PHASE 5:ENVIRONMENTAL MONITORING

Project Objectives:

The project aims to create a real-time environmental monitoring system for a park to enhance the experience for visitors and promote outdoor activities. Key objectives include:

1. **Real-time Monitoring:** Continuously monitor environmental parameters in the park, including air quality, weather, and noise levels.

2. **Data Accessibility:** Provide park visitors with easy access to real-time environmental data through a mobile app or website.

3. **Safety:** Ensure the safety of park visitors by providing alerts and information about extreme weather conditions or air quality issues.

4. **Promote Outdoor Activities:** Encourage outdoor activities and recreation by providing valuable information to visitors.

IoT Device Deployment:

Deploy IoT devices throughout the park to monitor various environmental parameters. These devices typically include:

- **Weather Sensors:** Measure temperature, humidity, wind speed, and precipitation.

- **Air Quality Sensors:** Monitor air pollutants like PM2.5, PM10, carbon monoxide, and ozone.

- **Noise Level Sensors:** Capture ambient noise levels.

- **Solar Panels:** Provide power to the devices, often supplemented with battery backups.

- **Connectivity:** Devices are connected to the internet using Wi-Fi, cellular, or other appropriate methods.

- **GPS Modules:** Geotag the data for accurate location information.

Platform Development:

Create a web-based Environmental Monitoring Platform to collect, analyze, and display data. The platform includes:

- **Data Aggregation:** Collects data from all deployed IoT devices in real-time.

- **Data Analysis:** Processes and analyzes the data to provide meaningful information.

- **User Interface:** Allows park visitors to access data through a user-friendly web interface.

- **Alert System:** Sends alerts to visitors for weather warnings, air quality issues, or other relevant information.

- **Data Display:** Provides graphical representations of environmental data, including maps and charts.

Code Implementation:

The IoT devices are programmed to collect data and transmit it to the platform. The Environmental Monitoring Platform is developed using web technologies such as Python, JavaScript, and relevant frameworks. It also includes database systems to store and manage collected data.

Benefits to Park Visitors and Promotion of Outdoor Activities:

1. **Safety:** Park visitors can access real-time weather data, allowing them to plan their activities and receive alerts for adverse conditions, ensuring their safety.

2. **Health and Well-being:** Air quality monitoring helps visitors make informed decisions about outdoor activities, especially those with respiratory conditions, promoting a healthier outdoor experience.

3. **Outdoor Event Planning:** The system allows visitors to check weather and air quality conditions before organizing outdoor events or picnics, enhancing the park's usability.

4. **Recreation Opportunities:** Accurate data on weather conditions and noise levels encourage visitors to engage in outdoor sports, picnics, and other recreational activities.

5. **Educational Tool:** The system can be used as an educational resource, teaching visitors about the environment and the impact of outdoor activities.

6. **Environmental Awareness:** By making environmental data accessible and understandable, the system increases awareness of the park's ecosystem, fostering a sense of responsibility for its preservation.

The real-time environmental monitoring system benefits park visitors by providing them with critical information for a safe and enjoyable outdoor experience. It promotes outdoor activities by assuring visitors that they can make informed decisions, improving their overall well-being and encouraging them to explore and appreciate the natural environment.
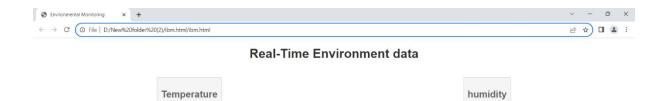
PROGRAM:

HTML PROGRAMING:

```
<!DOCTYPE html>

<html>

<head>

<title>Environmental Monitoring</title>

<link rel="stylesheet" type="text/css" href="style.css">

</head>

<body>

<h1>Real-Time Environment data </h1>

<div class="data-container">

<div class="sensor">
```

```html
<h2> Temperature</h2>

<p id="temperature">Loading...</p>

</div>

<div class="sensor">

<h2> humidity</h2>

<p id="humidity">loading...</p>

</div>

</div>

<script src="script.js"></script>

</body>

</html>
```

CSS PROGRAMMING

```css
body {

    font-family: Arial, sans-serif;

    text-align: center;

}


.data-container {

    display: flex;

    justify-content: space-around;

}


.sensor {

    margin: 20px;

    padding: 10px;

    border: 1px solid #ccc;

    border-radius: 5px;

    background-color: #f5f5f5;

}
```

```css
h1 {

   color: #333;

}


h2 {

   color: #666;

}


p {

   font-size: 20px;

}
```

JAVA SCRIPT PROGRAMMING:

```javascript
// Simulating real-time data with random values
function updateData() {

   const temperatureValue = (Math.random() * 30 + 10).toFixed(2);

   const humidityValue = (Math.random() * 50 + 30).toFixed(2);


   document.getElementById('temperature').textContent = temperatureValue + "°C";

   document.getElementById('humidity').textContent = humidityValue + "%";


   setTimeout(updateData, 5000); // Update every 5 seconds

}


updateData(); // Start updating data


// In a real-world scenario, replace the random values with actual data from IoT devices.
```

Real-Time Environment data

Temperature

38.92Â°C

humidity

76.52%