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Hydroponics 5
GNG1103[D]
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Project Deliverable G: Prototype II and Customer Feedback

Introduction

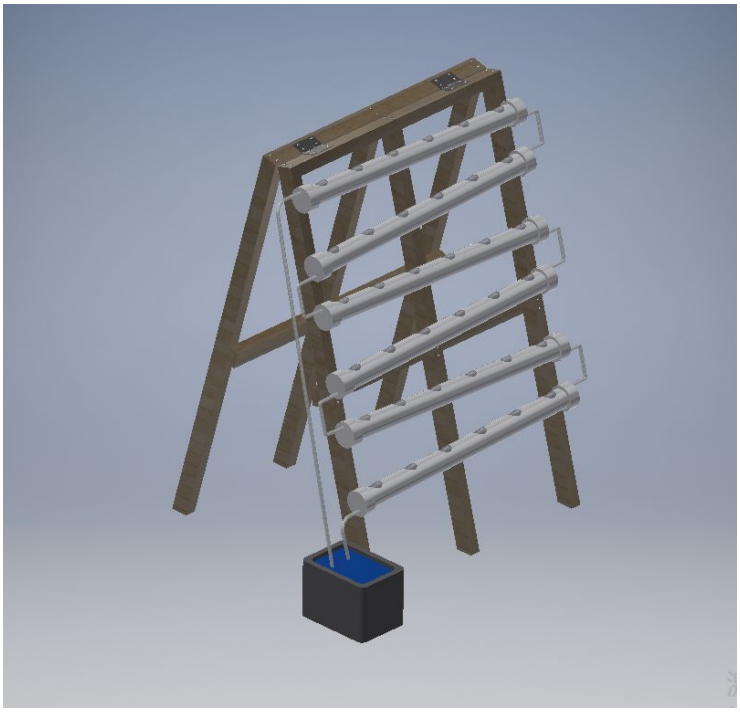
After building our first prototype and making a test plan describing thoroughly the circumstance of the making of this prototype and analyzing our client feedback. We have identified some points that we need to improve for our next prototype. This deliverable will consist of focusing on those points to improve our first prototype.

Objectives of prototype II

This prototype will not have any kind of model visualization but will instead focus on the results of our last prototype. We will be developing solutions for every key aspect of our system that need improvement or extra care. In this case, the general objective will be de-risking.

Prototype II

3D Model**:**



Here are the key aspects that we identified from prototype I:

- Pump type need to be decided, (voltage, power consumption, etc)
- Water collection technique consideration.
- Which type of solar panel is going to be used? (DC?)
- Does the solar panel need a battery?
- How much height needs to be increased to allow gravity works?
- What kind of nutrients are going to be used?
- We need to make sure the extremities of the pipes do not leak
- Water pump needs to be able to bring the water to the top pipe
- Frame has to hold the pipes in place
- We need to determine a recipient for the plants
- We need to think about which fittings are necessary for our pipes

After discussing these points with the whole team and our project manager and talking to more experienced people (home depot personal), we have come up with these solutions:

Pump, solar panel and battery
Our pump uses 12 volts and 2.1 amps meaning it consumes 25.2 Watts. Since our pump does not need to run 24/7, we can use a 12 volts DC solar panel that provides about 25 Watts and we won't need a battery.

Water and nutrients
We have decided that we will not have any way to collect water, if water needs to be added in the system, it will be done manually. The main nutrients that can be added to the water are nitrogen and phosphorous, we will not be able to provide any due to financial reasons but the customer can buy some at the following link or any other nutrients for lettuce: https://www.amazon.ca/dp/B00NQANQAC/ref=as_li_ss_tl?slotNum=15&ie=UTF8&linkCode=g12&linkId=08e65ab7a68a8c019abeed7bd757eda1&imprToken=3aF7gql4Yhge5CLsZp166Q&tag=ponics2-20

Plumbing and structure
Unfortunately, we do not have enough money to buy PVC to tubing fittings so we will need to find a way to ensure there is no leaking between those parts, right now we are thinking about doing precise cuts and using silicone. Our frame will have hinges, chains and wood blocks fixed on the base of the greenhouse to ensure it will not crumble.

Plants and plant recipient
Our system will be growing lettuce and they will be placed in red party cups which will have holes in them to let the water reach the plant.

Aspect(s) that needs extra care while building

While building, we will need to be very careful when connecting the tubing to the PVC pipes since this is the part where leaking is the most likely to happen.

Conclusion

To conclude, we have made a second test plan after using our previous test plan's results to improve our first prototype. We have then analysed this improved version of our first prototype to identify once again some aspects of the device that we need to pay more attention once we start building which will be the next step of this project.

Appendix :

Hinges and folding frame: