



END SEMESTER ASSESSMENT(ESA)  
B.TECH.(CSE) IV SEMESTER

UE20CS252 - MICROPROCESSOR AND  
COMPUTER ARCHITECTURE LABORATORY

PROJECT  
REPORT ON

# **AUTOMATED MULTI- LAYERED HOME SECURITY SYSTEM**

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# **ABSTRACT OF THE PROJECT**

## **DESCRIPTION:**

This is an Arduino project on multi-layered home security system. The aim of this project is to develop a home security using Ultrasonic sensor. The buzzer rings whenever an unauthorized person is detected. There is also a laser that constantly sends beams of light to a light sensor and acts as a tripwire. The alarm is triggered whenever someone passes and the beams are not detected.

### **The main parts used in this project are:**

- Ultrasonic sensor (HCSR04)
- Photoelectric resistor
- Laser dot diode module (Red light)

## **GENERAL WORKING:**

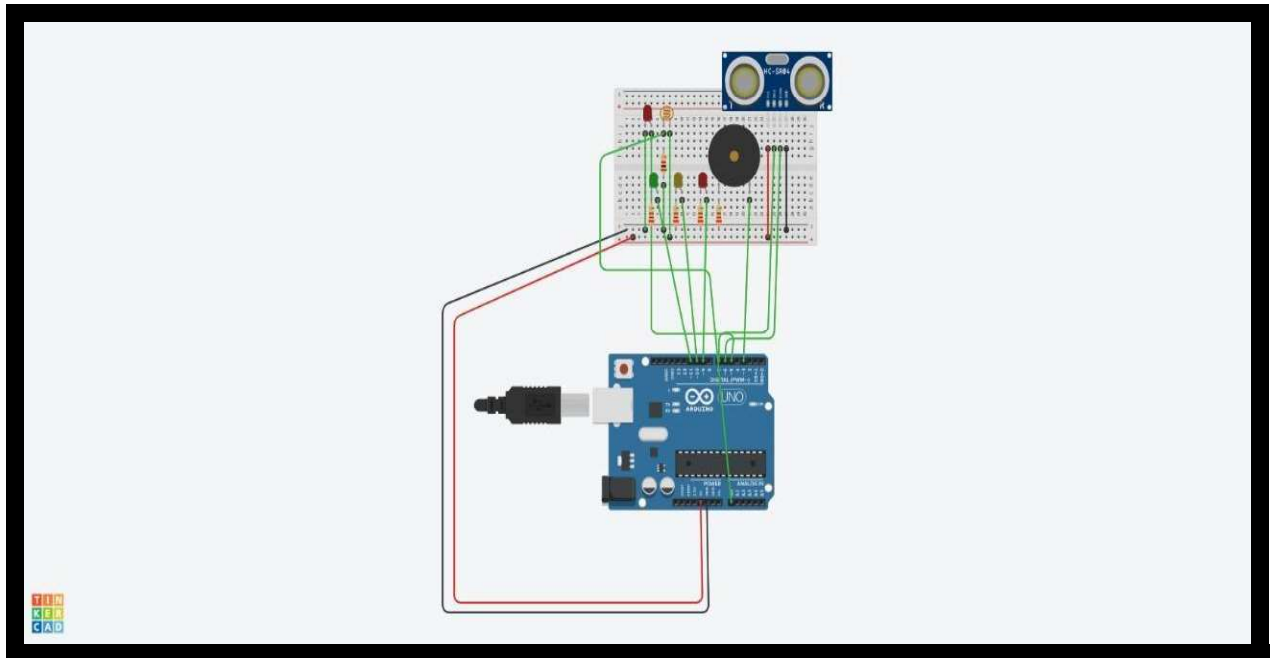
This system works on the laser trip wire system and ultrasonic distance detection system.

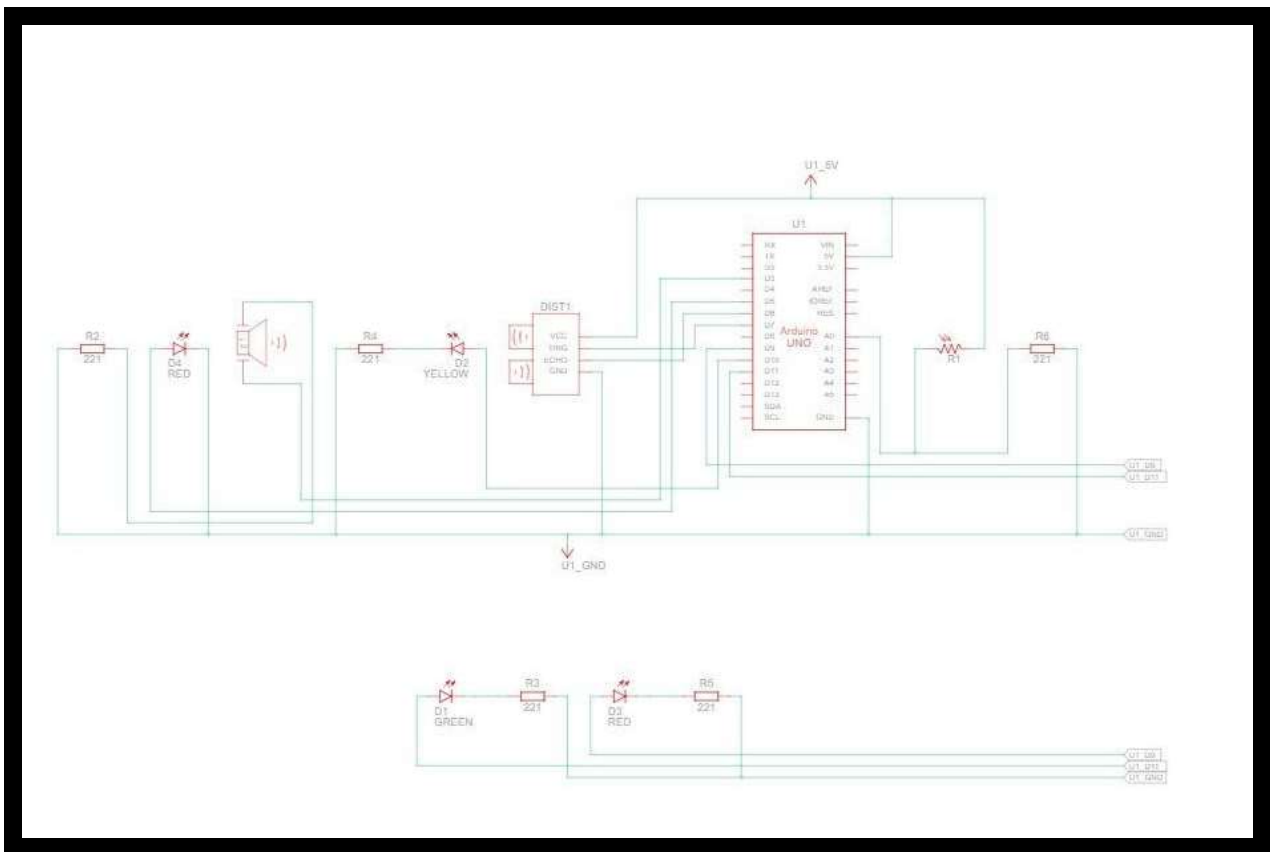
The main variables that come into play which makes these systems works is the photo intensity level being read by the photoelectric resistor and the distance measured from the ultrasonic sensor.

The way the whole system works together is the laser tripwire systems is the first layer of security where when the person goes past the laser the light intensity on the photoelectric resistor will reduce below the set threshold which will trigger the buzzers to alert the respective person.

The next layer of protection is the ultrasonic sensor placed near the object, as the person gets closer at every set distance a LED will light up indicating how close the person is to the object and once the person reaches really close to the object the buzzer starts to alarm the owner of the object.

