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| Marwadi University<br>Marwadi Chandarana Group<br>NAAC A+ | **Marwadi University**<br>**Faculty of Engineering & Technology**<br>**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: 92400133055** |

**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
```

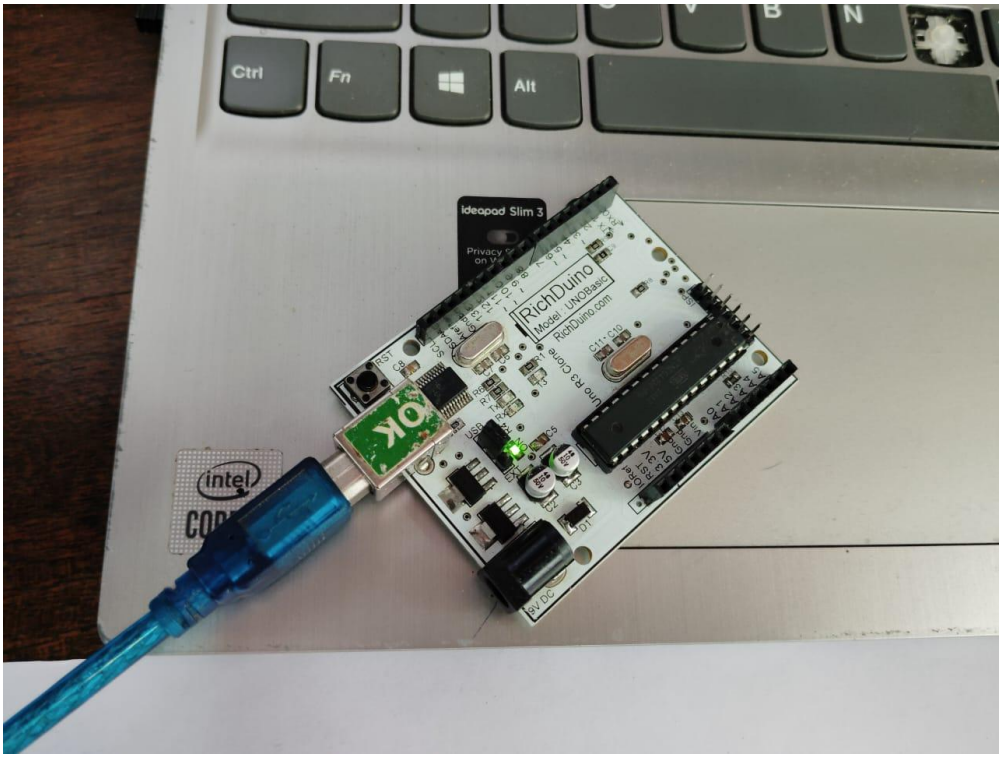
```
    else:
        print("Invalid input! Enter '1', '0', or 'q'.")
```

Test the LED Control:

Type 1 → LED should turn ON.

Type 0 → LED should turn OFF.

Type q → Script exits.



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**Post Lab**

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

**Python Code**

```
import serial
import time

ser = serial.Serial('COM3', 9600, timeout=1)  # Update COM port
time.sleep(2)  # Allow time for connection setup

while True:
    command = input("Enter command (ON/OFF): ").strip()
    if command in ["ON", "OFF"]:
        ser.write((command + '\n').encode())  # Send command
        print(f"Sent: {command}")
    else:
        print("Invalid command. Enter ON or OFF.")

ser.close()
```

**Arduino Uno Code**

```
#define LED_PIN 13

void setup() {
    Serial.begin(9600);
    pinMode(LED_PIN, OUTPUT);
}

void loop() {
    if (Serial.available() > 0) {
        String command = Serial.readStringUntil('\n');
        command.trim();

        if (command == "ON") {
            digitalWrite(LED_PIN, HIGH);
            Serial.println("LED Turned ON");
        } else if (command == "OFF") {
            digitalWrite(LED_PIN, LOW);
            Serial.println("LED Turned OFF");
```

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```
    }
  }
}
```

arduino.py

D: > Ruhaan > Python > college > arduino.py > ...

```python
import serial
import time

ser = serial.Serial('COM13', 9600, timeout=1)  # Update COM port
time.sleep(2)  # Allow time for connection setup

while True:
```

DEBUG CONSOLE TERMINAL PORTS

TERMINAL powershell

```
PS D:\Ruhaan\Python\college> python .\arduino.py
Enter command (ON/OFF/Q): ON
Sent: ON
Enter command (ON/OFF/Q): ON
Sent: ON
Enter command (ON/OFF/Q): OFF
Sent: OFF
Enter command (ON/OFF/Q): OFF
Sent: OFF
Enter command (ON/OFF/Q): Q
PS D:\Ruhaan\Python\college>
```