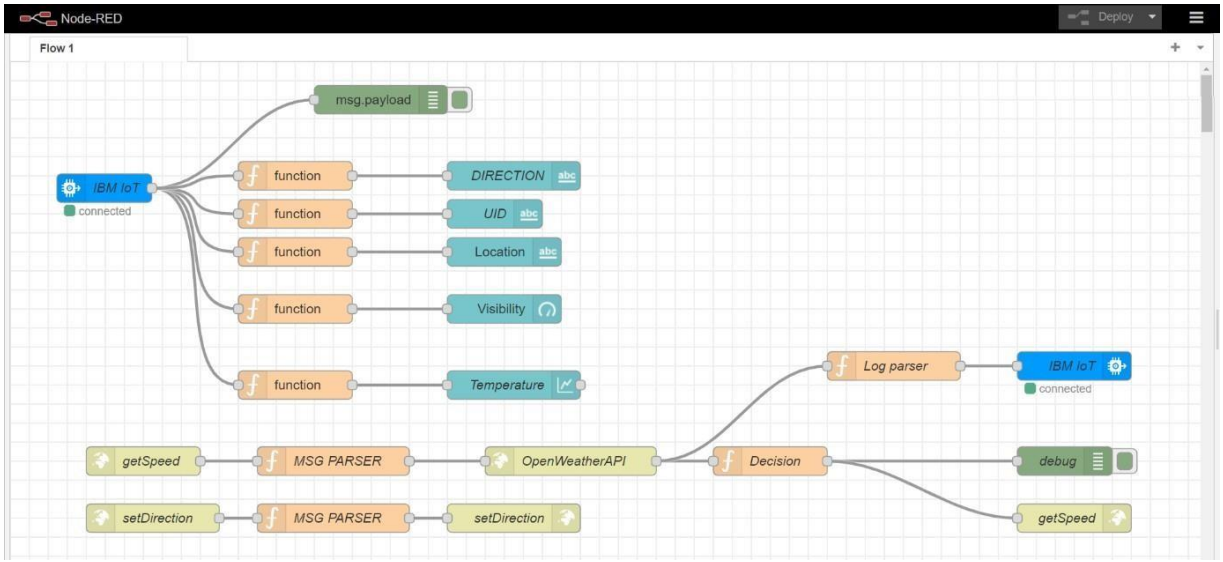
Sprint 04

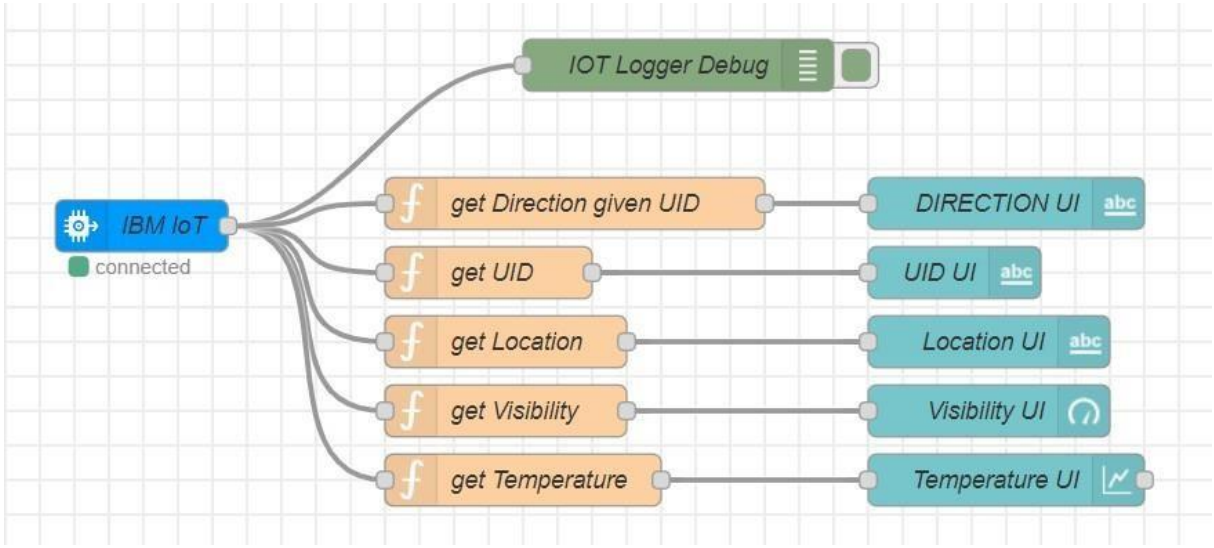
Signs with Smart Connectivity for Better Road Safety

