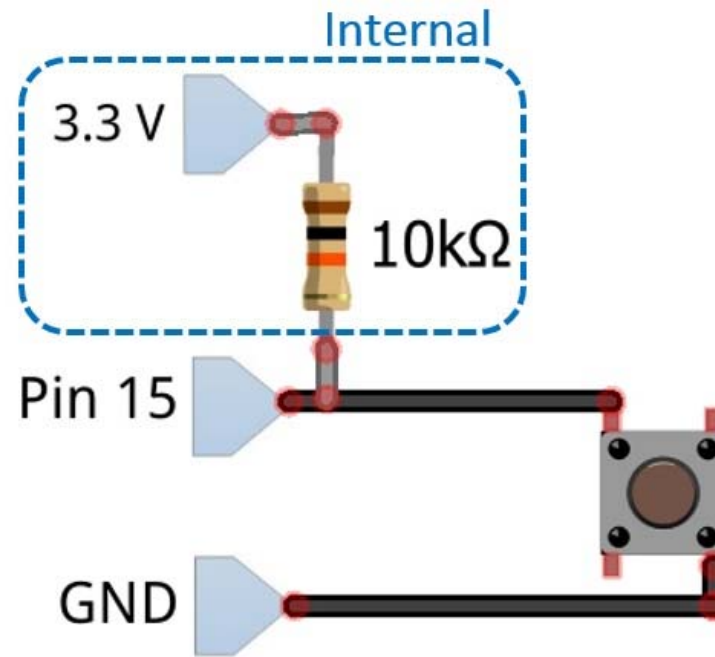
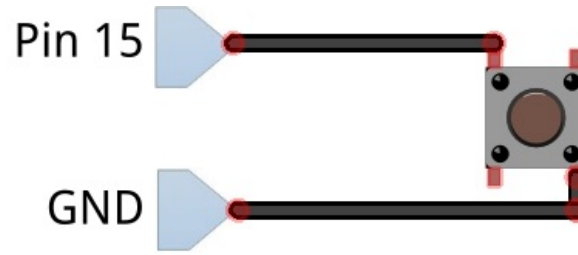
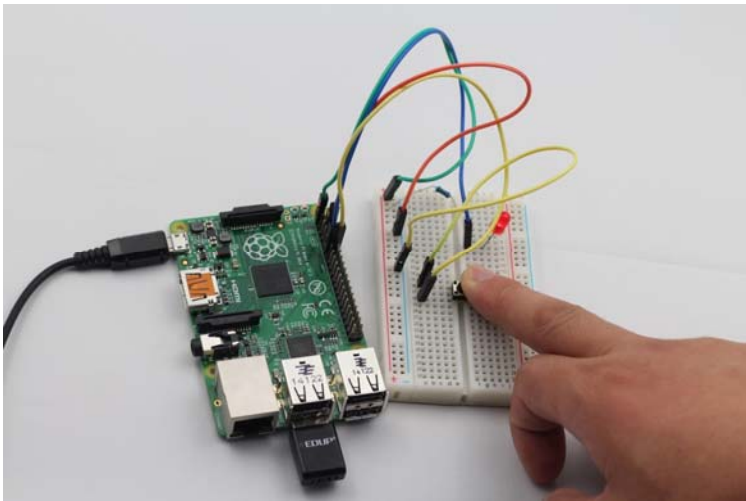
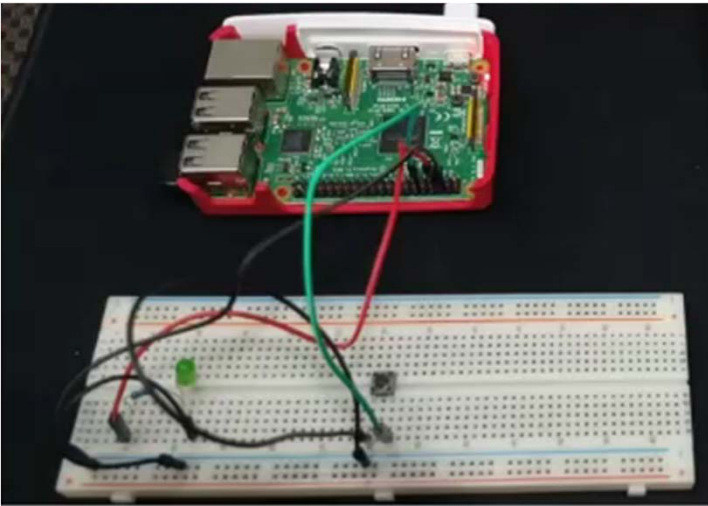


0 (LOW) or 1 (HIGH)

0V ... 1.65V 1.65V ... 3.3V

```
GPIO.setup(15, GPIO.IN, pull_up_down = GPIO.PUD_UP)
```





220 Ω



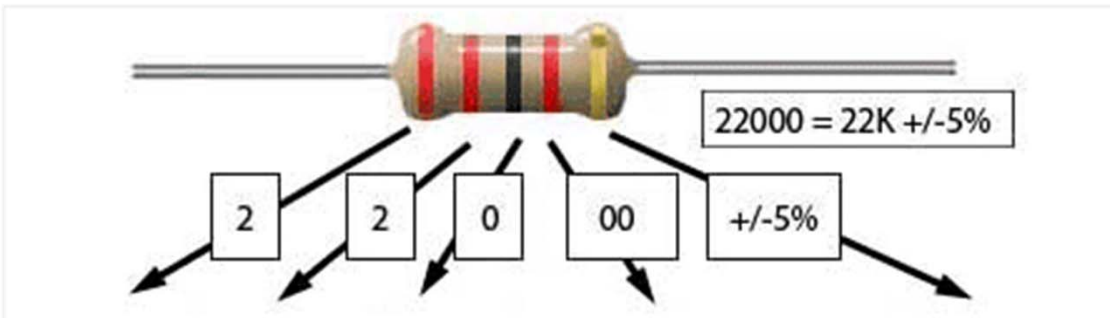
1 kΩ



10 kΩ



100 kΩ



Band	1	2	3	4	5
Meaning	1st Digit	2nd Digit	3rd Digit	(No. of zeros)	Tolerance % (No band +/- 20%)
Silver				.00 (divide by 100)	+/-10%
Gold				.0 (divide by 10)	+/-5%
Black	0	0	0	No Zeros	
Brown	1	1	1	0	+/-1%
Red	2	2	2	00	+/-2%
Orange	3	3	3	,000	
Yellow	4	4	4	0,000	
Green	5	5	5	00,000	+/-0.5%
Blue	6	6	6	,000,000	+/-0.25%
Violet	7	7	7	0,000,000	+/-0.1%
Grey	8	8	8		+/-0.05%
White	9	9	9		


```

# Import the relevant libraries
import RPi.GPIO as GPIO
import time

# GPIO Mode (BOARD / BCM)
GPIO.setmode(GPIO.BOARD)

# Set GPIO Pins
LedPin = 11

# Set GPIO direction (IN / OUT)
GPIO.setup(LedPin, GPIO.OUT)

# Start conditions
GPIO.output(LedPin, GPIO.LOW)

# Main program
if __name__ == '__main__':
    try:
        # This code repeats forever
        while True:
            print('LED on')
            GPIO.output(LedPin, GPIO.HIGH)
            time.sleep(0.5)
            print('LED off')
            GPIO.output(LedPin, GPIO.LOW)
            time.sleep(0.5)

        # Reset by pressing CTRL + C
    except KeyboardInterrupt:
        print("Program stopped by User")
        GPIO.output(LedPin, GPIO.LOW)
        GPIO.cleanup()

```

```

# GPIO pin for the LED

# Set LedPin's mode to output

# Set LedPin low to turn the led off

# Program starts here

# LED on

# LED off

# LED off
# Release resource

```

