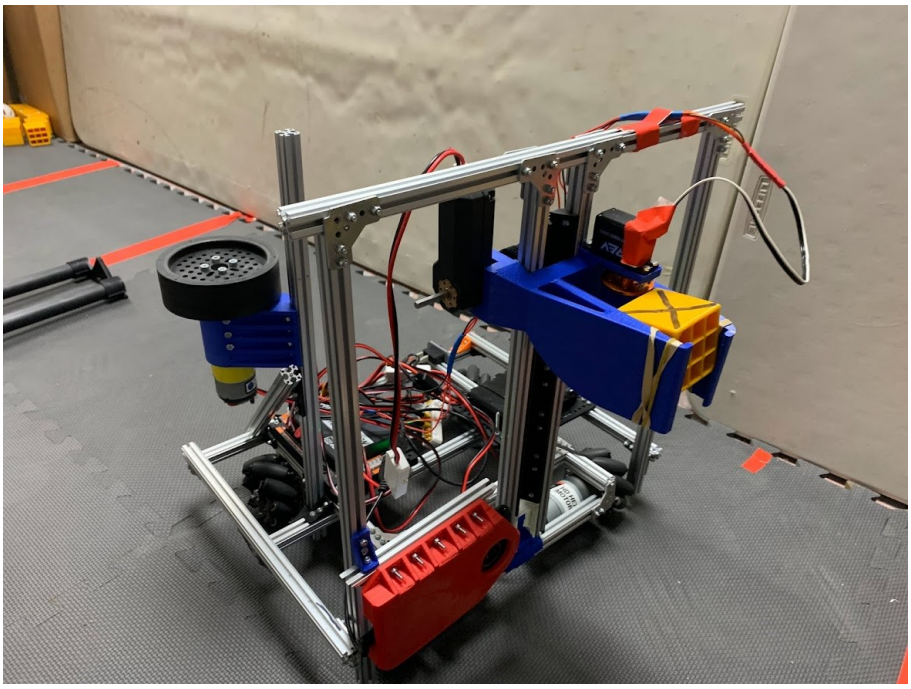
Rambam

Engineering Portfolio



Team #17384

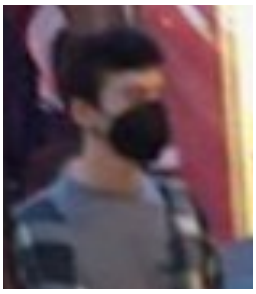
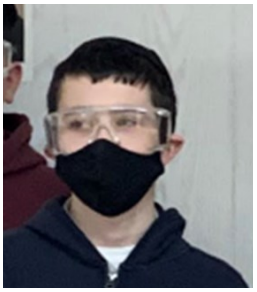
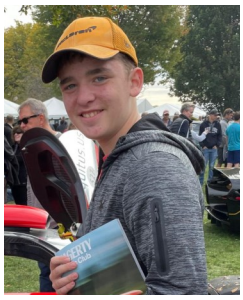
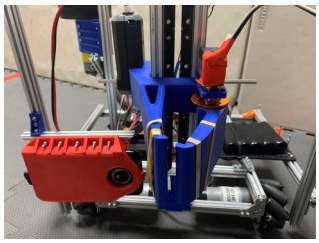
Our Team:

The Rambam Rambots is a 3rd year FTC team which operates as a program of Rambam Mesivta in Lawrence, Long Island, New York. Everyone one of our team members began their journey with FIRST when they joined the Rambots, thus our longest standing members only had 2 years of FIRST experience coming into this season (with one of those years being during COVID). Our team was founded by Captains Eliezer G. and Jacob Z. as a way of helping grow the school's robotics program from its four person RoboCup Junior team to a much larger FTC team. This allowed for significantly more student involvement and made it an environment where less experienced students could learn.

The team's name originated with the RoboCup team. It used to be called the Rambam Ravens Robotics (the school's administration required it to match the schools athletics programs), Ravenotics or simply the Rambam Robotics Team. This changed however when a RoboCup announcer mispronounced the school as Ram·Bahm and decided to call the team Rambam Rambots as opposed to its more lame original name. The name stuck ever since and team members make our more fitting logo (see below). Unlike our name which we've been told implies a level of violence, our work and especially our robots are quite the opposite. For instance this year's robot, Jounce, named after fourth derivative of position (calculus based physics stuff), can't hurt a fly (trust us we've tried).

