Universally Accessible Garden Progress Report

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Review of Last Period's Goals

The primary goal for this last period outlined in the project proposal was to finalize the size and rough design needed for the project. Determining the size of the unit was a prerequisite for determining the specifications of the internal components and this goal was achieved on time. The next set of goals was to determine the prototype specifications and order the components that need to be shipped. The specifications were determined in week 3 rather than the week 2 target, and the components were not ordered on time. The difficulties associated with this target are outlined in the next section. The components have been ordered as of this week, as per the revised timeline included in this document. Further goals included an inventor drawing to visualize our project and to start constructing the prototype beginning in March. The inventor drawing has been completed on schedule and the building of the prototype has been pushed back as per the revised schedule.

Difficulties Encountered

A few problems were encountered during the design phase of the Universally Accessible Garden was choosing the components for the prototype and being able to grow something before the project deadline.

Choosing Prototype Components

Harder than originally anticipated to decide on the final components for our prototype.
More decisions than anticipated had to be made regarding the components once the specifications of the prototype were determined, notably within the electronic and hydroponic systems. As a result, more research on the components than originally anticipated was needed to ensure they will function correctly and integrate well within the system.

Feasibility of Growing Vegetables by Project Deadline

The fastest growing plant that was identified for use in our device is spinach which takes approximately 30 to 45 days from germination to harvest. Originally the goal was to have the prototype finished by March 15 which required the early deadline of ordering the components. Since this is not enough time to grow spinach, it has been decided to push the timeframe back and prioritize the design phase due to the difficulties found in selecting the components necessary for a cohesive, working system. Options are currently being explored to transfer already growing plants into the system to ensure proof of concept.

Prototype Specifications

It has been determined that the building of the prototype will require these items:

Electronic systems, driven by Arduino microcontroller:

-Light/Pump timing using relay module
-LED grow light, 45W, 13" X 13" X 0.7"
-Simple digital display
-Automatic humidity control using digital humidity sensor & ultrasonic fog generator

Hydroponic drip system:

-80 GPH fountain pump
-½" (I.D.) tubing
-¼" (I.D.) tubing
-drip emitters
-1' x 2' grow tray, 6 plants set in 3-inch diameter net pots

Unit Casing:

-Shell and housing for the unit to be determined when ordered components arrive

It must be noted that there are some omissions from this list that were discussed in the project proposal:

Arduino controlled pH sensor: The $50 cost to get a single unit pH sensor delivered on time to meet project deadlines exceeded the value it would provide to the prototype. For the making of a marketable product these sensors can be ordered in advance from China for $3. It was determined that pH testing strips are a more suitable solution to keep costs low.

Nutrient Solution Mixer: It was determined that the cost associated with creating a system in the unit to mix nutrient solution was not necessary. There are various options for premixed plant solution available online at a suitable cost.

Current Design

An inventor sketch of our design can be seen in Figure 1 below.

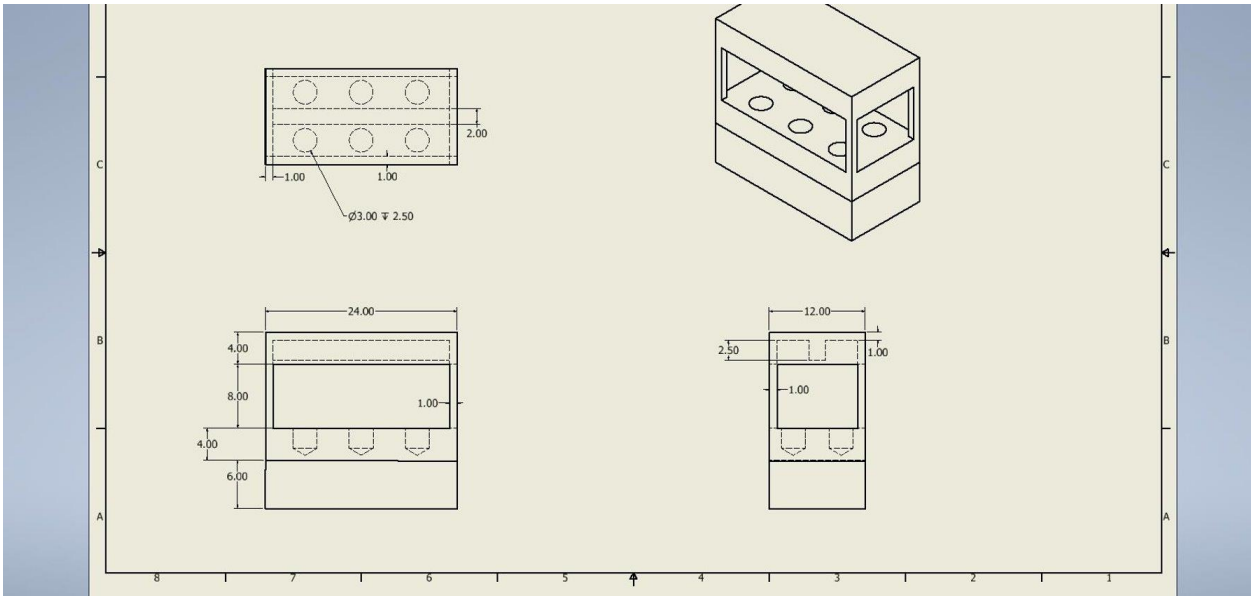

Figure 1: Inventor Sketch of Design

Updated Timeline

Below, Figure 2 illustrates our updated timeline, what we have and will accomplish before the project deadline.

Figure 2: Gantt Chart

Conclusion

Steady progress has been achieved since the project proposal. During this period the design phase has been mostly completed, excluding the finalizing of the unit shell contingent on receiving ordered components. Designing a unit with many simultaneous integrated processes has proven challenging and the design phase was extended to compensate for this. Despite the challenges, a revised schedule has been determined and the project is still on schedule to demonstrate a functional prototype for the final presentation.