Experiment No. - 7

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Branch: BE-CSE(LEET)
Semester: 6th
Subject Name: IOT Lab

UID: 21BCS8129
Section/Group:20BCS-ST-801/B
Date of Performance: 21/04/2023
Subject Code: 20CSP-358

1. **Aim:**
   To display Hello World on LCD using Arduino Uno.
2. **Objective:**
   a. Learn about IOT Based Simulation.
   b. Learn about IoT circuitry.
3. **Requirements:**
   a. Arduino Uno R3 board
   b. LCD 16x2
   c. USB or 5V Power Supply
   d. Jumper Wires

4. **Procedure:**

About LCD:

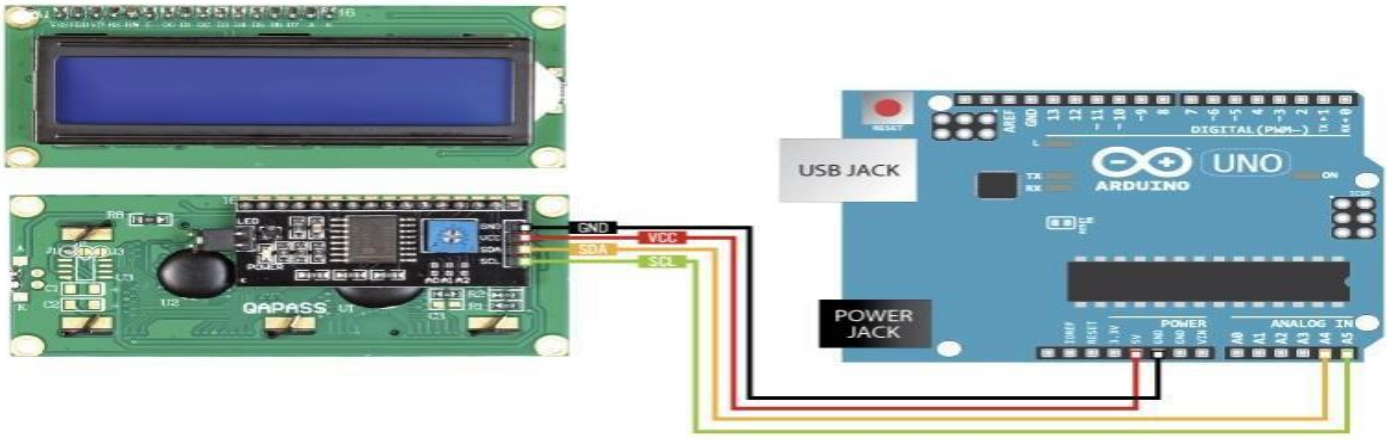
A Liquid Crystal Display commonly abbreviated as LCD is basically a display unit built using Liquid Crystal technology. To display output values and messages.

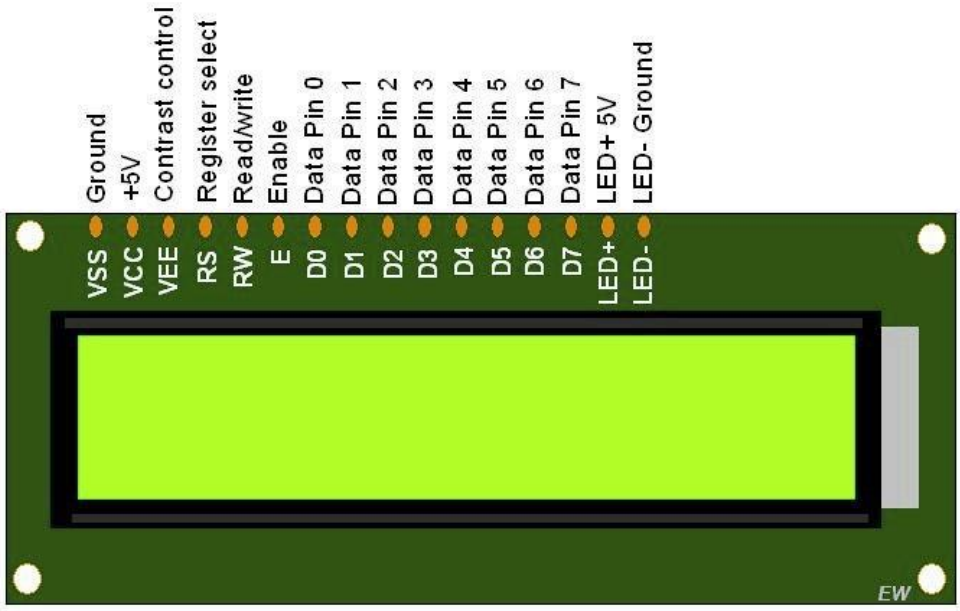
JHD162A is a 16×2 LCD module based on the HD44780 driver from Hitachi. The JHD162A has 16 pins and can be operated in 4-bit mode or 8-bit mode. Here we are using the LCD module in 4-bit mode.