RAMBOTS

About our Members:

Jacob Z.  Captain - Founder 3rd year in FIRST Team Management & CAD	**Eliezer G.**  Captain - Founder 3rd year in FIRST Software	**Shua L.**  3rd year in FIRST Sensors/Driver	**Aryeh B.**  2nd year in FIRST Claw Design/Sub. Driver
Ariel F.  2nd year in FIRST Build/Driver	**Menachem L.**  2nd year in FIRST Documentation	**Daniel R.**  1st year in FIRST Programing	**Raphael P.**  1st year in FIRST General
Ari M.  1st year in FIRST Programming	**Ezra Z.**  1st year in FIRST Design	**Avi M.**  1st year in FIRST Human Player	**Meir M.**  1st year in FIRST Design/Sub. Human Play.
Shmuel R.  1st year in FIRST Design/Field Assembly	**Michael J.**  1st year in FIRST Programming	**Mentor Mr. Nachum Twersky**  1st year in FIRST	**Jounce**  1st year in FIRST Robot

Rambam Rambots Portfolio (Team #17384)

Our Mentors

Our coach/mentor Mr. Twersky is in his first year as in his first year in FIRST as well as a first year STEM teacher at Rambam. He takes a fairly hands-off approach to our teams work. It allows us to explore, create and fail but makes sure there is someone there to ensure nothing goes horribly wrong.

Our School

Rambam Mesivta Maimonides High School (Rambam), is a religious boys high school in Lawrence, New York. Rambam was founded in 1991 by a group of community minded individuals who saw the need for an all boys' Mesivta program that offers combined excellence in Judaic Studies and College Preparatory studies. Since then school has received the Blue Ribbon award twice from the US Department of Education and Middle States Accreditation. It is a small school by design and allows students to create and grow teams with school assistance. One of those teams are us, the Rambam Rambots.

Our Mission

Our team's mission from day one has been to be a place where students of all experience levels can learn, grow and have fun. We also work to embody our schools motto of "Torah · Midos · Excellence" throughout our work. We also prioritize reuse and keeping team expenses to a minimum.

Our Funding

As a student team we receive funding from two primary sources. We receive base funding for "student activities" from our school. This helps pay for registration fees, transportation and other expenses. We additionally have in the past (though unfortunately not this year) received STEM grants specifically designated for the team.

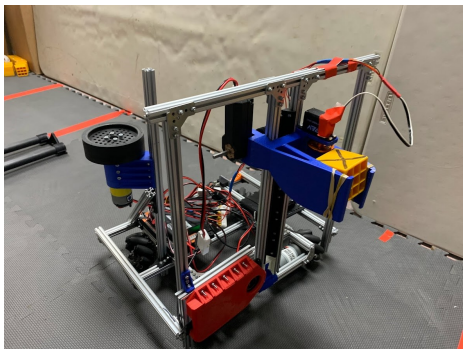
Sustainability/Recruiting

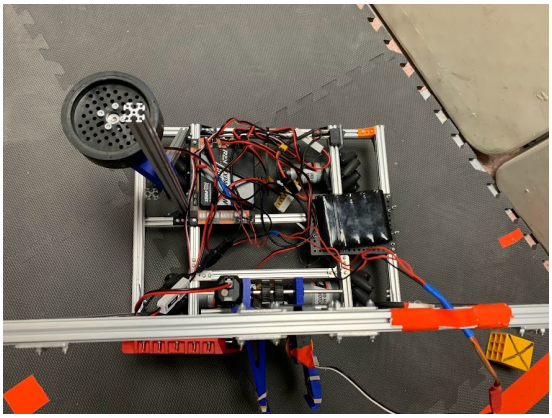
Being closely affiliated with our school our recruitment and team membership is tied exclusively to it. We recruit similarly to other teams in our school.

