Deliverable E
Project Plan and Cost Estimate

GNG 1103 – Engineering Design
Group # 10

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Introduction

In this document, our team will outline the project plan, budget, and strategize for each of our prototypes. The project plan will involve a schedule of the tasks, division of work, and projected due dates required to complete the prototypes on time. Our budget will go over properties such as estimated costs, quantity needed, and description of the materials which will be used to complete each prototype. We will also identify risks associated with prototyping and discuss risk management strategies.

Project Plan

Prototype 1

Prototype 1 will serve as the starting point for our physical design models. We need to create an overview and proof of concept that we can build off of in the future. To do this, we've divided the work into three subsystems which we will roughly design individually to address any issues found within each system. We will combine these systems to assemble a rough mock up of what our final project may resemble.

Since the first prototype will in fact be the first physical sample of our product, there are some limitations. For instance, the subsystems that will design in our first prototype might not be compatible for each other since there will still be adjustments to make, and the systems will be designed independently. Furthermore, the first prototype may not accurately give us an idea of how the subsystems work in relation to each other since it is indeed the starting point of our physical design models.

Task	Estimated Task Duration	Projected Due Date	Responsibility
Decide on the premise of the prototype	1 Hour	October 18	Team discussion
Create sample non-functional Arduino board displaying the information flow from	1 Day	October 22	Bassam
Design and build mock-up rig to attach tact switch to Ultimaker	2 Days	October 22	Sandra, Het

Construct Dashboard user interface with basic functions	2 Days	October 22	Ella
Compile components and work through any errors	3 Days	October 24	Team collaboration

Prototype 2

The second prototype will model the most complicated subsystem, which will likely be the code that transmits the information collected by the sensor and delivers it to the Dashboard UI. To do this, we will need to create a mock sensor to collect "data"; this will be a tact switch we can manually activate to test and see if our code works. In the end, we should have a program that starts a timer when the button is being held, and that displays the word "idle" otherwise.

This prototype will help us sort through any errors in our code so that we can be sure it works when implemented with the final sensor and the UI. We need to be careful to ensure that the physical mock-up sensor is set up properly and is functional, so that any errors we get in our output can be attributed to an error in the code. To be sure that our physical mock sensor works, we can model the code and set up we learned during the Arduino lab.

Task	**Estimated Task Duration**	**Projected Due Date**	**Responsibility**
Discuss any changes to the design that need to be implemented, choose subsystem to prototype	1 Hour	October 25	Team discussion
Determine materials needed for prototype	1 Hour	October 25	Team discussion
Divide team into subsections and begin work on each element of subsystem	5 Days	October 25	To be determined
Combine elements and address errors	1 Day	November 5	To be determined
Test the prototype	1 Day	November 6	Team discussion
Observe and note changes to be made	1 Hour	November 6	Team discussion

Prototype 3

This will be a focused physical Prototype that closely resembles the final product. In fact, our final design will ideally be identical to this prototype, assuming we have met all of our criteria. After all the feedback that we got from our previous prototypes, we will make sure to fix all of the errors that we encountered during our previous proposals. By the time we are finished, everything should work perfectly in terms of the sensor, the microcontroller, and the user interface.

Task	**Estimated Task Duration**	**Projected Due Date**	**Responsibility**
Discuss issues with previous prototypes, create solutions	1 Hour	November 7	Team discussion
Determine materials needed for prototype	30 Minutes	November 7	Team discussion
Create final sensor section and attachment device	4 Days	November 18	Het
Create final microcontroller setup	6 Days	November 18	Ella, Bassam
Establish functional Dashboard user interface	5 Days	November 18	Ella
Install sensor to sample 3D printer	1 Hour	November 18	Sandra, Het
Compile components and work through any errors	1 Day	November 18	Team collaboration
Test the prototype	1 Day	November 18	Team collaboration
Make changes if needed	3 Hours	November 20	Team collaboration
Refine design and create last minute features, time permitting	2 Hours	November 20	Team collaboration
Present the prototype to our client	**Milestone**	November 21	Team collaboration

Gantt Diagram of Project Plan

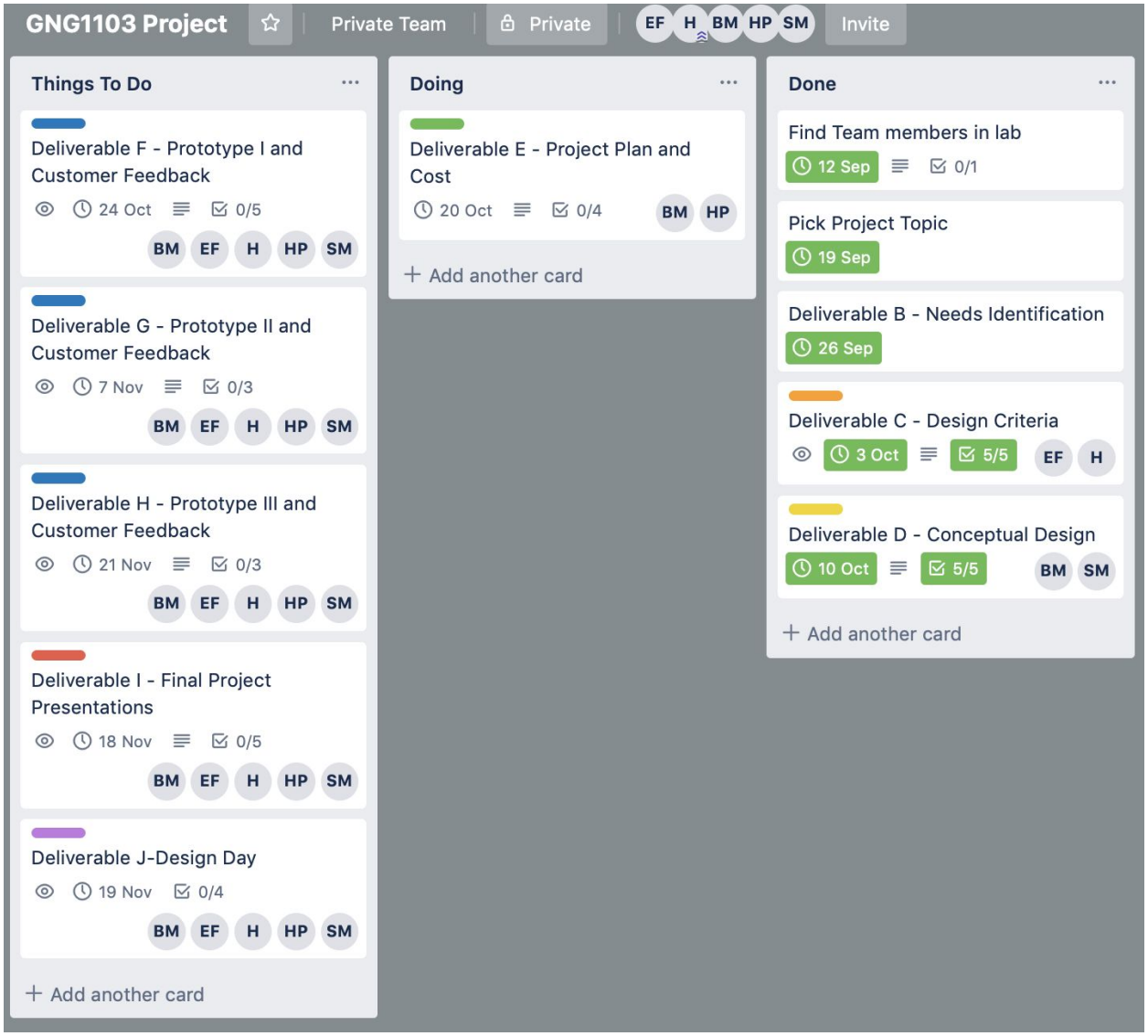

Figure 1: Gantt Diagram of the following plan for the project.

Bill Materials

Item number	Part Name	Description	Quantity	Unit Cost	Total Cost
1.	Tact Switch	Contact sensor triggered with pressure	5	$0.37	$1.85
2.	NodeMCU	Microcontroller featuring Wifi chip	1	$8.19	$8.19
3.	Arduino Uno	Open-source microcontroller board	1	$14	$14
4.	Dupont Jumper Cables	Electrical wire with pin at each end	2	$3	$6
5.	Arduino USB cable	USB cable compatible with Arduino Uno	1	$4	$4
				Total cost:	$34.04

Conclusion

This report traces how our group will make three models inside a financial limit of 100 dollars and a time allotment that reaches out to the finish of this semester. Our first prototype will concentrate on a shortsighted model produced using scrap materials and drawings. The second prototype will focus on the software involved to ensure our design is functional. Lastly, our third prototype will be a comprehensive working model that enables the customers to see the whole design in real life. This will be a functioning model that can allow users to interact with the interface and sensors. Our projected cost puts us well within our budget and will allow us room for error. Each of our proposed timelines and due dates also account for any unforeseen error, which will lower the risk of us missing any deadlines.

Works Cited

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