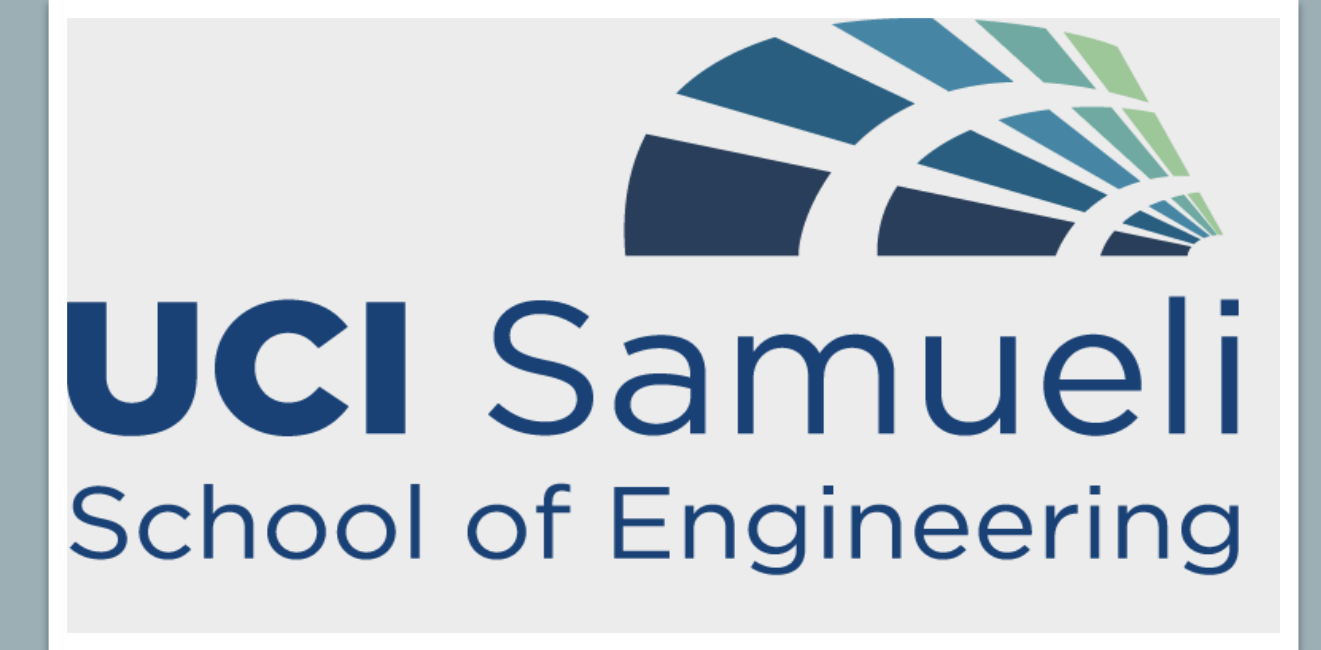# Robotic Arm

Advisor: Dr. Ian Harris

Background

An industrial robot, also referred as a robotic arm, is a mechanical device that is often programmed to autonomously perform tasks. Some of these tasks include welding, painting, performing surgical tasks, or manufacturing. Robotic arms have become a proactive development because they reduce the cost of labor, provide more efficient laborious results, and, most importantly, perform tasks in environments not suitable for humans.

