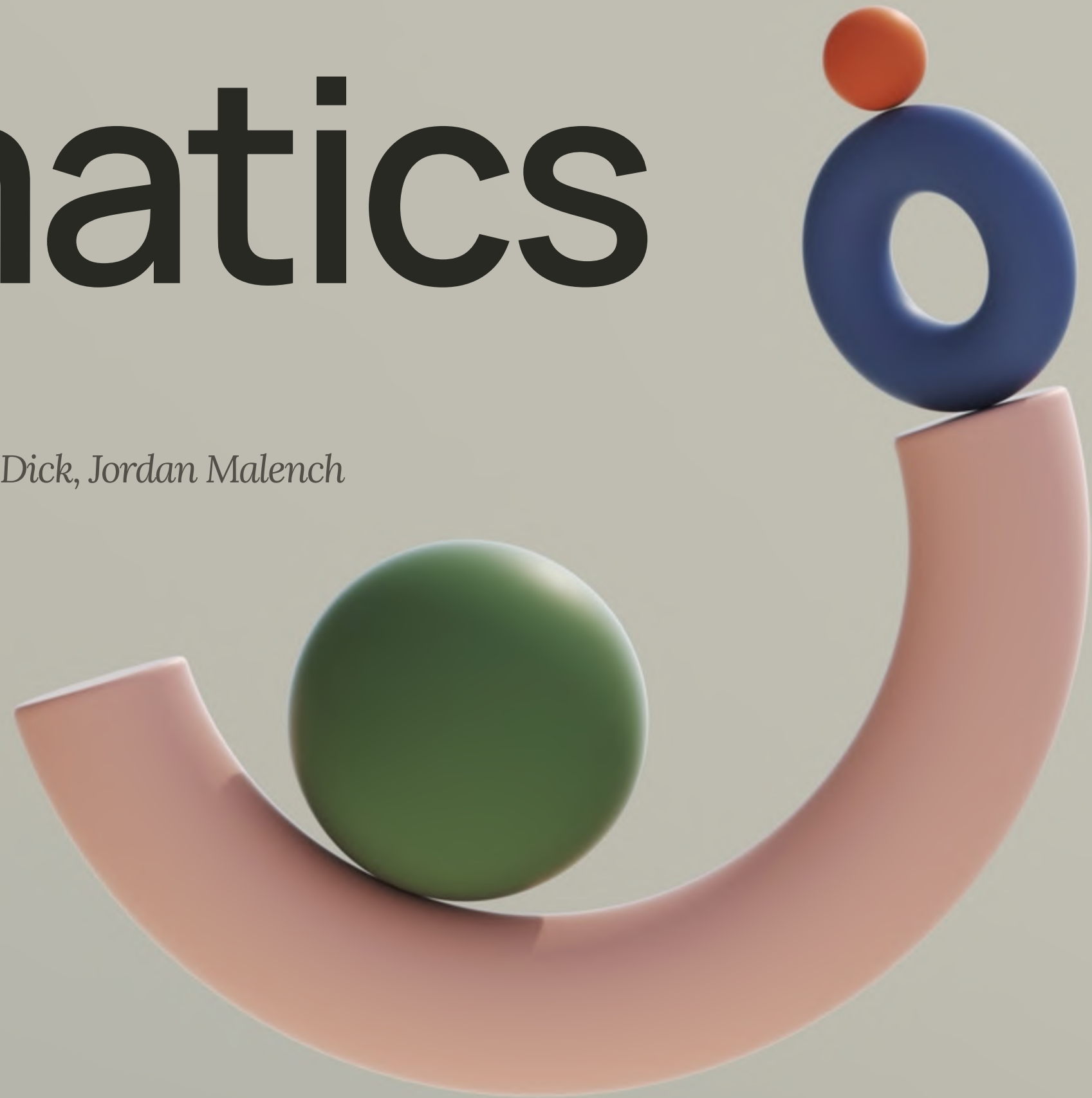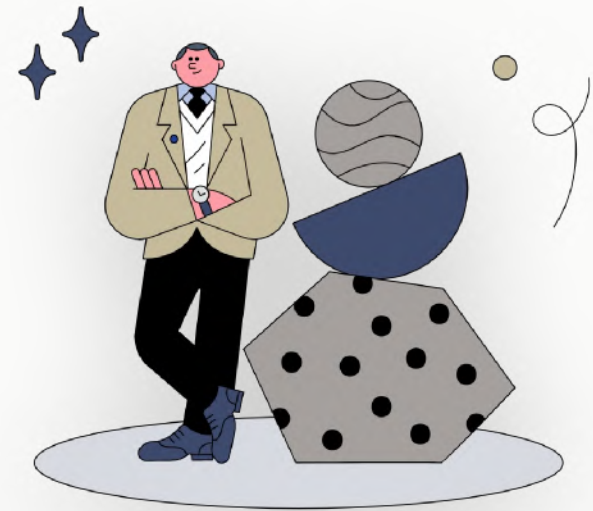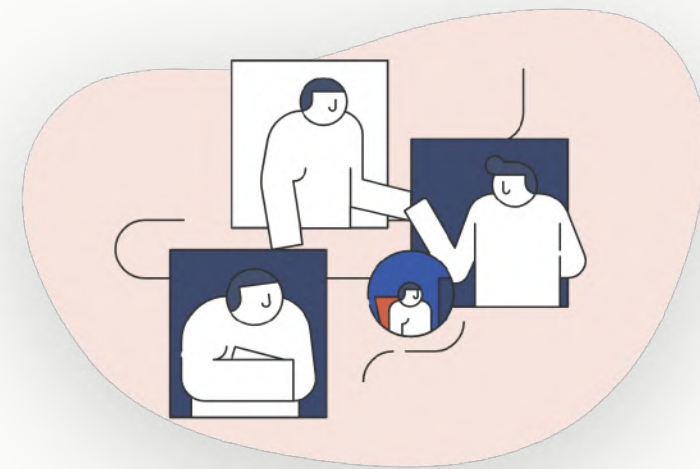# Foldamatics

Group C3.1

Rabih Daoud, Jeyason Jeyaparan, Joshua Labelle, Ryan Dick, Jordan Malench
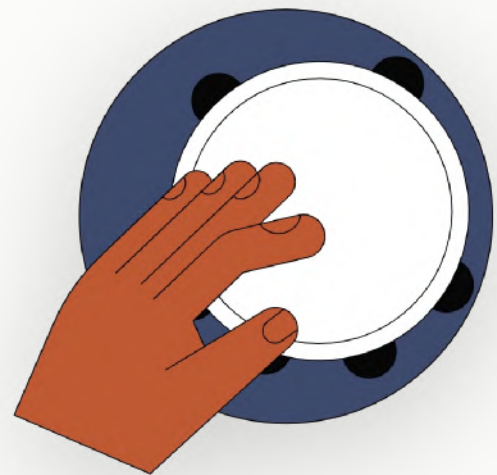
Customer Needs

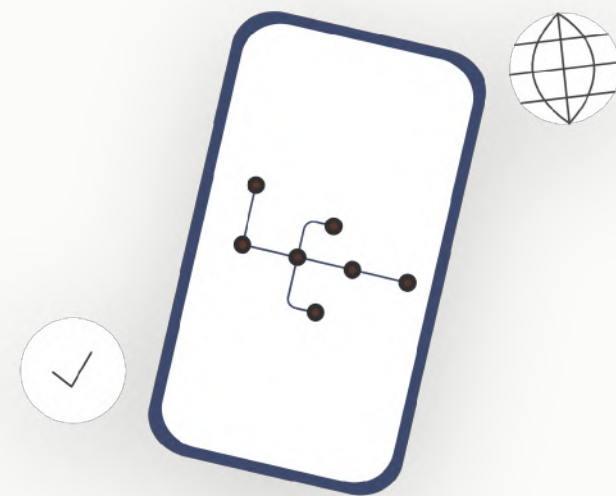Durability and strength

Multi-user functionality
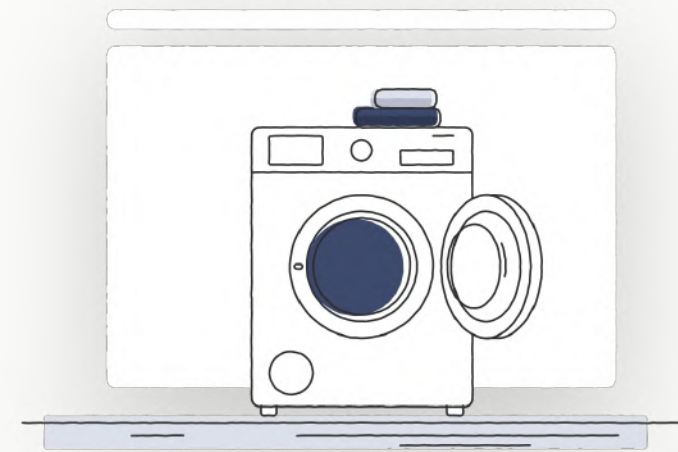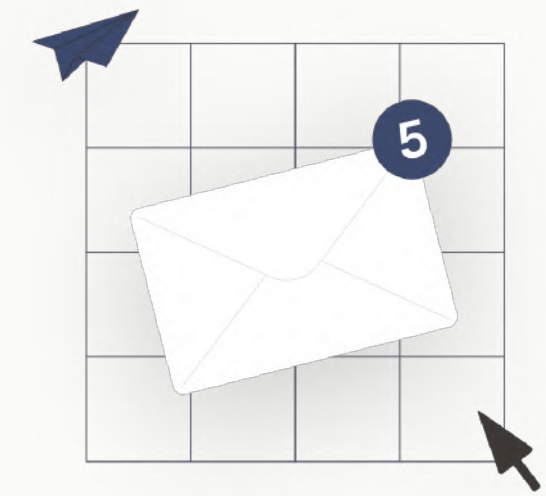
Quality materials

Easy installation

Reduced hand movement
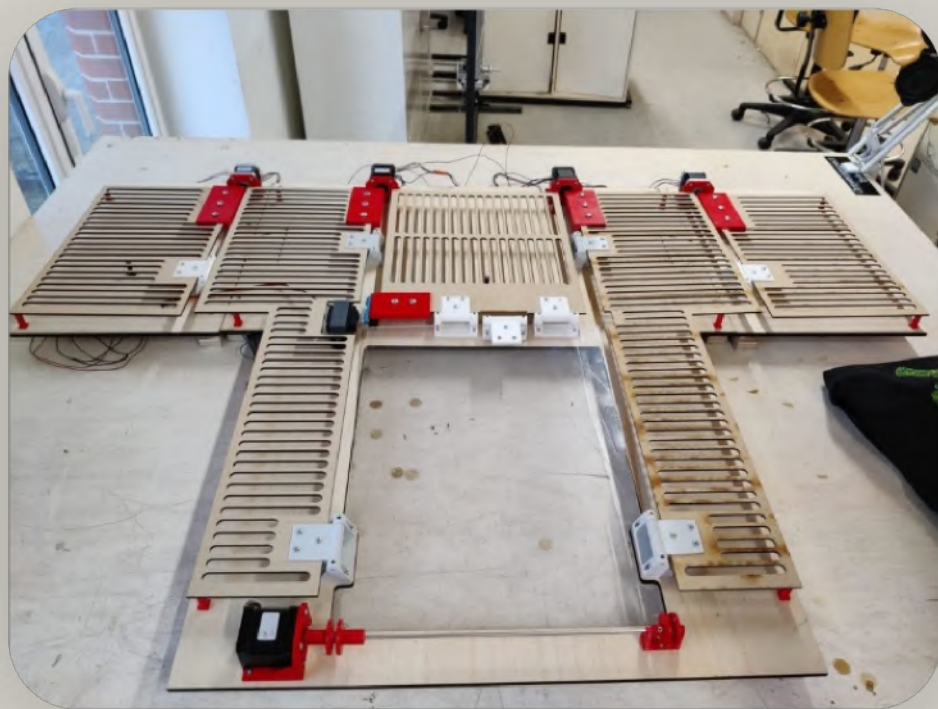
Mobile app integration

Versatility in folding

Status communication

Benchmarking

Arduino powered

Automatic Clothes Folding Machine

T-Shirt Folder Electric Desktop

Metric #	Need #s	Metric	Imp	Unit	Arduino powered	Automatic Clothes Folding Machine	T-Shirt Folder Electric Desktop
1	1	Durability	2	years of life	5	2	> 1
2	1	Load Support	3	g	>198.5	>198.5	>198.5
3	3	Weight of Product	5	kg	5	<5	200
4	2	Number of concurrent users	3	users	1	1	1
5	3	Installation time	5	s	30	NA	NA
6	4	Built from cardboard	5	Binary	No	Yes	No
7	5	Reduces hand movement	5	Binary	Yes	Yes	Yes
8	6	Used with mobile app	3	Binary	No	No	No
9	7	Movement during use	5	cm	0	0	0
10	8	Cleanable with a wipe	5	Binary	Yes	No	Yes
11	9	Activated by voice	1	Binary	No	No	No
12	10	Visually appealing	1	subj	1	2	4
13	11	Possible clothing types	3	list	T-shirt, long sleeve	T-shirt	T-shirt, sportswear,work clothes
14	12	Communicates its state	3	Binary	No	No	Yes

Target Specifications

Installation time

The device should not take a very long to set up because we want it to be convenient

Movement during use

The device should stay in place when it is being used by the user.

Activated by voice

The device should be activated by voice because some users do not have the capability to activate it in other ways.

Software compatibility

The client uses both Apple and Microsoft products and the t-shirt folder should be compatible with both, however, the most important is Apple.

Durability

We want this product to last a long period of time, however its robustness and durability is not that big of a priority for our client.

