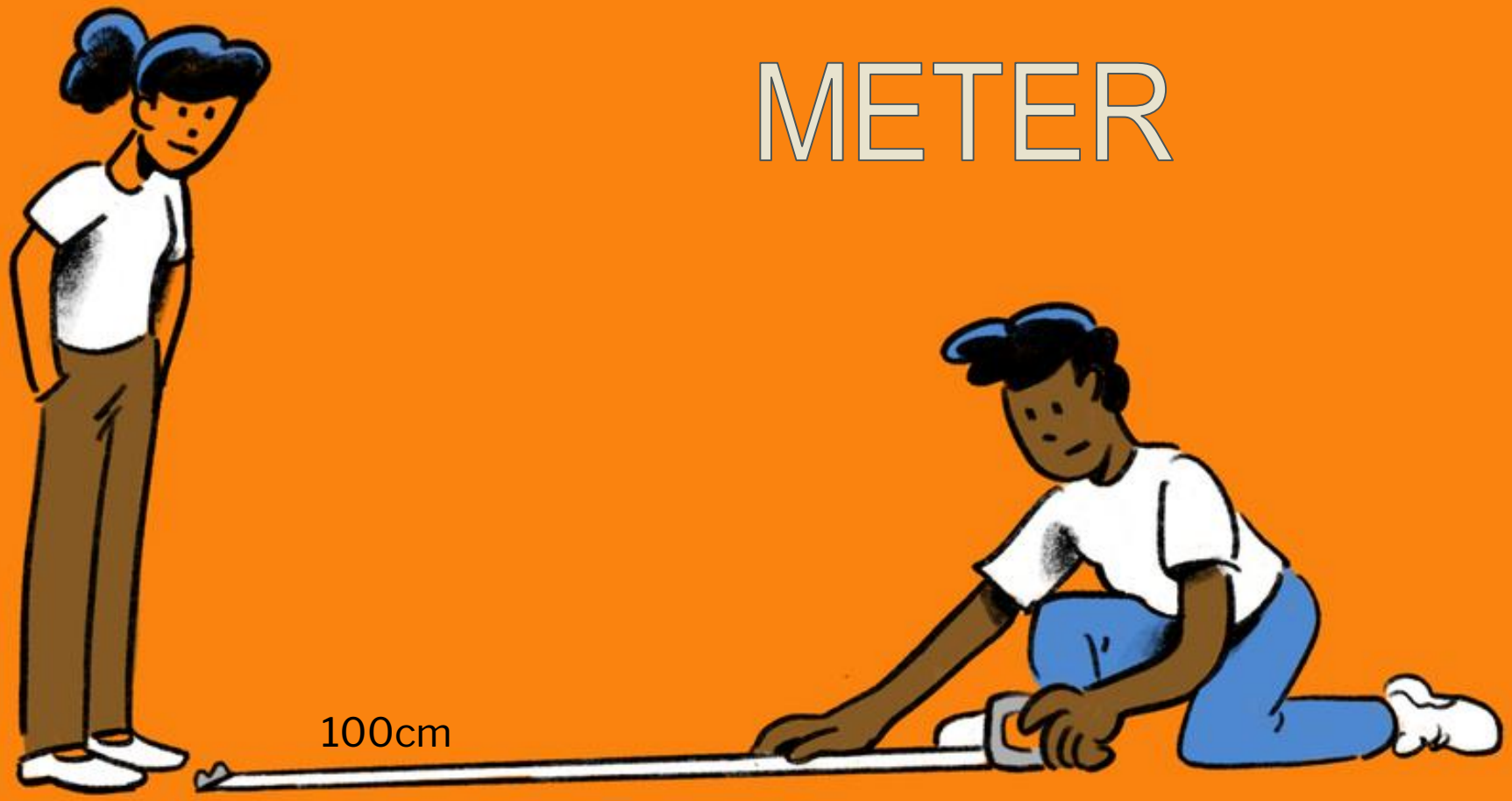
