GNG 1103 – Engineering Design Project Deliverable E

Project Schedule, Risk Analysis, and Cost Estimation

Group #12

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Introduction

This deliverable contains the plan and schedule for the completion of the hydroponics system. This report will outline how and when the 3 prototypes of the project will be completed. This schedule will be presented using a Gantt diagram. Possible risks will be assessed and backup plans will be developed for all risks that reasonable likely. Risks and backup plans will be included in this report. Lastly, cost estimates for all the prototypes will included.

Project Plan:

For our project, we shall make three prototypes that will use different methods of prototyping that we learned in class to fully analyze the different features of our design. This will provide us enough information to better our design for the final product.

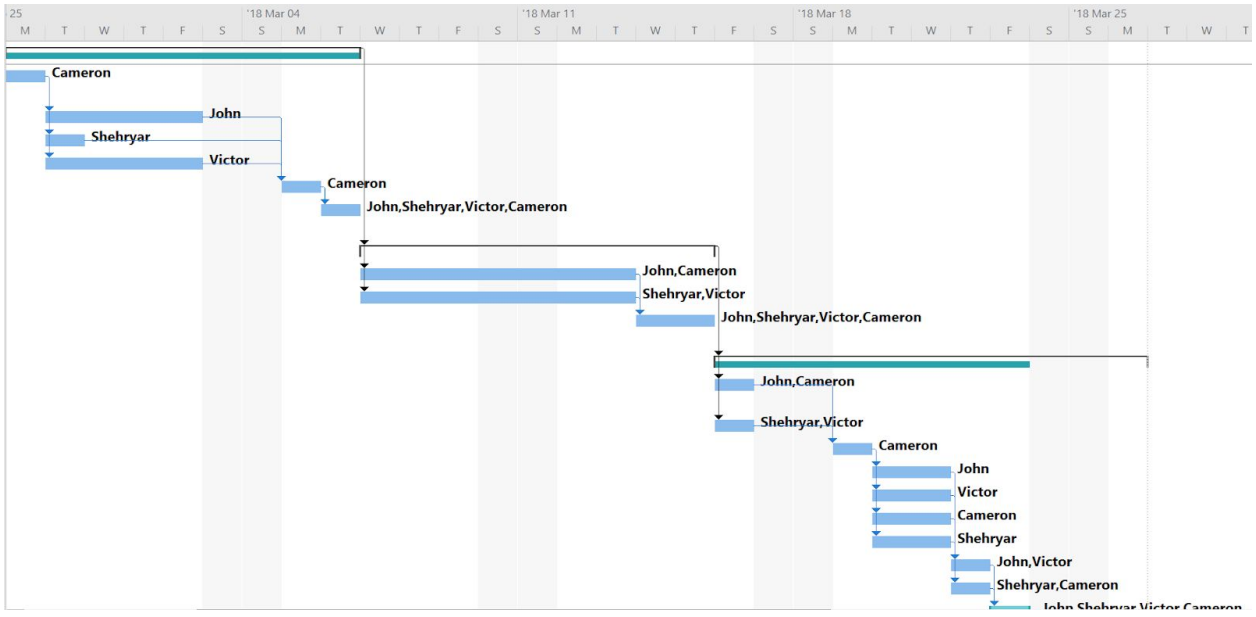
Our first prototype will consist of our **Design 2.2** found in deliverable D and will be a complete model of the system using materials found lying around such as cardboard and other cheap things. This prototype will be a representation physically of **Design 2.2** and will give us a better idea of how to implement other features in the design. The prototype will show basic proof of concept and be useful in improving on the future prototypes. The prototype can also be showed to the customer and users for feedback

The second prototype will consist of critical subsystems. This will allows us to demonstrate that the design will work and be effective. Firstly, we will tackle the structure of the hydroponics system and create a prototype to work on how the plants can stay inside the system and how the plants can come in contact with the water. Before integrating the pump, we will determine a prototype for the drip system. Instead of using the pump, we will pour water down the drip reservoir to observe the rate of water out the drippers.

A comprehensive prototype will be made for the final and third design. It will be a fully functional system. This is made before the final product is actually made. The design will be in depth due to the results we obtained from the second prototype. We will also determine the cost and actual dimensions for the hydroponic system. In order to make the final prototype, we will assign one team member to be in charge of the financial aspects including purchases. After purchasing the materials, each person will be in charge of different features of the system. Finally, after we have produced the prototype, we will do further testing to assure everything works up to standard and if it does not, we will make changes to better assure the final product satisfies all the customer needs.

