Embedded Systems Lab 8

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Q1. Interface force sensor with Arduino board and display the amount of force given as input to sensor in LCD screen. Also, interface LED RGB and change color of the LED based on some threshold values.

Aim: To interface a force sensor with Arduino board and displaying the amount of force given as input to sensor in LCD screen. To interface LED RGB and changing color of the LED based on some threshold values.

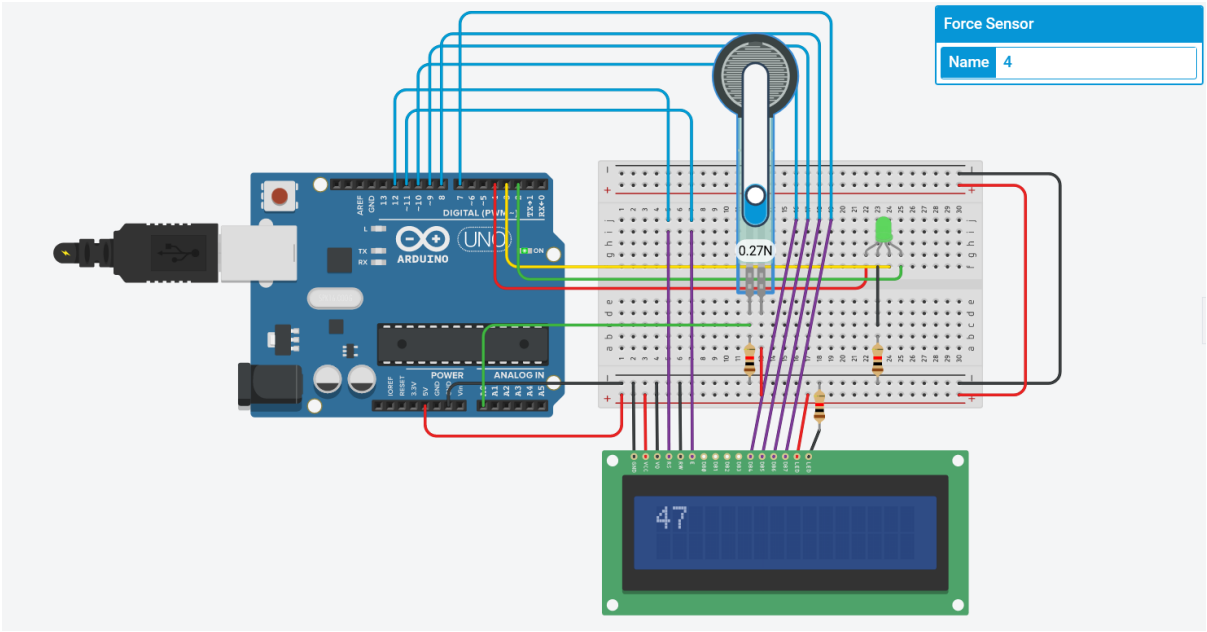
Link: https://www.tinkercad.com/things/iMQ2YJXjJjz

