Marwadi University Marwadi Chandarana Group NAAC A+	**Marwadi University** **Faculty of Engineering & Technology** **Department of Information and Communication Technology**	
Subject: Programming With Python (01CT1309)	**Aim:** To control an LED connected to an Arduino Uno using Python via serial communication (PySerial)	
Experiment No: 26	**Date:**	**Enrollment No: 92400133181**

Aim: To control an LED connected to an Arduino Uno using Python via serial communication (PySerial)

IDE: Spyder & Arduino IDE

Installation

pip install PySerial

Hardware

Circuit Diagram:

LED Anode (+) → Arduino Pin 13

LED Cathode (-) → 220Ω Resistor → GND

Arduino Code:

```
void setup() {
  pinMode(13, OUTPUT);  // Set LED pin as output
  Serial.begin(9600);   // Start Serial communication
}


void loop() {
  if (Serial.available()) { // Check if data is received
    char command = Serial.read(); // Read the received command
    if (command == '1') {
      digitalWrite(13, HIGH); // Turn ON LED
    } else if (command == '0') {
      digitalWrite(13, LOW);  // Turn OFF LED
    }
```

```
  }
}
```

Python Code

```
import serial
import time

# Initialize Serial Communication (Replace 'COM3' with the correct port)
arduino = serial.Serial(port='COM3', baudrate=9600, timeout=1)
time.sleep(2)  # Allow time for Arduino to reset

def send_command(command):
    arduino.write(command.encode())  # Send command as bytes
    print(f"Sent: {command}")

while True:
    user_input = input("Enter '1' to turn ON LED, '0' to turn OFF, 'q' to quit: ")
    if user_input in ['1', '0']:
        send_command(user_input)
    elif user_input == 'q':
        print("Exiting...")
        break
```

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else:

print("Invalid input! Enter '1', '0', or 'q'.")

Test the LED Control:

Type 1 → LED should turn ON.

Type 0 → LED should turn OFF.

Type q → Script exits.

```python
import serial
import time

# Initialize Serial Communication (Replace 'COM3' with the correct port)
arduino = serial.Serial(port='COM71', baudrate=9600, timeout=1)
time.sleep(2)  # Allow time for Arduino to reset

def send_command(command):
    arduino.write(command.encode())  # Send command as bytes
    print(f"Sent: {command}")

while True:
    user_input = input("Enter '1' to turn ON LED, '0' to turn OFF, 'q' to quit: ")
    if user_input in ['1', '0']:
        send_command(user_input)
    elif user_input == 'q':
        print("Exiting...")
        break
    else:
        print("Invalid input! Enter '1', '0', or 'q'.")

```

Output:

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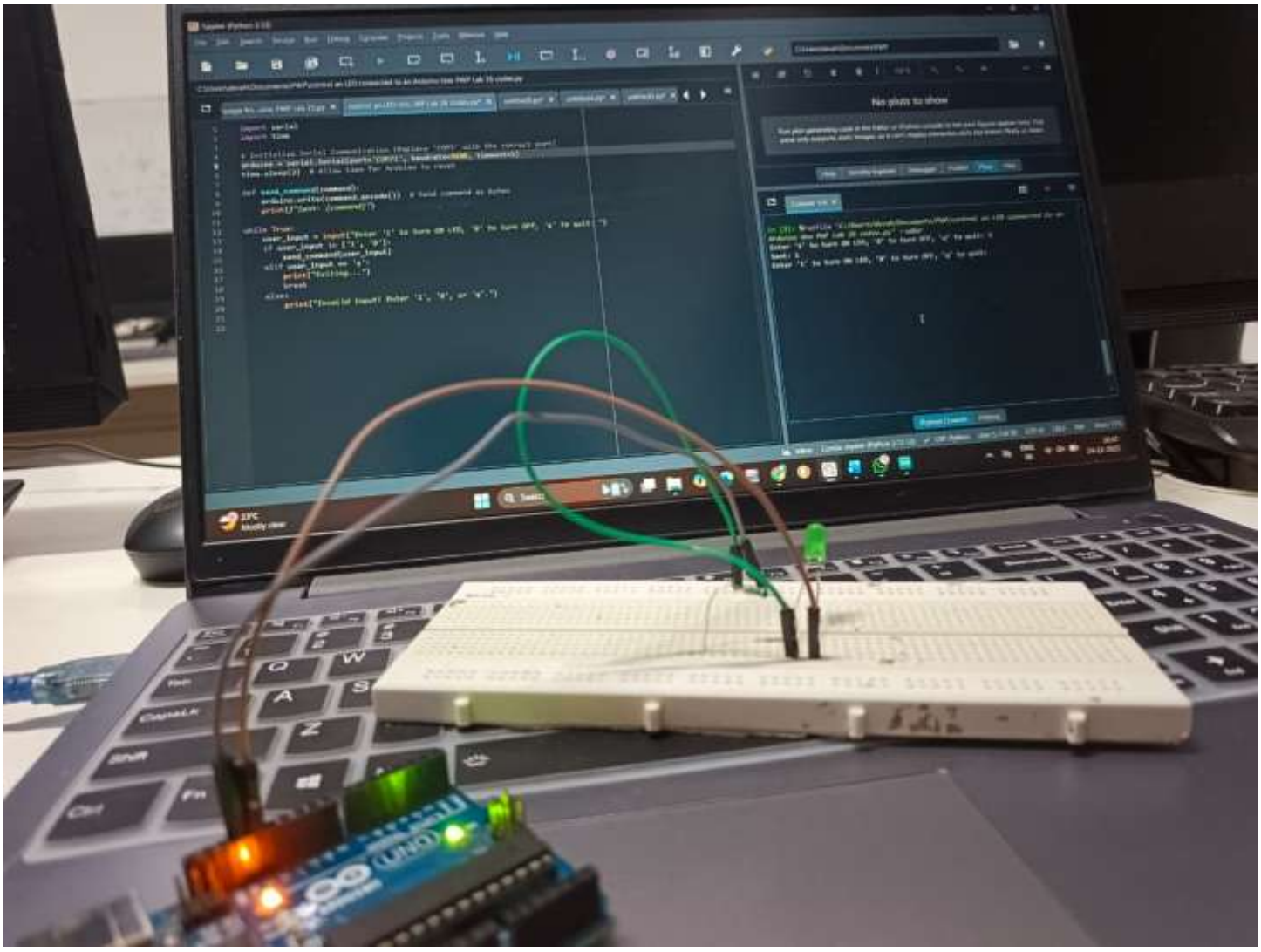

