Climate Guard: DHT11 Integration with Azure IoT for Smart Environmental Monitoring

Aim:

The aim of the provided code is to create a program for an ESP8266 microcontroller that reads temperature and humidity data from a DHT11 sensor and sends this data to a Google Apps Script (GAS) service. The GAS service is expected to process the data and potentially store it in a Google Spreadsheet or perform other actions.

Components Used:

- ESP8266 Microcontroller: This is the main microcontroller that reads sensor data and sends it to the GAS service.
- DHT11 Sensor: This sensor measures temperature and humidity.
- Azure Central Cloud: A cloud computing service provided by Microsoft, capable of handling and processing data from Internet of Things (IoT) devices.

Circuit Diagram:
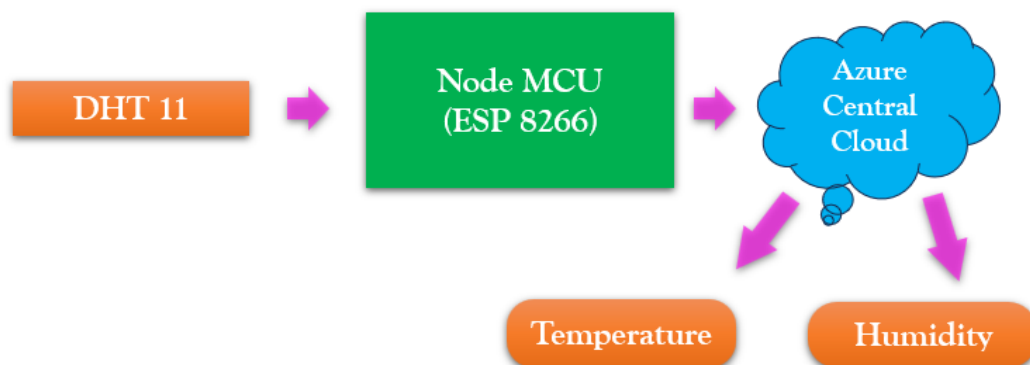
Procedure:

Initialization: The program initializes the DHT sensor, Serial communication, and the WiFi connection to the specified network.

Data Reading: In the loop function, the code reads temperature and humidity data from the DHT11 sensor.

Data Sending: The sendData function is responsible for sending the temperature and humidity data to the Azure Central Cloud. It establishes a secure connection to the specified host using HTTPS.

Request Building: The code builds a URL or API endpoint with the necessary credentials and the temperature/humidity data as parameters. It then sends an HTTP GET or POST request to this endpoint.

<u>Connection Handling</u>: The code checks for a successful connection establishment and certificate verification.

<u>Response Handling</u>: The program waits for the server's response, checks if the response indicates success, and prints the response.

Observations:

- The code outputs the temperature and humidity readings to the Serial monitor.
- Connection-related messages are printed to the Serial monitor.
- If the Azure Central Cloud service successfully receives and processes the data, a success message is printed; otherwise, a failure message is printed.

Results:

- The ESP8266 microcontroller should successfully connect to the specified WiFi network.
- The DHT sensor should provide temperature and humidity readings.
- The ESP8266 should successfully establish a secure connection with the Azure Central Cloud service and send the data.
- The Azure Central Cloud service is expected to receive and process the data.