University of Ottawa

Faculty of Engineering

GNG 1103 – Engineering Design

Project Deliverable E: Project Schedule and Cost

Section B01
Team 5

Team Members:
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Introduction

This document covers the first transition of our project towards prototyping and long-term completion. A design drawing of the chosen concept is included, and plans are highlighted towards getting our first prototype (a basic proof of concept), as well as subsequent prototypes towards the end of the project timeline. A bill of materials essential for operational success of our design is also included in this document as well as sourcing for these materials.

Conceptual Design Drawings

The following diagrams show the overall concept circuitry for the three components that make up our full design concept:

PIR sensor

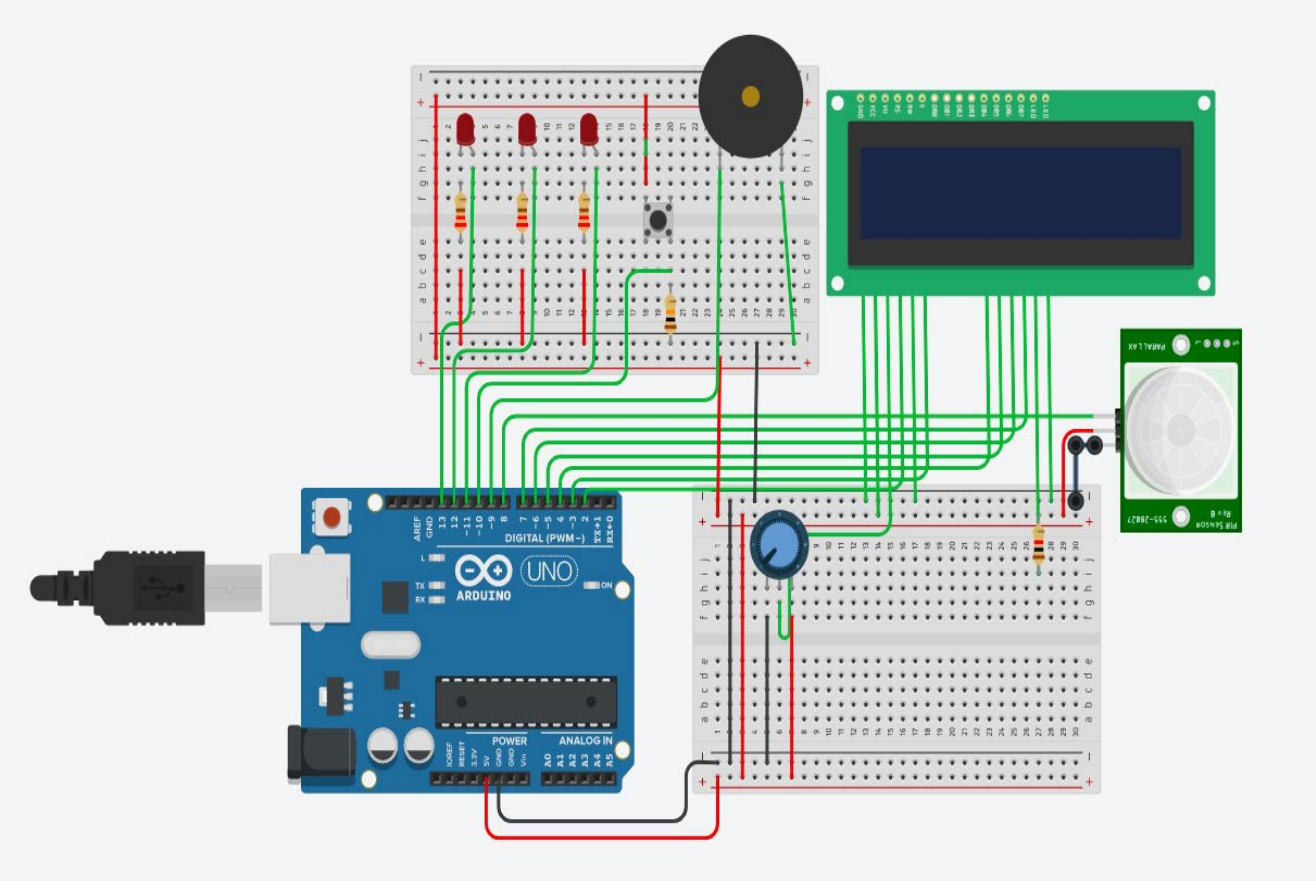

Fig1: Tinkercad circuitry of PIR Sensor

CO/ Gas sensor

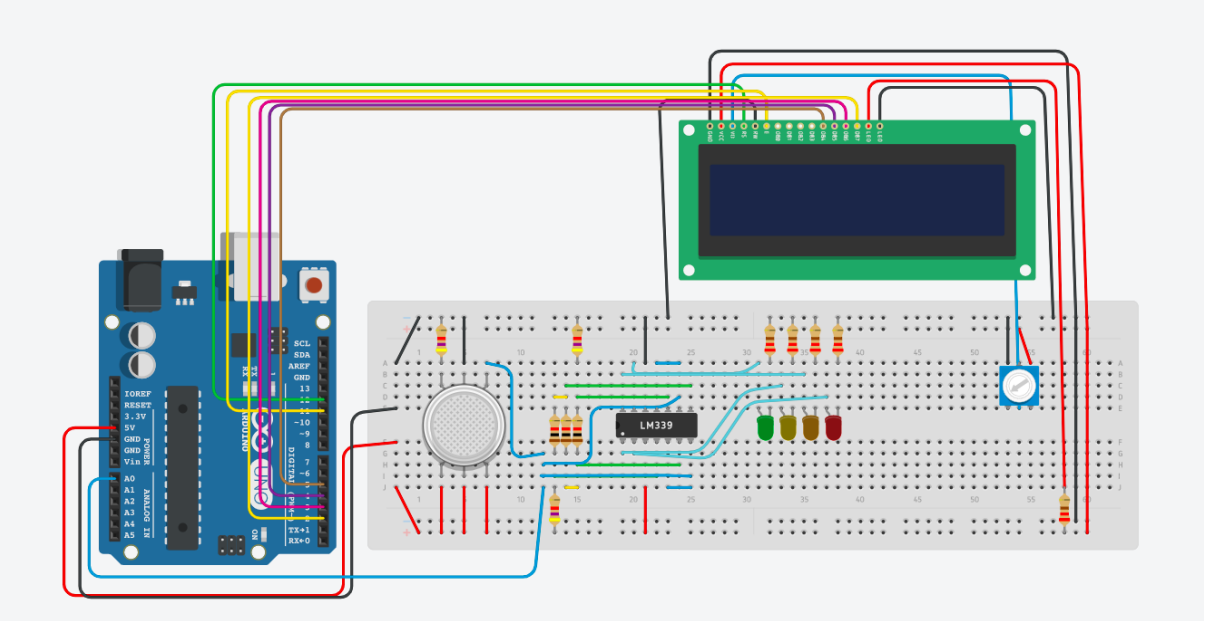

Fig 2: Tinkercad circuitry of CO/ Gas Sensor

Temperature sensor

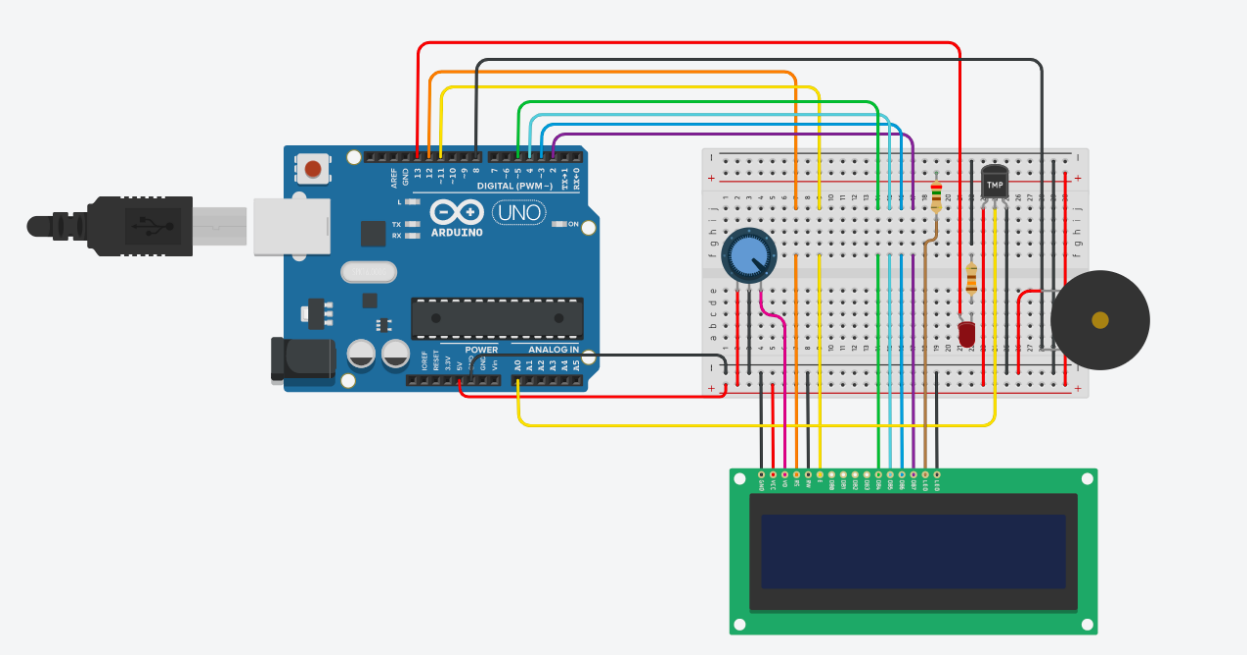

Fig 3: Tinkercad circuitry of Temperature Sensor

Global Concept

The image below shows an embedded final design view of our project; a hand sketch transformed to a model that will be tested out by our client.

