

A Practical activity Report submitted  
for Engineering Design Project-II (UTA-014)  
by

**Name : Ananya Garg**

**Roll number : 101903548**

**Batch : 2CO21**

**Submitted to**

**Dr. Garima**



**THAPAR INSTITUTE**  
OF ENGINEERING & TECHNOLOGY  
(Deemed to be University)

**DEPARTMENT OF COMPUTER SCIENCE and ENGINEERING**

**THAPAR INSTITUTE OF ENGINEERING AND TECHNOLOGY,**

**(A DEEMED TO BE UNIVERSITY), PATIALA, PUNJAB**

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**Objective :** To write and execute an arduino based program for an Accident Avoidance System.

**Software Used :** TinkerCad Simulator

**Hardware Component Used :**

S.No	Component	Qty
1.	Arduino Board	1
2.	Ultrasonic Distance Sensor	1
3.	Piezo Buzzer	1
4.	LED	2
5.	Connecting Wires	-
6.	Resistors	2

**Theory :**

**1. Arduino Board** - Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

The Arduino Uno is a microcontroller board based on the ATmega328. It has 20 digital I/O pins (a 16 MHz resonator, a USB connection, a power jack, and a reset button).



**Figure 1.1 - Arduino**

Image Source : <https://www.antratek.com/arduino-uno>

**2.Ultrasonic Distance Sensor** - An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (i.e. the sound that humans can hear).



**Figure 1.2 - Ultrasonic Distance Sensor**

Image Source : <http://UltrasonicDistanceSensor>

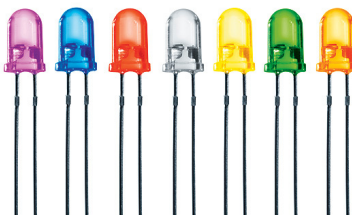
**3.Piezo Buzzer** - A "piezo buzzer" is basically a tiny speaker that you can connect directly to an Arduino. "Piezoelectricity" is an effect where certain crystals will change shape when you apply electricity to them. By applying an electric signal at the right frequency, the crystal can make sound.



**Figure 1.3 - Piezo Buzzer**

Image Source : <http://PiezoBuzzer>

**4.LED** - Light-emitting diode (LED) is a semiconductor device that emits light when an electric current is passed through it. Light is produced when the particles that carry the current (known as electrons and holes) combine together within the semiconductor material.



**Figure 1.4 - LED**

Image Source : <http://LED>

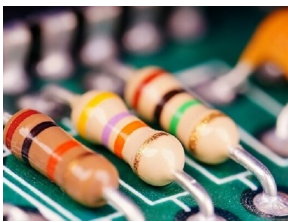
**5.Connecting Wires** - Connecting wires allows an electrical current to travel from one point on a circuit to another because electricity needs a medium through which it can move. Most of the connecting wires are made up of copper or aluminum.



**Figure 1.5 - Connecting Wires**

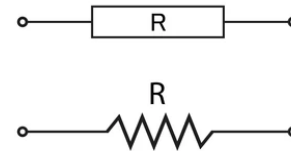
Image Source : <http://ConnectingWires>

**6.Resistor:** The resistor is an electrical component to create resistance in the flow of electric current. The resistance is measured in ohms. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines. The ratio of an ideal resistor can be calculated by Ohm's law i.e.  $V=IR$