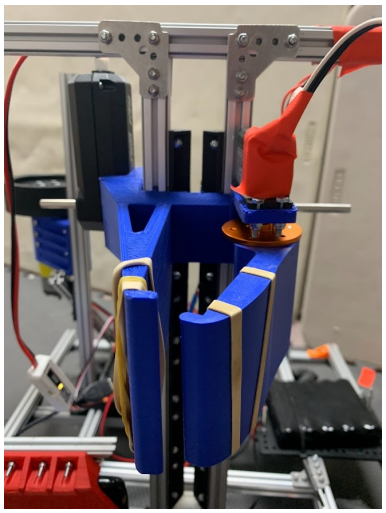
The Rambots

Our Robot:

Jounce:







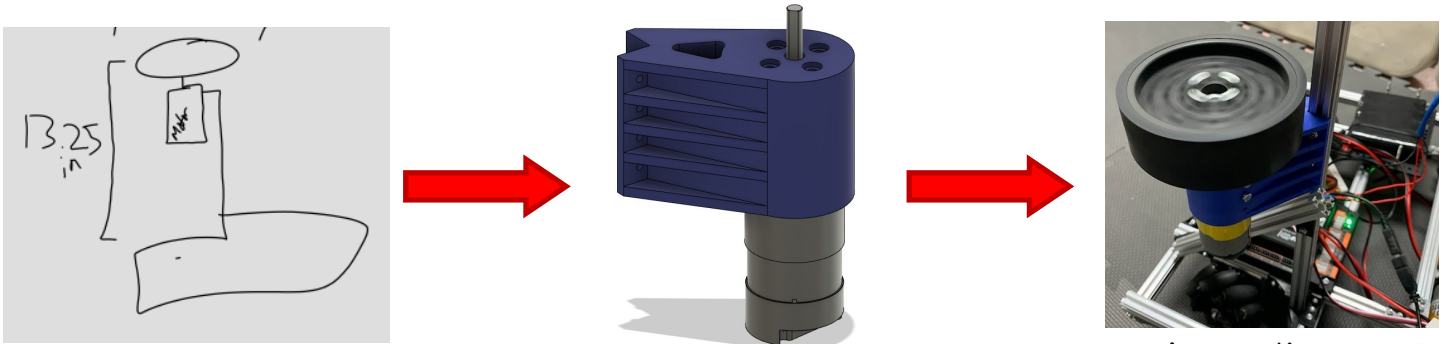
Due to the uncertainty that COVID presented, where any day the school could shut down with little notice, our robot design was simplified this year. This also helped us avoid things breaking at the least convenient times like they have in previous years. It was planned and designed in pieces with different people building different parts and putting it al together in CAD.

Sub Assemblies

Each of these sub-assemblies started with a drawing on the whiteboard. Ideas and deigns where conceived and presented by different team members with everyone from programmers to human players. Team members then voiced concerns and requested things be reexplained or added notes to the design. The chosen designs where then designed more fully in CAD and built in the real world.

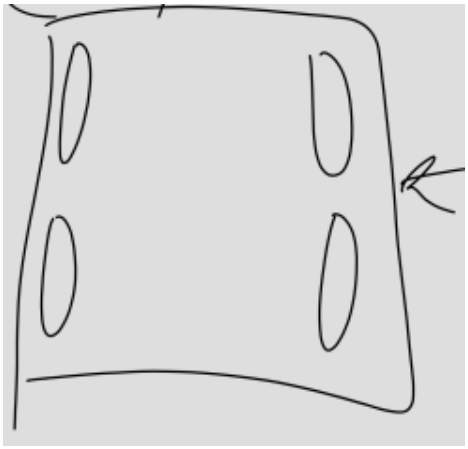
Carousel Spinner

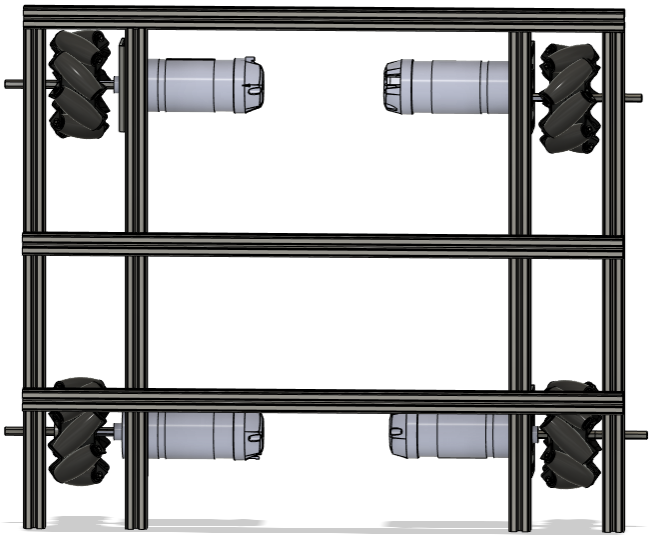
We decided to reuse the motor/wheel that we used to throw disks in last year's Ultimate Goal season. This combined with a slight redesign to Jacob's mount and an additional piece of extrusion proved promising in initial tests.



