

Automated Hydroponic Box

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CSE123B: Senior Design

Baskin
Engineering
UC SANTA CRUZ



Why Create a Hydroponic Box?

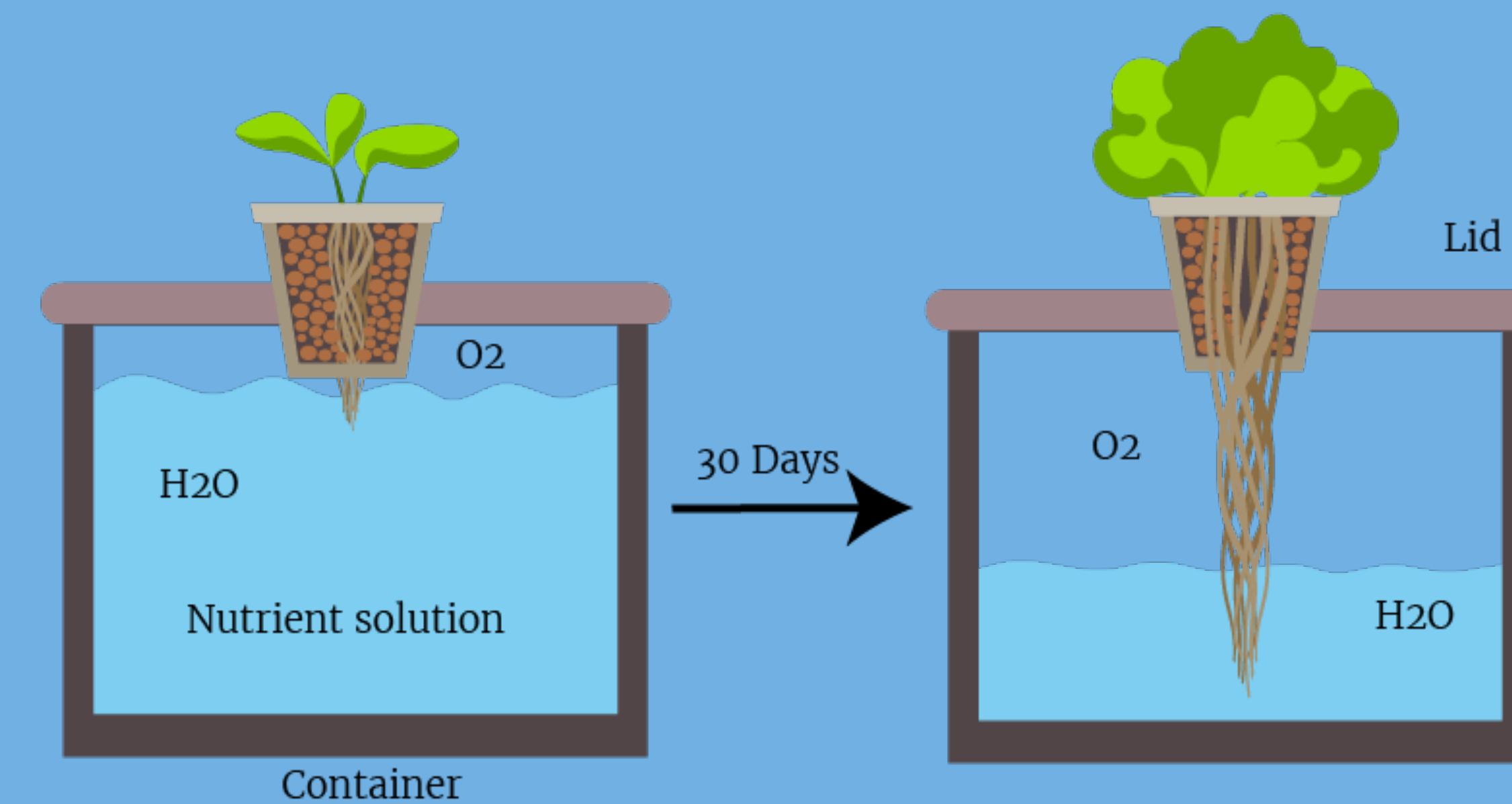
Getting fresh produce can be hard for students given the scarcity of fast and reliable transportation off campus, especially when public transportation options can pose a health risk.