Team ID	PNT2022TMID08719
Project Name	Signs with smart connectivity for Better road safety

Node RED :

Node RED flow :





// get Direction given UID
msg.payload = global.get(String(msg.payload.uid)); return msg;

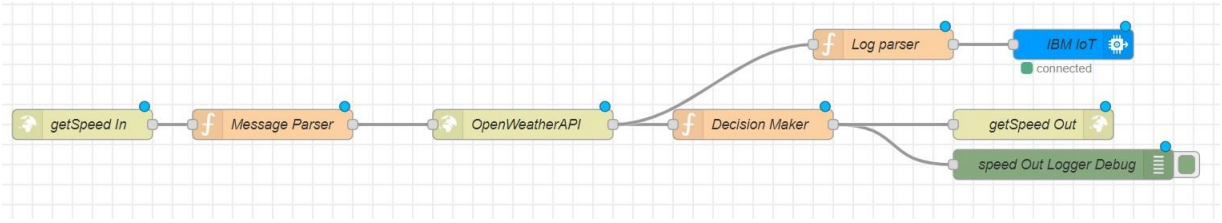
// get UID msg.payload = msg.payload.uid; return msg;

// get Location msg.payload = msg.payload.location; return msg;

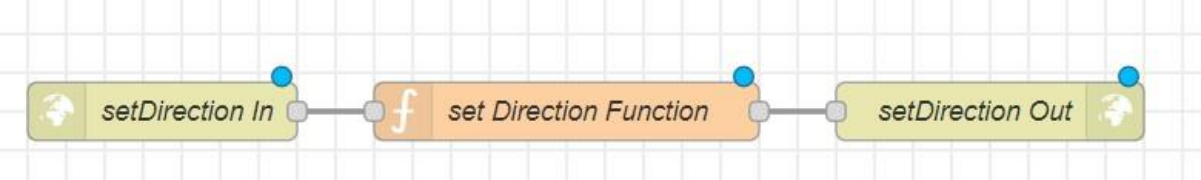
// get Visibility msg.payload = msg.payload.visibility; return msg;

// get Temperature msg.payload = msg.payload.temperature;
return msg;

getSpeed API flow :

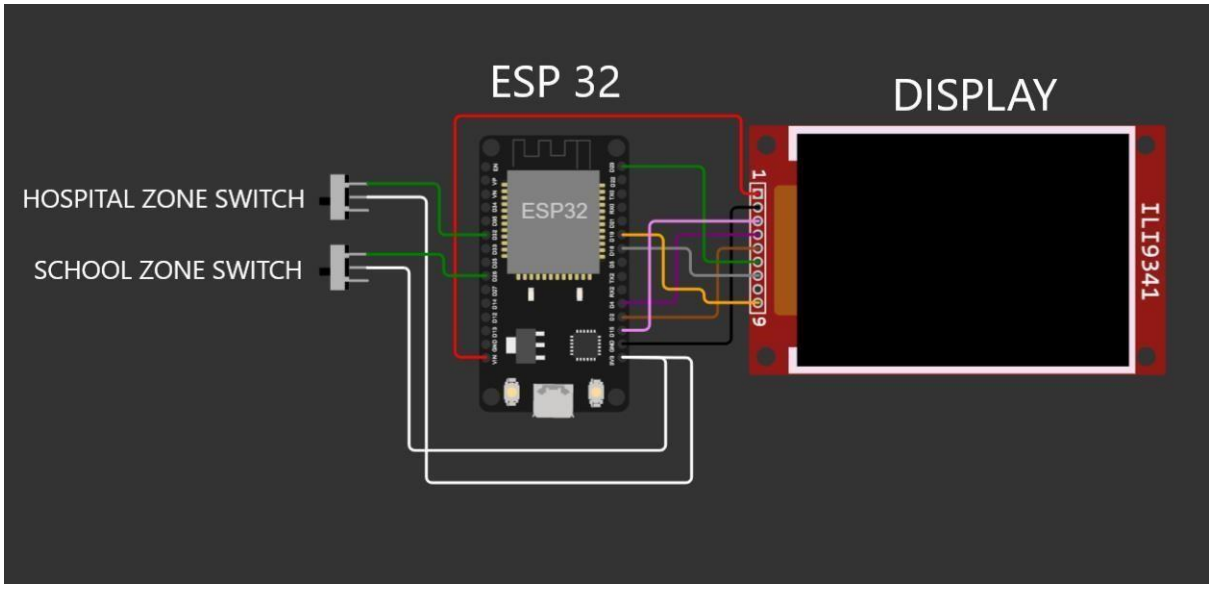

Log parser
IBM IoT
connected
getSpeed In
Message Parser
OpenWeatherAPI
Decision Maker
getSpeed Out
speed Out Logger Debug

```
weatherObj = JSON.parse(JSON.stringify(msg.payload));
localityObj = global.get("data"); var
suggestedSpeedPercentage = 100;

var preciseObject = { temperature :
    weatherObj.main.temp - 273.15, location :
    localityObj.location, visibility :
    weatherObj.visibility/100, uid :
    localityObj.uid,
    direction : global.get("direction") };

msg.payload = preciseObject; return

msg;


weatherObj = JSON.parse(JSON.stringify(msg.payload));
localityObj = global.get("data"); var
suggestedSpeedPercentage = 100;

var preciseObject = { temperature :
    weatherObj.main.temp - 273.15,
    weather : weatherObj.weather.map(x=>x.id).filter(code => code<700),
visibility : weatherObj.visibility/100 };

if(preciseObject.visibility<=40) suggestedSpeedPercentage
    -=30

switch(String(preciseObject.weather)[-1]) // https://openweathermap.org/weather-
conditions refer weather codes meaning here
{ case "0" : suggestedSpeedPercentage -=10;break; case
    "1" : suggestedSpeedPercentage -=20;break; case "2"
    :
    suggestedSpeedPercentage -=30;break; }

msg.payload = preciseObject;

var doNotHonk = 0;
if(localityObj.hospitalZone=="1"||localityObj.schoolZone=="1")
    doNotHonk = 1;

var returnObject = { suggestedSpeed :
    localityObj.usualSpeedLimit*(suggestedSpeedPercentage/100), doNotHonk :
    doNotHonk
}
msg.payload = String(returnObject.suggestedSpeed) + " kmph \n\n" +
(returnObject.doNotHonk==1?"Do Not Honk":"") + "$" +
global.get(String(localityObj.uid));

return msg;
```




```
global.set(String(msg.payload.uid),msg.payload.dir);
return msg;
```

Circuit Diagram :



ESP 32 CODE :

```
#include <WiFi.h> #include
<HTTPClient.h> #include
<Adafruit_GFX.h>
#include <Adafruit_ILI9341.h>
#include <string.h>

const char* ssid = "Wokwi-GUEST";
const char* password = "";

#define TFT_DC 2
#define TFT_CS 15
Adafruit_ILI9341 tft = Adafruit_ILI9341(TFT_CS, TFT_DC);

String myLocation = "Chennai,IN"; String usualSpeedLimit
= "70"; // kmph

int schoolZone = 32; int hospitalZone
= 26;

int uid = 2504; // ID Unique to this Micro Contoller String getString(char

x)

{
      String s(1, x); return
      s;
}

String stringSplitter1(String fullString,char delimiter='$')
{
      String returnString = "";
      for(int i = 0; i<fullString.length();i++) { char c
            = fullString[i]; if(delimiter==c) break;
            returnString+=String(c);
```

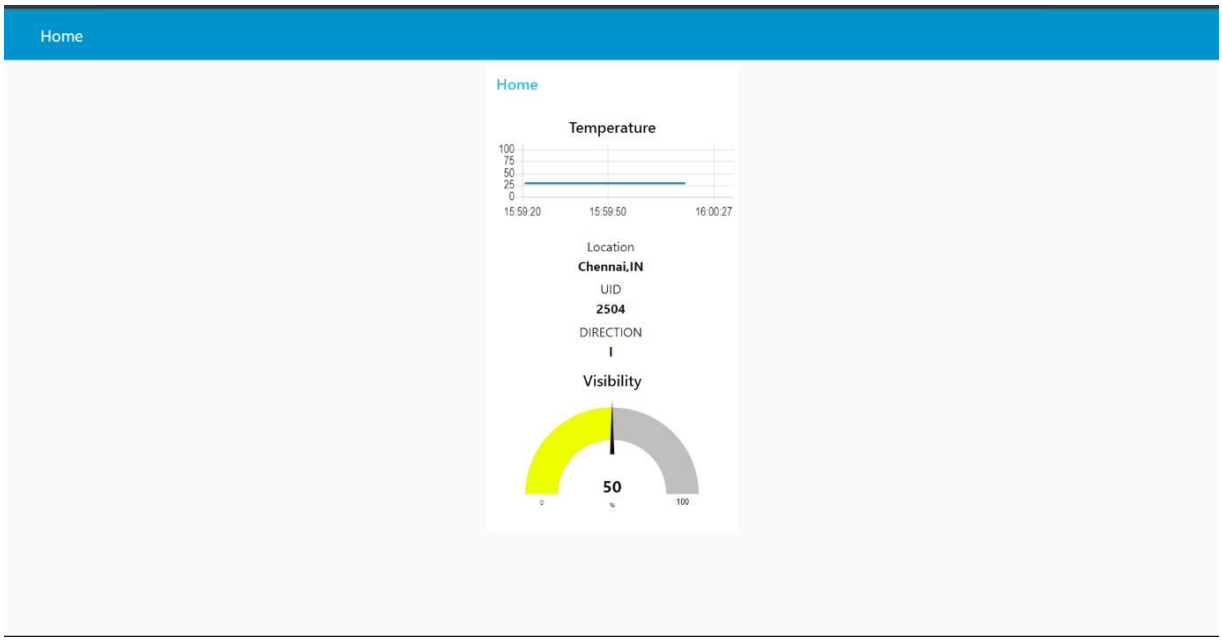
```
    }
    return(returnString);
}

String stringSplitter2(String fullString,char delimiter='$')
{
    String returnString = ""; bool flag
    = false;
    for(int i = 0; i<fullString.length();i++) { char c =
        fullString[i];                          if(flag)
        returnString+=String(c);    if(delimiter==c)
        flag = true;
    }
    return(returnString);
}

void rightArrow()
{ int refX = 50;
  int refY = tft.getCursorY() + 40;

  tft.fillRect(refX,refY,100,20,ILI9341_RED);
  tft.fillTriangle(refX+100,refY-
30,refX+100,refY+50,refX+40+100,refY+10,ILI9341_RED);
}

void leftArrow()
{ int refX = 50;
  int refY = tft.getCursorY() + 40;

  tft.fillRect(refX+40,refY,100,20,ILI9341_RED); tft.fillTriangle(refX+40,refY-
  30,refX+40,refY+50,refX,refY+10,ILI9341_RED);
}

void upArrow()
{ int refX = 125;
  int refY = tft.getCursorY() + 30;

  tft.fillTriangle(refX-
40,refY+40,refX+40,refY+40,refX,refY,ILI9341_RED); tft.fillRect(refX-
15,refY+40,30,20,ILI9341_RED); }

String APICall() {
  HTTPClient http;

  String url = "https://node-red-grseb-2022-11-05-test.eu-
gb.mybluemix.net/getSpeed?";
  url += "location="+myLocation+"&";
  url += "schoolZone="+(String)digitalRead(schoolZone)+(String)"&"; url +=
  "hospitalZone="+(String)digitalRead(hospitalZone)+(String)"&";url +=
  "usualSpeedLimit="+(String)usualSpeedLimit+(String)"&";
```

```
url += "uid="+(String)uid;
http.begin(url.c_str()); int
httpResponseCode = http.GET();

if (httpResponseCode>0) {
   String payload = http.getString();
```

