

GNG1103  
**Deliverable E**

# **Project Plan and Cost Estimate**

Submitted by

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## **Abstract**

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Throughout this paper, the team will develop a project plan and schedule to ensure that the three project prototypes get done on time and to a high standard. The team will also present an estimation of the cost of the project and come to a conclusion on the feasibility of the project.

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## List of Acronyms

Acronym	Definition
CEED	Centre for Entrepreneurship & Engineering Design
SD	Secure Digital

STEM	Science-Technology-Engineering-Mathematics
ETC	Estimated Time of Completion

# **1 Introduction**

The following deliverable will show how the team structured their project plan and schedule to ensure that all three project prototypes are completed on time along with the necessary tasks for each. The three prototypes will be separately evaluated to create a task list, cost evaluation and schedule that will outline owners and dependencies of tasks. A Gantt chart will serve as a concise overview of the prototyping schedule. In addition, there will also be a list of significant project risks and a set of contingency plans to mitigate these risks. The team will then conclude with a Feasibility Study which will serve as an assessment of the practicality of the project as a whole. In summary, this deliverable will act as an outline of the project schedule and cost, including any risks and how they will be mitigated along with an assessment of the practicality of the proposed plan.

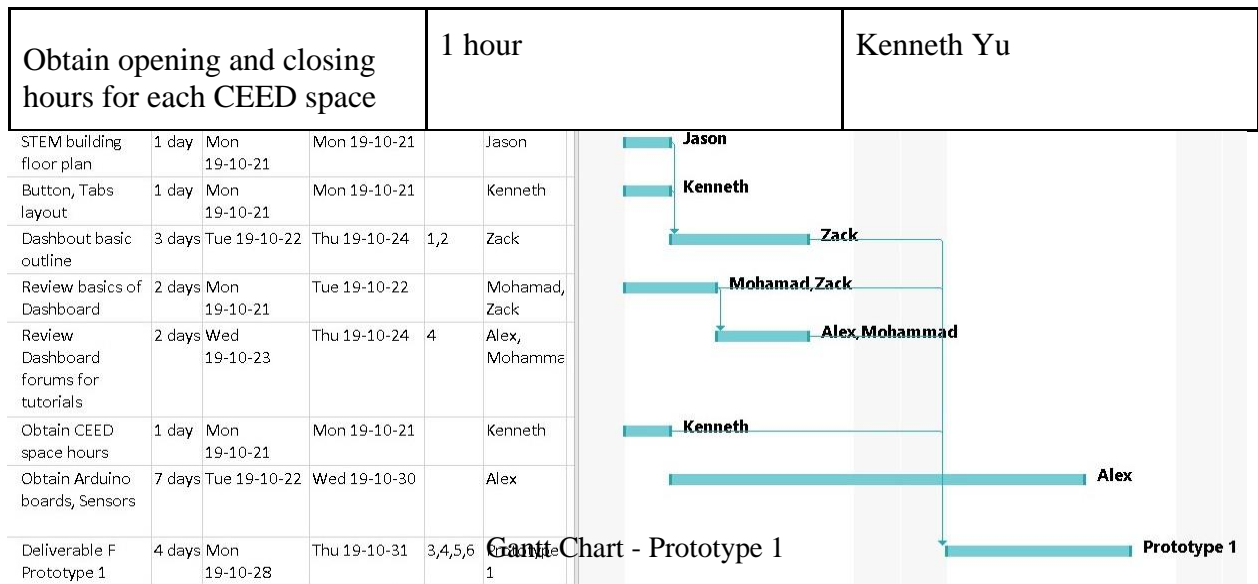
## 2 Project Plan

### Task List

#### Prototype 1

Prototype 1 will most likely include only an outline of how the dashboard will look like. It will show the buttons, tabs, and the basic functions of what we aim the dashboard will be able to do. The actual functionality of the dashboard will then slowly be implemented throughout prototype 2 and 3 as seen fit.

Task	Estimated Time	Person Responsible
Draw the outline of the map of the ground floor and review with actual space on ground floor STEM building	Outline: 1 day Review: 21/10/2019 due to reading week	Jason Gonzalez Pulido
Sketch an outline of button placements and tabs to be placed on Dashboard	1 day	Kenneth Yu
Make the basic outline on Dashboard	1-3 days	Zach Shields
Obtain Arduino board and infrared sensors	1 week	Alex Vandici
Review how to add functions, linking processes and basic use of Dashboard	1-2 days	Mohamad Ali Jarkas and Zach Shields
Review Ross forums to identify any useful tutorials necessary for the project	Continuous process, 3 to 4 relevant tutorials to be identified by 21/10/2019	Alex Vandici and Mohamad Ali Jarkas



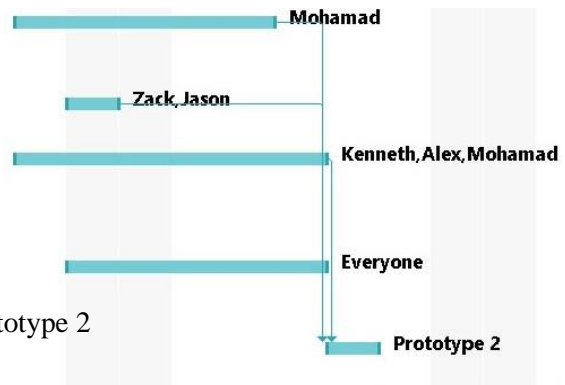
## Prototype 2

Prototype 2 will see an implementation of the actual functions. The team will also test the addition of peripherals to the dashboard to get an idea of how well they can be integrated.

Task	Estimated Time	Person Responsible
Get basic functions for buttons and tabs working	1-3 days	Mohamad Ali Jarkas
Connect the sensor to Dashboard and test	1 day	Zach Shields, Jason Gonzalez Pulido
Refine prototype according to customer feedback on prototype 1	3-4 days	Kenneth Yu, Alex Vandici, and Mohamad Ali Jarkas
Coding necessary for functions	3-4 days	Everyone

Button, Tabs working on Dashboard	3 days	Fri 19-11-01	Tue 19-11-05		Mohamad
Test sensors on Dashboard	1 day	Sat 19-11-02	Sat 19-11-02		Zack, Jason
Refine design based on customer feedback	4 days	Fri 19-11-01	Wed 19-11-06		Kenneth, Alex, Mohamad
Finish coding for functions on Dashboard	4 days	Sat 19-11-02	Wed 19-11-06		Everyone
Deliverable G Prototype 2	1 day	Thu 19-11-07	Thu 19-11-07	9,10,11	Prototype 2

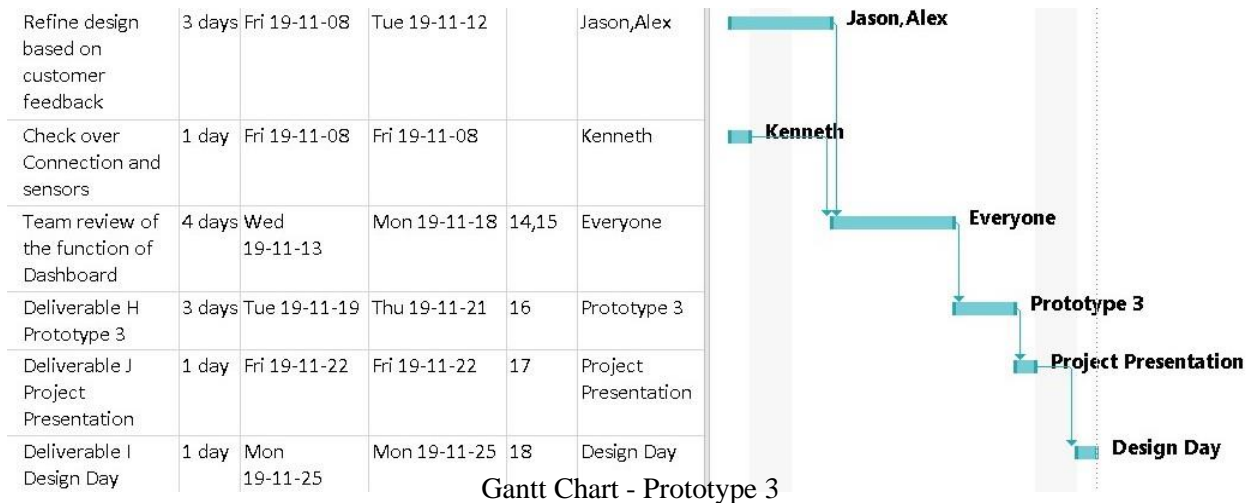
Gantt Chart - Prototype 2



### Prototype 3

Task	Estimated Time	Person Responsible
Further polish the outline to make it more aesthetic and user-friendly	3-4 days	Jason Gonzalez and Alex Vandici
Double-check connections and functionality of the sensors	1-2 days	Kenneth Yu
Refine prototype according to customer feedback on prototype 2	3-4 days	Alex Vandici and Zach Shields
Lay down finishing touches to get the final customer feedback	5-7 days	Everyone





### 3 Project Risk

The team acknowledges the lack of expertise in using Ross and understands that there will be difficulties along the way. The team also aims to perfectly implement the peripherals together but keeps in mind that things might not go according to plan, and must be altered quickly to keep pace and stay on track. Finally, as a software-based project, there is always the chance that the files are mislocated, deleted or even get corrupted beyond repair.

