



NiCa Bell

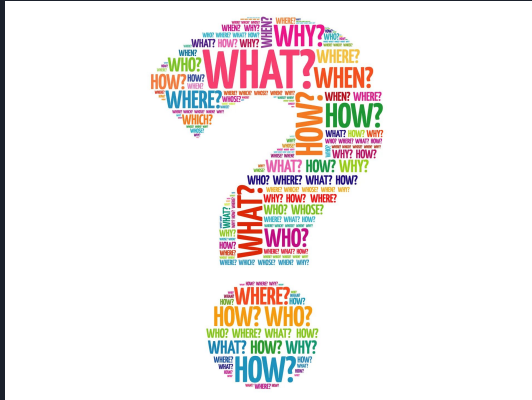
Team A2

Ayesha Khan, Aunonto Bhuiya, Ethan Chan,
Lomamba Dieudonne, Alessandro Furlano

Client Interview Questions and Meeting Summary

Questions:

- Open ended questions
- Follow up questions



Meeting Summary:

First Meeting:

- Fran has cerebral palsy
- Unable to project her voice at night
- Unable to push a button reliably
- Require some system to inform the night staff

Second Meeting:

- Presented our concept and got feedback

Client Needs

Rank	Need	Metric	Units
1	Device is sensitive to sound/voice, but is quiet	8	dB
1	The device simply notifies the staff - no complicated commands	9, 10	dB, s
1	The device works independently of external equipment		
1	The device effectively notifies the staff	9, 10	dB, s
1	The device recognizes the words "hey" and "help"	8	dB
1	The device can be operated by one person alone		
1	The device has to be plugged into the wall, limits any complications with battery and charging	6	Amps, Volts, Kw
1	Device needs to be easy to use and multiple different workers come in and out		
2	Device interacts solely with the client and her staff	9	dB
2	The device is wearable and portable	3,4	mm ³ , g
2	The device uses lights to notify clients	11	cd
2	Device needs a light so fran can be noticed help is coming	11	cd
3	The device is small, similar to a tissue box, and fits on a side table.	2	cm ³
3	Device is hot pink		
4	Device needs to be the size of a tissue box if on a side table, device on wall mount has to be light in weight	1,2	cm ³ , kg
5	The device can be connected to the internet		

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Problem Statement

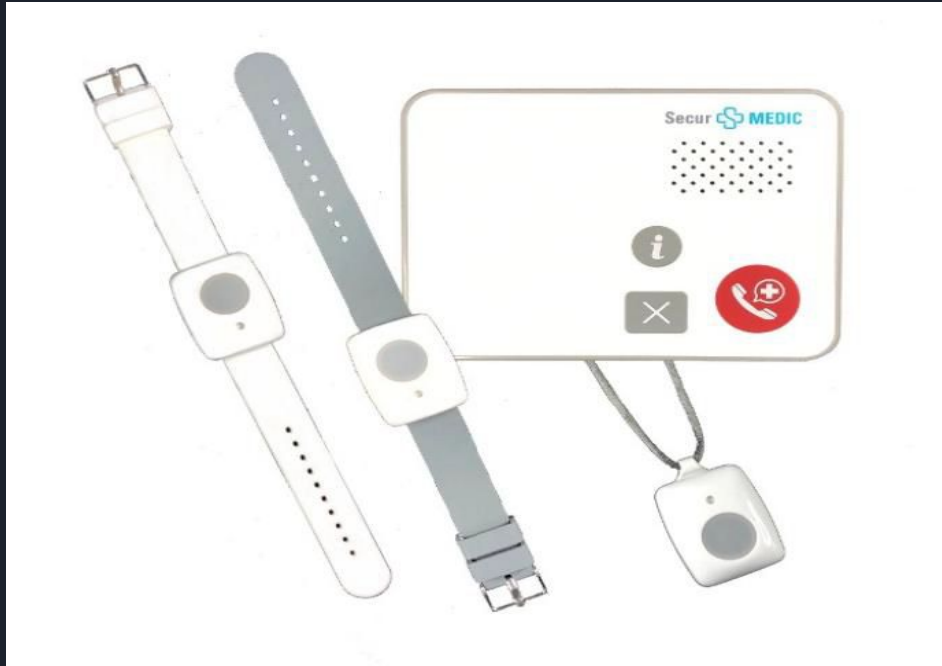
The client, Fran, requires a set of devices that can discreetly and effectively communicate with each other, thus, notifying her support staff through voice activation. The device should be low maintenance and function over a variety of distances.

Benchmarking



BoomER Emergency
Response System

Benchmarking



SecurMEDIC

Benchmarking



Philips Lifeline

Benchmarking



Philip GoSafe



Metrics and Specifications

Team 2's product has two devices: Main and Staff

Device Type: Night Call Bell (Main device)

Device Style: Wall mount

Dimensions: Height = 3", Width = 2", Length = 3"

Weight: 125g - 250g

Colour: Pink

Power: 110V

Device Type: Night Call Bell (Staff device)


Device Style: Clip on

Dimensions: Height = 1", Width = 2"; Length = 3"

Weight: 30g - 50g

Colour: Pink (or any)

Power: Rechargeable



Metrics Number	Metrics	Unit	Values
1	Total Mass-Main	Kg	0.25-0.50
2	Total Volume-M	cm ³	45.72
3	Total Mass-Staff	g	30-50
4	Total Volume-S	cm ³	15.24
5	Cost	CAD\$	100
6	Power Source-M	A, V, W	15, 110-120, 1800
7	Power Source-S	A, V, W	15, 110-120, 5
8	Sound Intensity	dB	30
9	Indicator Volume	dB	60
10	Notification Duration	s	30
11	Light Indicator Brightness	cd	110



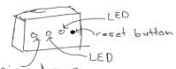
Metrics and Specifications - End

Based on these target specifications, Team 2 is now in the process of developing some prototypes for the most effective two-way communication device for our client and her support staff.

Design Concepts

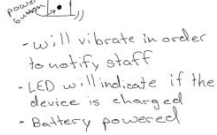


Main Unit:
- Wall mounted



Microphone
- 1 LED is to indicate the device heard from the other is to indicate if the device is connected to wifi
Plugged into wall
reset button is to be pressed by staff when they assist Fran and will stop the vibrating of the portable unit

Portable Unit:



- will vibrate in order to notify staff
- LED will indicate if the device is charged
- Battery powered

Figure 3: Alessandro's First Concept

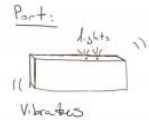
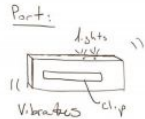
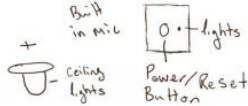
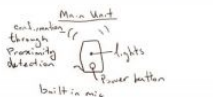
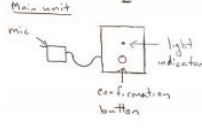


Figure 2: Ayesha's Concepts

Main Unit:
- Sits on dresser located near Fran's bed



- LED will indicate that the device heard from battery powered
- reset button is to be pressed by staff when they assist Fran and will stop the vibrating of the portable unit

2nd Unit:



- speaker will chime when Fran picks up Fran's noise
- LED will indicate that the device is active
- wall mounted
- plugged in
- located in kitchen

Main Unit:
- located on ceiling



- LED to indicate that

Portable Unit



- chimes in order to notify the staff
- the reset button stops the chime
- battery powered
- uses sim card

Audio-focused Design
- 2 lights - 1 for microphone in the activate and light in the activate and light
- Reset button on side / front / top / side
- Large size for activation / volume

Clip panel light house
- White indicator / LED to acknowledge / light

Wall-plug design
- Single design - indicator will mount / plug into wall
- One piece with integrated unit / indicator

Ball model
- use same ball form design to save time on production
- Allow speaker for large distance / notification
- Detachable / ball mount
- Still portable with the clip

Simplified RPD design
- More reduction design
- Button not integrated / Simple design to quicken ball power
- Clip simplified model
- Box design with indicator to internal

Similar design
- Similar design to low frequency design
- Side base that is slightly larger
- External button
- Simple clip-on design

- Size more dependent on available material

Paro Bio Inc 30015942

Concept 1
- mic / power / light / roughly size of tissue box
- Side table
- inside double board + wifi
- receiver - on person
- light / mic / power / roughly size of tissue box
- house view / micro / usb / charger
- inside wifi / power / light / roughly size of tissue box
- to fit in / pocket / as long it's / connected to we will / can receive the call

Concept 2
- Wall mount
- 2 lights one light to know they been heard and one light is coming
- Signal that help is coming
- bigger as concept one
- some insides as concept one
- light to signal fall
- light weight design
- sleek to fit in / house returns
- on screen / next / help needed

Concept 3
- on dresser
- Pa system
- calls go between systems
- was well as button to stop listening when worker comes in and presses

Receiver
- on the wall / plug in / mic and speaker / two way / pager system (live high remote)

CANTRADE CAPITAL INC.

Green light (light for message sent)
Main device (unit)
Red light (light for help is on way)
clip on
reset button (to stop the vibration and send signal to Fran)
Second part (vibrates) (to Fran)

Wireless Mic clip on (help is on the way)
clip on
reset button (vibrates) (to Fran)
helped (to stop the vibration)

Volume (button)
Reset indicator (light / red)
Signal in (light / green)
Signal out (light / green)
Radio like (lets on a table beside the bed)

The support staff will hear the radio on and will go to Fran.

Figure 7: Deudonne's Concepts

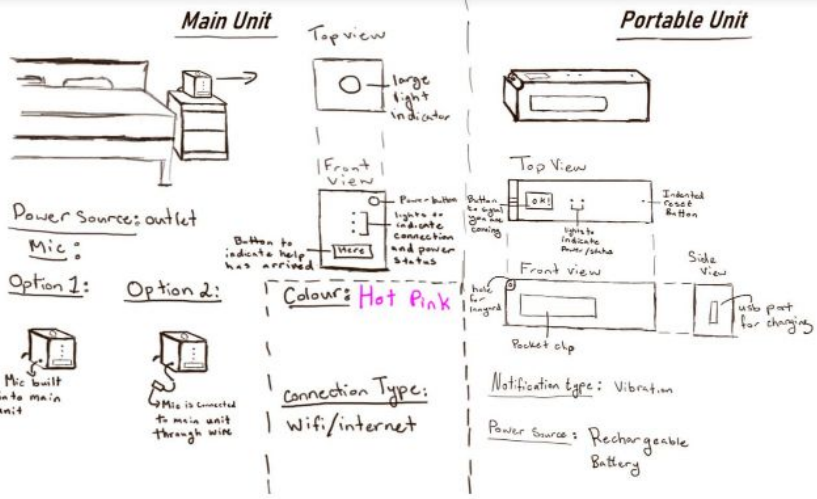


Figure 9: Final Concept 1

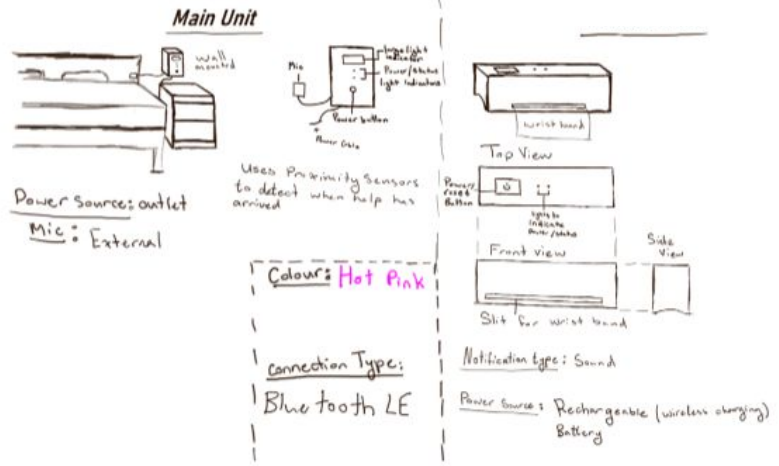


Figure 10: Final Concept 2

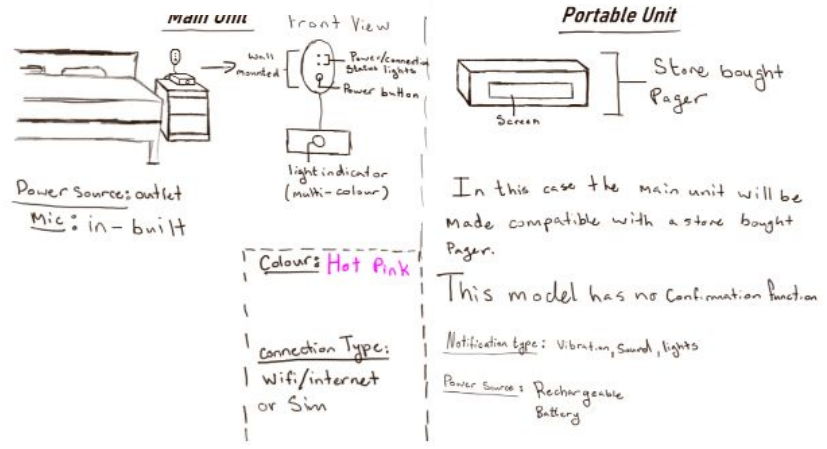


Figure 11: Final Concept 3

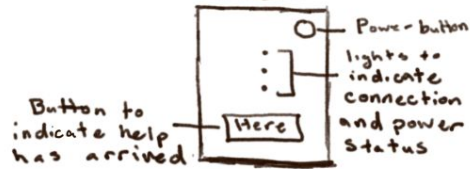
Main Unit



Top view



Front view



Power source: outlet

Mic:

Option 1:

Option 2:



Mic built into main unit



Mic is connected to main unit through wire

Colour: Hot Pink

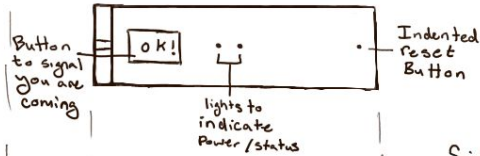
connection Type:

Wifi/internet

Portable Unit



Top View



Front view



Side View



Notification type: Vibration

Power Source: Rechargeable Battery



Feasibility Study

Risks

- The price of a sufficiently sensitive mic for our clients needs exceeding budget.
- Recognition software is unable to decipher the necessary words.

Uncertainties

- Microcontroller board, programming language, and method of speech to text used for the project.
- Longevity of proposed software solutions.
- Structural material.



TELOS

AF: Can do C, prefers no coding, can solder , no solidworks(willing to learn), Can machinery (ottawa)

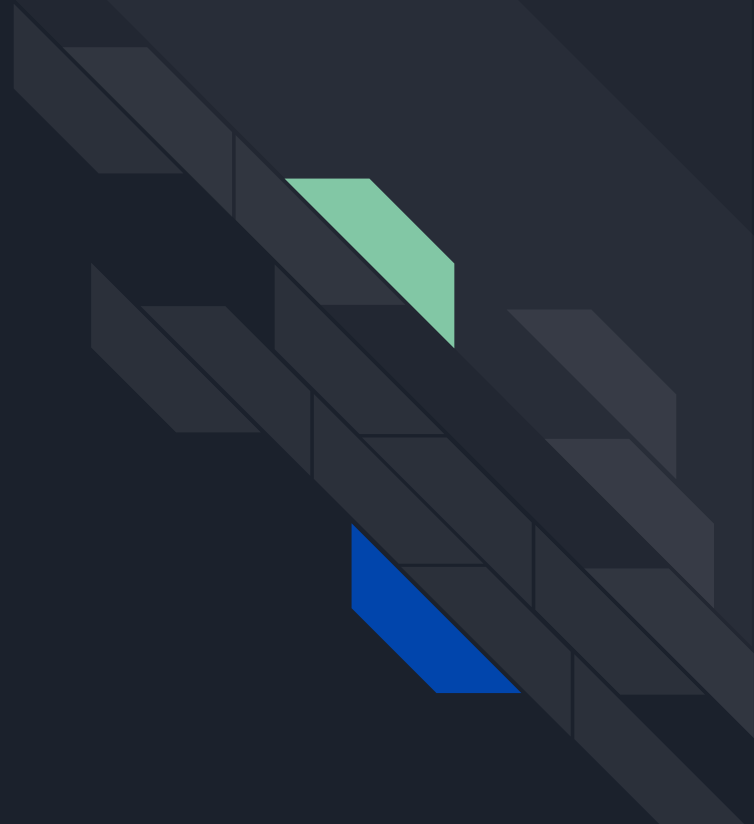
EC: Minimal machinery experience, decent soldering (have soldering iron), decent experience in cad softwares but not solidworks specifically, can do most programming language subtypes. ottawa

DL: Coding: minimal C++ coding, a bit of python. **Other:** Just learning new stuff now but willing to learn (especially hardware)

AB: Can code minimal: C/C++, java, moderate machinery experience, hand tools and hardware work is minimal but can learn. (Not in ottawa).

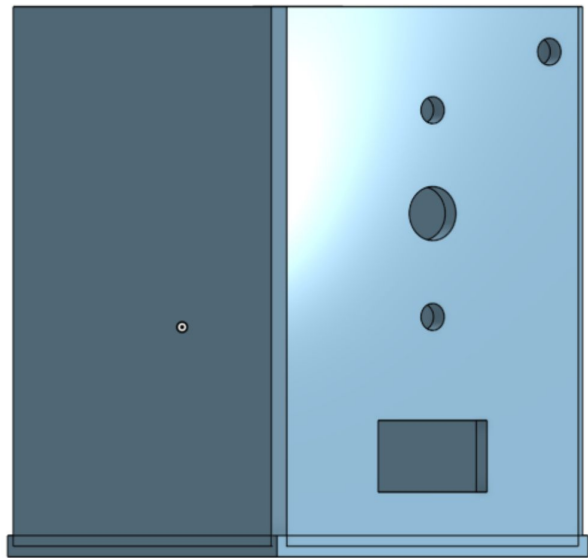
AK: Can code: python, c/c++, java, js, arduino, but bad with networks and servers. Can do all machinery and handtools and hardware, can do solidworks, can solder (but prefers not to), in ottawa

Prototype I

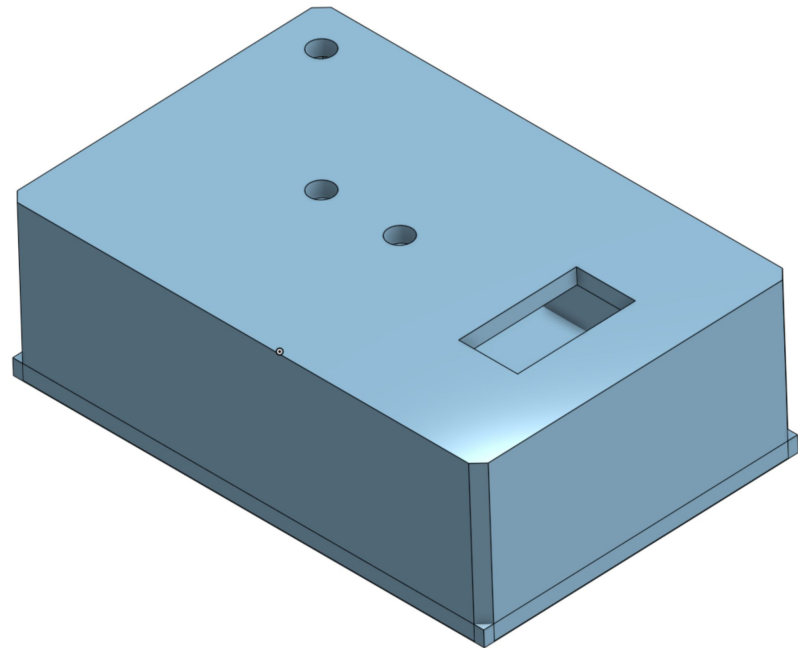


Hardware

Main Unit



Portable Unit



Software

```
tempaudio.py - D:\Programs\Python\Python37-32\tempaudio.py (3.7.0)
File Edit Format Run Options Window Help

import speech_recognition as sr

r = sr.Recognizer()

with sr.AudioFile('D:/Users/Ethan Chan/AppData/Local/Google/Cloud SDK/sf_test.fl
audio = r.record(source)

a = r.recognize_google(audio, language='en-US')
print(a)

Python 3.7.0 Shell
File Edit Shell Debug Options Window Help

Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:06:47) [MSC v.1914 32 bit (Inte
l)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: D:\Programs\Python\Python37-32\tempaudio.py =====
hey
>>>
===== RESTART: D:\Programs\Python\Python37-32\tempaudio.py =====
testing 1 2 3
>>>
```

```
Neglect Function
Check if "Stop signal" received:
While Situation 2 == false

If "ok button" & "Stop signal" == false
safecount = safecount + 1
audiocount = safecount/3
If safecount > 3 and audiocount < 3
Increase motor1 by 1 factor
Else
Play sound

Else if "Stop signal" == false and "ok button" == true
safecount = safecount + 1
audiocount = safecount/3
If safecount > 3 and audiocount < 3
Increase motor1 by 1 factor
Else
Play sound

Else if "Stop signal" == true and "ok button" == false
safecount = safecount + 1
audiocount = safecount/3
If safecount > 3 and audiocount < 3
Increase motor1 by 1 factor
Else
Play sound

Else if "ok button" & "Stop signal" == true
Stop Motor1, sound and indicator
Situation2 = true
Call Connection Function

Call Connection Function

Server Function:
systemcount = systemcount + 1
While systemcount < 3:
While Flag = False and count < 3:
Check if connected to portable unit:
If yes:
Call Audio function
If not:
count = count + 1
Flag = False

Turn large indicator red
Red small indicator beings blinking every 5 seconds

Audio Function:
While Flag1 = False
Check if there is noise:
If yes:
Is the noise = "hey" or "help"?
If yes:
Call Server Function
If not:
Flag1 = False
If not:
Flag1 = False
```

Bill of Materials

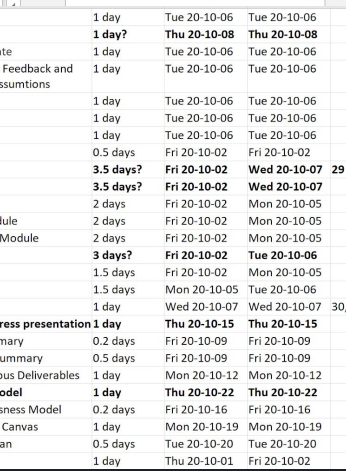
Retailer	Item name & description	Cost per Unit (CAD\$)	Number of Items	Total Cost (CAD\$)
Makerstore	Microphone	9.00	1	9.00
Alessandro	Vibrating Motor	Free	2	Free
Makerstore	PCB Mount Mini Speaker	4.00	1	4.00
Ethan	Battery Connector	0	1	0
Makerstore	LEDs	0.60	5	3.00

Makerstore	Protoboard	--	1	--
Walmart	Batteries (9V)	4.98	1	4.98
Makerstore	Resistors	--	3	--
CanaKit	Raspberry Pi Zero W board	12.95	1	12.95
CanaKit	Raspberry Pi Zero W Kit	32.95	1	32.95
CanaKit	Sd card	9.00	1	9.00
Makerstore	Buttons (Tactile button switch)	5.00	3	15
	Total Cost			89.88