# CIRCUIT DIAGRAM





## ARDUINO CODE

```
#define trigPin 7
#define echoPin 6
#define LEDlampRed 9
#define LEDlampYellow 10
#define LEDlampGreen 11
#define buzzer 3
#define Rec A0
#define Laser 5
int sound = 5000;
bool detection;
int sens;

void setup() {
  Serial.begin (9600);
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(LEDlampRed, OUTPUT);
  pinMode(LEDlampYellow, OUTPUT);
  pinMode(LEDlampGreen, OUTPUT);
  pinMode(buzzer, OUTPUT);
  pinMode(Laser, OUTPUT);
  pinMode(A0, INPUT);
}

void loop() {

  //short Detect = analogRead(Rec);
  sens = analogRead(A0);
  long duration = digit, distance = cm;
```

```

digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
Serial.println(sens);
durationindigit = pulseIn(echoPin, HIGH);
distanceincm = (durationindigit/5) / 29.1;
digitalWrite(Laser,1);
if(sens< 150)
{
    //The Max value is 760, if someone passes it goes below
    that (every value lower than 700 can do the work)
    detection = true;          //The detection is triggered
}
if(detection==true)
{
    tone(buzzer,sound); //Alarm sequence will go on as long as the detection is
    true
    delay(50);          //This alarm has two sounds 2kHz nd 1Khz delayed by 50ms
    tone(buzzer,sound);
    delay(50);
}

digitalWrite(LEDlampGreen, LOW);
digitalWrite(LEDlampYellow, HIGH);
digitalWrite(LEDlampRed, HIGH);

if (distanceincm< 20) {
digitalWrite(LEDlampGreen, HIGH);
}
else {
digitalWrite(LEDlampGreen, LOW);
}

if (distanceincm< 10) {
digitalWrite(LEDlampYellow, HIGH);
}
else {
digitalWrite(LEDlampYellow,LOW);
}
if (distanceincm< 5) {
digitalWrite(LEDlampRed, HIGH);
sound = 1000;
}
else {
digitalWrite(LEDlampRed,LOW);
}

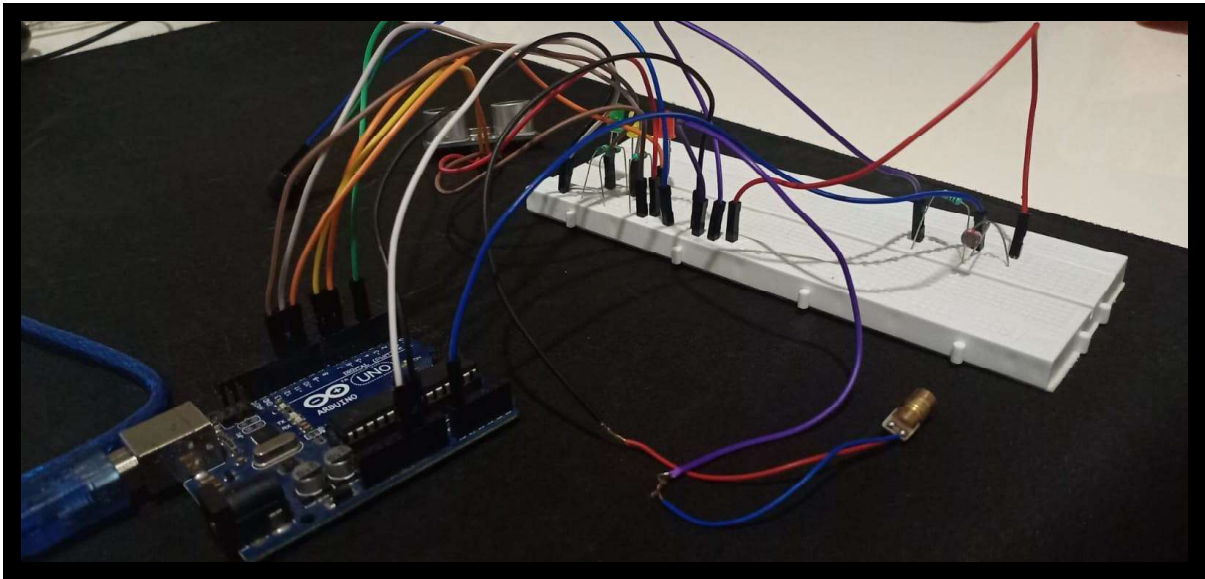
if (distanceincm> 5 || distanceincm<= 0){
Serial.println("Outside the permissible range of distances");
noTone(buzzer);
}
else {
Serial.print(distanceincm);
Serial.println("cm");
tone(buzzer, sound);
}

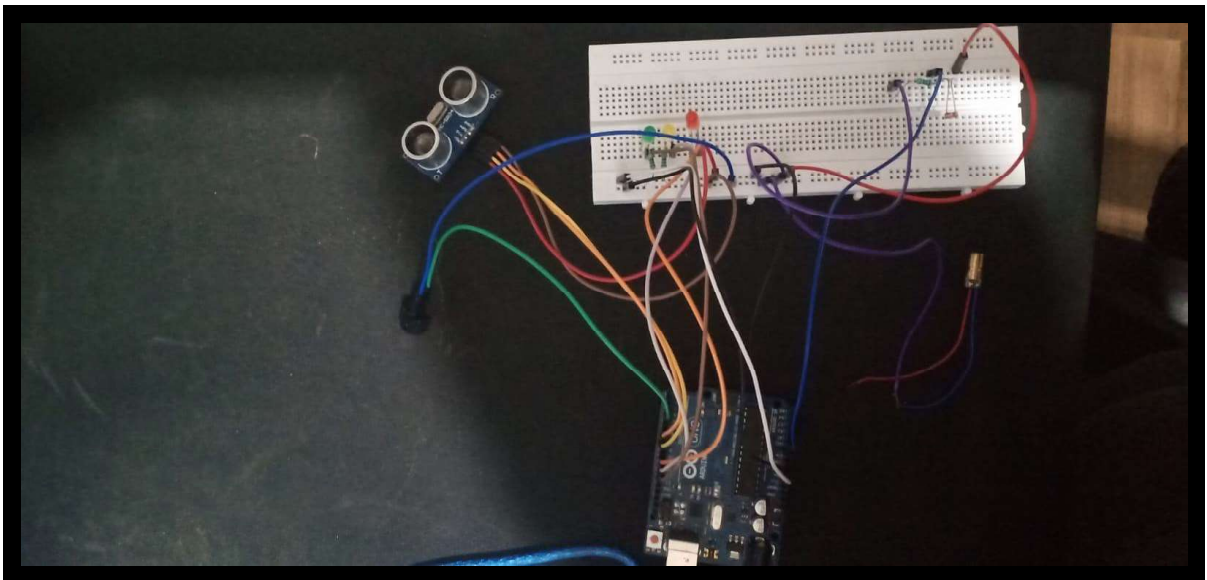
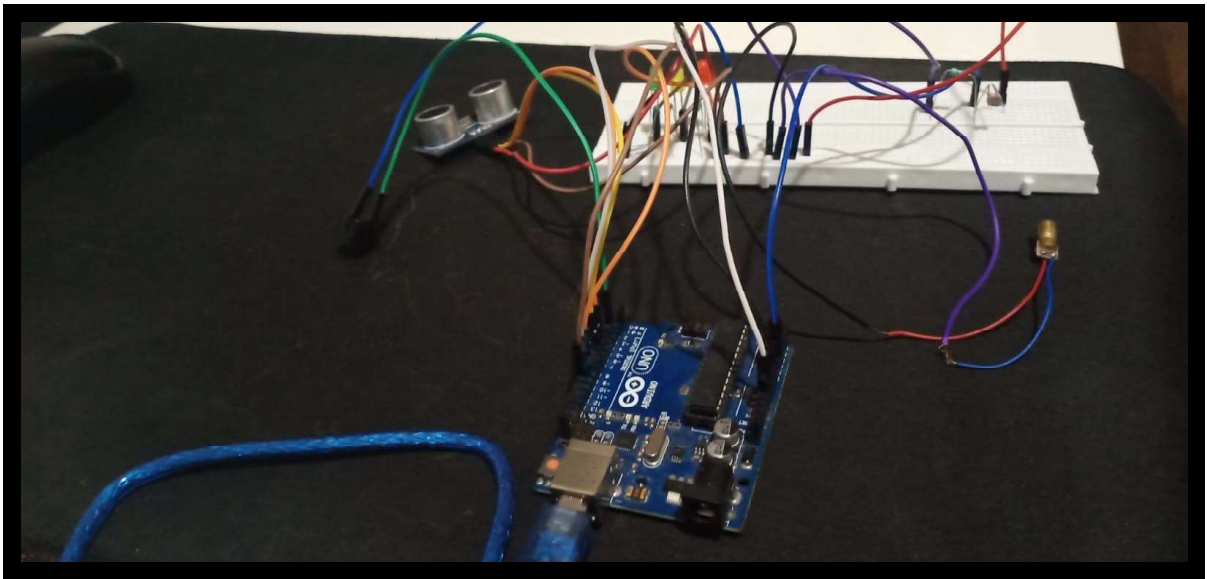
delay(300);
}

