Project 7: Arduino DIY Calculator using a 4*4 Keypad and 16*2 LCD Display

The components used in this project are:

1. **Arduino Uno**

A microcontroller board that acts as the brain of the project. It reads input from the keypad and controls the LCD.

2. **4x4 Keypad**

A 16-button matrix (4 rows × 4 columns) used for inputting numbers and operations (0–9, +, -, *, /, etc.).

3. **16x2 LCD Display**

A screen with 2 rows and 16 columns, used to show inputs, operations, and results of calculations.

4. **Resistor (1 kΩ)**

Used to limit the current, usually connected with an LED or to adjust LCD contrast.

5. **LED (optional)**

A small light-emitting diode, possibly used to indicate power or error states.

6. **Connecting Wires**

Used to make electrical connections between components on the breadboard and Arduino.

7. **Breadboard**

A solderless board used for building and testing the circuit layout easily.

8. **Power Supply (5V)**

Provides the necessary voltage to run the Arduino and other components, usually via USB or external adapter

Description :

The keypad has a total of 8 pins: 4 for the rows (R1–R4) and 4 for the columns (C1–C4). These pins are connected to the Arduino's digital PWM pins 0 through 7.

For the LCD, its data pins DB4 to DB7 are connected to Arduino pins 11, 10, 9, and 8 respectively. The **Enable** pin of the LCD is connected to pin 12 of the Arduino, while the **RS (Register Select)** pin is connected to pin 13.

One of the LCD’s LEDs is connected to the Arduino’s ground through a 1 kΩ resistor. The **Vo** (contrast control) and **GND** pins of the LCD are also connected to the Arduino's ground. Additionally, the **Vo** and **RW** (Read/Write) pins are shorted together and grounded.

Finally, the **Vcc** and the other LED pin of the LCD are shorted and connected to the Arduino's 5V pin to power the display.