**KINGS ENGINEERING COLLEGE**

**PROJECT TITLE:AIR QUALITY MONITORING**

**DEPARTMENT:BIO MEDICAL ENGINEERING**

**MENTOR:MARY LALITHA**


**TEAM MEMBERS**

**LAVANYA**

**MANGALASELVI NIVETHA**

**MANIMEGALAI**

**MUTHUPANDIYAMMAL**

## Continue building the project by developing the data sharing platform.

**Database Setup:**

Choose a suitable database system to store the collected air quality data. Options include PostgreSQL, MySQL, or cloud-based databases like Firebase or AWS DynamoDB.

**API Design:**

Design RESTful APIs or Graph QL endpoints to allow data access and sharing. These APIs will enable communication between your database and the user interface.

**User Authentication:**

Implement user authentication to control access to the platform. Common methods include username/password, OAuth, or API tokens.

**User Roles and Permissions:**

Define user roles (e.g., admin, regular user) and set permissions for each role to manage data access and sharing.

**Web or Mobile Interface:**

Develop a user-friendly web or mobile interface that allows users to view real-time air quality data and historical trends.

**Real-Time Data Updates:**

Integrate mechanisms for real-time data updates. Consider using technologies like Web Sockets or server-sent events (SSE) for instant data delivery.

**Data Visualization:**

Create interactive and informative data visualizations, such as charts, graphs, and maps, to present air quality data in an understandable format.

**Data Filters and Search:**

Implement features that enable users to filter and search for specific data points based on location, time, or air quality parameters.

**Data Sharing Options:**

Allow users to share specific data sets or visualizations with others through shareable links or social media integrations.

**Notifications and Alerts:**

Set up a notification system that informs users of important updates or when air quality levels reach predefined thresholds.

**Data Export:**

Provide options for users to export data in various formats (e.g., CSV, PDF) for further analysis or reporting.

## Use web development technologies (e.g., HTML, CSS, JavaScript) to create a platform that displays real-time air quality data.

**here web application to display real-time air quality data using HTML, CSS, and JavaScript:**

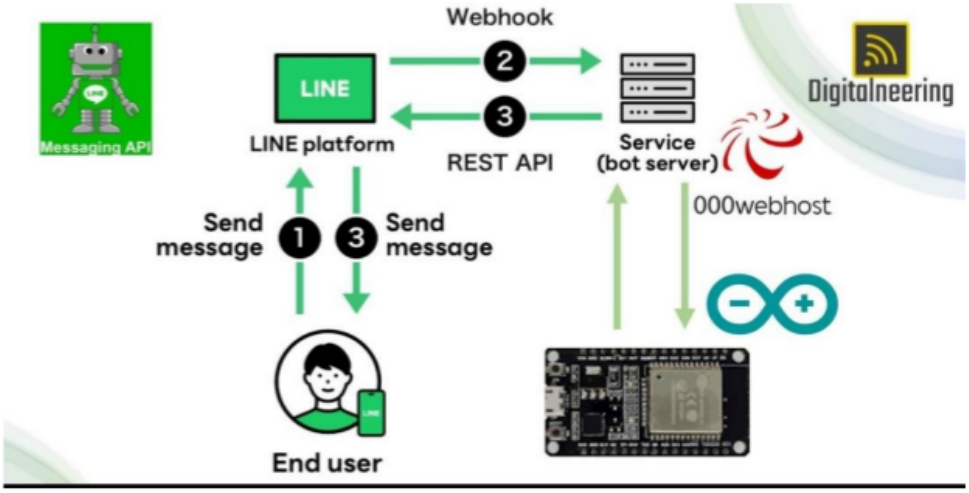
HTML (index.html):

```
html
<!DOCTYPE html>
<html lang="e n">
<head>
 <meta charset="UTF-8">
 <meta name="viewport" content="width=device-width, initial-scale=1.0">
 <link rel="stylesheet" href="styles.css">
 <title>Real-Time Air Quality</title>
</head>
<body>
 <div class="container">
   <h1>Real-Time Air Quality</h1>
   <div class="data">
     <h2>Air Quality Index (AQI): <span id="aqi">Loading...</span></h2>
    <p>Last Update: <span id="last-update">-</span></p>
    </div>
  </div>
 <script src ="app.js"></script>
</body>
</html>
```

CSS (styles.css):

```
css
body {
    font-family: Arial, sans-serif;
    background-color: #f2f2f2;
    text-align: center;
}

.container {
    background-color: #fff;
    border-radius: 10px;
    box-shadow: 0px 0px 10px rgba(0, 0, 0, 0.2);
    padding: 20px;
    margin: 50px auto;
    width: 80%;
    max-width: 400px;
}

h1 {
    color: #333;
}

.data {
    margin-top: 20px;
}

3. **JavaScript (app.js)**:

javascript
const aqiElement = document.getElementById('aqi');
const lastUpdateElement = document.getElementById('last-update');

function fetchData() {
    // Replace this URL with the source of your real-time air quality data (API
endpoint).
    const apiUrl = 'https://your-air-quality-api-url-here';

    fetch(apiUrl)
        .then(response => response.json())
        .then(data => {
            const aqi = data.aqi;
            const lastUpdate = new Date(data.time);
```

```
            aqiElement.textContent = aqi;
            lastUpdateElement.textContent = lastUpdate.toTimeString();
        })
        .catch(error => {
            console.error('Error fetching data:', error);
            aqiElement.textContent = 'N/A';
            lastUpdateElement.textContent = 'Error';
        });
}
```




## Design the platform to receive and display air quality data sent by the IoT devices.

### IoT Devices:

Develop or integrate IoT sensors that measure air quality parameters (e.g., PM2.5, PM10, CO2, temperature, humidity).
Ensure devices are connected to the internet (Wi-Fi, cellular, LoRa, etc.) for data transmission.