Goal and Objective

The goal of the robotic arm project is to create a fully autonomous mechanical arm capable of sorting and organizing arbitrary objects by the characteristics of these objects. It will have proper mechanical structures and the necessary degrees of motion needed to complete these complex tasks. A robotic arm with such qualities has yet to be developed. We hope that our finalized, successful prototype will encourage further research and development that will enable robotic arms, such as ours, to travel in dangerous or hazardous environments for human beings, such as deep sea projects or trips to mars.
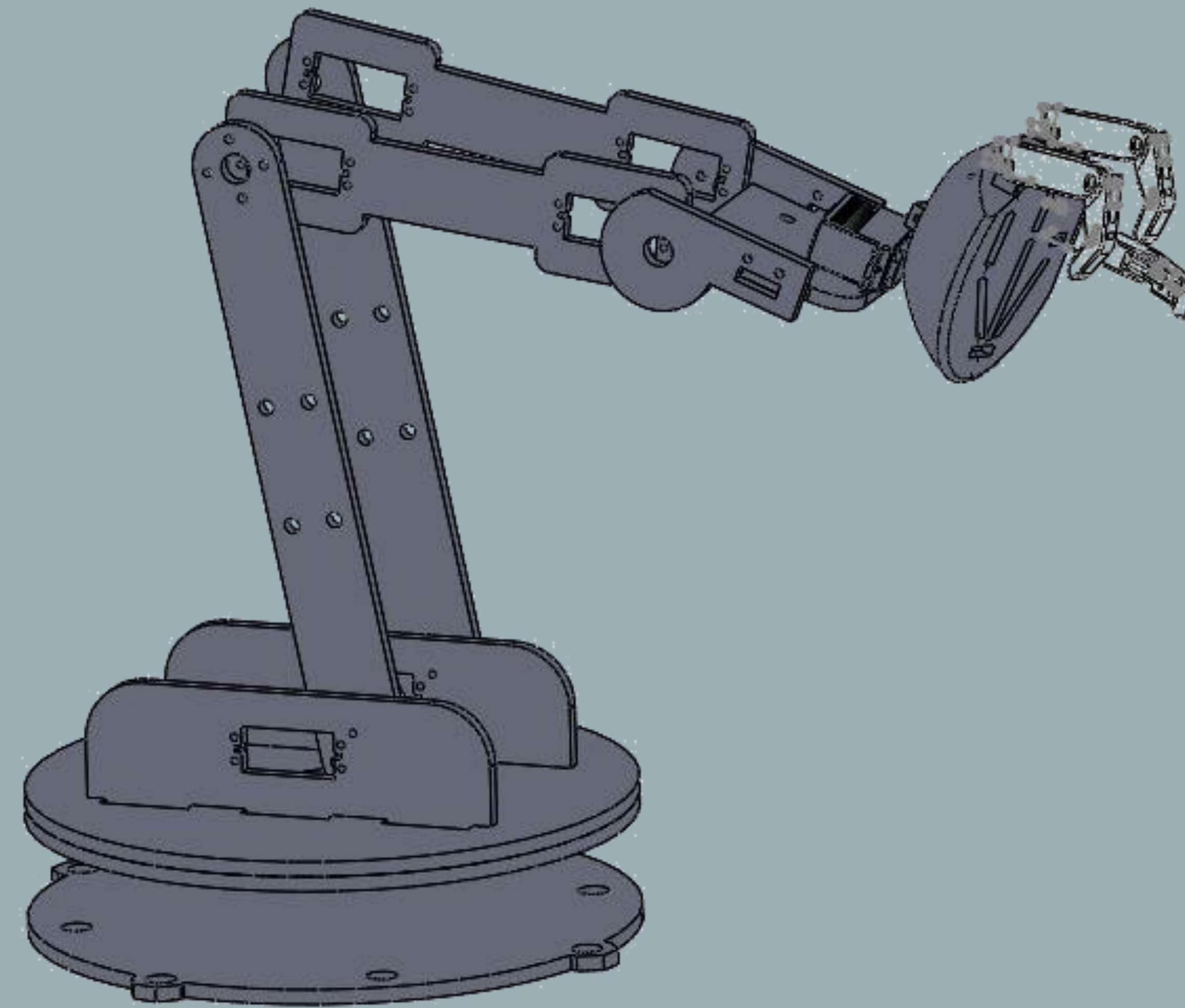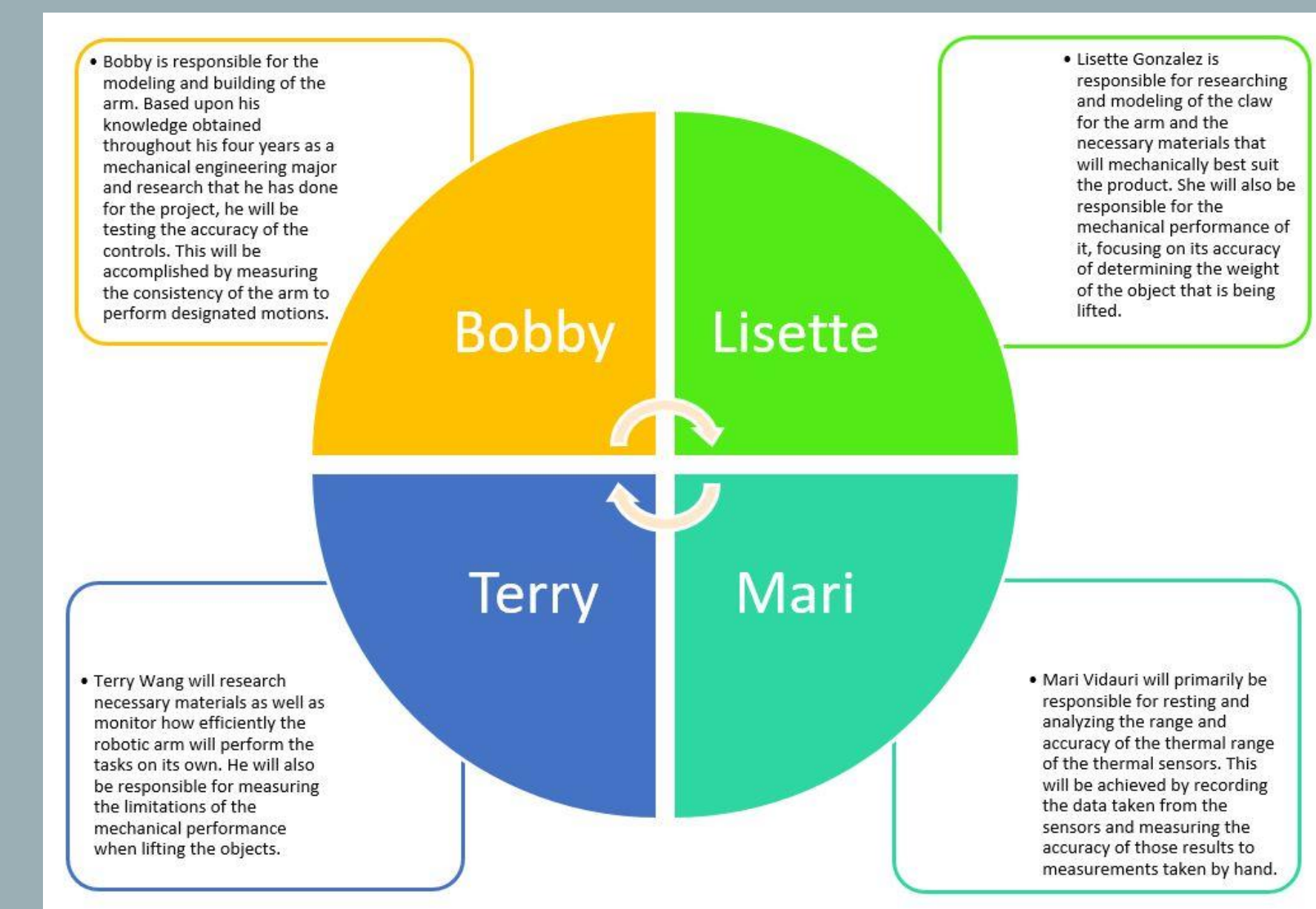
Current Status

