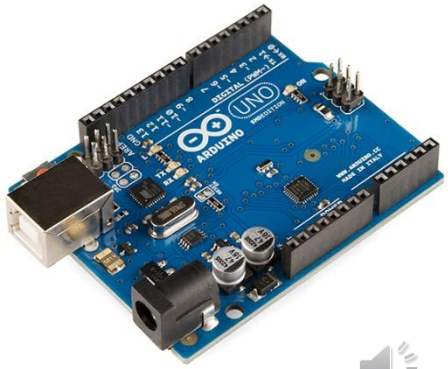
Task 6 - Room Access Monitoring

COMPLEX EMBEDDED SYSTEMS LAB

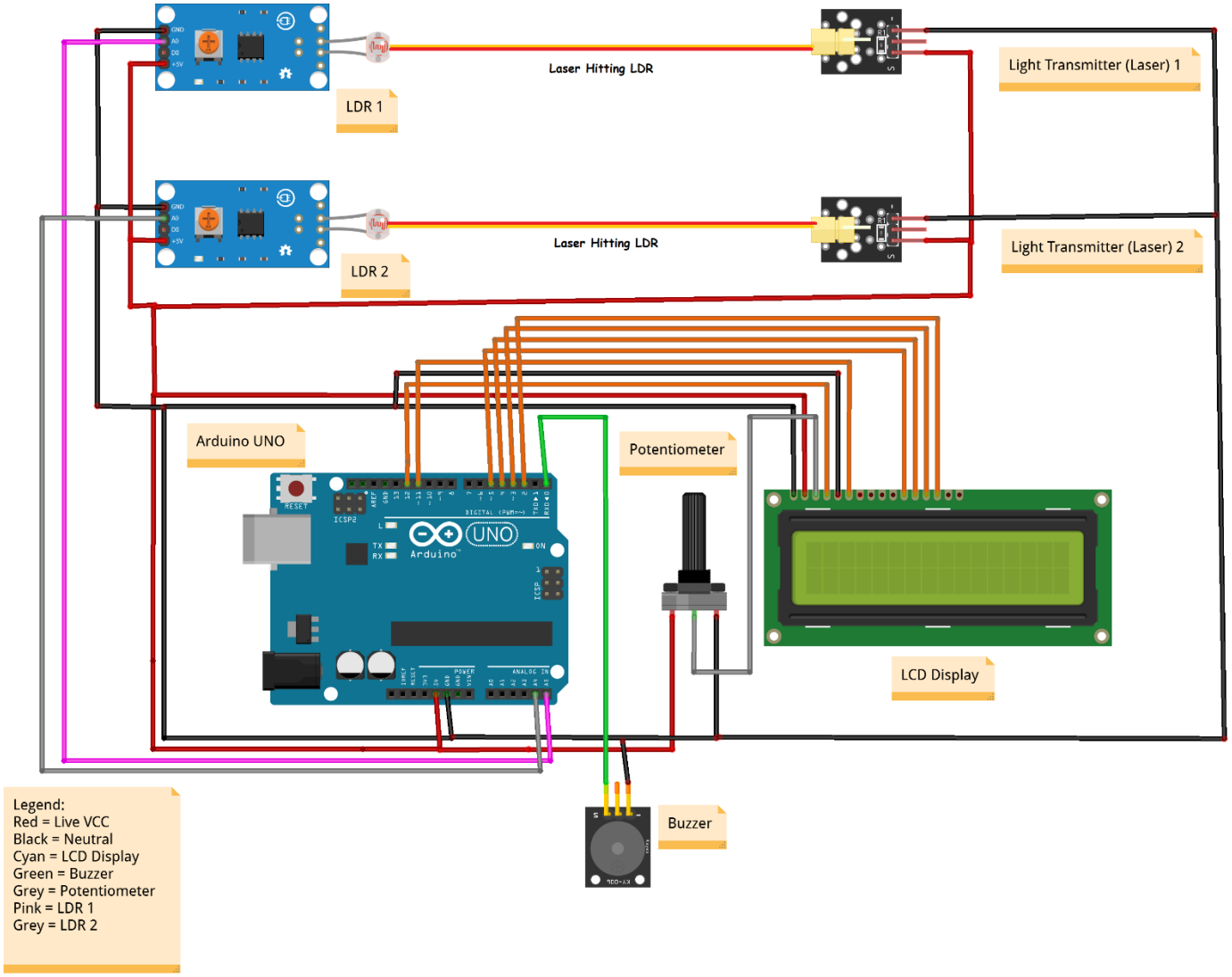


What is the Project About ?

