Project Deliverable D: Conceptual Design

GNG 1103 —Engineering Design

Faculty of Engineering —University of Ottawa

Hydroponic 2:

Zhema Wen-(300087146)

Liam Leahy-(300120875)

Stanley Lin-(300120839)

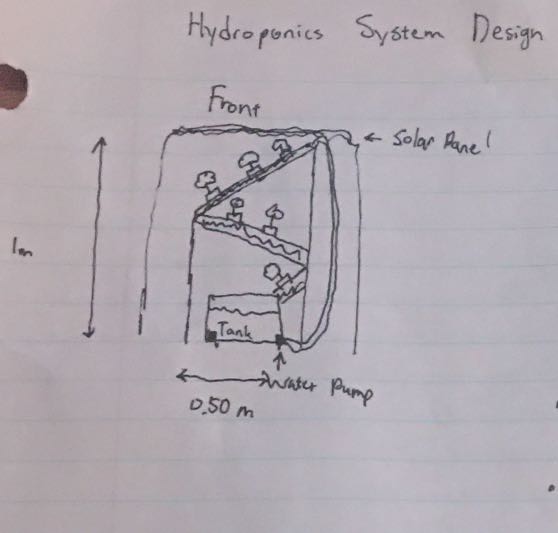
Allen Wang-(300069750)

Vedashri Patil

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**Introduction**

This deliverable illustrates three different conceptual design based on design criteria and the group discussion and extracting optimal concept by benchmarking. On account of client meeting, there are three main aspects that the team required to focus on are self sustaining, electricity and costs of materials. We gather three concepts from team members including the general sketch and descriptive text of each structure of concept. Thus, each concept will be analyzed and evaluated by design criteria to improve the project in the future.

**Concept 1** (Stanley Lin)

The sketch above is trend to be a “Z” with 1 by 0.5 meter dimensions (approximate 3.3\*1.6 feet). The concept demonstrates a fundamental structure of hydroponic system.

