Human Exoskeleton

Team J

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Alroumi Alenezi – 02.20.2017 – Lerner-Exoskeleton-Mount

Project Description

- The project is about designing an Adjustable Human-Exoskeleton Mounting Interface.
- The design should provide assistance to individuals with neuromuscular disorders.
- The design should help to improve walking biomechanics in the individuals.
- The design is expected to provide better services compared to the existing designs.

Importance of the project

- The project is important because:
  - It improves the currently being used designs.
  - Helps in eliminating the ineffectiveness of the existing designs.
  - Benefiting the health care industry, specifically departments dealing with neuromuscular disorders.
  - Helps in practically practicing the theoretical learning skills throughout the course.

Client's Information

- Zach Lerner, Ph.D.
- Director of NAU's Biomechatronics Lab.

Background and Benchmarking

- Engineers have always been interested in designing devices to assist effectiveness in other professions.
- Due to such interests, engineers have developed different kinds of exoskeletons for lower limb, upper limb and body assistance.
- To further make them function more effectively, better and more effective designs have been developed over the years, and are still being developed.

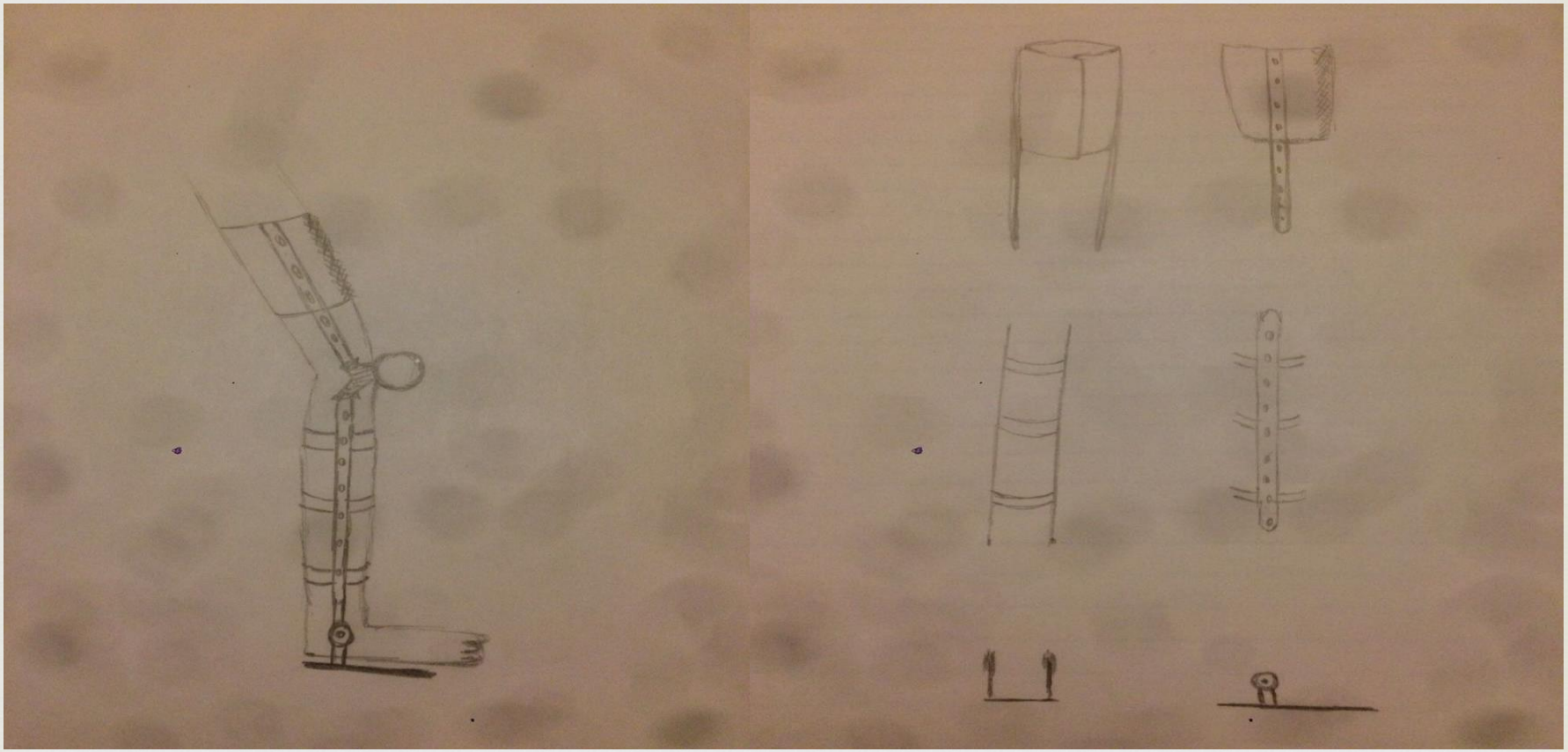
Existing Designs

- The ReWalk Exoskeleton
  - Provides powered knee and hip motion.
  - The system is controlled using an on board computer that includes motion sensors.
  - It mimics the gait pattern of able-bodied individuals.
- The Vanderbilt Exoskeleton
  - Assist users in performing the basic motions, including walking, standing, sitting, as well as walking up and down stairs cases.
  - Provides a modular-based design easy to assemble.
  - Includes two different brushless direct current motors used in actuating the knee and hip joints.

Customer Requirements & Weightings

- Design requirements
  - Should be adjustable to fit children between 5-12 years of age.
  - It should be lightweight.
  - Should use soft fabric that does not cause irritation.
- Customer requirements
  - The size of it should fit a 7 years old kid with a normal height.
  - The material should be strong and the system should be easy to install.
  - Need to have simple tingle on the foot portion.

Design Sketches



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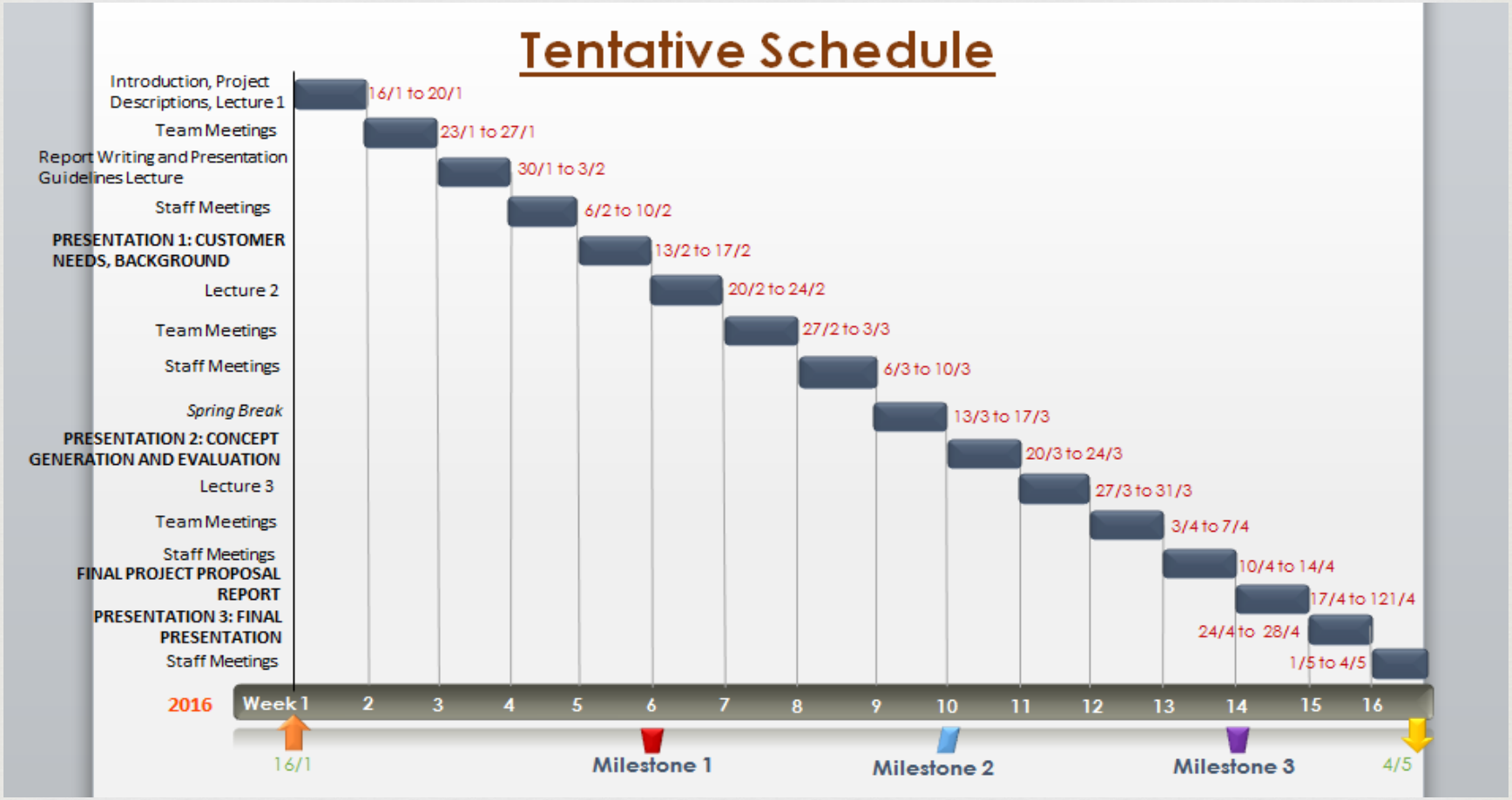
Schedule and Budget "Schedule"



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"Budget"

Our Budget in this project is 500$ funded by Dr. Lerner to design the system(s).

- Estimated Cost :

1- Materials (40%)

2- Advertisment (20%)

3- Manufacturing (30%)

4- Prototyping (10%)

Questions ?

Team J