

Prof. Terry Stevens

EGR 107 - 02

Team 5 - Renzo Garza Motta - Collin Rogers - Aziz Gram Sarhan Jr.

Design Innovation Award

Our design was inspired by the efficiency in past years of the paddle collection method. Based on this we took the competition's constraints into account very seriously and implemented such constraints into our design. Originally, our main concern was storage of the balls, batteries, and wheels. We took the wheels into account because of the obstacles present in the arena, as well as the other robots in the round. Therefore, we designed the sides of our robot so it would have a gap for the wheels, and axel within the piece. In addition, we added storage in the upper part of the side part for the batteries, not only for optimization of space, but since our design was planned to be fully 3D printed, we needed to add weight above the wheels to improve traction. Also, we made a small canal toward the front of the side piece design that would redirect wires from the base piece toward the top piece, which houses most electronics.

Although our side pieces, as well as the top piece had the same design for the most of the design process, we reiterated through several designs in the base piece. It was originally made to house the QTR-3RC sensor (Reflectance Sensor Array) to be able to follow a line as well as a pair of IR LEDs that would improve the readings of the sensor, and we soon realized that our design was too thin for the electronics, and had no space to direct the wires. Eventually we decided to go through some design iterations, and decided to make a larger slope within the base, and make it hollow so we could run more wires through. After the midterm qualifier we decided to upgrade to a bigger Reflectance Sensor Array, after this upgrade he had to redesign our base one more time. In addition, we ran into a problem in which our motor's belt (motors were top mounted, with belt-driven wheels in the lower portion) weren't functioning, so we decided to designate space in the base piece for the motors. After this obstacles, we decided to increase the already existing hole for the sensor, and move the openings for the IR LEDs, after this we were able to fulfill the requirements set by our own team.

*Paddle was removed for clear viewing of the design

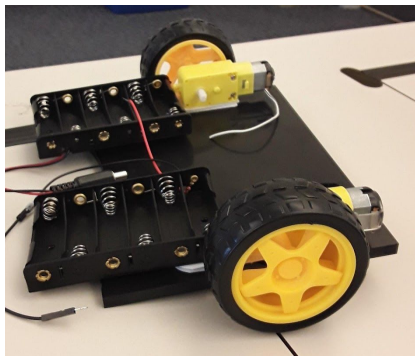


Figure 0.0 (Prototype 1)



Figure 1.1 (Base Design 1)

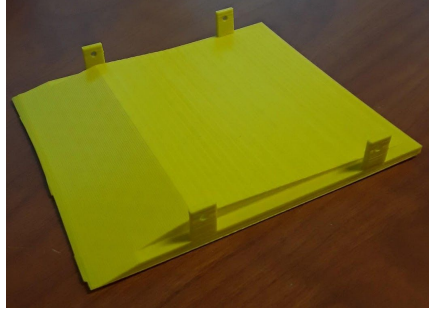


Figure 1.2 (Base Design 2)

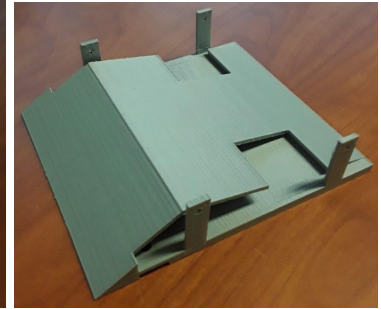


Figure 1.3 (Base Design 3)

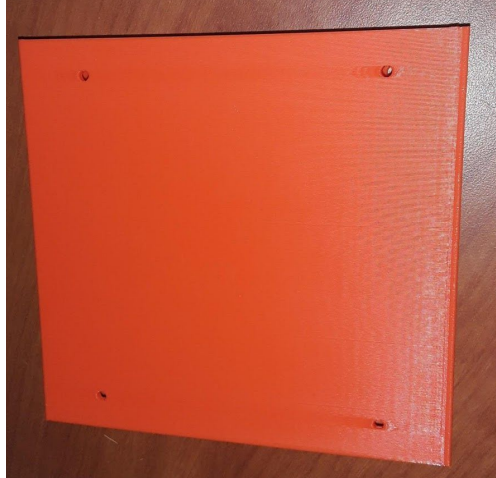


Figure 2.1 (Side Piece Design 1)

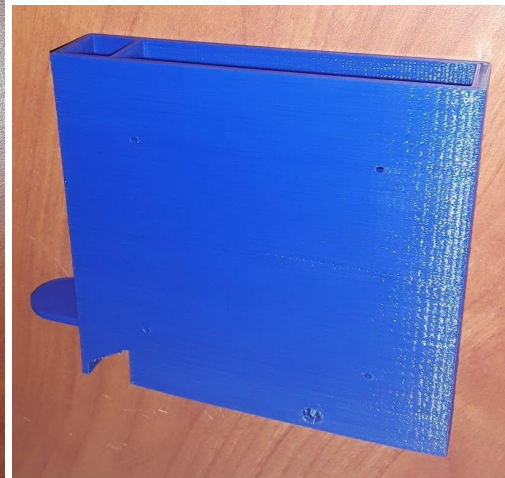


Figure 2.2 (Side Piece Design 2)

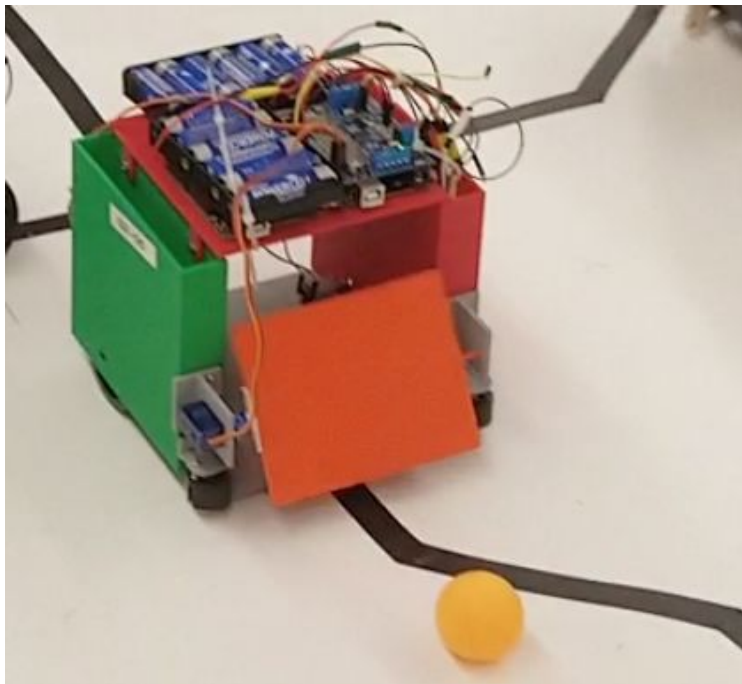


Figure 3.1 (Midterm Design)

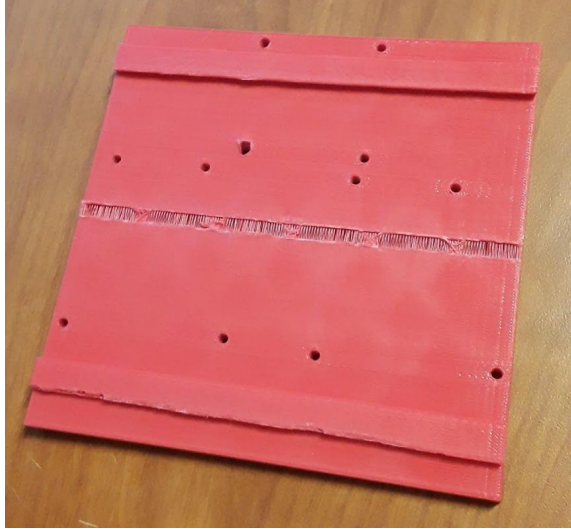


Figure 3.2 (Top Piece Design 1)

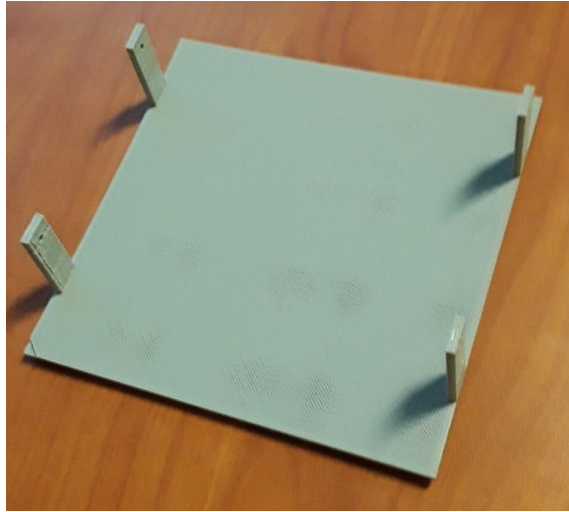


Figure 3.3 (Top Piece Design 2)

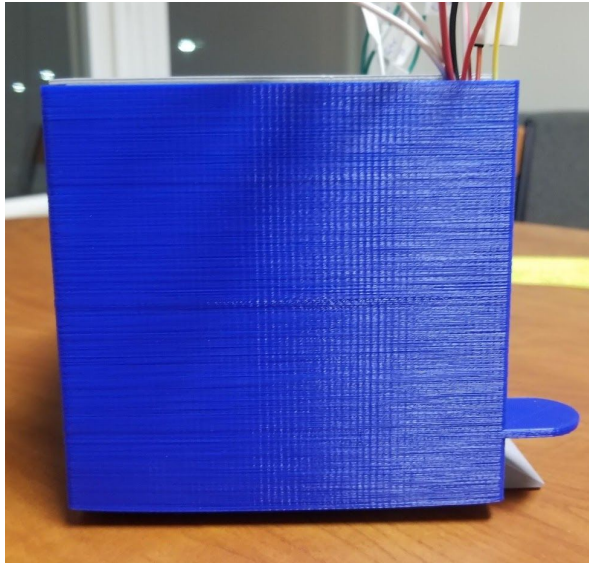


Figure 4.1 (Final Design)

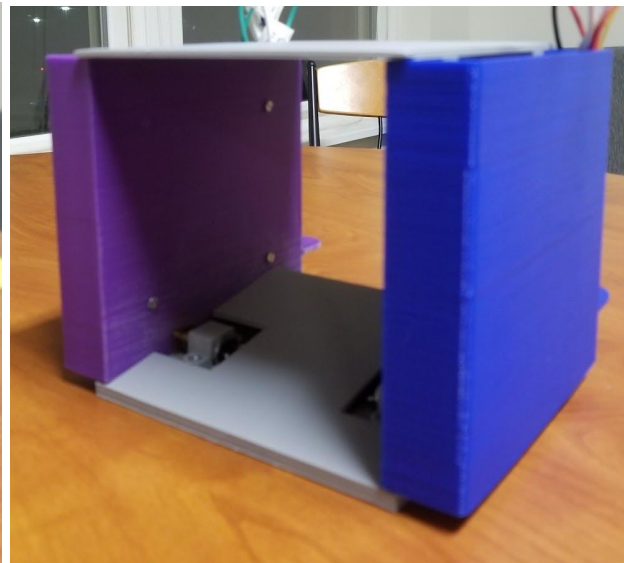


Figure 4.2 (Final Design)

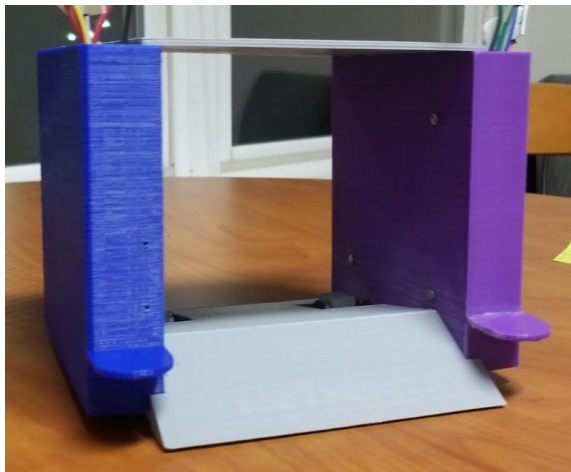


Figure 4.3 (Final Design)

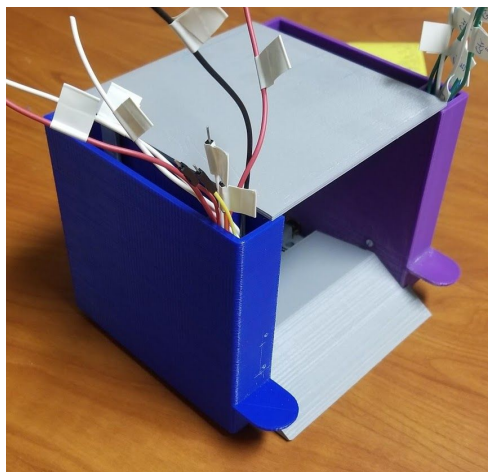


Figure 4.4 (Final Design)