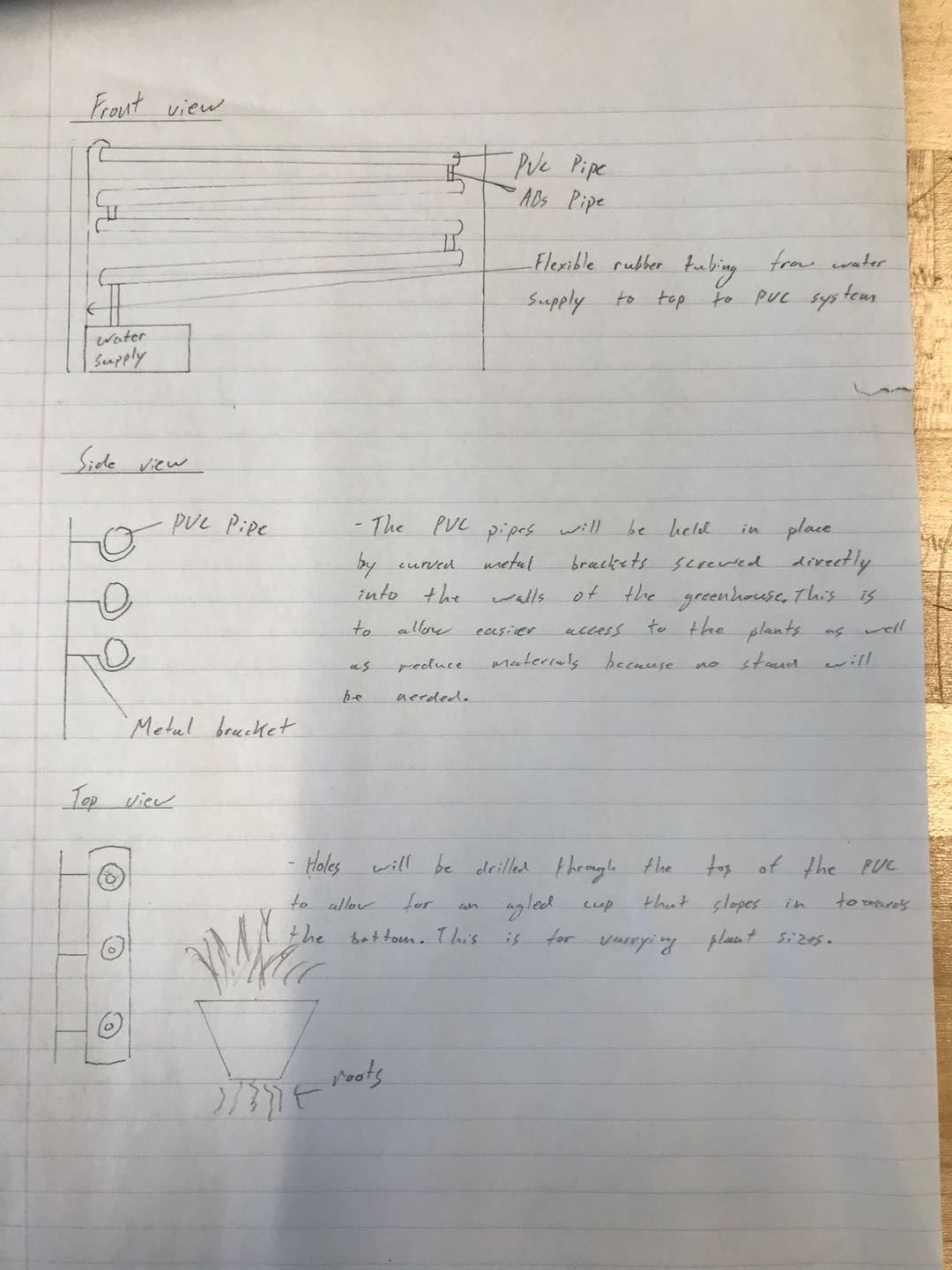
*Structure:*

At the top of the hydroponic system, there is a solar panel to provide electric for the whole system, specifically for the water pump. In the middle of the system, PVC pips with wholes carry plants, which the top entrance of the pip connected with a cube with water pump. The water pump provides impetus for flowing water from a tank. And the whole structure will put up by the wooden frame. (The connection of pips are using 90 degree PVC connectors)

Size: The hydroponic system is a 0.5\*0.5\*1.0 meters cuboid.

*Problem of concept 1 :*

Water filtration : Hydroponic system should have its water filtration system to filter impurities in water.   
Connection with greenhouse: This concept does not contain the connection part wi8th greenhouse.

**Concept 2 (Liam Leahy)**

This hydroponic system will directly install into the wall of the greenhouse, which can be accessed for convenience.

*Structure:*

The PVC pips will be hold in place by curved mental brackets screwed directly into the walls of the greenhouse. This is to allow people easier access to the plants as well as produce materials. The connection section between pips would be ABS pipe. There will be flexible rubber tubing from water supply to top to PVC pips. Holes will be drilled through the top of the PVC to allow for an angled cup that slopes in towards the bottom.

*Problem and subsystems of concept 2:*

Water pump:

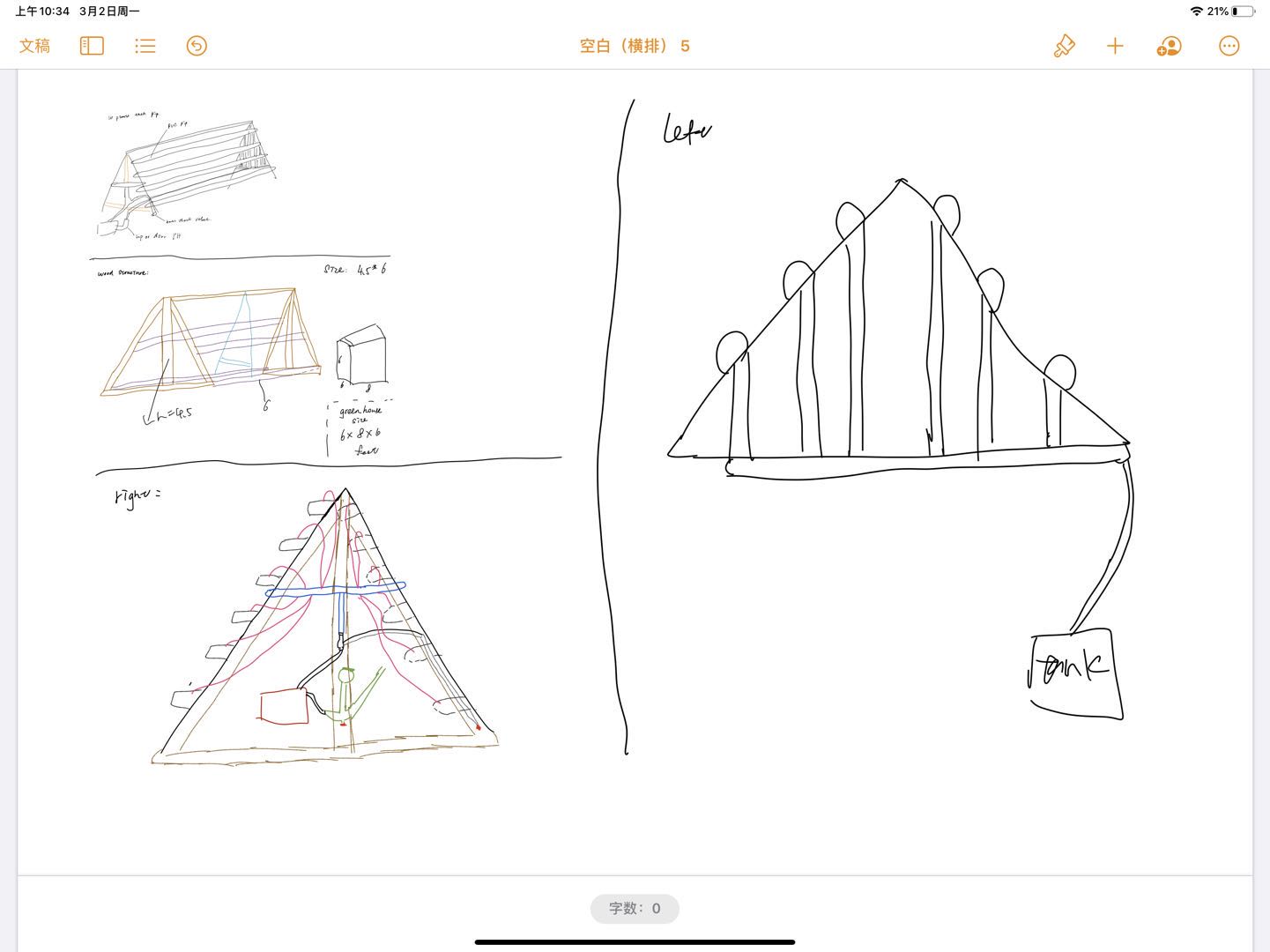
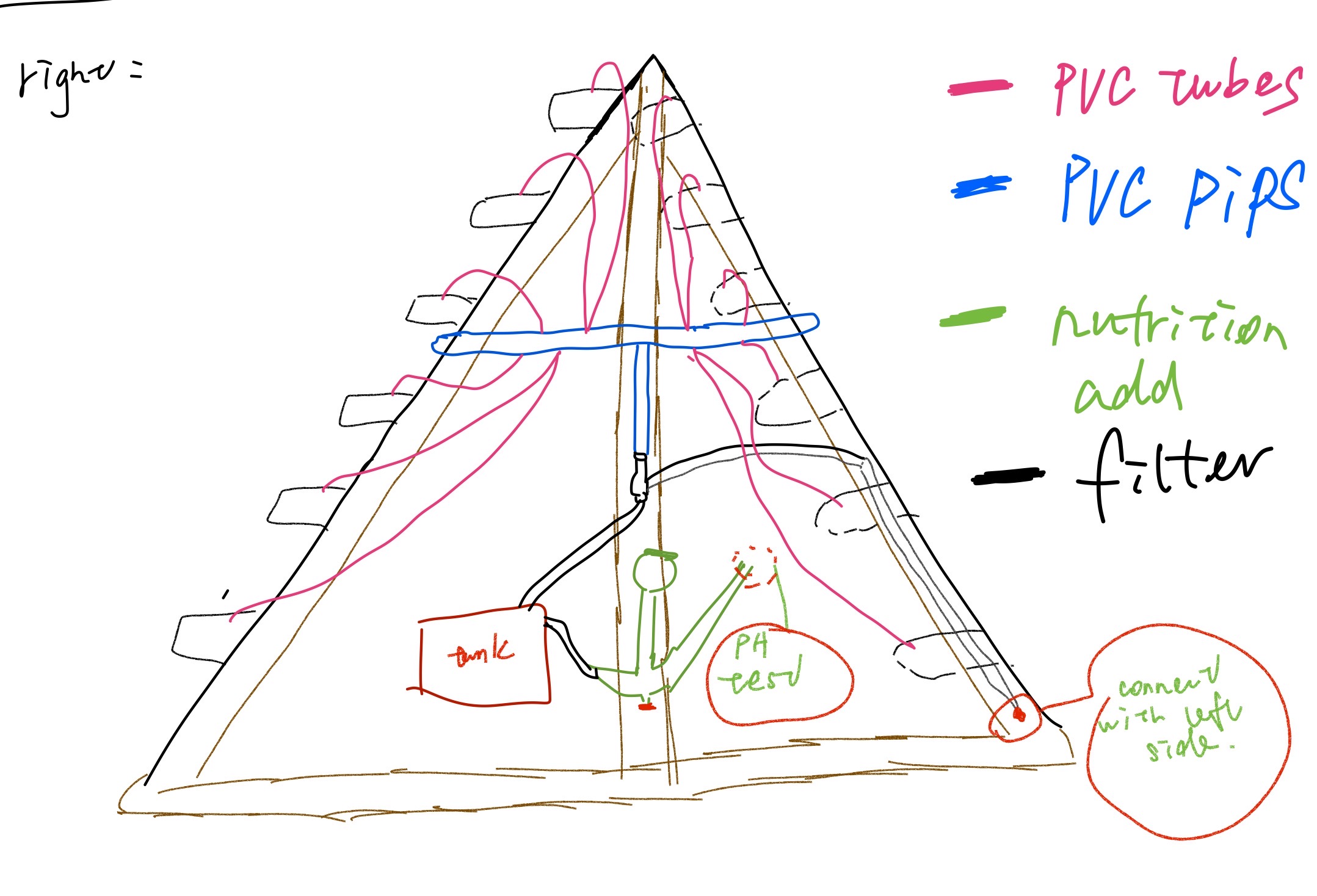
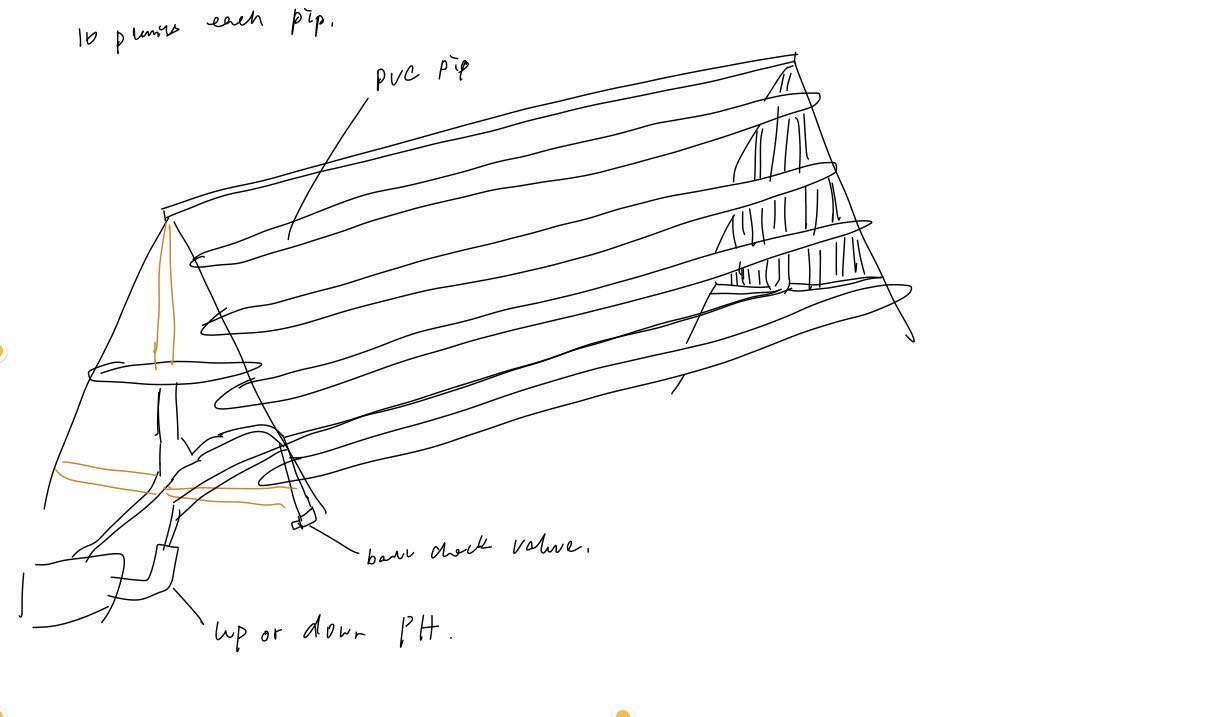
In a hydroponic system, it is paramount that water pump can provide impetus for water circulation and sustainability.

Electricity supply:

The system should have a battery or solar panels to supply electricity.

Subsystem:

According to the client, the system must be easy to assemble and disassemble when transported that we will improve this concept to disassemble.

**Concept 3:(Zhema Wen)**

This concept is a stable triangle wooden structure, which is stable and flexible.

*Structure:*

This hydroponic system are consist by a water reservoir, PVC pips, PVC tubes, water pump, and a section can easier adding nutrients into water and testing PH in water. The PVC pipe (blue part in the picture) in the middle of the structure is to connect the water pump(reservoir) and PVC tubes(PVC pips with plants). The other tube that connect the water pump is connecting with the left side to collect the used water to make a water circulation.

*Problem and subsystem of concept 3:*

Electricity supply:

This concept does not achieve the client’s need for self-sufficiency that the water pump need electricity to work.

Structure:

The concept is complicate, but it meet a plurality of most demand.

Cost:

The cost of building a hydroponic system is limited.

Subsystem:

The whole structure will be well-organized and simplified, and the budget issue will also be concerned in this concept.

Conclusion:

Comparing this three concepts, concept 2 and 3 are getting a large extent to meet client needs. After next group meeting, the group will nail one final design of hydroponic system, and we will also enhance the design based on the concepts that mentioned above.