DOCUMENTATION

TRAFFIC MANAGEMENT

TEAM DETAILS

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PROBLEM DESCRIPTION	Describing the project objectives,IOT Senor setup,Arduino UNO intergration by including diagrams,schematics and screenshot of the IOT sensor and web application

IOT (INTERNET OF THINGS)

IoT technology can be described as the 'Internet of Things,' based on the concept that all the desired devices can be connected inside a specific network for sharing data and information without any manual intervention. We can segregate the devices used for this purpose based on their capability to send, receive, and gather data in the network. IoT's salient properties include its secure nature, usability on smart devices, ability to connect to any network, and facilitation of faster connectivity.

IOT CAN BE USED TO IMPROVE THE TRAFFIC MANAGEMENT:

- ✓ IoT-based monitoring provides real-time data for better decision-making.

- ✓ Smart traffic can minimize congestion by using the IOT.

- ✓ Improved air quality from reducing air pollution generated by slow-moving traffic

TRAFFFIC MANAGEMENT IN IOT

Traffic management is one of the biggest infrastructure hurdles faced by developing countries today. Developed countries and smart cities are already using IoT and to their advantage to minimize issues related to traffic.

OVERVIEW OF WORKING

ULTRASONIC DISTANCE SENSOR: THE IOT SENSOR deployed in road to detect the distance of vehicles.

CONNECTIVITY: These sensor are connected to a network allowing them to transmit real time data or central server or cloud.

DATA PROCESSING: The central server often powered by IOT devices like ARDUINO UNO,Process the incoming data to determine the radiation of distance

USER INTERFACES: Information about distance sensor then the light will be link to users through various interfaces.This can include mobile apps and websites.

REAL TIME UPDATES: Users can receive real time update on the condition of traffic in the area the, reducing the wait in the traffic area and minimize the traffic congestion.

OBJECTIVES

- To Reduce traffic jams and accidents on the streets

- To Ensure immediate clearance for emergency vehicles

  Facilite safer and shorter commute times

- To Reduce congestion & energy consumption at intersections

- To Offer significant productivity benefits with real time monitoring of crucial infrastructures

- To Reduce operating costs with efficient traffic management processes

- To Ensure compliance with the regulations for reducing the carbon footprint

- To Save billions of gallons of fuel wasted every year

- To Accurate tracking & quick recovery of lost and stolen vehicle

ABSTRACT

A significant amount of research work carried out on traffic management systems, but intelligent traffic monitoring is still an active research topic due to the emerging technologies.such as the Internet of Things (IoT) . The integration of these technologies will facilitate the techniques for better decision making and achieve urban growth. However, the existing traffic prediction methods mostly dedicated to highway and urban traffic management, and limited studies focused on collector roads and closed campuses. Besides, reaching out to the public, and establishing active connections to assist them in decision-making is challenging when the users are not equipped with any smart devices. This research proposes an IoT based system model to collect, process, and store real-time traffic data for such a scenario. The objective is to provide real-time traffic updates on traffic congestion and unusual traffic incidents through roadside message units and thereby improve mobility. These early-warning messages will help citizens to save their time, especially during peak hours. Also, the system broadcasts the traffic updates from the administrative authorities. A prototype is implemented to evaluate the feasibility of the model, and the results of the experiments show good accuracy in vehicle detection

COMPONENTS USING IN TRAFFIC MANAGEMENT

➢ Ultrasonic distance sensor
➢ LEDS
➢ Connecting wires
➢ Arduino UNO

ULTRASONIC DISTANCE SENSOR:

An ultrasonic Sensor is a device used to measure the distance between the sensor and an object without physical contact. This device works based on time-to-distance conversion.

ARDUINO :

It is an open-source electronics platform. It consists ATmega328 8-bit Microcontroller. It can be able to read inputs from different sensors & we can send instructions to the microcontroller in the Arduino. It provides Arduino IDE to write code & connect the hardware devices like Arduino boards & sensors.