- Develop a system that monitors the number of people present in a room
- If a maximum number of people is exceeded, a step-by-step notification system should inform about the violation of this rule
- How to recognize not only when a person enters but also leaves the room to decrease the counter.

Phase One

The Hardware Setup

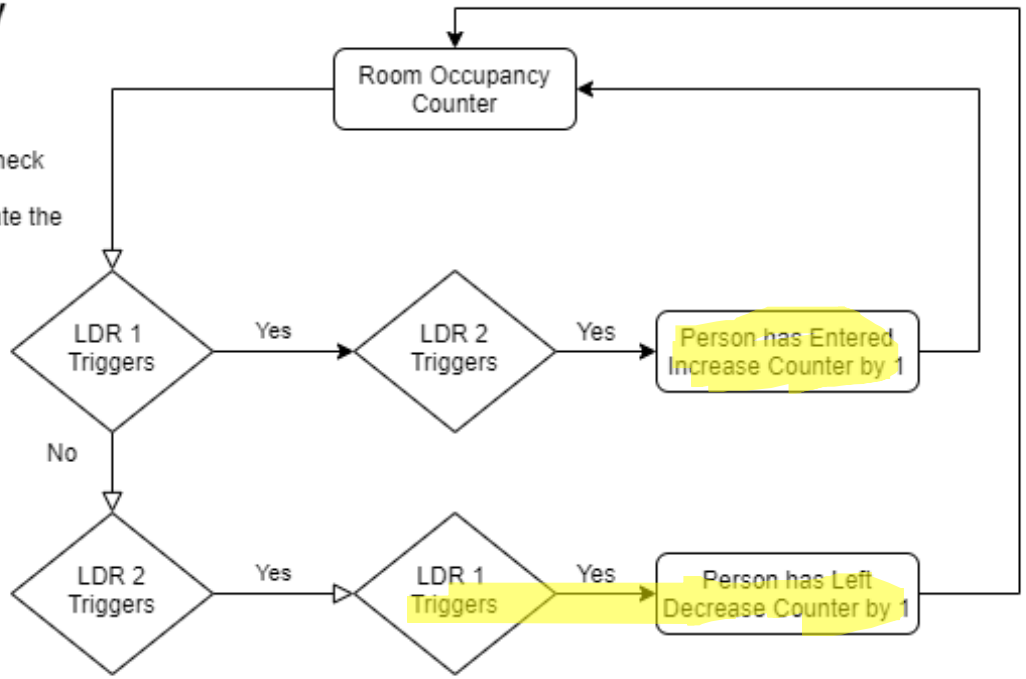


Phase One

The Design And Required Hardware

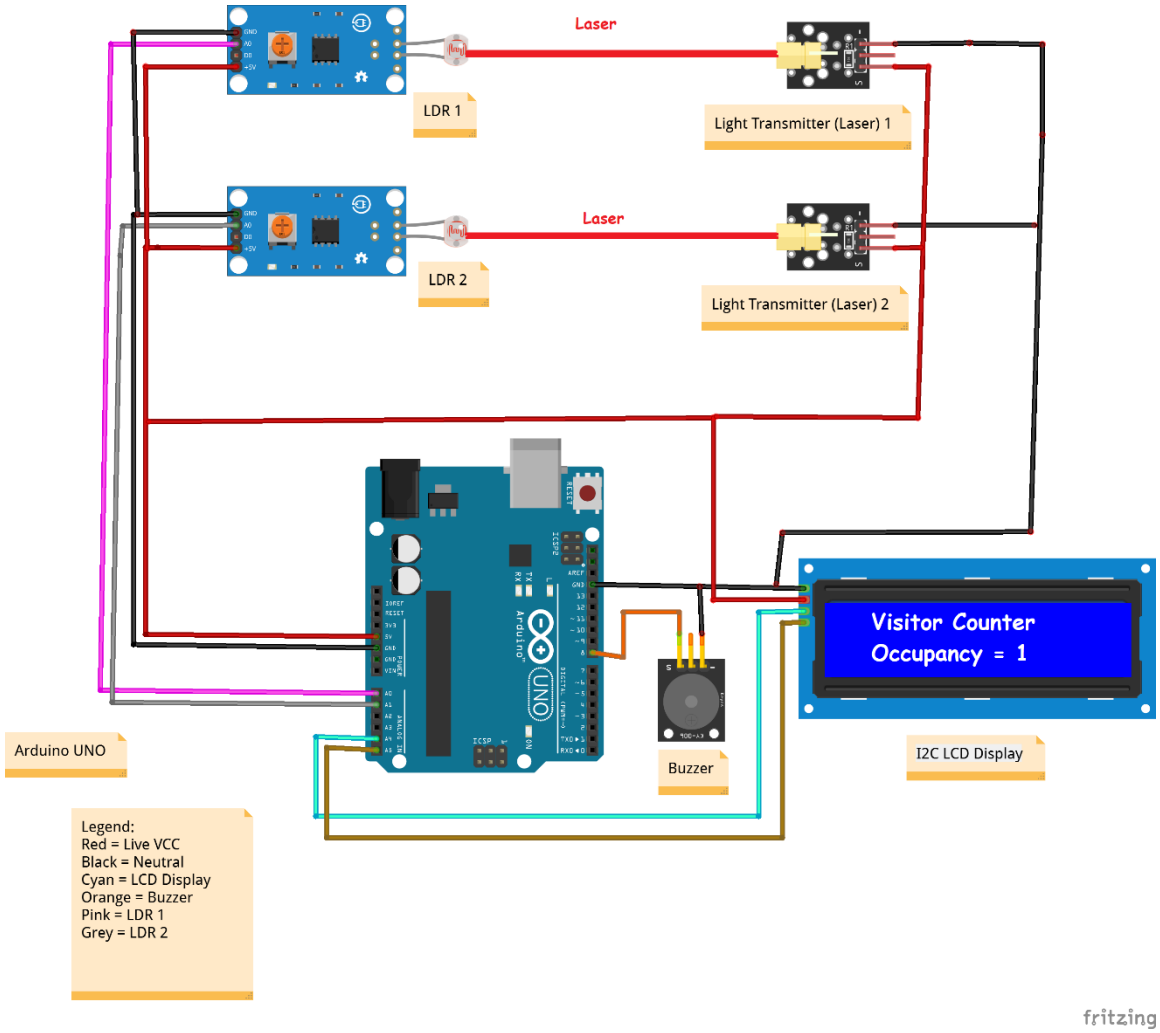
Room Occupancy Counter

Loop runs continuously to check the value of LDRs and Update the Counter at Real time.