GANTT CHART

	Task Mode	Task Name	Duration	Start	Finish	Predecessc	Resource Names
1		**Produce Prototype 1**	**7 days**	**Mon 18-02-26**	**Tue 18-03-06**		
2		Determine dimensions of the hydroponic system	1 day	Mon 18-02-26	Mon 18-02-26		Cameron
3		Create the tubing structure	4 days	Tue 18-02-27	Fri 18-03-02	2	John
4		Create the reservoir box	1 day	Tue 18-02-27	Tue 18-02-27	2	Shehryar
5		Create the piping	4 days	Tue 18-02-27	Fri 18-03-02	2	Victor
6		Assemble the parts together	1 day	Mon 18-03-05	Mon 18-03-05	3,4,5	Cameron
7		Analyze basic structure and complete deleriverable F	1 day	Tue 18-03-06	Tue 18-03-06	6	John,Shehryar, Victor,Cameron
8		**Produce Prototype 2**	**7 days**	**Wed 18-03-07**	**Thu 18-03-15**	**1**	
9		Build the plant growing medium	5 days	Wed 18-03-07	Tue 18-03-13	1	John,Cameron
10		Build basic drip system	5 days	Wed 18-03-07	Tue 18-03-13	1	Shehryar,Victor
11		Analyze results and complete delieverable G	2 days	Wed 18-03-14	Thu 18-03-15	9,10	John,Shehryar, Victor,Cameron
12		**Produce Prototype 3**	**7 days**	**Fri 18-03-16**	**Mon 18-03-26**	**8**	
13		Improve on the design from prototype 2	1 day	Fri 18-03-16	Fri 18-03-16	8	John,Cameron
14		Identify the materials and suppli	1 day	Fri 18-03-16	Fri 18-03-16	8	Shehryar,Victor
15		Buy the materials and supplies	1 day	Mon 18-03-19	Mon 18-03-19	13,14	Cameron
16		Build the tubing structure	2 days	Tue 18-03-20	Wed 18-03-21	15	John
17		Build the reservoir	2 days	Tue 18-03-20	Wed 18-03-21	15	Victor
18		Build plant medium	2 days	Tue 18-03-20	Wed 18-03-21	15	Cameron
19		Build drip system	2 days	Tue 18-03-20	Wed 18-03-21	15	Shehryar
20		Assemble the parts together	1 day	Thu 18-03-22	Thu 18-03-22	16,17,18,19	John,Victor
21		Attach the pipes and the pumps	1 day	Thu 18-03-22	Thu 18-03-22	16,17,18,19	Shehryar,Cameron



Project Risks and Contingency Plans

Risk	Chance of Occurence	Impact on Overall System(Low-High)	Back-up Plan
The growth medium will not retain water.	Medium-Low	High	A different growth medium will be used. Research will be done to find a material that works well in hydroponics systems.
The water won't travel well from the top plant to the bottom one. Some plants receive more water than others.	Low	High	Less of the growth medium will be used so that less water is retained. A drip system will be developed that delivers water to each plant separately.
Sensors don't work	Very Low	Low	A new sensor must be purchased.
Team member with critical task becomes unable to complete it due to illness.	Low	Medium	The workload will be redistributed among team members.
The cost of the materials is greater than the designated budget.	Medium	High	The final design must be altered in order to save costs (e.g. the final design will be smaller, cheaper materials will be used).

Cost Projections

The cost for all the materials of the 3 prototypes is listed below in the tables and are based on pure research. However, the cost can be different from the estimated value depending how everything goes.

Prototype 1

Materials	Cost ($)	Use
Cardboard	0	Base
Plastic Water Bottle	0	Reservoir
Straws	0 (Tim Hortons/Mcdonalds)	Tubes
Tape	0	Connect materials
Paper	0	Pump
Total	0	

Prototype 2

Materials	Cost ($)	Use
Basil seeds	2	To grow
Plastic cups	6	Hold the plants
Floral foam	8	Hold Plants
Drip Tubes	9	Move water
Release Valves	1	Control water flow
Total	26	

Prototype 3

Materials	Cost ($)	Use
pH Sensors	22	Display pH

Floral foam	Previous cost	Hold Plants
Drip Tubes	Previous cost	Move water
Release Valves	5+ Previous cost	Control water flow
Wood	15	Structure
Water tank	10	Storage
Lights	10	To grow plants
Wheels	10	Mobility
Total	72	

Conclusion

This report outlines the team schedule, the risks, and the estimated costs associated with the completion of the three prototypes of the hydroponic system. This report offers a rough outline of the completion of the project over the upcoming weeks. Most of the elements in this report are subject to change.