To try and avoid any of the above risks, appropriate measures will be taken. The team will be taking workshops ahead of time to have a better understanding of the software and hardware we are working with. Before implementing any extra features on the board, our first priority will be having a working prototype of the main hub, therefore if any other features are not coming together and we do not have time to figure out why we will have a team meeting to decide if the function will be pursued, however we would still have a functional mainboard. To avoid any software getting lost or corrupted, we will have multiple backups of the software in different locations(i.e different computers) as well as all previous major saves in the event that the current save is corrupted or lost. This ensures that we will still have the data if the one being worked on is lost, destroyed or corrupted.

## 4 Cost Estimation

Most of this project will be software-based. The software is free, so the budget will be used to purchase extra peripherals to further enhance the functionality.

- Arduino Uno 3 board: 17 CAD

**Source:** <https://makerstore.ca/shop?olsPage=products%2Farduino-uno-r3>

Or

- Raspberry Pi Zero: 16.5 CAD

**Source:** <https://makerstore.ca/shop?olsPage=products%2Fxn-raspberry-pi-zero-wgu2l&page=2>

- Jumper cables: 1 CAD per 10 cables

**Source:** <https://makerstore.ca/shop?olsPage=products%2Fjumper-cables-per-10>

- Infrared PIR sensors 3x; 13 CAD

**Source:** [https://www.amazon.ca/Aukru-HC-SR501-Pyroelectric-InfraredDetector/dp/B019SX6ZR6?ref\\_=fscfp\\_pl\\_dp\\_1](https://www.amazon.ca/Aukru-HC-SR501-Pyroelectric-InfraredDetector/dp/B019SX6ZR6?ref_=fscfp_pl_dp_1)

**Total cost(for now):** \$31 CAD+tax or \$30.5 CAD+ tax

As the team explained in the previous deliverables, the interactive map will aim to gather data from its surroundings, in addition to data logged in by users. In order to achieve this, some sort of electronic board was needed. The team picked an Arduino board because a few team members have had previous experience with the board. If the need arises, we can order another board.

Jumper cables are necessary to connect the sensors onto the Arduino/Raspberry Pi board. The PIR sensors are crucial to gather data from the surroundings i.e. if a person steps away from the machine for more than 15 minutes.

These components are the necessities for now. Other components that might be necessary will be added to the list later down the road. All of this will stay under the specified budget of \$100 CAD.

## **5 Feasibility Study and Knowledge Gaps**

The solution, so far, is feasible and can be manufactured if everything goes to plan. Despite that, the team acknowledges our limited knowledge and experiences surrounding Ross Dashboard, Java scripts, and the functionality of an Arduino board. In order to ensure the completion of our project to our standards, we will make sure to ask for help, attend different workshops, and reach out if we hit a roadblock. We will also utilise the resources around us (from those with more experience in certain coding elements to information that can be gathered from the internet) to meet our goals and expectations.

When it comes to legal issues involved in the creation of our project there are little to none, however one that we have considered from our product would be if we were to add cameras to the spaces so that there is a live feed for telling users how busy the spaces are. We have discussed this with CEED management and they informed us the only requirement would be for us to put up a sign that said that the people within the space are on camera. For the economic and operational aspects, it is clear that we are unable to add sensors to every machine or tool in all of the CEED spaces due to our budget of \$100. This means that it is only feasible for us to do an example of what might be spread throughout the spaces later. With regards to scheduling, the information for how we plan to divide our time can be seen in the project plan above and we believe that there is enough time for us to make this product for our project. To reiterate, we believe that our project is feasible and viable given the technical, economic, legal, operational and scheduling information provided above.

## 6 Conclusion

From this deliverable, we strongly believe that the discussed time frames will help us stay on track. The introduction of an assigned individual for each task will aid in the task being actively worked on and talked about, further pushing our progress. In addition, we learned from writing out the project risks and feasibility of our project that it is in our best interest to actively do workshops and start learning the necessary skills that we need for our project to avoid getting delayed too often. This deliverable has given us insight into what really must be done. Working through the cost estimation it turns out we still have a little room to play with which is nice to know for the future. Moving forward we should continue to look back at this plan and not only look at it but update it with current information and progress. Through this we are always conscious of what still needs to be done and if we can afford it in terms of money and time.

Overall, this deliverable has helped us clarify how to progress and to clearly see the tasks ahead of us as well as our limitations moving forward. This will help us with what we should be doing now to minimize work overflow at the last minute and any roadblocks throughout the project. We've learned how taking the time to manage your time and efforts, can open your eyes to what you can really do in that time and how you should tackle it.

## 7 Bibliography

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