



## ASSIGNMENT

### IMAGE OF THE EXPERIMENT: Blinking LED Bulb using Raspberry Pi and relay module

#### COMPONENTS:

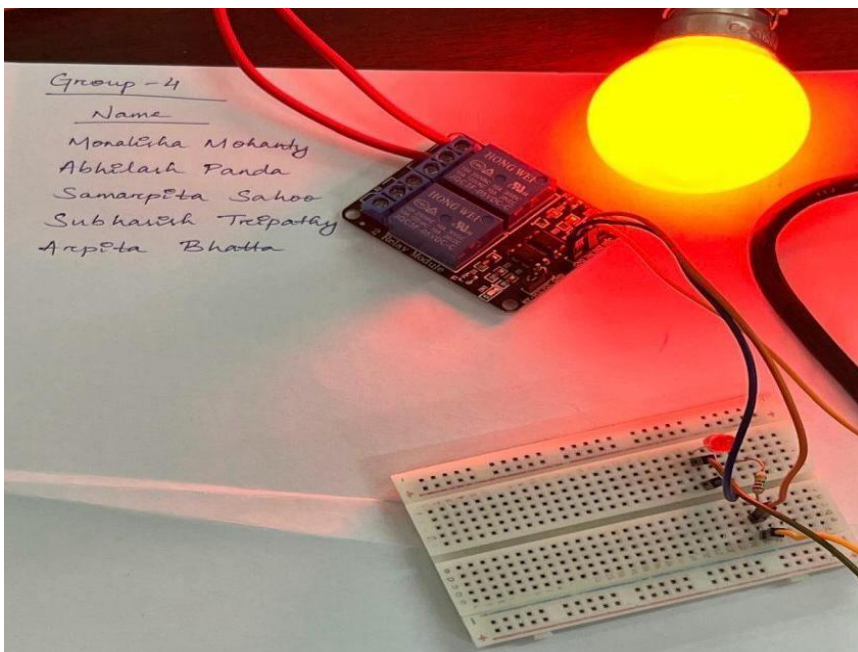
1. Raspberry Pi Model 4B
2. Power Adapter, Keyboard, Mouse, and Monitor
3. Breadboard
4. Single LED Bulb
5. Relay Module
6. Connecting Wires

#### Code for Blinking LED Bulb:

```
import RPi.GPIO as g from
time import sleep
g.setwarnings(False)
g.setmode(g.BCM)
g.setup(3, g.OUT)
while True:
    g.output(3, 1)
    sleep(0.5)
    g.output(3, 0)
    sleep(0.5)
```

**EXPERIMENT SETUP:** The circuit consists of an LED bulb connected to a relay module, which is further connected to the Raspberry Pi's GPIO pin. The LED alternates between ON and OFF states at a fixed interval, creating a blinking effect.

#### IMAGE OF THE EXPERIMENT:



#### OUTPUT:

The LED bulb blinks continuously with a 0.5-second interval, demonstrating the control of external components using Raspberry Pi GPIO pins .

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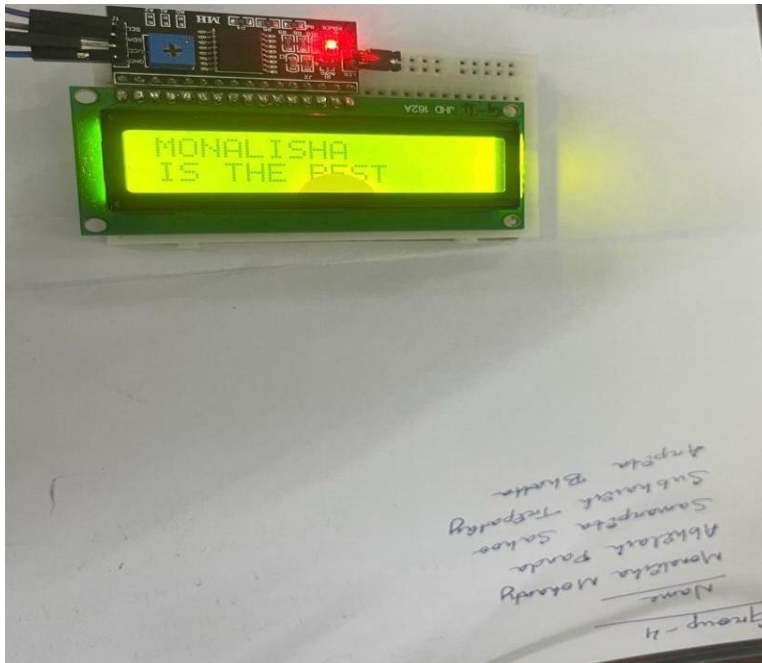
## ASSIGNMENT

**OBJECTIVE:** Display text on LCD using raspberry pi.

Code for Display text on LCD:

```
From RPLCD.i2c import charLCD  
lcd=charLCD('PCF8574',0x74)  
lcd.write_string("Hello from grp5")  
lcd.cursor_pos=(1,0) lcd.write_string("69")
```

**IMAGE OF THIS EXPERIMENT:**



**OUTPUT:**

The text was displayed on the LCD display panel.