LEDs:
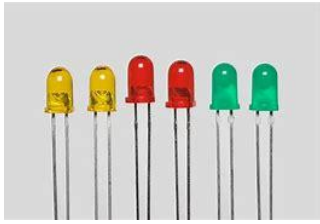
Light Emitting Diode or LED is basically a Diode that can emit light.

Being a diode means it has Cathode pin, the negatively charged electrode by which electrons enter an electrical device, and Anode pin, positively charged electrode by which the electrons leave a device. One long leg and one short. The long leg is Positve (Ano). The short leg is the Cathode.

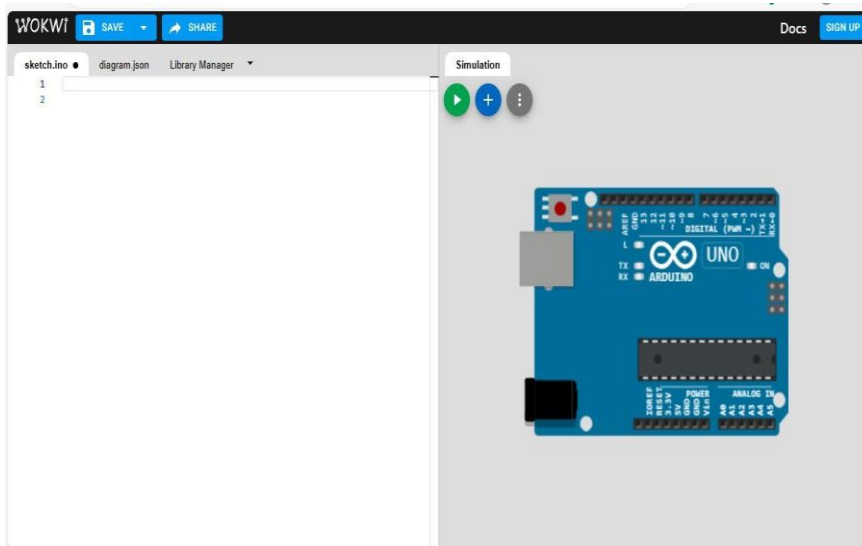# Simulation Steps

STEP 1: Access Wokwi

• Go to the websites(https://wokwi.com)

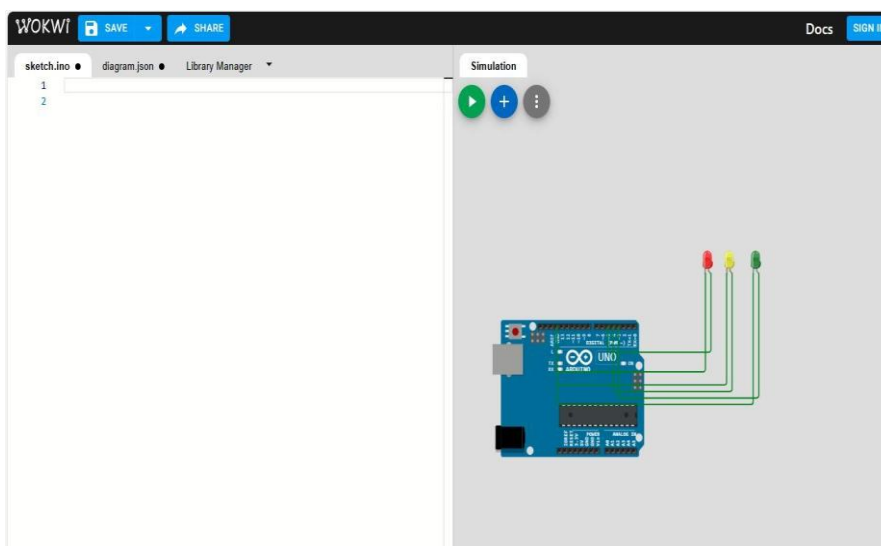# STEP 2: Create a Project

• Click on the new project

STEP 3: Add component

• In the component panel search for a "Arduino UNO" and drag it onto the virtual breadboard

STEP 4: Add a LED

• Find and drag an LED
• Drag the 3 LED with different kind of colours(red,yellow and green)

SIMULATION CONNECTION:

- LED 1 Cathode connected in the "Arduino" at GND 1.
- LED 1 Anode connected in the "Arduino" at uno 5.
- LED 2 Cathode connected in the "Arduino" at GND 1.
- LED 2 Anode connected in the "Arduino" at uno 4.
- LED 3 Cathode connected in the "Arduino" at GND 1.
- LED 3 Anode connected in the "Arduino" at uno 3.
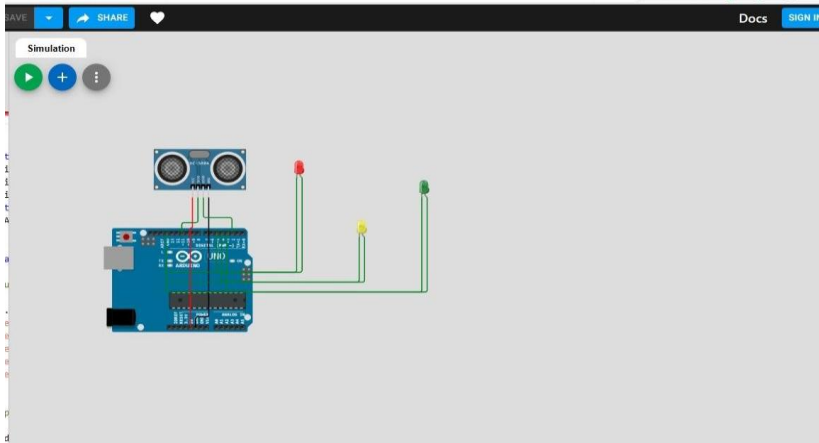
STEP 5: Add a Ultrasonic sensor.
- Find and drag a ultrasonic sensor.
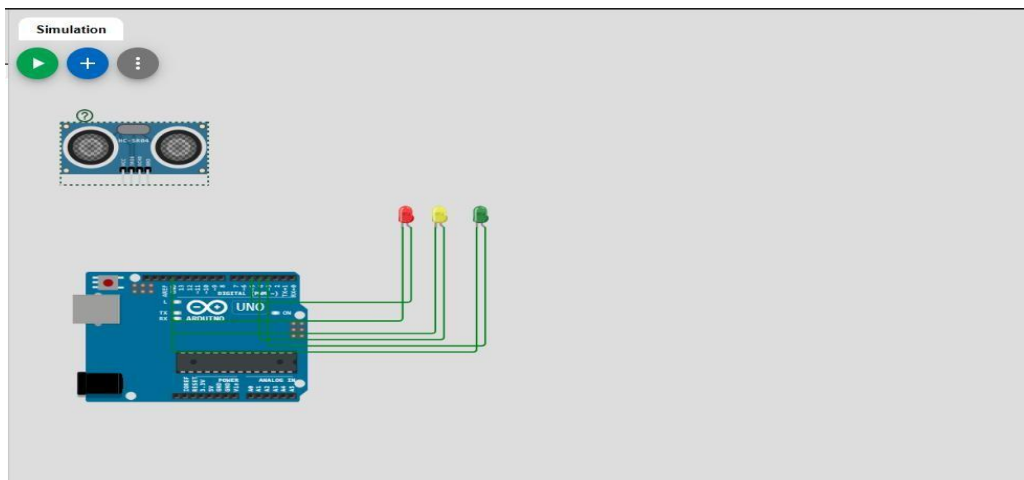
Simulation steps:

- Ultrasonic 1:GND is connected to the "Arduino" at uno GND 2.
- Ultrasonic 1.Echo is connected to the "Arduino" at uno 2.
- Ultrasonic 1.TRIG is connected to the "Arduino" at Uno 11.