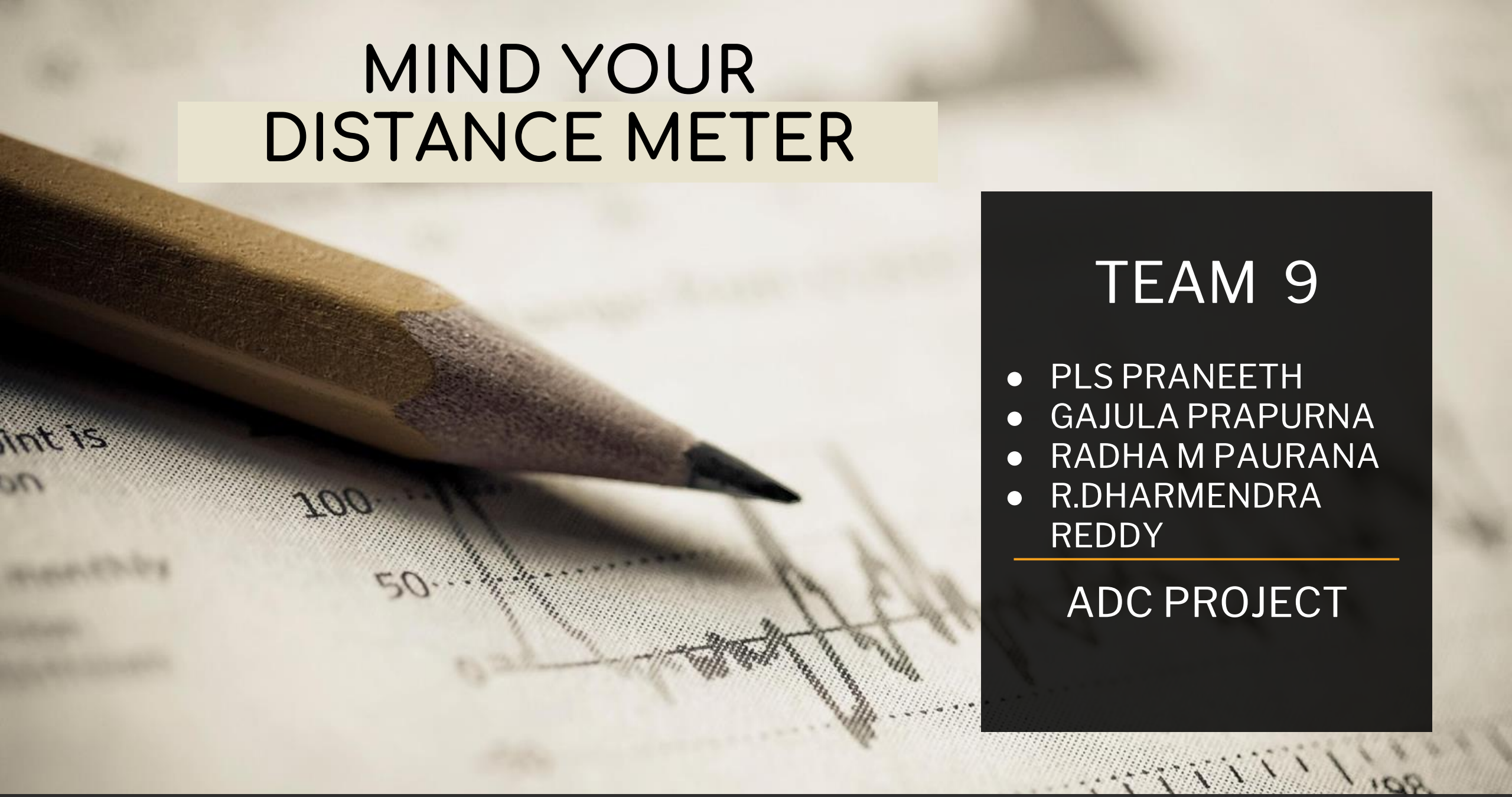
MIND YOUR DISTANCE METER



