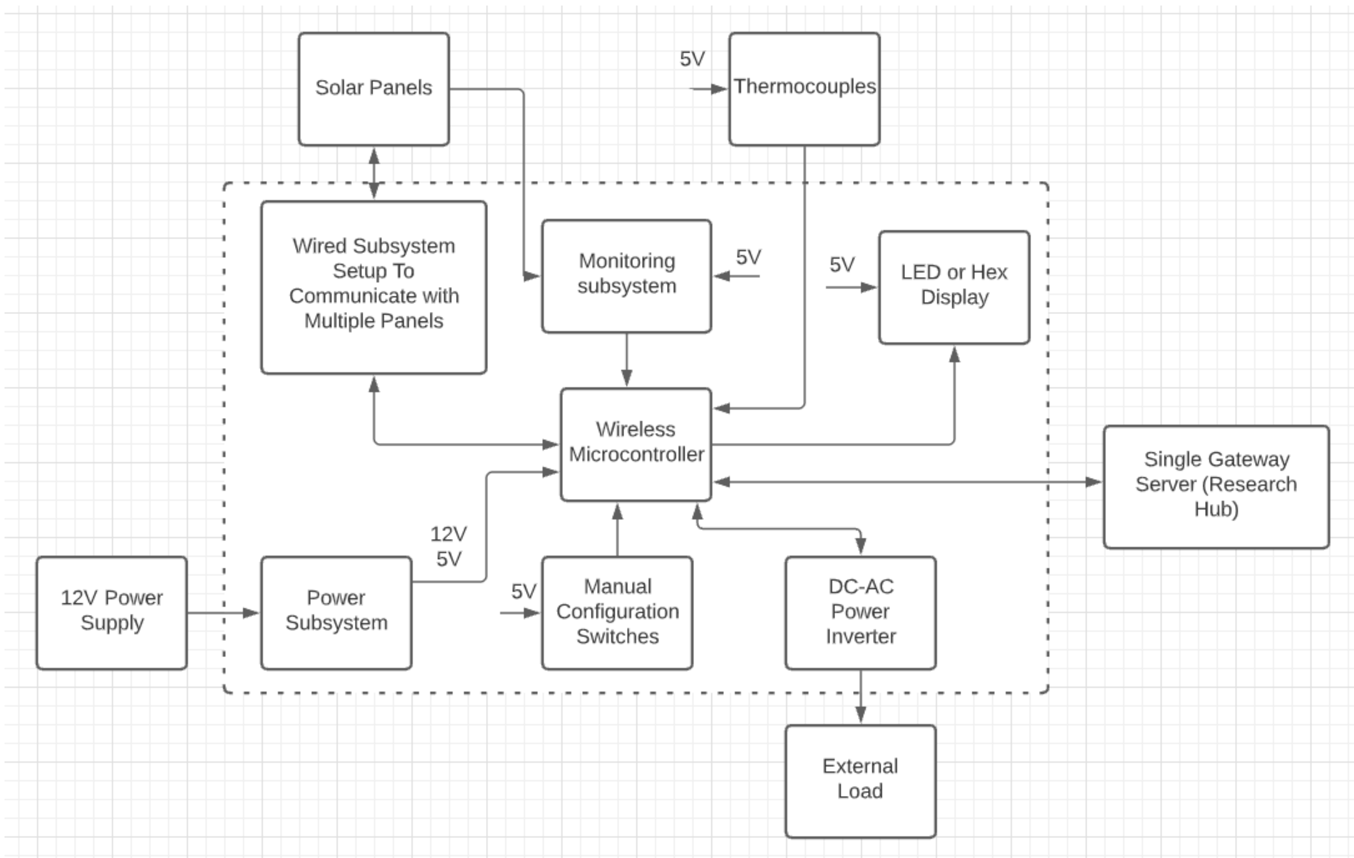
First TA Meeting Notes:

Block Diagram:
https://lucid.app/lucidchart/4cb9e38b-6251-46ce-b9c2-149ff0d2e640/edit?invitationId=inv_5285fbee-5ece-41b9-a9d3-344f7830ee7b

Wireless Microcontroller:
https://predictabledesigns.com/introduction-to-the-esp32-wifi-bluetooth-wireless-microcontroller/



3 - High Level Requirements:

1. Recording key solar panel data values - voltage, current, power output, temperature
2. Wireless communication capability with solar panels (with interactive web design)
3. Scalability

1 Sub-system Requirement:

1. Manual Switch Controls

0.2 Design
1. Block Diagram
Figure 2: System Block Diagram
The interface box for the solar panel will consist of seven important subsystems: the Voltage/Current Monitoring Subsystem, Ethernet Interface, Microcontroller/Processing Subsystem, Power Subsystem, Switching Subsystem, LED’s, and Manual Configuration Switches.
The Power Subsystem is responsible for generating from a 12V power source all of the voltage rails necessary for the interface box to operate as expected as well as toggling power to the interface box in general.
The Switching Subsystem connects the appropriate solar panel cell combination (32 cells, 64 cells, or 128 cells) to the output of the interface box, and this subsystem is controlled by the Microcontroller Subsystem.
The Voltage/Current Monitoring Subsystem is responsible for measuring the voltages of all possible output configurations and the current delivered to the load, as well as reporting that information when requested by the Microcontroller Subsystem.

Thermocouples that will be mounted directly on the solar panel will feed temperature data directly into the Microcontroller Subsystem.
The Ethernet Interface is necessary for ensuring that the interface box is able to connect to a network/server and, additionally, allowing a remote user to monitor and configure the interface box. When the Ethernet Interface is not being utilized, users can control the output configuration and toggle the output via the Manual Configuration Switches which will be mounted on the interface box.
LED’s aid in manual configuration by indicating interface box power, whether the output is enabled, and whether the Ethernet interface is being used.
Lastly, the Microcontroller Subsystem acts as the central processing unit of the system and is responsible for carrying out commands sent through the Ethernet Interface by the user (or the Manual Configuration Switches if Ethernet is not being used), monitoring for failure conditions that occur, setting the appropriate output configuration, and setting the LED’s to their appropriate states.
The correct implementation of each of these blocks will ensure that all of the high-level requirements are met.