● Ultrasonic 1.VCC is connected to the "Arduino" at
Uno 5V.ULTRASONIC CONNECTIO TO THE "ARDUINO"

STEP 6: CODE

```c
#include <WiFi.h>
#include <ThingSpeak.h>
#include <stdio.h>
const int echoPin=2;
int ledPin1=3;
int ledPin2=4;
int ledPin3=5;
const int trigPin=11;
bool ledActivated=false;
unsigned long ledActivationTime=0;
unsigned long myChannelNumber = 2126746;
const char * myWriteAPIKey = "LZNGZ5F5XFUQXLO7";
void setup()
{
Serial.begin(9600);
pinMode(echoPin,INPUT);
pinMode(trigPin,OUTPUT);
pinMode(ledPin1,OUTPUT);
pinMode(ledPin2,OUTPUT);
pinMode(ledPin3,OUTPUT);}
void loop()
{
if(!ledActivated)
{
digitalWrite(trigPin,LOW);
delayMicroseconds(2);
digitalWrite(trigPin,HIGH);
delayMicroseconds(10);
digitalWrite(trigPin,LOW);
unsigned long duration=pulseIn(echoPin,HIGH);
unsigned long distance=duration/58;
Serial.print("Distance:");
Serial.print(distance);
```

```
Serial.println("cm");
if(distance<50)
{
digitalWrite(ledPin3,HIGH);
Serial.println("Heavily Crowded");
ledActivated=true;
ledActivationTime=millis();
}
else if(distance<100)
{
digitalWrite(ledPin2,HIGH);
Serial.println("Moderately Crowded");
ledActivated=true;
ledActivationTime=millis();
}
else
{
digitalWrite(ledPin1,HIGH);
Serial.println("Less Crowded");
ledActivated=true;
ledActivationTime=millis();
}
}
else
{
if(millis()-ledActivationTime>=2000)
{digitalWrite(ledPin1,LOW);
digitalWrite(ledPin2,LOW);
digitalWrite(ledPin3,LOW);
ledActivated=false;
}
}
delay(1000);
}
```

STEP 7: Simulation

• Click on the simulate button to start the simulation.

• The LED should start to blinking the according to the ultrasonic sensor distance.

● The red light will be blink when the ultrasonic distanc sensor has high volume then it will display that the less crowed .
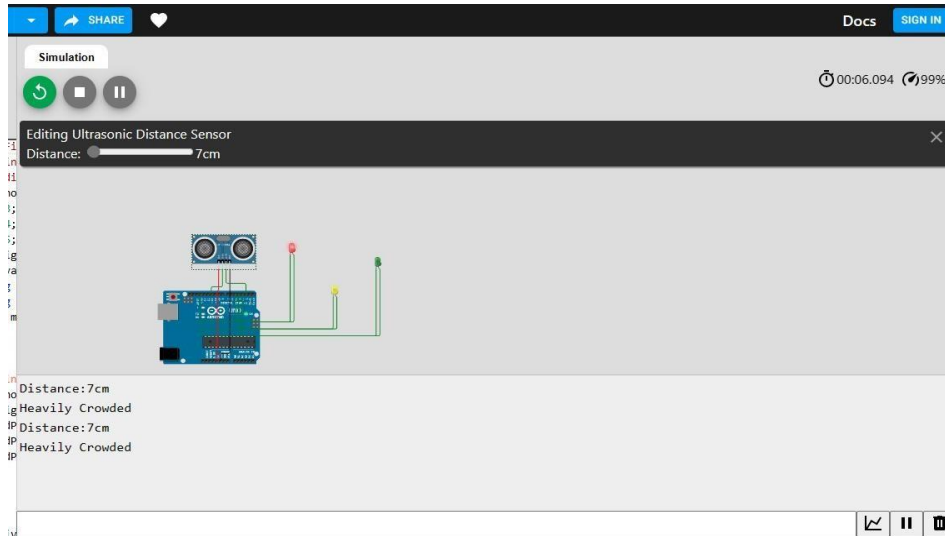
● The Yellow light will be blink when the ultrasonic distanc sensor has medium volume then it will display that the moderately crowed .
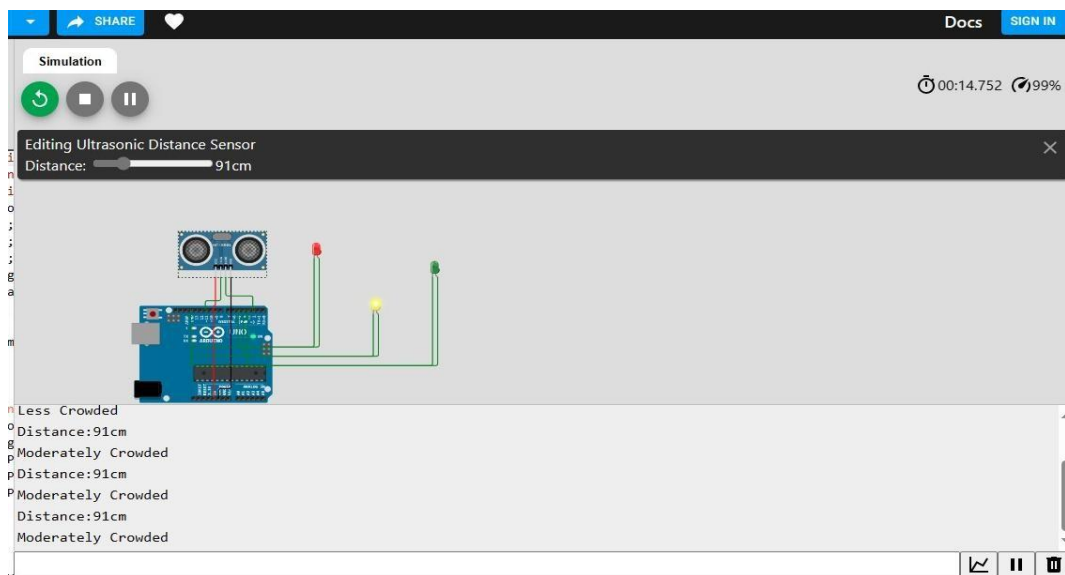
• The Green light will be blink when the ultrasonic distanc sensor has less volume then it will display that the heavy crowed .


```
Distance:403cm
Less Crowded
Distance:312cm
Less Crowded
Distance:312cm
Less Crowded
```
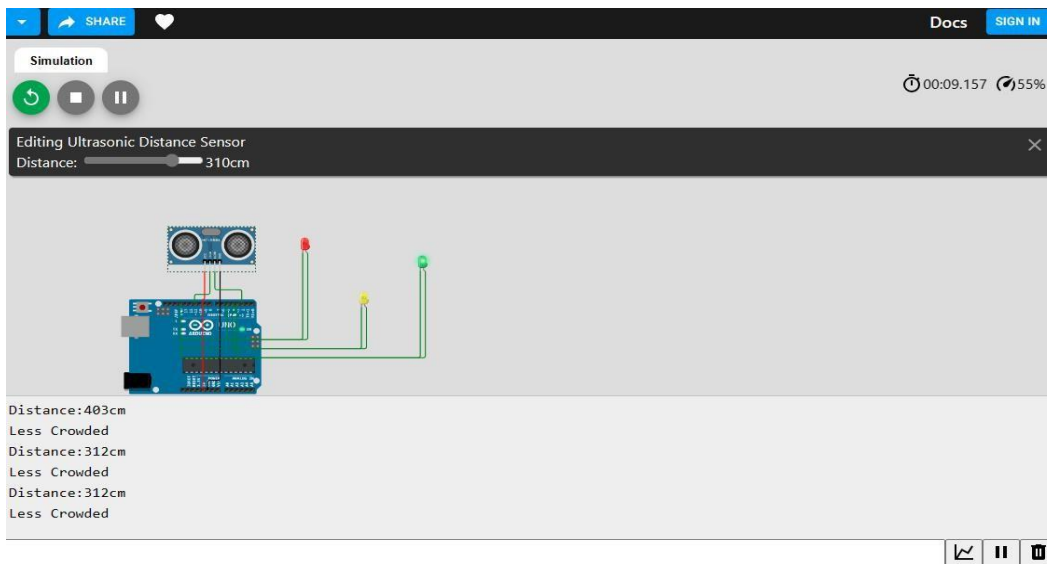
WEB APPLICATIO FOR TRAFFIC MANAGEMENT