```

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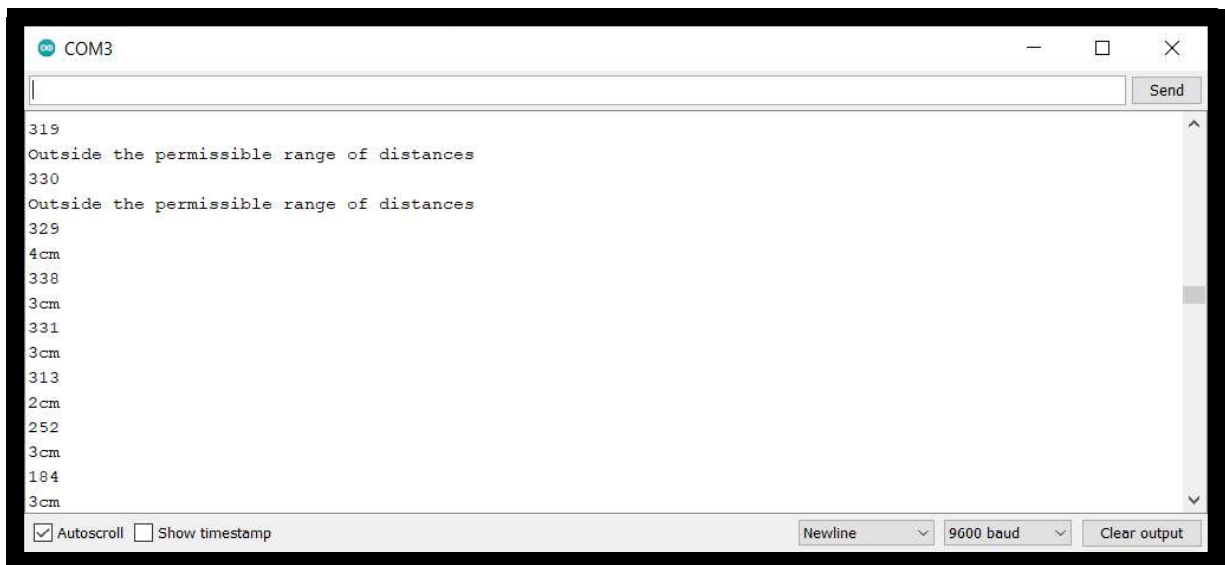
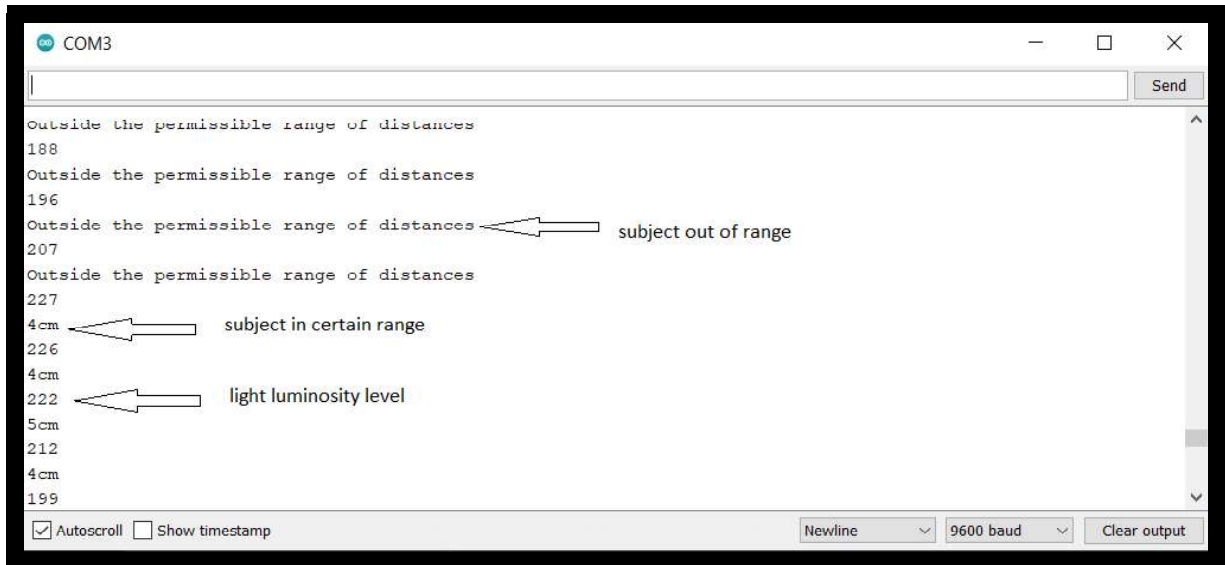
## Physical Model Structure