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**OBJECTIVE:** To control an LED and detect objects using ultrasonic sensor with a microcontroller based system.

**COMPONENTS:**

1. Raspberry Pi 4B
2. HC-SR04 Ultrasonic Sensor
3. LED
4. Resistor
5. Breadboard
6. Male to Female Connectors
7. Power Supply / USB Cable

**Code for Ultrasound sensor:**

```
import RPi.GPIO as GPIO
import time
GPIO.setwarnings(False)
GPIO.setmode(GPIO.BOARD)

TRIG = 16
ECHO = 18
LED = 22

GPIO.setup(TRIG, GPIO.OUT)
GPIO.setup(ECHO, GPIO.IN)
GPIO.setup(LED, GPIO.OUT)

while True:
    GPIO.output(TRIG, False)
    time.sleep(0.5)
    GPIO.output(TRIG, True)
    time.sleep(0.00001)
    GPIO.output(TRIG, False)

    while GPIO.input(ECHO) == 0:
        pulse_start = time.time()

    while GPIO.input(ECHO) == 1:
        pulse_end = time.time()

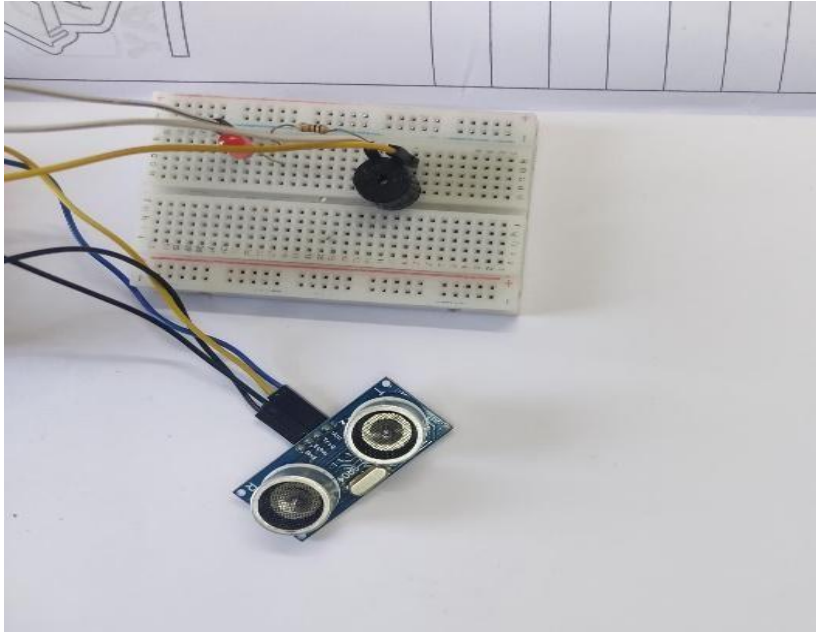
    pulse_duration = pulse_end - pulse_start
    distance = pulse_duration * 18150
    distance = round(distance, 2)

    print("Distance:", distance, "cm")

    if distance < 20:
        GPIO.output(LED, GPIO.HIGH)
    else:
        GPIO.output(LED, GPIO.LOW)

    time.sleep(1)
```

### **IMAGE OF THE EXPERIMENT:**



### **OUTPUT:**

When an object is detected within 20 cm, the LED turns ON.  
If no object is nearby, the LED remains OFF.

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## **ASSIGNMENT**

**OBJECTIVE:** To detect presence of raindrops using raindrop module sensor

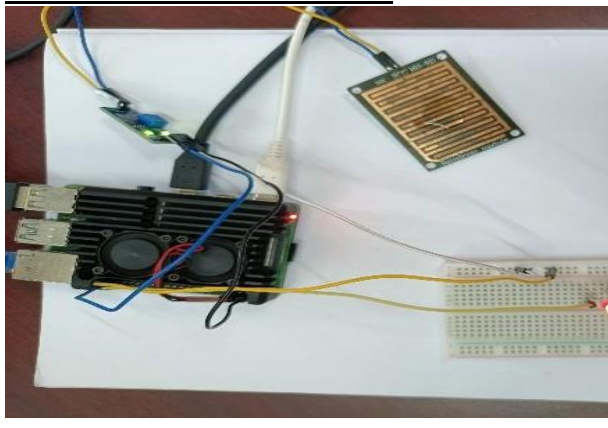
**COMPONENTS:**

1. Raindrop Sensor Module
2. Raspberry Pi 4B
3. Breadboard
4. LED
5. Resistor
6. Male to Female Connectors
7. Power Supply / USB Cable

