PROJECT NAME: AIR QUALITY MONITORING

PHASE 4: DEVELOPMENT – PART 2

INTRODUCTION:

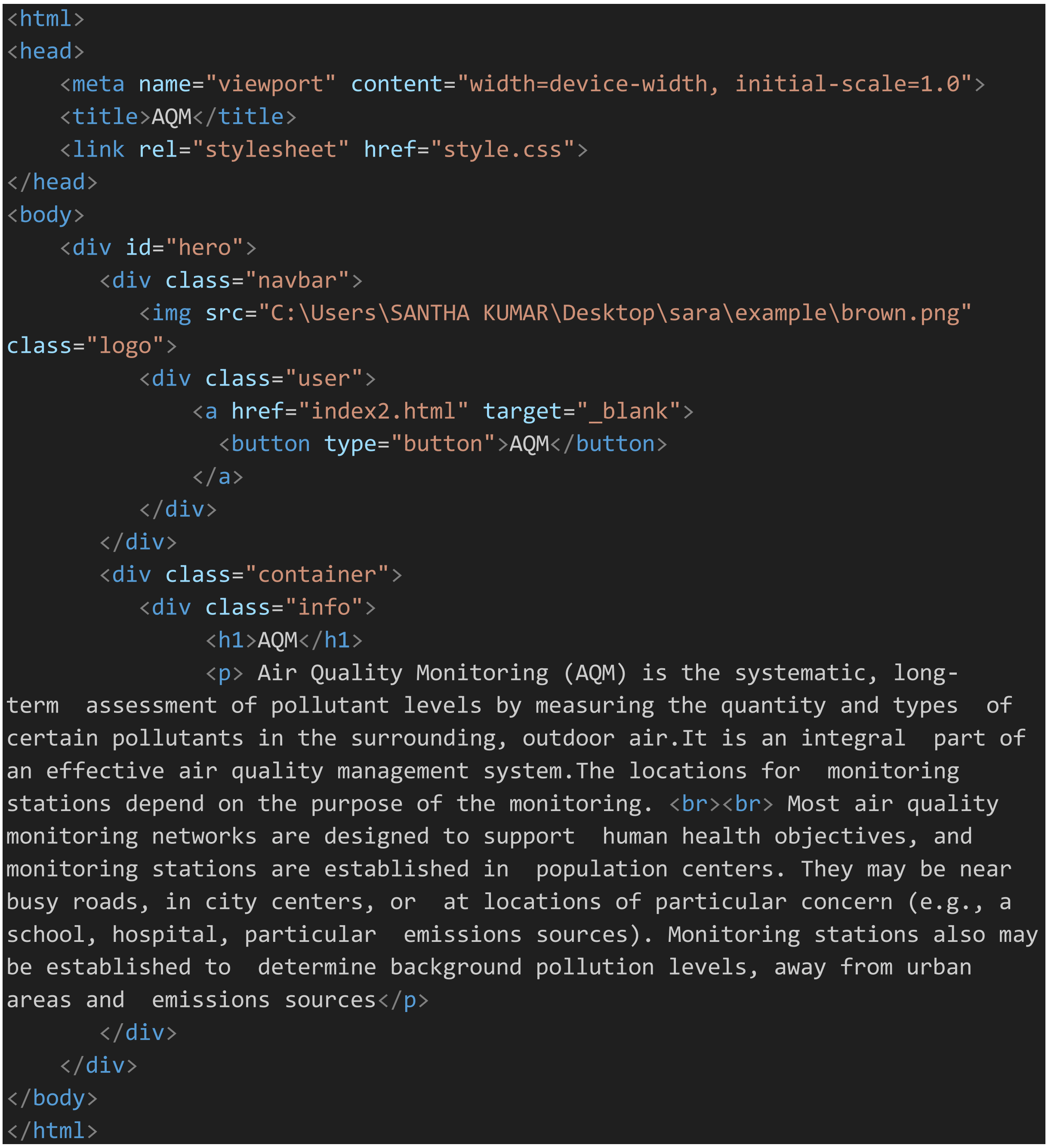
- Air quality monitoring refers to the systematic, long-term assessment of pollutant levels by measuring the quantity and types of certain pollutants in the surrounding, outdoor air. Pollutants tied to human and environmental health impacts include PM2.5, PM10, ground-level ozone, nitrogen dioxide and sulphur dioxide.

- Uses of Air Quality Monitoring (AQM) are,
    - Health Protection
    - Environmental Protection
    - Regulatory Compliance
    - Research and Study
    - Public Awareness

- In this phase, we have used web development technologies such as HTML, CSS, JavaScript to create a platform that displays real-time air quality data.

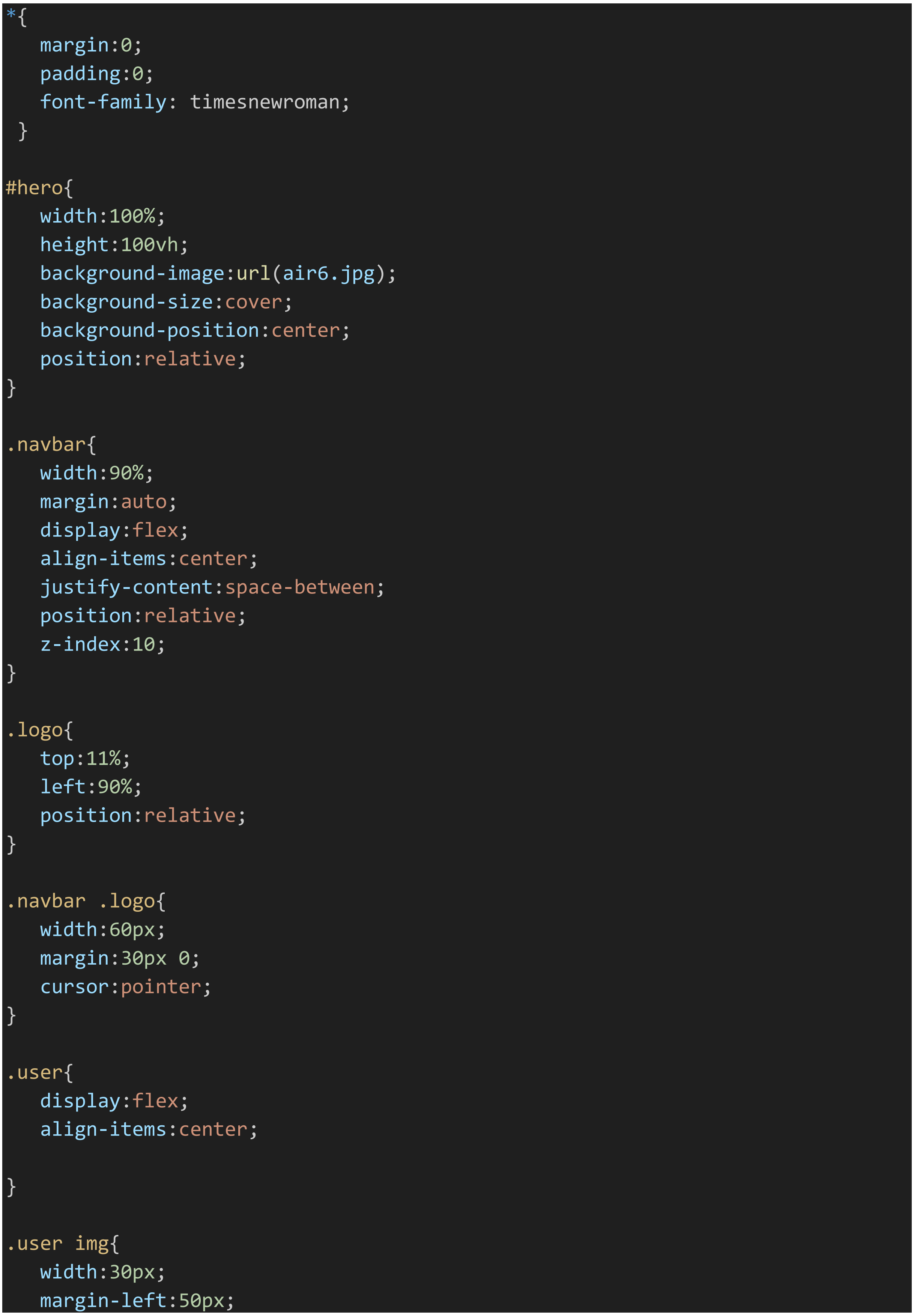
CODE:

index.html:

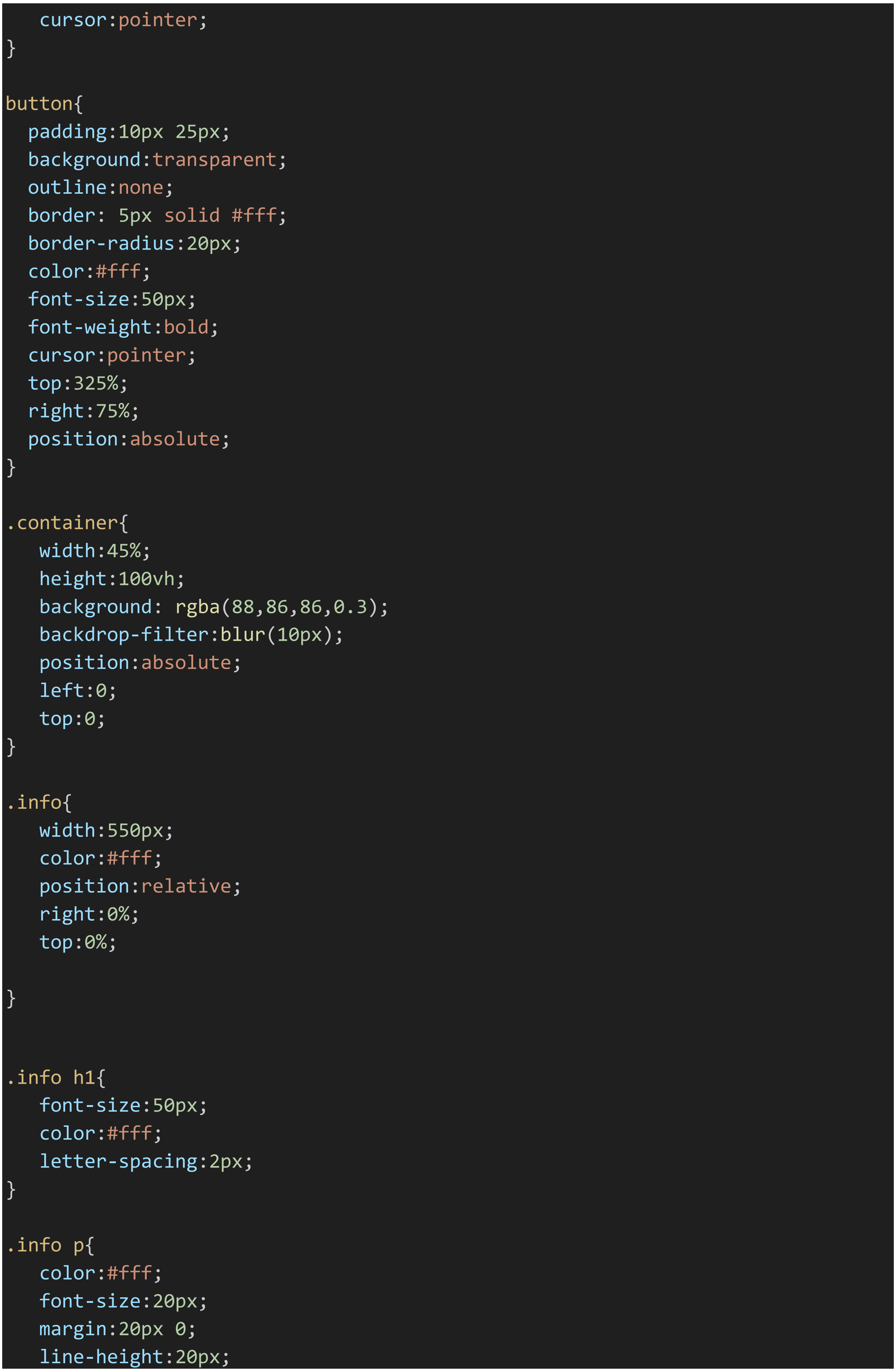


```
<html>
<head>
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>AQM</title>
    <link rel="stylesheet" href="style.css">
</head>
<body>
    <div id="hero">
       <div class="navbar">
          <img src="C:\Users\SANTHA KUMAR\Desktop\sara\example\brown.png"
class="logo">
          <div class="user">
              <a href="index2.html" target="_blank">
                <button type="button">AQM</button>
              </a>
          </div>
       </div>
       <div class="container">
          <div class="info">
               <h1>AQM</h1>
               <p> Air Quality Monitoring (AQM) is the systematic, long-
term  assessment of pollutant levels by measuring the quantity and types  of
certain pollutants in the surrounding, outdoor air.It is an integral  part of
an effective air quality management system.The locations for  monitoring
stations depend on the purpose of the monitoring. <br><br> Most air quality
monitoring networks are designed to support  human health objectives, and
monitoring stations are established in  population centers. They may be near
busy roads, in city centers, or  at locations of particular concern (e.g., a
school, hospital, particular  emissions sources). Monitoring stations also may
be established to  determine background pollution levels, away from urban
areas and  emissions sources</p>
       </div>
    </div>
</body>
</html>
```

style.css:



```
*{
   margin:0;
   padding:0;
   font-family: timesnewroman;
 }

#hero{
   width:100%;
   height:100vh;
   background-image:url(air6.jpg);
   background-size:cover;
   background-position:center;
   position:relative;
}

.navbar{
   width:90%;
   margin:auto;
   display:flex;
   align-items:center;
   justify-content:space-between;
   position:relative;
   z-index:10;
}

.logo{
   top:11%;
   left:90%;
   position:relative;
}

.navbar .logo{
   width:60px;
   margin:30px 0;
   cursor:pointer;
}

.user{
   display:flex;
   align-items:center;

}

.user img{
   width:30px;
   margin-left:50px;
```

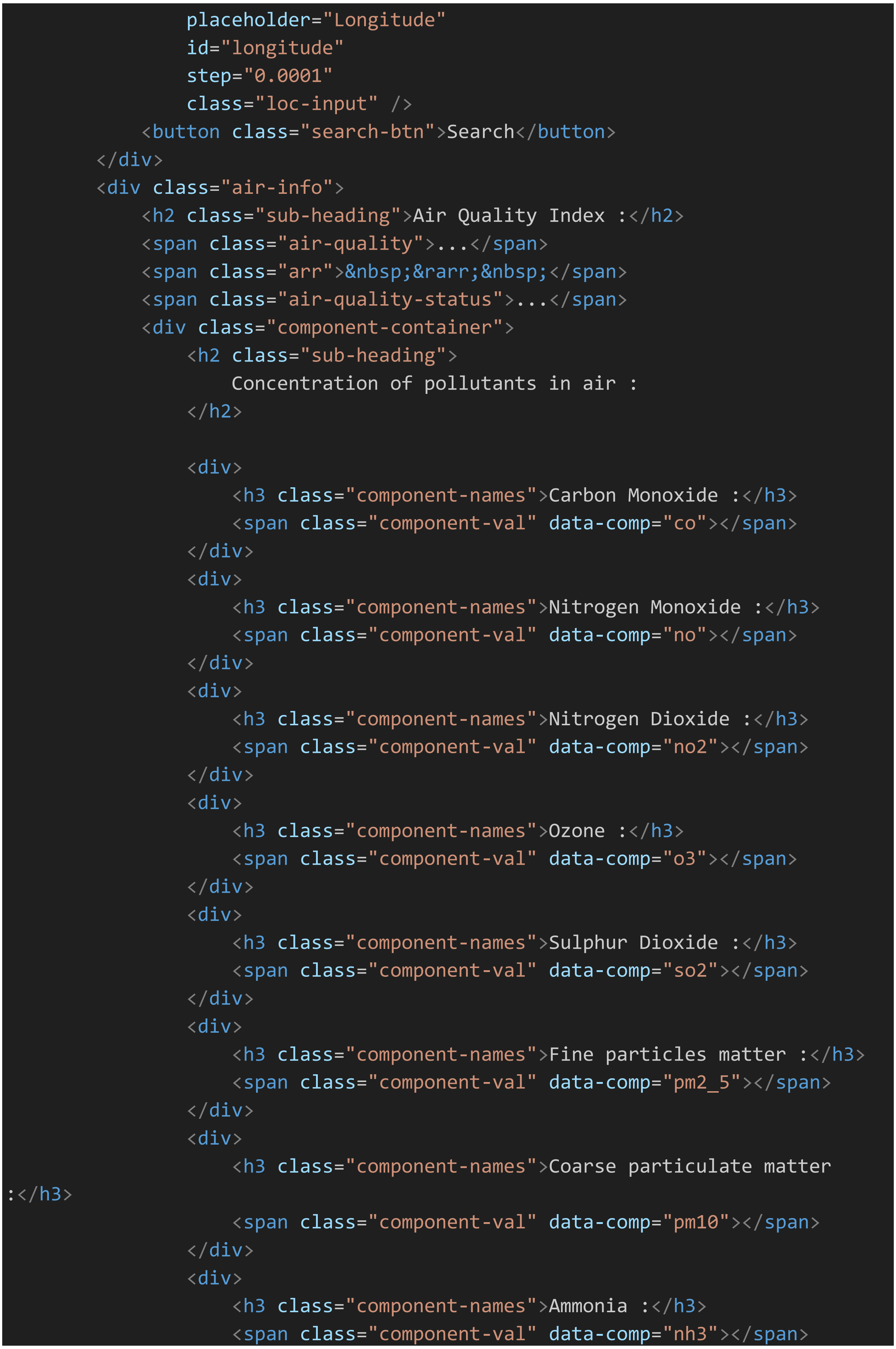


```css
   cursor:pointer;
}

button{
  padding:10px 25px;
  background:transparent;
  outline:none;
  border: 5px solid #fff;
  border-radius:20px;
  color:#fff;
  font-size:50px;
  font-weight:bold;
  cursor:pointer;
  top:325%;
  right:75%;
  position:absolute;
}

.container{
   width:45%;
   height:100vh;
   background: rgba(88,86,86,0.3);
   backdrop-filter:blur(10px);
   position:absolute;
   left:0;
   top:0;
}

.info{
   width:550px;
   color:#fff;
   position:relative;
   right:0%;
   top:0%;

}


.info h1{
   font-size:50px;
   color:#fff;
   letter-spacing:2px;
}

.info p{
   color:#fff;
   font-size:20px;
   margin:20px 0;
   line-height:20px;
```

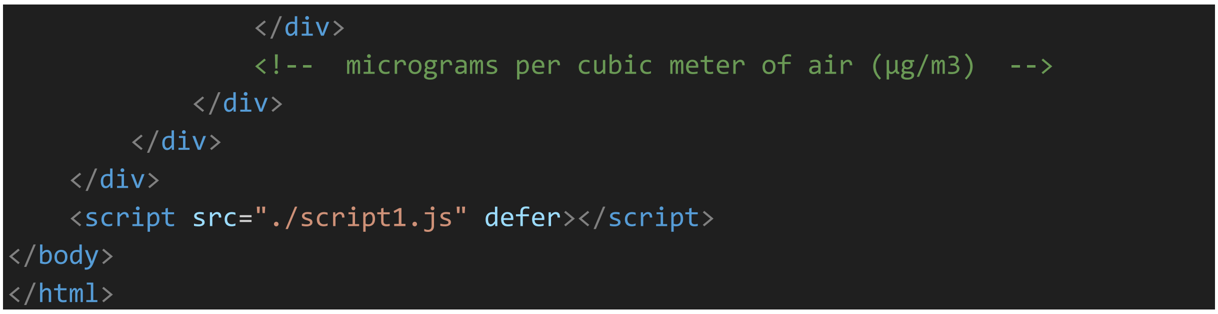
```
}


.info input{
    width:50%;
    padding:8px 10px;
    outline:none;
    border:2px solid #fff;
    border-radius:26px;
    background:transparent;
    color:#420F11;
    font-size:12px;
}
```

index2.html:

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>AQM</title>
    <link rel="stylesheet" href="./style5.css" />
    <link rel="preconnect" href="https://fonts.gstatic.com">
    <link
href="https://fonts.googleapis.com/css2?family=Fira+Code:wght@700&family=Monts
errat:wght@700&family=Poppins&display=swap" rel="stylesheet">
</head>
<body>
    <div class="root">
        <h1 class="heading">AQM</h1>
        <div class="location-container">
            <h2 class="sub-heading">Your Location :</h2>
            <label for="error-msg" style="color: rgb(130, 0, 0);"></label><br
/>
            <input
                type="number"
                name="lat"
                placeholder="Latitude"
                id="latitude"
                step="0.0001"
                class="loc-input" />

            <input
                type="number"
                name="lon"
```

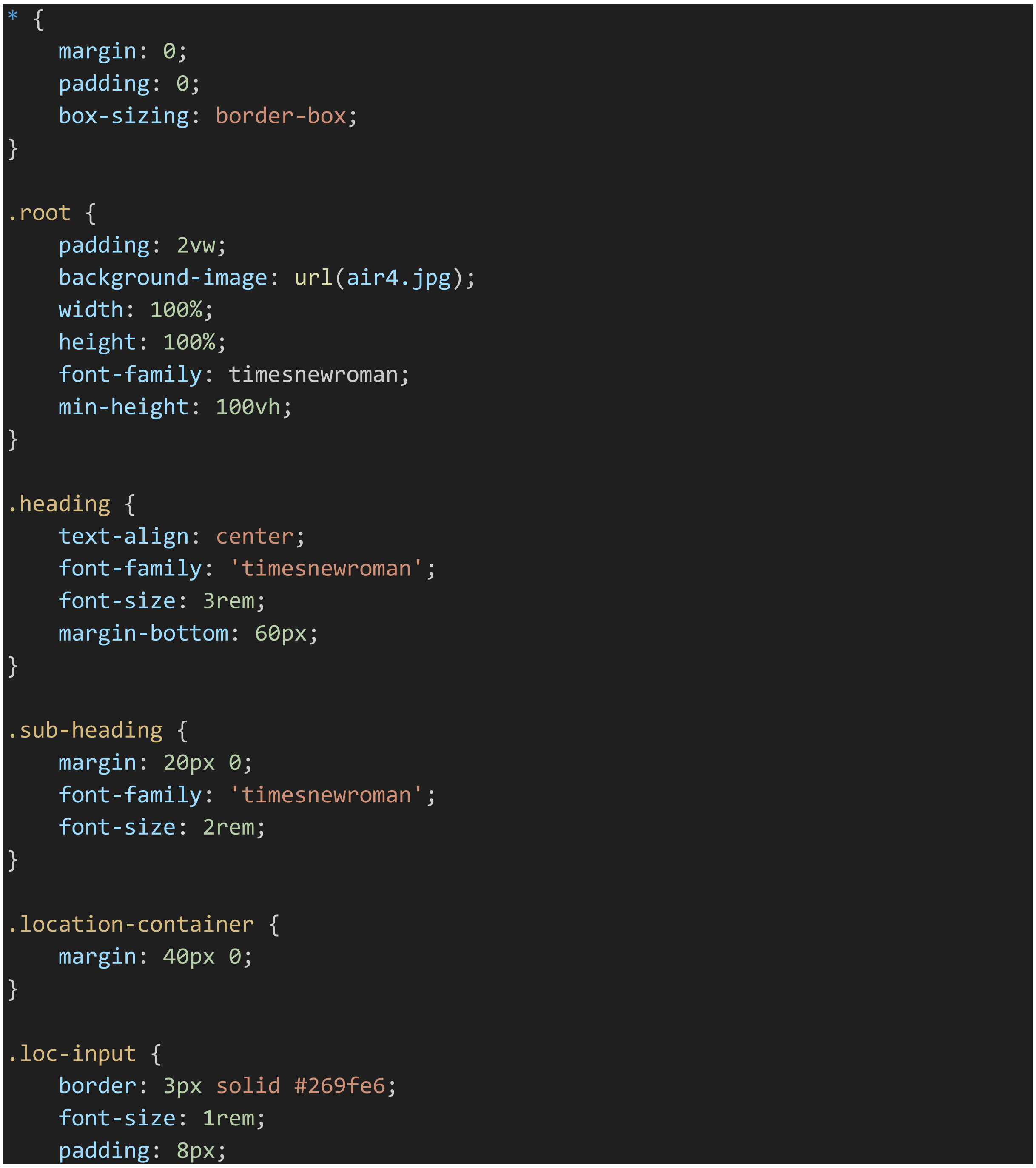


```
                placeholder="Longitude"
                id="longitude"
                step="0.0001"
                class="loc-input" />
            <button class="search-btn">Search</button>
        </div>
        <div class="air-info">
            <h2 class="sub-heading">Air Quality Index :</h2>
            <span class="air-quality">...</span>
            <span class="arr">&nbsp;&rarr;&nbsp;</span>
            <span class="air-quality-status">...</span>
            <div class="component-container">
                <h2 class="sub-heading">
                    Concentration of pollutants in air :
                </h2>

                <div>
                    <h3 class="component-names">Carbon Monoxide :</h3>
                    <span class="component-val" data-comp="co"></span>
                </div>
                <div>
                    <h3 class="component-names">Nitrogen Monoxide :</h3>
                    <span class="component-val" data-comp="no"></span>
                </div>
                <div>
                    <h3 class="component-names">Nitrogen Dioxide :</h3>
                    <span class="component-val" data-comp="no2"></span>
                </div>
                <div>
                    <h3 class="component-names">Ozone :</h3>
                    <span class="component-val" data-comp="o3"></span>
                </div>
                <div>
                    <h3 class="component-names">Sulphur Dioxide :</h3>
                    <span class="component-val" data-comp="so2"></span>
                </div>
                <div>
                    <h3 class="component-names">Fine particles matter :</h3>
                    <span class="component-val" data-comp="pm2_5"></span>
                </div>
                <div>
                    <h3 class="component-names">Coarse particulate matter
:</h3>
                    <span class="component-val" data-comp="pm10"></span>
                </div>
                <div>
                    <h3 class="component-names">Ammonia :</h3>
                    <span class="component-val" data-comp="nh3"></span>
```

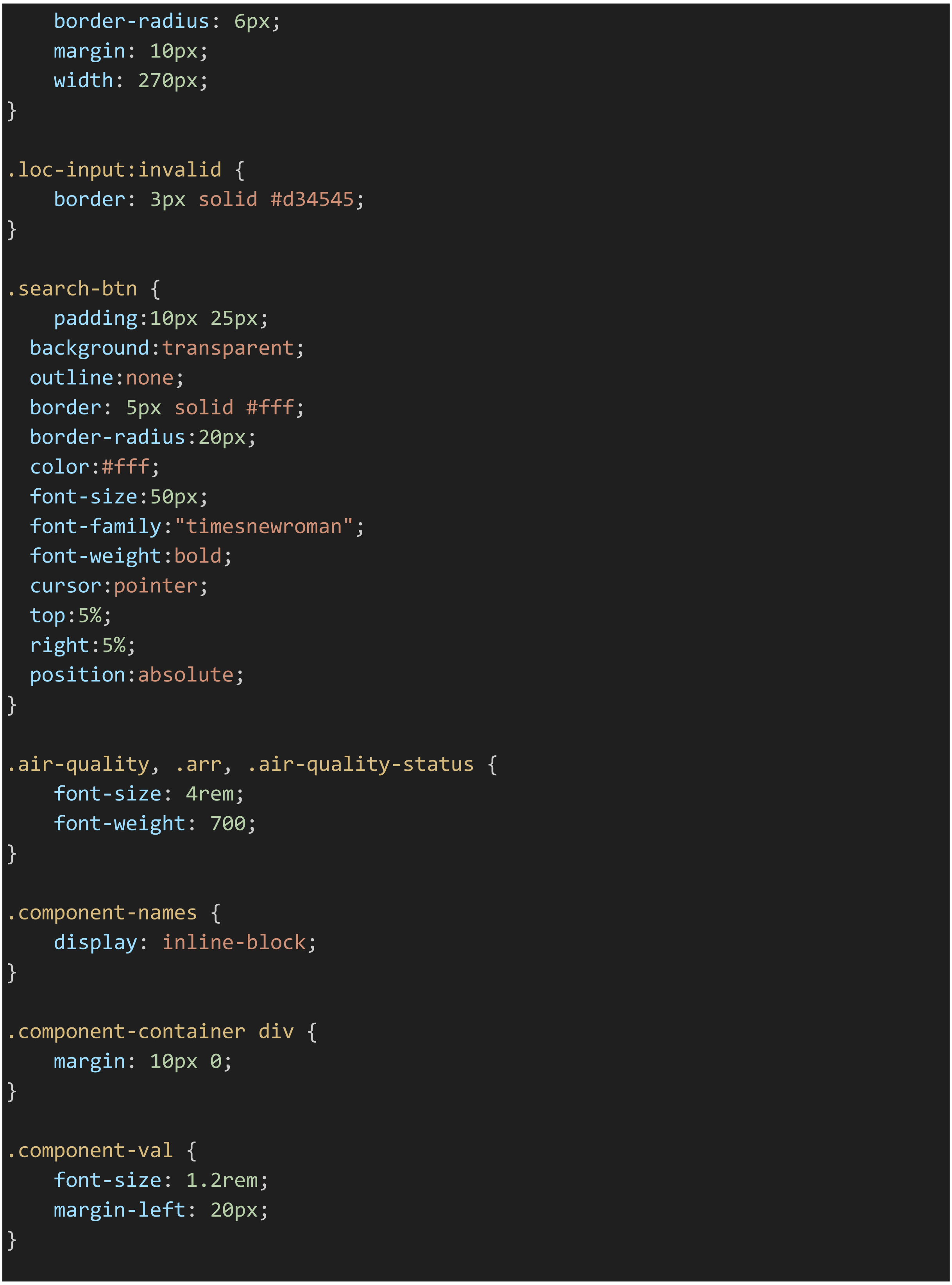


```html
                </div>
                <!--  micrograms per cubic meter of air (μg/m3)  -->
            </div>
        </div>
    </div>
    <script src="./script1.js" defer></script>
</body>
</html>
```

style5.css:

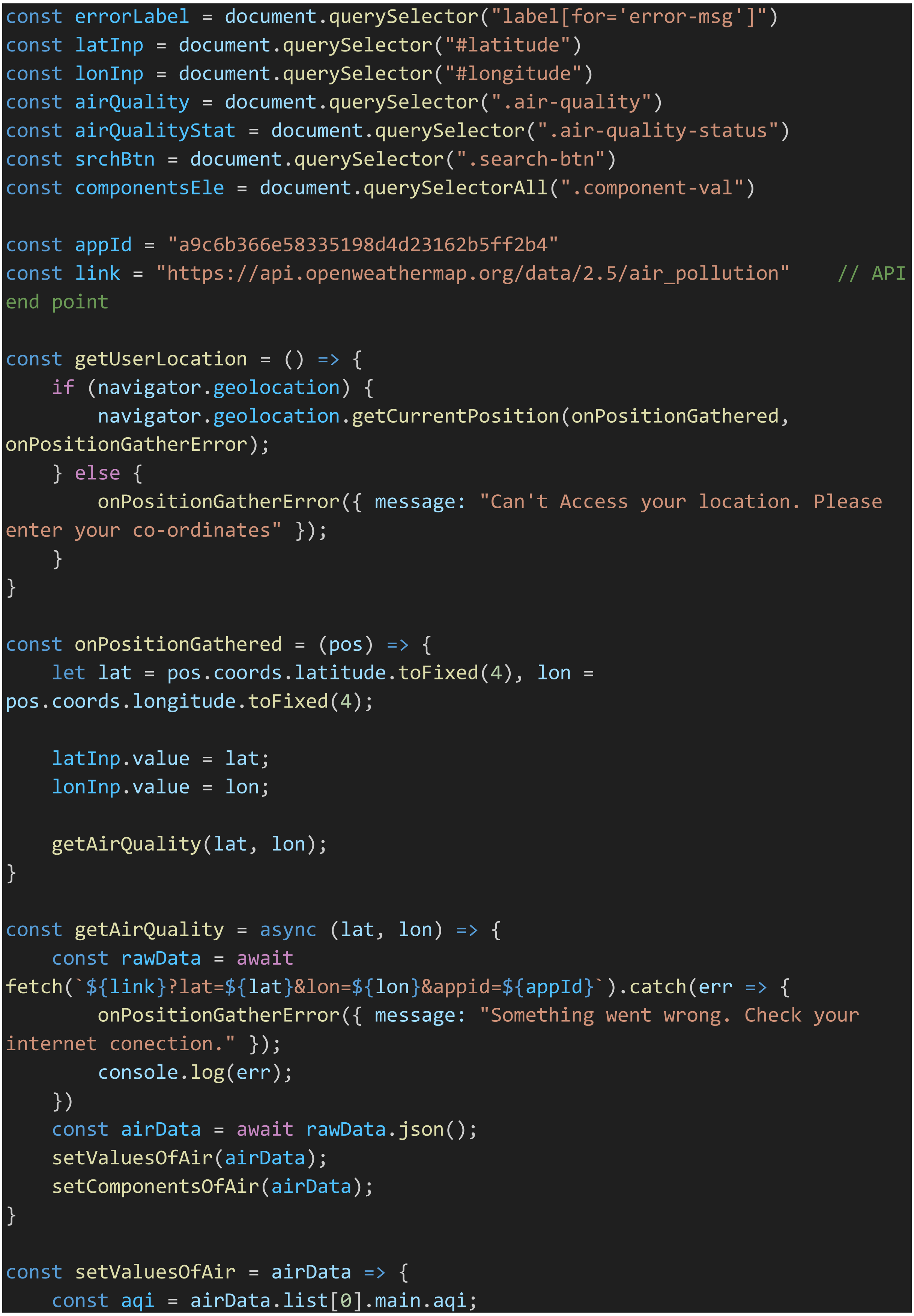


```css
* {
    margin: 0;
    padding: 0;
    box-sizing: border-box;
}

.root {
    padding: 2vw;
    background-image: url(air4.jpg);
    width: 100%;
    height: 100%;
    font-family: timesnewroman;
    min-height: 100vh;
}

.heading {
    text-align: center;
    font-family: 'timesnewroman';
    font-size: 3rem;
    margin-bottom: 60px;
}

.sub-heading {
    margin: 20px 0;
    font-family: 'timesnewroman';
    font-size: 2rem;
}

.location-container {
    margin: 40px 0;
}

.loc-input {
    border: 3px solid #269fe6;
    font-size: 1rem;
    padding: 8px;
```

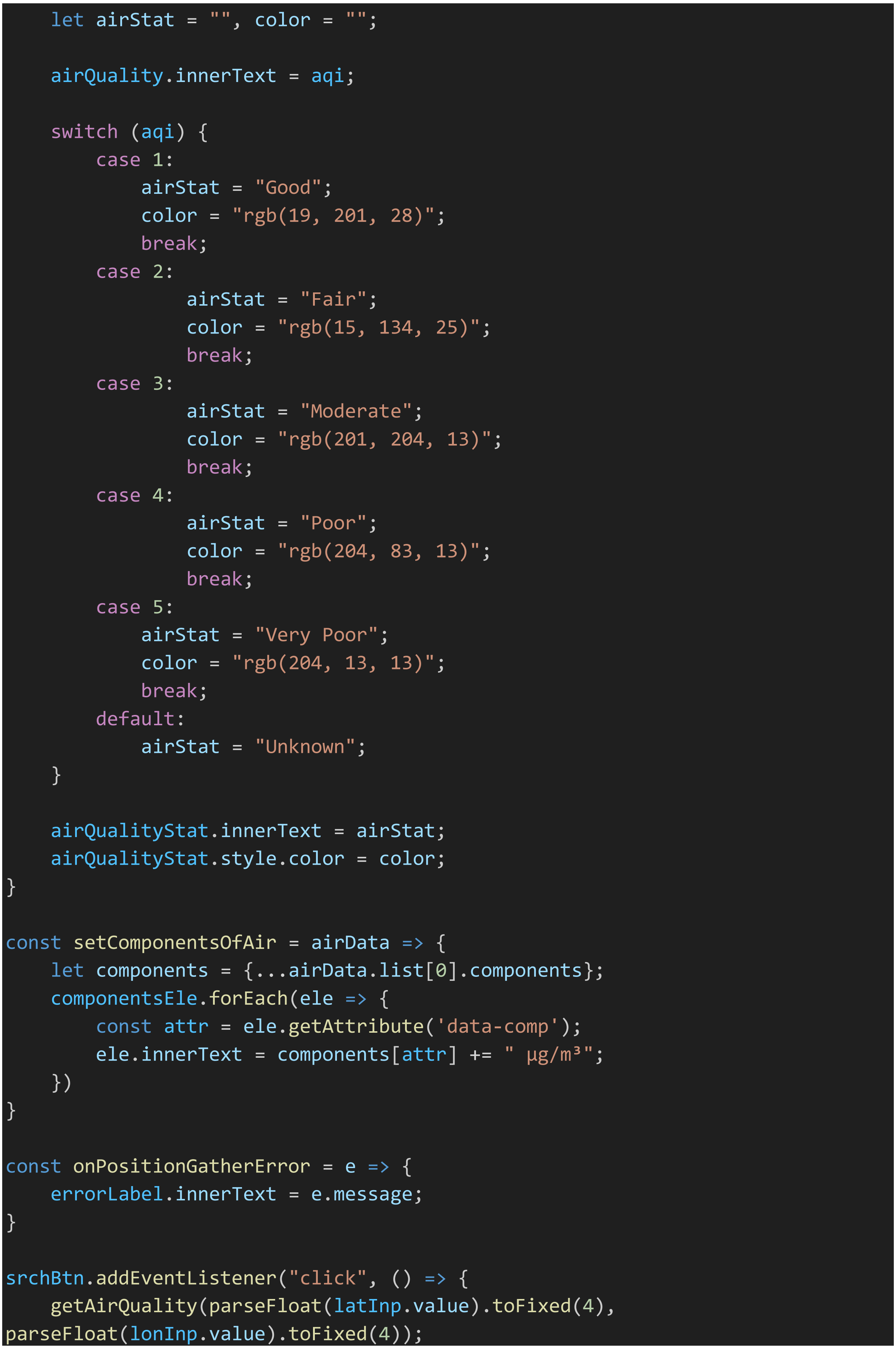


```css
    border-radius: 6px;
    margin: 10px;
    width: 270px;
}

.loc-input:invalid {
    border: 3px solid #d34545;
}

.search-btn {
    padding:10px 25px;
  background:transparent;
  outline:none;
  border: 5px solid #fff;
  border-radius:20px;
  color:#fff;
  font-size:50px;
  font-family:"timesnewroman";
  font-weight:bold;
  cursor:pointer;
  top:5%;
  right:5%;
  position:absolute;
}

.air-quality, .arr, .air-quality-status {
    font-size: 4rem;
    font-weight: 700;
}

.component-names {
    display: inline-block;
}

.component-container div {
    margin: 10px 0;
}

.component-val {
    font-size: 1.2rem;
    margin-left: 20px;
}
```

script1.js:



```
const errorLabel = document.querySelector("label[for='error-msg']")
const latInp = document.querySelector("#latitude")
const lonInp = document.querySelector("#longitude")
const airQuality = document.querySelector(".air-quality")
const airQualityStat = document.querySelector(".air-quality-status")
const srchBtn = document.querySelector(".search-btn")
const componentsEle = document.querySelectorAll(".component-val")

const appId = "a9c6b366e58335198d4d23162b5ff2b4"
const link = "https://api.openweathermap.org/data/2.5/air_pollution"    // API end point

const getUserLocation = () => {
    if (navigator.geolocation) {
        navigator.geolocation.getCurrentPosition(onPositionGathered, onPositionGatherError);
    } else {
        onPositionGatherError({ message: "Can't Access your location. Please enter your co-ordinates" });
    }
}

const onPositionGathered = (pos) => {
    let lat = pos.coords.latitude.toFixed(4), lon = pos.coords.longitude.toFixed(4);

    latInp.value = lat;
    lonInp.value = lon;

    getAirQuality(lat, lon);
}

const getAirQuality = async (lat, lon) => {
    const rawData = await fetch(`${link}?lat=${lat}&lon=${lon}&appid=${appId}`).catch(err => {
        onPositionGatherError({ message: "Something went wrong. Check your internet conection." });
        console.log(err);
    })
    const airData = await rawData.json();
    setValuesOfAir(airData);
    setComponentsOfAir(airData);
}

const setValuesOfAir = airData => {
    const aqi = airData.list[0].main.aqi;
```

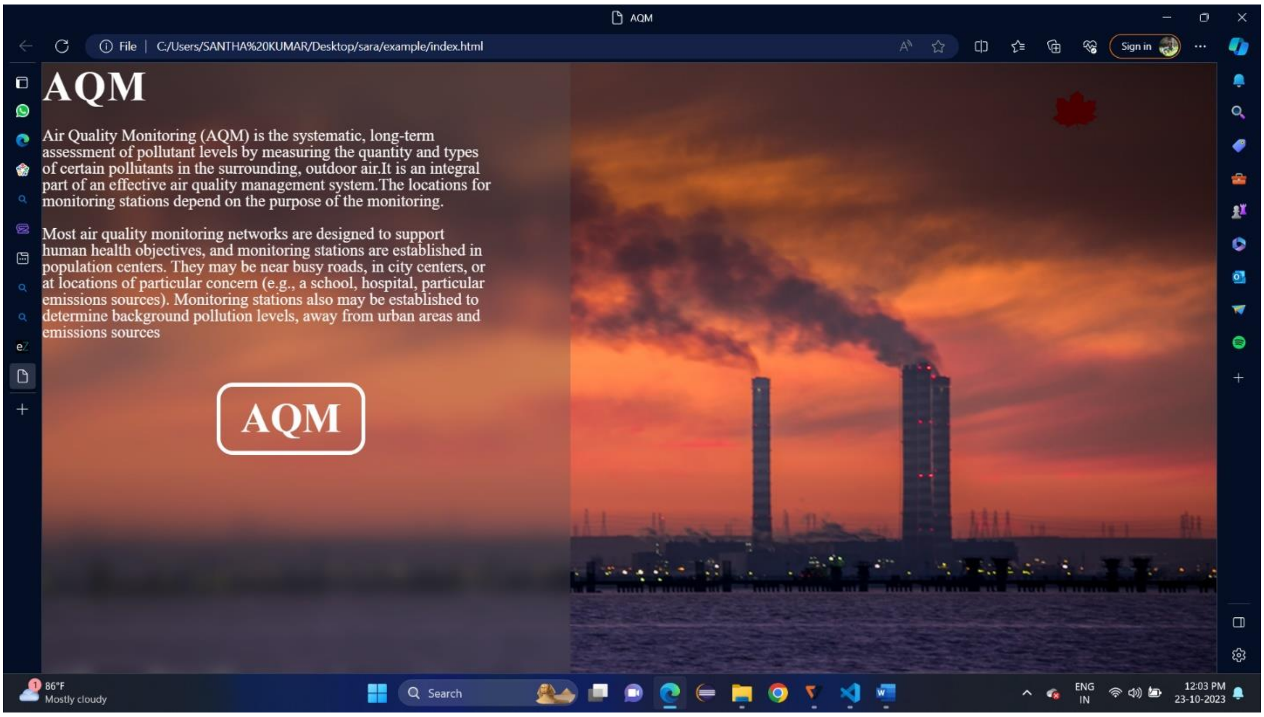


```
    let airStat = "", color = "";

    airQuality.innerText = aqi;

    switch (aqi) {
        case 1:
            airStat = "Good";
            color = "rgb(19, 201, 28)";
            break;
        case 2:
                airStat = "Fair";
                color = "rgb(15, 134, 25)";
                break;
        case 3:
                airStat = "Moderate";
                color = "rgb(201, 204, 13)";
                break;
        case 4:
                airStat = "Poor";
                color = "rgb(204, 83, 13)";
                break;
        case 5:
            airStat = "Very Poor";
            color = "rgb(204, 13, 13)";
            break;
        default:
            airStat = "Unknown";
    }

    airQualityStat.innerText = airStat;
    airQualityStat.style.color = color;
}

const setComponentsOfAir = airData => {
    let components = {...airData.list[0].components};
    componentsEle.forEach(ele => {
        const attr = ele.getAttribute('data-comp');
        ele.innerText = components[attr] += " μg/m³";
    })
}

const onPositionGatherError = e => {
    errorLabel.innerText = e.message;
}

srchBtn.addEventListener("click", () => {
    getAirQuality(parseFloat(latInp.value).toFixed(4),
parseFloat(lonInp.value).toFixed(4));
```

```
})

getUserLocation()
```

- In this program, we have linked a Application Program Interface (API) called “OpenWeatherMap” which helps to provide a way for different software applications to communicate with each other and exchange data.
- A “key” is created in the OpenWeatherMap API to access the data from the website.
- Use of API in AQM includes,
    - Real-time Data Access
    - Current Air Pollution Data
    - Data Visualization
    - Historical Data Access
    - Pollutant Information
    - Forecasting
    - Integration with other services
    - Development of user-friendly website
- Here, geolocation is received as input such as latitude and longitude in order to check the air quality.
- Pollutant Information such as “Carbon Monoxide”, “Nitrogen Monoxide”, “Nitrogen Dioxide”, “Ozone”, “Sulphur Dioxide”, “PM2.5”, “PM10” and “Ammonia” can be received to monitor the Air Quality.

OUTPUT

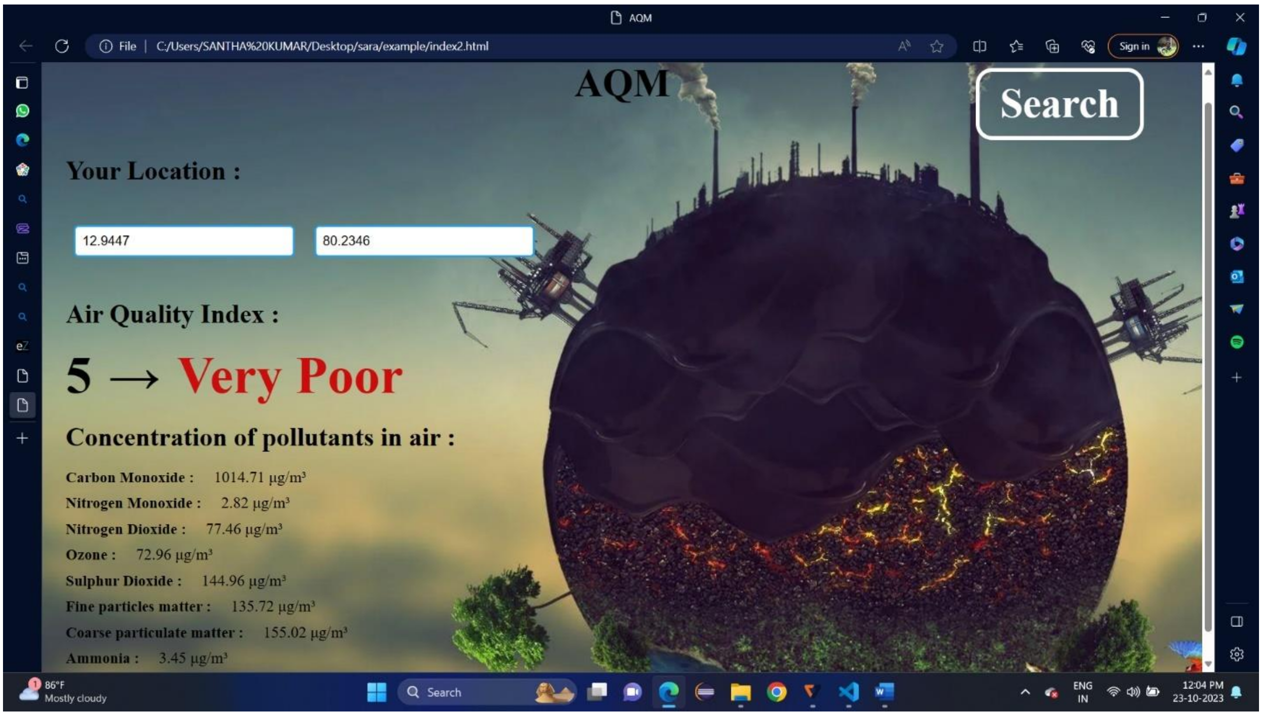

AQM
File | C:/Users/SANTHA%20KUMAR/Desktop/sara/example/index.html
Sign in
86°F
Mostly cloudy
Search
ENG
IN
12:03 PM
23-10-2023

AQM

Air Quality Monitoring (AQM) is the systematic, long-term assessment of pollutant levels by measuring the quantity and types of certain pollutants in the surrounding, outdoor air.It is an integral part of an effective air quality management system.The locations for monitoring stations depend on the purpose of the monitoring.

Most air quality monitoring networks are designed to support human health objectives, and monitoring stations are established in population centers. They may be near busy roads, in city centers, or at locations of particular concern (e.g., a school, hospital, particular emissions sources). Monitoring stations also may be established to determine background pollution levels, away from urban areas and emissions sources

AQM


AQM
File | C:/Users/SANTHA%20KUMAR/Desktop/sara/example/index2.html
Sign in
86°F
Mostly cloudy
Search
ENG
IN
12:04 PM
23-10-2023

AQM

Search

Your Location :

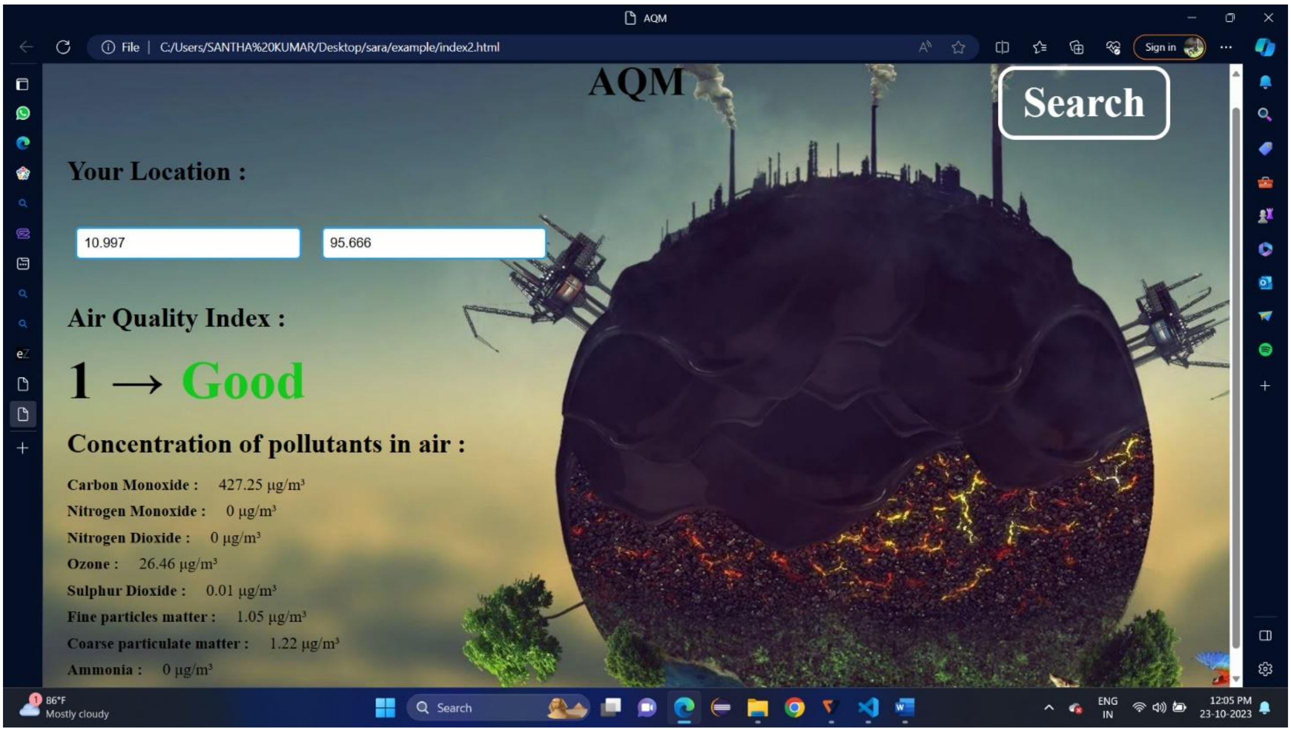
12.9447 80.2346

Air Quality Index :

5 → Very Poor

Concentration of pollutants in air :

Carbon Monoxide : 1014.71 μg/m³
Nitrogen Monoxide : 2.82 μg/m³
Nitrogen Dioxide : 77.46 μg/m³
Ozone : 72.96 μg/m³
Sulphur Dioxide : 144.96 μg/m³
Fine particles matter : 135.72 μg/m³
Coarse particulate matter : 155.02 μg/m³
Ammonia : 3.45 μg/m³


AQM
File | C:/Users/SANTHA%20KUMAR/Desktop/sara/example/index2.html
Sign in
Search
86°F
Mostly cloudy
Search
ENG
IN
12:05 PM
23-10-2023

AQM

Your Location :

10.997 95.666

Air Quality Index :

1 → Good

Concentration of pollutants in air :

Carbon Monoxide : 427.25 µg/m³
Nitrogen Monoxide : 0 µg/m³
Nitrogen Dioxide : 0 µg/m³
Ozone : 26.46 µg/m³
Sulphur Dioxide : 0.01 µg/m³
Fine particles matter : 1.05 µg/m³
Coarse particulate matter : 1.22 µg/m³
Ammonia : 0 µg/m³

CONCLUSION:

➢ In conclusion, the use of web technologies in an Air Quality Monitoring (AQM) project has proven to be highly beneficial. The integration of APIs like OpenWeatherMap has enabled real-time, forecasted, and historical air pollution data to be easily accessed and utilized. This data includes detailed information about various polluting gases and particulates, which is crucial for comprehensive air quality analysis.

➢ The use of web technologies has also facilitated the development of user-friendly applications that provide timely air quality updates. These applications can be customized to provide data for specific locations, making them highly relevant for users.