

Project Deliverable D: **Detailed Design and Prototype 1**
GNG 2101 – Intro. to Product Dev. and Mgmt. for Engineers
Faculty of Engineering – University of Ottawa

GNG2101, Section # Z
Team # Z2

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Introduction

During our second meeting with our client and a potential user, we explored 4 designs; 2 were portable and 2 were stationary. Although our client and the user found our designs interesting, they also gave us a lot of constructive feedback on our designs. They pointed out that our designs may be too complex and that they would prefer that we keep it simple. After a long and in-depth conversation, our team now has a deeper understanding of our clients' needs and preferences, allowing us to start designing a prototype.

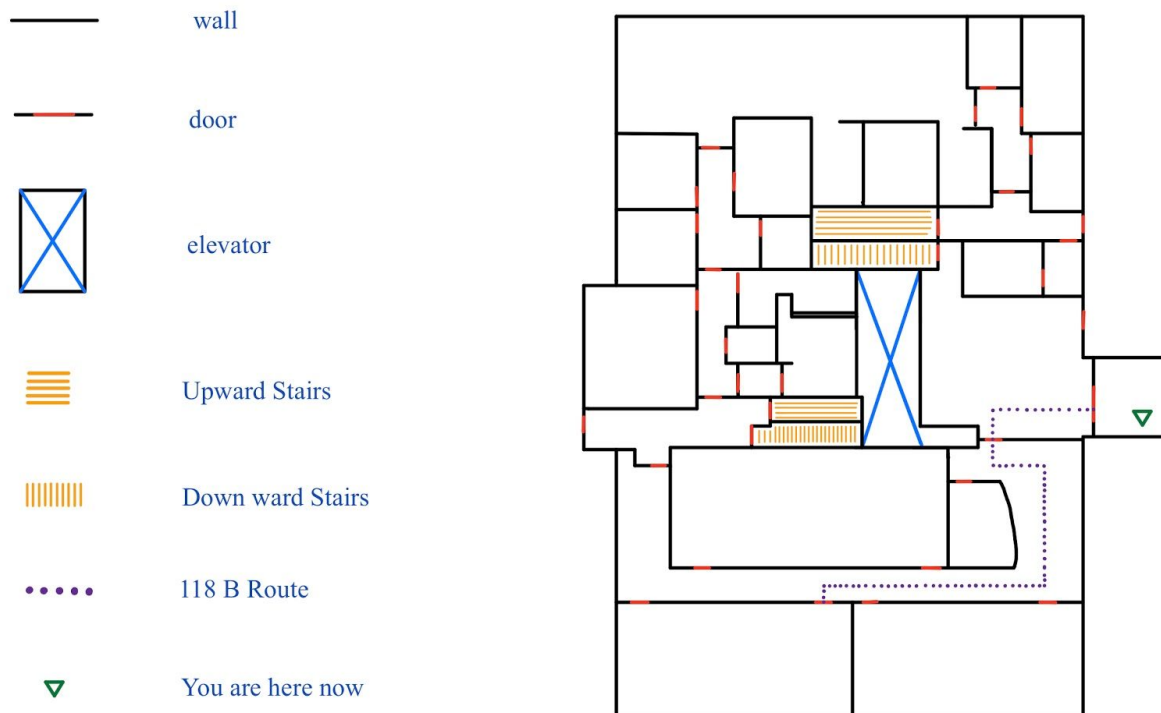
Client Feedback during Client Meet 2

- The map should have as little detail as possible.
- Using braille indications will not benefit many users considering the fact that only 4% of visually impaired people can read braille.
 - There are also many different versions of braille and languages which makes it difficult to establish a universal language for our map.
 - If braille is used, it can only be used in the standard font size in order for it to be legible (which is quite big).
 - Also, if braille indications are being used, they should be in both French and English.
- Tactile maps with an audio component are the most effective at guiding the visually impaired. Audio should definitely be integrated into our design if possible. Inexpensive audio tags can be purchased and be added to our map, giving our users audio directions.
- Textures can become very confusing, very quickly. Only a very limited number of textures should be used.
- Too many surface heights can also easily lead to confusion.
- Some legally blind users can still see colours with a lot of contrast. Using colours and contrast will make our map much easier to read.
- We should not rely on a single way of presenting the information on the map (only braille, textures, audio, etc). We should instead try to integrate various components into our design.
- We should aim to design a 40 by 40 map.
- A stationary map may be better. Using a tactile map requires both hands and this can be challenging for visually impaired users who tend to have a cane or assistance dogs that they need to manage.

Aspects that Need to be Changed/Improved in our Design

Our legend needs to be simplified. We need to make our map as uncluttered and simplistic as possible. We need to find a way of effectively integrating braille so that it can appeal to the biggest possible audience. We really need to consider having an audio component. We have to steer away from a texture based map and steer towards a map that uses different ways of communicating information. We need to focus our design (either fully portable or fully stationary).

Detailed Concept Design



In this map design, the black lines are elevated and the red lines are elevated even more. The blue cross will be in a different texture. Textured lines will also be used to designate staircases. The legend will be printed in bilingual braille, and at the side, there will be audio tags with bilingual recordings.

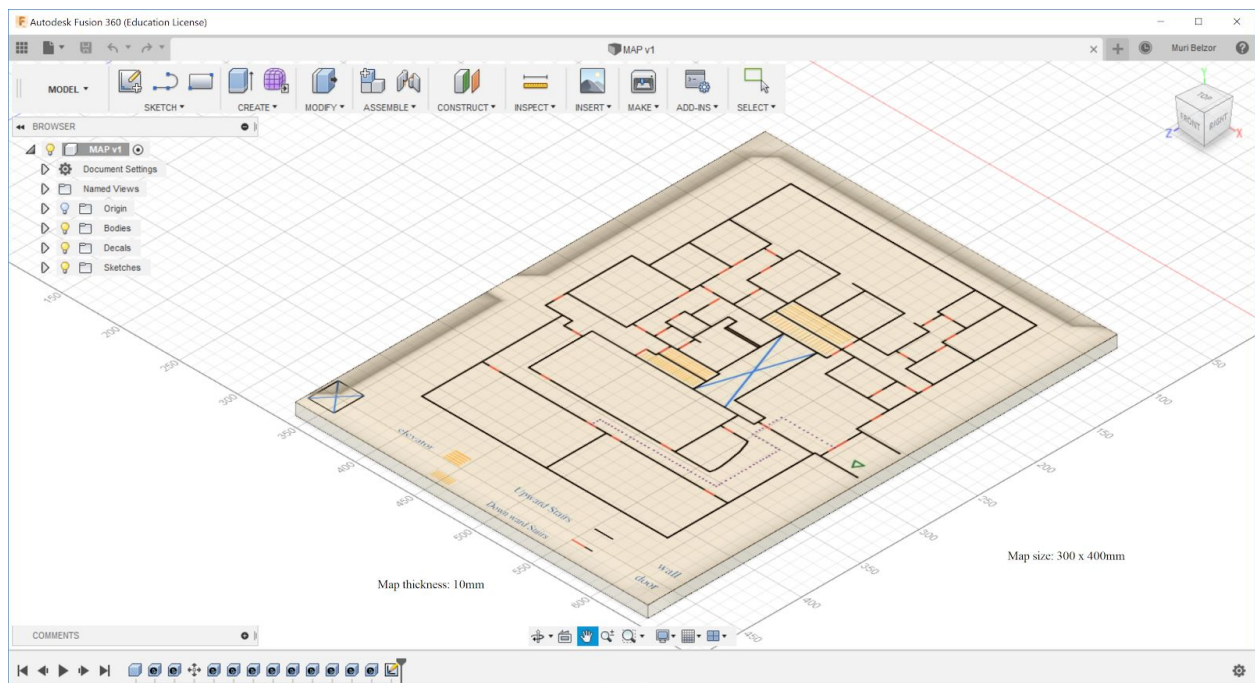
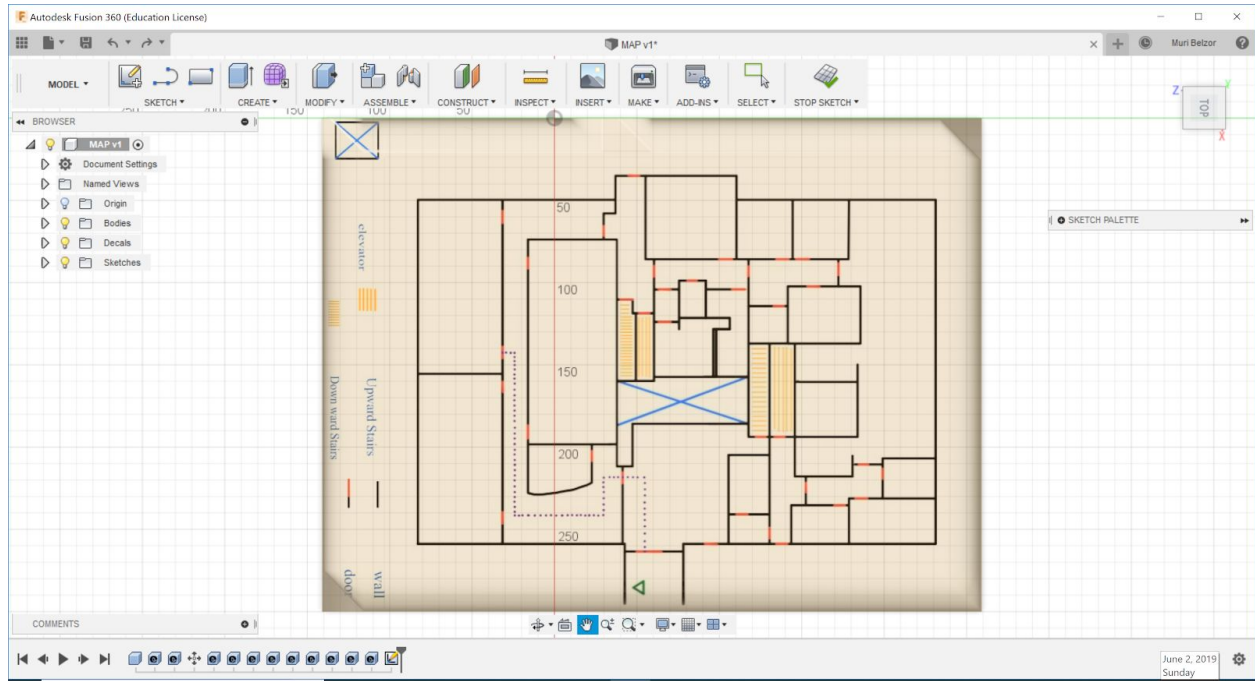
Our map has two main subsystems: the legend and the map. Both subsystems are joined together on the map to create a single interface.

Critical Product Assumptions and First Product Prototype

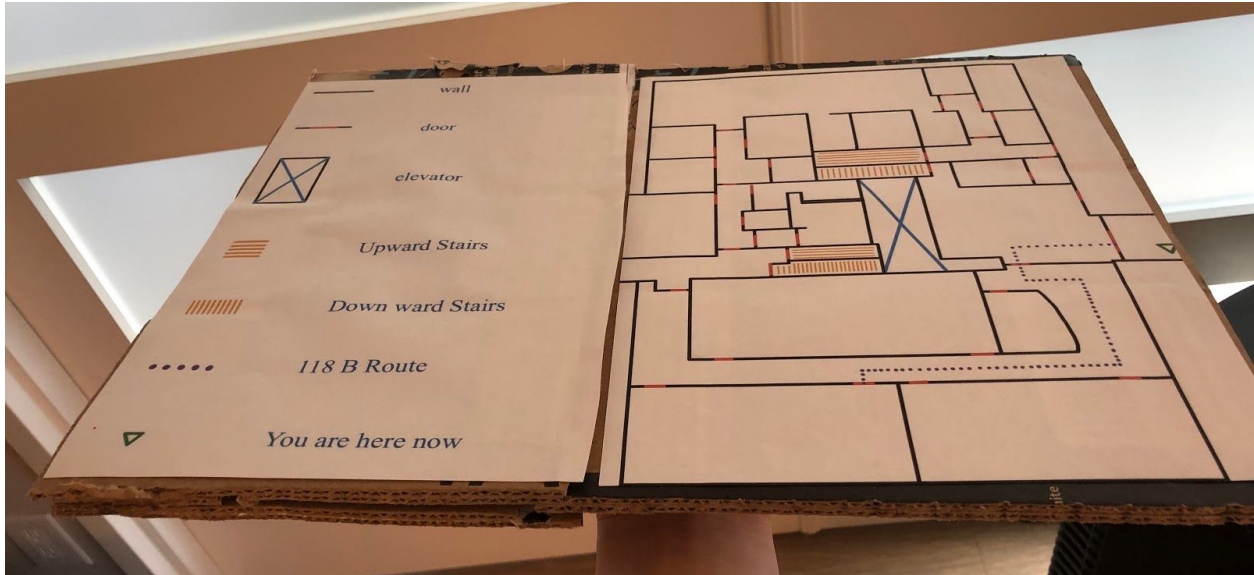
Our most critical product assumptions are that we should use a mixture of techniques to create a tactile map that will work for the majority of people with visual impairment. These techniques will include using a few textures, using an audio component, adding bilingual braille, and using contrasting colours. We will also assume that the product will be made using 3D

printing. 3D printing will allow us to create a map with contrasting colours, various textures, and bilingual braille all while using durable colour plastic. As for the audio component, we will assume that audio tags will be most effective as it is what was suggested to us by the user.

Prototype Documentation and Function



*All dimensions are in millimetres.



* Physical Prototype 1 Built out of cardboard and paper

The purpose of our prototype is to test whether or not the legend and the map are clear and understandable. We also want to verify that the designated path to room 118B is easy to follow. Finally, we want to check that it satisfies our acceptable/target specifications and fits the needs of our client.

Prototype Testing and Performance Evaluation

	Design Specifications	Relation (=, < or >)	Prototype One Value	Target Value	Units
No.	Functional Requirements				
1.	Weight	=<	1	5	kg
2.	Dimension	=<	28 x 39	50 x 60	cm
3.	Thickness	=<	10	30	mm
5.	Writing size	=<	15	15	mm
6.	(margin of error)	=<	2	2	mm

Compared to our target specifications, our first prototype is lighter and smaller. This is due to the fact that we adapted our model according to the new information our client provided us; such as wanting to have a simplistic map.

6. Outline what your team intends to present to your client(s) and what information you would like to gather at your next client meeting.

Our team would present prototype 1 to our client, let our client take a look at it, and ask for feedback. We would like to ask our clients if they think the size of the map fits their standards, is the information too cluttered, and would the levels of elevation be too overwhelming.