SMART WATER MANAGEMENT

Date	**26-10-2023**
Team ID	**666**
Team Name	**Proj_223434_Team_2**
Project Name	**Smart Water Management**

SOURCE CODE:

```
#define BLYNK_TEMPLATE_ID "TMPLlcLQu4bQ"

#define BLYNK_TEMPLATE_NAME "water monitor"

#define BLYNK_AUTH_TOKEN "OgvenxCWu9sG7-9deFGLFCLE4rWCGW7N"


char ssid[] = "Wokwi-GUEST";

char pass[] = "";

int emptyTankDistance = 150 ;

int fullTankDistance =  40 ;

int triggerPer =   10 ;

#include <Adafruit_SSD1306.h>

#include <WiFi.h>

#include <WiFiClient.h>

#include <BlynkSimpleEsp32.h>

#include <AceButton.h>

using namespace ace_button;


#define TRIGPIN    27

#define ECHOPIN    26

#define wifiLed    2

#define BuzzerPin  13

#define RelayPin   14

#define ButtonPin1 12

#define ButtonPin2 33
```

```
#define ButtonPin3 32
#define fullpin    25

#define VPIN_BUTTON_1    V1
#define VPIN_BUTTON_2    V2
#define VPIN_BUTTON_3    V3
#define VPIN_BUTTON_4    V4
#define VPIN_BUTTON_5    V5

#define SCREEN_WIDTH 128
#define SCREEN_HEIGHT 32

#define OLED_RESET     -1
Adafruit_SSD1306 display(SCREEN_WIDTH, SCREEN_HEIGHT, &Wire,
OLED_RESET);

float duration;
float distance;
int   waterLevelPer;
bool  toggleBuzzer = HIGH;

bool toggleRelay = false;
bool modeFlag = true;
bool conection = true;
String currMode;

char auth[] = BLYNK_AUTH_TOKEN;

ButtonConfig config1;
AceButton button1(&config1);
ButtonConfig config2;
```

```
AceButton button2(&config2);
ButtonConfig config3;
AceButton button3(&config3);

void handleEvent1(AceButton*, uint8_t, uint8_t);
void handleEvent2(AceButton*, uint8_t, uint8_t);
void handleEvent3(AceButton*, uint8_t, uint8_t);

BlynkTimer timer;

void checkBlynkStatus() {

  bool isconnected = Blynk.connected();
  if (isconnected == false) {
    digitalWrite(wifiLed, LOW);
    conection = true;

  }
  if (isconnected == true) {
    digitalWrite(wifiLed, HIGH);
    conection = false;
  }
}



BLYNK_WRITE(VPIN_BUTTON_3) {
  modeFlag = param.asInt();
  if(!modeFlag && toggleRelay){
      digitalWrite(RelayPin, LOW);
      toggleRelay = false;
    }
    controlBuzzer(500);
    currMode = modeFlag ? "AUTO" : "MANUAL";
}

BLYNK_WRITE(VPIN_BUTTON_4) {
  if(!modeFlag){
    toggleRelay = param.asInt();
    digitalWrite(RelayPin, toggleRelay);
    controlBuzzer(500);
  }
  else{
    Blynk.virtualWrite(VPIN_BUTTON_4, toggleRelay);
  }
}

BLYNK_WRITE(VPIN_BUTTON_5) {
  toggleBuzzer = param.asInt();
  digitalWrite(BuzzerPin, toggleBuzzer);
}

BLYNK_CONNECTED() {
  Blynk.syncVirtual(VPIN_BUTTON_1);
  Blynk.syncVirtual(VPIN_BUTTON_2);

  Blynk.virtualWrite(VPIN_BUTTON_3, modeFlag);
  Blynk.virtualWrite(VPIN_BUTTON_4, toggleRelay);
  Blynk.virtualWrite(VPIN_BUTTON_5, toggleBuzzer);
}

void displayData(){
  display.clearDisplay();
  display.setTextSize(3);
  display.setCursor(30,0);
  display.print(waterLevelPer);
  display.print(" ");
  display.print("%");
  display.setTextSize(1);
  display.setCursor(0,25);
  display.print(conection ? "OFFLINE" : "ONLINE");
  display.setCursor(60,25);
  display.print(currMode);
  display.setCursor(110,25);
  display.print(toggleRelay ? "! ON" : "OFF");
  display.display();
}

void measureDistance(){

  digitalWrite(TRIGPIN, LOW);
  delayMicroseconds(2);

  digitalWrite(TRIGPIN, HIGH);
  delayMicroseconds(20);

  digitalWrite(TRIGPIN, LOW);

  duration = pulseIn(ECHOPIN, HIGH);

  distance = ((duration / 2) * 0.343)/10;

  if (distance > (fullTankDistance - 10)  && distance < emptyTankDistance ){
    waterLevelPer = map((int)distance ,emptyTankDistance, fullTankDistance, 0, 100);
```

```
Blynk.virtualWrite(VPIN_BUTTON_1, waterLevelPer);
Blynk.virtualWrite(VPIN_BUTTON_2, (String(distance) + " cm"));



if (waterLevelPer < triggerPer){

  if(modeFlag){
    if(!toggleRelay){
      controlBuzzer(500);
      digitalWrite(RelayPin, HIGH);
      toggleRelay = true;
      Blynk.virtualWrite(VPIN_BUTTON_4, toggleRelay);
    }
  }
  else{
    if (toggleBuzzer == HIGH){
      digitalWrite(BuzzerPin, HIGH);
      Serial.println(" BuzzerPin high");
    }
  }
}

if (distance < fullTankDistance){
  digitalWrite(fullpin, HIGH);
  if(modeFlag){
    if(toggleRelay){
      digitalWrite(RelayPin, LOW);

      toggleRelay = false;
      Blynk.virtualWrite(VPIN_BUTTON_4, toggleRelay);
      controlBuzzer(500);
```

```
       }
      }
      else{
       if (toggleBuzzer == HIGH){
       digitalWrite(BuzzerPin, HIGH);
       }
      }
    }
    if (distance > (fullTankDistance + 5) && waterLevelPer > (triggerPer + 5)){
      toggleBuzzer = HIGH;
      Blynk.virtualWrite(VPIN_BUTTON_5, toggleBuzzer);
      digitalWrite(BuzzerPin, LOW);
    }
    if (distance = fullTankDistance){
    Serial.println(" udh bang ");



    }
  }
  displayData();
  delay(100);
}

void controlBuzzer(int duration){
  digitalWrite(BuzzerPin, HIGH);
  Serial.println(" BuzzerPin HIT");
  delay(duration);
  digitalWrite(BuzzerPin, LOW);
}

void setup() {
```

```
Serial.begin(9600);

pinMode(ECHOPIN, INPUT);
pinMode(TRIGPIN, OUTPUT);
pinMode(wifiLed, OUTPUT);
pinMode(RelayPin, OUTPUT);
pinMode(BuzzerPin, OUTPUT);
pinMode(fullpin, OUTPUT);

pinMode(ButtonPin1, INPUT_PULLUP);
pinMode(ButtonPin2, INPUT_PULLUP);
pinMode(ButtonPin3, INPUT_PULLUP);

digitalWrite(wifiLed, HIGH);
digitalWrite(RelayPin, LOW);
digitalWrite(BuzzerPin, LOW);

config1.setEventHandler(button1Handler);
config2.setEventHandler(button2Handler);
config3.setEventHandler(button3Handler);

button1.init(ButtonPin1);
button2.init(ButtonPin2);
button3.init(ButtonPin3);

currMode = modeFlag ? "AUTO" : "MANUAL";

if(!display.begin(SSD1306_SWITCHCAPVCC, 0x3C)) {
  Serial.println(F("SSD1306 allocation failed"));
  for(;;);
}
```