Shock Resistance

The device should be able to withstand an accidental bump or fall from a average table

Load Support

Our solution should ideally support over 198.5g (max average shirt weight), but it's acceptable if it can handle at least 85g (min average shirt weight).

Weight of Product

Our product should be easily installed and portable, requiring a weight below 5kg, ideally under 3kg, to outperform our Automatic Clothes Folding Machine competitor.
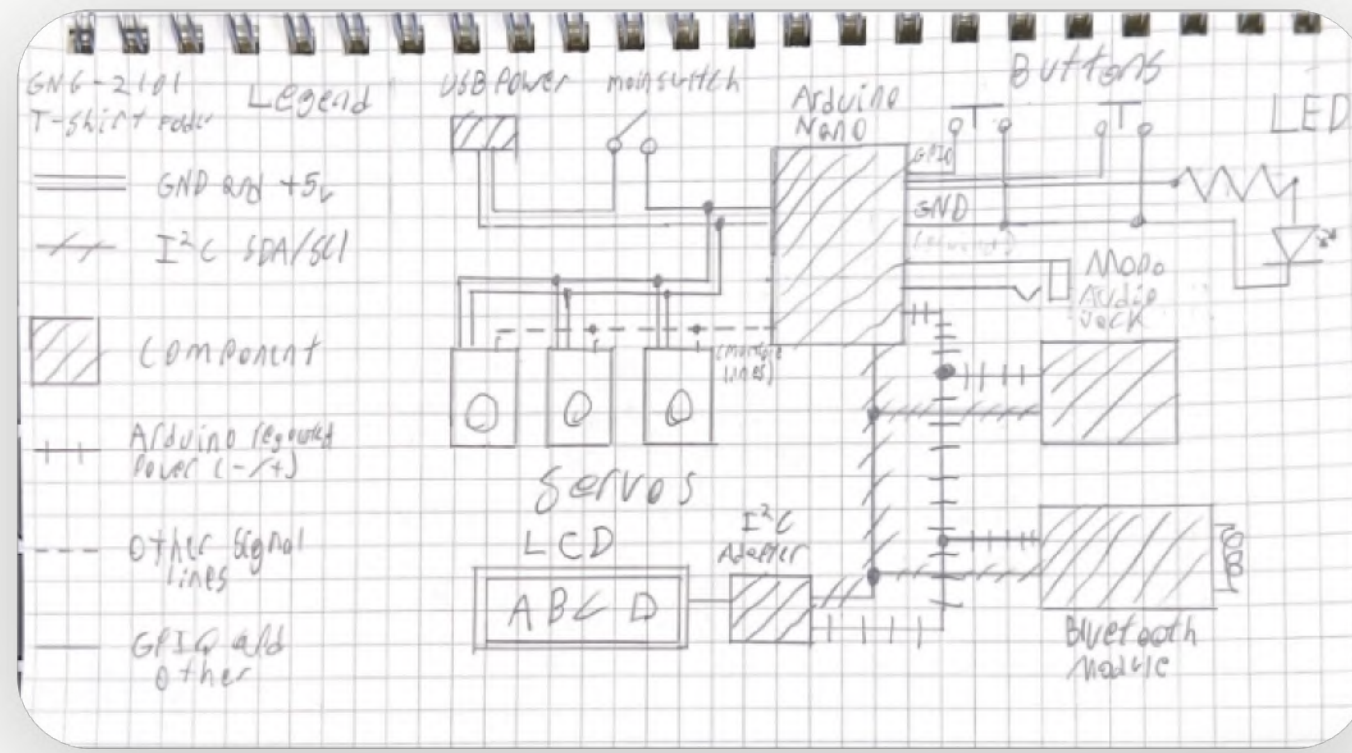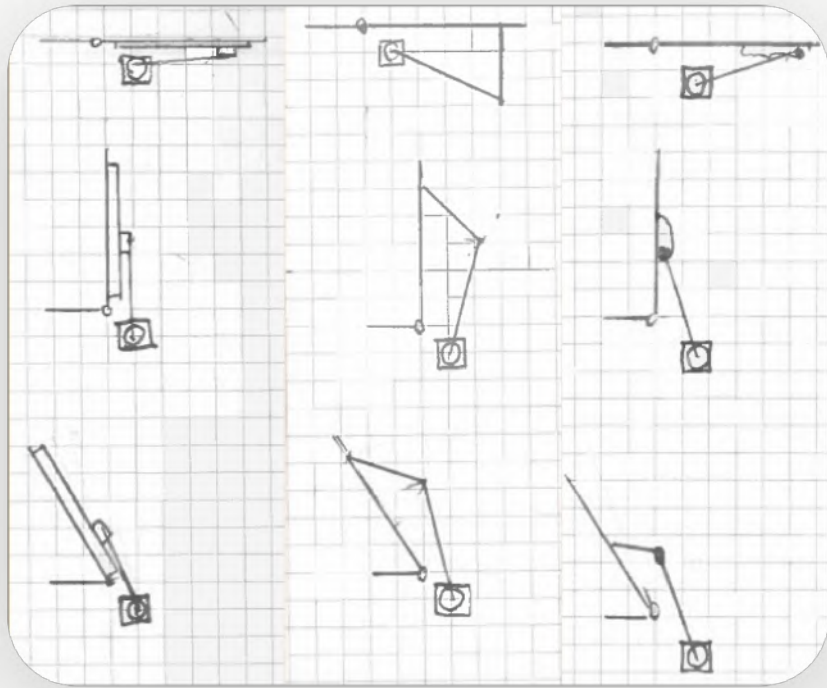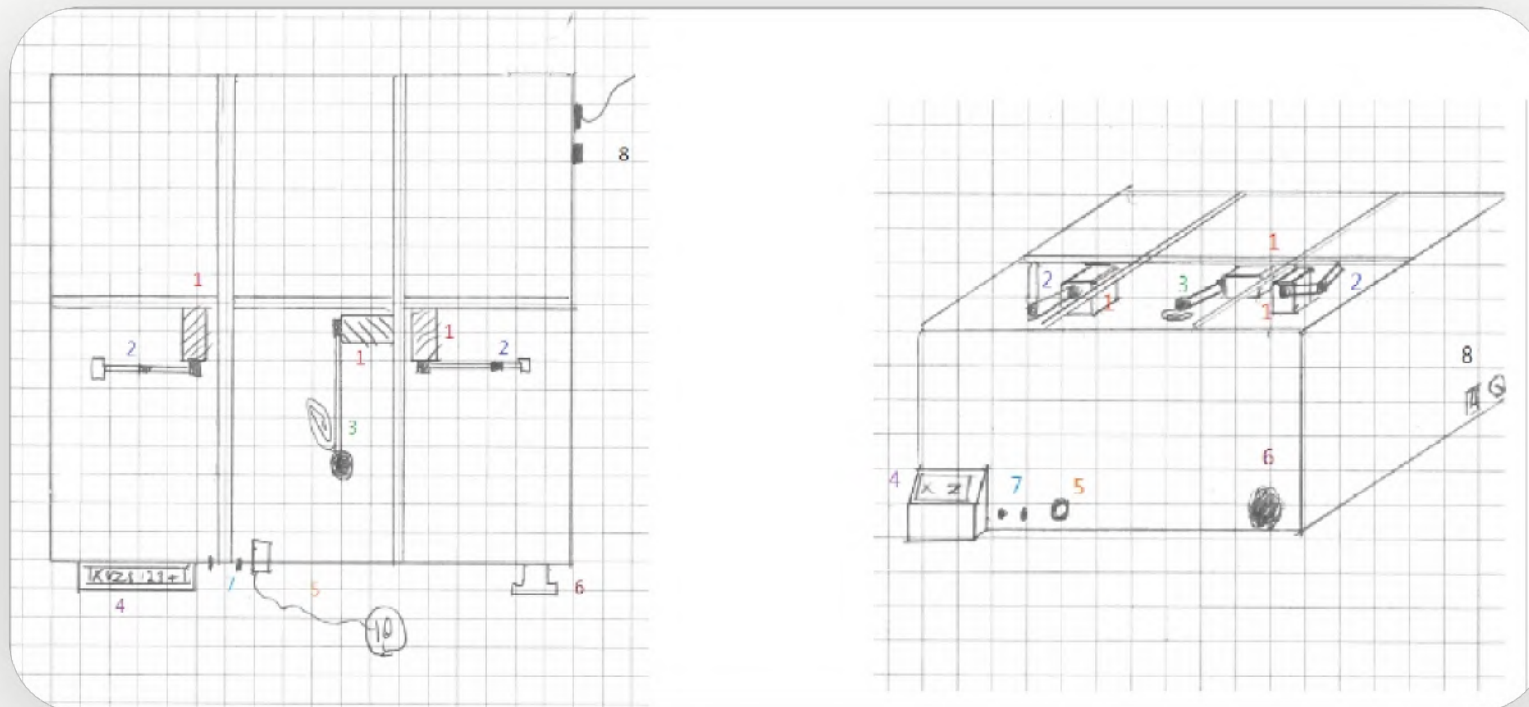
Number of concurrent users

The product must work for at least one person, with multi-user functionality as a "nice to have" but not necessary feature.

Number of concurrent users

The product must work for at least one person, with multi-user functionality as a "nice to have" but not necessary feature.

| Metric	Unit	Ideal Value	Marginal Value
Durability	Years of life	> 4	> 2
Shock Resistance	Joules	50	30
Load Support	g	>198.5	>85
Weight of Product	kg	<3	<5
Number of concurrent users	users	>1	>0
Installation time	Seconds	<30	<60
Movement during use	cm	0	<2
Cleanable with a wipe	Binary	Yes	Yes
Activated by voice	Binary	Yes	Yes
Visually appealing	Subj	5	3
Possible clothing types	list	Adult T-shirt	T-shirt
Communicates its state	Binary	Yes	Yes
Software compatibility	-	2	Apple iOS & Microsoft

