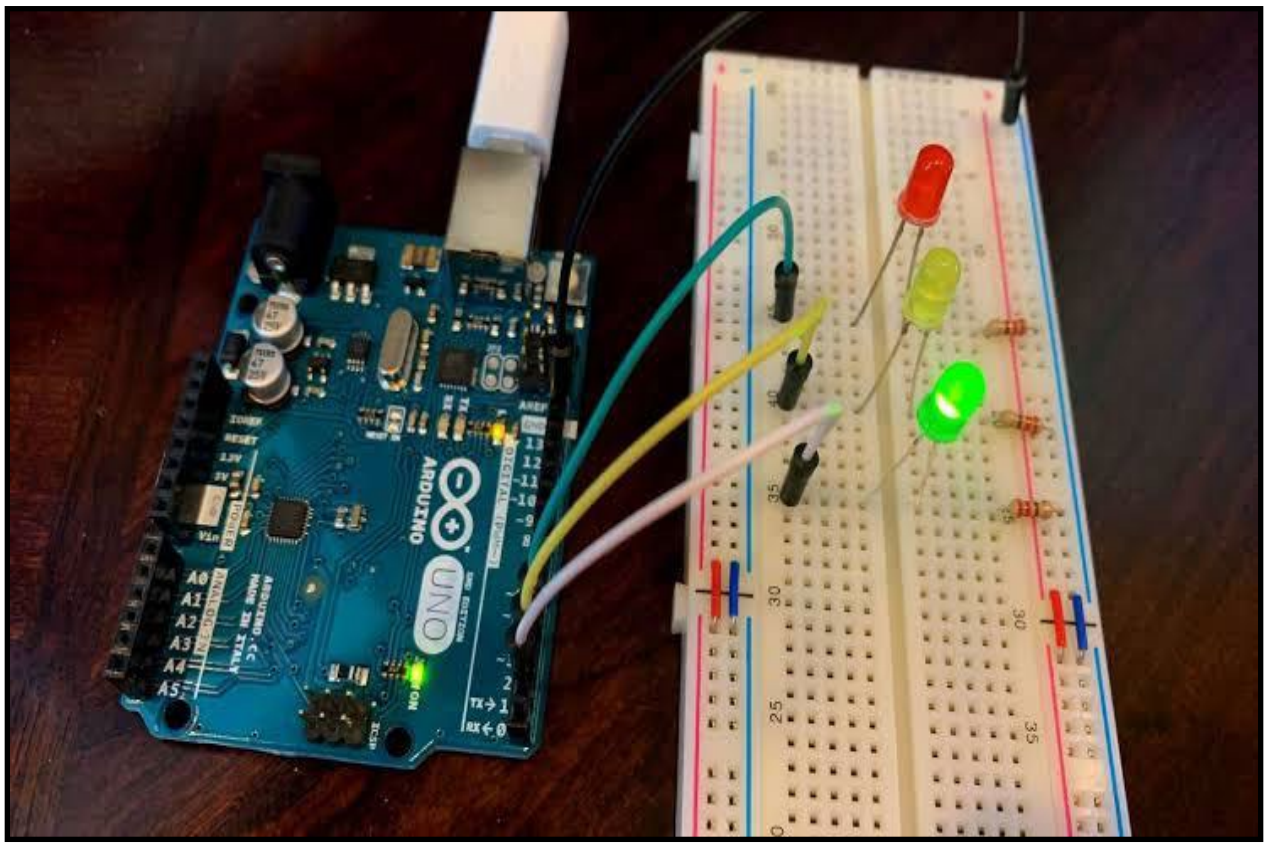
TRAFFIC MANAGEMENT SYSTEM

PHASE :4

DEVELOPMENT PART :2

INTRODUCTION:

The development of a traffic management system involves several stages, and here is an overview of the first part.Project Planning and Requirements Gathering: In this initial phase, the project team defines the scope and objectives of the traffic management system. Sensor Deployment: The next step is to deploy the sensors in strategic locations throughout the city. These sensors can include traffic cameras, vehicle detectors, and environmental sensors to monitor air quality. The sensors are connected to the IoT network, allowing them to transmit data in real-time .Network Infrastructure Setup: A reliable network infrastructure is crucial for connecting the IoT devices. Data Collection and Processing: Once the sensors are installed and connected, they start collecting data on traffic conditions. This data includes vehicle counts, speeds, and other relevant parameters.This is the initial part of the development process for a traffic management system in the context of IoT.



