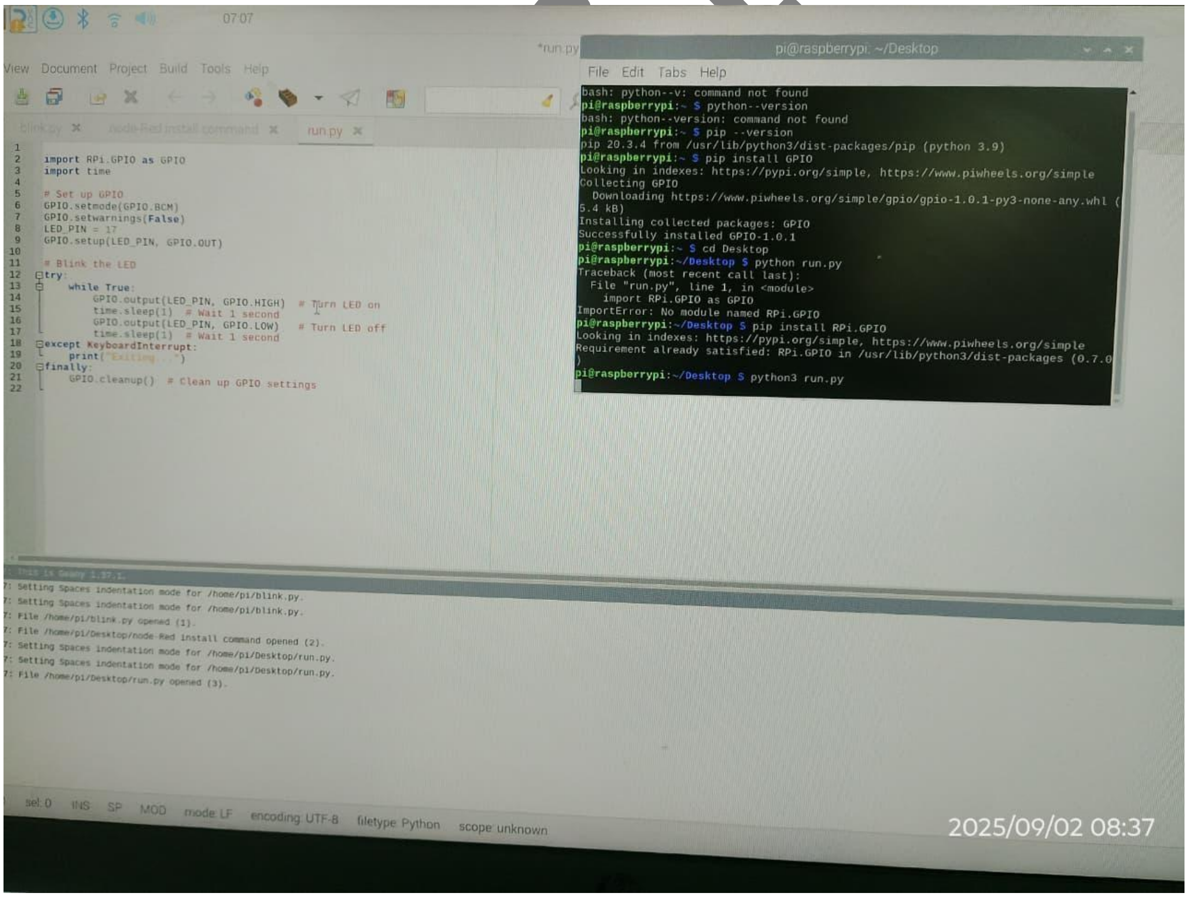
Name – Naman Srivastava

Aim ->
To simulate an emergency alarm system where an LED blinks rapidly (0.2 sec interval) when a button is pressed.

Procedure ->

1. Connect a push button to GPIO 27 as input.
2. Connect an LED to GPIO 17 as output.
3. Write a Python program using RPi.GPIO to read the button state.
4. Implement logic: while the button is pressed (GPIO.input(27) == 1), blink the LED with a delay of 0.2 seconds.
5. Run the program and test by pressing/releasing the button.