MAX PEPPER/CNN

MIND YOUR DISTANCE METER



TEAM 9

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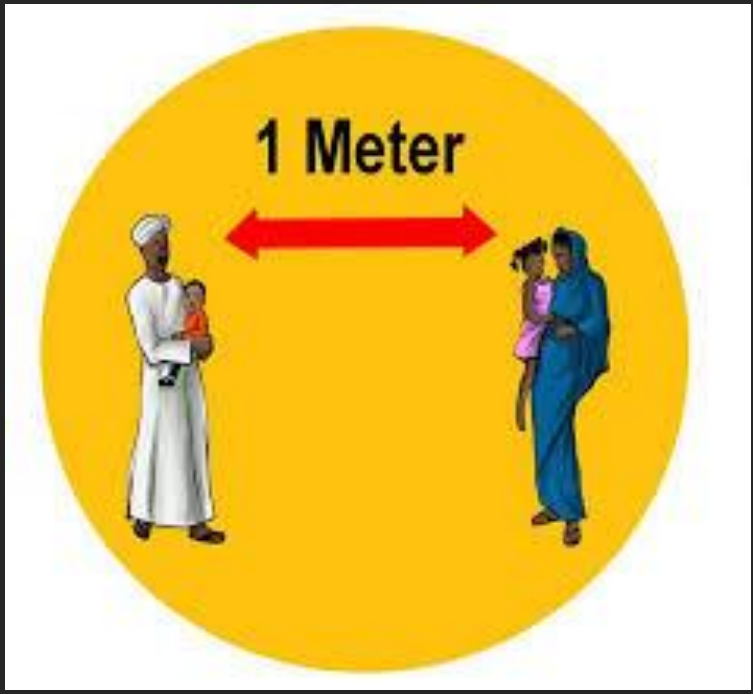
ADC PROJECT

ABSTRACT



The current outbreak of the novel coronavirus also known as COVID-19 was declared as a public health emergency by the WHO where over a million people have been affected by the disease with over 50000 deaths till date. Social distancing is a method to minimize crowd interactions and prevent the spread of disease within groups of people.

This project focuses on how social distancing has been used to deal the issues that needs to be tackled to address and control the pandemic situation.

The primary focus of our work is to warn the people when they knowingly or unknowingly cross the threshold of an S-D limit that is “100 cm or 1 meter”. The proposed model is the integration of proximity sensors and an alarming model.

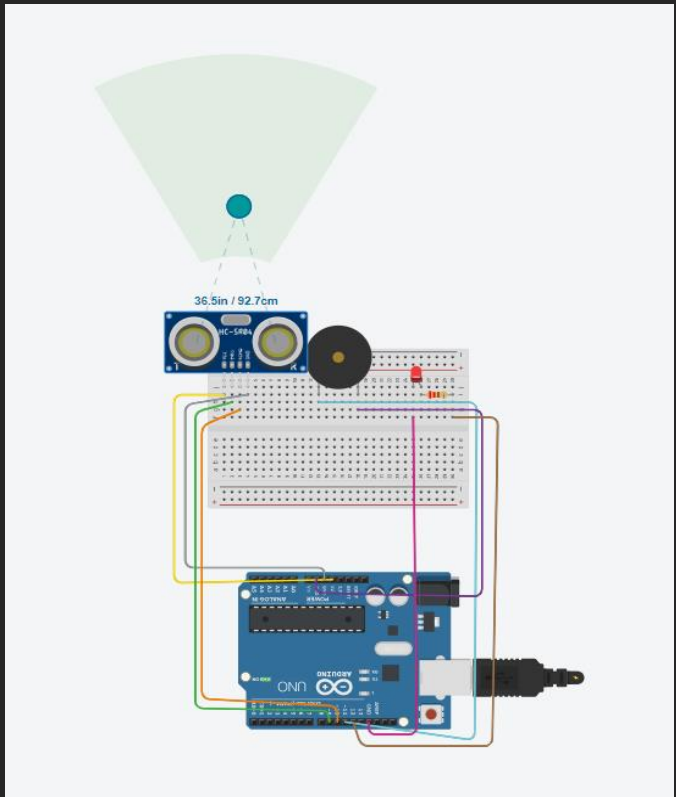
OBJECTIVES

1. This project “MIND YOUR DISTANCE METER” mainly helps us to solve the issues of COVID 19 and helps us in maintaining Social distancing.

1. The primary focus of our work is to warn the people when they knowingly or unknowingly cross the threshold of an S-D limit that is “100 cm or 1 meter”.

1. This device can be used by everyone as it is cost efficient and the use of Arduino Nano in this device instead of Arduino Uno is maintain its small size so that it can be used easily and comfortably.