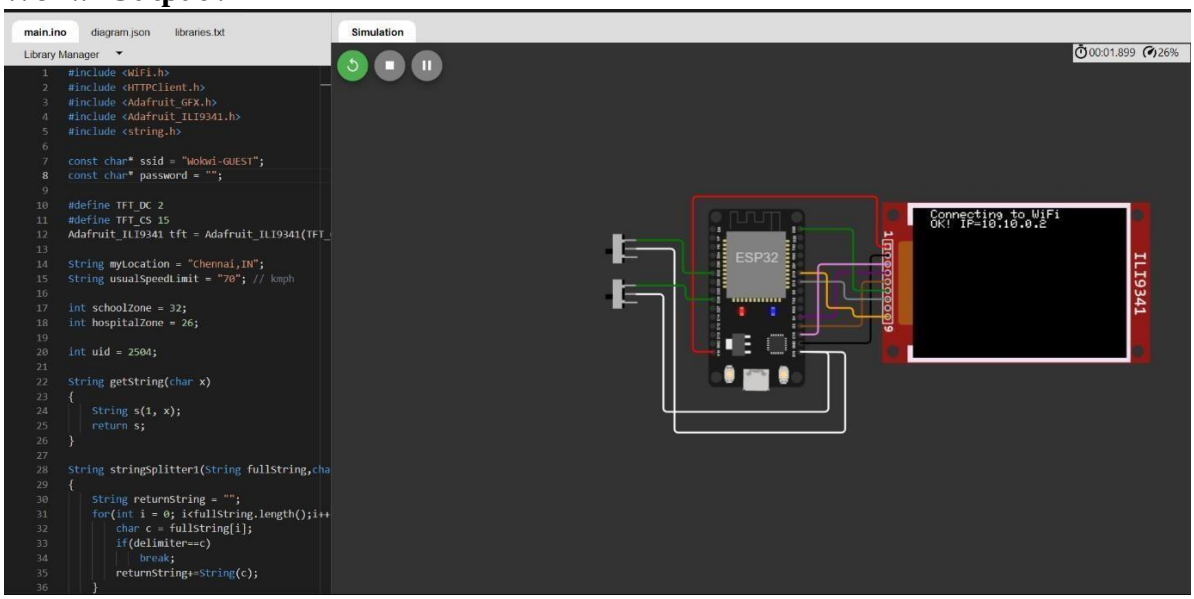
```
      http.end();
      return(payload);
    } else
    {
      Serial.print("Error code: ");
      Serial.println(httpResponseCode);
    } http.end();
}

void myPrint(String contents) {
   tft.fillScreen(ILI9341_BLACK);
   tft.setCursor(0, 20);
   tft.setTextSize(4);
   tft.setTextColor(ILI9341_RED);
   //tft.println(contents);

   tft.println(stringSplitter1(contents)); String c2
   = stringSplitter2(contents); if(c2=="s") //
   represents Straight
   { upArrow();
   }
   if(c2=="l") // represents left
   { leftArrow();
   }
   if(c2=="r") // represents right
   { rightArrow();
   }
}

void setup() {
   WiFi.begin(ssid, password, 6);

   tft.begin();
   tft.setRotation(1);

   tft.setTextColor(ILI9341_WHITE);
   tft.setTextSize(2);
   tft.print("Connecting to WiFi");

   while (WiFi.status() != WL_CONNECTED)
      {                 delay(100);
      tft.print(".");
   }

   tft.print("\nOK! IP="); tft.println(WiFi.localIP());
}

void loop() { myPrint(APICall());
   delay(100);
}
```

