An explanation of the original design problem or need that the design solves

For this project, the original design requirements were that we would create a mini-sumo robot that would be within the specified size of 10cmX10cm, and it would weigh within 95% of the 500g mini sumo bot limit. The robot needed to be able to push an object out of the circular ring 9 out of 10 times, as well as it needed to have a long-lasting battery life, be aesthetically pleasing, and it would be debuggable by showing the values of sensors while the robot is in competition whether with an LCD screen or led lights or sounds. We also had to come up with two extra requirements as a group we decided to have the robot be able to detect its opponent within 2 seconds and that it would display a victory on the LCD when it has won a battle. The robot uses an Arduino platform, uses infrared sensors to detect boundaries, uses ultrasonic sensors to detect objects, and has a custom PCB to make the whole thing work.

A narrative explanation of how you approached the project as a team, including development phases and ongoing evaluation and revision to the design.

We approached the problem by separating the different tasks evenly into blocks. Separating them by each group member's strong suits. By doing this we ensure that everyone will contribute equally and their best effort because they are working on a topic that they have knowledge on already. We had many different designs of the enclosure. We had to spend a fair bit of time making sure that everything would fit in the allocated space. After that most of our problems came when testing the logic of the code. While attempting to fix the logic of the code we mainly were changing one variable at a time to try to find the issue presented. Testing the logic of the code took us longer than expected but in the end, everything worked how we wanted it to.

Project Timeline

342 GANTT CHART TEMPLATE

PROJECT TITLE	SUMO ROBOT		TEAM MEMBERS	Tieying Chu, Qunyi Pan, Andrew Zellner, Porter Obrist
PROJECT MANAGER	Brandilyn Coker		DATE	4/11/22

WBS NUMBER	TASK TITLE	TASK OWNER	START DATE	DUE DATE
1	Design Requirements	All	3/28/22	4/7/22
2	Block Diagram	All	4/6/22	4/10/22
3	Meeting time and task schedule	All	4/6/22	4/11/22
4	Research	All	4/12/22	4/20/22
5	Parts purchase	Tieying Chu	4/14/22	4/22/22
6	PCB design	All	4/20/22	4/29/22
7	Coding	All	4/23/22	5/20/22
8	Circuit Buliding	Qunyi Pan, Andrew Zellner	5/2/22	5/13/22
9	Enclosure	Porter Obrist Tieying Chu	5/9/22	5/20/22
10	Testing	All	5/13/22	5/20/22
11	Presenting	All	5/23/22	5/27/22

Key lessons you learned from the project as a team

A few lessons we learned from this project would be to test early and often. With this project specifically lots of testing was required and it exceeded our expected time frame. Another lesson we learned would be when working with hardware that is moving make sure to try to keep similar parts oriented in the same direction. If you don't, wheels can move inconsistently and cause issues. The last lesson we learned was that communication is almost as important as your individual work. A group that has great communication will succeed at a much higher percentage than one that does not. Make sure that you communicate with your group heavily early in a project.