CIRCUIT DIAGRAM



Simulation software used :- TINKERCAD

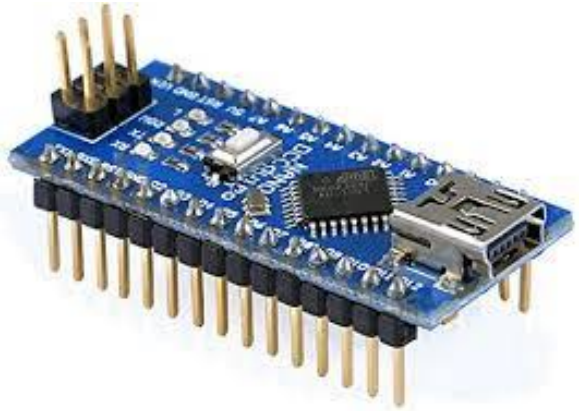
Components Required:-

- Arduino Nano
- Ultrasonic Sensor
- Passive Buzzer
- LED
- Resistor (220 oms)
- Bread Board
- Jumper wires

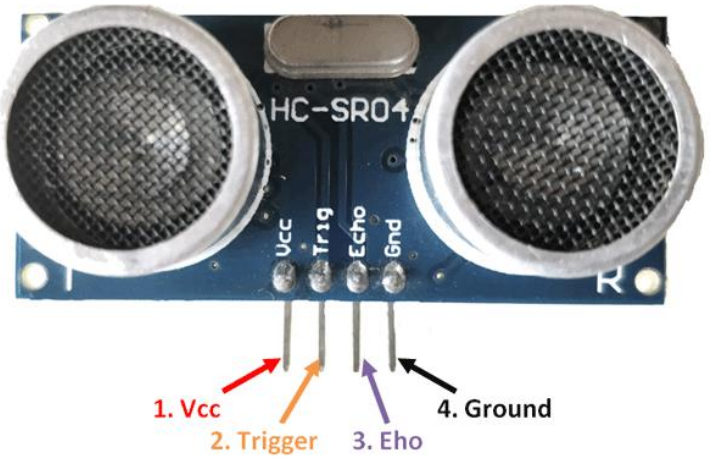
Simulation for this project has been done in Tinkercad.

We have used Arduino Nano (microcontroller) as our major component and interfaced it with the Ultrasonic Sensor to make an alarming device to perform social distancing during the period of COVID - 19.

The Arduino Nano is very much similar to the Arduino UNO. They use the same Processor (Atmega328p) and hence they both can share the same program. One big difference between both is the size UNO is twice as big as Nano and hence occupies more space on your project. Also Nano is breadboard friendly while Uno is not.



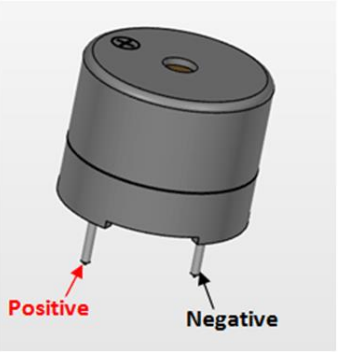
HC-SR04 Ultrasonic (US) sensor is a 4 pin module, whose pin names are Vcc, Trigger, Echo and Ground respectively. This sensor is a very popular sensor used in many applications where measuring distance or sensing objects are required. The module has two eyes like projects in the front which forms the Ultrasonic transmitter and Receiver. The sensor works with the simple high school formula that



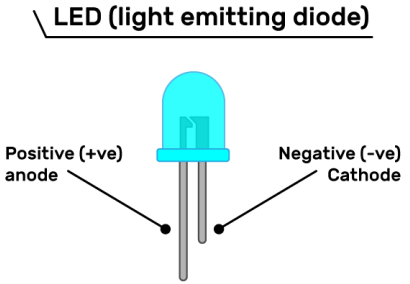
$$\text{Distance} = \text{Speed} \times \text{Time}$$

The Ultrasonic transmitter transmits an ultrasonic wave, this wave travels in air and when it gets objected by any material it gets reflected back toward the sensor this reflected wave .