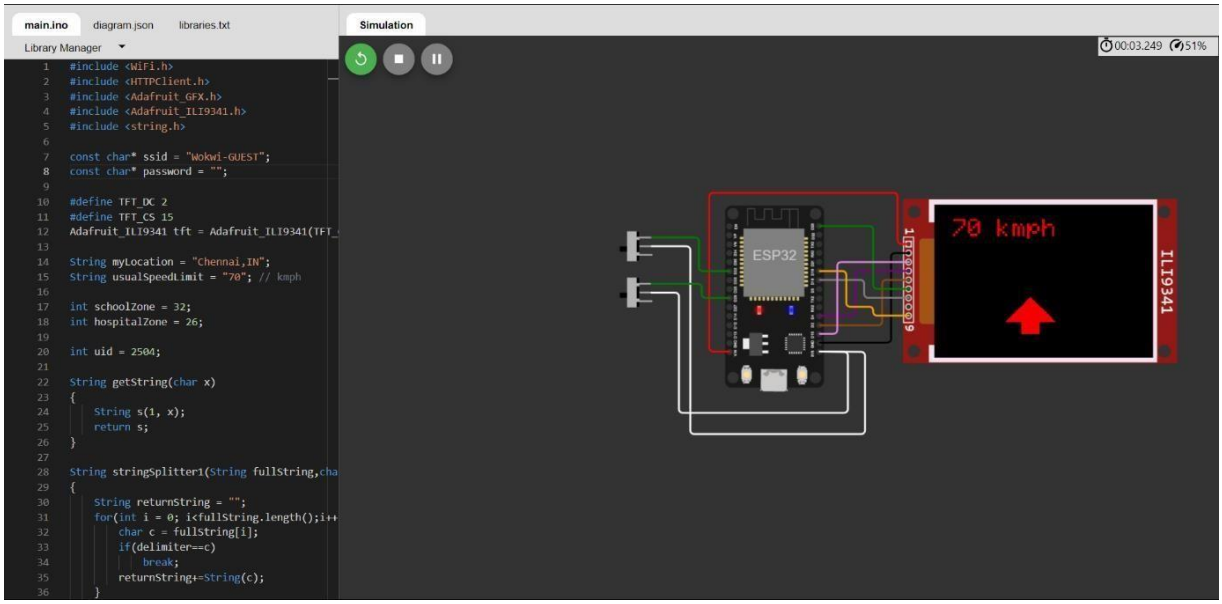
Output :

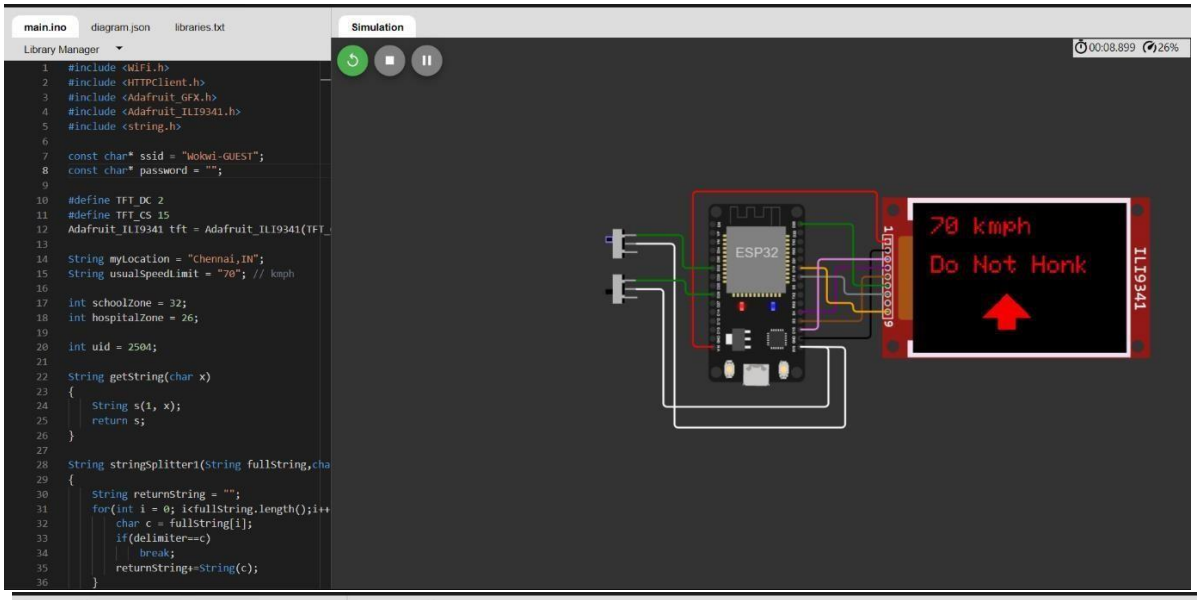
Node RED Dashboard :