Initial Concepts

Housing and Frame
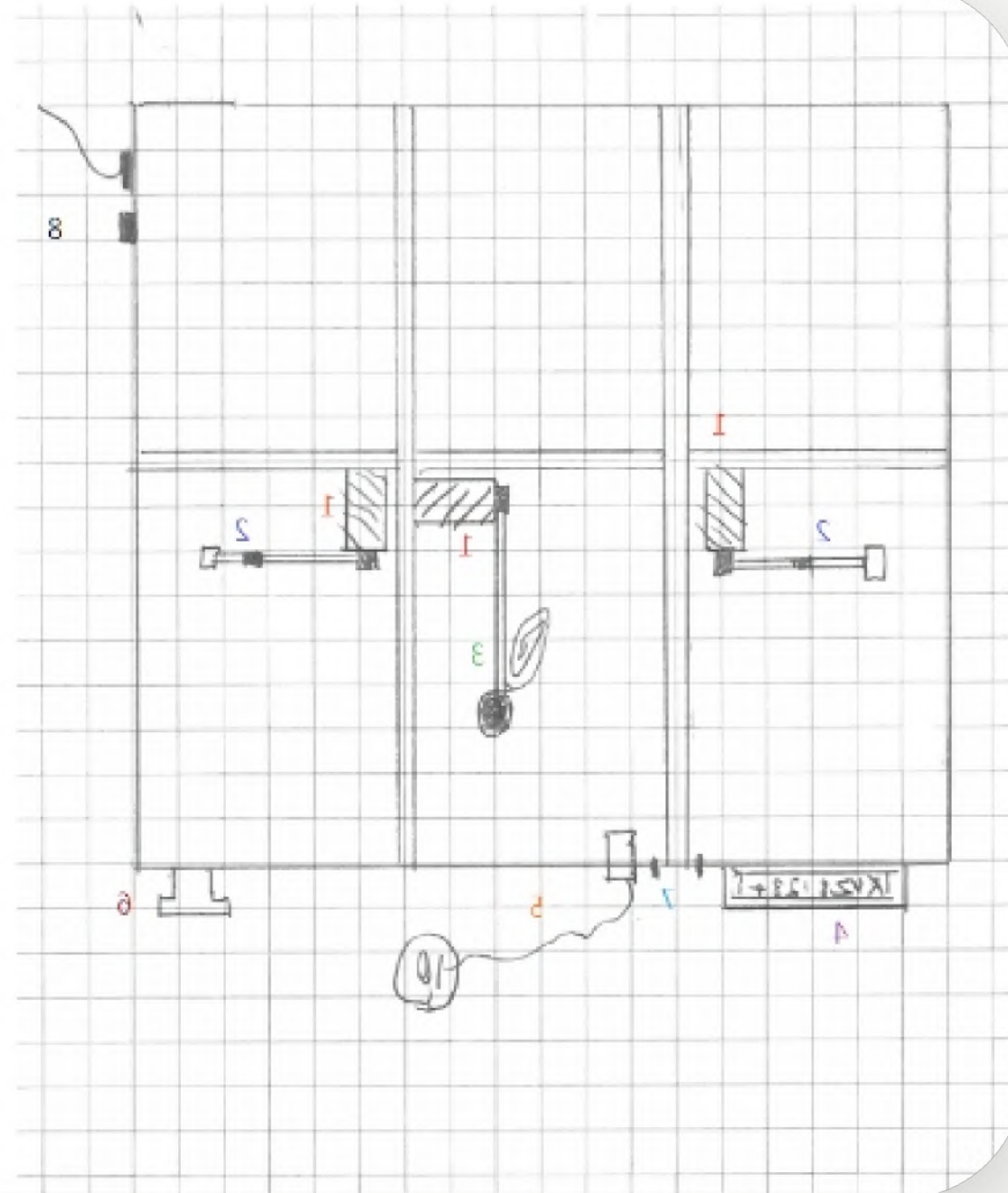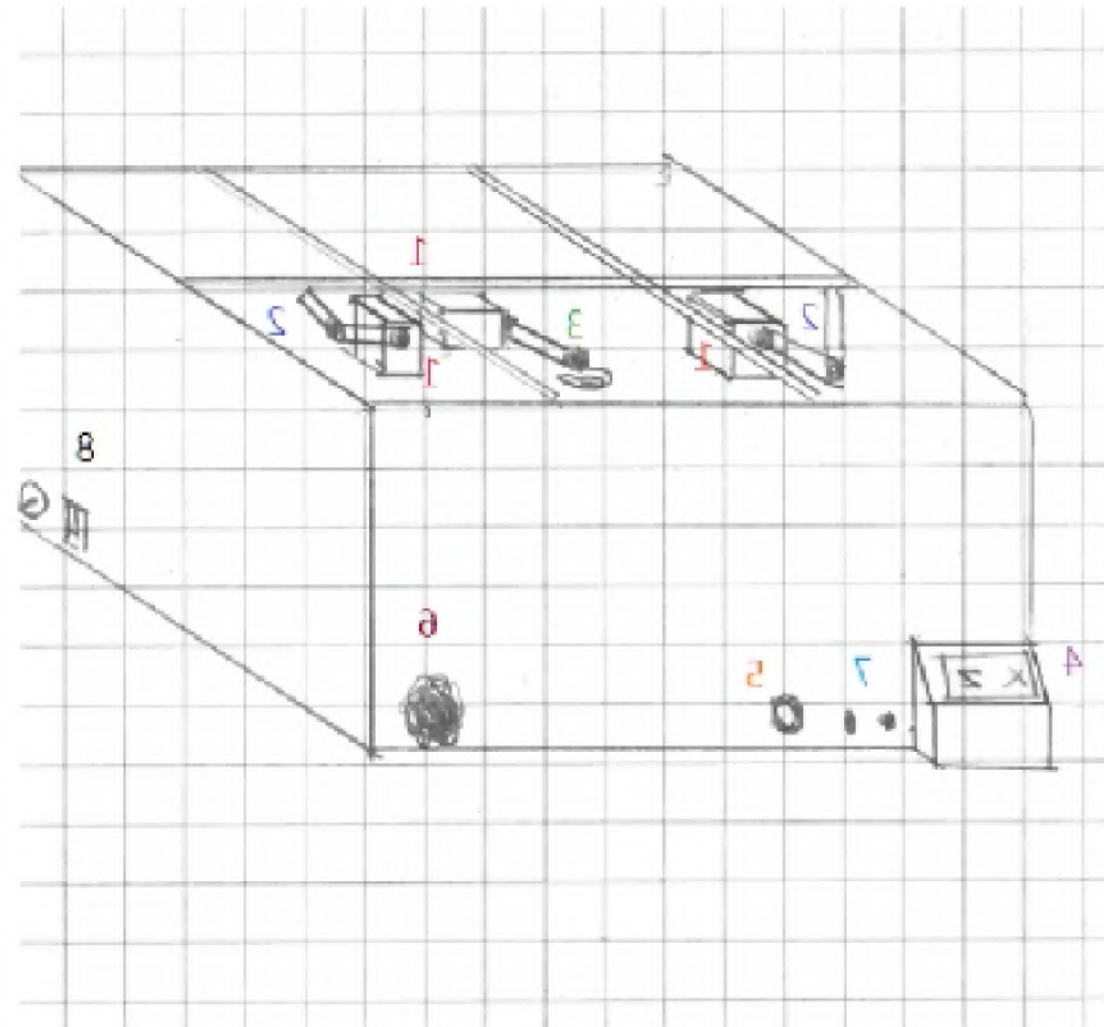
Folding Actuators
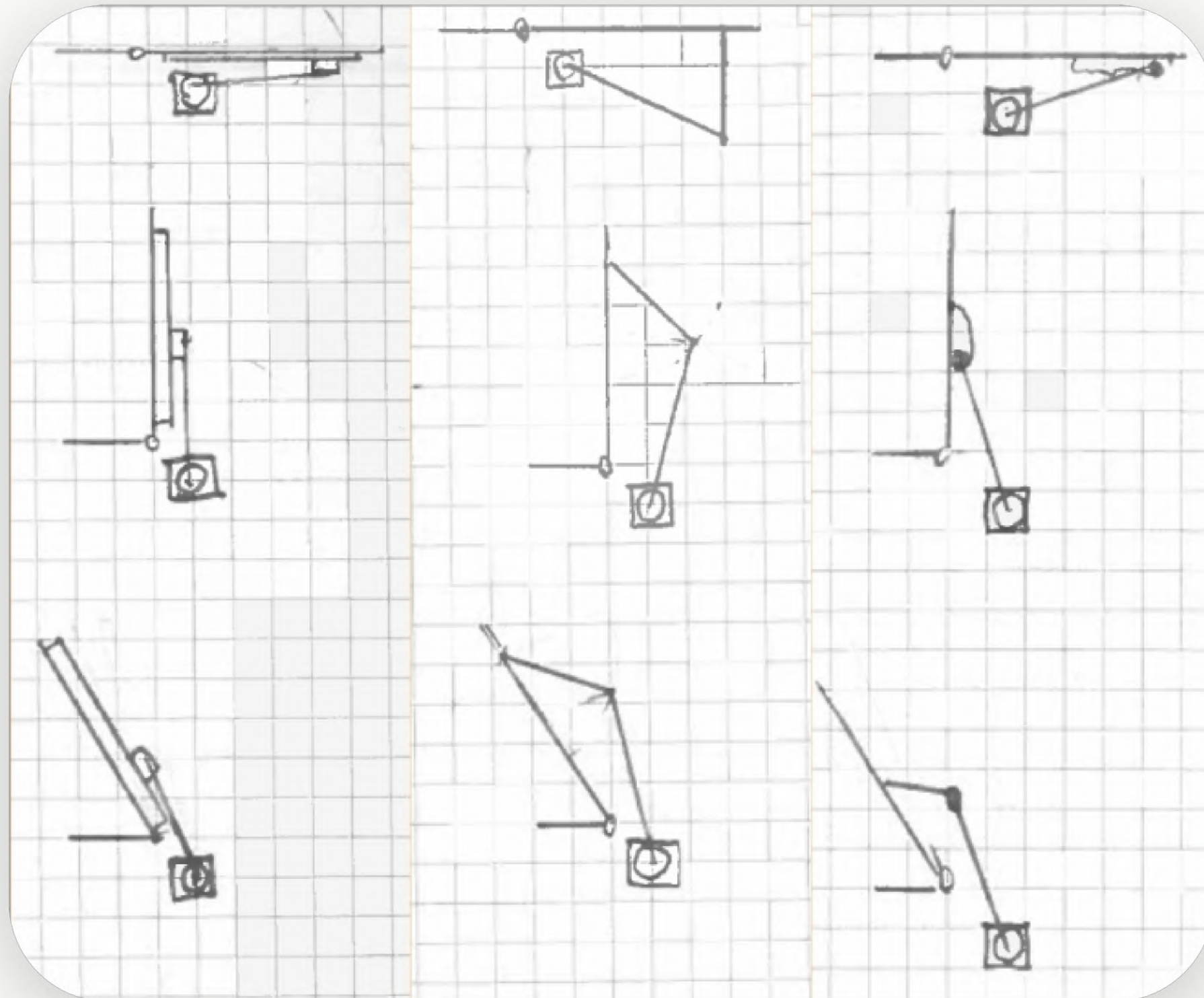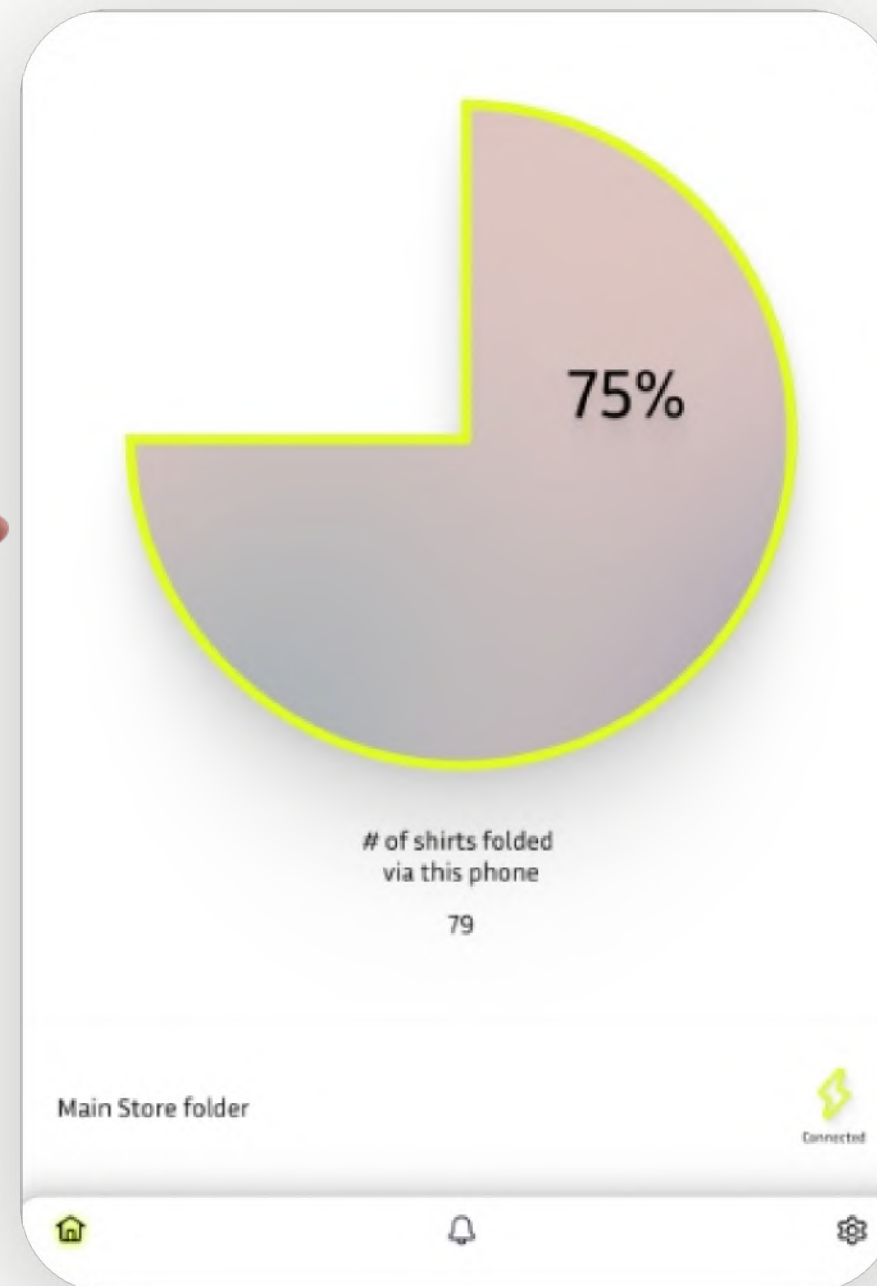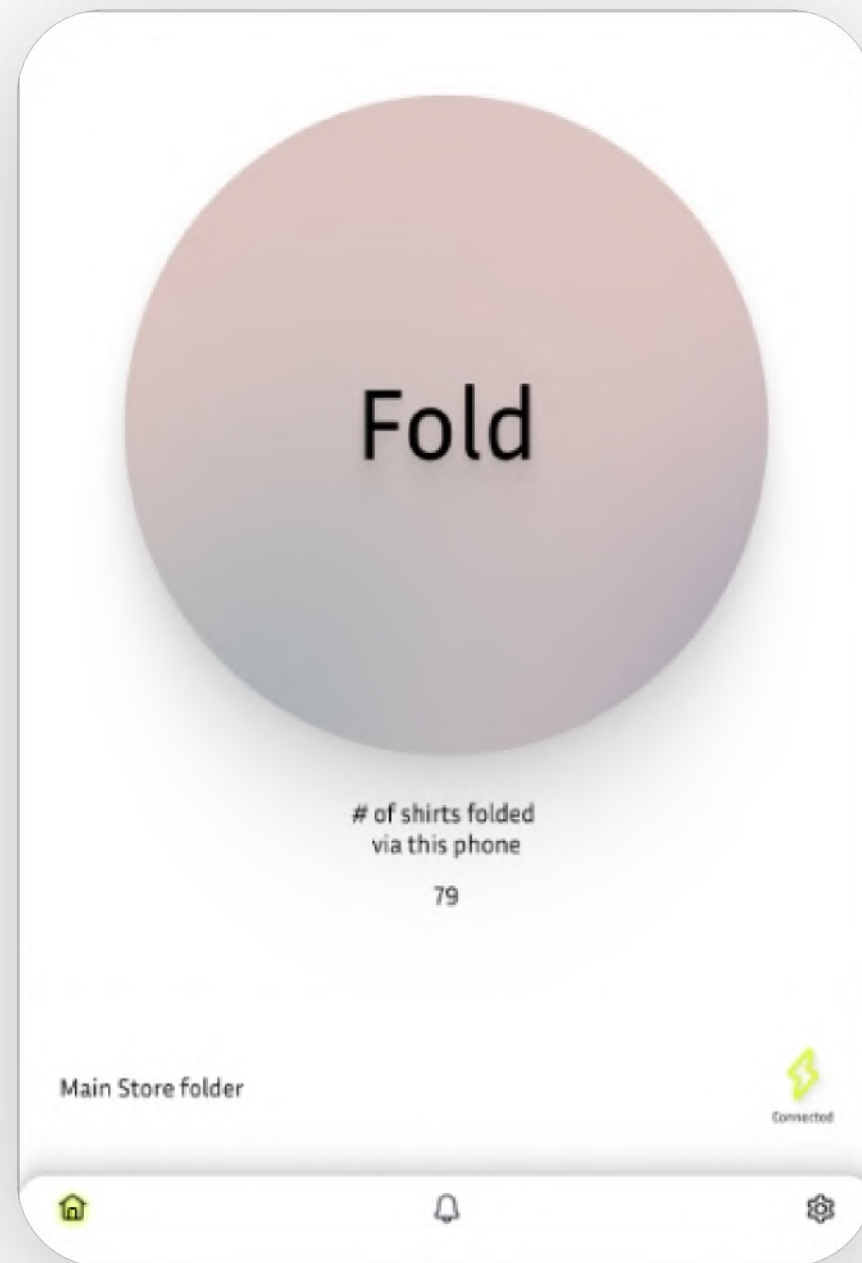
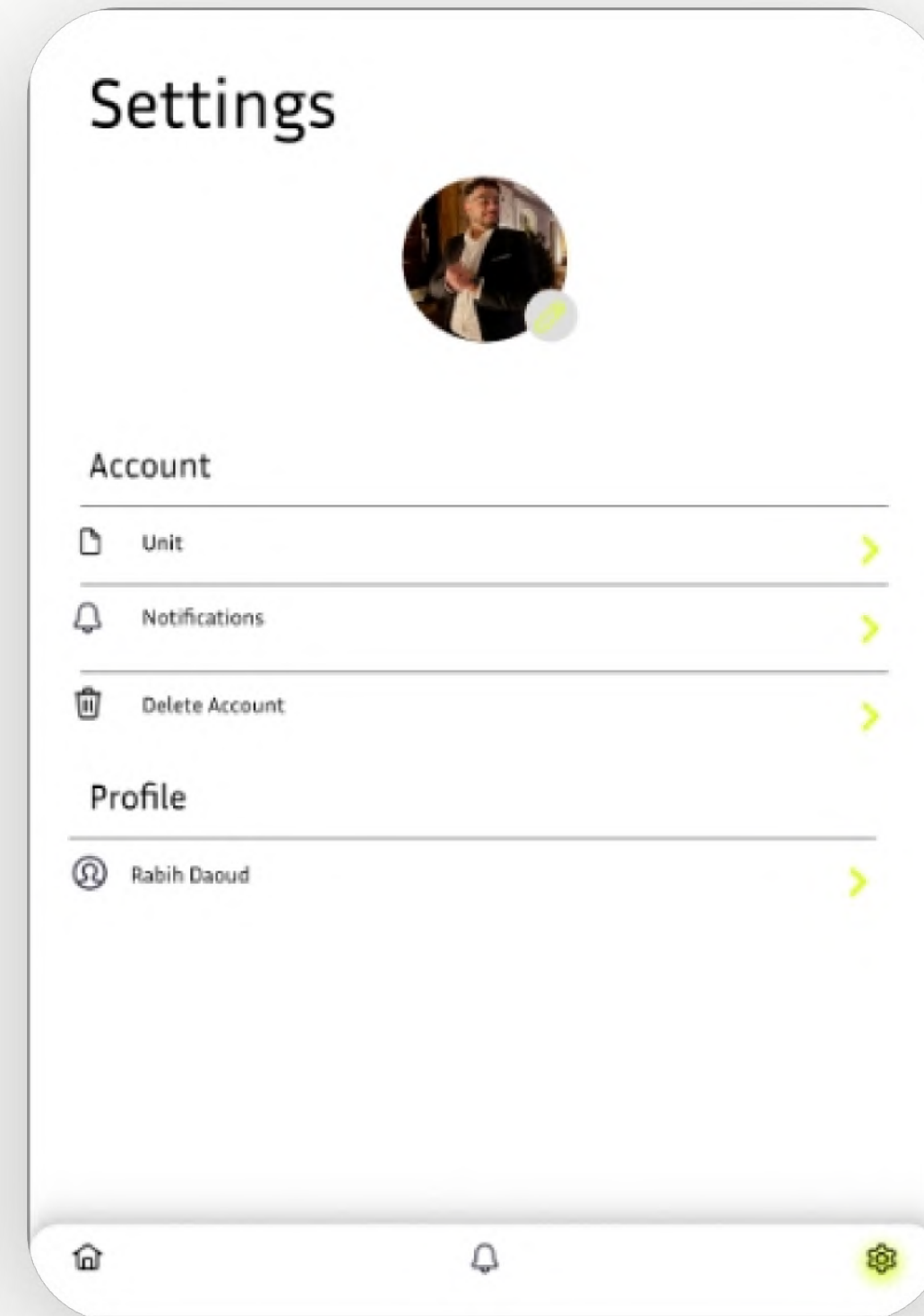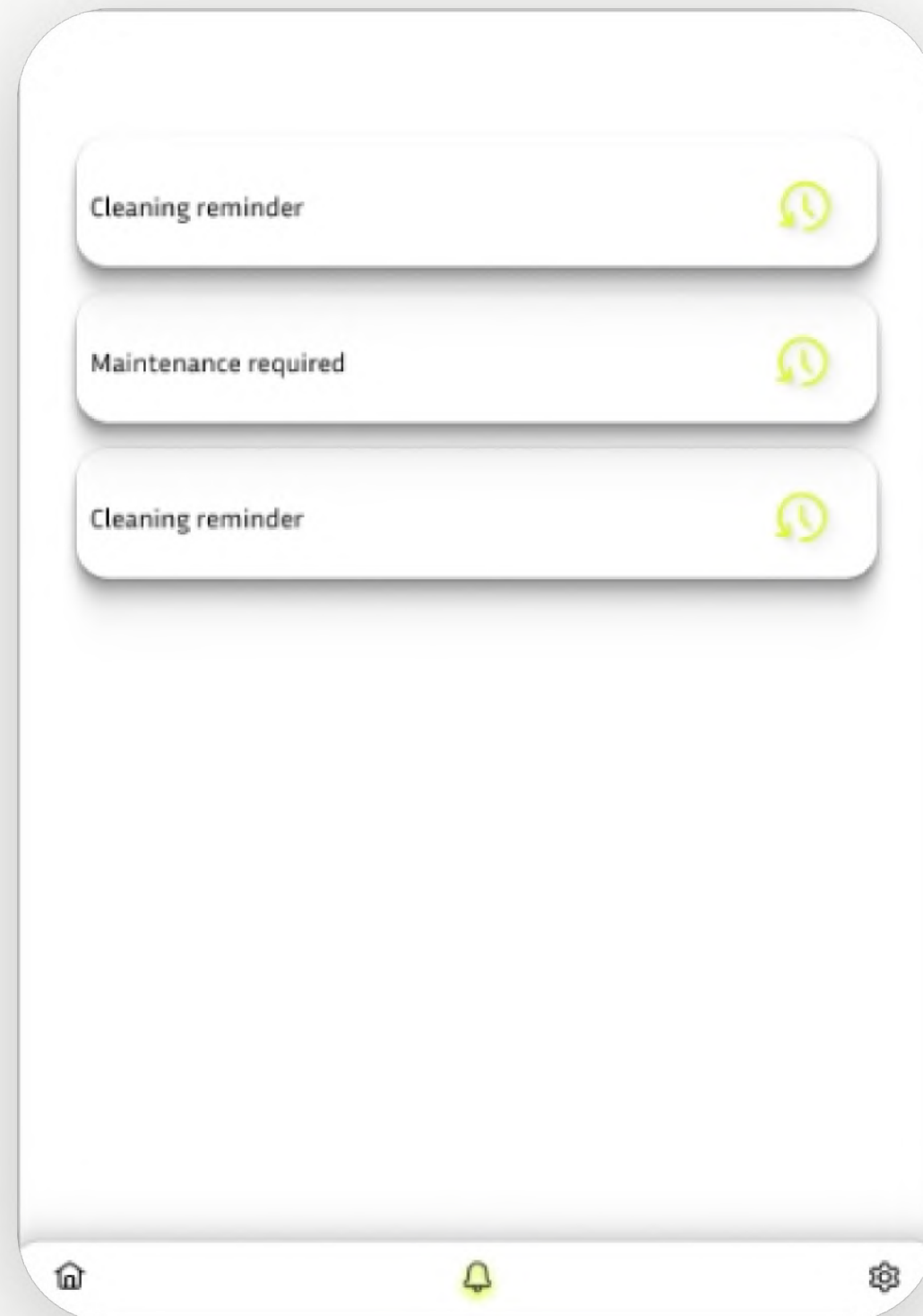# Electronics Design
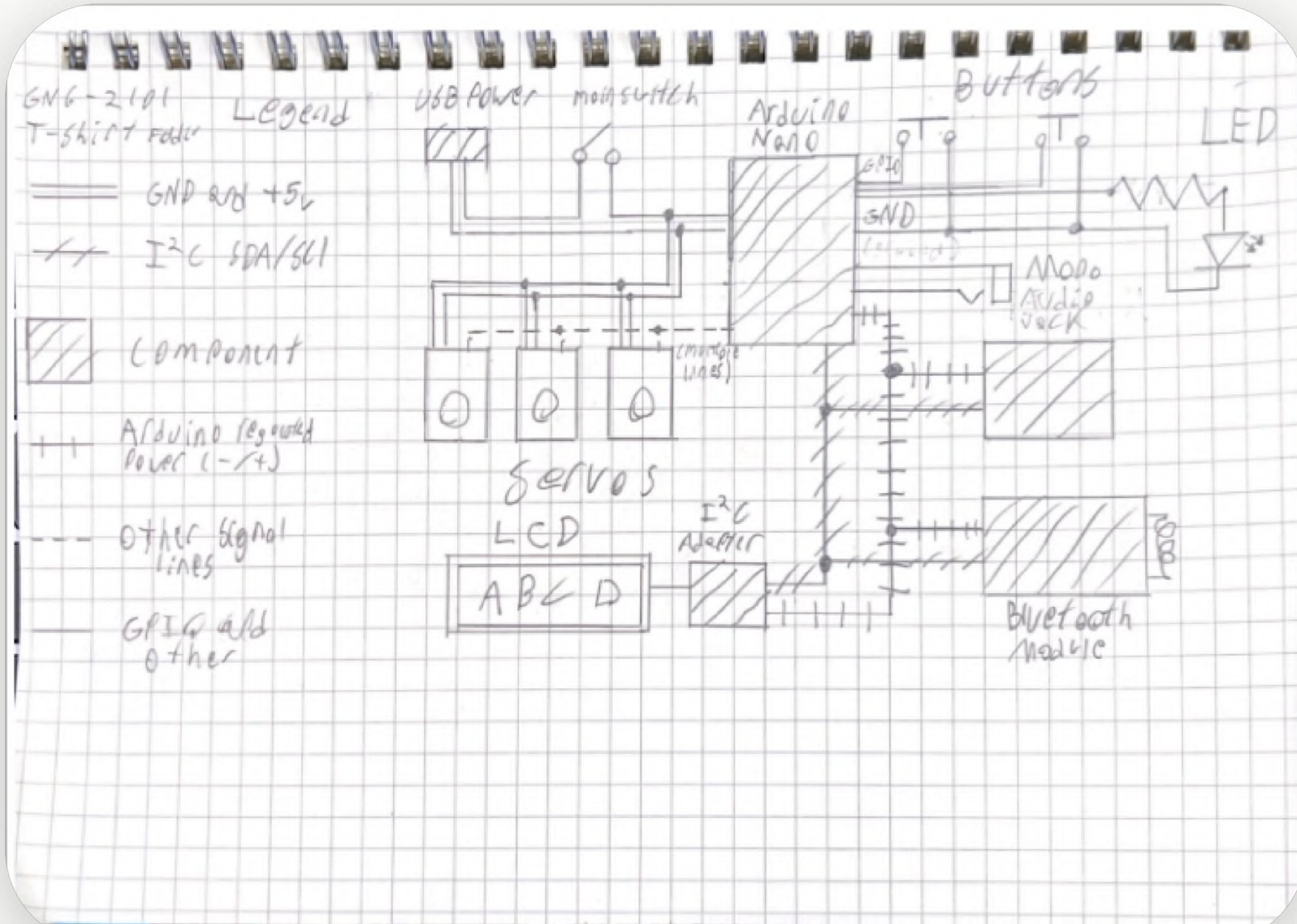
Pictures of CAD Model
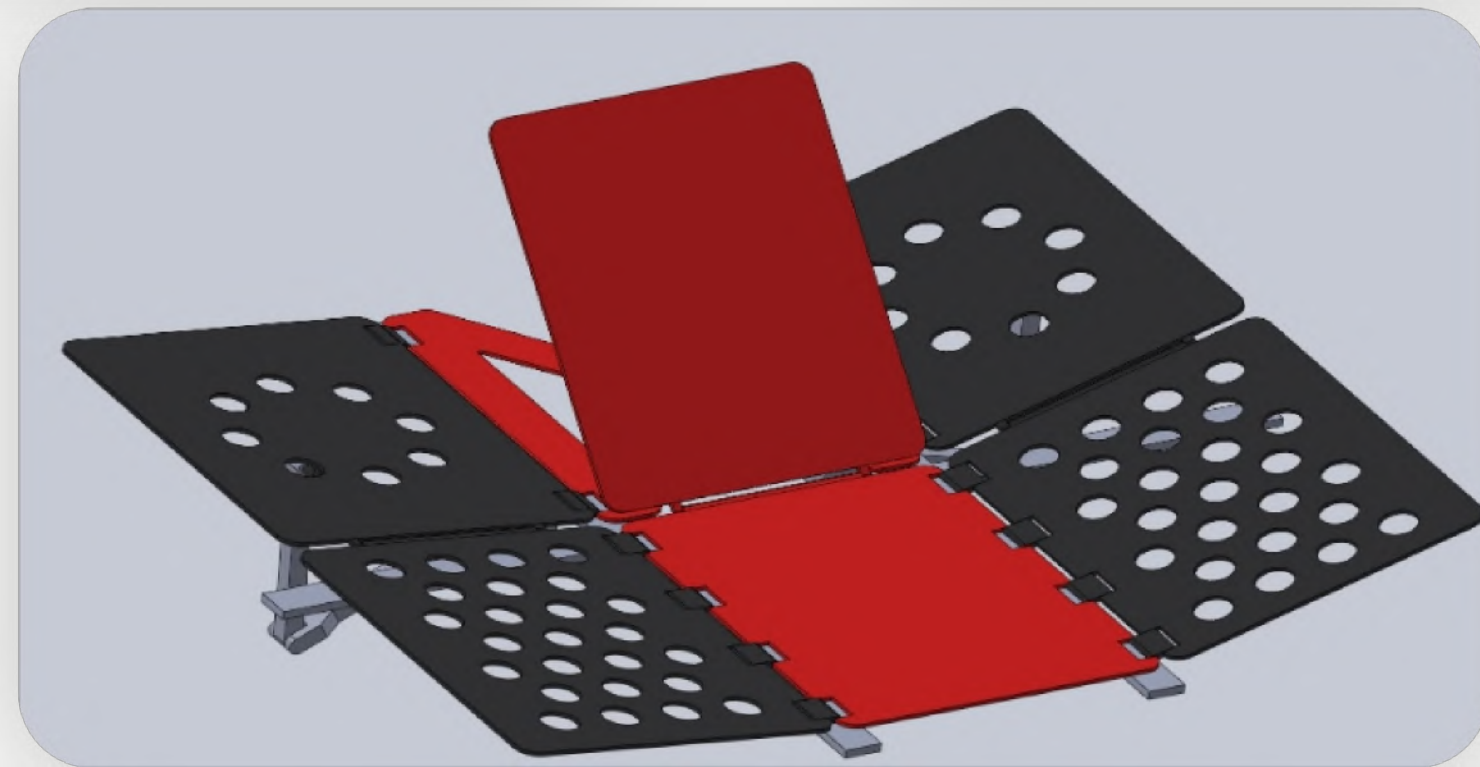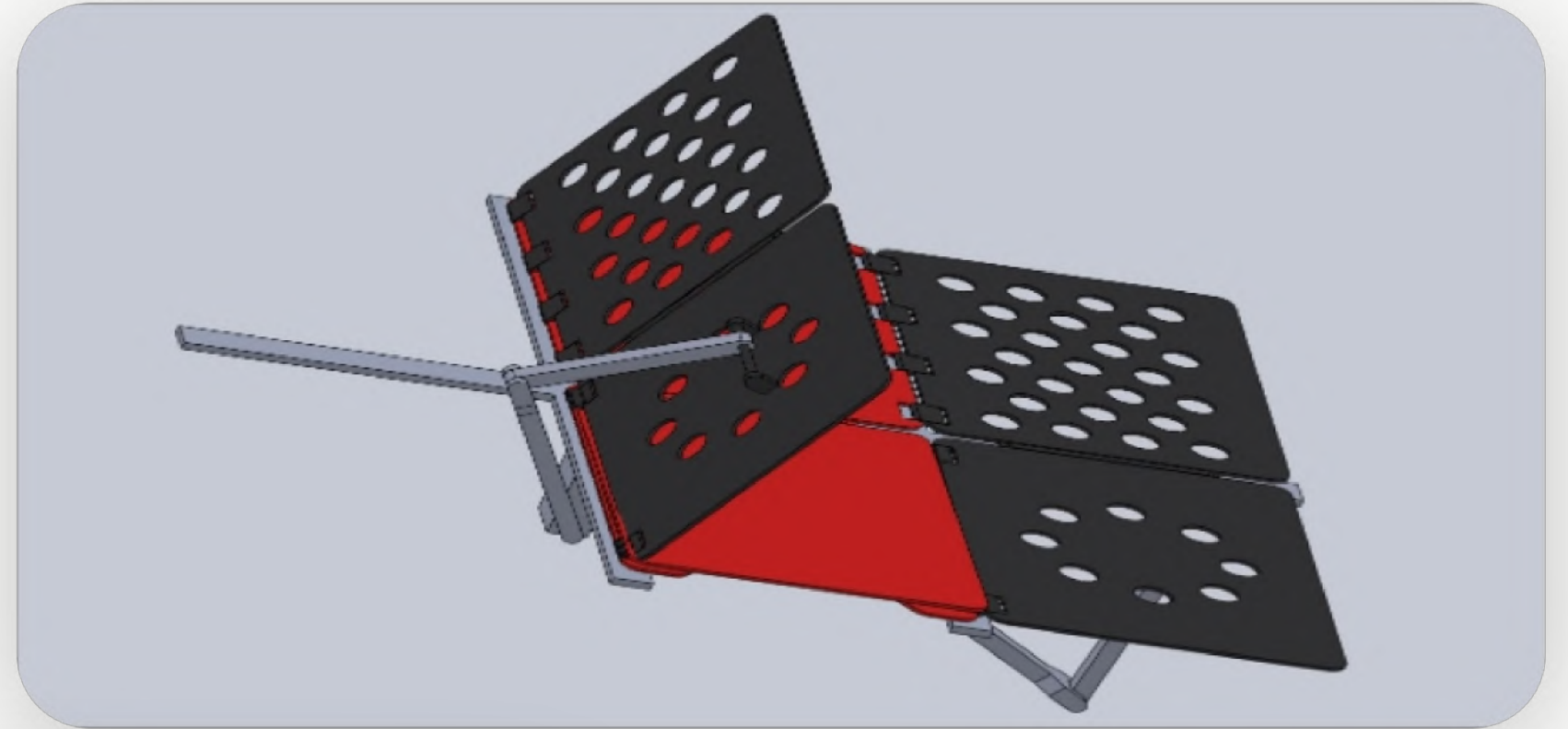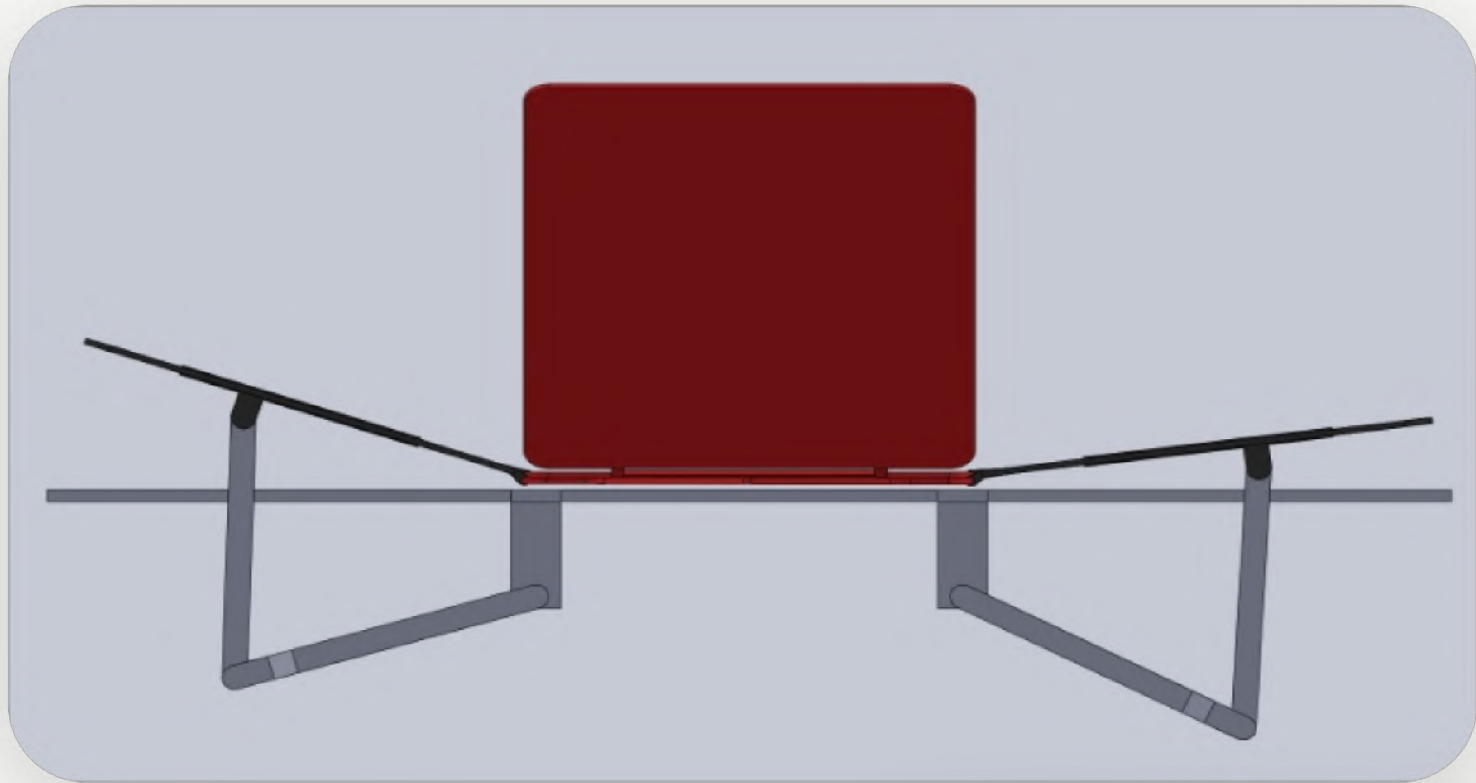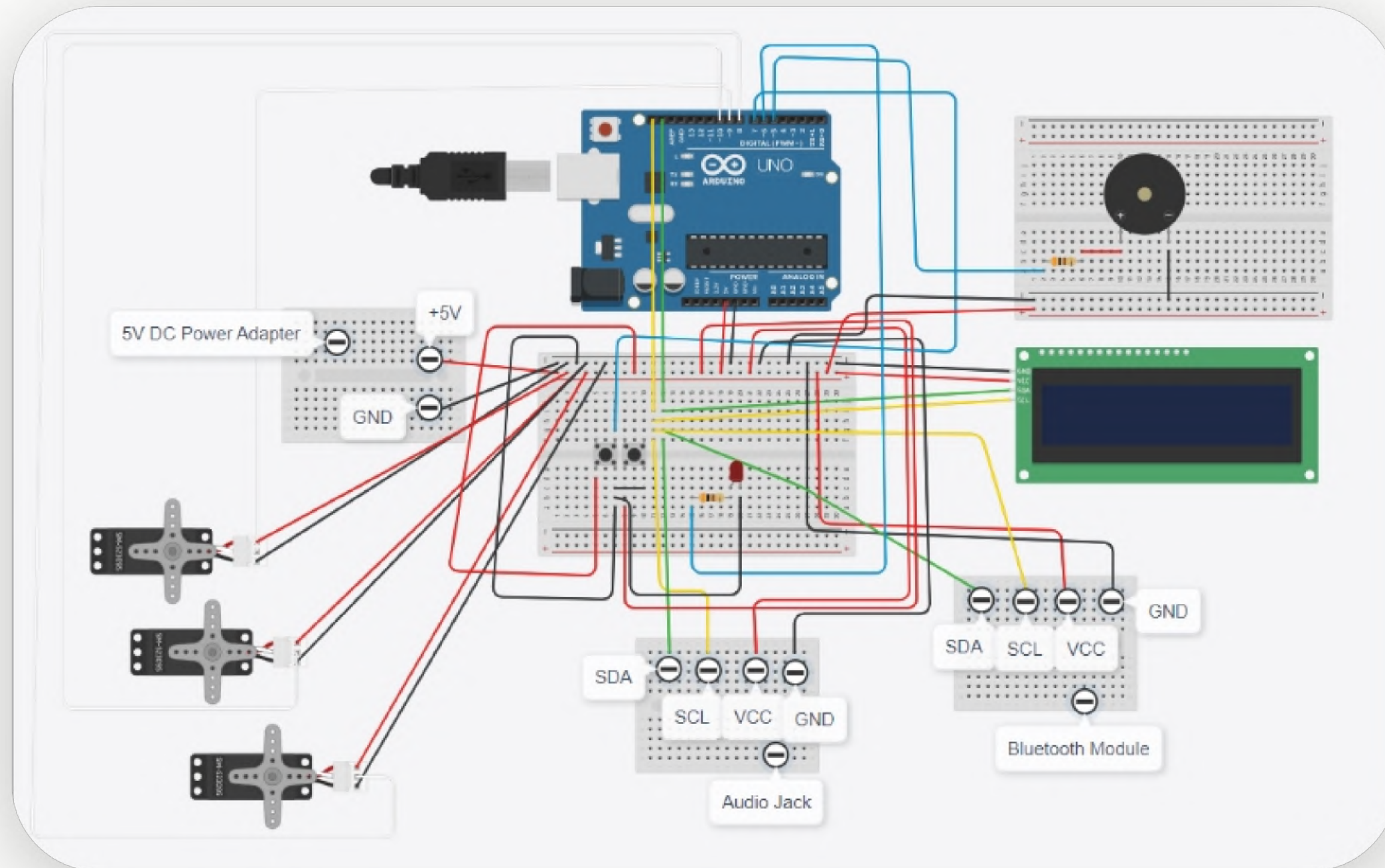
Prototype 1