Creating a hydroponic box makes it more accessible and less dangerous for students living in apartments on campus to obtain fresh produce from the comfort of their homes.

Hydroponic Method

The hydroponic method we chose to grow our plants is the Kratky Method because it is the method that best fit our design objectives:

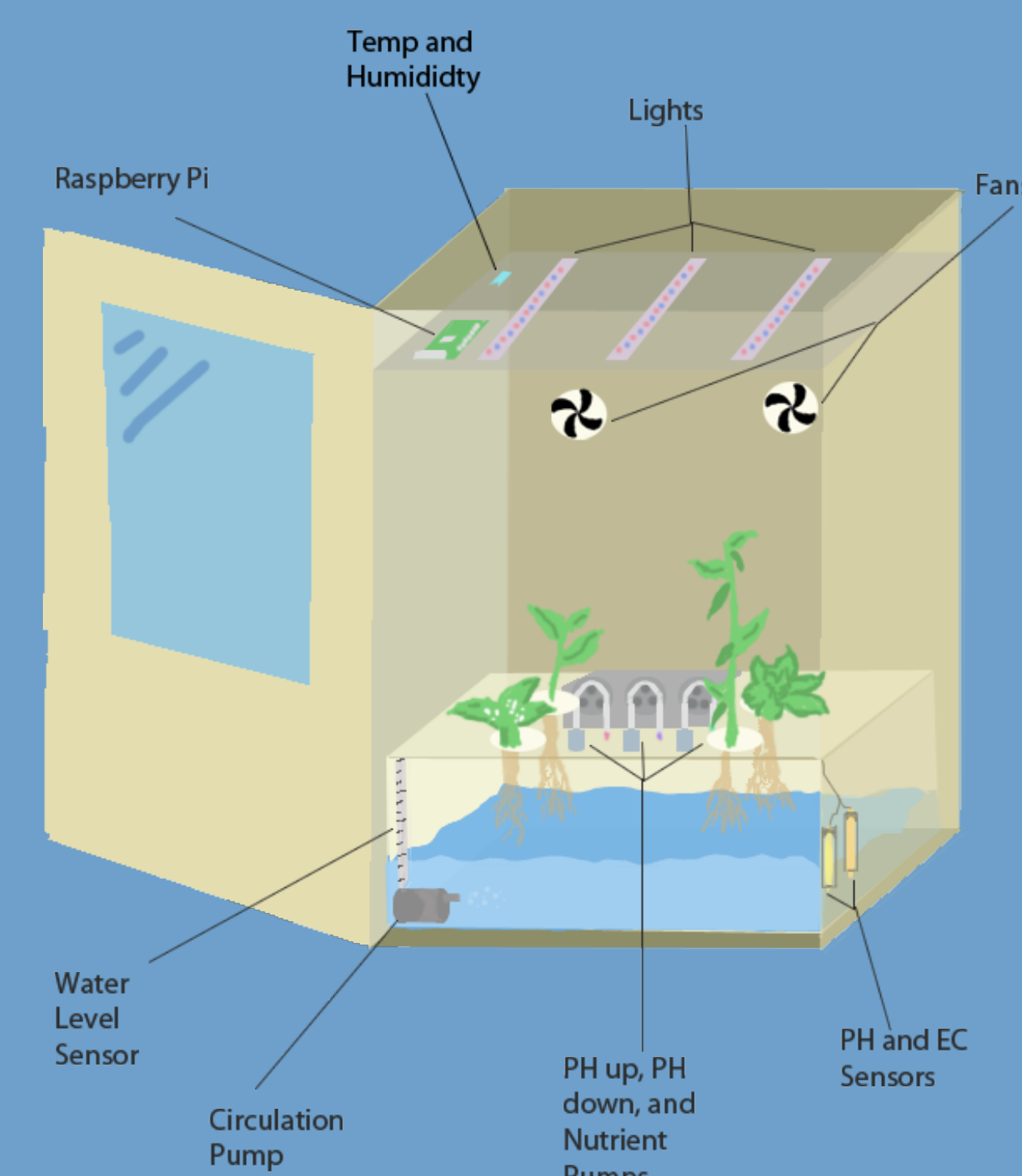
- passively grows; minimal maintenance
- specifically made to grow leafy vegetables for self consumption
- simple, compact hardware requirements



