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**EXERCISE 1: LOGGING ERROR MESSAGES AND WARNING LEVELS**

This Java program demonstrates how to log error and warning messages using **SLF4J** (Simple Logging Facade for Java) in a **air pollution monitoring system**.

**Objective**

This exercise demonstrates how to integrate and use the SLF4J logging framework with Log4j2 in a Java application that monitors air pollution levels.

**Key Goals:**

**Implement Logging with SLF4J**

Set up SLF4J with Log4j2 backend to log messages at different severity levels.

**Monitor Air Quality Metrics**

Use logging to report abnormal levels of pollutants like PM2.5 and PM10 in real time.

**Use Appropriate Log Levels**

Log error messages for dangerously high pollution (e.g., PM2.5 > 150).

Log warnings for borderline thresholds (e.g., PM10 > 300).

Log info for normal monitoring updates.

**Improve System Observability**

Enable developers and operators to trace environmental alerts efficiently through structured logs.

**Code & Output:**

**AirPollutionLogger.java**

package org.example;

import org.slf4j.Logger;

import org.slf4j.LoggerFactory;

public class AirPollutionLogger {

private static final Logger logger = LoggerFactory.getLogger(AirPollutionLogger.class);

public static void main(String[] args) {

double pm25 = 185.6;

double pm10 = 325.4;

if (pm25 > 150.0) {

logger.error("CRITICAL: PM2.5 levels are dangerously high: " + pm25 + " µg/m³");

}

if (pm10 > 300.0) {

logger.warn("WARNING: PM10 levels exceed safe limits: " + pm10 + " µg/m³");

}

logger.info(" Monitoring air quality data for urban zone...");

}

}

Explanation

logger.error(...): Used for critical air quality violations (e.g., PM2.5 dangerously high).

logger.warn(...): Used for warning-level conditions (e.g., PM10 nearing risk thresholds).

logger.info(...): General monitoring activity}

