Deliverable E - Project Schedule and Cost

GNG 1103 - Engineering Design

Fall 2021

University of Ottawa

Course Coordinator: Dr. Muslim Majeed

Group 8: Hans Rao Ladkoo, Benjamin McConnell, Kobe Belanger, Steven Wilson, Kaitlynn Sampel

Submission Date: October 26, 2021

Table of Contents

1.0 Introduction

This deliverable outlines a final design plan for our final concept as seen in deliverable D, a project schedule, a risk and contingency plan, and a cost estimate with a bill of materials. On October 21, 2021, our group met with our client Mansour Kharoub to discuss our three proposals. During this meeting, Mr. Kharoub provided us with feedback for the final design concept.

Our group will create a project schedule that contains the tasks and subtasks along with the timeline and the group members assigned. To add, our group came up with a plan on how we would respond and take action to any problems or complications that occur during the rest of the project. Finally, once our group finalized our designs, we created a cost estimate and a bill of materials to predict possible expenses.

2.0 Design Drawings

Navigation. The app has 4 main views: login, setup, dashboard, and alerts. The user will be able to interact with the product through the app and will have access to real-time data from the sensors in the vehicle. Below is a flowchart of how our product will function.

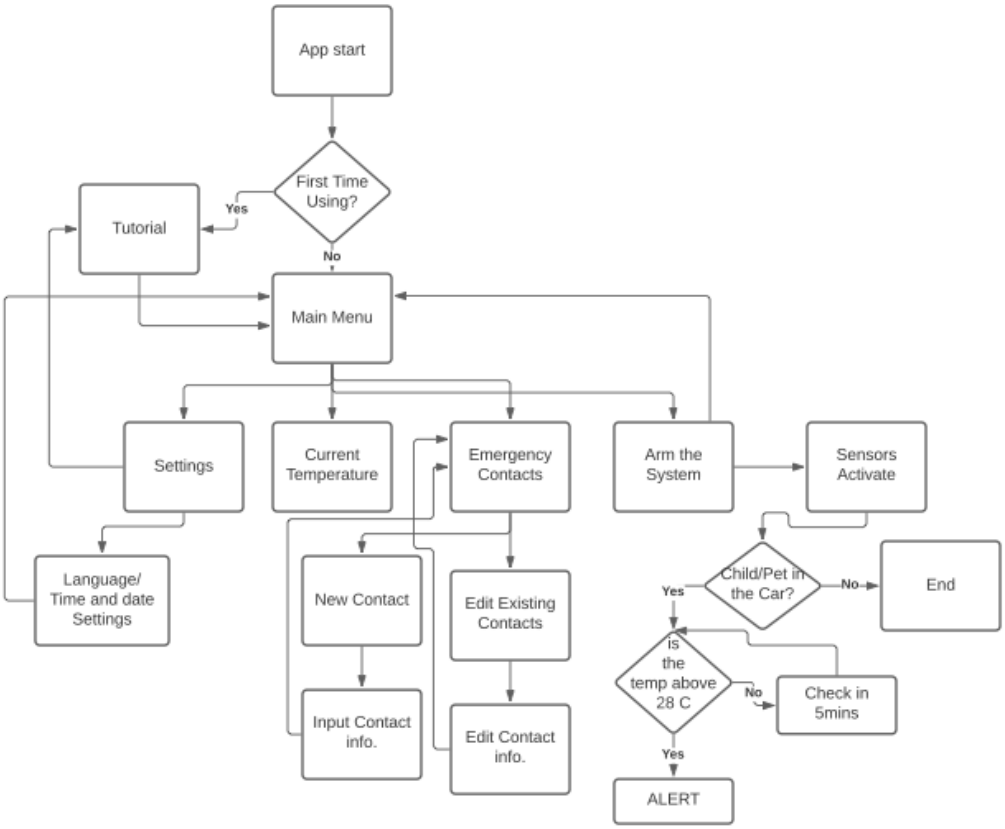


Figure 1. Flowchart for Hot Car Emergency Device

App Login. The user will need to create an account in order to save preferences, emergency contacts, and pair the app with the device. The login page will allow the user to create an account in case it's the first time they are using the product.