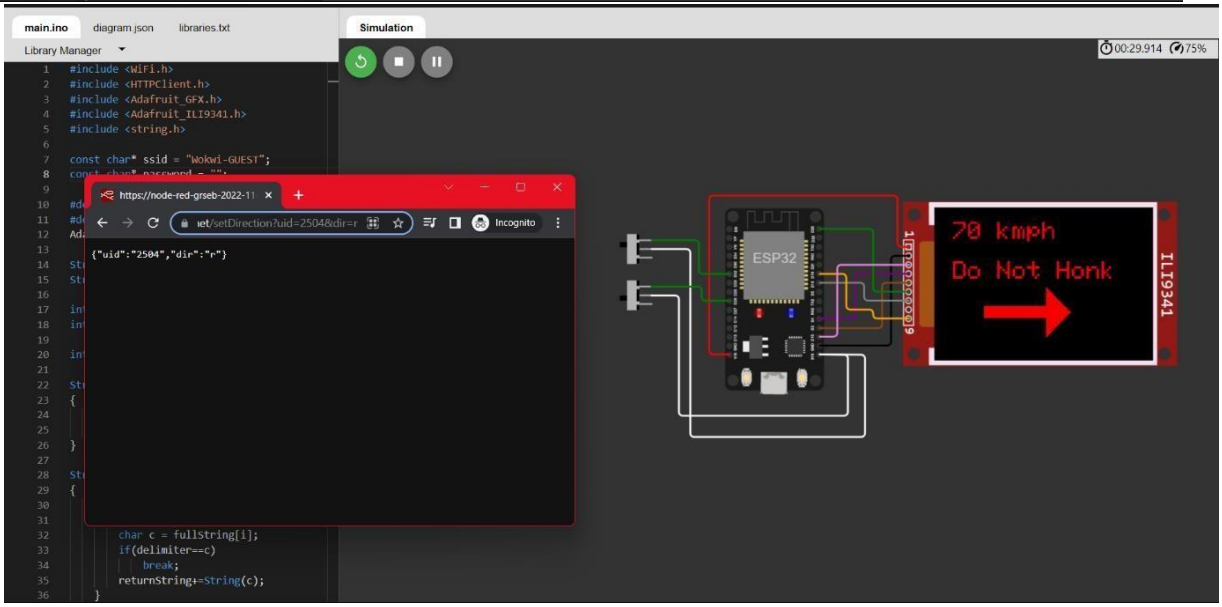


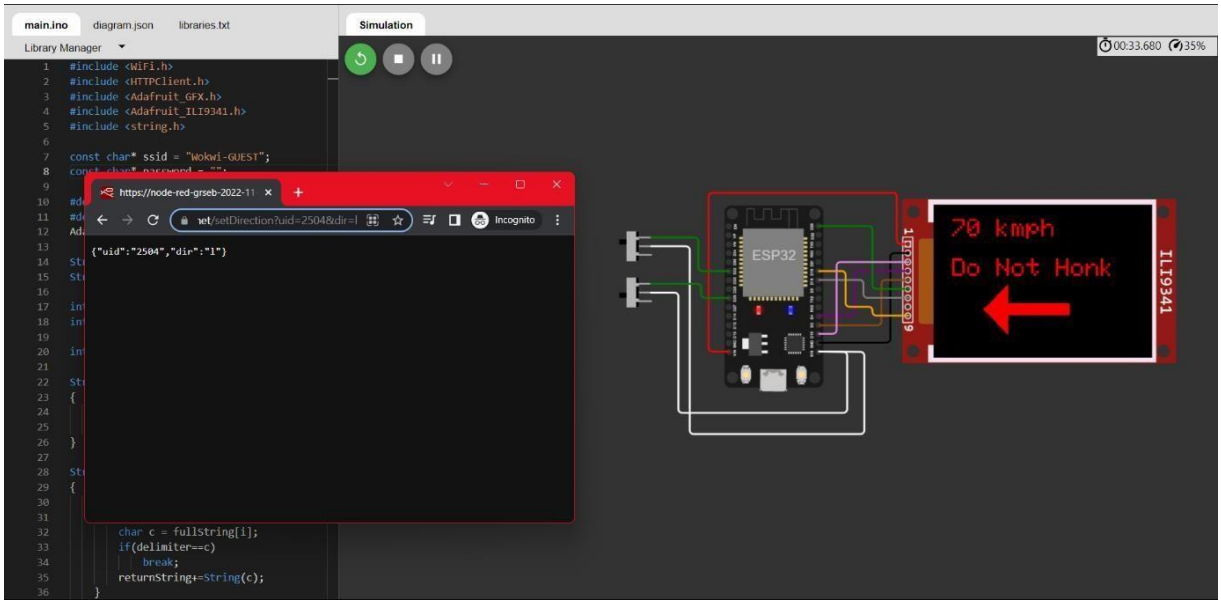
Wokwi Output :




main.ino
diagram.json
libraries.txt
Library Manager
Simulation
00:03.249
51%
#include <WiFi.h>
#include <HTTPClient.h>
#include <Adafruit_GFX.h>
#include <Adafruit_ILI9341.h>
#include <string.h>
const char* ssid = "Wokwi-GUEST";
const char* password = "";
#define TFT_DC 2
#define TFT_CS 15
Adafruit_ILI9341 tft = Adafruit_ILI9341(TFT_
String myLocation = "Chennai,IN";
String usualSpeedLimit = "70"; // kmph
int schoolZone = 32;
int hospitalZone = 26;
int uid = 2504;
String getString(char x)
{
String s(1, x);
return s;
}
String stringSplitter1(String fullString,cha
{
String returnString = "";
for(int i = 0; i<fullString.length();i++
char c = fullString[i];
if(delimiter==c)
break;
returnString+=String(c);
}
ESP32
70 kmph
ILI9341


main.ino
diagram.json
libraries.txt
Library Manager
Simulation
00:08.899
26%
#include <WiFi.h>
#include <HTTPClient.h>
#include <Adafruit_GFX.h>
#include <Adafruit_ILI9341.h>
#include <string.h>
const char* ssid = "Wokwi-GUEST";
const char* password = "";
#define TFT_DC 2
#define TFT_CS 15
Adafruit_ILI9341 tft = Adafruit_ILI9341(TFT_
String myLocation = "Chennai,IN";
String usualSpeedLimit = "70"; // kmph
int schoolZone = 32;
int hospitalZone = 26;
int uid = 2504;
String getString(char x)
{
String s(1, x);
return s;
}
String stringSplitter1(String fullString,cha
{
String returnString = "";
for(int i = 0; i<fullString.length();i++
char c = fullString[i];
if(delimiter==c)
break;
returnString+=String(c);
}
ESP32
70 kmph
Do Not Honk
ILI9341


main.ino
diagram.json
libraries.txt
Library Manager
Simulation
00:29.914
75%
https://node-red-grseb-2022-11
Incognito
{"uid":"2504","dir":"r"}
ESP32
70 kmph
Do Not Honk
ILI9341


main.ino
diagram.json
libraries.txt
Library Manager
Simulation
00:33.680
35%
#include <WiFi.h>
#include <HTTPClient.h>
#include <Adafruit_GFX.h>
#include <Adafruit_ILI9341.h>
#include <string.h>
const char* ssid = "Wokwi-GUEST";
https://node-red-grseb-2022-11
Incognito
{"uid":"2504","dir":"1"}
char c = fullString[i];
if(delimiter==c)
break;
returnString+=String(c);
ESP32
70 kmph
Do Not Honk
ILI9341