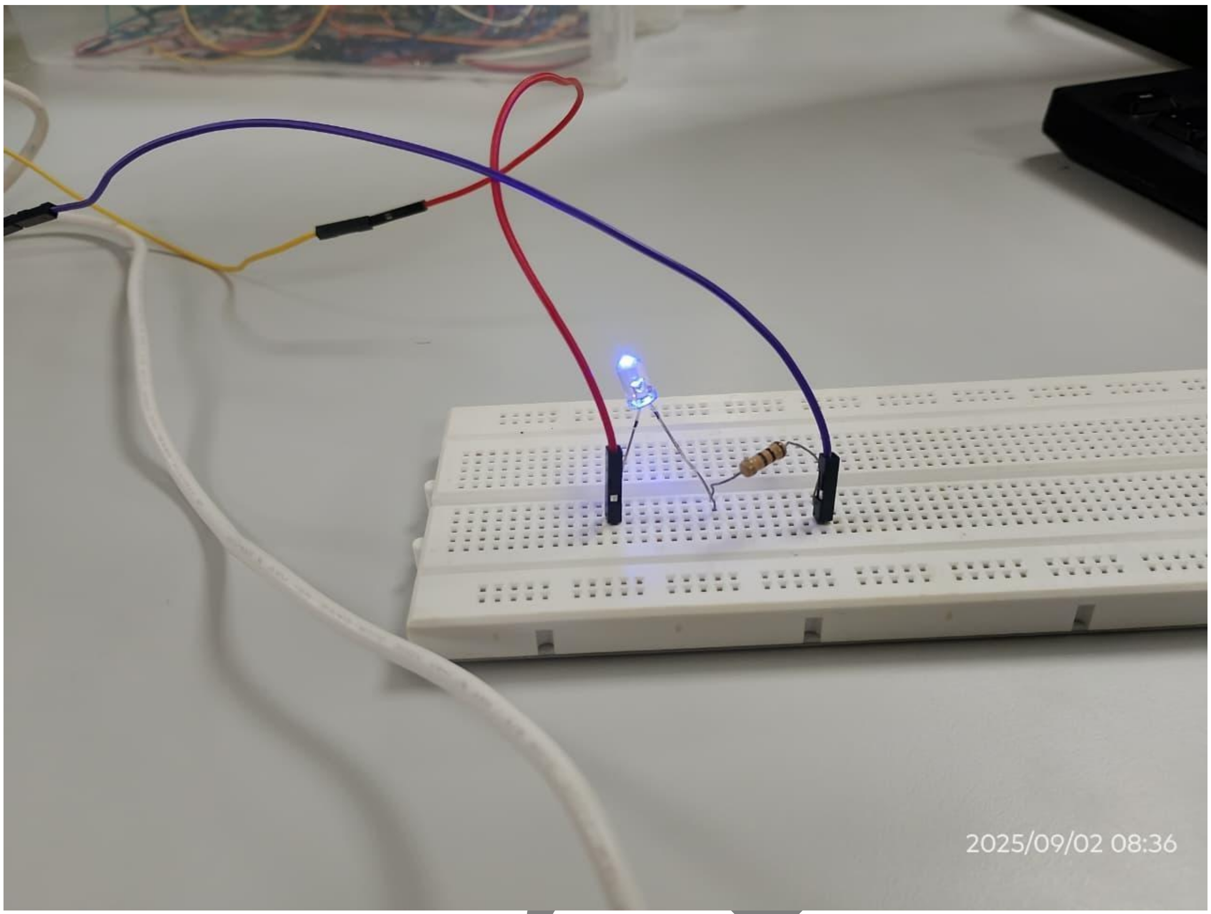
Output ->

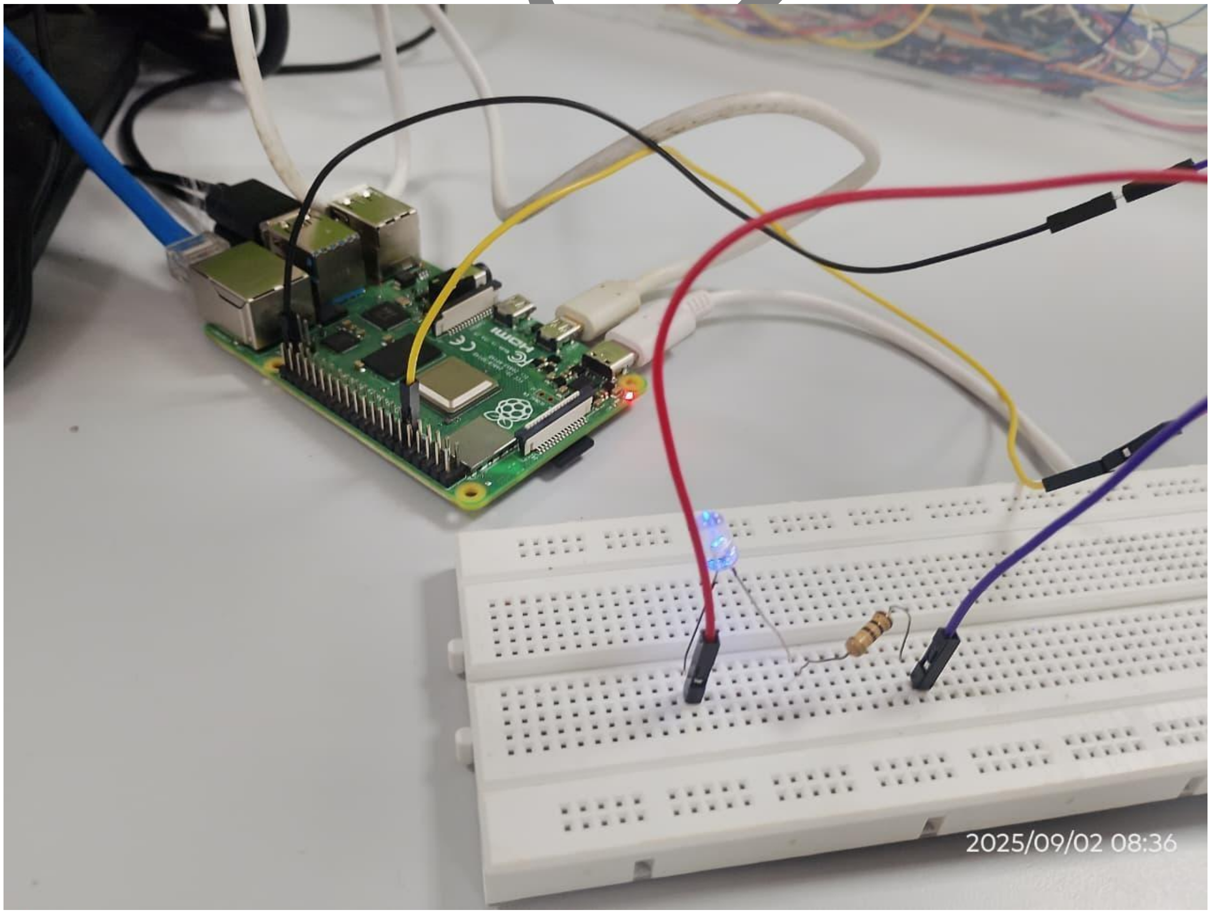

07:07
*run.py
View Document Project Build Tools Help
blink.py
node-Red install command
run.py
pi@raspberrypi: ~/Desktop
File Edit Tabs Help
sel: 0 INS SP MOD mode: LF encoding: UTF-8 filetype: Python scope: unknown
2025/09/02 08:37