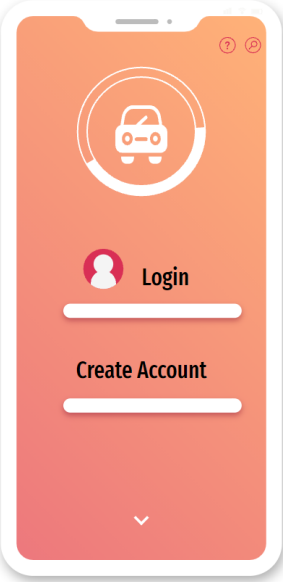


Figure 2. App Login View

App Setup. The setup view will allow the user to input the emergency contacts and the maximum tolerated temperature inside the vehicle in case a child is left unattended.

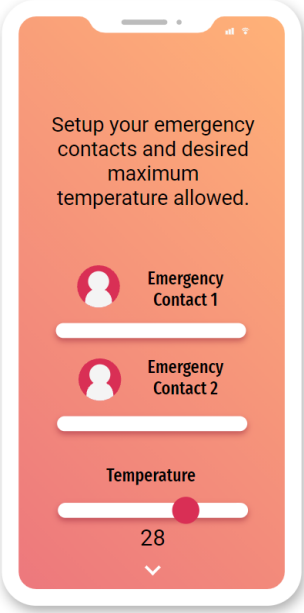


Figure 3. App Setup View

App Dashboard. The app dashboard will allow the user to monitor the data that is being collected by the sensors onboard the vehicle. The user will be able to view the inside and outside temperature of the vehicle, the battery charge, and turn the system on/off.

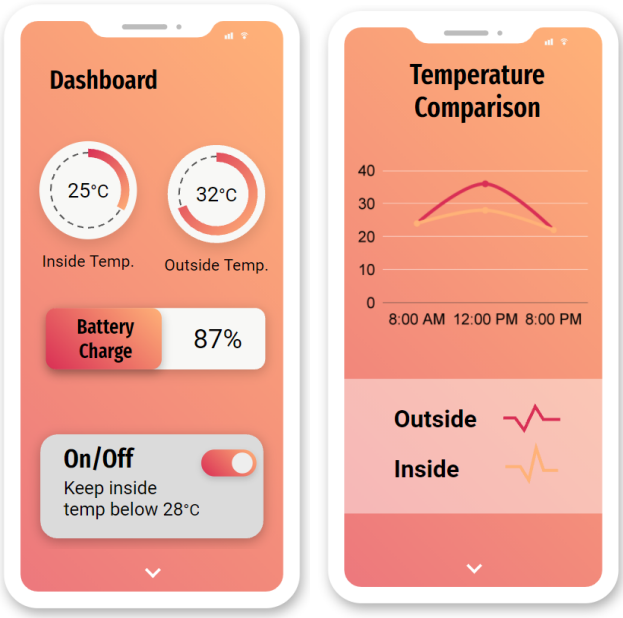


Figure 4. App Dashboard Views

App Alerts. The app will notify the user in case a child has been left unattended and when the battery is low. The emergency contacts and current temperature will also be displayed.