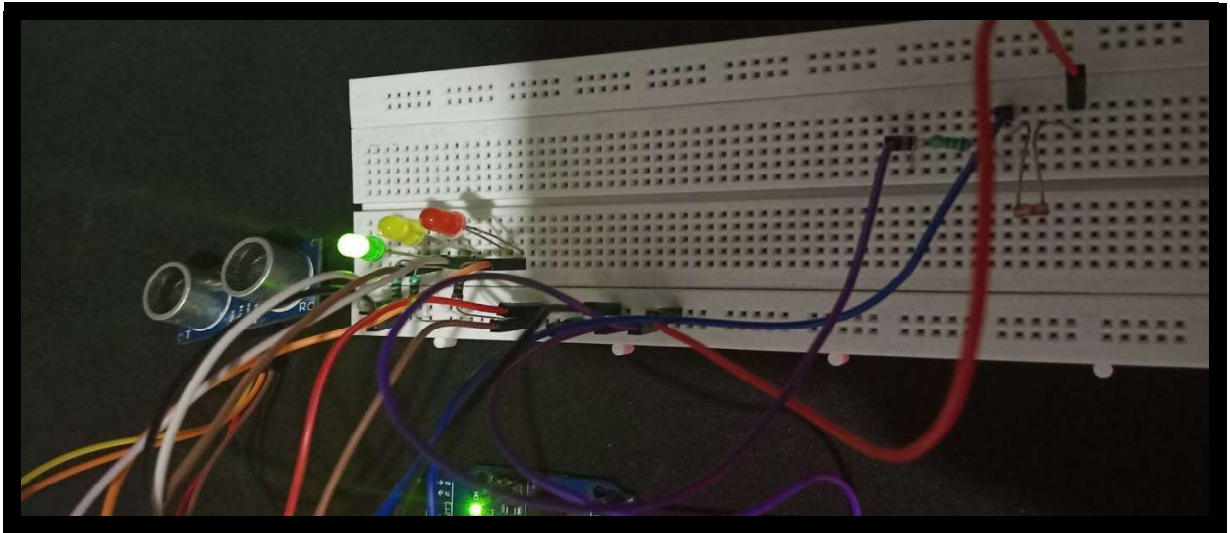




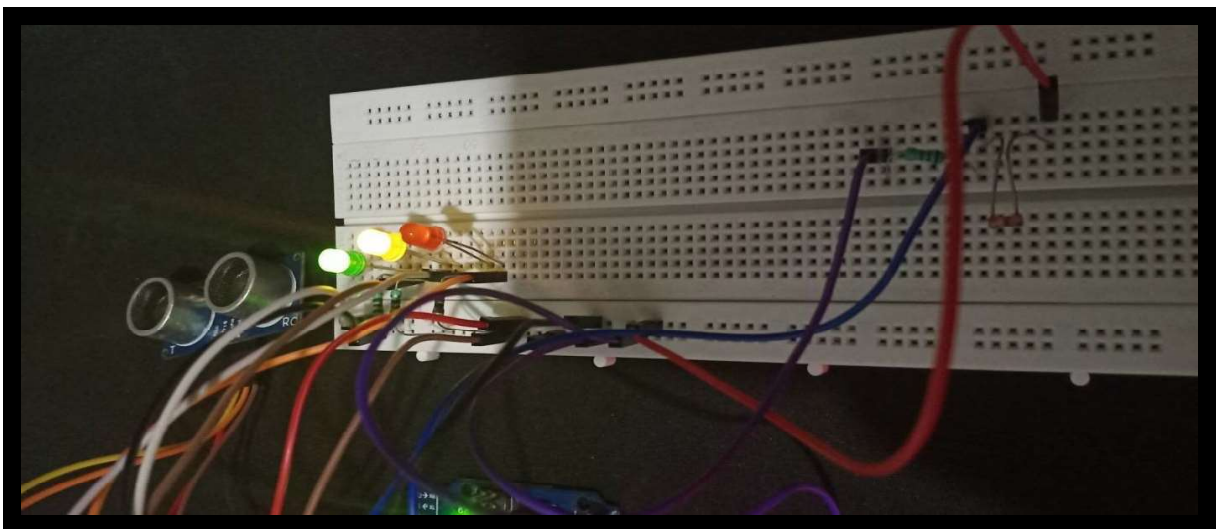
# Output Screenshots:



When subject is approx at 20 cm from sensor:



When subject is approx at 10 cm from sensor:



When subject is approx at 5 cm from sensor:

