NIELIT, Gorakhpur

Course Name: A-level (1st Sem.) **Subject: IoT**

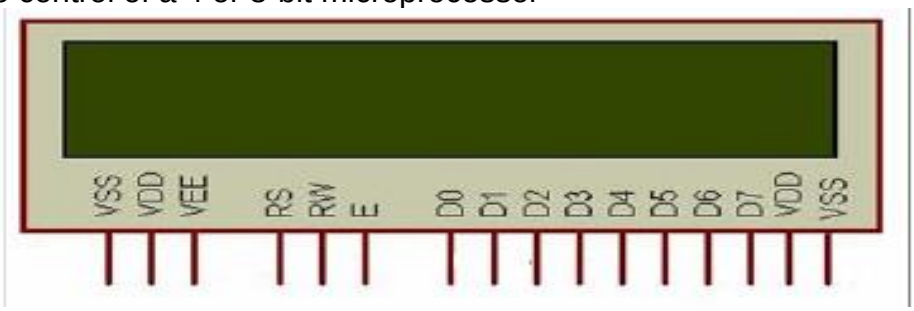
Topic: LCD interfacing with Arduino **Date: 20.03.2020**

Introduction

. A liquid crystal display (LCD) is a thin, flat panel used for electronically displaying information such as text, images, and moving pictures

LCDs are economical and easy to use device. These are most commonly used display devices in an embedded system. Commonly available display are set up as 16 to 20 characters by 1 to 4 line.

LCD used here has HD44780 dot matrix lcd controller. It is also called 16x2 Alpha Numeric LCD. It can be configured to drive a dot-matrix liquid crystal display under the control of a 4 or 8-bit microprocessor



Pin	Description
Vss	Ground
Vdd	Supply Voltage
Vee	Contrast Voltage
RS	Register Select
RW	Read/Write
E	Enable
D0-D7	Bidirectional Data Bus
Vdd,Vss	Back Light Supply

Control Pins

Register Select
If RS=0; Command Register
If RS=1; Data Register
Read/Write Select
If RW=0; Write Mode
If RW=1; Read Mode
Enable
Used to latch the data present on the data pins
A high-to-low edge is needed to latch the data

Data Pins

Data Lines
There are 8 data pins from D0 to D7
Bidirectional Data / Command Pins
Alpha Numeric Character are sent in ASCII format
We can use LCD either 8 bit mode or 4 bit mode
We use 4 bit mode: only D4 to D7 data pins are used

Functions Used

1. LiquidCrystal object_name(rs,rw,en,d0,d1,d2,d3,d4,d5,d6,d7)
   LiquidCrystal object_name(rs,rw,en,d4,d5,d6,d7)

   - This function defines an object named object_name of the class LiquidCrystal.
   - rs, rw and en are the pin numbers of the Arduino board that are connected to rs, rw and en of LCD.
   - d0, d1, d2, d3, d4, d5, d6 and d7 are the pin numbers of the Arduino board that are connected to data pins D1, D2, D3, D4, D5, D6 and D7 of LCD.
   - Example, LiquidCrystal lcd(13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3). This makes use of LCD in 8-bit mode.
   - Example, LiquidCrystal lcd(13, 12, 11, 6, 5, 4, 3). This makes use of LCD in 4-bit mode.

2. *lcd.*begin(cols,rows)

   - This function is used to define the number of rows and columns the LCD has and to initialize the LCD.
   - Needs to be called before calling other functions, once the object is defined using the function in point 1.
   - Example, for 16x2 LCD we write *lcd*.begin(16,2). *lcd* is the name of the object of the class LiquidCrystal. 16 is the number of columns and 2 is the number of rows.

3. *lcd.set*Cursor(col,row)

- This function positions the cursor of the LCD to a location specified by the row and column parameters.
- col is the column number at which the cursor should be at (0 for column 1, 4 for column 5 and so on).
- row is the row number at which the cursor should be at (0 for row 1, 1 for row 2).
- Example, for setting the cursor at the 5th column in the 2nd row, *lcd.*setCursor(4,1). *lcd* is the name of the object of the class LiquidCrystal.

4 . lcd.print(“”)

Print text to lcd

Exercise:

1) Write a programme to display text (NIELIT) on LCD screen