Design Objectives

- Inexpensive for the user
- Attractive and space saving design
- Monitor plants to ensure successful growth and adequate yield
- Allow the user to contribute to the growing process

Functional Prototype

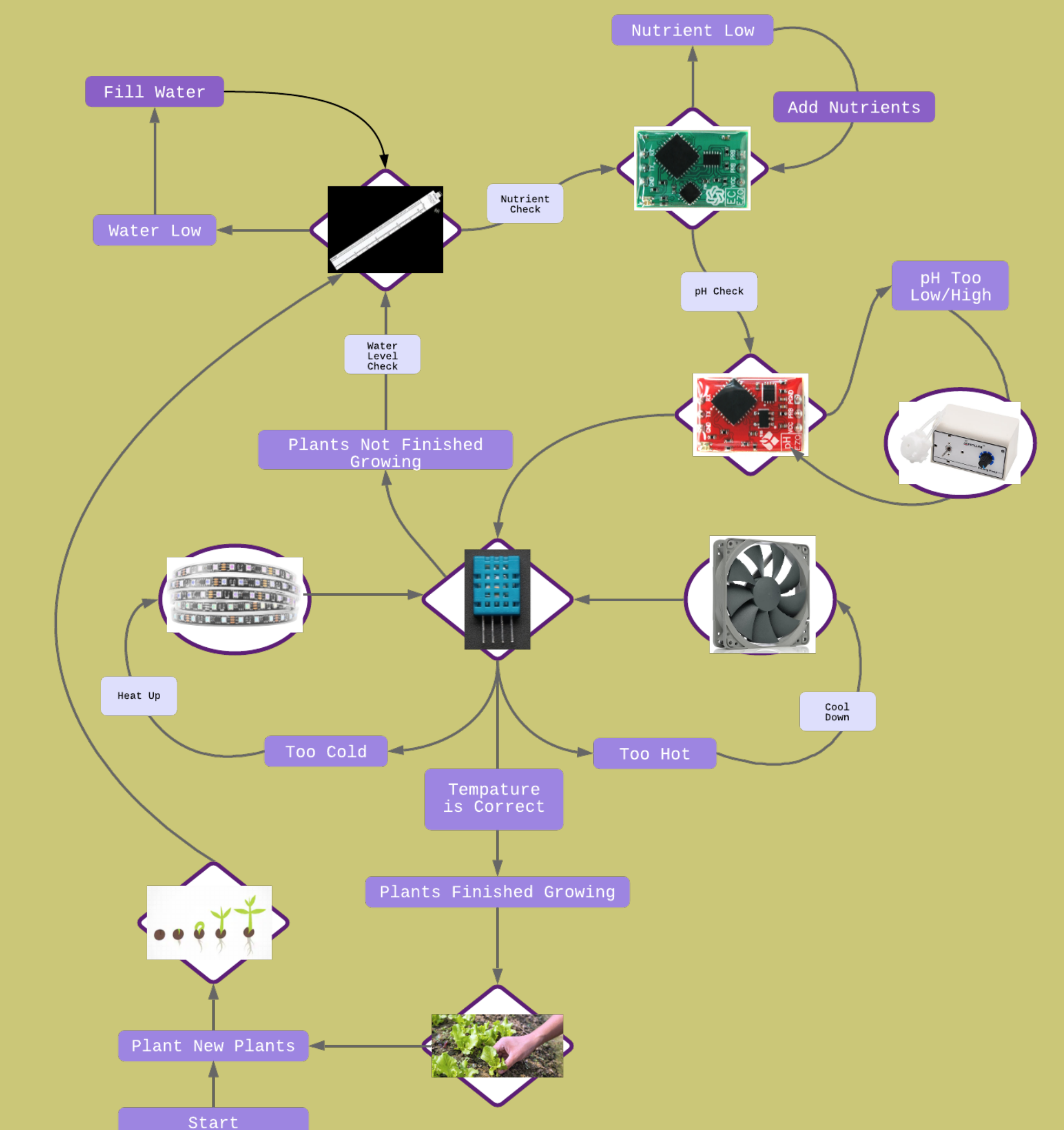


The image on the left is a technical drawing that depicts how we envisioned the final design for our aesthetic prototype.

The image on the right is our final prototype that we were able to successfully implement.