PYTHON PROGRAM USING ARDUINO:

1-Assign the traffic lights pins to variables

```
int d_red =10;
int d_yellow =9;
int d_green =8;
int r_red =4;
int r_yellow =3;
int r_green =2;
int l_red =13;
int l_yellow =12;
int l_green =11;
int u_red =7;
int u_yellow =6;
int u_green =5;
```

2-Configure the traffic lights as outputs

```
void setup()
{
  pinMode(d_red, OUTPUT);
  pinMode(d_yellow, OUTPUT);
  pinMode(d_green, OUTPUT);
  pinMode(r_red, OUTPUT);
  pinMode(r_yellow, OUTPUT);
  pinMode(r_green, OUTPUT);
  pinMode(l_red, OUTPUT);
  pinMode(l_yellow, OUTPUT);
  pinMode(l_green, OUTPUT);
  pinMode(u_red, OUTPUT);
  pinMode(u_yellow, OUTPUT);
  pinMode(u_green, OUTPUT);
}
```

3-Use **loop** function to keep the lights in a loop and use **changeLIght()** function to carry out the logic

```
void loop()
{
  changeLights();
}
void changeLights()
{
//Start (all yellow)
digitalWrite(u_red,LOW);
digitalWrite(d_red,LOW);
digitalWrite(r_red,LOW);
digitalWrite(l_green,LOW);
digitalWrite(u_yellow,HIGH);
digitalWrite(d_yellow,HIGH);
digitalWrite(r_yellow,HIGH);
digitalWrite(l_yellow,HIGH);
delay(5000);

//upper lane go
digitalWrite(u_yellow,LOW);
digitalWrite(d_yellow,LOW);
digitalWrite(r_yellow,LOW);
digitalWrite(l_yellow,LOW);
digitalWrite(u_green,HIGH);
digitalWrite(r_red,HIGH);
digitalWrite(l_red,HIGH);
digitalWrite(d_red,HIGH);
delay(10000);

//ALL YELLOW
digitalWrite(u_yellow,HIGH);
digitalWrite(d_yellow,HIGH);
digitalWrite(r_yellow,HIGH);
digitalWrite(l_yellow,HIGH);
digitalWrite(u_green,LOW);
digitalWrite(r_red,LOW);
digitalWrite(l_red,LOW);
digitalWrite(d_red,LOW);
delay(5000);

//RIGHT LANE GO
```

```
digitalWrite(u_yellow,LOW);
digitalWrite(d_yellow,LOW);
digitalWrite(r_yellow,LOW);
digitalWrite(l_yellow,LOW);
digitalWrite(u_red,HIGH);
digitalWrite(l_red,HIGH);
digitalWrite(d_red,HIGH);
digitalWrite(r_green,HIGH);
delay(10000);

//ALL YELLOW ON
digitalWrite(u_yellow,HIGH);
digitalWrite(d_yellow,HIGH);
digitalWrite(r_yellow,HIGH);
digitalWrite(l_yellow,HIGH);
digitalWrite(u_red,LOW);
digitalWrite(l_red,LOW);
digitalWrite(d_red,LOW);
digitalWrite(r_green,LOW);
delay(5000);

//DOWN LANE GO
digitalWrite(u_yellow,LOW);
digitalWrite(d_yellow,LOW);
digitalWrite(r_yellow,LOW);
digitalWrite(l_yellow,LOW);
digitalWrite(u_red,HIGH);
digitalWrite(l_red,HIGH);
digitalWrite(r_red,HIGH);
digitalWrite(d_green,HIGH);
delay(10000);

//ALL YELLOW
digitalWrite(u_yellow,HIGH);
digitalWrite(d_yellow,HIGH);
digitalWrite(r_yellow,HIGH);
digitalWrite(l_yellow,HIGH);
digitalWrite(u_red,LOW);
digitalWrite(l_red,LOW);
digitalWrite(r_red,LOW);
```

```
digitalWrite(d_green,LOW);
delay(5000);

//LEFT LANE GO
digitalWrite(u_yellow,LOW);
digitalWrite(d_yellow,LOW);
digitalWrite(r_yellow,LOW);
digitalWrite(l_yellow,LOW);
digitalWrite(u_red,HIGH);
digitalWrite(d_red,HIGH);
digitalWrite(r_red,HIGH);
digitalWrite(l_green,HIGH);
delay(10000);

}
```