### Data Collection and Ingestion:

Set up a data ingestion layer to receive data from IoT devices.
Use MQTT, HTTP, or other IoT protocols to collect data.
Implement data validation and cleansing to ensure accuracy.

## Database:

Store incoming data in a database (e.g., SQL or NoSQL) for historical reference.
Design the schema to efficiently store time-series data.

## Cloud :

Host the platform on a cloud service (e.g., AWS, Azure, Google Cloud) or on-premises servers.
Ensure scalability, reliability, and security.

## API:

Develop RESTful or Graph QL APIs for IoT devices to send data to the platform.
Implement authentication and authorization mechanisms for device access.

## Data Processing:

Use data processing tools like Apache Kafka, Spark, or Flink for real-time processing and analysis.
Calculate air quality indices (AQI) from raw sensor data.

## User Interface:

Build a web or mobile interface for users to access air quality data.
Display real-time and historical air quality data, including visualizations (charts, maps, etc.).
Implement user authentication and role-based access control.

## Notifications:

Set up alerts and notifications for users based on predefined air quality thresholds.
Notifications can be sent via email, SMS, or push notifications.

## Data Analytics:

Use machine learning models to predict air quality trends or detect anomalies.
Provide insights and recommendations for users.

## Security:

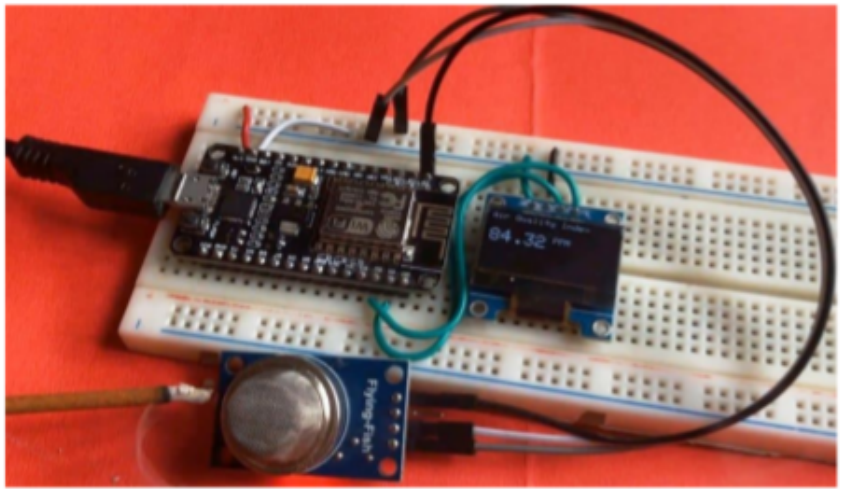
Implement security measures to protect data in transit and at rest.
Regularly update and patch the system to guard against vulnerabilities.

## Compliance:

Ensure compliance with data privacy regulations (e.g., GDPR) and industry standards.

## Maintenance and Monitoring:

Monitor system health and performance using tools like Prometheus or Grafana.
Plan for regular maintenance and updates to keep the platform running smoothly.




## Designing mobile apps for iOS and Android platforms that provide users with access to real-time air quality level updates requires careful planning and a user-friendly interface. Below, I'll outline the design considerations for creating these mobile apps:

Flutter code example:
flutter create air_quality_app
cd air_quality_app
dependencies:
flutter:
sdk: flutter
http: ^0.13.3
charts_flutter: ^0.11.0
main.dart: Main entry point for the app.
screens/home_screen.dart: Home screen displaying air quality information.
widgets/air_quality_chart.dart: Widget for displaying charts.
services/api_service.dart: Service for making API calls.

```
import 'package:flutter/material.dart';
import 'screens/home_screen.dart';
void main() {
 runApp(MyApp());
}
class MyApp extends StatelessWidget {
```

```
 @override
 Widget build(BuildContext context) {
 return MaterialApp(
 title: 'Air Quality App',
 theme: ThemeData(
 primarySwatch: Colors.blue,
 ),
 home: HomeScreen(),
 );
 }
}
import 'package:flutter/material.dart';
import 'widgets/air_quality_chart.dart';
class HomeScreen extends StatelessWidget {
 @override
 Widget build(BuildContext context) {
 return Scaffold(
 appBar: AppBar(
 title: Text('Air Quality App'),
 ),
body: Center(
 child: AirQualityChart(),
 ),
 );
 }
}
import 'package:flutter/material.dart';
import 'package:charts_flutter/flutter.dart' as charts;
class AirQualityChart extends StatelessWidget {
 @override
 Widget build(BuildContext context) {
 // Implement your chart logic here using the 'charts' package
 return Container(
 height: 300,
 child: Placeholder(), // Replace with your chart widget
 );
 }
}
import 'dart:convert';
import 'package:http/http.dart' as http;
class ApiService {
 final String apiUrl; // Replace with your API endpoint
 ApiService(this.apiUrl);
 Future<Map<String, dynamic>> getAirQualityData() async {
 final response = await http.get(Uri.parse(apiUrl));
 if (response.statusCode == 200) {
 return json.decode(response.body);
 } else {
 throw Exception('Failed to load air quality data');
 }
```

}
}
Flutter run
This Flutter code provides a simple app that simulates real-time air quality level updates. To create a complete
app, you would need to Creating a complete, production-ready mobile app involves significant amount of
work, and it's often a multi-stage development process. You may want to consider working with a mobile app
development team or hiring experienced developers to build the app to your specifications.
Mit app wireframe:


https://appinventor.mit.edu.