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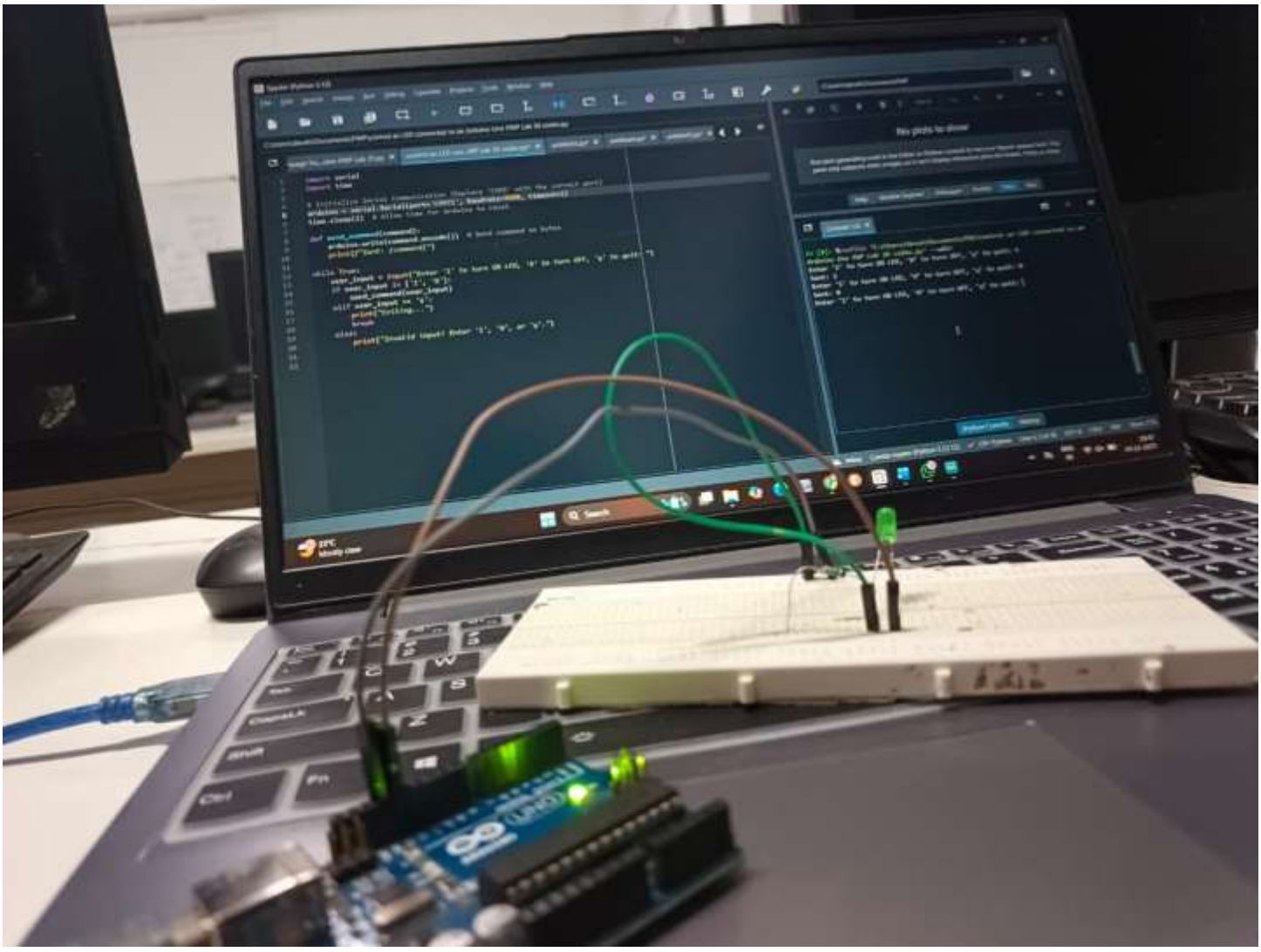

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```
In [2]: %runfile C:/Users/devah/Documents/PWP/untitled2.py --wdir
Enter '1' to turn ON LED, '0' to turn OFF, 'q' to quit: 1
Sent: 1
Enter '1' to turn ON LED, '0' to turn OFF, 'q' to quit: 0
Sent: 0
Enter '1' to turn ON LED, '0' to turn OFF, 'q' to quit: 1
Sent: 1
Enter '1' to turn ON LED, '0' to turn OFF, 'q' to quit: 0
Sent: 0
Enter '1' to turn ON LED, '0' to turn OFF, 'q' to quit: q
Exiting...

In [3]:
```

Post Lab

Write python script to continuously send commands ('ON' or 'OFF') to control an LED on Arduino.

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```python
import serial
import time

# Set your Arduino's serial port and baud rate
arduino_port = 'COM3'  # Change to your actual port
baud_rate = 9600

try:
    ser = serial.Serial(arduino_port, baud_rate, timeout=1)
    time.sleep(2)  # Allow time for Arduino to reset
    print("LED control started. Press Ctrl+C to stop.")
  while True:
        ser.write(b'ON\n')  # Send 'ON' command
        print("LED is ON")
        time.sleep(1)

        ser.write(b'OFF\n')  # Send 'OFF' command
        print("LED is OFF")
        time.sleep(1)
except serial.SerialException as e:
    print(f"Serial error: {e}")
except KeyboardInterrupt:
    print("\nLED control stopped.")
    ser.close()
Arduino Code (LED_Control.ino):
const int ledPin = 13; // Pin connected to the LED
void setup() {
  pinMode(ledPin, OUTPUT); // Set LED pin as output
  Serial.begin(9600); // Initialize serial communication
}
void loop() {
  if (Serial.available() > 0) {
    String command = Serial.readStringUntil('\n');
    command.trim(); // Remove any whitespace
    if (command == "ON") {
      digitalWrite(ledPin, HIGH); // Turn LED on
    } else if (command == "OFF") {
      digitalWrite(ledPin, LOW); // Turn LED off
    }
  }
}
```