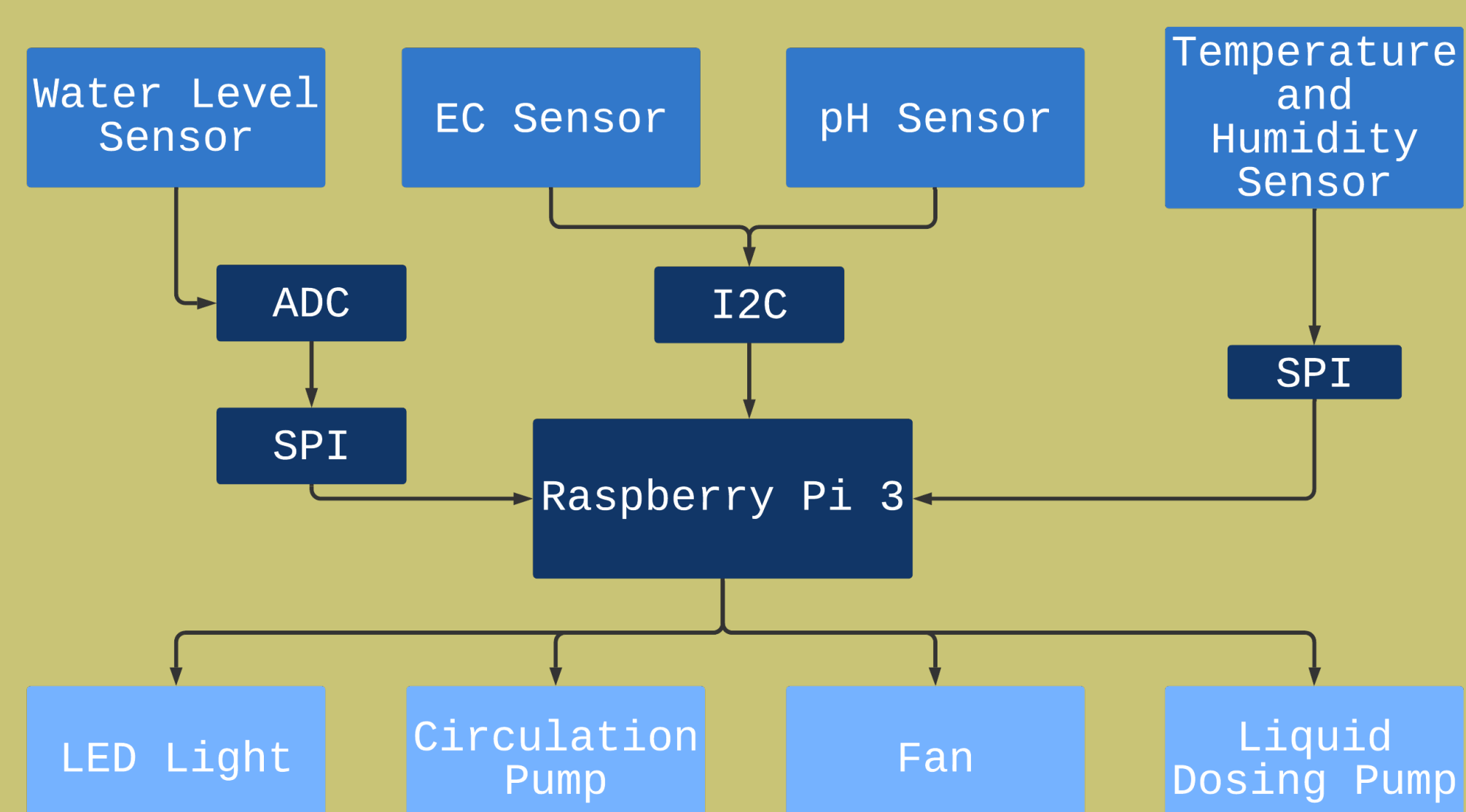
Behavioral Diagram

This diagram demonstrates the germination process of the plant, showing how the sensors and actuators ensure that the plant is under the right conditions to grow successfully.