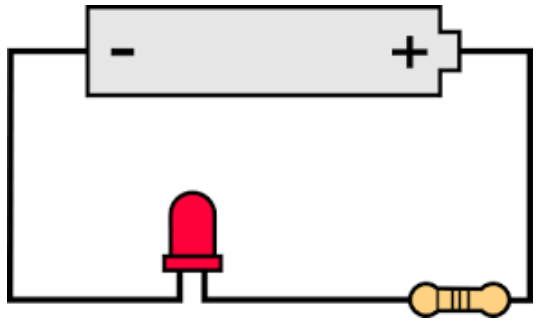
A passive buzzer (Piezo Buzzer) has a very simple 2 pin structure , one end is connected to the voltage source(+ve) and the other end is connected to the ground.
When it receives a HIGH input , it will start buzzing and vice-versa.



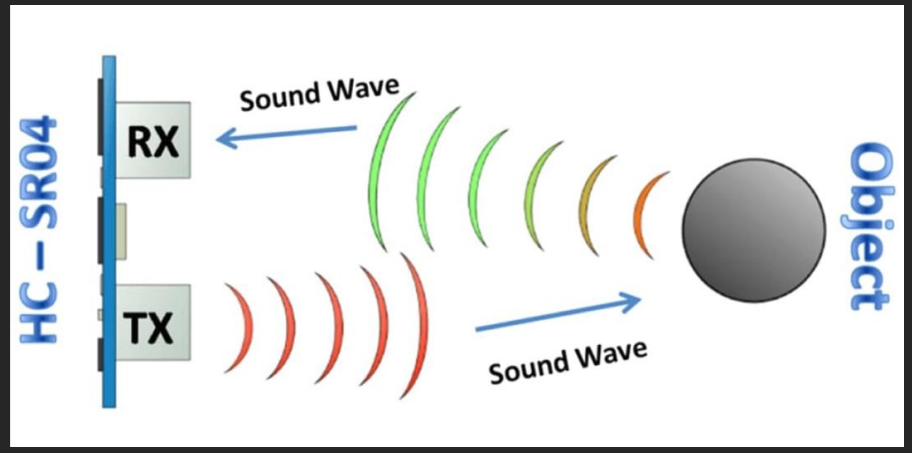
A light-emitting diode is a two-lead semiconductor light source. It is a p–n junction diode that emits light when activated. When a suitable voltage is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons.



The resistor here is connected in series with the LED .
Such a resistor is called as a ballast resistor.It is used to limit the current passing through the LED and prevent it from burning.



METHODOLOGY



It works by the ultrasonic sensor sending out high and low pulses to measure the distance between it and an obstacle or person. This is done from converting the time it took for the pulse to come back to a distance (cm in this case).

After the distance is measured, We have coded the LED and Buzzer to turn on if less than 100 cm away (this amount is easily adjustable by changing the value on the IF statement) and turn off when more than 100 cm away.

Speed of sound:

$$v = 340 \text{ m/s} = 0.0343 \text{ cm/}\mu$$

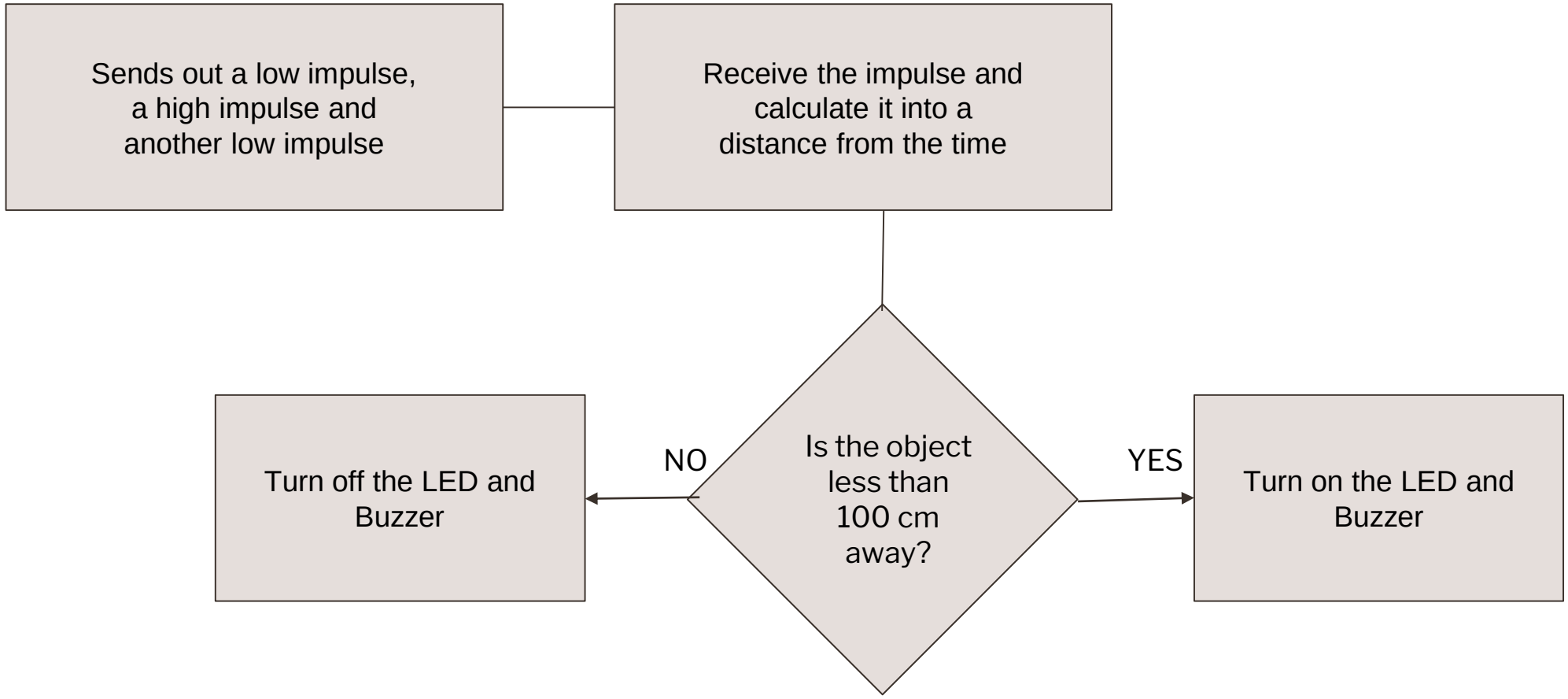
Time = Distance / Speed = 100 / 0.0343 = 2941 μs