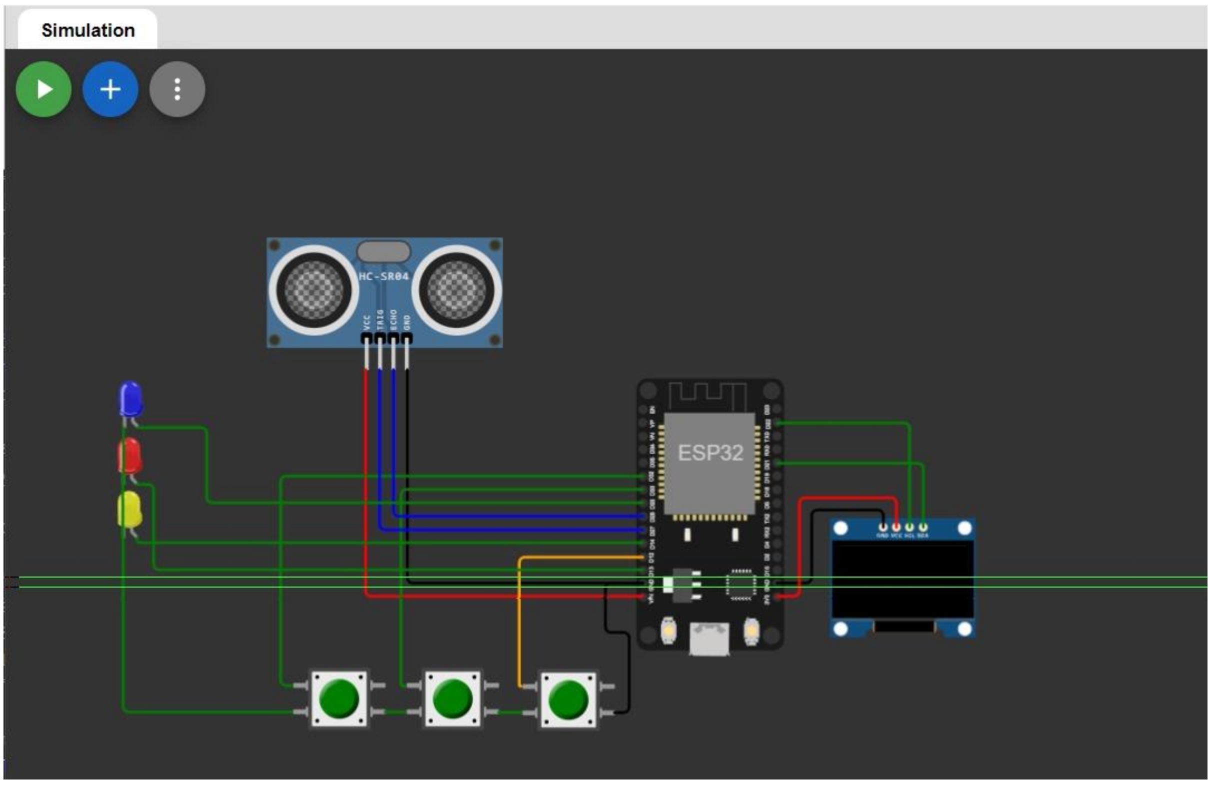
```
  delay(1000);
  display.setTextSize(1);
  display.setTextColor(WHITE);
  display.clearDisplay();

  WiFi.begin(ssid, pass);
  timer.setInterval(2000L, checkBlynkStatus);
  timer.setInterval(1000L,  measureDistance);
  Blynk.config(auth);
  delay(1000);

  Blynk.virtualWrite(VPIN_BUTTON_3, modeFlag);
  Blynk.virtualWrite(VPIN_BUTTON_4, toggleRelay);
  Blynk.virtualWrite(VPIN_BUTTON_5, toggleBuzzer);

  delay(500);
}
 void loop() {

  Blynk.run();
  timer.run();

  button1.check();
  button3.check();

  if(!modeFlag){
    button2.check();
  }

}
void button1Handler(AceButton* button, uint8_t eventType, uint8_t buttonState) {
  Serial.println("EVENT1");
  switch (eventType) {
    case AceButton::kEventReleased:
      if(modeFlag && toggleRelay){
        digitalWrite(RelayPin, LOW);
        toggleRelay = false;
        controlBuzzer(500);
      }
      modeFlag = !modeFlag;
      currMode = modeFlag ? "AUTO" : "MANUAL";
      Blynk.virtualWrite(VPIN_BUTTON_3, modeFlag);
      controlBuzzer(200);
      break;
  }
}

void button2Handler(AceButton* button, uint8_t eventType, uint8_t buttonState) {
  Serial.println("EVENT2");
  switch (eventType) {
    case AceButton::kEventReleased:
      if(toggleRelay){
        digitalWrite(RelayPin, LOW);
        toggleRelay = false;
      }
      else{
        digitalWrite(RelayPin, HIGH);
        toggleRelay = true;
      }
      Blynk.virtualWrite(VPIN_BUTTON_4, toggleRelay);
      controlBuzzer(500);
      delay(1000);
      break;
  }
}

void button3Handler(AceButton* button, uint8_t eventType, uint8_t buttonState) {
  Serial.println("EVENT3");
  switch (eventType) {
    case AceButton::kEventReleased:
      digitalWrite(BuzzerPin, LOW);
      toggleBuzzer = LOW;
      Blynk.virtualWrite(VPIN_BUTTON_5, toggleBuzzer);
      break;
  }
}
```

Diagram. Json:

```
    {
  "version": 1,
  "author": "Anonymous maker",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 0, "left": 0, "attrs": {} },
    { "type": "board-ssd1306", "id": "oled1", "top": 127.94, "left": 144.23, "attrs": {} },
    {
      "type": "wokwi-pushbutton",
      "id": "btn1",
      "top": 210.09,
      "left": -82.64,
      "attrs": { "color": "green" }
    },
    {
```

```
    "type": "wokwi-pushbutton",
    "id": "btn2",
    "top": 209.94,
    "left": -165.82,
    "attrs": { "color": "green" }
  },
  {
    "type": "wokwi-pushbutton",
    "id": "btn3",
    "top": 209.63,
    "left": -247.46,
    "attrs": { "color": "green" }
  },
  {
    "type": "wokwi-hc-sr04",
    "id": "ultrasonic1",
    "top": -98.88,
    "left": -265.69,
    "attrs": { "distance": "137" }
  },
  {
    "type": "wokwi-led",
    "id": "led1",
    "top": 74.72,
    "left": -383.66,
    "attrs": { "color": "yellow" }
  },
  {
    "type": "wokwi-led",
    "id": "led2",
    "top": 36.18,
    "left": -383.97,
    "attrs": { "color": "red" }
   },
   {
    "type": "wokwi-led",
    "id": "led3",
    "top": -4.65,
    "left": -383.35,
    "attrs": { "color": "blue" }
   }
 ],
 "connections": [
   [ "esp:TX0", "$serialMonitor:RX", "", [] ],
   [ "esp:RX0", "$serialMonitor:TX", "", [] ],
   [ "oled1:GND", "esp:GND.1", "black", [ "v-12.55", "h-51.53", "v52.48" ] ],
   [ "oled1:VCC", "esp:3V3", "red", [ "v-21.39", "h-69.82", "v70.82" ] ],
   [ "oled1:SCL", "esp:D22", "green", [ "v0" ] ],
   [ "oled1:SDA", "esp:D21", "green", [ "v0" ] ],
   [ "ultrasonic1:GND", "esp:GND.2", "black", [ "v0" ] ],
   [ "ultrasonic1:VCC", "esp:VIN", "red", [ "v0" ] ],
   [ "btn3:2.r", "btn2:2.l", "green", [ "h0" ] ],
   [ "btn2:2.r", "btn1:2.l", "green", [ "h0" ] ],
   [ "btn1:2.r", "esp:GND.2", "black", [ "h10.68", "v-57.57", "h-17.06", "v-34.12" ] ],
   [ "btn1:1.l", "esp:D12", "orange", [ "h-1.3", "v-101.73" ] ],
   [ "esp:D33", "btn2:1.l", "green", [ "h-173.93", "v141.24" ] ],
   [ "btn3:1.l", "esp:D32", "green", [ "h-7.99", "v-158.4" ] ],
   [ "ultrasonic1:ECHO", "esp:D26", "blue", [ "v0" ] ],
   [ "ultrasonic1:TRIG", "esp:D27", "blue", [ "v0" ] ],
   [ "led3:C", "led2:C", "green", [ "v0" ] ],
   [ "led2:C", "led1:C", "green", [ "v0" ] ],
   [ "led1:A", "esp:D14", "green", [ "v0" ] ],
    [ "led2:A", "esp:D13", "green", [ "h12.22", "v61.32" ] ],
    [ "led3:A", "esp:D25", "green", [ "h49.73", "v53.95" ] ],
    [ "led1:C", "btn3:2.l", "green", [ "v0" ] ]
  ],
  "dependencies": {}
}
```