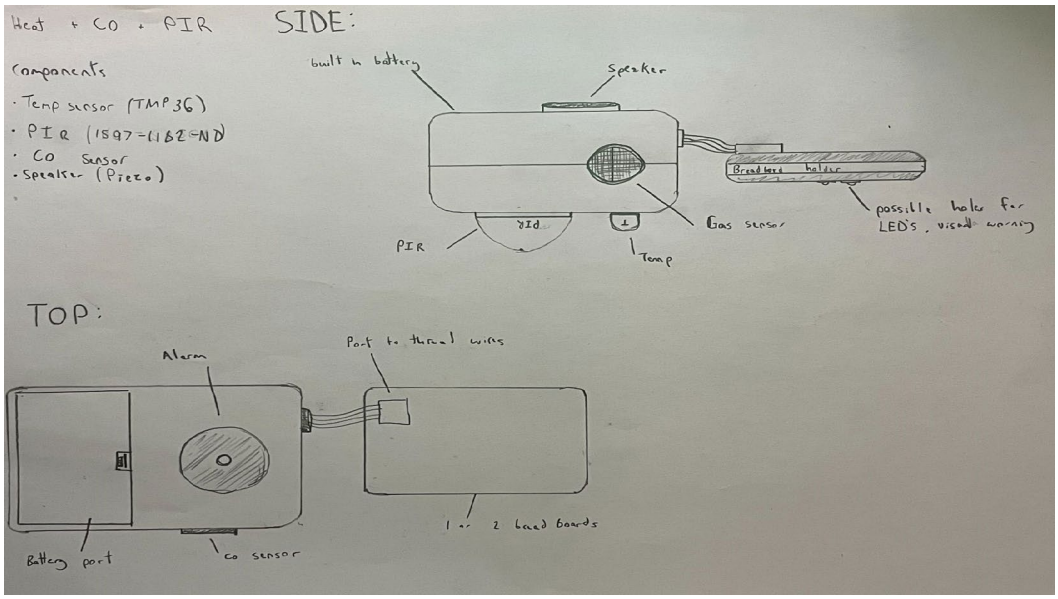

Fig 4: Hand Sketch of concept

Pir - red
Temp - yellow
Gas - blue
Speaker - blue

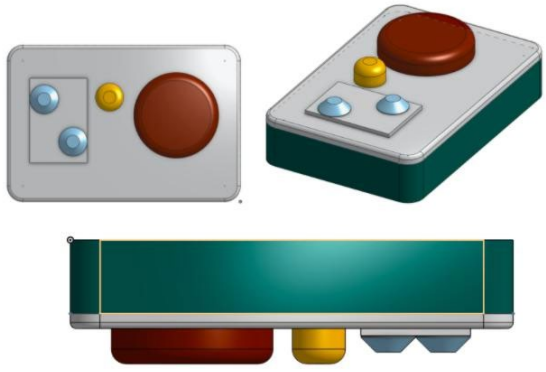

Figure 5: CAD view of assembled prototype

Bill of Materials

Item #	Item Description	Quantity	Unit Price	Amount
1.	Arduino Uno	1	$0	$0
2.	Temperature Sensor (TMP36)	1	$1.92	$1.92
3.	PIR Sensor(adeept)	1	$5.12	$5.12
4.	MQ7 gas sensor	1	$6.01	$6.01
5.	Quad comparator (LM 339)	1	$3.00	$3.00
6.	Resistor set (100, 470, 1K, 2.2K)	1	$2.79	$2.79
7.	SFE piezo element	2	$1.92	$3.84
8.	LED set	1	$3.78	$3.78
9.	Rotary Potentiometer	1	$1.22	$1.22
10.	6’’ M/M Jumper Wires	2	$2.50	$5.00
11.	RoboJax LCD1602 LCD Screen	1	$12.10	$12.10
12.	Solderable Breadboard	1	$6.14	$6.14
18.	Solderless Breadboard	1	$3.74	$3.74
19.	Power bank	1	$0.00	$0.00
20.	Push button	1	$1.09	$1.09
21.	3d printed casing			
Total Cost				$55.86

