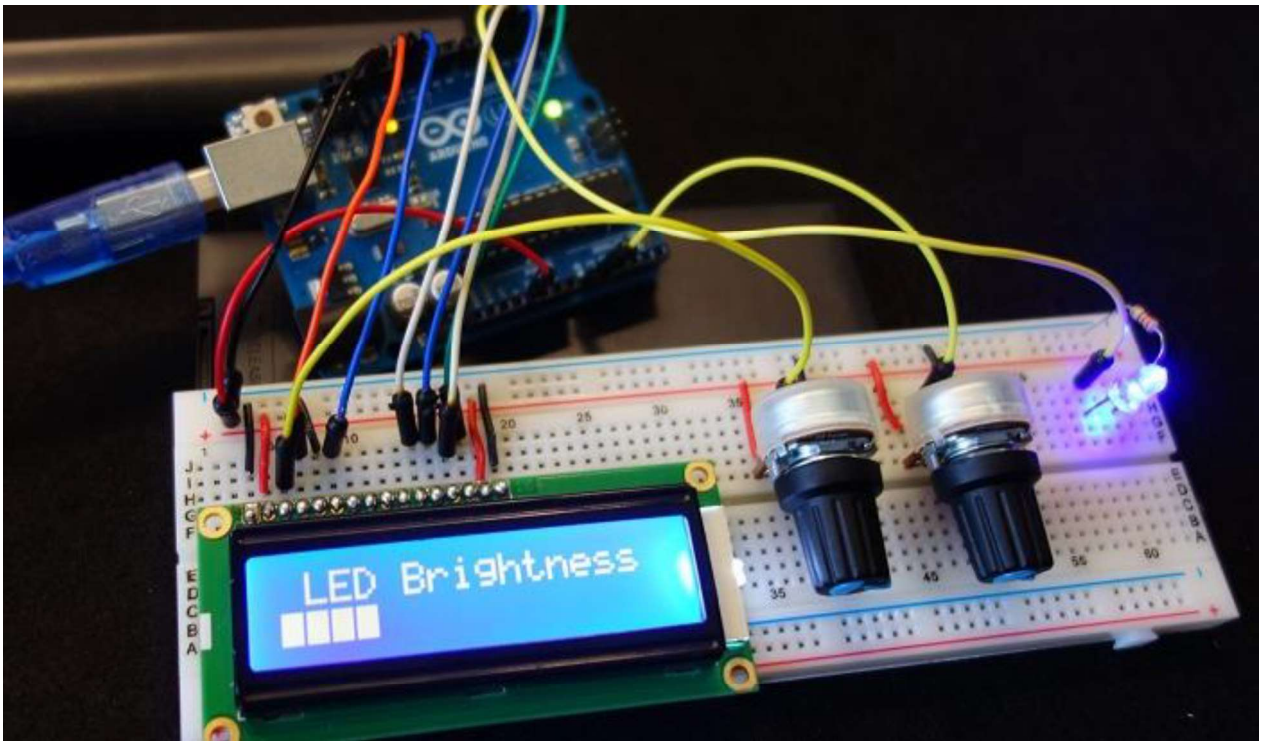
Project 12
LED Brightness on a 16x2 LCD



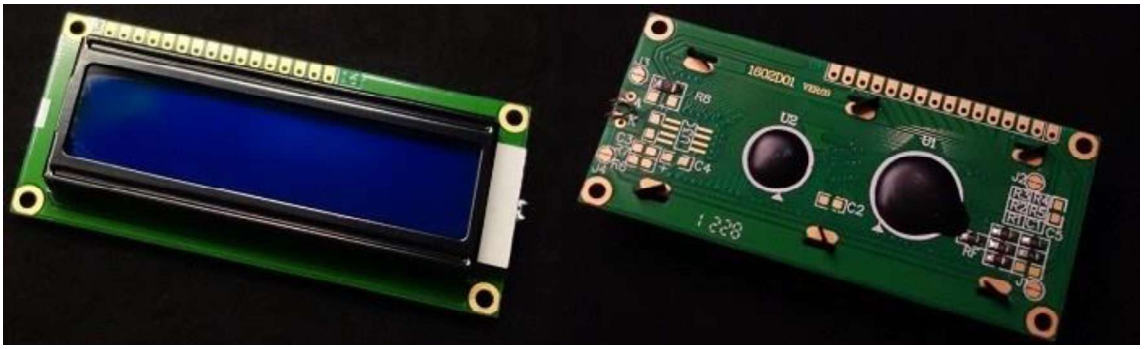
View code on GitHub	Click here

Introduction

This is a beginner project where you'll use a 16×2 LCD to display the LED brightness. Shortly, in this project we'll control an LED brightness using a potentiometer. The LED brightness will be displayed on the LCD screen using a progress bar

Introducing the LCD

The simplest and inexpensive way to display information is with an LCD (liquid crystal display). These are found in everyday electronics devices such as vending machines, calculators, parking meters, printers, and so on. These are ideal for displaying text or small icons. The figure below shows a 16×2 LCD front and back view.



This LCD has 2 rows, and each row can display 16 characters. It also has LED backlight to adjust the contrast between the characters and the background.

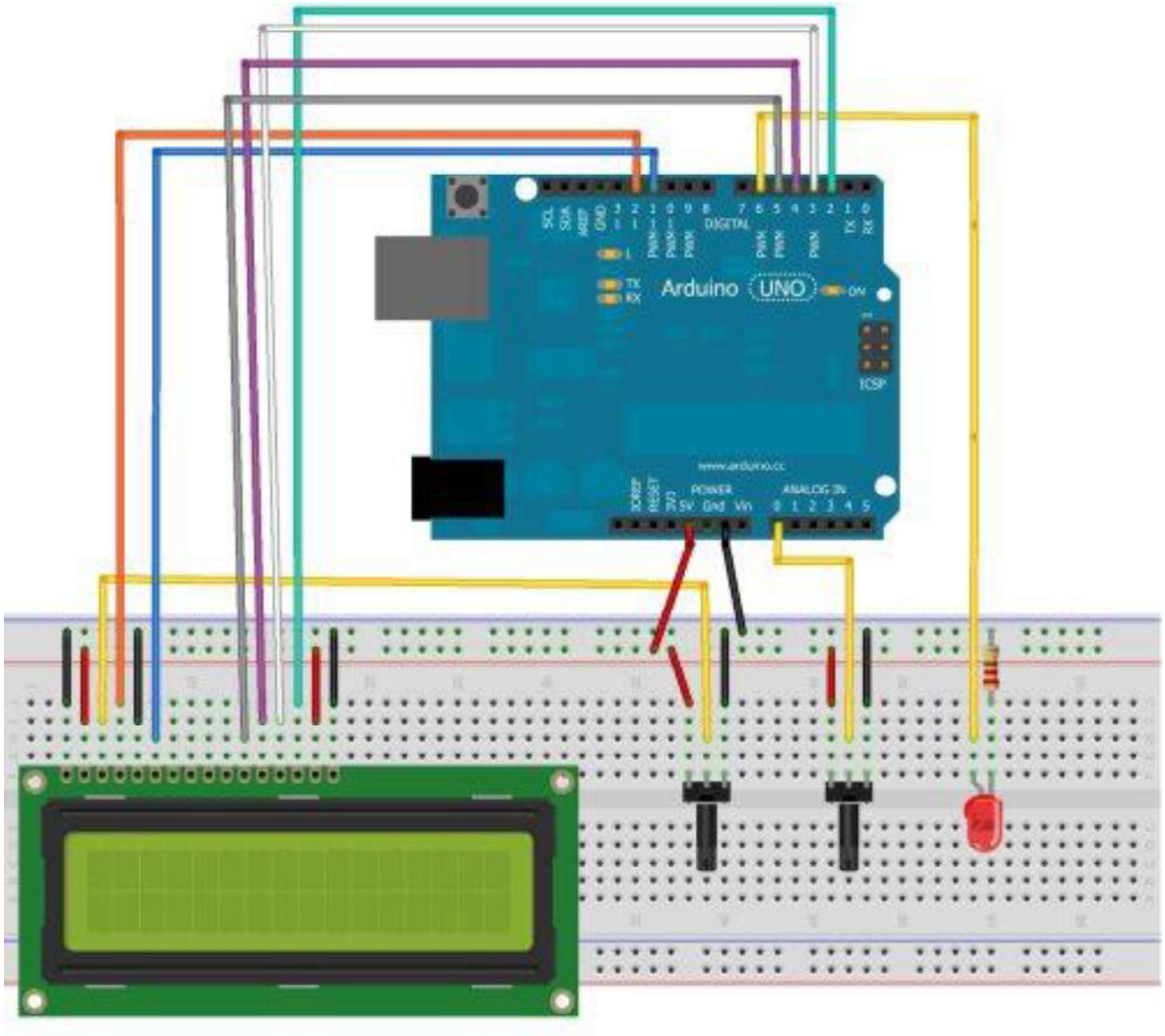
Parts Required

For this project you need the following parts:

- Arduino UNO – read Best Arduino Starter Kits
- 1x Breadboard
- 1x LCD 16×2
- 2x 10k Ohm Potentiometers
- 1x 5mm LED
- 1x 220Ohm Resistor
- Jumper wires

Schematics

Wire all the parts by following the next schematic diagram.



The next table shows a brief description of each pin of the LCD display. Make sure your LCD uses the same pinout.

INTERFACE PIN CONNECTIONS

Pin No.	Symbol	Level	Description
1	VSS	---	Ground for Logic (0V)
2	VDD	---	Power supply for Logic (+5.0V)
3	V0	---	Power supply for LCD drive
4	RS	H/L	Register selection (H:Data register,L:Instruction register)
5	R/W	H/L	Read/Write selection (H:read,L:Write)
6	E	H/L⟶L	Enable signal for LCM
7~14	DB0~DB7	H/L	Data Bus Lines
15	LEDA	---	Power supply for backlight(+5.0V)
16	LEDK	---	Power supply for backlight(-)

Code

Copy the following code and upload it to your Arduino board. The code is well commented so that you can easily understand how it works, and modify it to include in your own projects.

View code on GitHub

```
// include the library code
#include <LiquidCrystal.h>

// initialize the library with the numbers of the interface pins
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);
int potPin = A0;       // Analog pin 0 for the LED brightness potentiometer
int ledPin = 6;        // LED Digital Pin with PWM
int potValue = 0;      // variable to store the value coming from the potentiometer
int brightness = 0;    // converts the potValue into a brightness
int pBari = 0;         // progress bar
int i = 0;             // foor loop

//progress bar character for brightness
byte pBar[8] = {
  B11111,
  B11111,
  B11111,
  B11111,
  B11111,
  B11111,
```

```
  B11111,
};

void setup() {
  // setup our led as an OUTPUT
  pinMode(ledPin, OUTPUT);
  // set up the LCD's number of columns and rows:
  lcd.begin(16, 2);
  // Print a message to the LCD
  lcd.print(" LED Brightness");
  //Create the progress bar character
  lcd.createChar(0, pBar);
}

void loop() {
  // clears the LCD screen
  lcd.clear();
  // Print a message to the LCD
  lcd.print(" LED Brightness");
  //set the cursor to line number 2
  lcd.setCursor(0,1);
  // read the value from the potentiometer
  potValue = analogRead(potPin);
  // turns the potValue into a brightness for the LED
  brightness=map(potValue, 0, 1024, 0, 255);
  //lights up the LED according to the bightness
  analogWrite(ledPin, brightness);
  // turns the brighness into a percentage for the bar
  pBari=map(brightness, 0, 255, 0, 17);
  //prints the progress bar
  for (i=0; i<pBari; i++)
  {
    lcd.setCursor(i, 1);
    lcd.write(byte(0));
  }
  // delays 750 ms
  delay(750);
}
```