Mecanum Drive

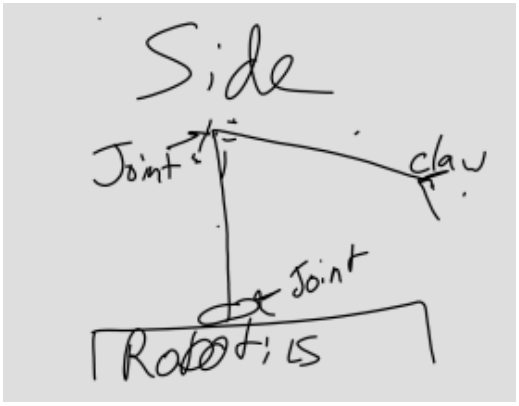
Last year we purchased a set of mecanum wheels in order to be able to do the 360 degree driving they enable. We decided to reuse the same wheels and motors (Rev HD Hex Motors w/40:1 Gearbox) on the four corners of the robot. See explanation of mecanum (below left) and a CAD model of our implementation (below right).

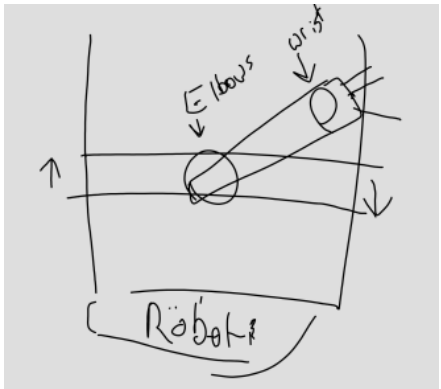


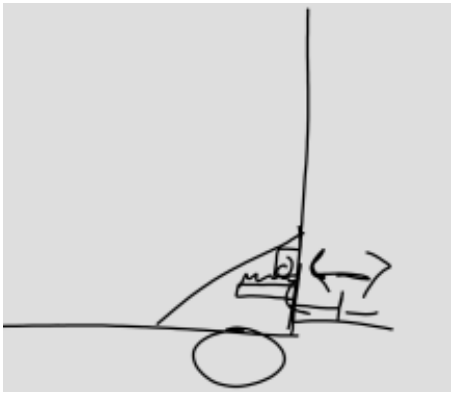


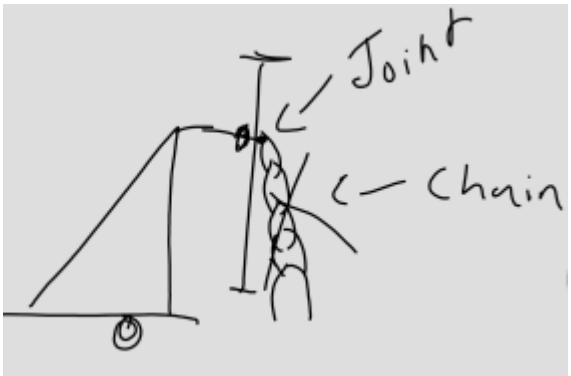
Arm and Claw

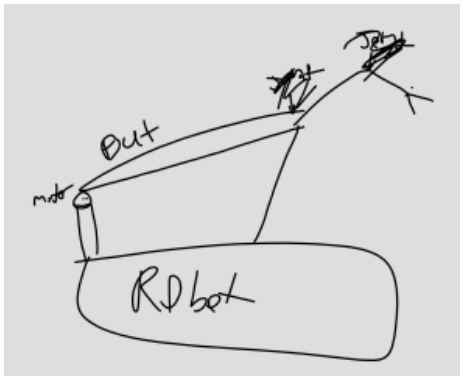
We went through a lot of design ideas for this one, a lot… of… ideas…