Mobile Application (Folding Process)
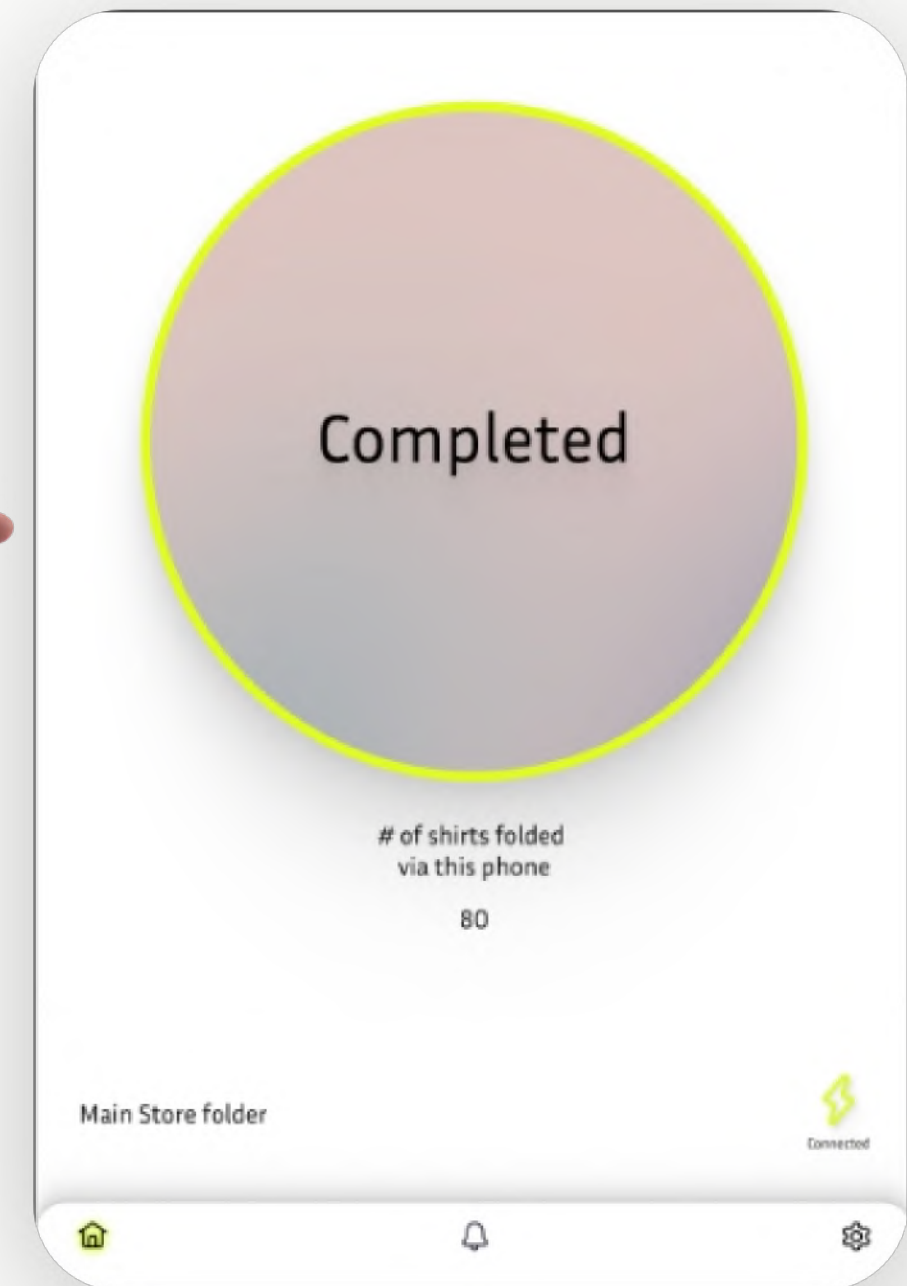
Prototype 1

