ASHLEY MARTIN
TEAM 7
BME 291
WEEK 8 (3/14-3/20)

MEDSence: Accessible Pill Cap Dispensing/Cutting Device

**Work Completed**

This week I did a lot of work with Autodesk Inventor Professional 2008. I completed a few more tutorials in order to get a better grasp on the program, which is quite complicated to learn. I double-checked all of the parts made previously and added a few new parts that I hadn’t made in week 7. I drew the end piece for the blade track, which enables it to be attached to the inner radius of the enclosure. This part can be seen below in Figure 1. I also drew the two motors, which are the black objects in Figure 3, and the top and bottom of the enclosure, which can be seen in Figure 2.

![Figure 1. End Piece for Blade Track](image1)

![Figure 2. Top and Bottom of Enclosure](image2)

Finally, after all of the components were drawn, I inserted them into a new Assembly file to group them together and model all of the mechanical components of our pill cap together. This was a very important task. From this model, we can see that all of our
parts will fit into the enclosure. It helped us ensure that all of the components will fit together correctly and will not interfere with each other. It also helped us see how much space we would have left over for the electrical components, which should be plenty. By putting constraints on each of the components, they come together in the device. It also caused us to precisely measure all of the parts and determine where they would be placed. We also realized that we need to build two more components: something for the cutting motor to attach to in order to push the blade and cut the pill, and a chute to bring the pill out of the device. The assembled device can be seen below in Figure 3.

![Figure 3. Assembled Pill Cap](image)

This week, a lot of work was also done on the mechanical parts of the pill cap. Springs were attached to the cutting mechanism so that the blade will be retracted after the motor pushes it forward to cut a pill. The movement of this was tested with the motor. This setup can be seen below in Figure 4. The movement of the servomotors was also tested, and the code written was successful in moving the motors the specified amount.

![Figure 4. Cutting Mechanism with Springs Attached](image)
Future Work

Next week we will start attaching the parts to the enclosure. We will also machine a part to hold the cutting motor to the enclosure and a chute to dispense the pills. We need to test the cutting motor to make sure it can apply enough force to cut the pills in half with the force of the springs pulling back on it. Some force analysis will be done to find out how much force is actually exerted by the motor. We will also continue developing the source code for the text-to-speech module.

Project Review

After Spring Break, we are now at the halfway point through the semester. I believe that the physical components of the project have come along very nicely, with all but two parts having been built already. The electrical components of the project are also moving along, with the motors and Bluetooth device working smoothly. Our team continues to work well together and we have had no problems with teamwork. Although I worked fewer hours than usual this week due to a big exam and a graduate school visit, I still feel like we are making good progress with our project.

Hours Worked

This week I worked 8 hours.