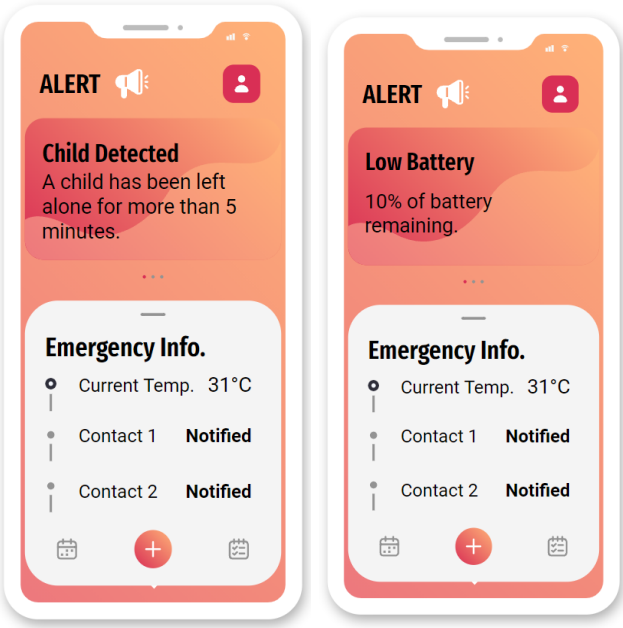


Figure 5. App Alert Views

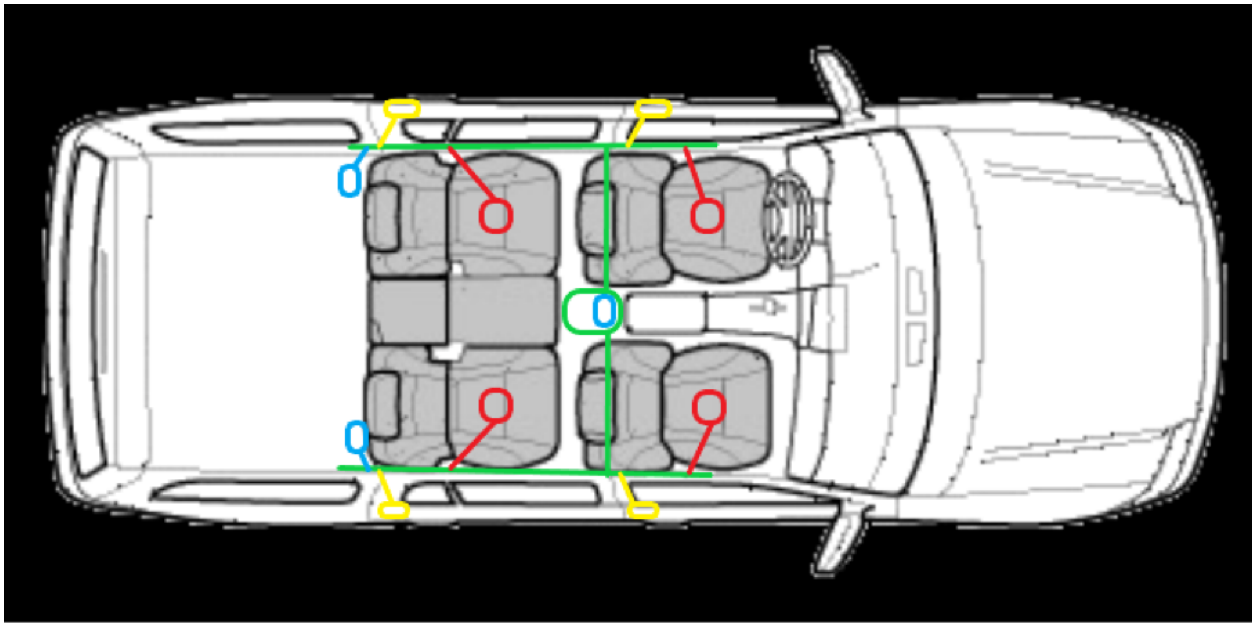
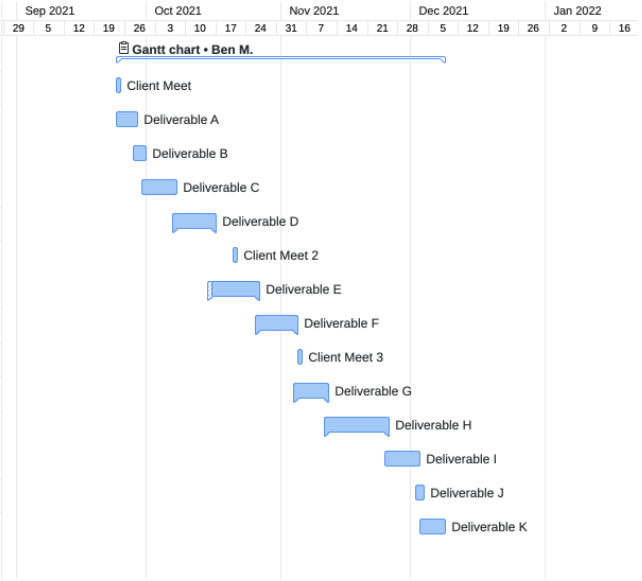


