Project Overview:

Develop an innovative **Air Quality** and **Socio-Economic** Data Application that not only informs users about air quality but also provides insights into the broader factors influencing it. This project involves the creation of a versatile **front end**, allowing participants to choose between a **web application** or a **mobile application**. A robust backend system supports this frontend, ensuring users have easy access to vital information on air quality and socio-economic indicators for **cities and countries worldwide**.

Feature 1: Air Quality Metrics

To represent air quality of different cities/countries, various metrics such as AQI (Air Quality Index), PM2.5 levels, PM10 levels, and ozone levels should be taken into consideration. Implement a generic color scheme of **AQI** that will represent air quality like the following image:

AQI color scheme should be **consistent** throughout the whole interface and should be used in all the features mentioned below.

➢ **Top 10 Polluted Cities**

- ➔ Display the current top 10 most polluted cities globally using data from the IQAir API's Air Quality Index (AQI).
- ➔ Provide dynamic and visually appealing representation.
- ➔ Include user-friendly filters and sorting options if applicable.

➢ **Top 10 Cleanest Cities**

- ➔ Present a list of the top 10 cleanest cities globally based on IQAir API's AQI latest data.
- ➔ Provide dynamic and visually appealing representation.
- ➔ Enhance user experience with filters and sorting options if applicable.

➢ **Search by City/Country**

- ➔ Implement an intuitive search bar with auto-complete functionality.
- ➔ Allow users to efficiently access air quality data for specific cities or countries.

➢ **Comparative Analysis:**

- ➔ Develop a feature for comparing the air quality of at least two cities.
- ➔ The comparison should be visualized in a side-by-side interface or by overlaying data on a single chart or graph. Use key air quality metrics such as AQI (Air Quality Index), PM2.5 levels, PM10 levels, ozone levels for comparison.

Feature 2: Social Economic Factors

Enhance user engagement by extending the application to provide economic and social indicators for the countries associated with the cities in your air quality data.

- Total GDP
- GDP Per capita
- GDP Growth
- Total population
- Population Growth

For reference, consider the following API endpoints as examples:

Total population data:
https://api.worldbank.org/v2/country/all/indicator/SP.POP.TOTL?format=json

Population growth data for a specific country (e.g., Bangladesh):
https://api.worldbank.org/v2/countries/bd/indicators/SP.POP.GROW?format=json

Feature 3: Interactive Map Integration

- ➢ Enable users to visually explore air quality and socio-economic data on an interactive map.
- ➢ Combining location-based information from the AirQuality API with geographical representations, users can gain valuable insights into air quality and its correlation with socio-economic factors in different regions.

Key Components:

- **Map API Integration:** Select a reputable map API, such as **Google Maps, Mapbox,** or **Leaflet**, and integrate it into the application. This map should serve as the canvas for displaying data.
- **Geospatial Data Overlay:** Overlay air quality data onto the map, providing real-time markers or visual indicators on specific locations (cities or regions) based on the air quality API. Different colors or icons can represent air quality levels, allowing users to quickly grasp the information.
- **Socio-Economic Data Filters:** Implement user-friendly filters that allow users to customize their map view. These filters should enable users to focus on specific socio-economic indicators or air quality metrics. **For instance, users can filter by GDP per capita, view only cities with particular air quality ranges, or explore population growth in a certain region.**

What we Expect from the Backend

- ➔ Apply data processing and transformation techniques to combine air quality data from **IQAir API** (https://www.iqair.com/air-pollution-data-api) with **socio-economic indicators** from the **World Bank API**.
- ➔ Ensure data consistency and accuracy through rigorous **validation and quality checks.**
- ➔ Develop well-documented API endpoints that the frontend (web or mobile) can use to request data, ensuring readiness to handle user queries.

What we Expect from the Frontend

- ➔ For a **web application**, your task is to create an intuitive and responsive user interface, making sure it works well across various devices and browsers. In the web application, emphasize responsive design to adapt to different screen sizes for an optimal user experience.
- ➔ If you're developing a **mobile application**, design an engaging and user-friendly interface suitable for **Android or iOS platforms**.

General Instructions for Participants:

- ➢ Initiate a new GitHub repository during the Hackathon and commit regularly.
- ➢ Develop the project during the Hackathon, avoiding pre-existing solutions.
- ➢ Properly attribute publicly available code used in your project.
- ➢ Choose your preferred tech stack.
- ➢ Disqualification will occur in cases of unfair attempts or breaches of terms.
- ➢ User-friendly modern UI, clean code, and best coding practices will be considered as a plus but prioritize completing all the features first if you are concerned about time constraints.

Good Luck!