

Group name: GreenHouse

Group number: 13

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Testing time: 3:30pm; Tuesday, April 2st, 2019

Customer Requirements:

- 3 ft. x 3 ft. x 6 ft. greenhouse structure
- Greenhouse door can be opened in 10 seconds or less
- Greenhouse is transparent and allows light to filter inside
- Maintains a minimum temperature of 40° F
- Works using one standard North American wall outlet (110-120V AC)
- Monitors temperature, light, humidity, and soil moisture
- Sensor data displayed on a web application
- Power consumption displayed on web application
- Notifications sent via email to user if conditions are abnormal

Equipment and Setup:

- Greenhouse structure is made using 1-½" pvc pipe and treated lumber. The structure is covered by a double-layer of polyethylene plastic (to create an air gap in between the layers of plastic). The door to the greenhouse was made using two adhesive zippers.
- Shelf is made using ½" BC plywood. Shelf is 30"x32" with 2-½" rectangular cutouts in the corners to make space for pvc pipes
- Heating element, Arduino, and ESP8266 are connected to an extension cord which is connected to a wall outlet
- ESP8266 and heating element are connected to 2.4GHz wifi network generated by laptop mobile hotspot

Data Collection:

Greenhouse Structure and Heating Element

- The door will be opened while being timed to show that the door on the greenhouse can be opened in 10 seconds or less.

Software

- Present the state views of the green house is properly demonstrated on the side bar.
- Present that the sensor data are properly showing on the graphs and are updated.
- Heat the outside temperature sensor, present the data plot
- Insert the soil moisture into the soil, present the data plot
- Demonstrate that energy consumption and energy cost analysis are being demonstrated in figure as well as graphs.
- Set the lowest temperature to be higher than current inside temperature, show that the warning message is received, and the heater would be turned on.

- Set the lowest temperature to be lower than current inside temperature, show that the heater is turned off.
- Set the specific time, show that the update message is received, which includes the sensor data and the power consumption within the month