CIRCUIT DIAGRAM:



WEB DEDVELPOMENT PLATFORM:

HTML:

```
  <!DOCTYPE html>
<html lang="en">


<head>
```

```html
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Water Monitor</title>
    <link rel="stylesheet" href="styles.css">
</head>

<body>
    <div class="container">
        <h1>Water Monitor</h1>
        <div class="status">
            <h2>Water Level: <span id="waterLevel">0%</span></h2>
            <h2>Status: <span id="status">Offline</span></h2>
        </div>
        <div class="controls">
            <button id="toggleMode">Toggle Mode</button>
            <button id="toggleRelay">Toggle Relay</button>
            <button id="toggleBuzzer">Toggle Buzzer</button>
        </div>
    </div>
    <script src="script.js"></script>
</body>
</html>
```

CSS:

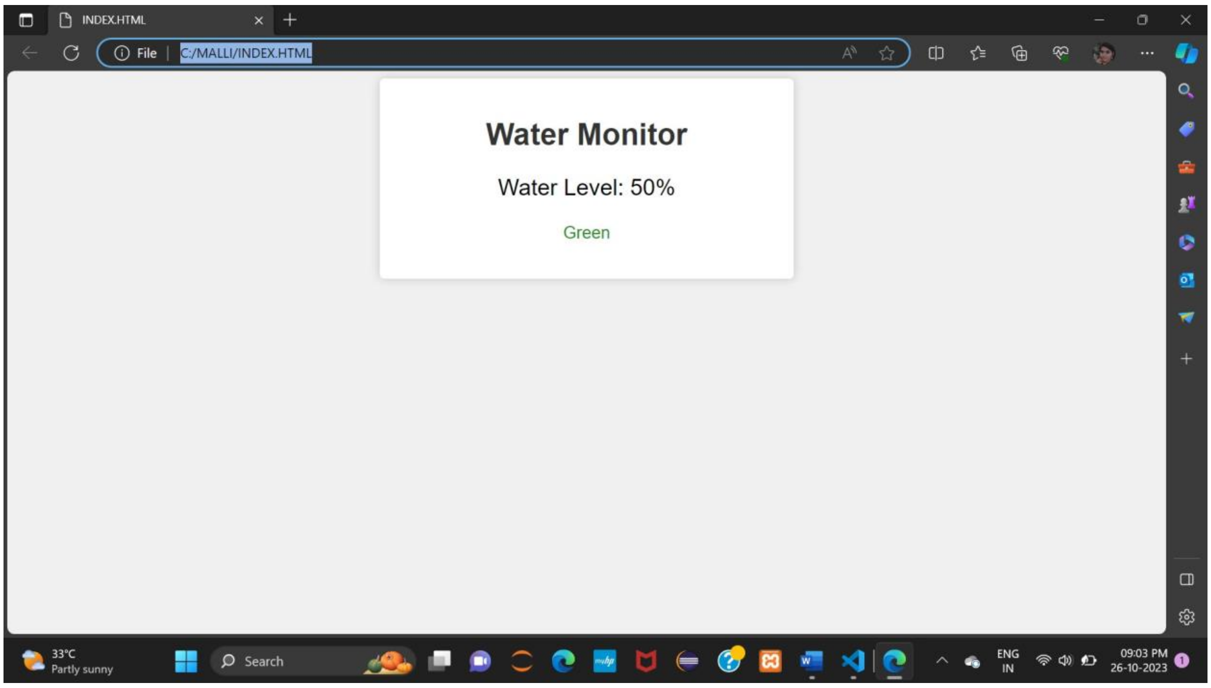
```css
body {
    font-family: Arial, sans-serif;
}

.container {
    text-align: center;
    margin-top: 50px;
}

.status {
   margin-bottom: 20px;
}

.controls {
   display: flex;
   justify-content: center;
}

button {
   margin: 10px;
   padding: 10px 20px;
   font-size: 16px;
}
```

JAVASCRIPT:

```
document.addEventListener("DOMContentLoaded", function () {
   var waterLevelSpan = document.getElementById("waterLevel");
   var statusSpan = document.getElementById("status");
   var toggleModeBtn = document.getElementById("toggleMode");
   var toggleRelayBtn = document.getElementById("toggleRelay");
   var toggleBuzzerBtn = document.getElementById("toggleBuzzer");

   // Example WebSocket connection to the server (replace 'localhost' with your server
address)
   var socket = new WebSocket("ws://localhost:3000");

   socket.onopen = function () {
      statusSpan.textContent = "Online";
```

```
        statusSpan.style.color = "green";
    };

    socket.onmessage = function (event) {
        var data = JSON.parse(event.data);
        waterLevelSpan.textContent = data.waterLevel + "%";
    };

    socket.onclose = function () {
        statusSpan.textContent = "Offline";
        statusSpan.style.color = "red";
    };

    toggleModeBtn.addEventListener("click", function () {
        // Send a message to the server to toggle the mode
        socket.send("toggleMode");
    });

    toggleRelayBtn.addEventListener("click", function () {
        // Send a message to the server to toggle the relay
        socket.send("toggleRelay");
    });

    toggleBuzzerBtn.addEventListener("click", function () {
        // Send a message to the server to toggle the buzzer
        socket.send("toggleBuzzer");
    });
});
```

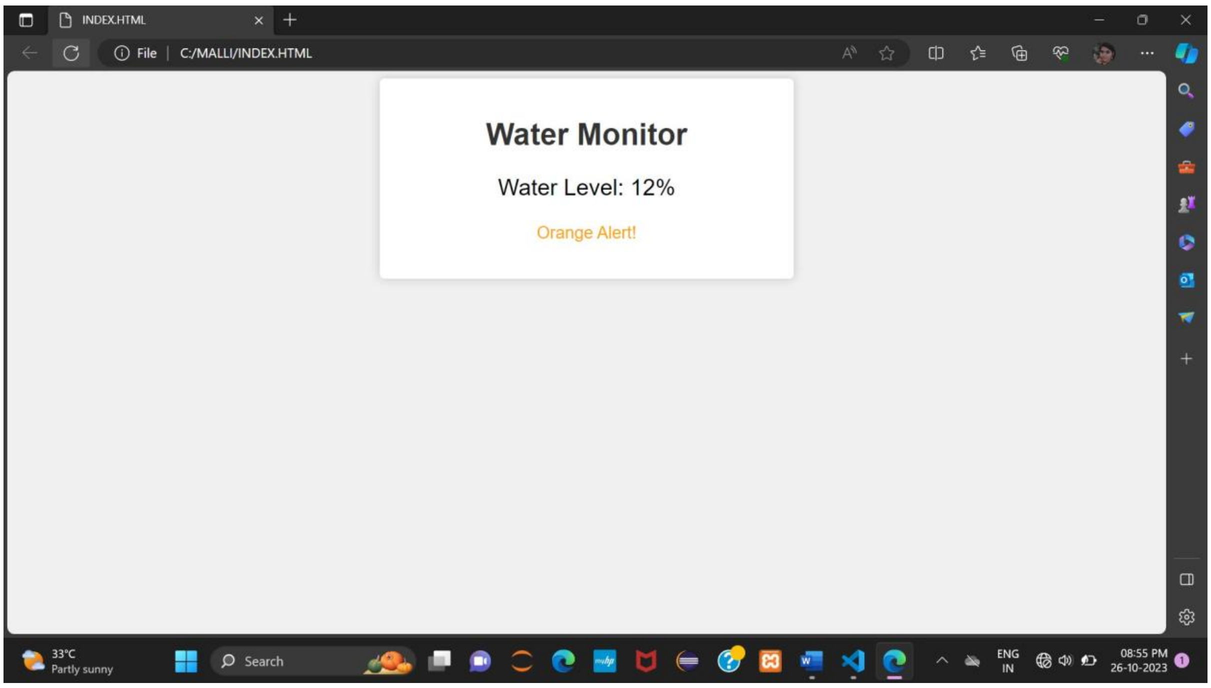
OUTPUT:



INDEX.HTML

File | C:/MALLI/INDEX.HTML

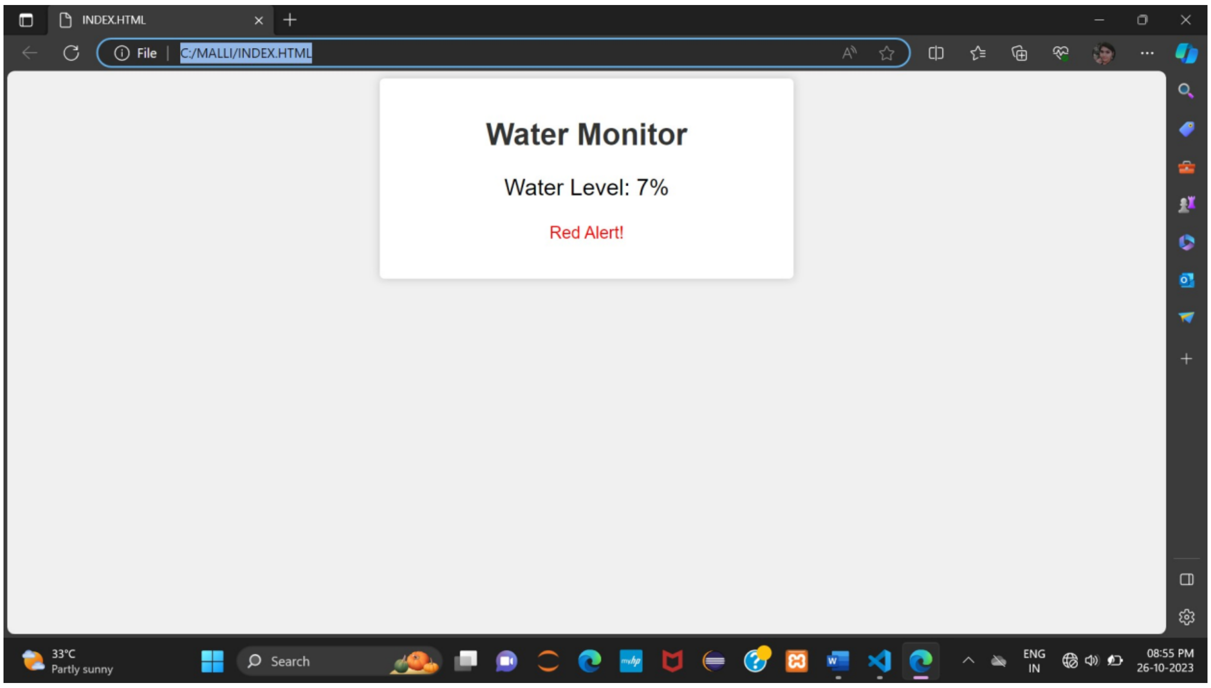
```
Water Monitor
Water Level: 50%
Green
```



INDEX.HTML

File | C:/MALLI/INDEX.HTML

```
Water Monitor
Water Level: 12%
Orange Alert!
```



Water Monitor

Water Level: 7%

Red Alert!

CONCLUSION:

The source code for Smart Water Management using C and for simulation diagram Json has been successfully created. By using web development technologies like HTML, CSS, JAVASCRIPT to create a platform that displays real-time water level status. We have designed the platform to receive and display real-time water level data.