D.U.G.

Communication Aid for Nathan

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ENGR 110

Meet Team D.U.G!

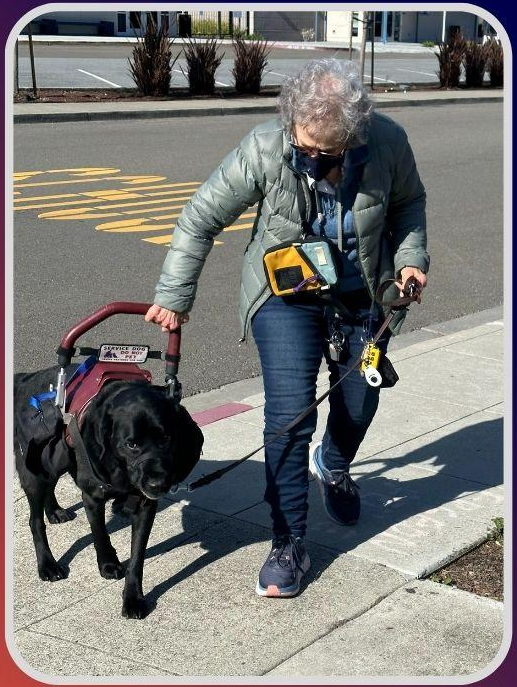
BREANNA
Product Design

OMAR
Computer Science

BESTE
Electrical Engineering

STEVEN
Computer Science

Meet Abby and Nathan



Abby is an artist, designer, and a clinical social worker. She is an individual with multiple disabilities: a mobility challenge and a visual impairment. She has a service dog, Nathan, who she has been working with for about 8 years.

Statement of Problem

People use a service dog to get their 'dog fix,' interfering with the working dog and disrespecting the dog's owner.

Takeaways from Interview with Abby

- **Distractions put Abby in jeopardy** since Nathan is not able to do his job
- The **responsibility** falls on Abby to inform people and **interrupts her activities**
- Abby appreciates the **opportunity to educate** people about etiquette (when she has the time)
- "We are **constantly interrupted** by the public"

Existing Solution

Signage

The current solution is signage, which can be hard to see and read as well as easy to ignore

Design Criteria

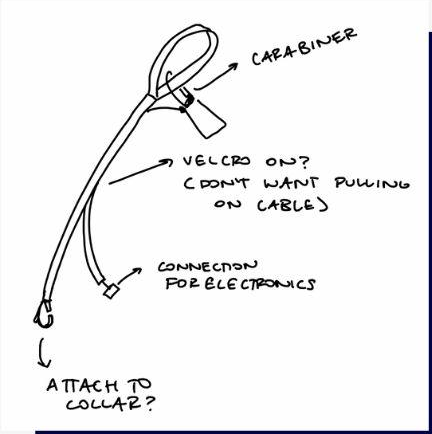
Easy to access and activate

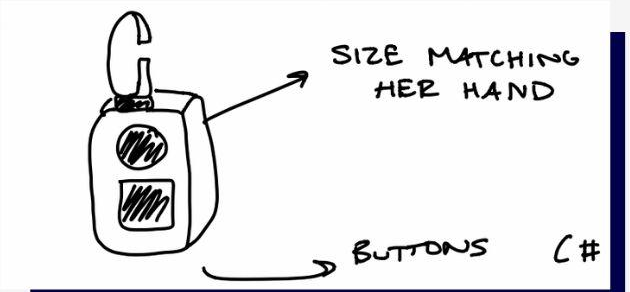
Loud enough to be heard

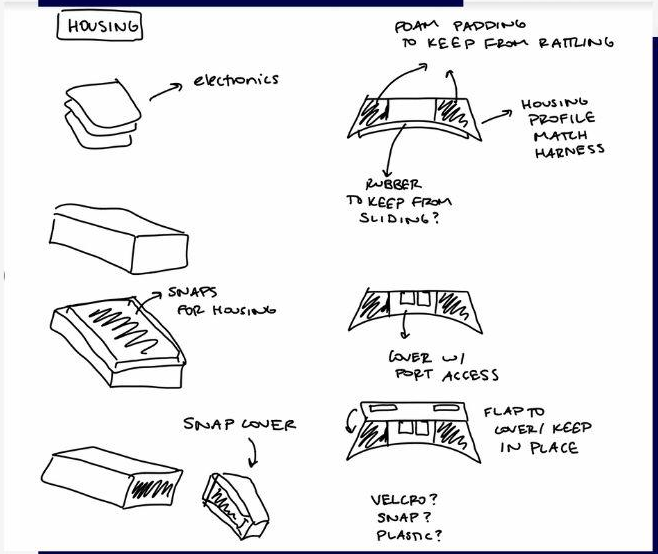
Lightweight and portable

Doesn't distract Nathan

BRAINSTORMING

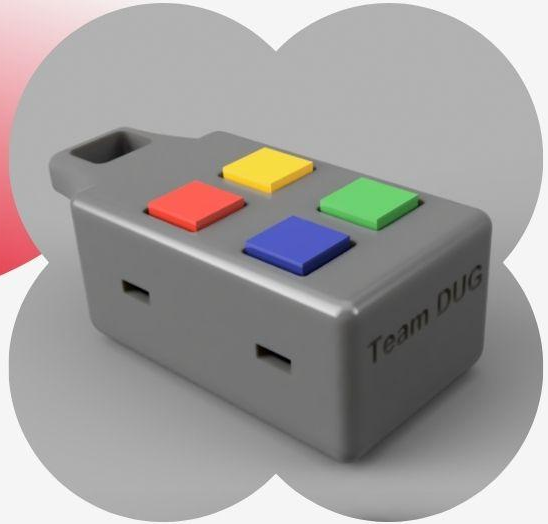






Design Vision

Our two-part design consists of a **speaker** that plays audio messages triggered by a **remote control**, carried by Abby



DESIGN CONSIDERATIONS

Remote:

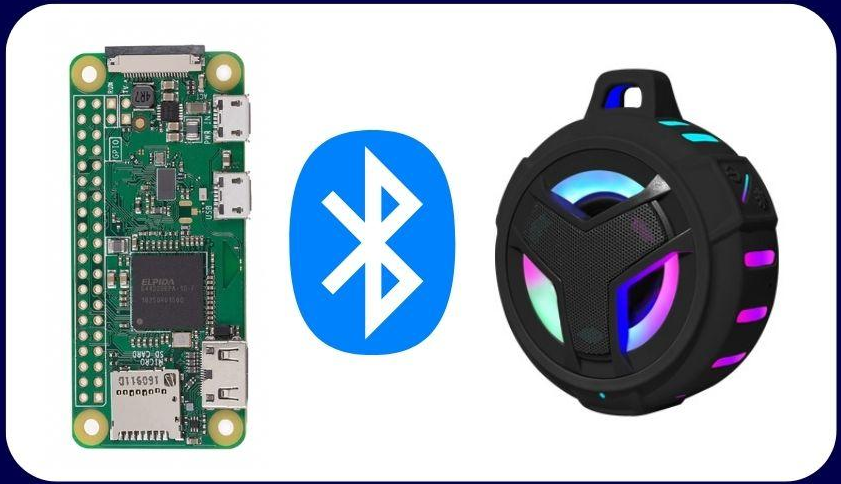
- Ergonomic fit for hand
- Large, colorful buttons
- Lightweight and easy to transport

Speaker:

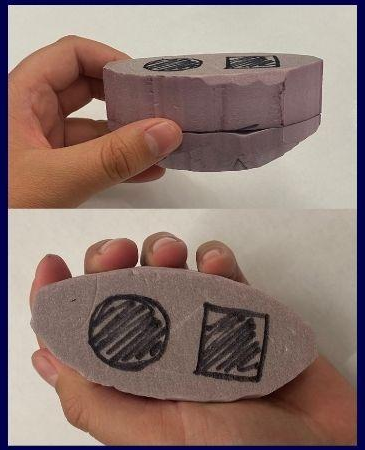
- Durable
- Waterproof
- Secure attachment

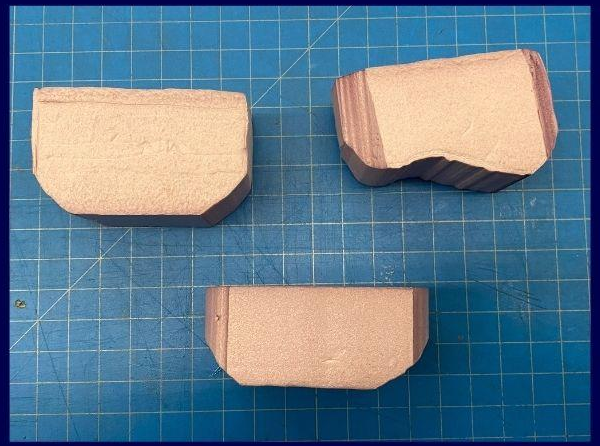
ELECTRONICS AND CODE

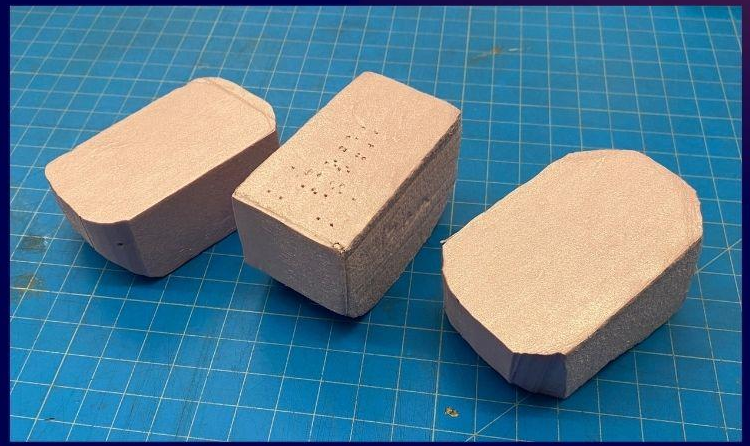
- Long battery life
- Connect automatically
- Quick response time
- Flexible audio messages



Prototyping the Remote







Early Models of Physical Remote (Pink Foam)

Prototyping the Remote

3D Printed Prototype #1

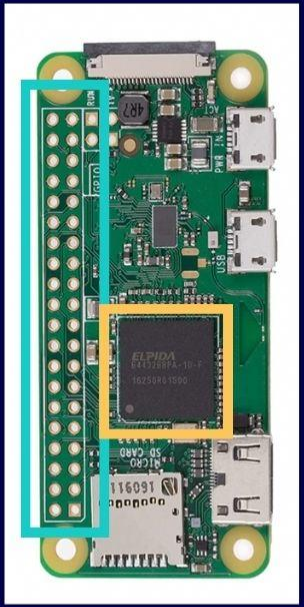
3D Printed Prototype #2

The Button Decision

What is a raspberry π?

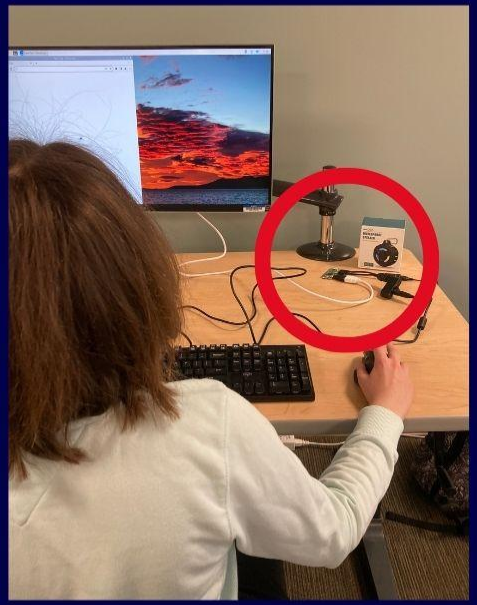
Computing and code on processor

General purpose input/output (GPIO) pins to communicate to other sensors or devices

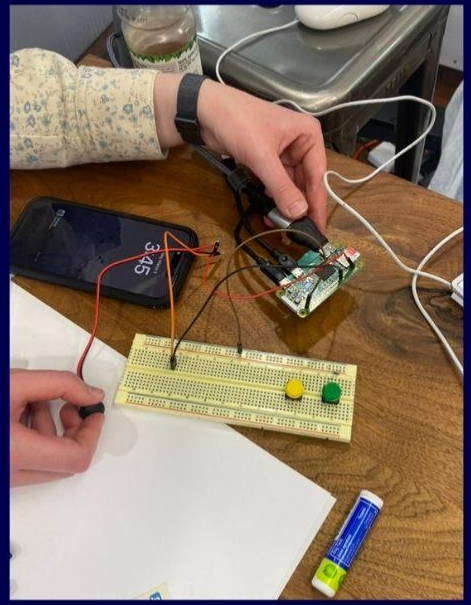


It is a small computer!

Prototyping the Electronics



Testing Code



Breadboard Circuit

Soldering

Our Current Prototype

Our Current Prototype

It Works!

Future Work

- Attach silicone case to exterior of remote
- Deliver current prototype to Abby in the Spring

Mass Production?

- Design a custom circuit and chip
- Reduce size
- Volume sensing + control

D.U.G.

Thank you!