Phase One

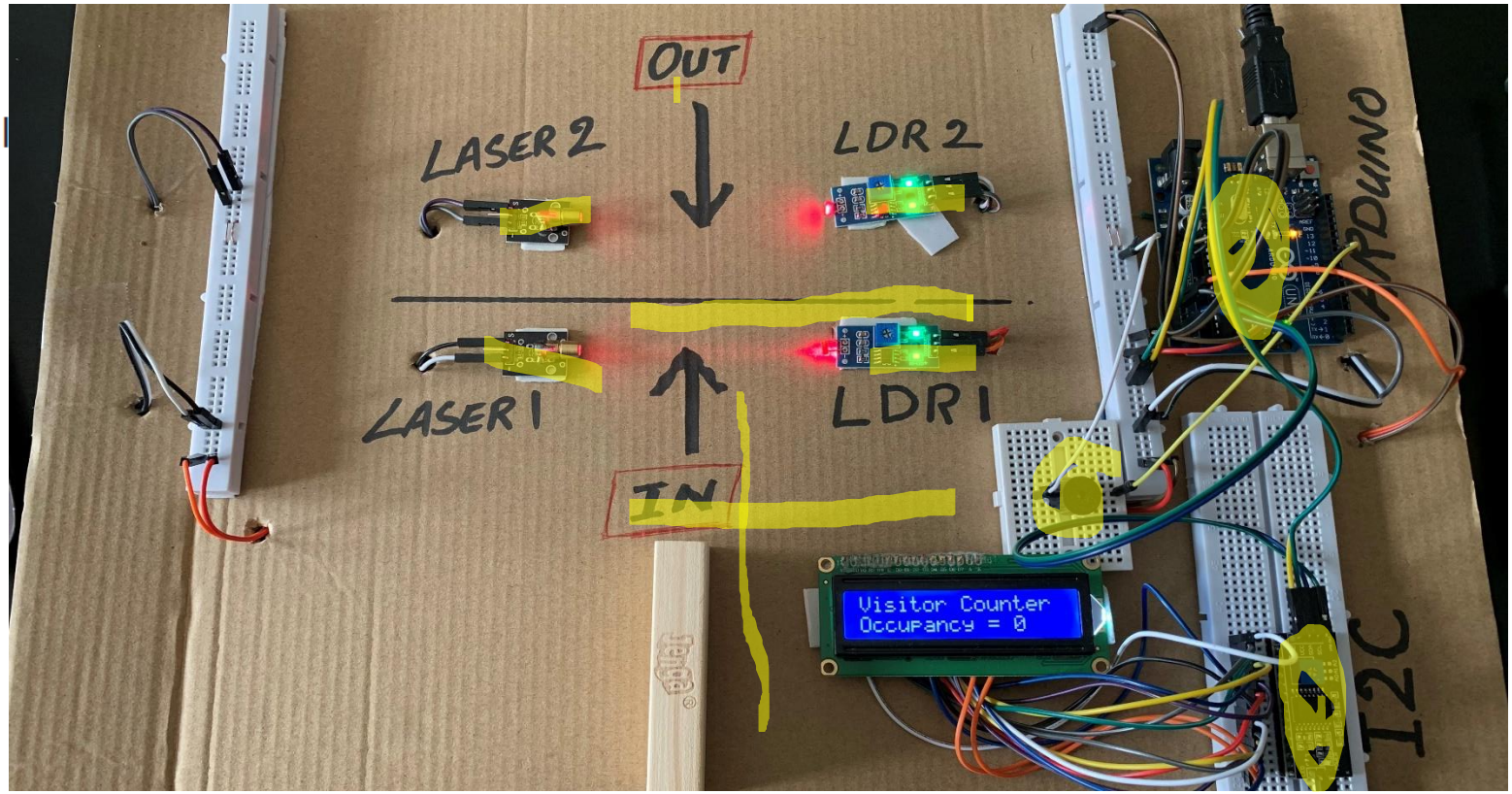
Updated Hardware Setup



Phase Two

The Real Outlook

ELECTRI



Phase Three

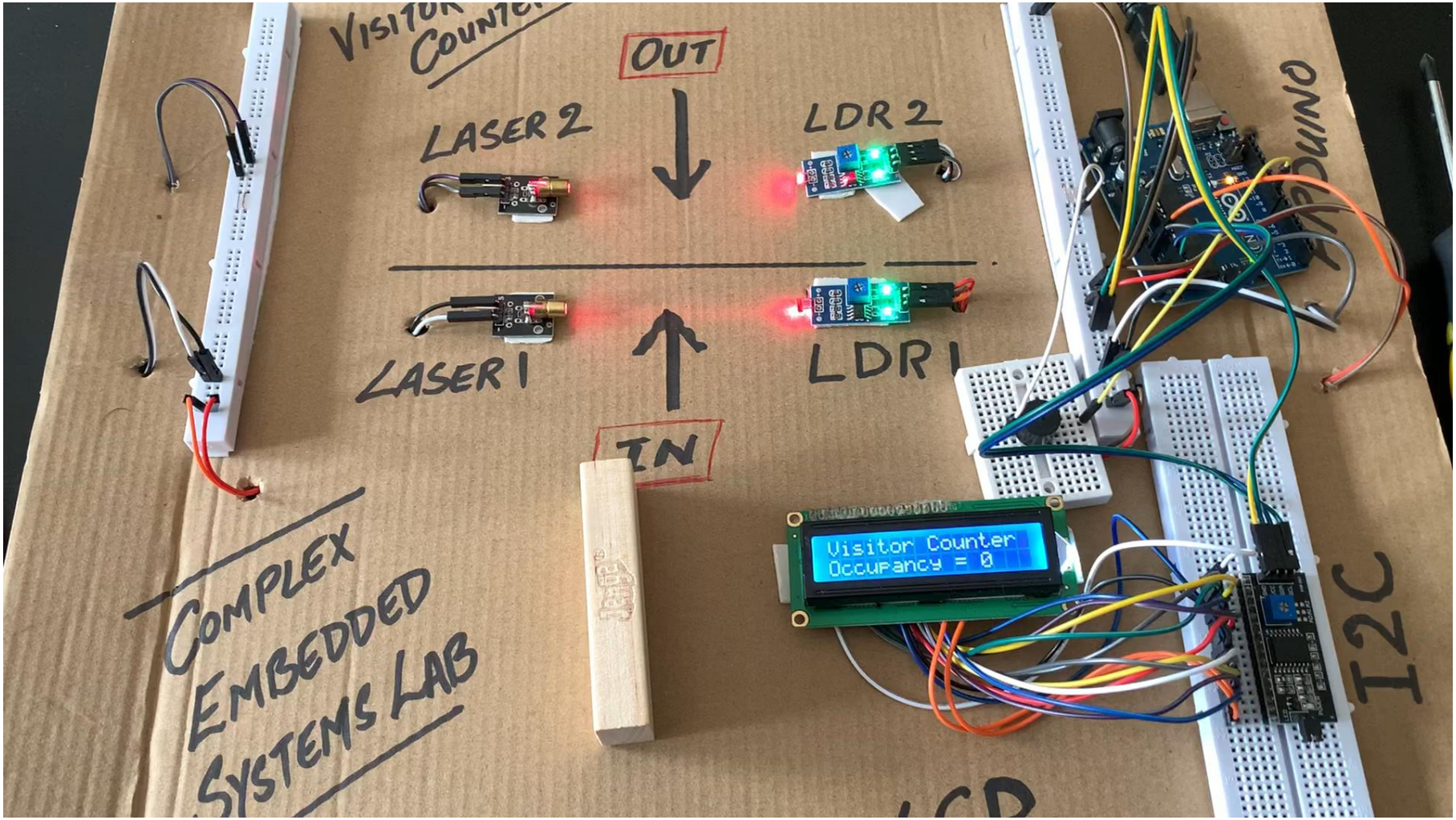
The Code

Merge

```
//%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
// VISITOR COUNTER %%%%%%%%%% EMBEDDED SYSTEMS LAB @ TU ILMENAU SS 2021 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
//%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

#define DETECT_LDR1 A0 // Setting Analog Pin A0 for LDR 1
#define DETECT_LDR2 A1 // Setting Analog Pin A1 for LDR 2

#define speaker 9 // Setting Digital Pin 9 for BUZZER
#include <Wire.h>
#include <LiquidCrystal_I2C.h> // Including I2C Library for our LCD

LiquidCrystal_I2C lcd(0x27,20,4);  // sets the LCD address to 0x27 for a 16 chars and 2 line display
//%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
// Initiazlizing Variables
int count = 0;
int threshold =300;
int i = 0;

//%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
// SET NUMBER OF VISITORS ALLOWED
int warning = 3; // For Low Buzzing Sound We can change this
int cuttoff = 6; // For High Buzzing Sound We can change this
//%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

void setup() {
  Serial.begin(9600);
  pinMode(DETECT_LDR1, INPUT);//define detect input pin
  pinMode(DETECT_LDR2, INPUT);//define detect input pin


  pinMode(speaker, OUTPUT);   //define BuZzer output pin
  lcd.init();                // initialize the LCD
  //lcd.init();
  lcd.backlight();
}

//%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

void loop() {

  int detected_LDR1 = analogRead(DETECT_LDR1);// read Laser sensor
  int detected_LDR2 = analogRead(DETECT_LDR2);// read Laser sensor

//%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
// Main Algorithm:
// If the Laser is cut first at LDR 1 detected by comparing the change of value with threshold
// This Means A Person Just Entered And the Counter is Increased by 1 else keep the counter value
//
// If the Laser is cut first at LDR 2 detected and LDR 1 Value is less then Threshold,
```

Phase Three

The Demo



What have We Achieved?

Working And Testing

- As shown in Demo everything works perfectly and all requirements have been met.
- The System has been tested many times and till yet NO Error has been found

Drawbacks of this Project

- Cannot fit this project to a door because of Low power of Lasers
- Will not work in real environments especially OUTDOORS
- This used strategy is just one of many ways to make Visitor Counter
- Proximity and IR sensors are obviously the Better Choice

Credits and Acknowledgments

@TU Ilmenau

- Mr. ***Maximilian Hammer*** for designing this Lab work and providing much needed support
- Prof ***Zimmermann*** for Teaching us Complex Embedded System Course

@The Internet

- Arduino IDE Example Codes and Community at: https://www.arduino.cc/en/Tutorial/LibraryExamples
- Instructables I2C LCD Setup at: https://www.instructables.com/Arduino-I2C-LCD-Driver-Library-and-PackMan/
- Lasers and Arduino at: https://create.arduino.cc/projecthub/projects/tags/lasers
- Bidirectional Counter and Automatic Light at:
- https://theiotprojects.com/bidirectional-visitor-counter-automatic-light-control-using-arduino/