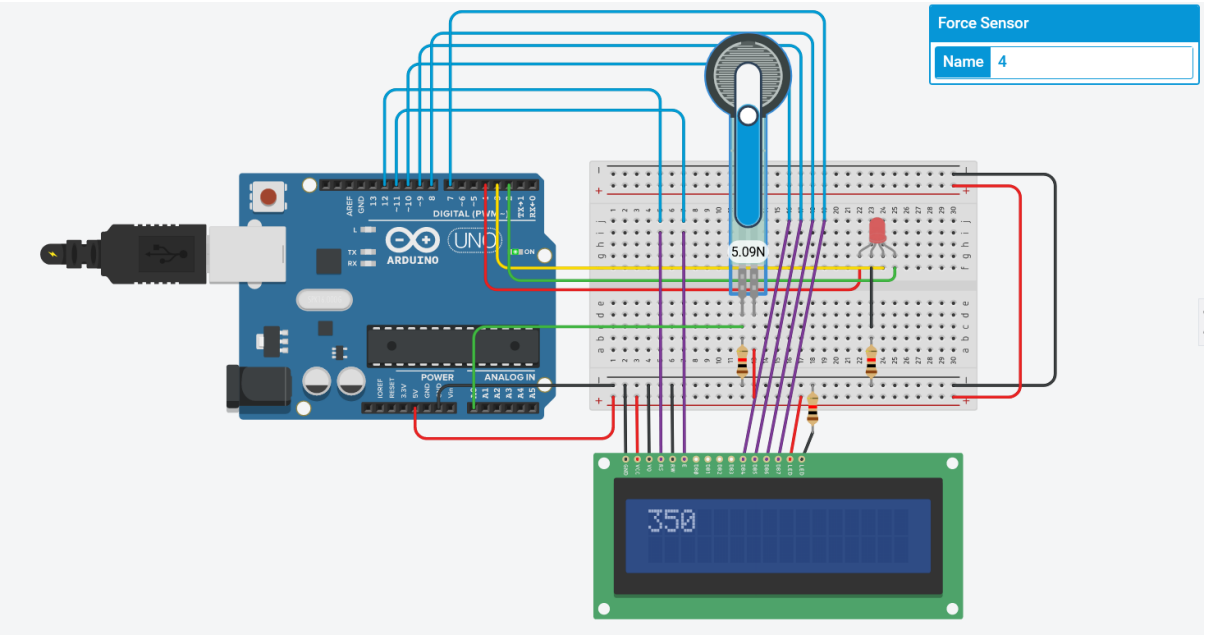
Code:

```
#include<LiquidCrystal.h>
LiquidCrystal lcd(12, 11, 10, 9, 8, 7);

int force = 0;
int red = 4;
int blue = 3;
int green = 2;
void setup()
{
  lcd.begin(16, 2);
  pinMode(A0, INPUT);
  pinMode(green, OUTPUT);
  pinMode(red, OUTPUT);
  pinMode(blue, OUTPUT);
  Serial.begin(9600);
}

void loop()
{
  force = analogRead(A0);
  Serial.println(force);
  lcd.clear();
  lcd.print(force);
  if(force<100){
    digitalWrite(green, HIGH);
    digitalWrite(blue, LOW);
    digitalWrite(red, LOW);
  }else if(force < 300){
```

```
    digitalWrite(green, LOW);
    digitalWrite(blue, HIGH);
    digitalWrite(red, LOW);
  }else{
    digitalWrite(green, LOW);
    digitalWrite(blue, LOW);
    digitalWrite(red, HIGH);
  }
  delay(1000);
}
```

Output:




Force Sensor
Name
4
5.09N
ARDUINO
UNO
POWER
ANALOG IN
350

Q2. Interface the keypad and tilt sensor with Arduino board, if the sensor is being tilted, then take input from keypad and print it in the LCD.

Aim: To interface a keypad and tilt sensor with Arduino board, if the sensor is being tilted, the taking input from keypad and printing it in the LCD.

