**KIIT, Deemed to be University**
**School of Computer Engineering**
**Sensors And Automation [EC28005]**

# EXPERIMENT -5

## Aim:

The aim of this experiment is to read an analog sensor value, convert it to a voltage reading, display it on a 16x2 LCD screen, and send the voltage reading to the laptop via serial communication.

## Component/Software Used:

| Component/Software | Specification |
|---|---|
| Arduino Uno | - |
| Bread Board, Cables, Connecting Wires, Laptop/Computer,7 Segment Display,Potentiometer | - |
| Software(s) Used | Arduino IDE 2.2.1 |

## Theory:

### Analog Sensor (Potentiometer):

An analog sensor, such as a potentiometer, generates a variable voltage signal based on the physical quantity being measured. In this experiment, the potentiometer could be used to simulate a real-world sensor.

**Arduino Analog-to-Digital Conversion:**

The "analogRead" function in the code is used to read the analog voltage from the potentiometer. The Arduino's built-in analog-to-digital converter (ADC) converts the analog voltage into a digital value, which can be further processed.

**LED Control:**

The experiment involves controlling an LED based on the sensor input. The LED is turned on or off based on certain conditions or sensor readings.

**Liquid Crystal Display (LCD):**

The 16x2 LCD is utilized to display the sensor readings and the converted voltage value in a readable format. The "LiquidCrystal" library is used to control the display.

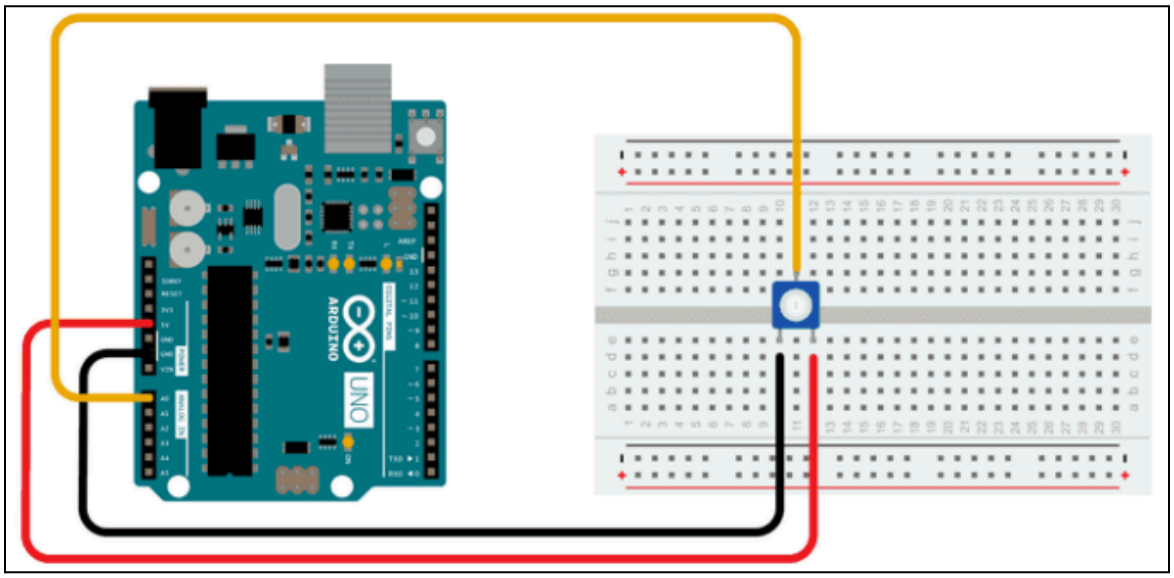
**Serial Communication:**

The serial communication interface of the Arduino is utilized to send the voltage reading to a connected laptop. The "Serial.begin" function initializes serial communication, and "Serial.println" is used to send the voltage value for display on the laptop.