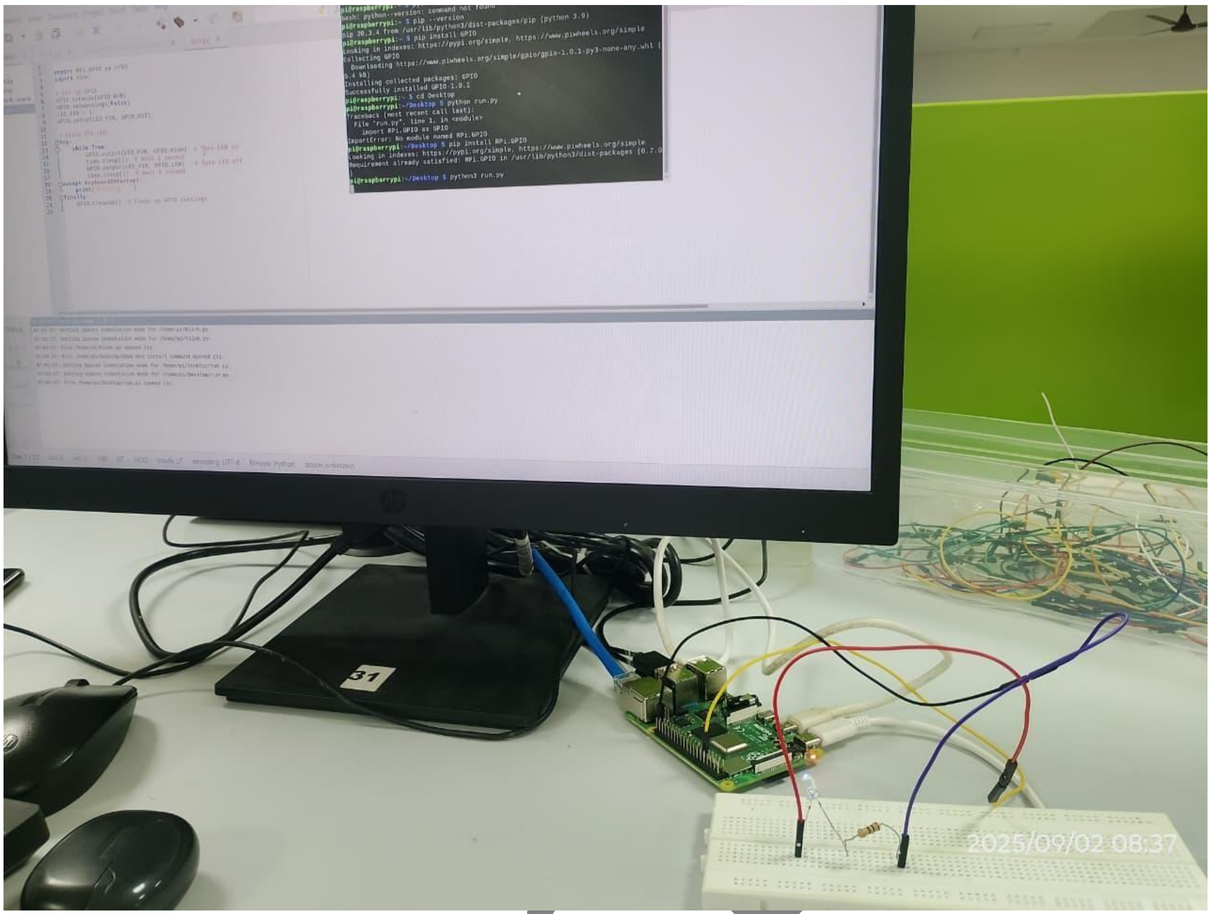
```python

import RPi.GPIO as GPIO
import time

# Set up GPIO
GPIO.setmode(GPIO.BCM)
GPIO.setwarnings(False)
LED_PIN = 17
GPIO.setup(LED_PIN, GPIO.OUT)

# Blink the LED
try:
    while True:
        GPIO.output(LED_PIN, GPIO.HIGH)  # Turn LED on
        time.sleep(1)  # Wait 1 second
        GPIO.output(LED_PIN, GPIO.LOW)   # Turn LED off
        time.sleep(1)  # Wait 1 second
except KeyboardInterrupt:
    print("Exiting...")
finally:
    GPIO.cleanup()  # Clean up GPIO settings
```

```
bash: python--v: command not found
pi@raspberrypi:~ $ python--version
bash: python--version: command not found
pi@raspberrypi:~ $ pip --version
pip 20.3.4 from /usr/lib/python3/dist-packages/pip (python 3.9)
pi@raspberrypi:~ $ pip install GPIO
Looking in indexes: https://pypi.org/simple, https://www.piwheels.org/simple
Collecting GPIO
  Downloading https://www.piwheels.org/simple/gpio/gpio-1.0.1-py3-none-any.whl (
5.4 kB)
Installing collected packages: GPIO
Successfully installed GPIO-1.0.1
pi@raspberrypi:~ $ cd Desktop
pi@raspberrypi:~/Desktop $ python run.py
Traceback (most recent call last):
  File "run.py", line 1, in <module>
    import RPi.GPIO as GPIO
ImportError: No module named RPi.GPIO
pi@raspberrypi:~/Desktop $ pip install RPi.GPIO
Looking in indexes: https://pypi.org/simple, https://www.piwheels.org/simple
Requirement already satisfied: RPi.GPIO in /usr/lib/python3/dist-packages (0.7.0
)
pi@raspberrypi:~/Desktop $ python3 run.py
```

```
7: This is Geany 1.37.1.
7: Setting Spaces indentation mode for /home/pi/blink.py.
7: Setting Spaces indentation mode for /home/pi/blink.py.
7: File /home/pi/blink.py opened (1).
7: File /home/pi/Desktop/node-Red install command opened (2).
7: Setting Spaces indentation mode for /home/pi/Desktop/run.py.
7: Setting Spaces indentation mode for /home/pi/Desktop/run.py.
7: File /home/pi/Desktop/run.py opened (3).
```