About Arduino Uno:

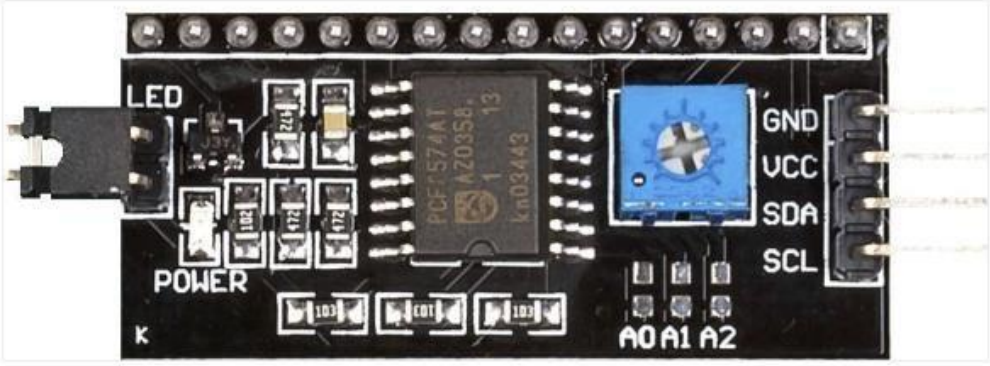
Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst-case scenario you can replace the chip for a few dollars and start over again.

Circuit Diagram:





SDA – Serial Data



SCL – Serial Clock

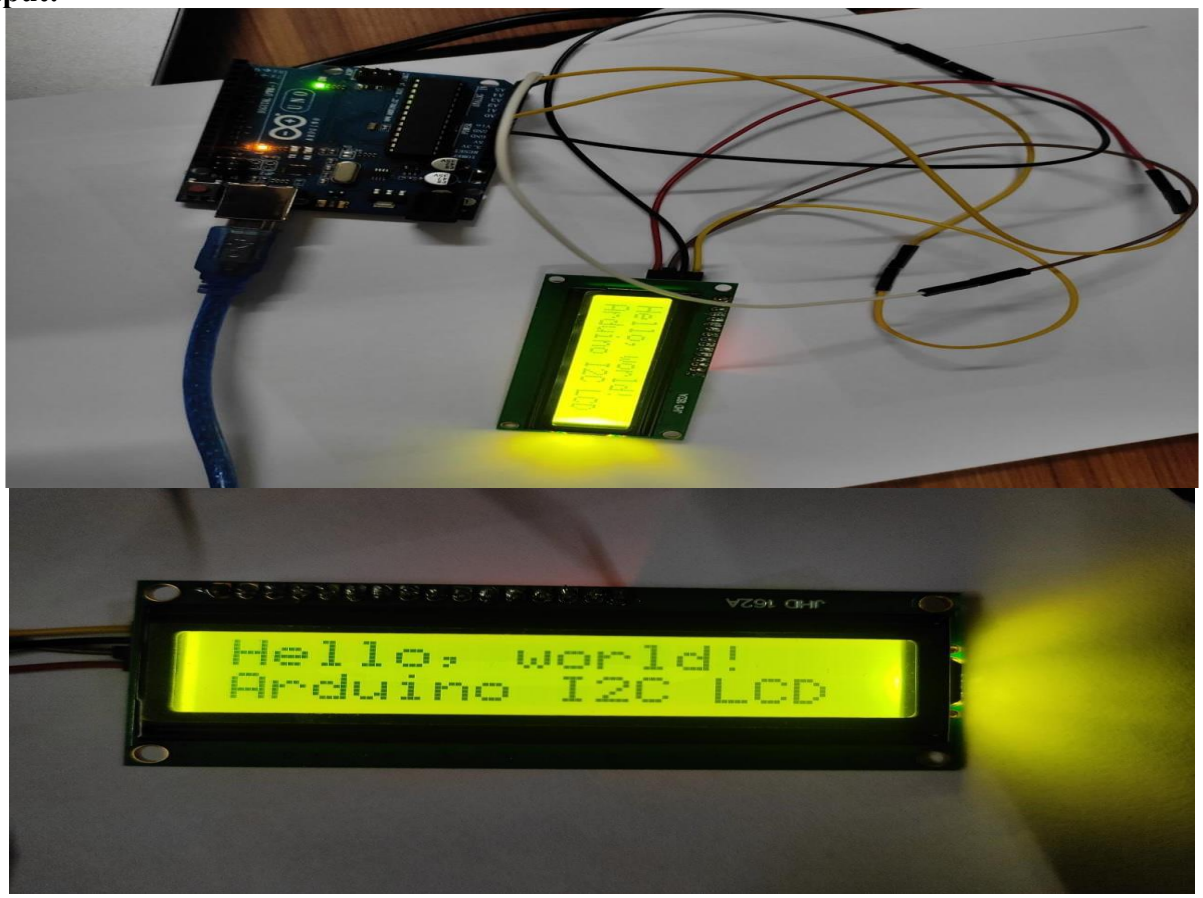
This is just two wires, called SCL and SDA. SCL is the clock line. It is used to synchronize all data transfers over the I2C bus. SDA is the data line. The SCL & SDA lines are connected to all devices on the I2C bus.

5. Steps/Program:

```
#include <LiquidCrystal.h>
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);

void setup(){
  lcd.begin(16,2);
}
void loop(){
  lcd.setCursor(0,0);
  lcd.print("Hello, World!");
  lcd.setCursor(0,1);
  lcd.print("Arduino 12C LCD");
}
```

6. Output:



Learning outcomes (What I have learnt):

- Learnt about LED.
- Learnt about IoT programming.
- Printed Hello World message on LED Display.

Evaluation Grid (To be created per the faculty's SOP and Assessment guidelines):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.	Worksheet completion including writing learning objectives/Outcomes. (To be submitted at the end of the day).		
2.	Post-Lab Quiz Result.		
3.	Student Engagement in Simulation/Demonstration/Performance and Controls/Pre-Lab Questions.		
	Signature of Faculty (with Date):	Total Marks Obtained:	