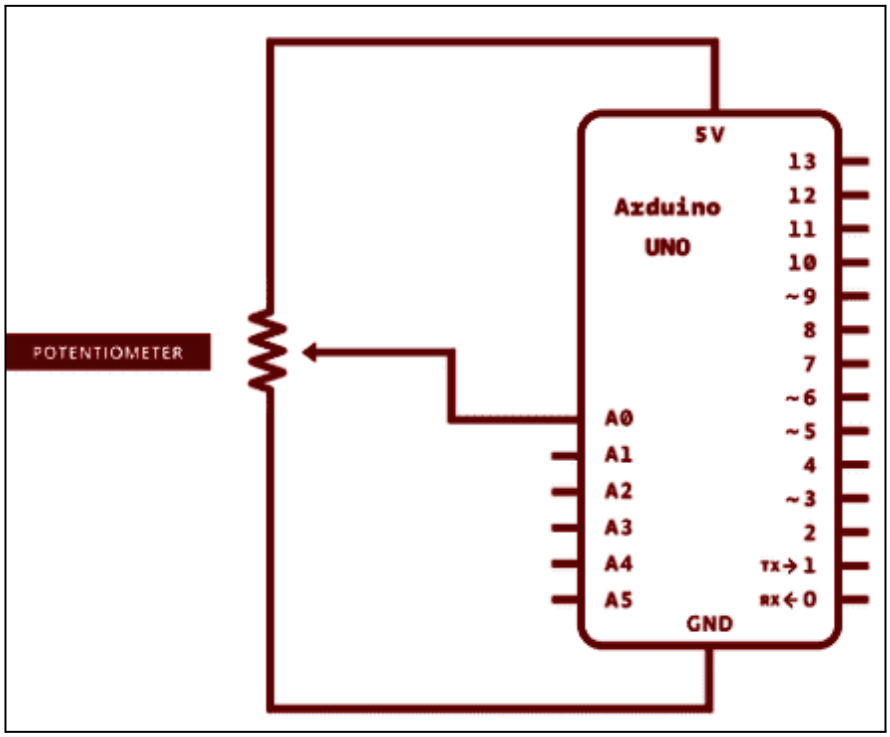
**Principle of Working:**

The principle of working revolves around the interaction of hardware components (analog sensor, LED, LCD) with the Arduino microcontroller, and the execution of specific control logic and communication protocols to achieve the desired functionality of reading, processing, and displaying sensor data.

## Circuit:



## Schematic:



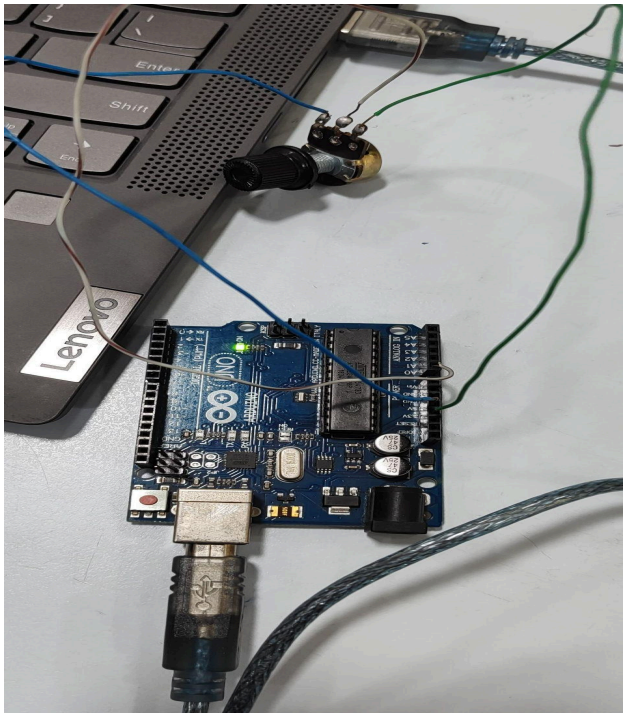
## Program:

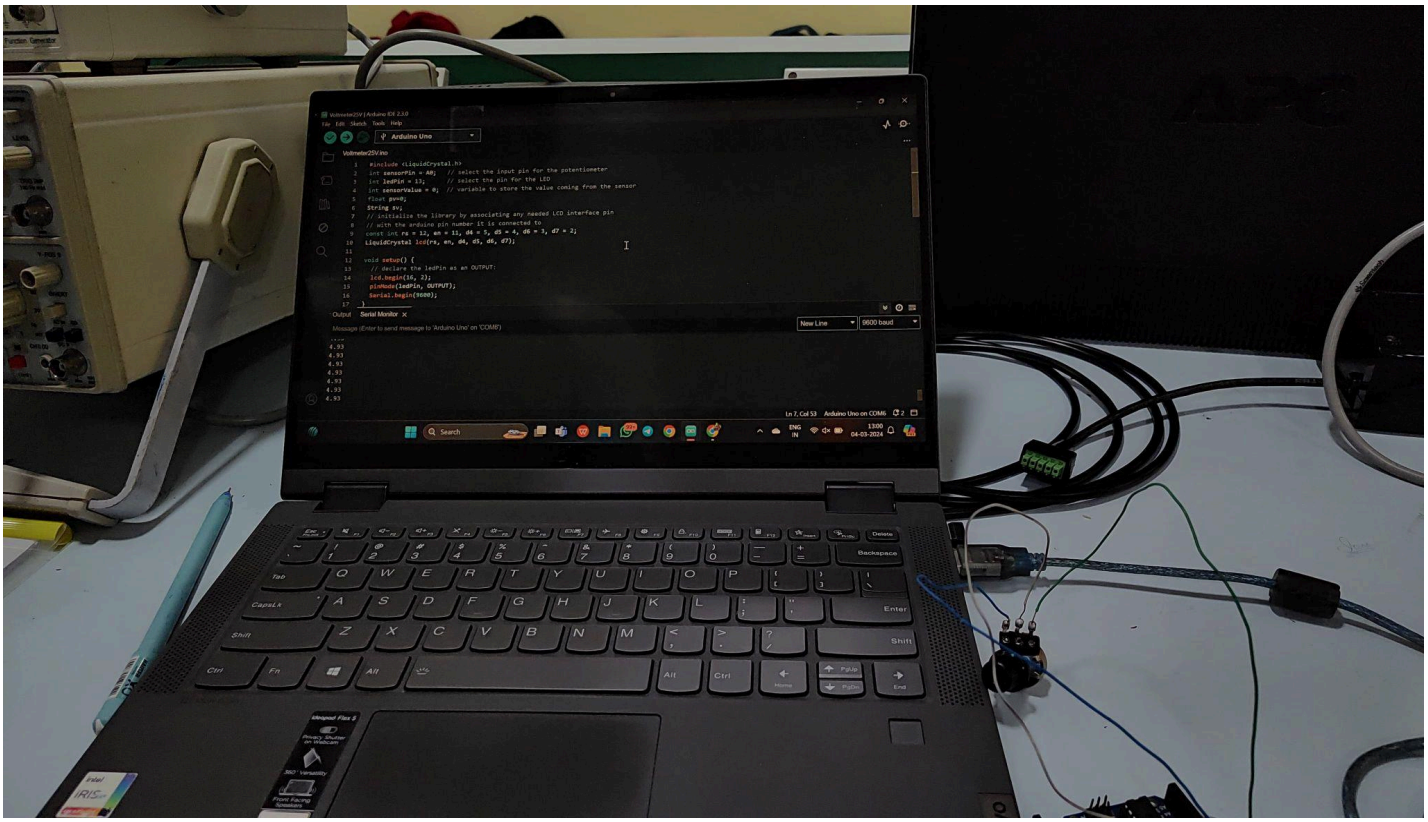
```
#include <LiquidCrystal.h>
int sensorPin = A0;        // select the input pin for the potentiometer
int ledPin = 13;           // select the pin for the LED
int sensorValue = 0;      // variable to store the value coming from the
       sensor
float pv=0;
String sv;
// initialize the library by associating any needed LCD interface pin
// with the arduino pin number it is connected to
const int rs = 12, en = 11, d4 = 5, d5 = 4, d6 = 3, d7 = 2;
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);
void setup() {
  // declare the ledPin as an OUTPUT:
  lcd.begin(16, 2);
  pinMode(ledPin, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  // read the value from the sensor:
  sensorValue = analogRead(sensorPin);
  // turn the ledPin on
sv=sensorValue;
```

```
// Print a message to the LCD.
lcd.clear();
lcd.setCursor(0, 0);
lcd.print(sv);
pv=4.82*sensorValue;
pv=pv/1000;
lcd.setCursor(0, 1);
sv=pv;
lcd.print(sv+"Volt");
Serial.println(sv);
delay(2000);}
```

## Result picture:





## Conclusion:

The conclusion of this experiment demonstrates an integrated system involving an analog sensor (potentiometer), LED control, Liquid Crystal Display (LCD) feedback, and serial communication. The experiment illustrates the practical implementation of sensor interfacing, data processing, and external data visualization using an Arduino microcontroller. The successful execution of this experiment highlights the potential for real-time sensor data acquisition, processing, and display, as well as external data communication for further analysis. Furthermore, it provides a foundation for developing more advanced sensor-based applications and systems using the Arduino platform.

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