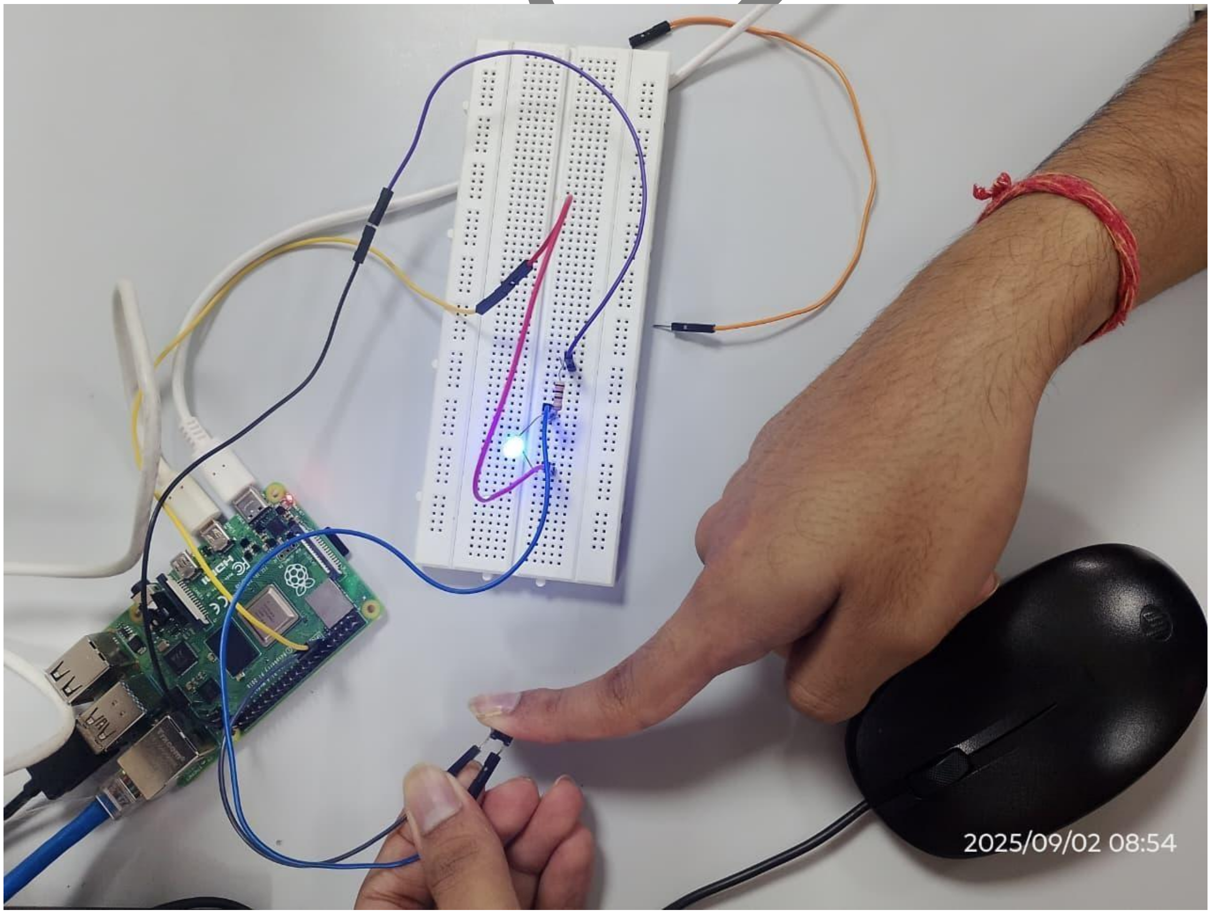

2025/09/02 08:36

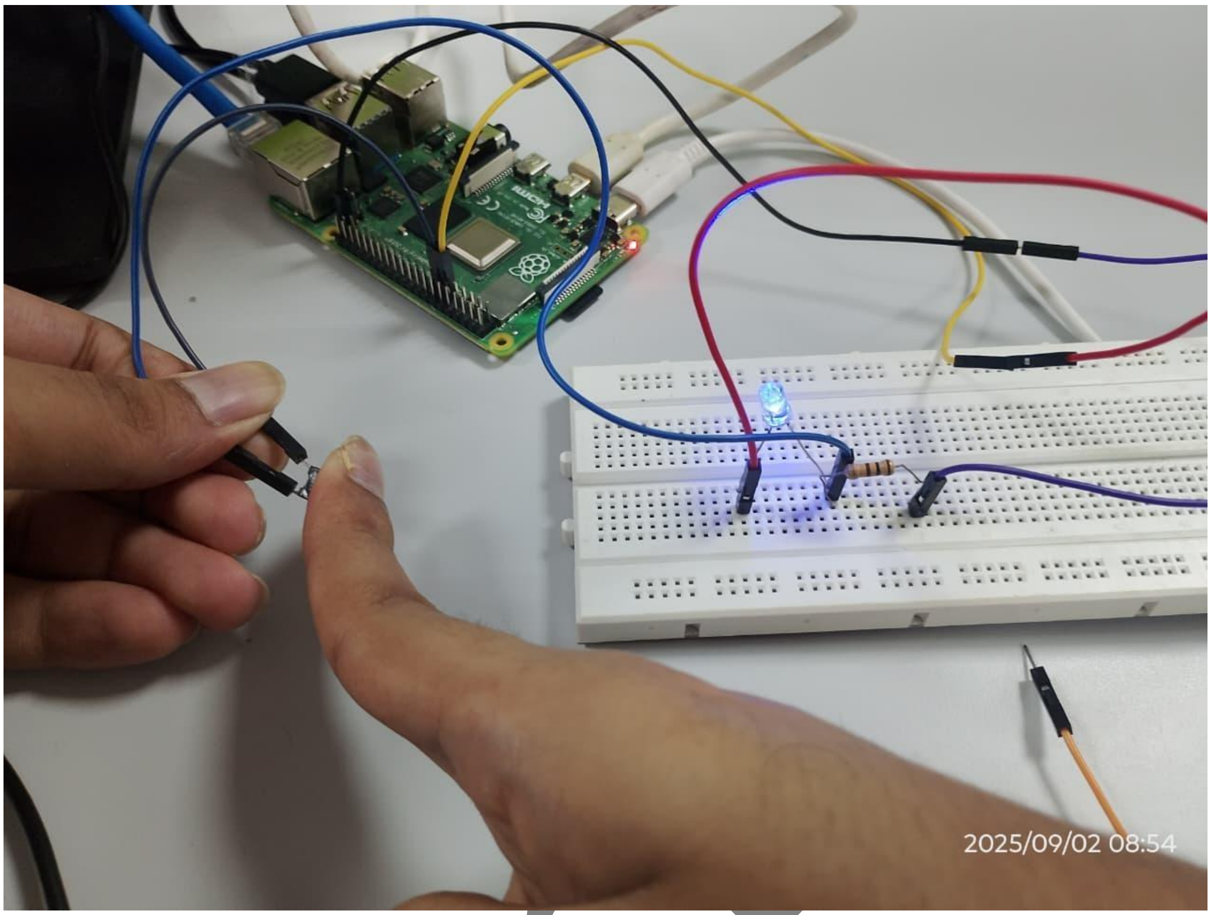

2025/09/02 08:36



```python
import RPi.GPIO as GPIO
import time

# Set up GPIO
GPIO.setmode(GPIO.BCM)
GPIO.setwarnings(False)
LED_PIN = [illegible]
GPIO.setup(LED_PIN, GPIO.OUT)

# Blink the LED
try:
    while True:
        GPIO.output(LED_PIN, GPIO.HIGH)  # Turn LED on
        time.sleep(1)  # Wait 1 second
        GPIO.output(LED_PIN, GPIO.LOW)  # Turn LED off
        time.sleep(1)  # Wait 1 second
except KeyboardInterrupt:
    print([illegible])
finally:
    GPIO.cleanup()  # Clean up GPIO settings
```

```
bash: python--version: command not found
pi@raspberrypi:~ $ pip --version
pip 20.3.4 from /usr/lib/python3/dist-packages/pip (python 3.9)
pi@raspberrypi:~ $ pip install GPIO
Looking in indexes: https://pypi.org/simple, https://www.piwheels.org/simple
Collecting GPIO
  Downloading https://www.piwheels.org/simple/gpio/gpio-1.0.1-py3-none-any.whl (
5.4 kB)
Installing collected packages: GPIO
Successfully installed GPIO-1.0.1
pi@raspberrypi:~ $ cd Desktop
pi@raspberrypi:~/Desktop $ python run.py
Traceback (most recent call last):
  File "run.py", line 1, in <module>
    import RPi.GPIO as GPIO
ImportError: No module named RPi.GPIO
pi@raspberrypi:~/Desktop $ pip install RPi.GPIO
Looking in indexes: https://pypi.org/simple, https://www.piwheels.org/simple
Requirement already satisfied: RPi.GPIO in /usr/lib/python3/dist-packages (0.7.0
)
pi@raspberrypi:~/Desktop $ python3 run.py
```