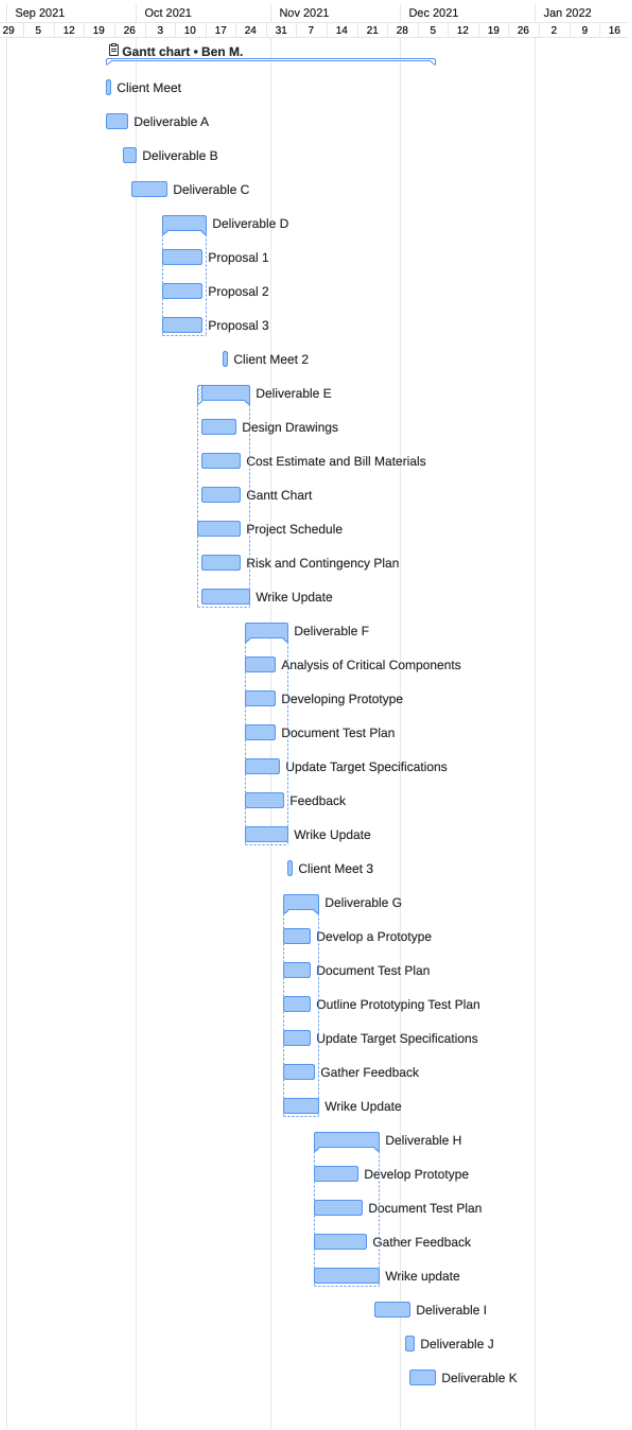
Figure. Wiring and sensor positions.

3.0 Gantt Chart

	Title	Start date	Due date ↑	Predecessors
1	**Gantt chart**			
2	Client Meet	24/09/2021	24/09/2021	
3	Deliverable A	24/09/2021	28/09/2021	
4	Deliverable B	28/09/2021	30/09/2021	
5	Deliverable C	30/09/2021	07/10/2021	
6	Deliverable D	07/10/2021	16/10/2021	
10	Client Meet 2	21/10/2021	21/10/2021	
11	Deliverable E	16/10/2021	26/10/2021	
18	Deliverable F	26/10/2021	04/11/2021	
25	Client Meet 3	05/11/2021	05/11/2021	
26	Deliverable G	04/11/2021	11/11/2021	
33	Deliverable H	11/11/2021	25/11/2021	
38	Deliverable I	25/11/2021	02/12/2021	
39	Deliverable J	02/12/2021	03/12/2021	
40	Deliverable K	03/12/2021	08/12/2021	
+	Add task			



