

# Individual Lab Report 1

Stephanie Chen

Team B: (still nameless)

Teammates: Trevor Decker, Ian Hartwig, Ian Rosado

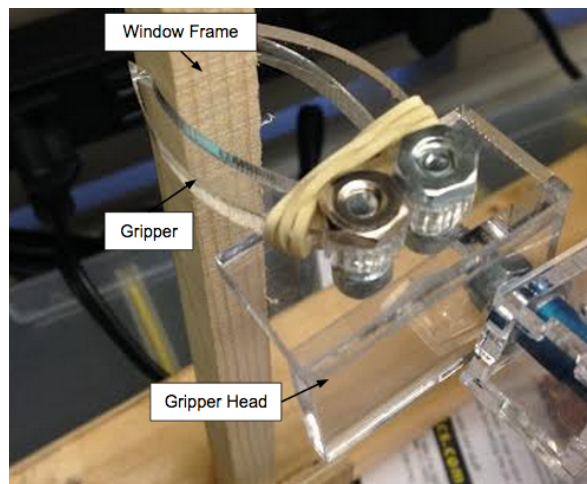
ILR01

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## Individual Progress

### Mock-Up Design

I was in charge of designing the side gripper on the two sides of the robot for the scaled-down mock-up that we presented. The gripping unit, shown below in Figure 1, was intended to show two functions. Firstly, we wanted to be able to rotate the gripper head parallel to the plane of the glass. This would allow us to pivot our robot onto a different frame. Secondly, we wanted the gripper to clamp onto the frame perpendicular to the window.



**Figure 1.** Gripper unit from mock-up

The mock-up allowed me to reflect on some of the geometrical and mechanical changes I would need to make for the final design. The gripper will need to have a larger contact area in order to distribute the normal force. We will also need a fairly large gripping force and implementing a ratchet or worm gear would allow us to hold our position mechanically, instead of continuously drawing motor power. The placement of the motor is also important because of the limited space. I determined that these will be important constraints moving forward.

In terms of manufacturing, I built the gripper in Solidworks which allowed me to laser cut parts. I also helped assemble the acrylic components using acrylic glue.

### Sensor Lab

I wrote the beginning of the code for interpreting potentiometer data, which eventually was incorporated into the final version that was displayed during the demo. I also wired the sensors to the breadboard. I wrote code for plotting real-time data in Matlab that was not demonstrated in the lab since it had some bugs in it that could not be fixed last minute. I kept the team on track by checking the lab requirements to make sure we met all tasks.

## Website

I added the introduction section to the website to start it off for the checkpoint last week. I set up a GitHub account and learned a bit of html and the process of updating the site.

## Challenges

For the mock-up, I found it difficult to quickly think of mechanisms that would allow me to perform a certain motion because I do not much experience building dynamic systems. As I move forward, I will watch more videos to familiarize myself with common mechanisms in robots. In spite of this, I was glad that I was able to use intuition to help with the design process.

For the sensor lab, although I was able to complete the tasks, I was unfamiliar with many of the conventions of wiring and how to connect the different components in a clean and efficient manner. I was also out of practice in programming on the Arduino and how to transfer the information to Matlab so I had to do a little bit of research that slowed down progress. Overall, I believe I need to gain more independence on the electronics side of the project. Therefore, I will try to be the main contributor for the remainder of the labs so I can gain the skills necessary to give valuable feedback. I will make sure to clarify any questions with my more experienced teammates.

For the website, we decided to use GitHub and I was unfamiliar with the interface and how to edit different components of the website. Much of my time was spent on the logistics of getting set up and learning how to add texts and images to the webpage. Moving forward, I believe that I will be able to update the website without the help of my group members.

## Cross-Referencing with Other Team Members

For the mock-up, my CAD model allowed the team to visualize the assembly and put the model together. For the sensor lab, I wrote code, which ended up helping Ian R. with the Arduino code he was writing for the limit switch and the flex sensor. We also did the initial wiring and we asked Ian H. and Trevor for assistance in checking to make sure we were getting reasonable values. For the website, Trevor, Ian H. and Ian R. are now able to add to information I have provided to meet the course requirements.

## Future Work

In the next week, I am planning on looking at motors and gearboxes to determine which ones I will need to ensure that the gripper can hold up the weight of the robot. I will solidify the geometry of the gripper as well as the pivoting head. This will allow me to determine how the gripper interfaces with the sliding arm. My other goal is to figure out what material would be best based on cost and manufacturability.