Long Term Task Planning

TASK	START DATE	END DATE
Team brainstorming and prototyping	Oct 26th	Nov 4th
DELIVERABLE F	Oct 27th	Nov 4th
Team Prototyping II	Nov 5th	Nov 10th
DELIVERABLE G	Nov 5th	Nov 11th
Team Prototyping III/Start of final project	Nov 11th	Nov 25th
DELIVERABLE H	Nov 12th	Nov 25th
Team Design Finalization	Nov 25th	December 1st
DELIVERABLE I	Nov 26th	Dec 1st
DELIVERABLE J	Nov 26th	Dec 1st
DELIVERABLE K	Dec 1st	Dec 8th

Individual Tasks	Owen	Nicole	Yalong	Nalida	Kenny
DELIVERABLE F	Prototype implementation planning and assembly	Make an analysis of the critical components (Engineering analysis)	prototyping test plan, analysis	Gather feedback and comments from client meeting.	Get TA Approval for BOM, Make purchases
DELIVERABLE G	Gather feedback and comments from client meeting.	update your target specifications, detailed design and BOM after tests are completed	Prototype implementation planning. .	document prototyping test plan, analysis and your results	Carefully document your prototyping test plan, analysis, and your results.
DELIVERABLE H	update your target	Carefully document your	Prototype implementatio	Prototype implementatio	Gather feedback and

	specifications, detailed design and BOM after tests are completed and analyzed.	prototyping test plan, analysis, and your results	n planning.	n planning. .	comments from client meeting.
DELIVERABLE I	Explain changes made what makes product better	Explain the basic user requirements.	Explain current solutions and alternatives and why solving the problem is important.	Provide a demonstration of your product in action and preferably working.	Explain changes made what makes product better
DELIVERABLE J	A summary of your project	Solution options and chosen concept (why/how)	Decisions made during project span	Trials and tribulations faced working on the project	lessons learned, future work, etc. from project
DELIVERABLE K	-Table of Content -Product documentation	-Project Overview -Conclusion section of report	-General information about device -Appendix I: Design Files	-Provide Functions and Features of device -Appendix II: Other Appendixes	-Troubleshooting and support -Conclusions and Recommendations for future work

Risks and Mitigation Plan

Technology risk

Since most meetings between team members as well as clients are online, meetings can be postponed due to technological difficulties, and documents can be lost.

Plans to mitigate

- Create a time frame instead of a specific date to hold meetings.

- Make sure important documents are stored and shared with more than one person.

Cost risk
With the given budget and project, it is possible to overstep the budget given to create a well-rounded device.

Plans to mitigate
- Improve communication between team members to make sure important components are purchased
- Search for cheaper options.

Product Delay Risk.
All components used in this project must be purchased online due to lack of access on the actual market. This can cause a delay in putting together the project because of delivery times. Since our group plans to assemble the materials, if possible, the late delivery of any materials is a sensibly possible risk. Also, as the group is in the primer phases of the prototyping system, there still might be some disarray. As we are testing the prototype, it is possible the material may not work, it is not as we expected. Moreover, the group doesn't have the experience to know the specific duration of the tasks, so there could be a delay in the estimated due dates.

Plans to mitigate
-Order components as early as possible

-Find faster ways to purchase components

Prototype 1 Action Plan

Task	Dependencies	Estimated Duration (Days)	Owner	Descriptions of Results	Due Date

Test validity of code for individual components		1	All	Taking screenshots or recording video of the simulation. These will be included in the deliverable	10/27/2021
Test for most efficient combination		2	All	Taking screenshots or recording video of the simulation. These will be included in the deliverable	10/29/2021
Test code of combination		1	All	Taking screenshots or recording video of the simulation. These will be included in the deliverable	11/01/2021
Put components together and simulate emergency	All the testing	1	All	Taking screenshots or recording video of the simulation. These will be included in the deliverable	11/02/2021
Refine and test size of product	First prototype completed	1	All	Recording the measurements	11/03/2021

References

https://github.com/adafruit/DHT-sensor-library

https://www.w3schools.com/CPP/default.asp

https://create.arduino.cc/projecthub/electropeak/pir-motion-sensor-how-to-use-pirs-w-arduino-raspberry-pi-18d7fa

https://www.arduino.cc/reference/en/libraries/mq131-gas-sensor/

https://www.tinkercad.com/dashboard?type=all&collection=lessons

https://www.robotshop.com/ca/en/checkout/cart/

https://www.amazon.ca/RoboJax-LCD1602-Screen-Character-Display/dp/B07C5NCY57

https://www.walmart.ca/en/ip/LM339-QUAD-VOLTAGE-COMPARATOR-2-pcs-pkg/6EWVLH6ZRBK1

Appendix

- Conceptual Design drawings – Nicole Meouch and Owen Haralovich
- Bill of Materials and document edit – Uzochukwu Ekenedilichukwu Ebenebe
- Long term planning – Nalida Awog-Badek
- Prototype 1 planning - Kayden Wang