Embedded Systems Lab 8

Name: Anurag Goyal

Roll No.: 106119014

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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:

Graphical user interface, diagram

Description automatically generated

Diagram

Description automatically generated

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:

Diagram, schematic

Description automatically generated

Diagram

Description automatically generated