This project demonstrates how to create a digital voltmeter using an Arduino and an LCD screen. The Arduino will measure the voltage applied to its analog input pin and display the corresponding voltage value on the LCD screen.

A voltmeter is an essential tool for measuring the potential difference (voltage) between two points in a circuit. By interfacing an LCD, the Arduino can display the measured voltage value, making it easy for users to read.

Circuit Setup:

1. LCD Connections (with I2C interface):

    - VCC of the LCD is connected to 5V on the Arduino.

    - GND of the LCD is connected to GND on the Arduino.

    - SDA (Serial Data) pin of the LCD is connected to A4 on the Arduino (for Uno).

    - SCL (Serial Clock) pin of the LCD is connected to A5 on the Arduino (for Uno).

2. Voltage Measurement:

    - The voltage you want to measure is connected to the analog input pin (e.g., A0) of the Arduino.

    - If you're measuring a voltage above 5V, consider using a voltage divider to reduce the voltage to a measurable range.

Voltage Divider :

If you plan to measure voltages above 5V (the Arduino's ADC reference voltage), you should use a voltage divider to scale down the voltage. Here's a simple voltage divider circuit:

- Connect a resistor (e.g., 10kΩ) between the voltage source (e.g., +12V) and the A0 pin of Arduino.

- Connect another resistor (e.g., 10kΩ) between A0 and GND.

Working Method:

1. Analog-to-Digital Conversion:

   - The Arduino uses its 10-bit ADC (Analog-to-Digital Converter) to read the voltage. The ADC converts the voltage applied to the analog pin (0 to 5V) into a digital value between 0 and 1023.

2. Voltage Calculation:

   - The Arduino code converts the raw ADC value into a voltage using the formula mentioned above. The voltage is then displayed on the LCD screen.

3. LCD Output:

   - The measured voltage is shown on the 16x2 LCD in real-time. The value updates continuously based on the voltage applied to the analog pin.

4. Serial Monitoring:

- The Arduino sends the measured voltage to the Serial Monitor (on your computer), so you can also monitor the values in a text-based format for debugging purposes.