**Code for raindrop sensor**

```
import RPi.GPIO as GPIO
import time
RAIN_SENSOR_PIN = 18
LED_PIN = 18
GPIO.setmode(GPIO.BCM)
GPIO.setup(RAIN_SENSOR_PIN, GPIO.IN)
GPIO.setup(LED_PIN, GPIO.OUT)
try:
    while True:
        if GPIO.input(RAIN_SENSOR_PIN) == 0:
            GPIO.output(LED_PIN, GPIO.HIGH)
            print("Rain detected")
        else:
            GPIO.output(LED_PIN, GPIO.LOW)
            print("No Rain detected")
        time.sleep(1)
except KeyboardInterrupt:
    GPIO.cleanup()
```

**IMAGE OF THIS EXPERIMENT:**



**OUTPUT:**

When the sensor detects water (rain), the LED turns ON and "Rain detected" is printed. If no water is detected, the LED remains OFF and "No Rain detected" is printed

## ASSIGNMENT

**OBJECTIVE:** To detect presence of moisture using moisture sensor

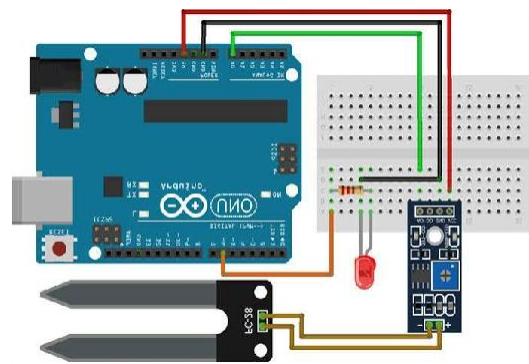
### COMPONENTS:

1. Moisture Sensor Module
2. Raspberry Pi 4B
3. Breadboard
4. LED
5. Resistor
6. Male to Female Connectors
7. Power Supply / USB Cable

### Code for moisture sensor

```
import RPi.GPIO as GPIO
import time
MOIST_SENSOR_PIN = 18
LED_PIN = 18
GPIO.setmode(GPIO.BCM)
GPIO.setup(MOIST_SENSOR_PIN, GPIO.IN)
GPIO.setup(LED_PIN, GPIO.OUT)
try:
    while True:
        if GPIO.input(MOIST_SENSOR_PIN) == 0:
            GPIO.output(LED_PIN, GPIO.HIGH)
            print("MOIST!!")
        else:
            GPIO.output(LED_PIN, GPIO.LOW)
            print("DRY!!")
        time.sleep(1)
except KeyboardInterrupt:
    GPIO.cleanup()
```

### IMAGE OF THIS EXPERIMENT:



### OUTPUT:

When moisture is present in the soil, the LED turns ON and "MOIST!!" is printed. If the soil is dry, the LED remains OFF and "DRY!!" is printed.

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## ASSIGNMENT

**OBJECTIVE:** To detect the brightness level of LED using light sensor

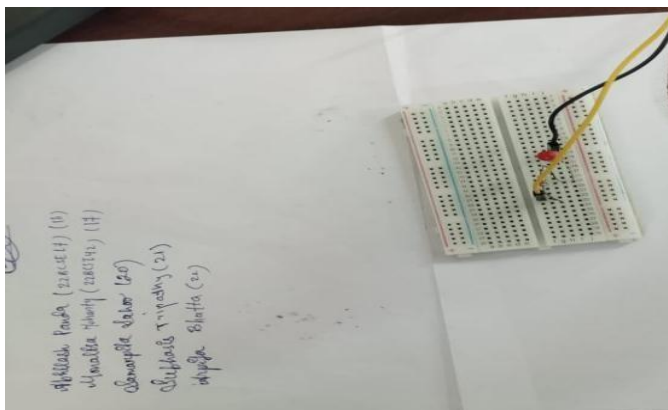
### COMPONENTS:

- |                         |                                |
|-------------------------|--------------------------------|
| 1. LED                  | 4. Resistors                   |
| 2. Light Sensor ( LDR ) | 5. Breadboard and Jumper Wires |
| 3. Raspberry Pi         | 6. Power Supply                |

### Code For Detecting Brightness :

```
import RPi.GPIO as g
import time
g.setwarnings(False)
g.setmode(g.BCM)
g.setup(3,g.OUT)
pwm = g.PWM(3, 100)
pwm.start(0)
try:
    while True:
        for duty_cycle in range(0,101,5):
            pwm.ChangeDutyCycle(duty_cycle)
            time.sleep(0.1)
        for duty_cycle in range(100,-1,-5):
            pwm.ChangeDutyCycle(duty_cycle)
            time.sleep(0.1)
except KeyboardInterrupt:
    print("\nExiting...")
    pwm.stop()
g.cleanup()
```

### Image Of This Experiment :



### Output :

From this experiment we fluctuated the brightness of LED Starting from 0 brightness to 100 , and reversing to 0.

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