Mobile Application (Notification Page) & (Settings Page)

TinkerCad (Circuit Diagrams)
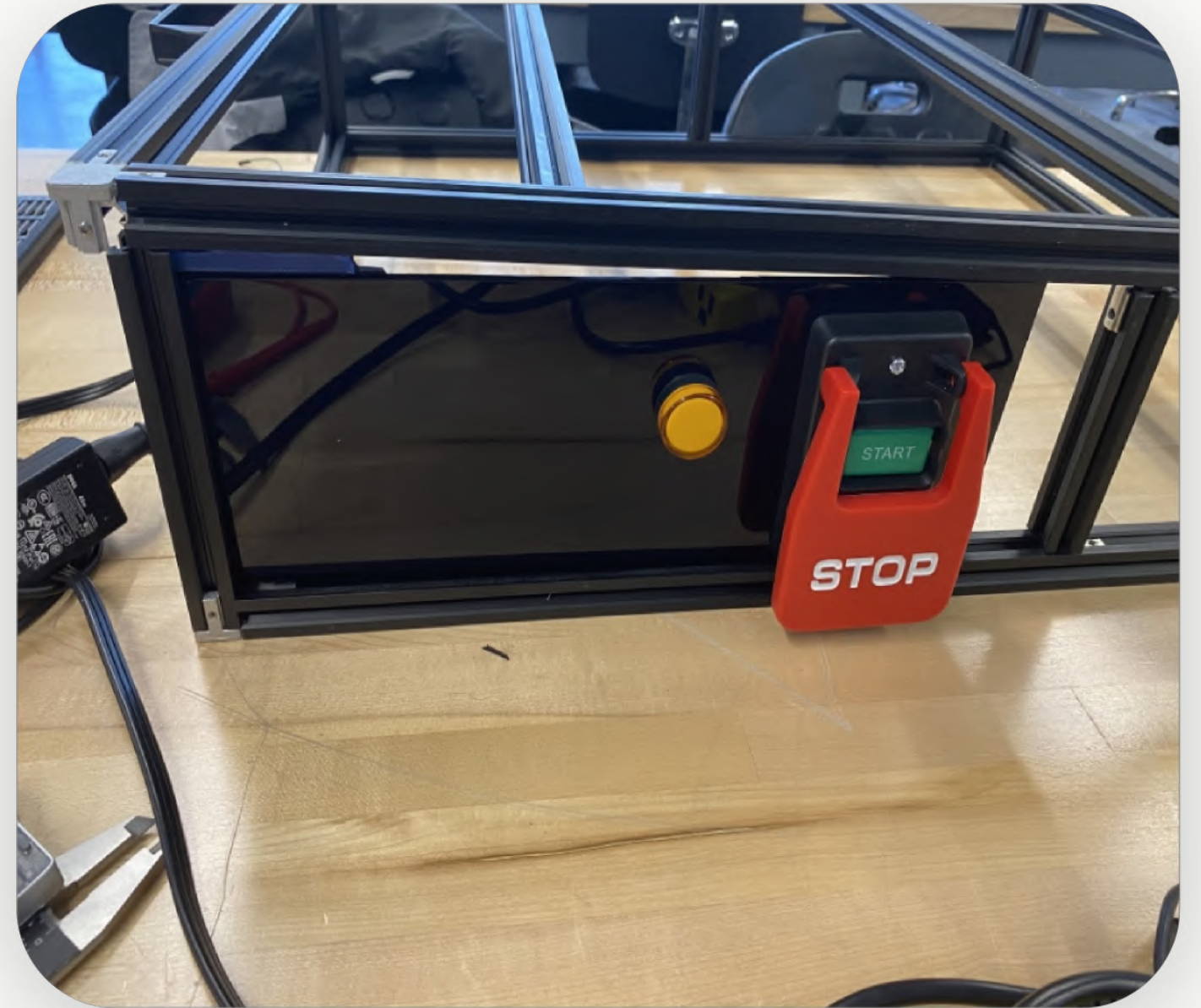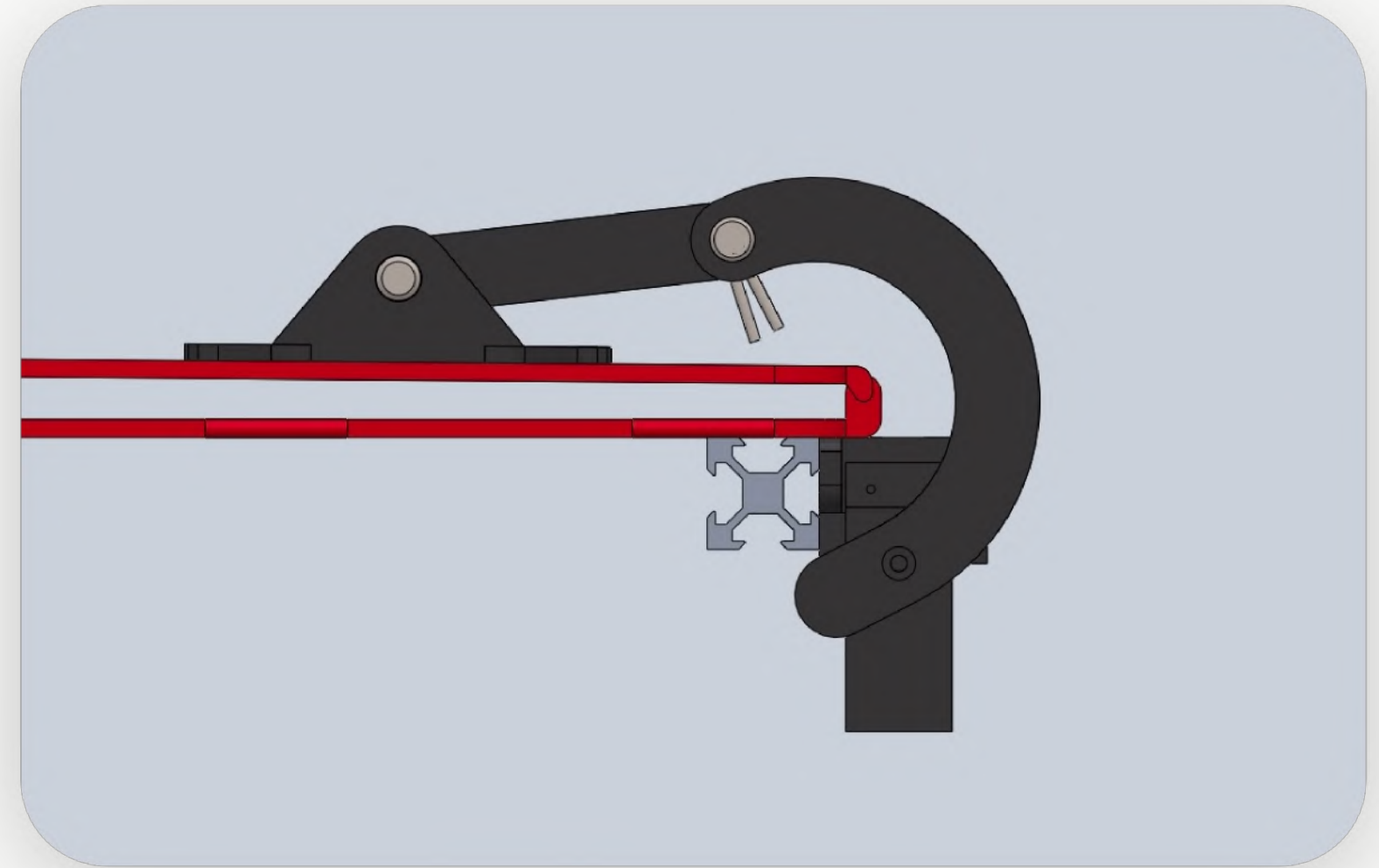
Housing and Frame Prototype

Hinge mechanics CAD model
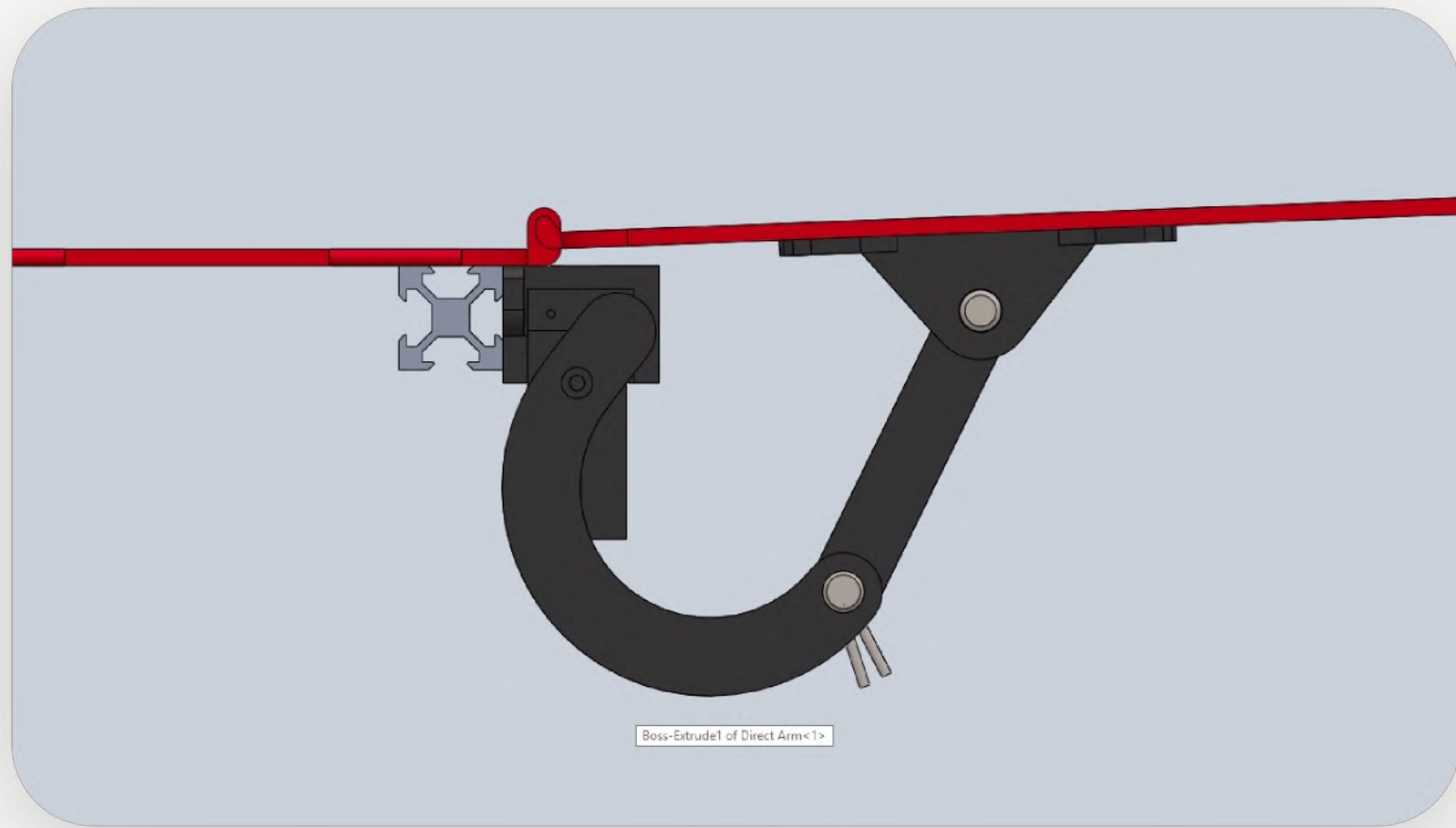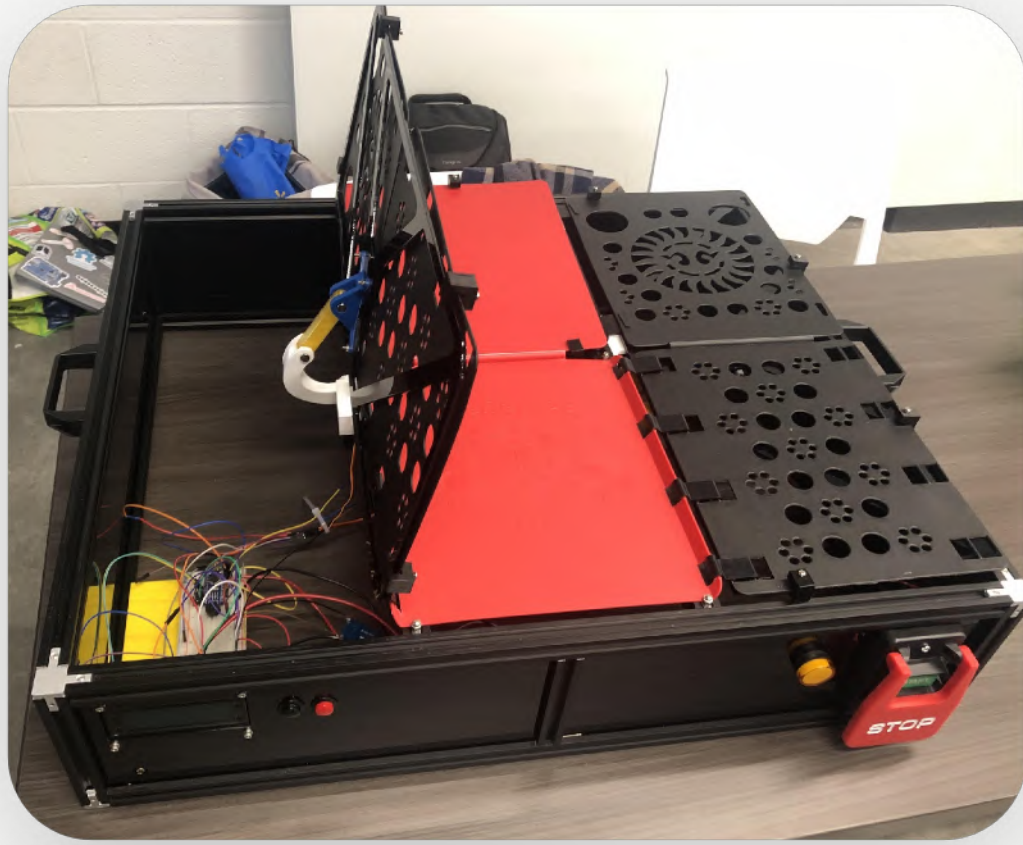
Final Product

Business Model

Foldamatics

Key Partners

- Schools and institutions for children with motor deficits
- Occupational therapists and special education professionals
- Manufacturers for electronic components and t-shirt folder materials
- App developers for the iPad app
- Distributors and retailers

Key Activities

- Product design and development (physical t-shirt folder and iPad app)
- Manufacturing and assembly of the t-shirt folder
- App development, updates, and maintenance
- Distribution and sales
- Marketing and promotion
- Customer support and after-sales services

Key Resources

- Engineering and design team
- Software development team
- Manufacturing facilities and equipment
- Funding and investments
- Intellectual property (patents, trademarks, etc.)

Value Propositions

- Empowering children with motor deficits to fold their t-shirts independently
- Easy-to-use, accessible interface through large physical buttons and iPad app
- Adaptable to various t-shirt sizes and thicknesses
- Enhances self-esteem and promotes a sense of accomplishment for the users
- Potential time-saver for caregivers and teachers

Customer Relationships

- Direct support through a dedicated customer service team
- Online community for sharing experiences, tips, and resources
- Regular app updates with new features and improvements based on user feedback
- Training and resources for educators and therapists to integrate Foldamatics into their programs

Channels

- Online sales through the company website
- In-person sales through distributors and retailers, including specialized stores for assistive devices
- Partnerships with schools and institutions for bulk purchases and program integration
- Trade shows and industry events

Customer Segments

- Children with motor deficits and their families
- Schools and institutions for children with special needs
- Occupational therapists and special education professionals
- Caregivers and teachers working with children with motor deficits

Cost Structures

- Product design and development costs
- Manufacturing and assembly costs
- App development and maintenance costs
- Marketing and promotion expenses
- Distribution and logistics costs
- Salaries for employees and contractors
- Licensing fees for patents, trademarks, and other intellectual property

Revenue Streams

- Direct sales of the Foldamatics t-shirt folder
- Licensing fees for schools and institutions to use the app
- Sales of accessories and replacement parts
- Potential subscription model for ongoing app updates and additional features

Pricing

| Costs	Sale Price	Operation costs	Profit
With everything included the cost of the t-shirt folder came to be $540 dollars some parts were donated, however operating at a scale would even things out.	Our competitors pricing similar yet more industrial products at $3000+ we can full-fill a market.	Calculated costs such as labour, renting the machines to preform what's needed to build in addition to some unexpected costs such as faulty parts etc.	$160 being on the high end, as we are dealing with a lot of easily faulty parts would bring out profit margins to %30 which on par with the industry
≈ $540	$1000	≈ $160	%30

Trials and Tribulations

- Trying to get the Bluetooth modules to work, we thought that we could use the HC-06 Bluetooth module at first, but it could not connect with iPads.

- So instead we switched to the HM-10 Bluetooth module, but for some strange reason although our devices could connect to the module, signals could not be sent to the module.

- Constantly changing the left, right, and center Servo degree values, to get a proper fold from the automated t-shirt folder.

- Soldering components incorrectly and having to resolder them.

- Figuring out how to program the LCD and testing the scrolling functionality.
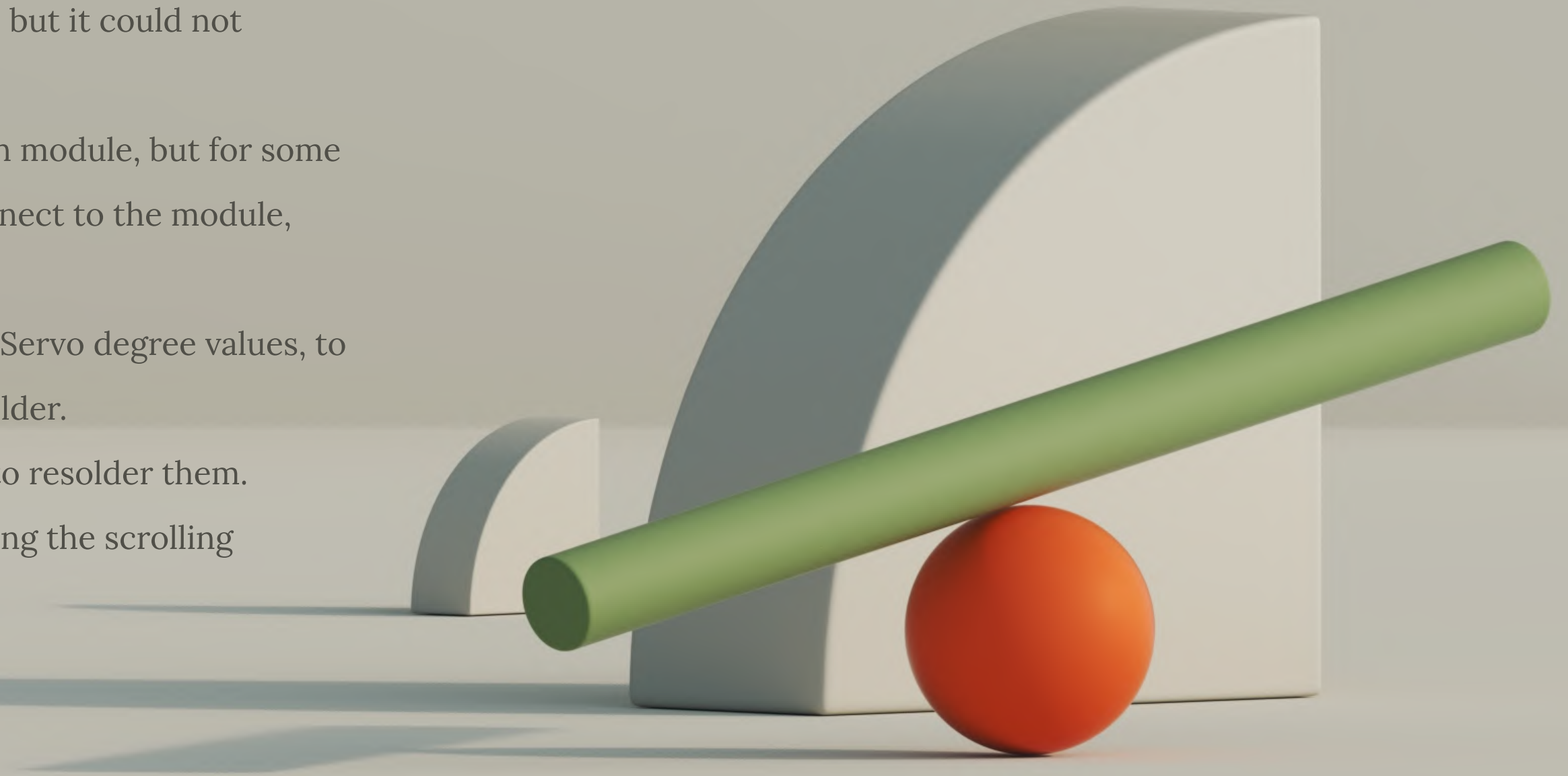
Next Steps

- Get the bluetooth module to read not just write

- Design a PCB board for the electronics instead of breadboard

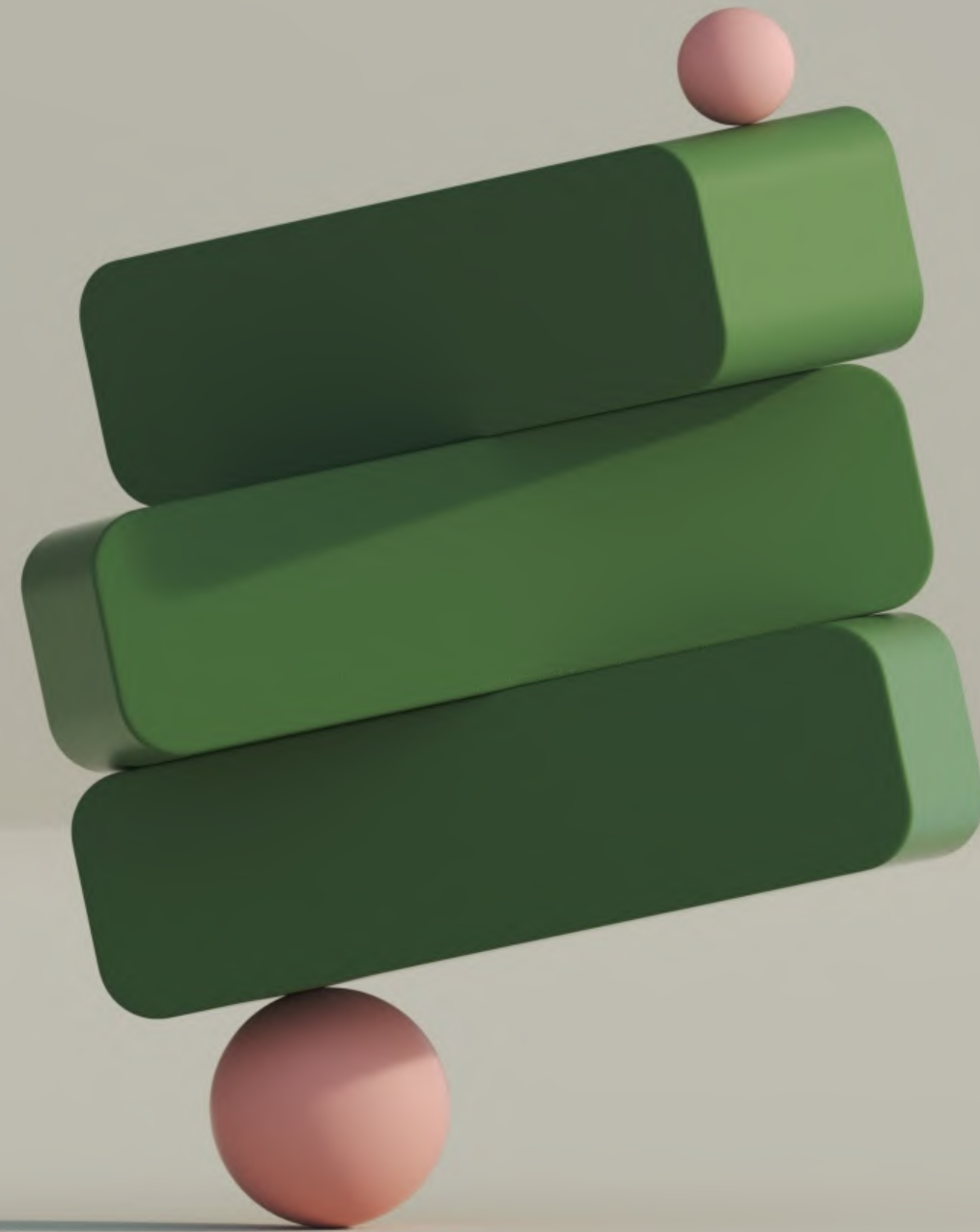- Give more control to the user in terms of speed, angle, etc.
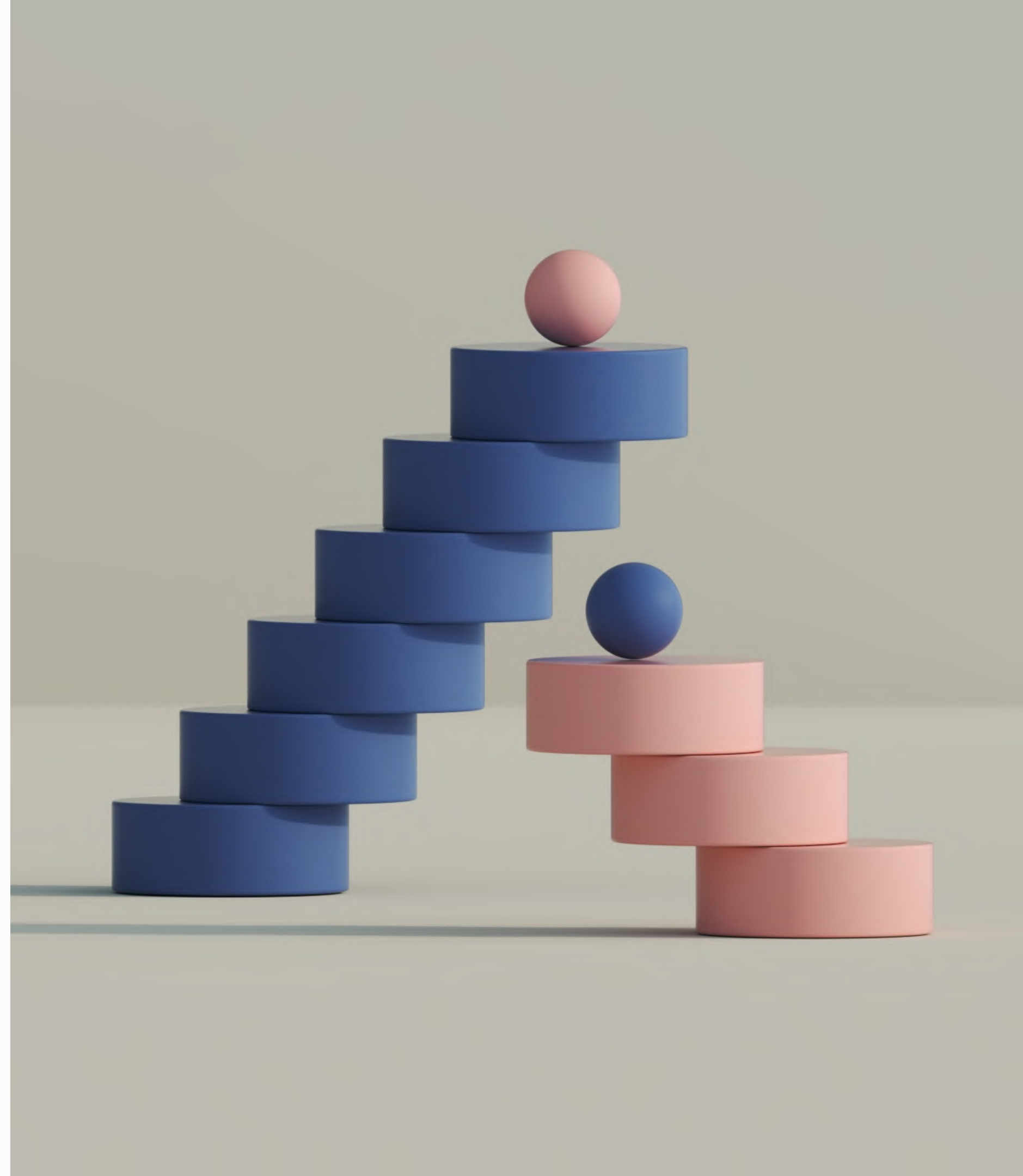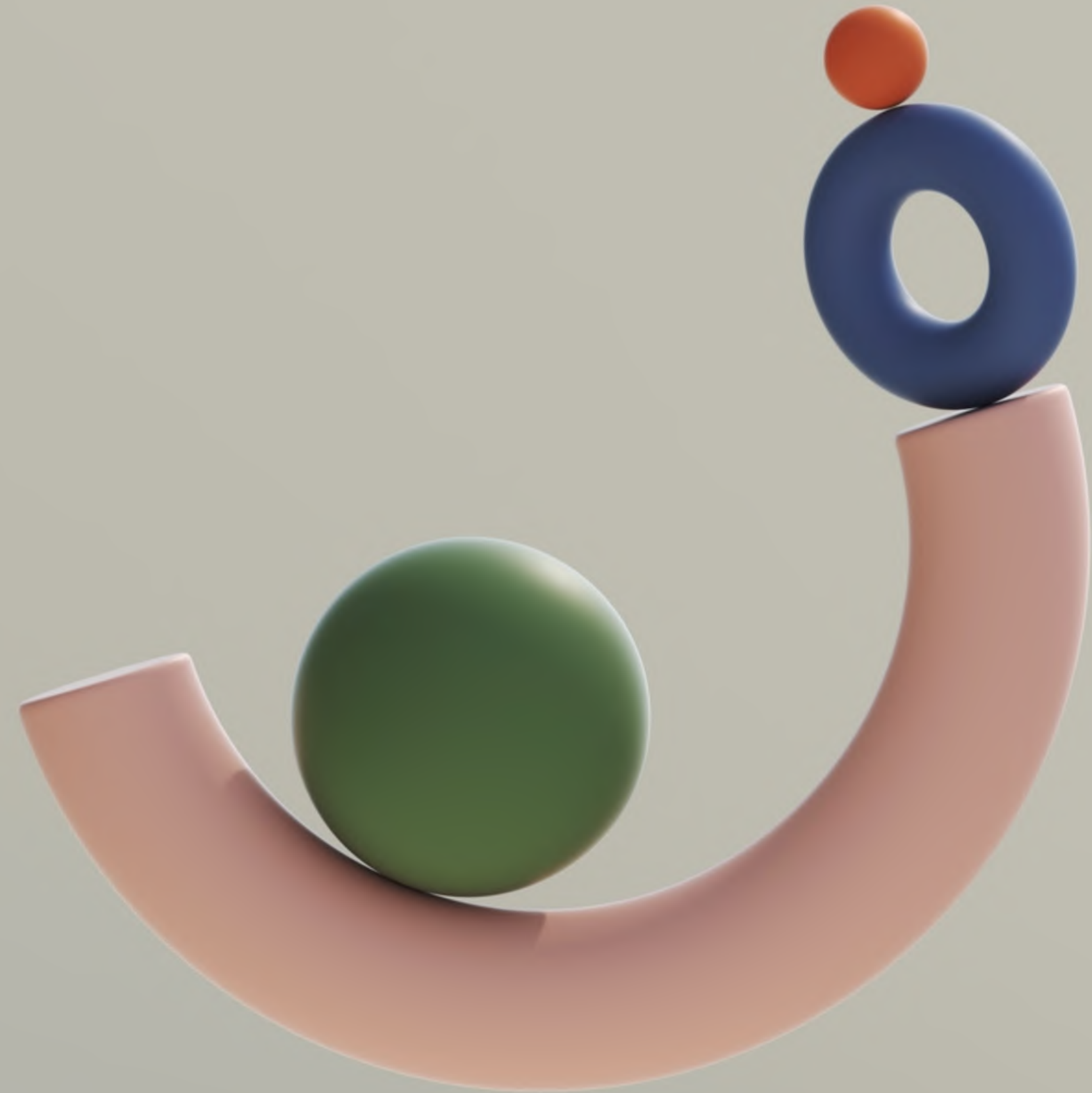
What did we learn?

To be part of a team and take an idea from a sketch on a paper to a functional prototype

- Project Management skills
- Collaboration/ Teamwork skills
- Learned about how to communicate with clients to get the information required to build prototypes
- Learned how to add design constraints for our product. (Ex. Design for Accessibility, Design for Safety)
- Learned how to make helpful prototypes that lead to the final prototype
- Learned about how to do benchmarking and target specifications
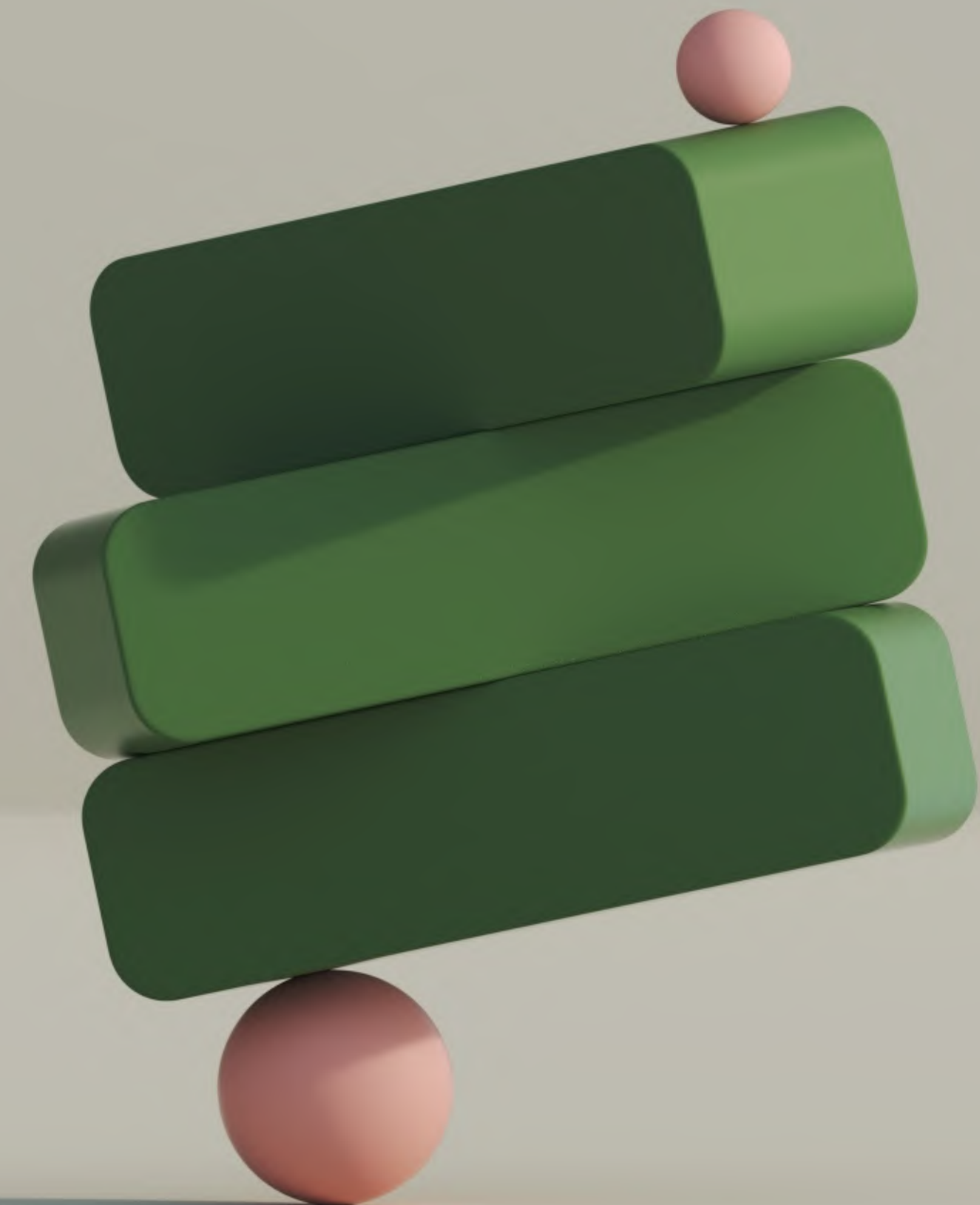
Questions?

Foldamatics

Thank you