	Title	Start date	Due date ↑	Predecessors
1	**Gantt chart**			
2	Client Meet	24/09/2021	24/09/2021	
3	Deliverable A	24/09/2021	28/09/2021	
4	Deliverable B	28/09/2021	30/09/2021	
5	Deliverable C	30/09/2021	07/10/2021	
6	Deliverable D	07/10/2021	16/10/2021	
7	Proposal 1	07/10/2021	15/10/2021	
8	Proposal 2	07/10/2021	15/10/2021	
9	Proposal 3	07/10/2021	15/10/2021	
10	Client Meet 2	21/10/2021	21/10/2021	
11	Deliverable E	16/10/2021	26/10/2021	
12	Design Drawings	16/10/2021	23/10/2021	
13	Cost Estimate and	16/10/2021	24/10/2021	
14	Gantt Chart	16/10/2021	24/10/2021	
15	Project Schedule	15/10/2021	24/10/2021	
16	Risk and Continge	16/10/2021	24/10/2021	
17	Wrike Update	16/10/2021	26/10/2021	
18	Deliverable F	26/10/2021	04/11/2021	
19	Analysis of Critical	26/10/2021	01/11/2021	
20	Developing Protot	26/10/2021	01/11/2021	
21	Document Test	26/10/2021	01/11/2021	
22	Update Target Spe	26/10/2021	02/11/2021	
23	Feedback	26/10/2021	03/11/2021	
24	Wrike Update	26/10/2021	04/11/2021	
25	Client Meet 3	05/11/2021	05/11/2021	
26	Deliverable G	04/11/2021	11/11/2021	
27	Develop a Prototyp	04/11/2021	09/11/2021	
28	Document Test	04/11/2021	09/11/2021	
29	Outline Prototypin	04/11/2021	09/11/2021	
30	Update Target Spe	04/11/2021	09/11/2021	
31	Gather Feedback	04/11/2021	10/11/2021	
32	Wrike Update	04/11/2021	11/11/2021	
33	Deliverable H	11/11/2021	25/11/2021	
34	Develop Prototype	11/11/2021	20/11/2021	
35	Document Test	11/11/2021	21/11/2021	
36	Gather Feedback	11/11/2021	22/11/2021	
37	Wrike update	11/11/2021	25/11/2021	
38	Deliverable I	25/11/2021	02/12/2021	
39	Deliverable J	02/12/2021	03/12/2021	
40	Deliverable K	03/12/2021	08/12/2021	
+	Add task			



4.0 Project Schedule

Scheduling is the list of project tasks while showing when a project will start and finish, as well as who will be completing those tasks. This will ensure that all the deliverables will be completed on time, and the wants and needs are met.

Table 1. Plan and Schedule for Prototype

Major Tasks	Possible Sub-Tasks	Dependencies	Estimated Duration (days)	Owner	Due Date
Client Meet 1		None	0	All	Sept 24, 2021
Deliverable A: Team Contract and Project Management		None	4	All	Sept 28, 2021
Deliverable B: Needs Identification and Problem Statement		Deliverable A	2	All	Sept 30, 2021
Deliverable C: Design Criteria		Previous Deliverables	7	All	Oct 7, 2021
Deliverable D: Conceptual Design		Previous Deliverables	9	All	Oct 16, 2021
	Proposal 1		8	Kobe	Oct 15, 2021
	Proposal 2		8	Steven	Oct 15, 2021
	Proposal 3		8	Kaitlynn	Oct 15, 2021
Client Meeting 2			0	All	Oct 21, 2021
Deliverable E: Project Plan and Cost Estimate		Previous Deliverables	10	All	Oct 26, 2021
	Design Drawings		7	Steven and Kobe	Oct 23, 2021

	Gantt Chart		8	Hans	Oct 24, 2021
	Cost Estimate and Bill Materials		8	Kobe	Oct 24, 2021
	Risk and Contingency Plan		8	Ben	Oct 24, 2021
	Project Schedule		9	Kaitlynn	Oct 24, 2021
	Wrike Update		10	Steven	Oct 26, 2021
Deliverable F: Prototype 1 and Customer Feedback		Previous Deliverables	9	All	Nov 4, 2021
	Developing a Prototype		6	All	Nov 1, 2021
	Analysis of Critical Components		6	Steven and Kobe	Nov 1, 2021
	Document Test Plan		6	Kaitlynn and Hans	Nov 1, 2021
	Update Target Specifications		7	Ben	Nov 2, 2021
	Feedback		8	All	Nov 3, 2021
	Wrike Update		9	Steven	Nov 4, 2021
Client Meeting 3			0	All	Nov 5, 2021
Deliverable G: Prototype 2 and Customer		Previous Deliverables	7	All	Nov 11, 2021