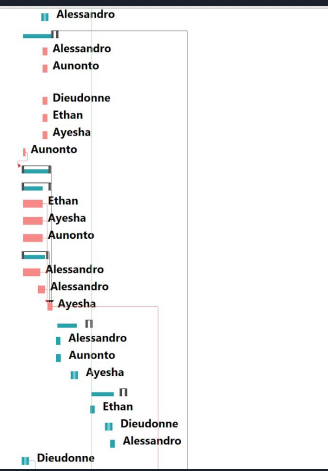
Project Plan



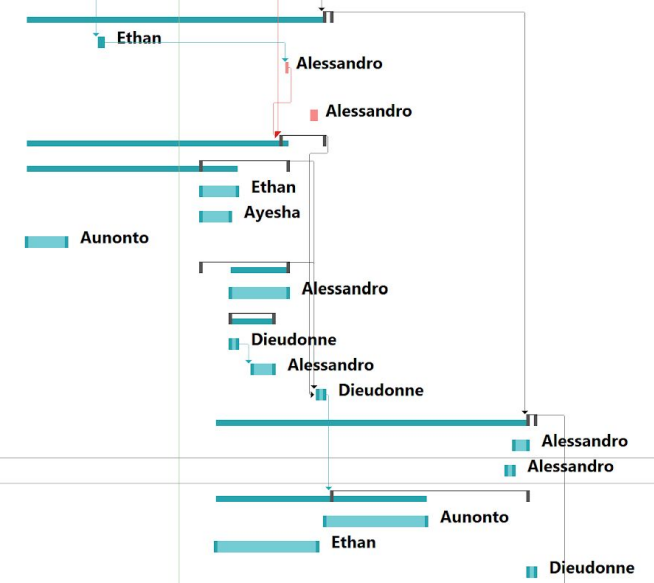
Task Name	Duration	Start	Finish	Predecessors	Resource Names	Add New Column
Initiation						
PD A: Team Contract	5 days	Wed 20-09-09	Tue 20-09-15		Alessandro	
Planning						
Setting Project Scope & Goals	4 days	Wed 20-09-16	Sun 20-09-20		Ayesha	
Budget	21 days	Sun 20-09-20	Fri 20-10-16		Aunonto	
Communication plan	12 days	Wed 20-09-16	Thu 20-10-01		Ethan	
Risk Management plan	12 days	Thu 20-10-01	Fri 20-10-16		Dieudonne	
Project plan (PD A & PD C)	16 days	Wed 20-09-09	Wed 20-09-30		Alessandro	
Execution						
PD A: Client Meeting preparation	5 days	Wed 20-09-09	Tue 20-09-15		Ayesha	
Client meet 1	1 day	Tue 20-09-22	Tue 20-09-22		Aunonto	
PD B						
Needs identification and metrics	0 days	Thu 20-09-24	Thu 20-09-24	2	Ethan	
Benchmarking and specifications	1 day	Wed 20-09-23	Wed 20-09-23	11	Dieudonne	
PD C						
Introduction	1 day?	Thu 20-10-01	Thu 20-10-01	12	Ayesha	
Project Plan Update	4 days	Fri 20-09-25	Wed 20-09-30		Aunonto	
Conceptual design	4 days	Fri 20-09-25	Wed 20-09-30		Alessandro	
Feasibility Study	4 days	Fri 20-09-25	Wed 20-09-30		Ayesha	
Lifelong Learning	4 days	Fri 20-09-25	Wed 20-09-30		Ethan	
Conclusion	1 day	Wed 20-09-30	Wed 20-09-30		Dieudonne	
Client meet 2	1 day	Tue 20-10-06	Tue 20-10-06		Alessandro	
PD D						
Project Plan Update	1 day?	Thu 20-10-08	Thu 20-10-08		Ayesha	
Summarize Client Feedback and Critical Product Assumptions	1 day	Tue 20-10-06	Tue 20-10-06		Alessandro	
Bill of Materials	1 day	Tue 20-10-06	Tue 20-10-06		Aunonto	
Introduction	1 day	Tue 20-10-06	Tue 20-10-06		Dieudonne	
PD E: Project progress presentation						
Client meet 2	1 day	Tue 20-10-06	Tue 20-10-06		Alessandro	
Project Plan Update	1 day	Tue 20-10-06	Tue 20-10-06		Ayesha	
Summarize Client Feedback and Critical Product Assumptions	1 day	Tue 20-10-06	Tue 20-10-06		Aunonto	
Bill of Materials	1 day	Tue 20-10-06	Tue 20-10-06		Dieudonne	
Introduction	1 day	Tue 20-10-06	Tue 20-10-06		Ethan	
Conclusion	1 day	Tue 20-10-06	Tue 20-10-06		Ayesha	
Detailed design	0.5 days	Fri 20-10-02	Fri 20-10-02		Aunonto	
Prototype 1	3.5 days?	Fri 20-10-02	Wed 20-10-07	29		
Software	3.5 days?	Fri 20-10-02	Wed 20-10-07			
Wifi Module	2 days	Fri 20-10-02	Mon 20-10-05		Ethan	
Messaging Module	2 days	Fri 20-10-02	Mon 20-10-05		Ayesha	
Speech to Text Module	2 days	Fri 20-10-02	Mon 20-10-05		Aunonto	
Housings	3 days?	Fri 20-10-02	Tue 20-10-06			
Main Unit	1.5 days	Fri 20-10-02	Mon 20-10-05		Alessandro	
Portable Unit	1.5 days	Mon 20-10-05	Tue 20-10-06		Alessandro	
Testing	1 day	Wed 20-10-07	Wed 20-10-07	30,31,32,33,34,35	Ayesha	
PD F: Business Model						
Project Plan Summary	0.2 days	Fri 20-10-09	Fri 20-10-09		Ethan	
Client Feedback Summary	0.5 days	Fri 20-10-09	Fri 20-10-09		Alessandro	
Summarize Previous Deliverables	1 day	Mon 20-10-12	Mon 20-10-12		Aunonto	
Choosing Our Business Model	0.2 days	Fri 20-10-16	Fri 20-10-16		Ayesha	
Creating Business Canvas	1 day	Mon 20-10-19	Mon 20-10-19		Ethan	
Update Project Plan	0.5 days	Tue 20-10-20	Tue 20-10-20		Dieudonne	
Client meet 3	1 day	Thu 20-10-01	Fri 20-10-02		Alessandro	



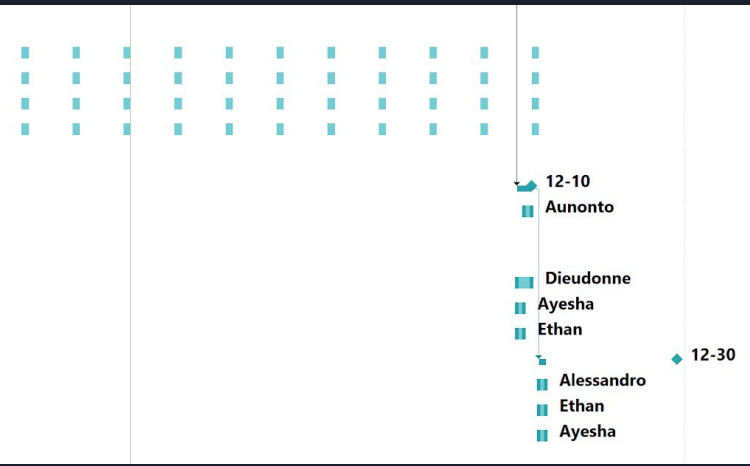
Client meet 2	1 day	Tue 20-10-06	Tue 20-10-06	Alessandro
PD D				
Project Plan Update	1 day?	Thu 20-10-08	Thu 20-10-08	Ayesha
Summarize Client Feedback and Critical Product Assumptions	1 day	Tue 20-10-06	Tue 20-10-06	Alessandro
Bill of Materials	1 day	Tue 20-10-06	Tue 20-10-06	Aunonto
Introduction	1 day	Tue 20-10-06	Tue 20-10-06	Dieudonne
Conclusion	1 day	Tue 20-10-06	Tue 20-10-06	Ethan
Detailed design	0.5 days	Fri 20-10-02	Fri 20-10-02	Ayesha
Prototype 1	3.5 days?	Fri 20-10-02	Wed 20-10-07	Aunonto
Software	3.5 days?	Fri 20-10-02	Wed 20-10-07	
Wifi Module	2 days	Fri 20-10-02	Mon 20-10-05	Ethan
Messaging Module	2 days	Fri 20-10-02	Mon 20-10-05	Ayesha
Speech to Text Module	2 days	Fri 20-10-02	Mon 20-10-05	Aunonto
Housings	3 days?	Fri 20-10-02	Tue 20-10-06	
Main Unit	1.5 days	Fri 20-10-02	Mon 20-10-05	Alessandro
Portable Unit	1.5 days	Mon 20-10-05	Tue 20-10-06	Alessandro
Testing	1 day	Wed 20-10-07	Wed 20-10-07	Ayesha
PD E: Project progress presentation				
Client meet 2	1 day	Thu 20-10-15	Thu 20-10-15	Ethan
Project Plan Summary	0.2 days	Fri 20-10-09	Fri 20-10-09	Alessandro
Client Feedback Summary	0.5 days	Fri 20-10-09	Fri 20-10-09	Aunonto
Summarize Previous Deliverables	1 day	Mon 20-10-12	Mon 20-10-12	Ayesha
PD F: Business Model				
Choosing Our Business Model	0.2 days	Fri 20-10-16	Fri 20-10-16	Ethan
Creating Business Canvas	1 day	Mon 20-10-19	Mon 20-10-19	Dieudonne
Update Project Plan	0.5 days	Tue 20-10-20	Tue 20-10-20	Alessandro
Client meet 3	1 day	Thu 20-10-01	Fri 20-10-02	Dieudonne



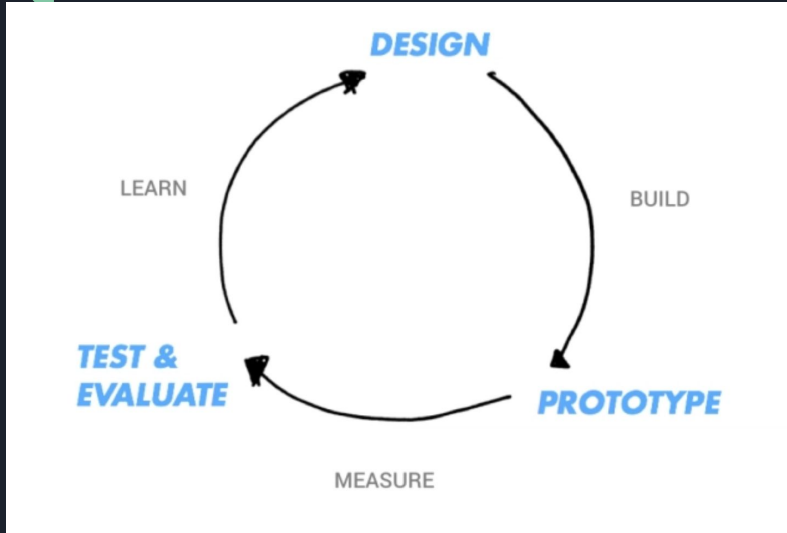
PD G	1 day?	Thu 20-11-05	Thu 20-11-05	23	Alessandro
Summarize Client Feedback	0.5 days	Mon 20-10-05	Mon 20-10-05	47	Ethan
Based on Client Feedbak Develop a New Dessign	0.5 days	Fri 20-10-30	Fri 20-10-30	49	Alessandro
Project Plan Update	1 day	Tue 20-11-03	Tue 20-11-03		Alessandro
4Prototype 2	4 days?	Fri 20-10-30	Wed 20-11-04	38,50	
4Software	10 days	Mon 20-10-19	Fri 20-10-30		
Wifi Module	5 days	Mon 20-10-19	Fri 20-10-23		Ethan
Messaging Module	4 days	Mon 20-10-19	Thu 20-10-22		Ayesha
Speech to Text Module	3.5 days	Fri 20-09-25	Wed 20-09-30		Aunonto
4Hardware	10 days	Mon 20-10-19	Fri 20-10-30		
Electronics	6 days	Fri 20-10-23	Fri 20-10-30		Alessandro
4Housings	4 days	Fri 20-10-23	Wed 20-10-28		
Update Housing Design	1 day	Fri 20-10-23	Fri 20-10-23		Dieudonne
Manufacturing	3 days	Mon 20-10-26	Wed 20-10-28	60	Alessandro
Testing	1 day	Wed 20-11-04	Wed 20-11-04	52,53,57	Dieudonne
4PD I	1 day	Thu 20-12-03	Thu 20-12-03	48	Alessandro
Design Day Pitch	2 days	Tue 20-12-01	Wed 20-12-02		Alessandro
Project Plan Update	1 day	Mon 20-11-30	Mon 20-11-30		Alessandro
4Final prototype	19 days	Fri 20-11-06	Wed 20-12-02	62	Ayesha
Sub-task related to final prototype	10 days	Thu 20-11-05	Wed 20-11-18		Aunonto
Sub-task related to final prototype	10 days	Wed 20-10-21	Tue 20-11-03		Ethan
Design day	1 day	Thu 20-12-03	Thu 20-12-03		Dieudonne



