GNG1103 C-09

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Deliverable G: Prototype II and Customer Feedback

Introduction:

This deliverable will discuss how the original project plan is being followed at prototype II. The new developments in our model and the new materials will be examined in this report. The feedback received from prototype I is going to be analyzed in this report specifically the steps that need to be taken in order to incorporate the feedback into the group's next prototype.

Prototyping Test Plan:

When designing Prototype I our group was going towards a type of design where water flows downward across angled plastic piping. Refer to Figure 1 for the previous design. When visiting the appliance store to gather materials, the group decided to change the design to operate like a waterfall. This type of design is a lot cheaper and more feasible to build. Refer to Figure 2 for the waterfalls of our design.

Figure 1: First model of design

Prototype II is not about the refinement of the overall design in our case. The ability to make any hydroponics system easier to use and manage is what our key focus is on. We not only focused on finding a way to alert the user when the tank needs to be filled, the team found a way to make the system more expandable and differentiable. This is another aspect improved from the previous design. Figure 3 shows the model of a simple circuit that will be implemented. Keep in mind the values in the photo are arbitrary in that we have not determined the right values for our system yet. Figure 4 shows the progress we have made in designing the circuit to alert our client.

Figure 3: Circuit Diagram for design

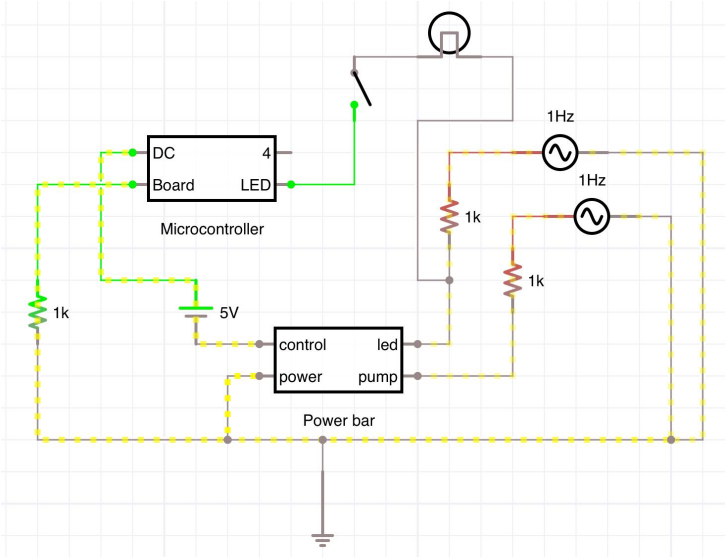
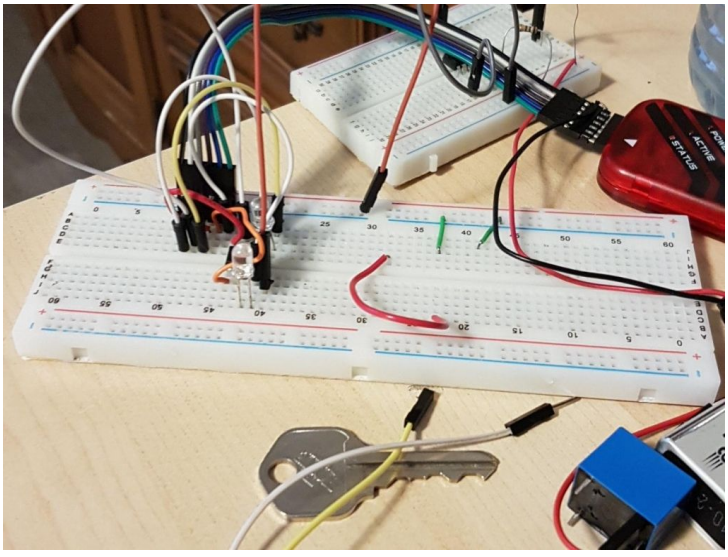


Figure 4: Circuit board to control lights



To accommodate our inexpensive product, we found an alternative to using rockwall. This cotton that can be found at common fish and plant stores is sold in less quantity making sure the client does not have to make a big investment, it is also easier to lay down and plant seeds. This greatly reduces the cost of our product if it is to be manufactured. For this reason, tests will be conducted in the next lab to ensure this is the most feasible option to replace rockwall itself as bedding for plants. Another option for printing a prototype and reducing costs is a 3D printed model. We are currently in the progress of seeing if Makerspace will give us the time allowed to print this model.

Test Objectives:

When performing subsystem tests on our system, we will be measuring how well the rise of water reacts to the ultrasonic sensor. This test will be performed to see if the microcontroller will react fast to the rise of water. Another test that can be performed is the force of weight on the hanger for the grow walls. As the system can be customizable and extended more weight will be needed on the frame. We will be able to run a stopping test where weight can be added to the support until the maximum weight is achieved.

Customer feedback:

The client gave us feedback:

- It is cost-effective to produce
- The electronics sub-system is portable to any hydroponics system.
- The system can be extended to add more plants.
- The electronics are easy to implement and don't cost much money.

Refinement of the design:

For the future prototype we will be able to run our code through the electronics. The group will also think about refining the design in terms of using 3D modeling for most of the prototype as discussed earlier. When the circuits and programs are completed testing will

be initiated to determine if using the ultrasonic sensor is the best route to take for measuring water levels.

Conclusion:

In conclusion, the group has followed our exact deadlines proposed in the last deliverable. We are all on track to building a working prototype that can be implemented in any hydroponics system. If chosen to be the company's next system, it will be customizable to any user's needs.