Posture +

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Problem Description

The average American sits for thirteen hours and sleeps for eight hours a day, leading to an extremely inactive lifestyle that can lead to problems later in life. These can range from obesity, increased blood pressure, and an increased risk of cancer. This has created a problem where people have to sit down to do their work efficiently, yet they must also remain physically active to prevent the aforementioned symptoms. Should this continue, a health epidemic might spread of people living short lifespans and a population with weaker legs, filling hospitals that might not be able to keep up with the large amounts of patients with high blood pressures. As a team, we hope to solve this with our product to help people save the time and money of going to the gym, as people have to drive to the gym in order to receive the doctor recommended two hours of muscle training a week. Our chair will remind its users that they have been sitting for a long time

Decision Matrix

Criteria:

Uniqueness/Creativeness

- 1-5
- Ask “Has this already been invented?/Are the improvements on this product necessary?” to avoid creating a repetitive design.
- 1 being the least unique/creative and 5 being the most unique/creative

Relation to Field of Study

- 1-3
- How much will our current knowledge (taken from both current classes and previous classes) aid us in our product’s construction?
- 1 being no help and three being useful

Feasibility

- 1-4
- If this is even possible, how likely are we able to produce an actual product line provided the money and resources.
- 1 being probably not and 4 being definitely

Marketability

- 1-5
- Can we sell this and how much money can we make off of this?
- 1 being we can’t sell this at all and 5 being we can make a lot of money off this idea

Usefulness

- 1-5
- Is this item needed/makes life, generally, easier
- 1 being not at all and 5 being a huge difference

Matrix:

	Uniqueness/ Creativeness	Relation to Field of Study	Feasibility	Marketability	Usefulness	**Total**
ICBM Defence System	5	2	1	2	5	15
The Better Microwave	5	3	3	2	5	18
The New Cutter	2	1	5	2	3	13
Smart Chair	3	4	3	4	5	19

Final Design:

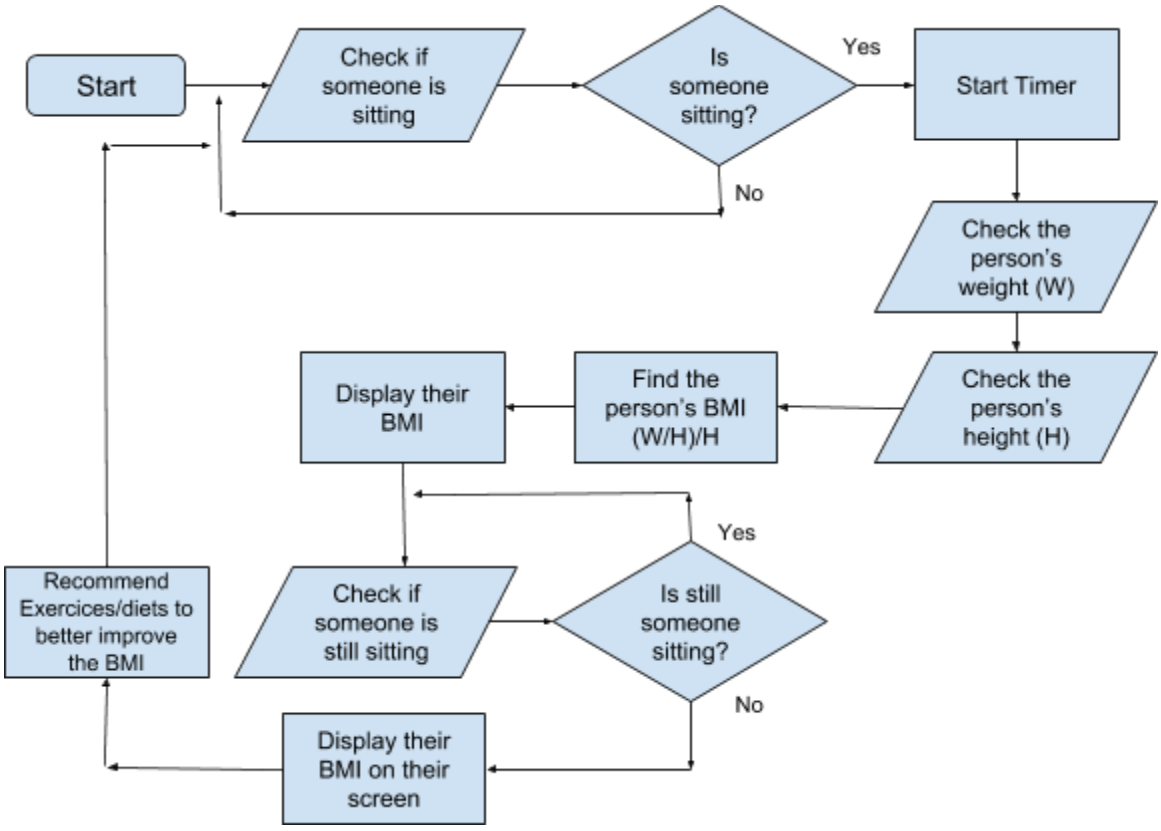
We decided on building the smart chair for our entrepreneurship project. Both the better microwave and the New Cutter we believe were not creative enough. The ICBM Defense System did meet the originality prerequisite, however it was too improbable to do as a project. The chair gave us the best of both worlds: and original idea that was still grounded in reality.

Research Summary

Chairs that monitor aspects of health do exist. However, nearly all of, if not every single one of, these products is designed to be used in a hospital or other medical setting. Because of this, they also don't record much of the information that our proposed design wants. The first device that we found, the EarlySense Chair Sensor, did not meet several of the problems we defined. Since it was designed for use in hospitals, it only monitored the user's pulse, breathing rate, and whether or not they were getting off of the chair. It was, however, able to do all of this through just the bottom of the chair. We would use this technology and expand upon its capabilities to also monitor the user's weight, BMI, and still keep the original functionalities of monitoring pulse and respiratory rate. Secondly, the chair will incorporate ergonomic design elements from several existing products to make the chair as comfortable as possible for the end user. Another product with functionality close to ours is the Axia Smart Chair, an ergonomic chair that alerts the user when they are sitting improperly. It does this by having parts of the chair vibrate to alert the user when their posture is bad. Again, this technology would ideally be embedded into our own design, making the ultimate health chair. When polled, about a third of people reported spending over 10 hours a day sitting, and in most cases it's unavoidable work, school, or homework. In addition, over 60% of people surveyed wanted to buy an ergonomic chair, and just over half were willing to pay for a service to improve their health. Our research showed that the average ergonomic chair would cost anywhere from $100-300, and it was definitely possible for them to go higher.

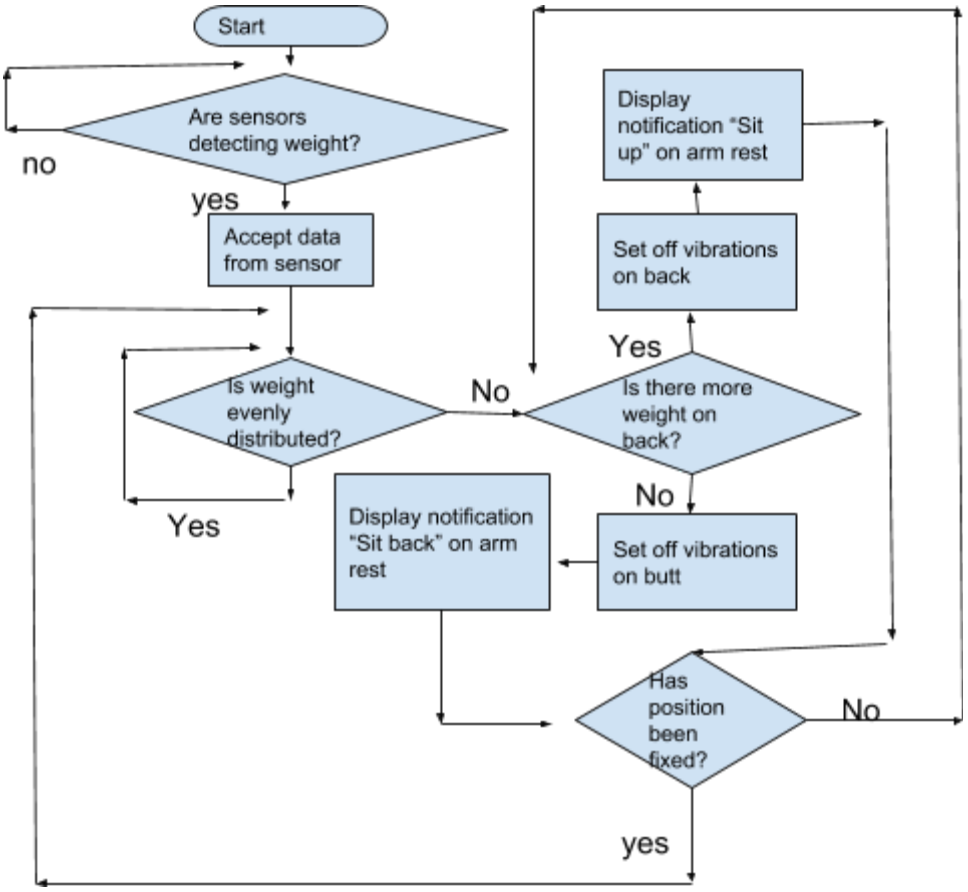
Flowcharts

BMI Display Flowchart:



Flowcharts

Posture:



Key Contributors: Rehan

Throughout these two weeks, I have primarily been tasked with developing the code for the project assisting in documentation, and developing a consumer survey. Being the primary programmer in the group, I developed the actual code and assisted in the development of the flowcharts. Due to the lack of an LCD screen, I decided to use Netlogo and use it to simulate what the screen on the chair would display, such as how long they would be sitting and their BMI. My program also gives simple recommendations to the user based on BMI input, such as those related to their diet and what kind of exercises they should be doing. This did require me to do research however, and through that I found out muscle training, not cardiovascular exercises, was the best option to burn fat and increase cell metabolism. The consumer survey was also made by me, and it was to collect data on how much people sit on a day as well as what price they would prefer. This has enabled our team to make changes to our design based on the feedback of respondents. Finally, I assisted in the documentation and wrote the problem description to allow my groupmates to model the chair in Autodesk inventor.

Key Contributors: Celine

During these past couple of weeks, I have worked on multiple parts of the final project. In the beginning of the project, I created the concept sketch of the chair, as well as the idea of putting the monitor on the armrest. I also worked on helping with the final design of the chair. During the construction of the project, I worked mainly on the flowcharts, starting with the idea as one large program/ flowchart for the entire chair. At last I ended up working on the two main flowcharts as seen in the documentation. Towards the end, I helped create the slides for the presentation and the “Work Cited” page. Finally, I worked on the logo on the first slide of the final presentation, creating concept sketches and the final design

Key Contributors: Daniel

My main task for this project was the Inventor models and some of the documentation. On the first day of our project, I set up the document according to previous projects. Then, during the proceeding weeks, I worked on the models. Most of my models are static as it was up to my teammate to constrain them. I did however had to constrain the back of the chair, unlike the rest of the files, due to complications. However it was and is treated like a singular piece. Most of the design process for the pieces were fairly similar, however one utilizes the decal tool to simulate the screen that the product would have. I took a break from Inventor about half way through to work on one of the flowcharts. Although it is a simplified version of what will be accomplished with the final product, it will be used as a starting off point for the actual programing. The rest of my time was spent making subtle changes to the previous parts to perfect them for the final product picture.

Key Contributors: Aaron

For this project, I was the project manager. At first, my job was keeping in constant contact with all of my group members and assigning them responsibilities. Later, while waiting for the Inventor parts to be finished, I did research on prior solutions, found out how making our chair would be possible, and figured out the basic functions of our chair. I then put together the research summary, and began assembling all of the inventor files I was given. Modification of the parts and assembly continued until the last day. I rendered all of the pictures for Inventor, and finally uploaded all of the parts and images to the drive folder.

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