OUTPUT:

The output of this program is a simulation of a traffic light system. The traffic lights will cycle through different states according to the code logic.

Here is the sequence of the traffic light states:

1. Start (all yellow): All lights are yellow.

2. Upper lane go: Upper lane lights are green, while the rest are red.

3. All yellow: All lights are yellow.

4. Right lane go: Right lane lights are green, while the rest are red.

5. All yellow: All lights are yellow.

6. Down lane go: Down lane lights are green, while the rest are red.

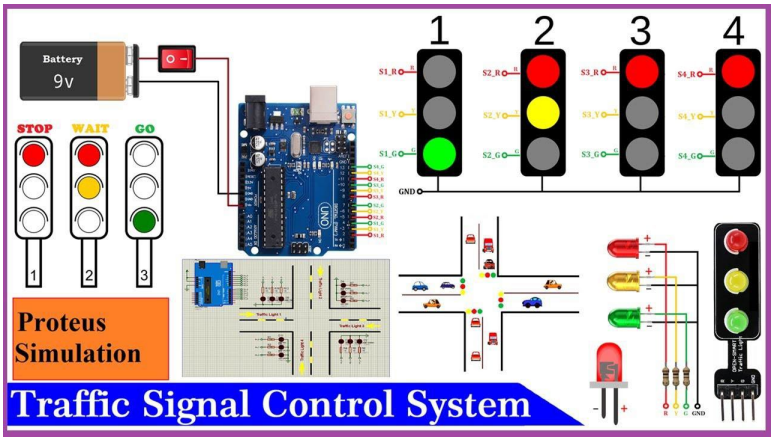
7. All yellow: All lights are yellow.

8. Left lane go: Left lane lights are green, while the rest are red.

The program will keep cycling through these states indefinitely in a loop. Each state lasts for a specified duration controlled by the delay() function in the code.

CONCLUSION:

In all urban areas, with the modernisation and reduction of industries, traffic has become the main cause for air pollution. Both in Winter (smog) as in summer (ozone) pollution is present. In all cities the main effort is to control and monitor the pollution level trough a wide network of measurement stations for a real time representation (AURORA and NEBULA, Milan, BLUME, Berlin) and even forecast (ATMOSFERA, Rome) in order to activate traffic reduction measurements.Therefore the main maps show the pollution levels for different pollutants (NO, ozone, CO, Benzene) not only along the principal roads but also represented in isolines (see also the contributions on Air). But controlling and reducing the air pollution from traffic is mainly a political decision on national and European wide scale, so that for now the most important achievement is a better informed public.



*In conclusion, an IoT based traffic management system using Arduino can greatly improve the efficiency and effectiveness of traffic control.

* The use of Arduino microcontrollers allows for easy connectivity and communication between different components of the system. This enables effective coordination between traffic lights, road signs, and other elements to ensure the smooth movement of vehicles and pedestrians.

*The IoT aspect of the system enables remote monitoring and control.

*Overall, an IoT based traffic management system using Arduino has the potential to significantly enhance traffic control, reduce congestion, and improve overall transportation efficiency.

*IoT based traffic management system using Arduino in traffic signal control enhances traffic flow, reduces congestion, and improves road safety through intelligent and adaptive signal control.