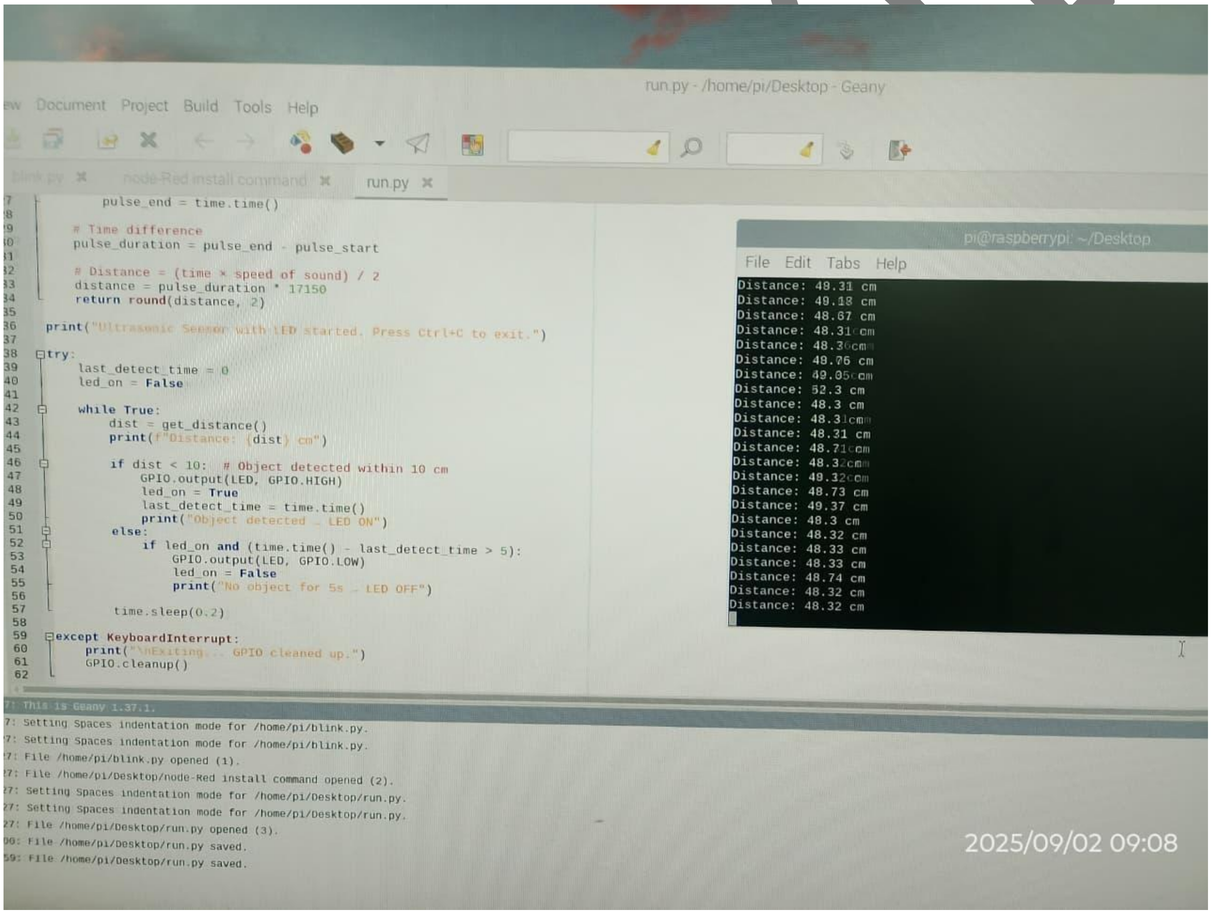
Inference ->
A simple emergency alarm system was successfully implemented using Raspberry Pi GPIO, validating rapid LED blinking based on button press.

Aim ->
To implement an automatic light system using an Ultra Sonic motion sensor and an LED.

Procedure ->

1. Connect PIR sensor output to GPIO 23.
2. Connect an LED to GPIO 17.
3. Write a Python program to read Ultra Sonic input from GPIO 23.
4. If motion is detected, turn the LED ON.
5. If no motion is detected, turn the LED OFF after a 5-second delay.
6. Run and test by moving in front of the Ultra Sonic sensor.