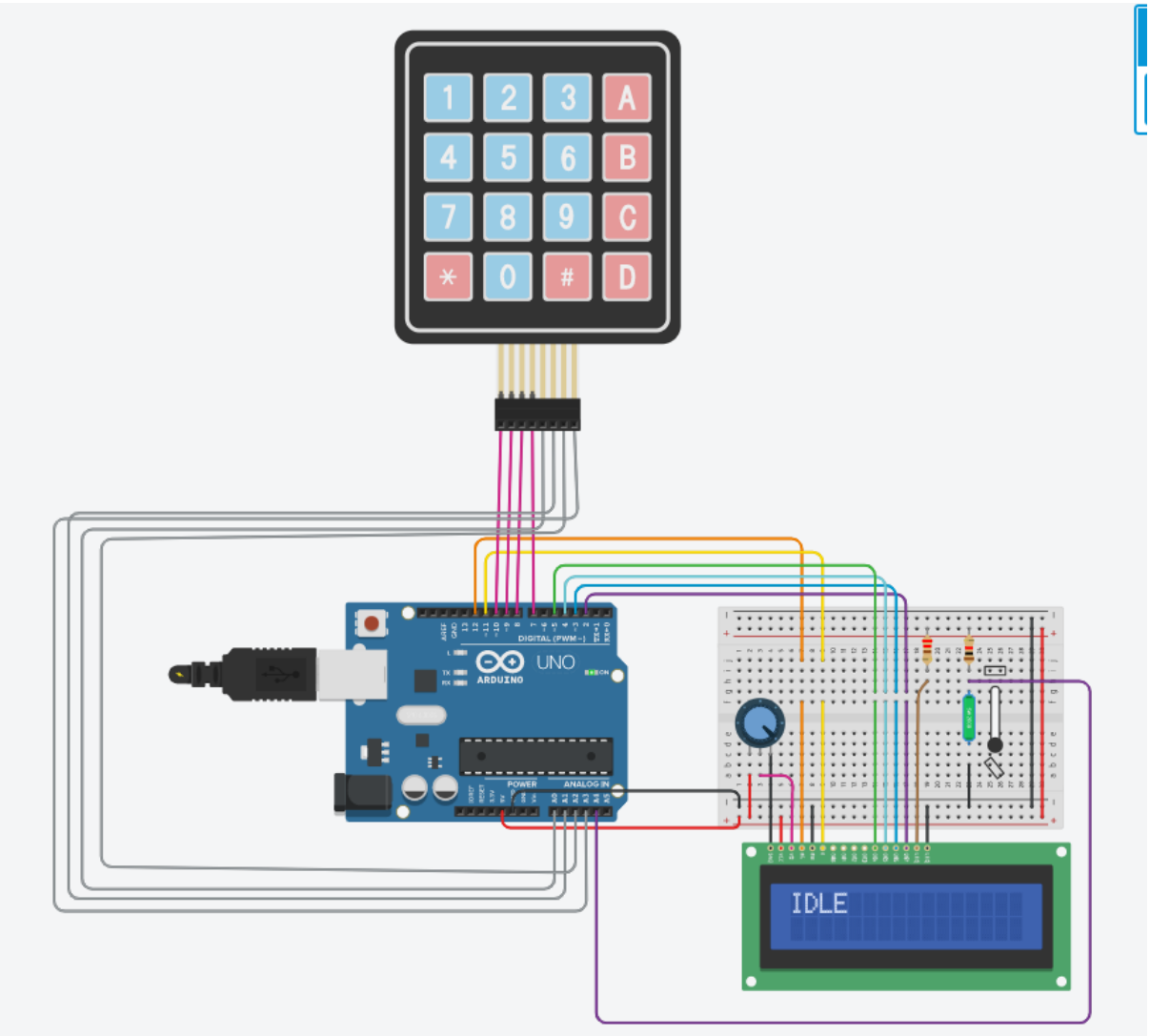
Link: https://www.tinkercad.com/things/4HOR9gDoABS