Our fisrt robot arm model is under construction. The parts have already been cut and assembly has already begun. Initial test codes have been written and expirements to learn the degree of accuracy of our controls.

Next steps

Tessting our limitations of the arms motion will soon begin This information is necessary to begin assessing our prliminary design. Implemantation as of sensors such as cameras will begin after this phase and we will begin to achieve autonomous motion.

Itemized Budget

Part/Material	Cost	Quantity	Total
Hardboard/Plywood	$12	1	$12
Large Servos	$16	6	$96
Small Servos	$16	3	$48
Arduino	$49.90	2	$100
Arduino Shield	$49.90	1	$50
Raspberry Pi	$39.95	1	$40
Nuts, Bolts, Washers	$25	1	$25
Double Sided Tape	$10	1	$10
External Battery	$30	2	$60
Cameras	$70	3	$210
heat sensor	$49.99	2	$100
Reed switch	$3.95	10	$40
breadboard + wires	$6.95	1	$7
ABS Plastic	$17.95	1	$18
Polycarbonate	$34.50	1	$35
		total	$849.50

- Bobby is responsible for the modeling and building of the arm. Based upon his knowledge obtained throughout his four years as a mechanical engineering major and research that he has done for the project, he will be testing the accuracy of the controls. This will be accomplished by measuring the consistency of the arm to perform designated motions.

- Lisette Gonzalez is responsible for researching and modeling of the claw for the arm and the necessary materials that will mechanically best suit the product. She will also be responsible for the mechanical performance of it, focusing on its accuracy of determining the weight of the object that is being lifted.

- Terry Wang will research necessary materials as well as monitor how efficiently the robotic arm will perform the tasks on its own. He will also be responsible for measuring the limitations of the mechanical performance when lifting the objects.

- Mari Vidauri will primarily be responsible for resting and analyzing the range and accuracy of the thermal range of the thermal sensors. This will be achieved by recording the data taken from the sensors and measuring the accuracy of those results to measurements taken by hand.

Bobby **Lisette** **Terry** **Mari**

October
- Begin initial research of robotic arms and Decide on a specific task we want the arm to accomplish to have a better understanding of a design and materials needed.

November
- Begin the process of cutting, printing, and buying the necessary parts as needed according to our parts list
- Have a semi complete functional robotic arm that is fully mechanical to asses any errors that could have occured during the build.

December
- Finalize the mechanical part of the robot and have it ready to be wired up electronically
- Investigate potential codes that can be useful for our robot and begin applying them for a trial and error process.

January
- Continue working on the code and start assembling the electrical components to verify how they work with the mechanical aspect of the arm

February
- Obtain final materials that will work the best for testing the arm, such as blocks or spheres, which is what the arm will be detecting, apart from the heated object, sensors, or cameras based on previous testing of components.

March
- Fix anything that could potentially break or cause obstructions when the arm is controlled electronically
- Have a semi complete code that can control the arm how we desire with minimal errors

April
- Continue working on code to optimize the arm's ability and do what we need it to do without any errors, electronically and mechanically.

May
- Work on any last minute details that may have been overlooked and prepare robotic arm for presentation.
- Plan for UCI's undergraduate research symposium, where we will be presenting all the work that was accomplished throughout the year.