Output:

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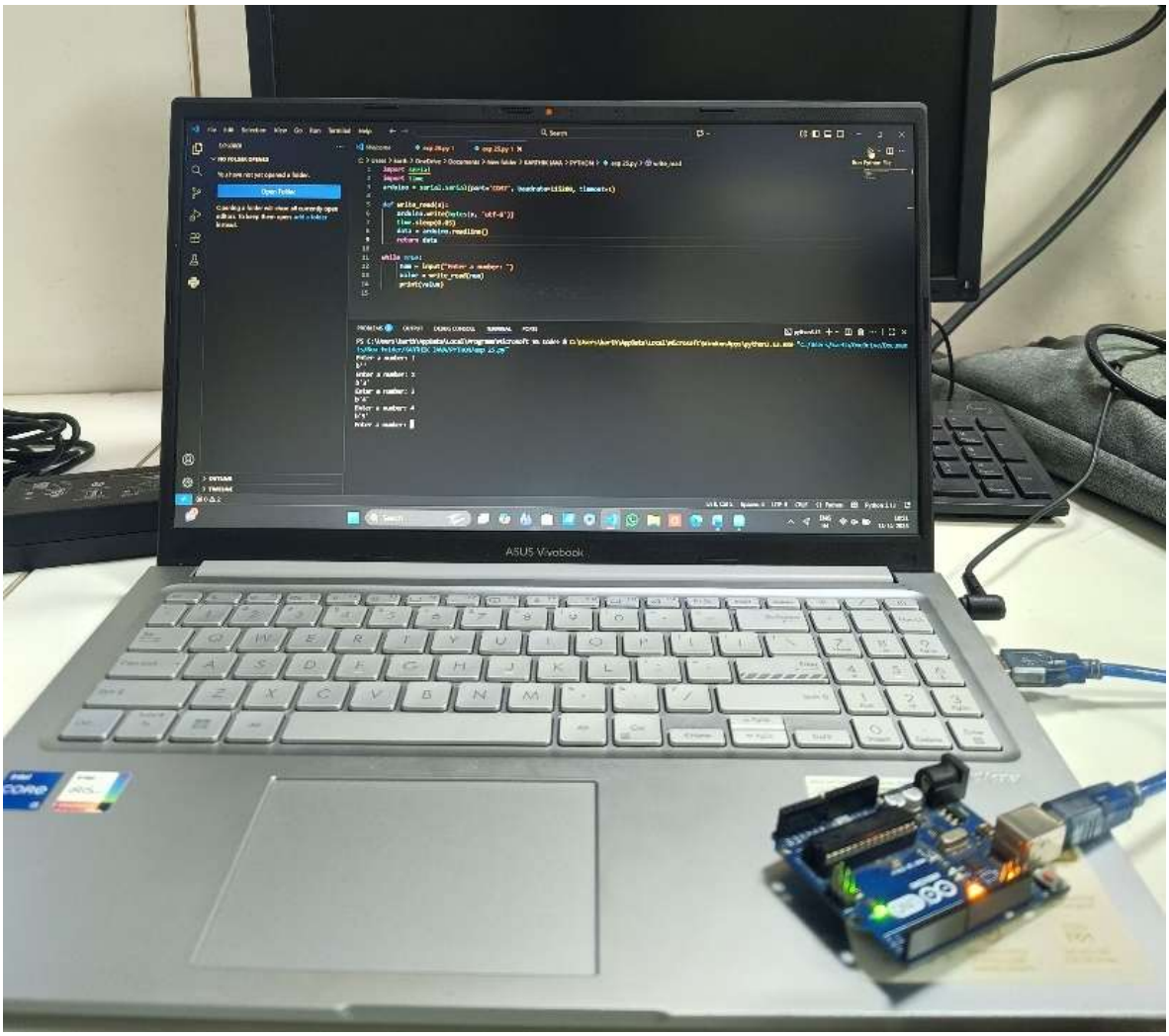

GitHub:
https://github.com/mallaadisrinivasu132035-code/python.git