BACHELOR OF COMPUTER SCIENCE

(BSc) PROGRAMME

CSC 327: EMBEDDED SYSTEMS AND MOBILE PROGRAMMING

PROJECT 8

VISITOR PEOPLE COUNTER

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1. Introduction

Problem Definition

IR sensors object detection can help us in our everyday lives especially now that technology has become vital, it is a very important application to know how many people enter in and out of an automatic room control. This is because such problems like leaving electrical appliances or even electricity leads to a lot of wastage or worse fire outcome and other related accidents. This system enables us to automatically control a number of factors like lighting, heating, cooling and other aspects which may depend on the number of people in a given space or room.

Objectives

The main aim of this project was to use two IR sensors for detecting movement of the person entering or leaving the room and to display the results on a 16x2 with I2c.

Justification

The system would help in the outside world in that it would:

- Help Reduce the Wastage of Electricity
- Reduce the risks of home appliances accidents.
- Enables Users to automatically control their homes.
- It increases the human to computer interaction especially when it comes to people who are impaired.

Limitations

The counter will continue to increase or decrease if a person stands near the sensor without entering or leaving the room since the IR sensor is always sensing the person's presence!

Related Works

Use of Motion IR Sensors to detect a person at the gate for security purposes.

Temperature Sensors used to detect the temperature of a place or house.