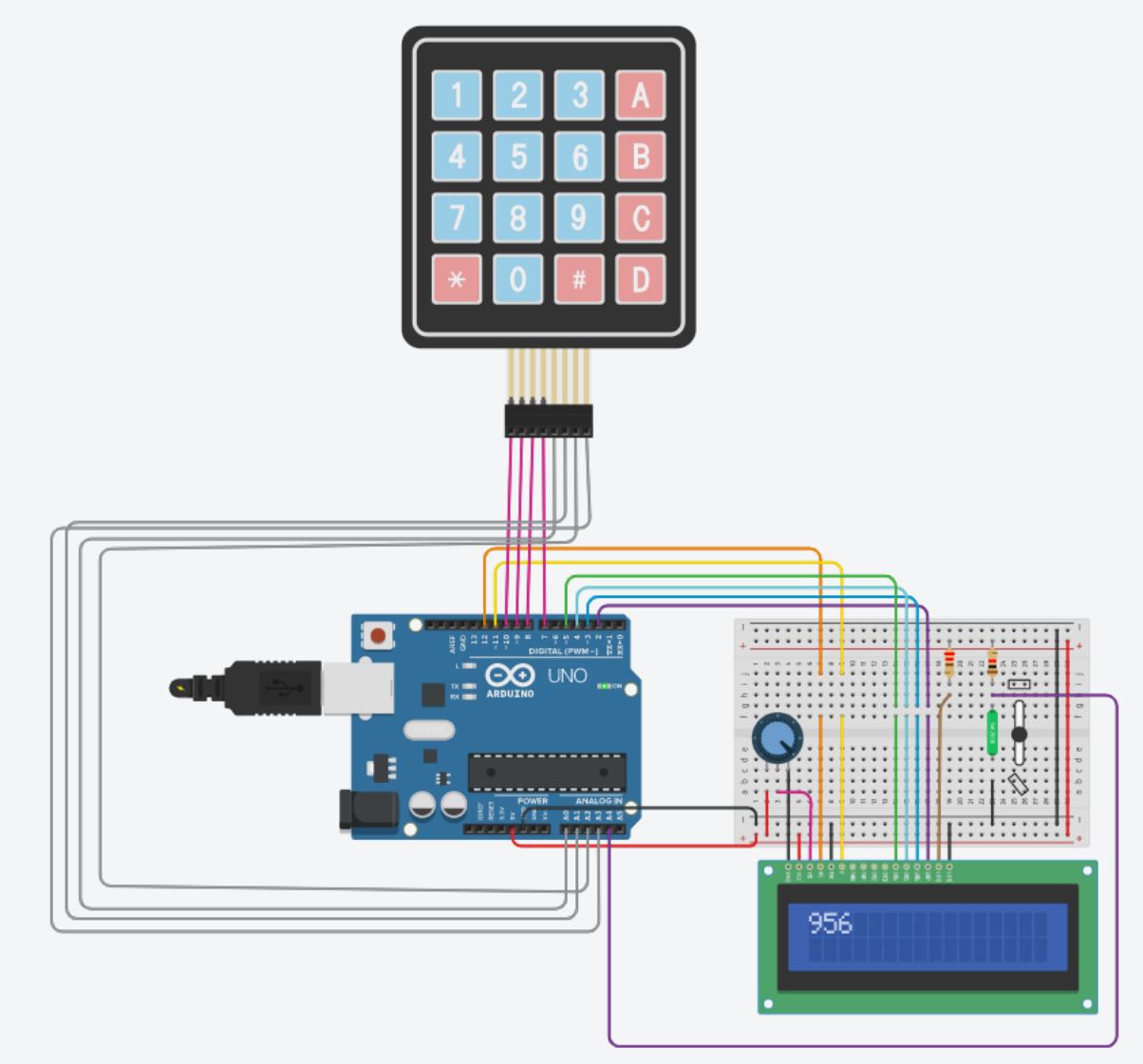
Code:

```
#include <LiquidCrystal.h>
#include <Keypad.h>

const byte numRows= 4; //number of rows on the keypad
const byte numCols= 4; //number of columns on the keypad

//keymap defines the key pressed according to the row and
columns just as appears on the keypad
char keymap[numRows][numCols]=
{
{'1', '2', '3', 'A'},
{'4', '5', '6', 'B'},
{'7', '8', '9', 'C'},
{'*', '0', '#', 'D'}
};

//Code that shows the the keypad connections to the arduino
terminals
byte rowPins[numRows] = {10,9,8,7}; //Rows 0 to 3
byte colPins[numCols]= {A0,A1,A2,A3}; //Columns 0 to 3

//initializes an instance of the Keypad class
Keypad myKeypad= Keypad(makeKeymap(keymap), rowPins,
colPins, numRows, numCols);


LiquidCrystal lcd(12, 11, 5, 4, 3, 2);
int tilt = A4;
```

```
char buf[16]={0};
int cnt =0;

void setup() {
  Serial.begin(9600);
  lcd.begin(16, 2);
  pinMode(tilt, INPUT);
}


void loop() {
  int reading = analogRead(tilt);


  char keypressed = myKeypad.getKey();

  Serial.println(reading);

  if(reading>100){

    buf[cnt] = keypressed;
    if(keypressed != 0) cnt++;
    cnt%=16;
    buf[cnt]=0;
    lcd.clear();
    lcd.print(buf);

  }else{
    lcd.clear();
    lcd.print("IDLE");
  }

  delay(50);
}
```

Output:




1 2 3 A
4 5 6 B
7 8 9 C
* 0 # D
UNO
ARDUINO
956