AIR QUALITY MONITORING

Building an IoT air quality monitoring system involves hardware and software components. For the hardware, you'll need sensors such as MQ135 for air quality and a microcontroller like Raspberry Pi or Arduino. Here, I'll outline the software part, assuming you have the necessary hardware set up.

First, install the required libraries for sensor communication. Here's an example for the Raspberry Pi using the MQ135 sensor:

Then, you can develop a Python script for the IoT device.

PYTHON SCRIPT :

```
import time
import requests
import json
import board
import busio
import adafruit_ads1x15.ads1115 as ADS
from adafruit_ads1x15.analog_in import AnalogIn

# Initialize the ADC
i2c = busio.I2C(board.SCL, board.SDA)
ads = ADS.ADS1115(i2c)
chan = AnalogIn(ads, ADS.P0)

# Replace 'YOUR_API_ENDPOINT' with your actual API endpoint
API_ENDPOINT = 'YOUR_API_ENDPOINT'

while True:
    try:
        pollution_level = chan.voltage  # Adjust the mapping based on the sensor specifications
        particulate_matter = 0  # Placeholder for the particulate matter reading

        sensor_data = {"pollution_level": pollution_level, "particulate_matter":
particulate_matter}

        headers = {'Content-Type': 'application/json'}
        response = requests.post(API_ENDPOINT, data=json.dumps(sensor_data),
headers=headers)

        if response.status_code == 200:
            print("Data sent successfully!")
```

```
        else:
            print(f"Failed to send data. Status Code: {response.status_code}")

    except Exception as e:
        print(f"An error occurred: {e}"    time.sleep(60)
```

IoT AIR QUALITY MONITORING:

Designing an IoT-enabled air quality monitoring system involves several key components such as sensors, data processing units, connectivity modules, and a user interface. Here are some key steps to consider:

1.Sensor Selection: Choose appropriate sensors for measuring pollutants like particulate matter (PM2.5, PM10), volatile organic compounds (VOCs), carbon monoxide (CO), nitrogen dioxide (NO2), and others.

2.Data Processing Unit: Implement a microcontroller or a small computing unit to process the data from the sensors and prepare it for transmission.

3.Connectivity: Integrate the system with wireless communication protocols like Wi-Fi, Bluetooth, or cellular networks for data transmission to a central server or a cloud platform.

4.Power Supply: Decide on a suitable power source, such as batteries, solar panels, or power outlets, depending on the deployment location and system requirements.

5.Data Visualization: Develop a user-friendly interface for users to monitor air quality data in real-time. This could be a mobile app, web dashboard, or a simple display unit.

6.Data Analytics: Implement data analytics techniques to interpret the collected data, generate insights, and identify patterns or trends in air quality over time.

7.Alert System: Set up an automated alert system to notify users when air quality levels exceed predefined thresholds, ensuring timely actions can be taken to mitigate potential health risks.

8.Security Measures: Prioritize data security by implementing encryption protocols, secure data transmission, and access control mechanisms to protect sensitive information.

Thank you