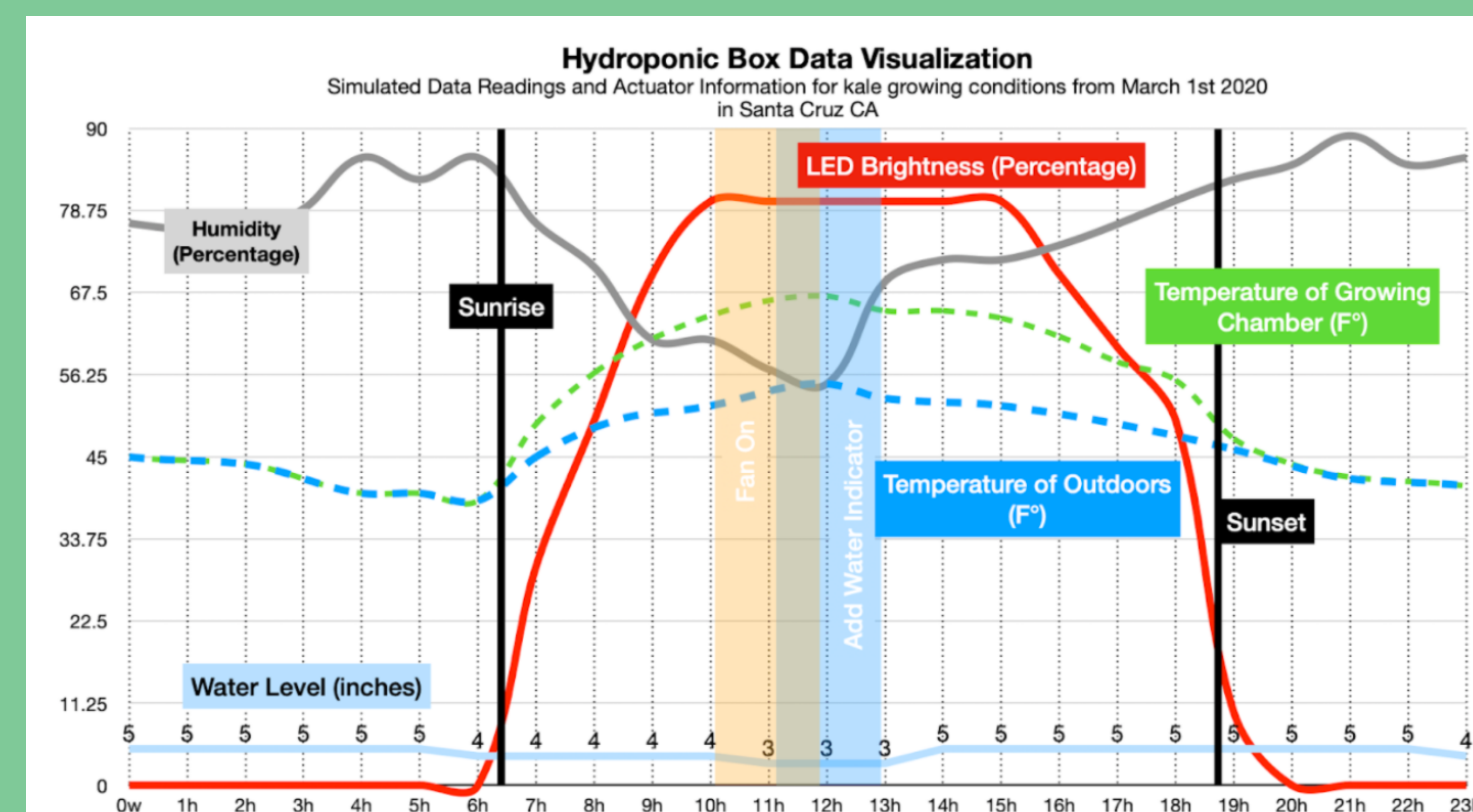
System Outline

The diagram below shows a simple overview of how we connected all of our components together to implement the program shown in our state machine diagram.



Simulated Day Cycle and Expected Performance

- Sensors and actuators communicated through our program
- Goal was to implement our state machine
- Demonstrates the response of our actuators on a typical day



Acknowledgements

We would like to thank Professor, David Harrison, and our TA, David Kooi, for guiding and mentoring us throughout this project. We would also like to thank Mr. Avery for helping us build the wood frame of our functional prototype.

References

- <https://originhydroponics.com/hydroponics-guide/>
- <https://www.cropking.com/catalog/nft-system>