Feedback					
	Develop a prototype		5	All	Nov 9, 2021
	Document Test Plan		5	Kobe and Hans	Nov 9, 2021
	Update Target Specifications		5	Kaitlynn	Nov 9, 2021
	Outline Prototyping Test Plan		5	Stevena nd Ben	Nov 9, 2021
	Gather Feedback		6	All	Nov 10, 2021
	Wrike Update		7	Steven	Nov 11, 2021
Deliverable H: Prototype 3 and Customer Feedback		Previous Deliverables	14	All	Nov 25, 2021
	Develop Prototype		9	All	Nov 20, 2021
	Document Test Plan		10	Steven	Nov 21, 2021
	Gather Feedback		11	All	Nov, 22, 2021
	Wrike Update		14	Steven	Nov 25, 2021
Deliverable I: Design Day Presentation Material		Previous Deliverables	7	All	Dec 2, 2021
Deliverable J: Project Presentations		Previous Deliverables	1	All	Dec 3, 2021

Deliverable K: User and Product Manual		Previous Deliverables	5	All	Dec 8, 2021

5.0 Risk and Contingency Plan

This section outlines the potential risks associated with the completion of the design project from team member-related risks to software or specific component related risks and their subsequent contingency plan to address the issues. The likelihood of the risk is assigned a value from 1 to 5, 1 being the least probable and 5 being the most probable. The same is applied for its resulting impact on the team. It is crucial to account for possible risks because they may impede on overall team performance and progression. Creating a contingency plan will ensure that the team is well prepared to take on any potential issue and hence eliminates problems such as panicking or feeling pressured.

Risk	Likelihood	Impact	Contingency plan
Unfamiliarity with programming of Arduino Uno	4	5	-Ask for help from the TA -Watch C++/C programming tutorials on youtube -Follow an Arduino Uno crash course to acquire the skill
Unfamiliarity with 3D modelling software	4	5	-Ask for help from the TA -Watch 3D Modelling software tutorials on youtube such as Onshape -Follow a 3D modelling crash course to acquire the skill
Specific component costing too much or not approved by TA	3	4	Organize a team meeting to decide on a replacement component
Specific component	4	4	Organize a team

not working as expected			meeting to decide on a replacement component
Team member(s) has an urgency such as a health issue or drops the course	2	4	An urgent team meeting should be organized to split the assigned tasks of that team member to the rest of us.
Team member(s) unable to finish assigned task	3	4	The team member should speak out as a result of which a team meeting will be organized whereby the team will work collaboratively to finish the task
Lack of time	2	4	-Request for a time extension if reason is valid -Try to eliminate relatively unimportant tasks to make time for the most important tasks.
Conflicts among team members	1	3	-Team voting carried out to get the final decision and settle the conflict

6.0 Cost Estimate and Bill of Materials

Link	Description	Price
https://www.pishop.ca/product/arduino-compatible-digital-temperature-sensor-module/	Temperature sensor module	$5,95
https://www.pishop.ca/product/mini-metal-speaker-w-wires-8-ohm-0-5w/	Speaker	$2,45
https://www.pishop.ca/product/breadboard-friendly-mini-pir-motion-sensor-with-3-pin-header/	Motion sensor	$5,45

https://www.robotshop.com/ca/en/interlink-15-square-fsr.html?gclid=CjwKCAjwn8SLBhAyEiwAHNTJbUzi79dyeW5HEWECAs-28-82gjPbx_RwGENxvjE-m0DPQFxYqGVY9RoC4HoQAvD_BwE	Pressure sensor	$10,72
	Computer fan	
	Arduino UNO	
	Electrical components	
		Total (with tax) : $27,76

7.0 Conclusion

In this deliverable, the focus was on assessing the cost of all the components that will be used for the final design to ensure we stay within the allocated budget. The results are tabulated in a Cost Estimate and Bill Of Materials table. Furthermore, we were also able to set up a work plan to ensure that each project deliverable is completed in due time. A Gantt chart was created for this purpose to better illustrate the team's progression on each project deliverable, as well as a project schedule to detail tasks of respective teammates on specific dates. The team is also ready to tackle any adversity that may impact team progression by referring to the above Risk and Contingency plan table. All in all, this deliverable prepares the team to guarantee that everything goes smoothly and according to plan to ensure the successful completion of the design project.

References

[1]https://www.freeasestudyguides.com/ac-in-car-temperature-sensor.html
[2]http://vehiclesecurity.co.nz/blog/pir-sensors/