CODE:

```html
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta http-equiv="X-UA-Compatible"
content="IE=edge">
<meta name="viewport" content="width=device-width,
initial-scale=1.0">
<title>WEB APPLICATION </title>
<style>
@import
url('https://fonts.googleapis.com/css2?family=Nunito:wg
ht@400;700&display=swap');
* {
margin: 0;
padding: 0;
```

```css
  box-sizing: border-box;
}
body {
color: #000;
font-family: 'Nunito' , sans-serif;
}.testimonial {
height: 100%;
display: flex;
flex-direction: column;
justify-content: center;
align-items: center;
padding-bottom: 5rem;
}
h1 {
margin: 20px 0;
}
.line {
height: 2px;
width: 6rem;
background-color: #e26c4f;
margin-bottom: calc(3rem + 2vmin);
}
.arrow-wrapper {
position: relative;
width: 70%;
border-radius: 2rem;
box-shadow: rgba(99, 99, 99, 0.2) 0px 2px 8px 0px;
overflow: hidden;
place-items: center;
}.review-wrap {
display: flex;
flex-direction: column;
justify-content: center;
align-items: center;
padding-top: calc(2rem + 1vmin);
width: 100%;
```

```css
}
#imgBox {
border-radius: 50%;
width: calc(10rem + 4vmin);
height: calc(10rem + 4vmin);
position: relative;
box-shadow: 5px -3px #e26c4f;
background-size: cover;
margin-bottom: calc(0.7rem + 0.5vmin);
}
#name {
margin-bottom: calc(0.7rem + 0.5vmin);
font-size: calc(1rem + 0.5vmin);
letter-spacing: calc(0.1rem + 0.1vmin);
font-weight: bold;
}
#profession {
font-size: calc(0.8rem + 0.3vmin);margin-bottom: calc(0.7rem +
0.5vmin);
color: #e26c4f;
}
#description {
font-size: calc(0.8rem + 0.3vmin);
width: 70%;
max-width: 40rem;
text-align: center;
margin-bottom: calc(2.4rem + 1vmin);
color: rgb(92, 92, 92);
line-height: 2rem;
}
.arrow {
width: calc(1.4rem + 0.6vmin);
height: calc(1.4rem + 0.6vmin);
border: solid #e26c4f;
border-width: 0 calc(0.5rem + 0.2vmin) calc(0.5rem
+ 0.2vmin) 0;
```

```css
cursor: pointer;
transition: transform 0.3s;
}
.arrow:hover {
transition: 0.3s;
transform: scale(1.15);
}.left-arrow-wrap {
position: absolute;
top: 50%;
left: 5%;
transform: rotate(135deg);
}
.right-arrow-wrap {
position: absolute;
top: 50%;
right: 5%;
transform: rotate(-45deg);
}
@media screen and (max-width: 900px) {
.testimonial {
width: 100%;
}
}
</style>
</head>
<body>
<div class="testimonial">
<h1>TRAFFIC MANAGEMENT USING IOT</h1>
<div class="line"></div>
<!-- arrow wrapper contains the review and the arrows
-->
<div class="arrow-wrapper"><!-- review section -->
<div id="reviewWrap" class="review-wrap">
<div id="imgBox"></div>
<div id="name"></div>
<div id="profession"></div>
```

```html
<div id="description"></div>
</div>
<!-- left arrow -->
<div class="left-arrow-wrap">
<div class="arrow"></div>
</div>
<!-- right arrow -->
<div class="right-arrow-wrap">
<div class="arrow"></div>
</div>
</div>
</div>
<script>
const reviewWrap =
document.getElementById("reviewWrap");
const leftArrow = document.querySelector(".left-
arrow-wrap .arrow");
const rightArrow = document.querySelector(".right-
arrow-wrap .arrow");
const imgBox =
document.getElementById("imgBox");
const    name    =    document.getElementById("name");const
profession =
document.getElementById("profession");
const description =
document.getElementById("description");
let people = [{
photo:
'url("https://th.bing.com/th/id/OIP.tBrw_mxy9n2uhuUj1f
