

Project Deliverable F
-Prototype 2-

Group B12

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Abstract

In this deliverable, as a team, we were responsible for summarizing our clients feedback on the presented prototype and developing another prototype based on the feedback received. In addition, sketches and CAD designs of our latest prototype have been added as well as testing that has been done. Based on our clients feedback, as a team, we discussed how we can best update our device and implement all the different aspects that our client wants. Once a prototype was produced, different types of testing methods were then determined to optimize performance of our final prototype. Each test has a minimum score that the device is expected to reach to pass and be acceptable for usage. If the tool scores lower than the expected value then changes need to be made in that specific area to optimize the score. In addition to our latest prototypes, more focused prototypes will be developed to test out specific features such as size and colour. Prototypes including just a base will be printed out to test specifically for size and small strips will be printed out solely for the purpose of viewing the way different colours go together. The most important thing is that we test our design as much as possible so we can be aware of any possible risk and improve our concept to ensure the ideal final result. Moving forward our main goal is to keep our project plan on track and test our device as much as possible.

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Introduction

The goal of this deliverable is to present our clients feedback, prototype 2, testing, and an updated prototype. After presenting our prototype 2 to our client very informative feedback was received that was then implemented when creating our updated prototype. Once our prototype was produced, a list of testing was produced and executed to ensure an optimal design for our project. Expected test results were made based on target specifications and if expected scores were not met then it informed us as a team on which aspects of our design needs to be updated. Updates on our prototype are always being made and the presented updated version is what we are currently working on.

Client Feedback on Prototype 2

Components

- Needs more resistance in buttons and in the roller. Liked how they functioned though.
- Liked the different sounds made by clicking the buttons.
- Liked how we didn't have a top plate on the button cube but was worried about dust and dirt accumulating inside.
- When the different cubes were connected they were quite loud and the client would like us to try and suppress the noise a little bit.
- Prefers the 2 shape roller instead of the round roller (More resistance).

Cubes shape and size

- We should make it smaller(Currently 4x4x3 so maybe 3x3x3).
- The edges of the cube were sharp so we should make them rounder(Maybe like a 3D octagon).
 - Client can't flip sides with one hand very well(Too big and not round enough).
 - Client can't roll it around in her hand to get different uses from it.
- Make the cube thinner so she could hold it better while using it.

Textures

- Sort of likes the phone case texture but would prefer a different one.
- Doesn't like the honeycomb texture (Needs to be more aggressive).
- Likes the texture of braille (Could spell her name with it).

Additional Comments

- Liked the concept we used for the physical prototype.
- She liked the idea of a fidget spinner cube.
- Would like us to change the color but doesn't mind the colour we are currently using.
- Liked the magnets and how we used them.

In our next prototype we will definitely need to make the cubes have more rounded edges since that was one of our clients main complaints about our presented prototype. The next major issue was the size of our presented prototype, the client had a hard time rolling the cube in her hand and had a hard time using the components since she couldn't properly hold it. She also really stressed the fact that we needed more resistance in the components that we had since they weren't really helping distract her like she wanted. She also said she would like to change the colour of the cube since she wasn't that big of a fan of it.

Prototype 2

Below are images of our prototype 2 that was presented to our client. All feedback received was based on this prototype. It was very important that our client was able to use this prototype in person because we were able to receive very constructive feedback about the functional fidelity of the prototype. In previous deliverables CAD drawings were presented for our prototype but for this prototype a hand held function prototype was made for the first time which is a very big progression in our project. The main tasks for the construction of this prototype was the use of the 3D printer. After doing our first print we learnt very important lessons about the importance of supports while printing and how valuable time is since prints can sometimes take hours. Once we were done printing all the components (everything in purple is printed) we glued in the magnets and welded together the roller pin so it would stay in place. Adjustments were made as seen fit and the rubber wheels that were in the BOM of our previous deliverable were not used at all.

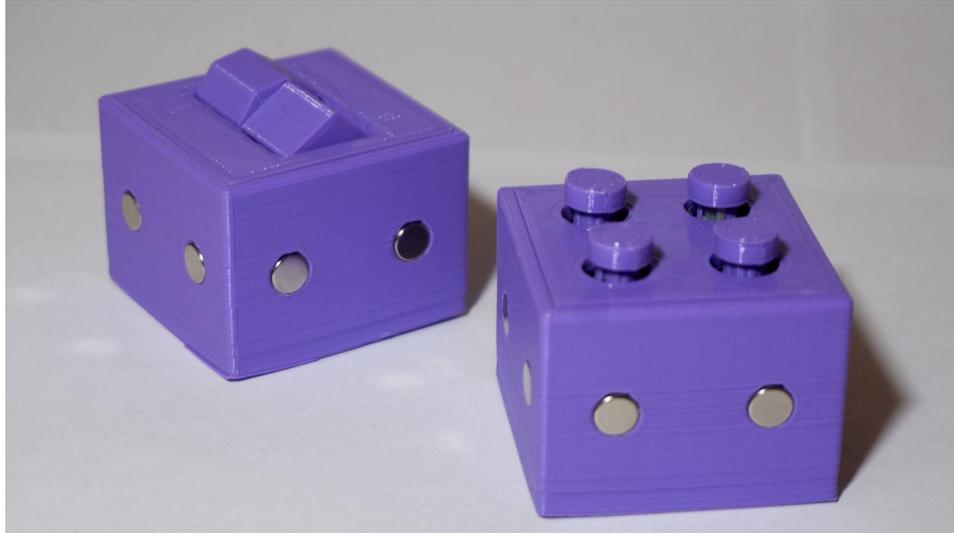


Figure 1: This is our button unit and roller unit with magnets on the sides so bases can connect to one another

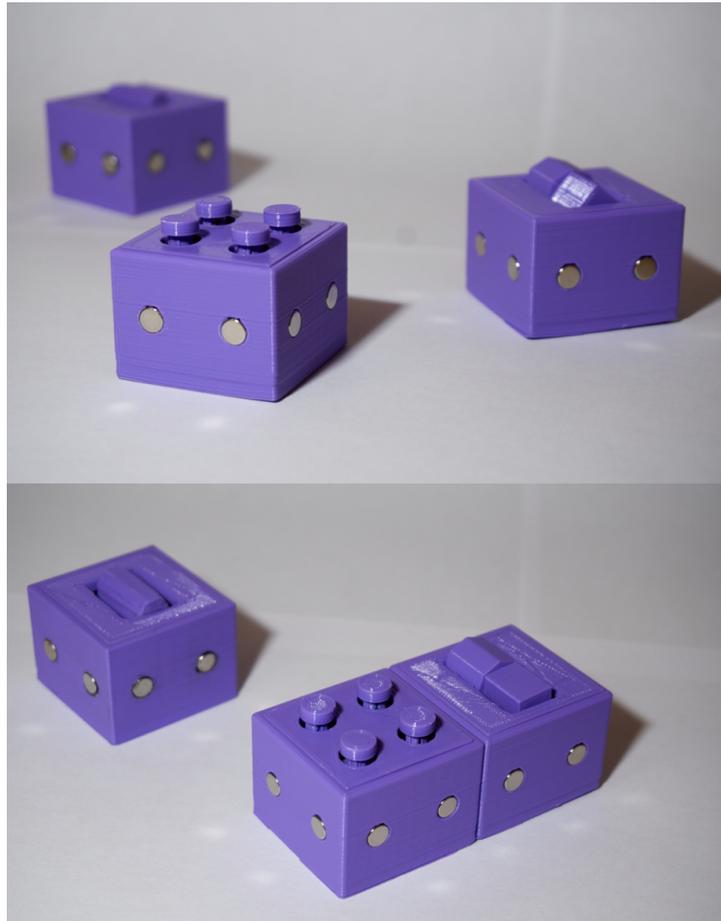


Figure 2: This is all three units we made so far. Picture on top shows when each unit is not attached to each other. The bottom unit demonstrates how each unit can snap together with the magnets built in on the side.



Figure 3: This is a closer look at the structure of our roller unit. It consists of a universal base, a cap which holds the roller.

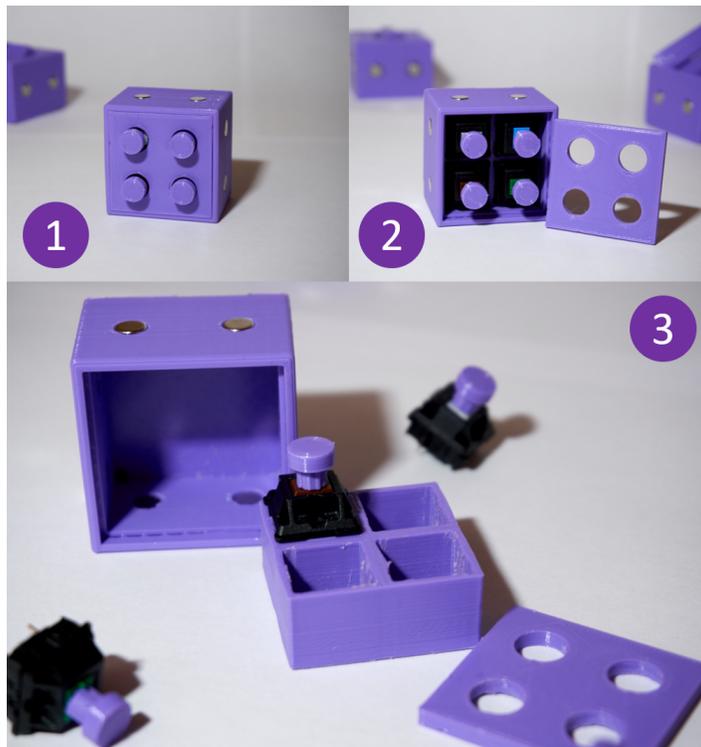


Figure 4: A closer look at the structure of button units. 1: the look of the unit. 2: The look without the cap. 3: the inner structure of the unit. It consists of a universal cap, the inner structure that holds four keys.

Updated Prototype

We met up with our client, got some constructive feedback from her which will improve our product. All the changes made below are based on the feedback received which was stated under 'Client Feedback on Prototype 2' of this deliverable. Moving forward we will be printing this design shown below and presenting it to our client to see if she likes the improvements. Instead of printing out the cover, adding in the components, and gluing in all the magnets, as a group we decided it would be best if we simply printed a couple bases of different dimensions to see which size best suits our client. Once the perfect size has been decided we will be able to print out the rest of our components in ease based on the given dimensions.

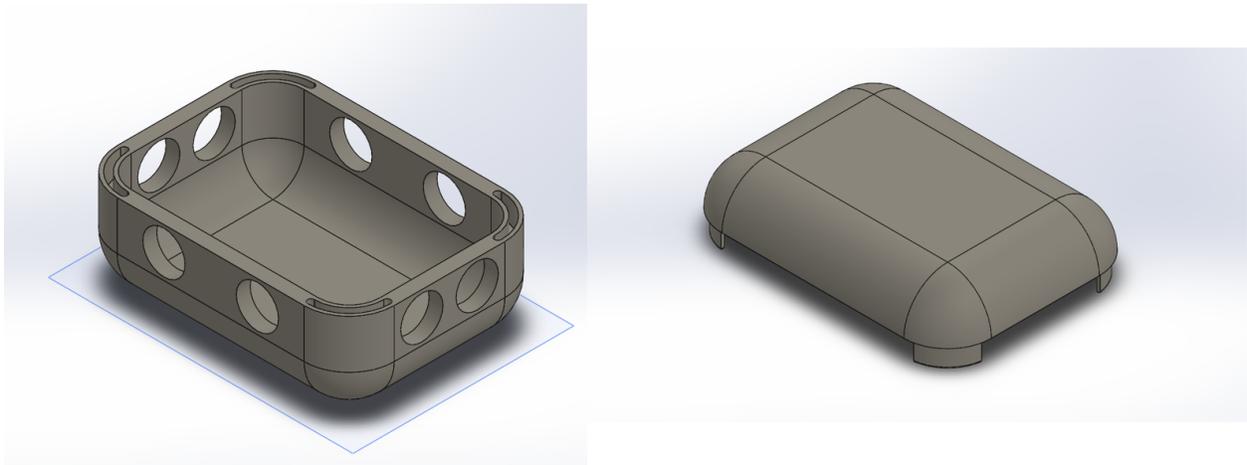


Figure 5: This is our new design to the prototype. The edge was rounded more so it feels better holding it. The size was 60% smaller than the previous design.

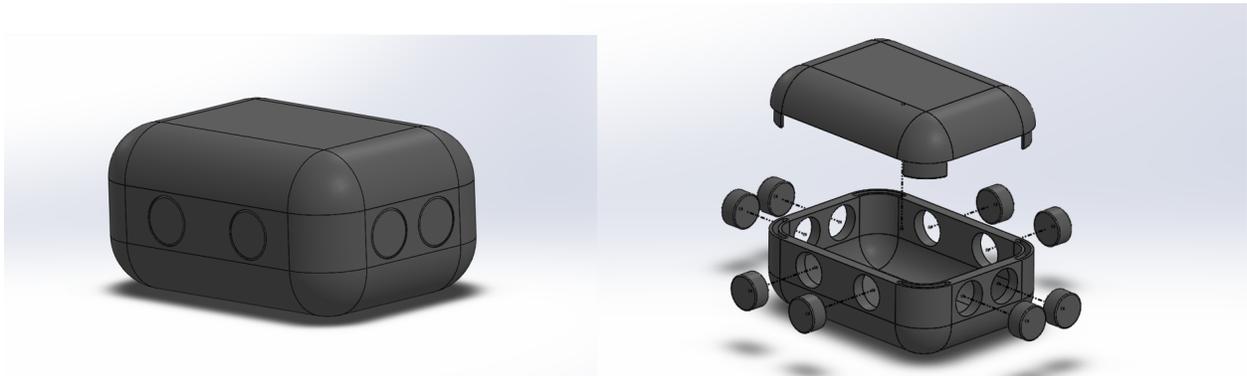


Figure 6: Exploded view of our design where the casing has been redesign

Above in Figure 6 you can see we redesign the casing. The cap is no longer a flat surface. The newer design of the cap allows it to blend into the shape of the cube better. One other change we made was the connection pin of the cap and the box. Instead of the regular pin we initially had, a longer design allows it to fit better with less play between two parts.

Prototype Testing, Analysis and Evaluation

This prototype produced for this section of the deliverable has been adequate to what was intended. Our prototype for this project was completed in time and matched the criteria that was given. We have successfully created three separate pieces, each one of them contains a different fidget tool on them, and can connect to the other pieces if needed.

Category	Need	Expected	Actual
Primary	Buttons with varying resistances	3-6 buttons of varying resistance	Four buttons, resistance is relatively weak, needs improvements
	User-Friendly tool	Simple to use and understand components	Easy to understand and used as reported by the client
	Sleek, clean-looking device to be used in a professional environment	Nice smooth sleek rectangular device	Edges are a bit too sharp and was uncomfortable
	Wide range of the resistance	Able to handle weather and damage	Holds together when dropped, weather testing not done
	Easily portable	Fits in the palm of the hand	Currently up to three pieces can comfortably fit in the client hands
	Low cost (\$20 max)	Cheap and affordable	Currently only a fraction of the resources spent are used for this prototype
	Maximum size of a phone	Little larger than the palm of a hand	Each piece is the size of two fingers
	Monotone colours	Simple monotone	Purple, client does

		colours	not find the colour pleasing
Multiple parts	Multiple different attachments	Several different pieces	Three different pieces, each with different tools on them

Table 1: Table of testing that was done on our prototype along with the evaluation and how it tested based on our target specifications

Project Plan

The following diagram is the project plan Gantt chart created using Wrike detailing every single deliverable over the course of this project. The upcoming deliverable that we are working on has been expanded as well as the following deliverable as examples to show job breakdown so that each team member of the team is contributing equally and knows what part they are responsible for. To ensure completion, each sub task is tagged with a team member and deadline. Down below you can see that we are currently working on summarizing our client feedback, and creating sketches for an updated version of our. Although there are many tasks that overlap, since the majority of the tasks are in progress they are expected to be completed earlier than the time allocated so for that reason other tasks were given. Based on our weekly meetings tasks are assigned and edited depending on where the individual is at for that task.

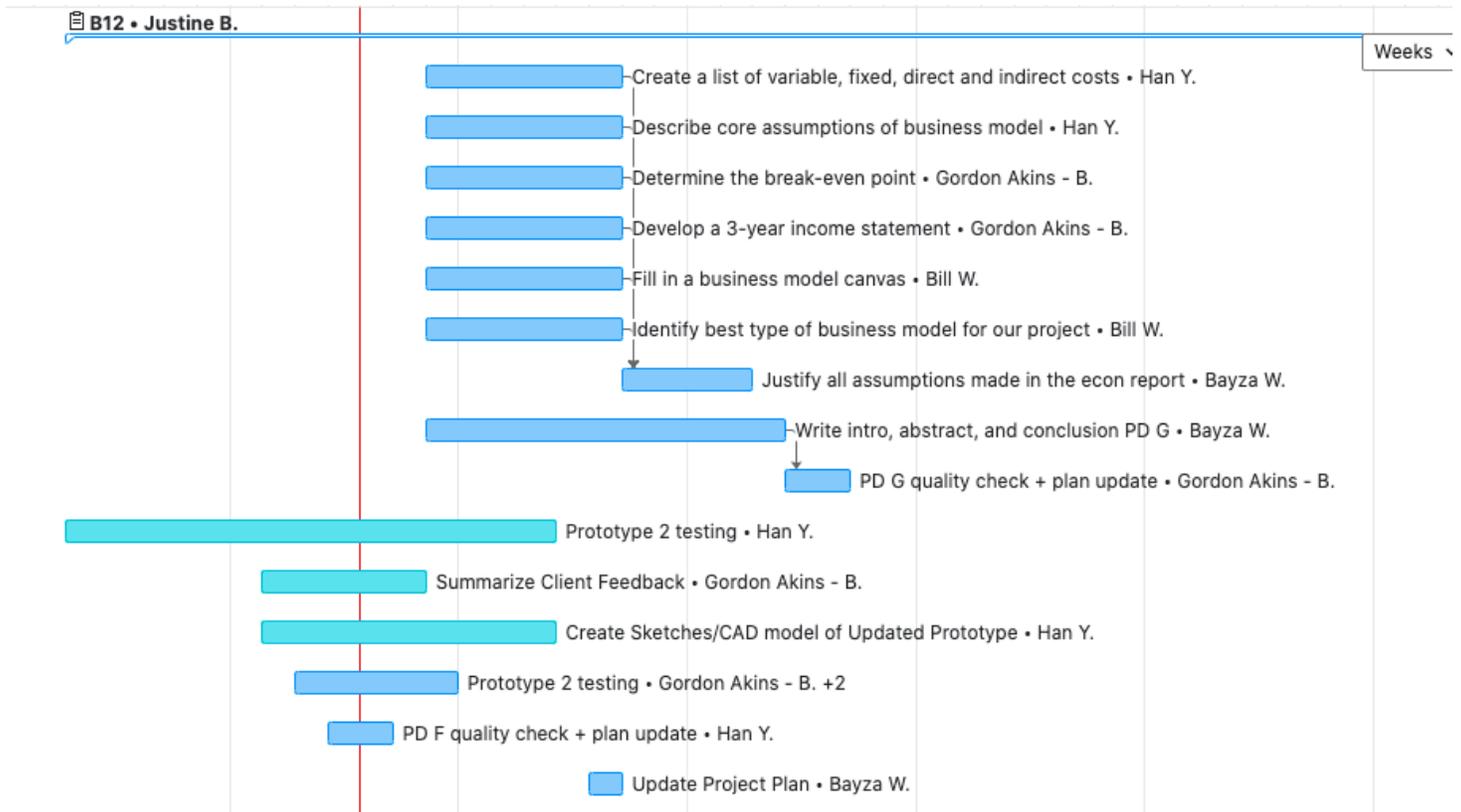


Figure 7: Updated project schedule including the task breakdown for the current deliverable as well as the upcoming deliverable

Conclusion

In conclusion, our team has taken a lot of time to hear exactly what our client had to say about our prototype 2 and implement the feedback that was given to produce a prototype that will successfully meet all of her requirements. produce a detailed concept of the final product. With a list of target specifications developed in the previous deliverable our group was able to create a list of tests that needed to be done along with their expected values. We are now ready to proceed to the next step of the project which is producing a further developed prototype. We will continue to keep in contact with our client to ensure that our project is progressing in the direction that our client is satisfied with. All in all, if we ensure that we are following our detailed project plan, produce as many prototypes as we can, and continuously test our device we should be able to successfully present a function prototype to our client.