Objective:
Implement a weather monitoring system using ROS (Robot Operating System) to collect temperature, humidity, and pressure data from multiple on-field nodes and transmit it to a remote station node. Additionally, ensure that the system performs fault detection, validates sensor readings, and logs relevant information for troubleshooting.

Task Details:

1. System Components:
    a. (On Field Nodes and Aggregator Node) : Develop ROS nodes for temperature, humidity, and pressure sensing, as well as an aggregator node for data collection and transmission.
    b. (Remote Station Node) : Implement a remote station node for monitoring on-field nodes and validating sensor readings.

2. Functionality:
    a. On-field Nodes:
    Each node is responsible for
        i. Collecting one of the following measurements: temperature, humidity, and pressure data.
        ii. Publishing the collected data along with node state (error status) to designated topics.
    b. Aggregator Node:
        i. Subscribe to on-field node topics to collect data and node states.
        ii. Aggregate data and node states into requests.
        iii. Communicate with the remote station node to transmit aggregated data.
    c. Remote Station Node:
        i. Monitor on-field nodes for faults and log relevant information to the console.
        ii. Validate received sensor readings to ensure they are within specified ranges.
        iii. Log out-of-range sensor readings to the console with warning messages.
        iv. The Remote Station Node shall respond to the client with whatever convenient response (for ex: received)

3. Communication Scheme:
    a. The On-field Nodes shall communicate with the Aggregator node through pub-sub communication.
    b. The Aggregator Node shall communicate with the remote station node through server-client communication.

4. Testing and System validation:
    a. Design and execute test scenarios to validate the functionality of the system.
    b. Test scenarios should cover normal operation, fault conditions, and out-of-range sensor readings.

Technical Notes:

- Custom Message and/or Service Types:
    - Students are eligible to implement their own custom message and/or service types as needed for the project
- The valid range for each sensor reading :
    - 10 <= t <= 100
    - 0.95 atm <= p <= 1.2 atm
    - 0.7 <= h <= 0.95