Output ->


run.py - /home/pi/Desktop - Geany
Document Project Build Tools Help
blink.py
node-Red install command
run.py
pi@raspberrypi: ~/Desktop
File Edit Tabs Help
2025/09/02 09:08

```python
            pulse_end = time.time()

        # Time difference
        pulse_duration = pulse_end - pulse_start

        # Distance = (time × speed of sound) / 2
        distance = pulse_duration * 17150
        return round(distance, 2)

print("Ultrasonic Sensor with LED started. Press Ctrl+C to exit.")

try:
    last_detect_time = 0
    led_on = False

    while True:
        dist = get_distance()
        print(f"Distance: {dist} cm")

        if dist < 10:  # Object detected within 10 cm
            GPIO.output(LED, GPIO.HIGH)
            led_on = True
            last_detect_time = time.time()
            print("Object detected – LED ON")
        else:
            if led_on and (time.time() - last_detect_time > 5):
                GPIO.output(LED, GPIO.LOW)
                led_on = False
                print("No object for 5s – LED OFF")

        time.sleep(0.2)

except KeyboardInterrupt:
    print("\nExiting... GPIO cleaned up.")
    GPIO.cleanup()
```

```
Distance: 48.31 cm
Distance: 49.18 cm
Distance: 48.67 cm
Distance: 48.31 cm
Distance: 48.36 cm
Distance: 48.76 cm
Distance: 49.05 cm
Distance: 52.3 cm
Distance: 48.3 cm
Distance: 48.31 cm
Distance: 48.31 cm
Distance: 48.71 cm
Distance: 48.32 cm
Distance: 49.32 cm
Distance: 48.73 cm
Distance: 49.37 cm
Distance: 48.3 cm
Distance: 48.32 cm
Distance: 48.33 cm
Distance: 48.33 cm
Distance: 48.74 cm
Distance: 48.32 cm
Distance: 48.32 cm
```

```
7: This is Geany 1.37.1.
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7: File /home/pi/blink.py opened (1).
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27: Setting Spaces indentation mode for /home/pi/Desktop/run.py.
27: Setting Spaces indentation mode for /home/pi/Desktop/run.py.
27: File /home/pi/Desktop/run.py opened (3).
00: File /home/pi/Desktop/run.py saved.
59: File /home/pi/Desktop/run.py saved.
```
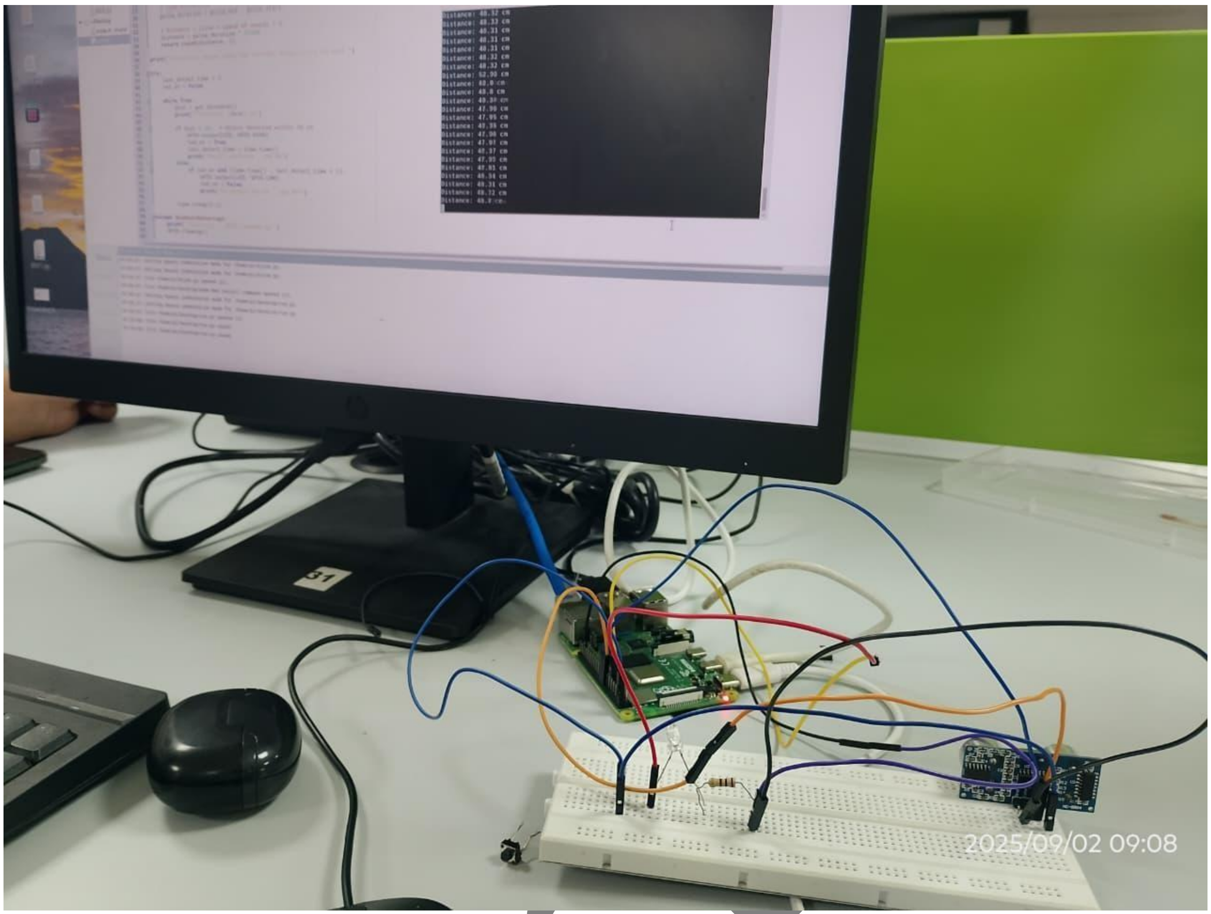
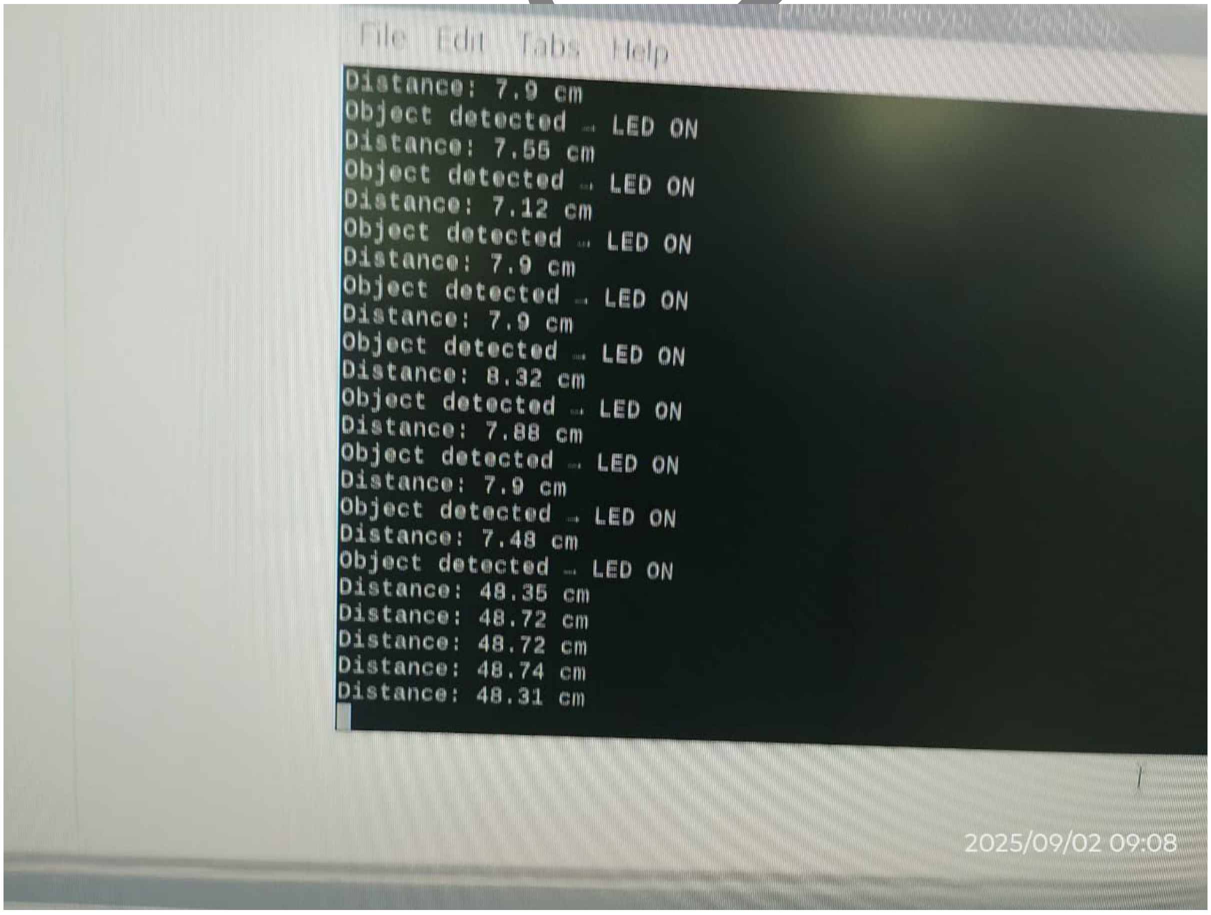
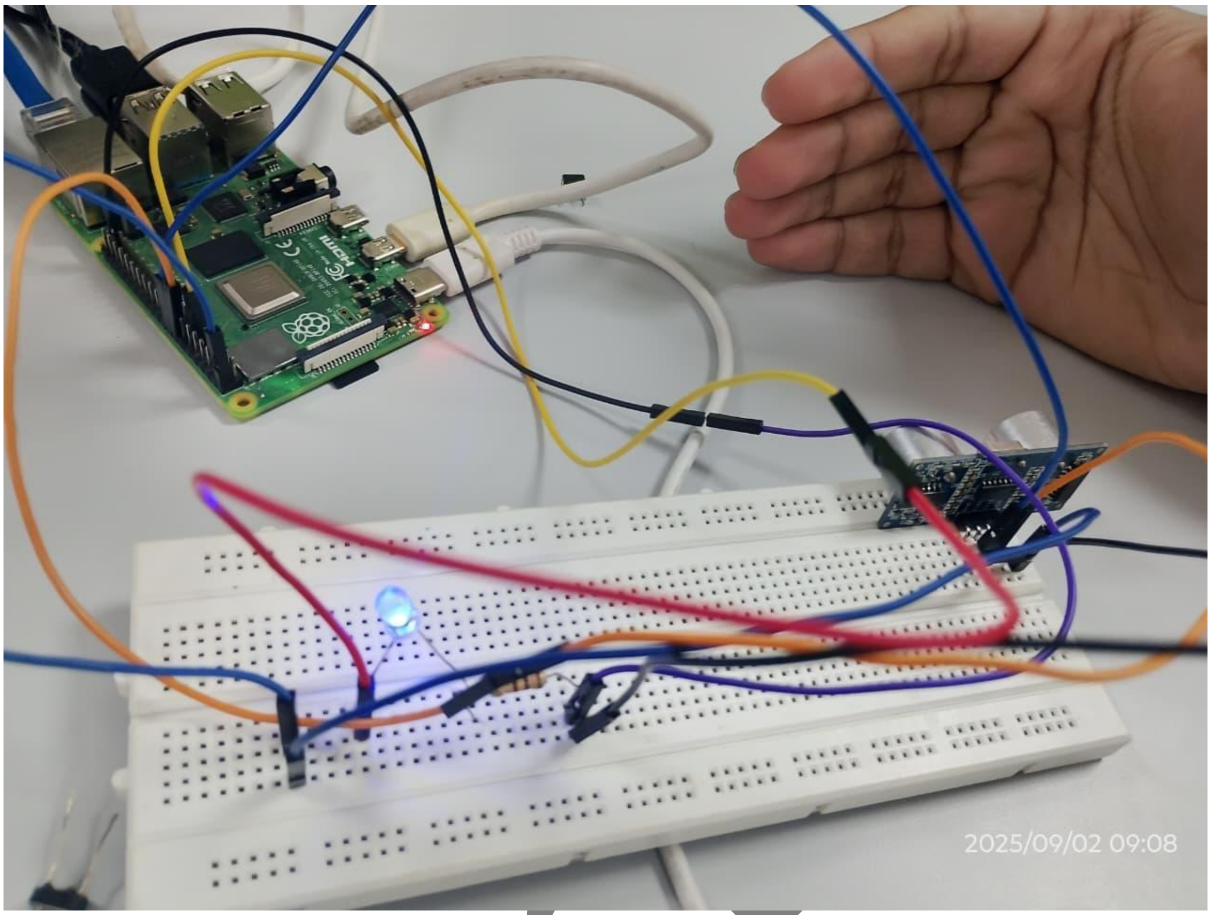



```
Distance: 48.32 cm
Distance: 48.33 cm
Distance: 48.31 cm
Distance: 48.31 cm
Distance: 48.31 cm
Distance: 48.32 cm
Distance: 48.32 cm
Distance: 52.99 cm
Distance: 48.0 cm
Distance: 48.8 cm
Distance: 48.39 cm
Distance: 47.98 cm
Distance: 47.95 cm
Distance: 48.39 cm
Distance: 47.98 cm
Distance: 47.97 cm
Distance: 48.37 cm
Distance: 47.95 cm
Distance: 47.91 cm
Distance: 48.34 cm
Distance: 48.31 cm
Distance: 48.72 cm
Distance: 48.8 cm
```



```
Distance: 7.9 cm
Object detected → LED ON
Distance: 7.55 cm
Object detected → LED ON
Distance: 7.12 cm
Object detected → LED ON
Distance: 7.9 cm
Object detected → LED ON
Distance: 7.9 cm
Object detected → LED ON
Distance: 8.32 cm
Object detected → LED ON
Distance: 7.88 cm
Object detected → LED ON
Distance: 7.9 cm
Object detected → LED ON
Distance: 7.48 cm
Object detected → LED ON
Distance: 48.35 cm
Distance: 48.72 cm
Distance: 48.72 cm
Distance: 48.74 cm
Distance: 48.31 cm
```



Inference ->
An automatic motion-triggered lighting system was successfully implemented, demonstrating Ultra Sonic based LED control with timed shutoff.