PIN CONNECTIONS

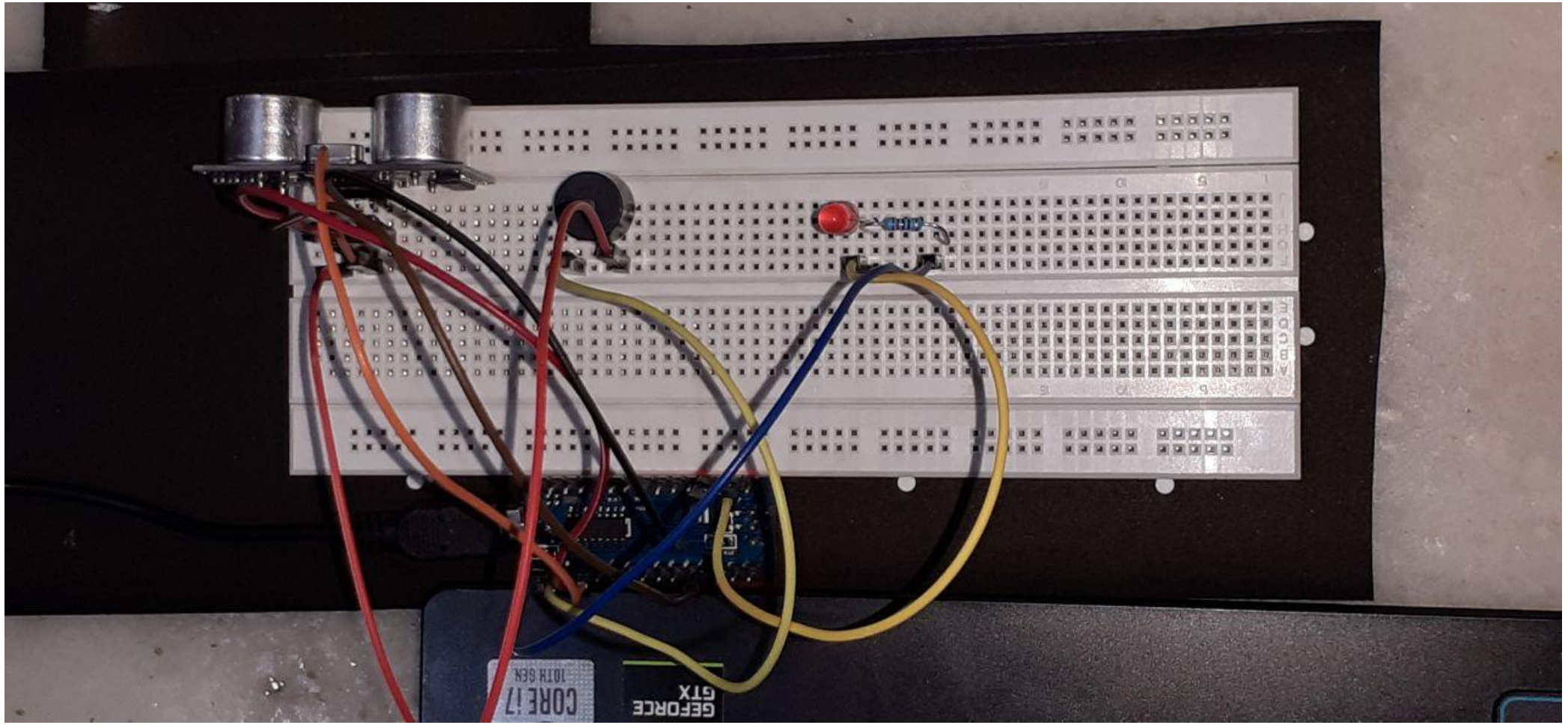
```
const int trigPin = 9;
const int echoPin = 10;
long duration;
int distanceCm, distanceInch;
void setup()
{
Serial.begin(9600);
pinMode(trigPin, OUTPUT);
pinMode(echoPin, INPUT);
pinMode(11,OUTPUT);
pinMode(12,OUTPUT);
}
void loop() {
digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(2);
digitalWrite(trigPin, LOW);
duration = pulseIn(echoPin, HIGH);
distanceCm= duration*0.034/2;
distanceInch = duration*0.0133/2;
Serial.println("Distance: ");
Serial.println(distanceCm);

if(distanceCm < 100)
{
  digitalWrite(11,HIGH);
  digitalWrite(12,HIGH);
}
else
{
  digitalWrite(11,LOW);
  digitalWrite(12,LOW);
}
}
```

COMPONENT	ARDUINO
VCC of HC-SR04	5V of Arduino Nano
GND of HC-SR04	GND of Arduino Nano
TRIG of HC-SR04	PIN no 9 of Arduino Nano
ECHO of HC-SR04	PIN no 10 of Arduino Nano
Positive Terminal of Buzzer	PIN no 11 of Arduino Nano
Negative Terminal of Buzzer	GND of Arduino Nano
Anode of LED	Resistor Terminal 1 (220 ohms)
Resistor Terminal 2 (220 ohms)	PIN no 12 of Arduino Nano
Cathode of LED	GND of Arduino Nano

OPERATION


Sends out a low impulse, a high impulse and another low impulse
Receive the impulse and calculate it into a distance from the time
Is the object less than 100 cm away?
NO
YES
Turn off the LED and Buzzer
Turn on the LED and Buzzer

HARDWARE SIMULATION OF THE PROJECT:



RESULTS AND ANALYSIS:

To check the simulation of this experiment :
TinkerCad Link

Circuit design social distancing device _ Tinkercad - Google Chrome 2020-11-01 16-11-53.mp4

HardWare Link done using Arduino Nano interfaced with the Ultrasonic Sensor:

Hardware Social Distanicng.mp4

WORKING

We may not be conscious about maintaining social distance every minute in such case this device helps us by alerting to do so.

When the distance between us and other person is less than 1 meter this device turns on the buzzer and light up LED indicating you have to maintain social distance

If the space is greater than 1 meter then this device automatically turns off.

CONCLUSION

In this project, we just tried to help the society to fight against COVID-19. In the absence of a vaccine for COVID-19, social-distancing is the only solution left with human beings.

Hence, in this short note, we have tried to use the “ MIND THE DISTANCE METER ” for humans.

In case of emergency interaction or in any other circumstances when interaction cannot be avoidable by using this device the users can maintain a safe distance from each other.

The alarming system warns the human when they cross the threshold minimum safe distance of 100 cm.

THANK
YOU