9hzwHaF8?pid=ImgDet&rs=1.jpg")' ,
name: "Traffic management" ,
profession: "Monitor traffic flow" ,
description: "Traffic management using iot devices
to mointor the traffic flow and congestion:"
},
{
```

```
photo:
"url('https://ae01.alicdn.com/kf/HTB1F4S5RXXXXXaC
XpXXq6xXFXXXR/High-quality-New-design-single
light-300mm-red-color-LED-traffic-signal-light.jpg')" ,
name: "RED SIGNAL" ,
profession: "BASED ON ULTRASONIC
SENSOR" ,
description: "The ultrasonic sensor has a low
distance radiation then the red light will be blink.Then
there is HEAVY CROWED"
},
    {photo:

        "url('https://th.bing.com/th/id/R.8cf589bfa8b98fdc6f8
    2d4
    48d040e37e?rik=Ex5W1RM1pf07Eg&riu=http%3a%2f
    %2fwww.kbrhorse.net%2fsigpics%2fmarb_6540f.jpg&e
    hk=RVOnFsrGfoLz2j7rJNmVEsHuZ7lir%2b7JQI0yI7G
    JOU0%3d&risl=&pid=ImgRaw&r=0.jpg')",
        name: "GREEN LIGHT",
        profession: "BASED ON ULTRASONIC
    SENSOR",
        description: "The ultrasonic sensor has a High
    distance radiation then the green light will be blink.Then
    there is LESS CROWED"
        }
      ];

      //        set        the        first        person
      imgBox.style.backgroundImage = people[0].photo;
      name.innerText = people[0].name;
```

```javascript
    profession.innerText = people[0].profession;
    description.innerText = people[0].description;
    let currentPerson = 0;


    //Select the side where you want to slide
    function slide(side, personNumber) {
      let reviewWrapWidth = reviewWrap.offsetWidth +
"px";
      let descriptionHeight = description.offsetHeight +
"px";
      //(+ or -)
      let side1symbol = side === "left" ? "" : "-";
      let side2symbol = side === "left" ? "-" : "";


              setTimeout(()=>{
          imgBox.style.backgroundImage
          =people[personNumber].photo;
    }, 0);
      setTimeout(() => {
        description.style.height = descriptionHeight;
      }, 100);
      setTimeout(() => {
        name.innerText = people[personNumber].name;
      }, 200);
      setTimeout(()    =>    {
        profession.innerText =
people[personNumber].profession;
      }, 300);
      setTimeout(() => {
```

```javascript
      description.innerText        =
people[personNumber].description;
    }, 400);
  }

  function setNextCardLeft() {
   if (currentPerson === 3) {
   currentPerson        =        0;
   slide("left", currentPerson);
   }        else        {
    currentPerson++;
   }

   slide("left", currentPerson);
  }

  function setNextCardRight() {
   if (currentPerson === 0) {
   currentPerson        =        3;
   slide("right", currentPerson);
   }        else        {
    currentPerson--;
   }

   slide("right", currentPerson);
  }

  leftArrow.addEventListener("click", setNextCardLeft);
```

```
    rightArrow.addEventListener("cli
ck",setNextCardRight);
   </script>
</body>

</html>
```

OUTPUT:

THE HOME PAGE OF APPLICATION

THE NEXT PAGES OF APPLICATION

TRAFFIC MANAGEMENT USING IOT

GREEN LIGHT

BASED ON ULTRASONIC SENSOR

The ultrasonic sensor has a High distance radiation then the green light will be blink.Then there
is LESS CROWED

YELLOW SIGNAL

BASED ON ULTRASONIC SENSOR

The ultrasonic sensor has A MEDIUM distance radiation then the green light will be blink.Then
there is MODERATE CROWED