**Figure 1.6 - Types of resistors**

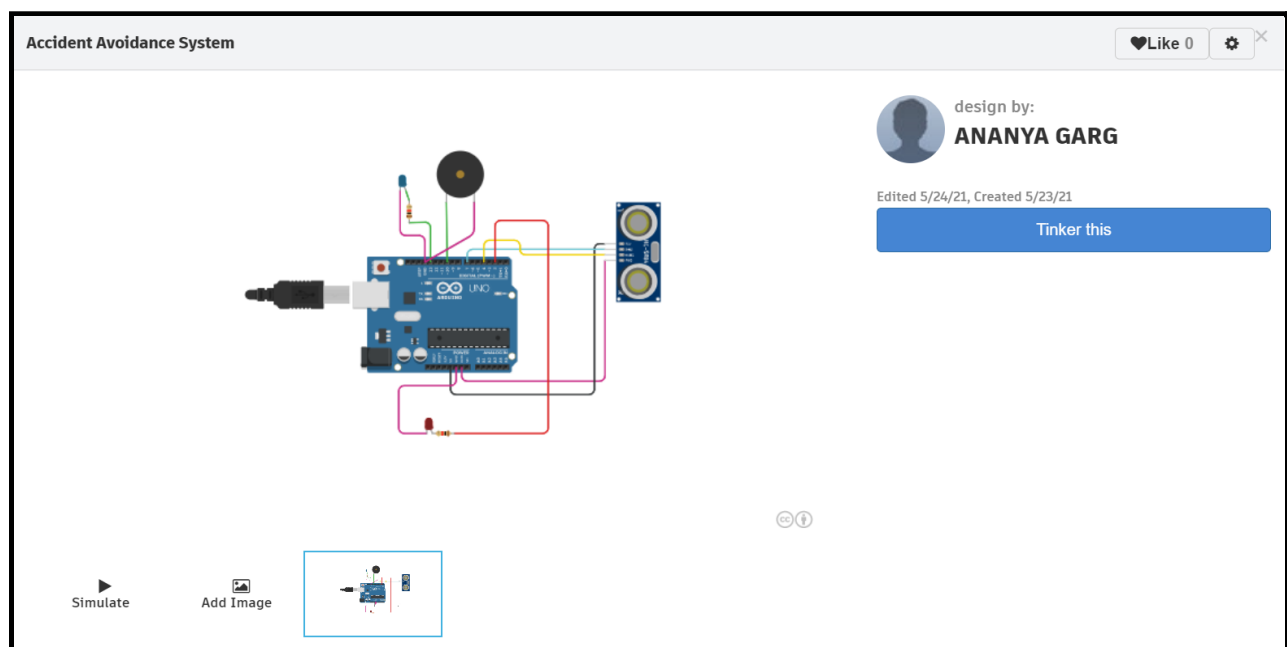
Image Source : [Resistor](#)

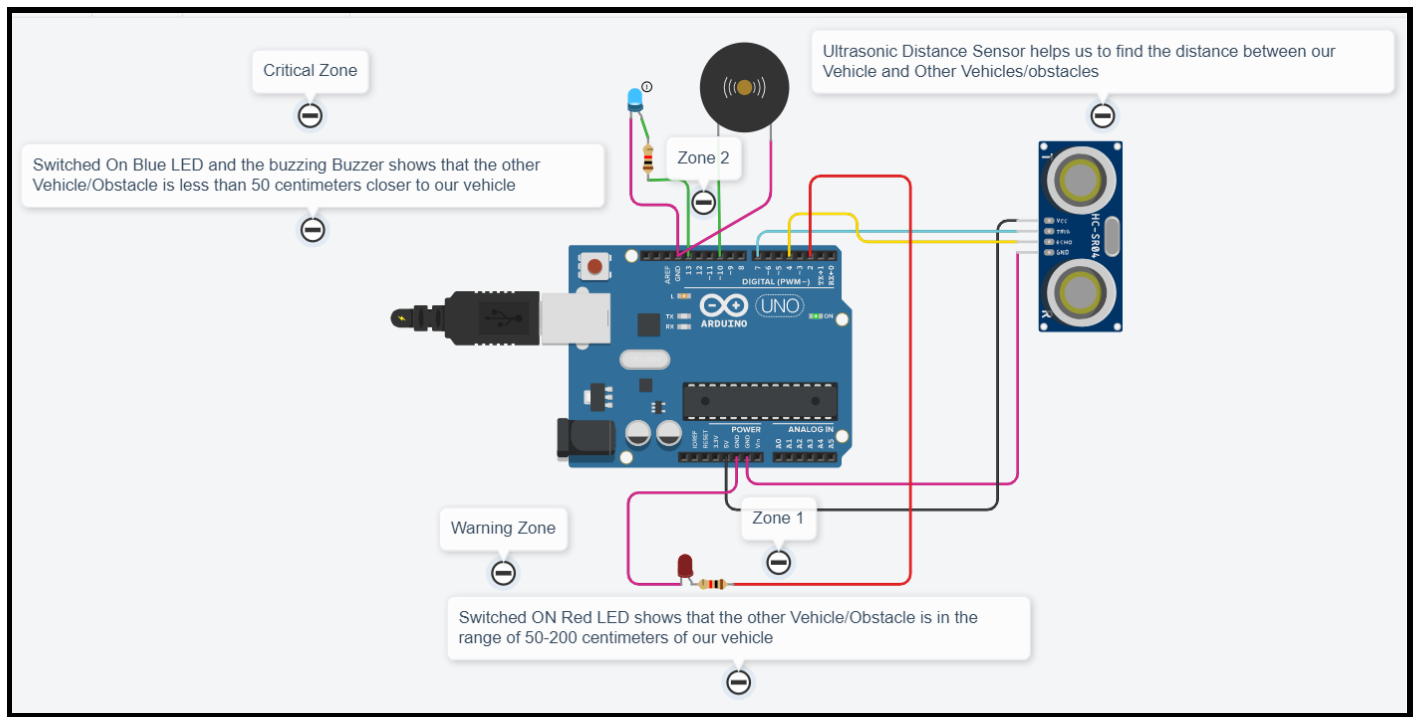


**Figure 1.7 - Symbol of resistor**

Image Source : [SymbolOfResistor](#)

## Circuit Diagram :





## Code :

//Name: Ananya Garg

//Roll No: 101903548

//Batch: 2CO21

//Accident Avoidance System

//The same system can be applied at front and back side of the vehicles

const int trigPin = 7;

const int echoPin = 4;

const int LED=2;

const int BuzzerLED=13;

int buzz = 10;

float duration;

float distance;

void setup()

```
{
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(13, OUTPUT);
  pinMode(2, OUTPUT);
  Serial.begin(9600);
}
```

void loop()

```
{
  digitalWrite(trigPin, LOW);
```

```

delayMicroseconds(2);

digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);

duration = pulseIn(echoPin, HIGH); //Using the pulseIn function to find out the time duration

distance= duration*0.034/2;      //Distance is being calculated using duration
Serial.print("Distance: ");      //Prints the statement on the Serial Monitor
Serial.println(distance);         //Prints the distance on the Serial Monitor

                                //***** ZONE 1 *****
                                //This zone warns the driver to drive carefully through a Red LED
if(distance <= 200 && distance >= 50) //If the other vehicle/Obstacle is in between the range of 50-200 cm
{
    digitalWrite(LED, HIGH);      //Turn the Red LED On to warn the driver
}
else                               //If the other vehicle is at a safe distance
{
    digitalWrite(LED, LOW); //Keep the Red LED OFF
}

                                //***** ZONE 2 *****
                                //This zone is a critical zone and warns the driver to slow down
                                //It warns through the blue LED and a Buzzer

if(distance < 50)                  //If the other vehicle is less than 50 cm from our vehicle
{
    digitalWrite(BuzzerLED, HIGH); //Turn the Blue LED ON

    tone(buzz, 2000);               //The buzzer starts buzzing
    delay(100);                     //Wait for 100 milliseconds
    noTone(buzz);                   //Stop the buzzer
    delay(100);                     //Wait for 100 milliseconds

    tone(buzz, 2000);               //This piece of code is repeated to make buzzing sound
    delay(100);
    noTone(buzz);
    delay(100);

    tone(buzz, 2000);
    delay(100);
    noTone(buzz);

    tone(buzz, 2000);
    delay(100);
    noTone(buzz);
    delay(100);
}

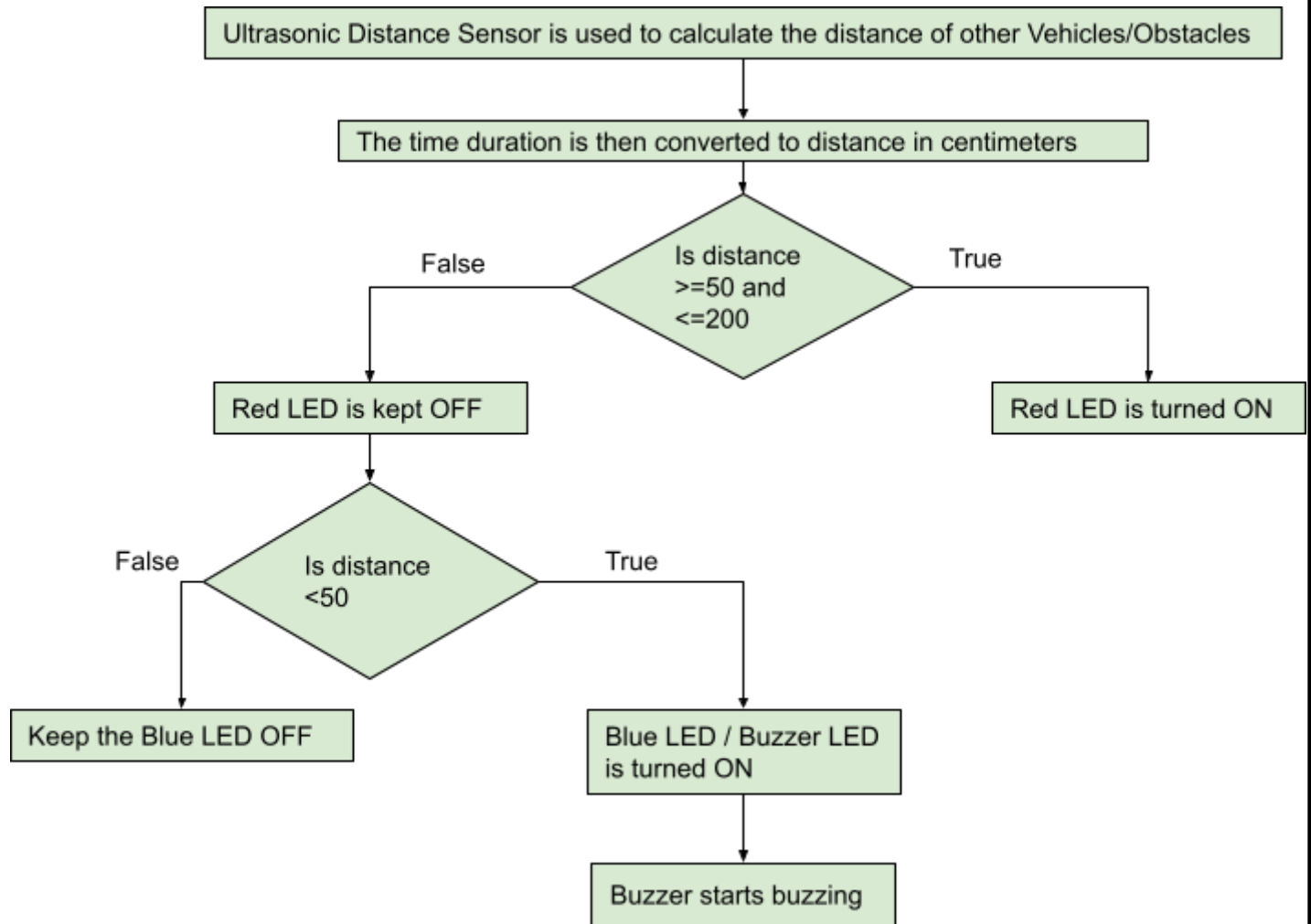
```

```

else                                     //If the vehicle is at a distance greater than 50 cms
{
  digitalWrite(BuzzerLED, LOW); //Keep the blue LED OFF
}
}

```

### **Logical Workflow Diagram :**



### **Simulation Link :**

[Accident Avoidance System\\_AnanyaGarg\\_101903548.mp4](#)

**Signature Of The Faculty Member**