3. System Design

Circuit Diagram

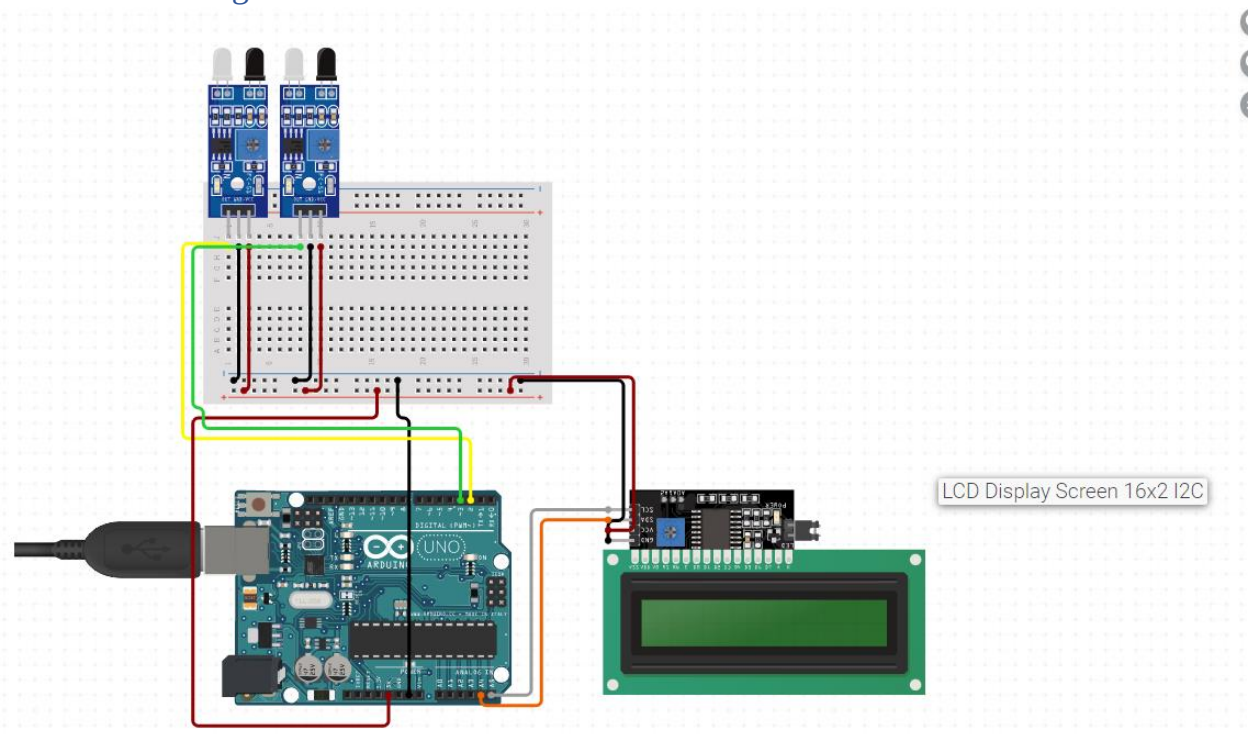

Figure 1: The Circuit *Diagram of the System*

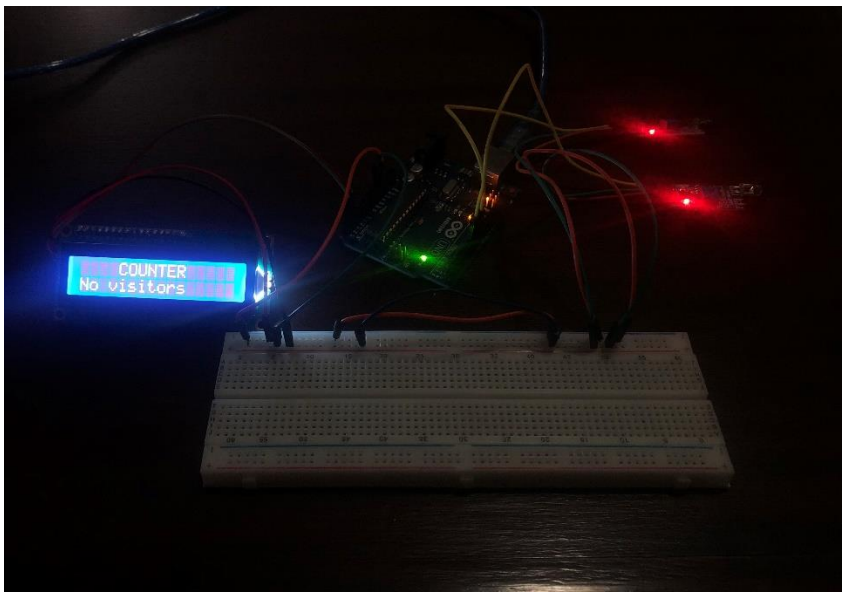

Figure 2: Hardware Connection

4. Implementation

In this section we are going to discuss in detail how the project was built from start to end. After connecting the circuit according to the circuit diagram above.

Firstly, one needs to download and include the Liquid crystal library to allow you to control **LCD** displays.

Then defined the IR sensor according to their respective pins that I set in the hardware.

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```
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27, 16, 2);
#define sensorPin1 7
#define sensorPin2 8

int sensorState1 = 0;
int sensorState2 = 0;
int count=0;
```

Figure 3: Code representing defining and initialization

Function setup() that configures the IR sensor pins as Inputs. Lcd.begin() function used to define the number of 16 char and 2 lines the LCD has and to initialize the LCD and to display Counter and No Visitors on the LCD.

```
void setup()
{
  pinMode (sensorPin1,INPUT);
  pinMode (sensorPin2, INPUT);

  lcd.begin(16,2);
  lcd.backlight();
  lcd.setCursor(4,0);
  lcd.print("COUNTER");
  lcd.setCursor(0,1);
  lcd.print("No Visitors     ");
  delay(200);
}
```

Figure 4: Code representing the Arduino setup

Setting up the functionality of each IR sensor (IR sensorPin1 to represent the entrance door and for which if any passes it increments while IR sensorPin2 to represent the exit door of which any one passes it decrements meaning someone has left the room.

```
void loop()
{
  sensorState1 = digitalRead(sensorPin1);
  sensorState2 = digitalRead(sensorPin2);

  if(sensorState1 == LOW){
    count++;
    delay(500);
  }

  if(sensorState2 == LOW){
    count--;
    delay(500);
  }
```

Figure 5: Code representing the IR sensors Functionality

Lastly to represent if nobody is in the room to display on the LCD that there are no visitors.

```
   if(count<=0)
  {
    lcd.setCursor(0,1);
    lcd.print("No visitors    ");
  }
  else if (count>0 && count<10){
    lcd.setCursor(0,1);
    lcd.print("Visitors:   ");
    lcd.setCursor(12,1);
    lcd.print(count);
    lcd.setCursor(13,1);
    lcd.print("  ");

  }
  else {
    lcd.setCursor(0,1);
    lcd.print("Visitors:   ");
    lcd.setCursor(12,1);
    lcd.print(count);
  }
}
```

Figure 6:Code representing the No visitors