Monitoring and Control					
Project objectives	61 days	Thu 20-09-17	Thu 20-12-10		Dieudonne
Quality of Deliverables	61 days	Thu 20-09-17	Thu 20-12-10		Ayesha
Project performance and cost	61 days?	Thu 20-09-17	Thu 20-12-10		Ethan
Schedule Status	61 days	Thu 20-09-17	Thu 20-12-10		Alessandro
Closing					
4PD J: User manual	0 days?	Thu 20-12-10	Thu 20-12-10	63	Alessandro
Title Page, Table of Contents, List of Figures, List of Tables, Bibliography, and Appendices	1 day	Wed 20-12-09	Wed 20-12-09		Aunonto
Main Body	2 days	Tue 20-12-08	Wed 20-12-09		Dieudonne
Conclusion	1 day	Tue 20-12-08	Tue 20-12-08		Ayesha
Introduction	1 day	Tue 20-12-08	Tue 20-12-08		Ethan
4PD K: Final Presentation	0 days?	Wed 20-12-30	Wed 20-12-30	129	Aunonto
Design Choices	1 day	Fri 20-12-11	Fri 20-12-11		Alessandro
Trials and Tribulations	1 day	Fri 20-12-11	Fri 20-12-11		Ethan
Project Summary	1 day	Fri 20-12-11	Fri 20-12-11		Ayesha



Future Plan for Prototypes



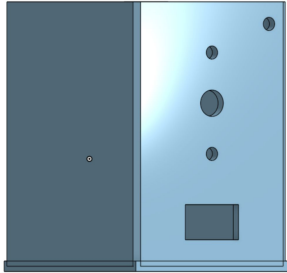
- Develop fully functioning comprehensive prototype
- Complete by October 30th
- Update models using client feedback
- Complete development of software modules

Lifelong Learning

- Problem Identification
- Positive Feedback
- Elimination and Addition of prospects
- Goals met



Thank You For Your Time!



Neglect Function

Check if "Stop signal" received:
While Situation 2 == false

```
If "ok button" & "Stop signal" == false
safecount = safecount + 1
audiocount = safecount/3
If safecount > 3 and audiocount < 3
    Increase motor1 by 1 factor
Else
    Play sound
```

```
Else if "Stop signal" == false and "ok button" == true
safecount = safecount + 1
audiocount = safecount/3
If safecount > 3 and audiocount < 3
    Increase motor1 by 1 factor
Else
    Play sound
```

```
Else if "Stop signal" == true and "ok button" == false
safecount = safecount + 1
audiocount = safecount/3
If safecount > 3 and audiocount < 3
    Increase motor1 by 1 factor
Else
    Play sound
```

```
Else if "ok button" & "Stop signal" == true
    Stop /motor1, sound and indicator
    Situation2 = true
    Call Connection Function
```

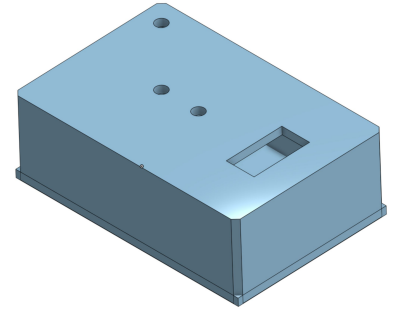
```
tempaudio.py - D:\Programs\Python\Python37-32\tempaudio.py (3.7.0)
File Edit Format Run Options Window Help
import speech_recognition as sr

r = sr.Recognizer()

with sr.AudioFile('D:/Users/Ethan Chan/AppData/Local/Google/Cloud SDK/sf_test.fl
audio = r.record(source)

a = r.recognize_google(audio, language='en-US')
print(a)
```

```
Python 3.7.0 Shell
File Edit Shell Debug Options Window Help
Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:06:47) [MSC v.1914 32 bit (Inte
l)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: D:\Programs\Python\Python37-32\tempaudio.py =====
hey
>>>
===== RESTART: D:\Programs\Python\Python37-32\tempaudio.py =====
testing 1 2 3
>>>
```



Call Connection Function

Server Function:

```
systemcount = systemcount + 1
```

```
While systemcount < 3:
```

```
    While Flag = False and count < 3:
```

```
        Check if connected to portable unit:
```

```
            If yes:
```

```
                Call Audio function
```

```
            If not:
```

```
                count = count + 1
```

```
                Flag = False
```

```
Turn large indicator red
```

```
Red small indicator beings blinking every 5 seconds
```

Audio Function:

```
While Flag1 = False
```

```
    Check if there is noise:
```

```
        If yes:
```

```
            Is the noise = "hey" or "help"?
```

```
                If yes:
```

```
                    Call Server Function
```

```
                If not:
```

```
                    Flag1 = False
```

```
        If not:
```

```
            Flag1 = False
```