PLC CODE LOGIC

The provided code is written for an industrial application using the M-Duino PLC, which is based on the Arduino Mega platform. The code is designed to read data from sensors, monitor their status, and store data to an SD card then send to Wi-Fi Shield based on receive commands via a serial connection.

Let's break down the code and create a simple flow diagram to illustrate its logic.

Library and Global Variables:

The code includes the required libraries, such as SPI, SD, and Arduino JSON.

It defines several global variables for various purposes, including control flags, timers, and sensor-related data.

Setup Function:

Initializes the serial communication for debugging and another serial connection for communication with an ESP module. Serial1 is in use for communication while Serial0 for debugging.

Attempts to initialize the SD card (the SC of SPI is connected to pin 53) and sets the flag based on success or failure. The flag indicates whether the SD card is connected.

Loop Function:

- Checks for incoming data (JSON) from the ESP module.
- Parses and processes the received JSON data, updating the scan rate and other parameters.
- Handles memory erase or polling requests from ESP.
- Continuously monitors the status of Sensors.
- Triggers events based on changes in sensor status.
- Writes data to the SD card if certain conditions are met.

Write to SD Function (write_to_sd):

Increments the packet serial number (PSN) and stores relevant sensor data in a JSON object. Depending on conditions, it can adjust the scan rate, clear the data file if it reaches capacity, and write data to the SD card.

Send JSON Function (send_json):

Similar to the "Write to SD" function but designed to send JSON data to the ESP module over the serial connection. This will work when the SD Card malfunctions.