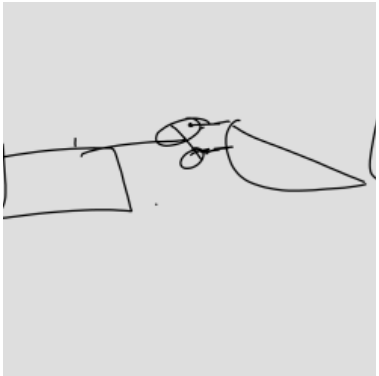




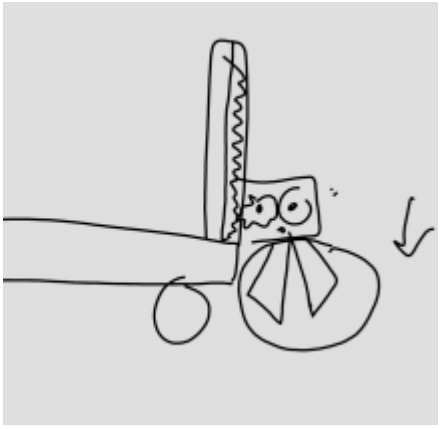


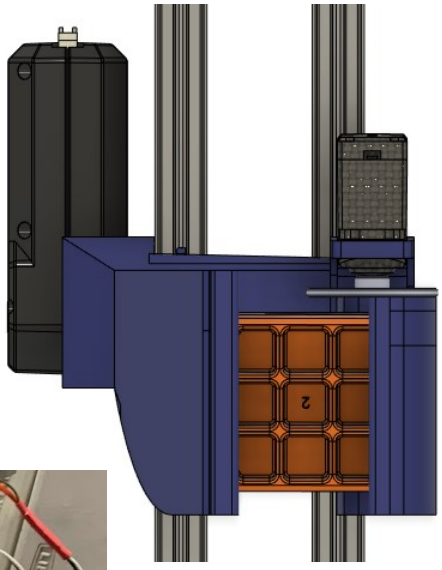


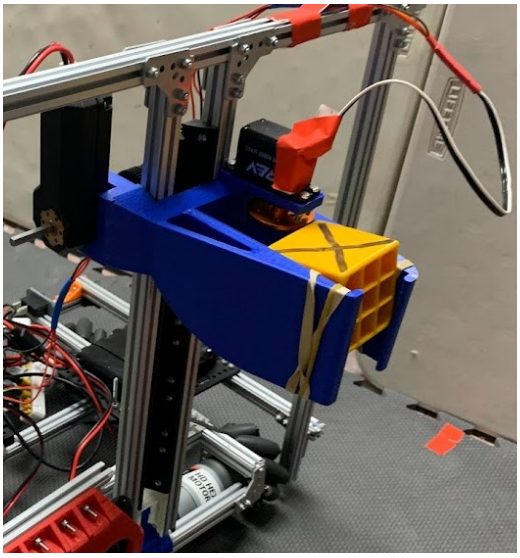




Eventually we settled on a rack and pinion to raise and lower the claw and a simple clamp style claw. The advantages of this design where its simplicity and that we had (or could 3D print) all the parts needed. Though it would be a bit limiting and require a separate TSE mechanism, due to time constraints and the alliance based nature of FIRST it was ruled our best option.

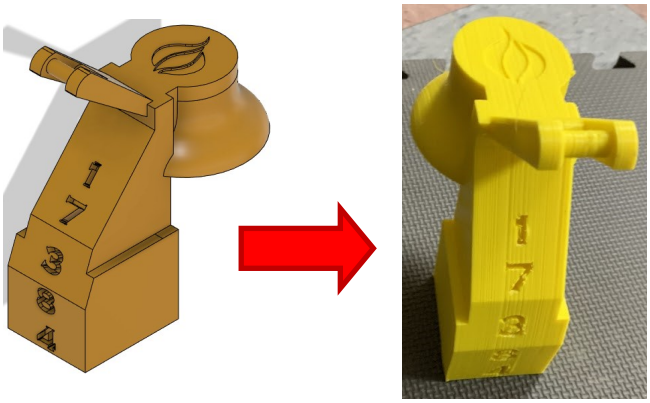


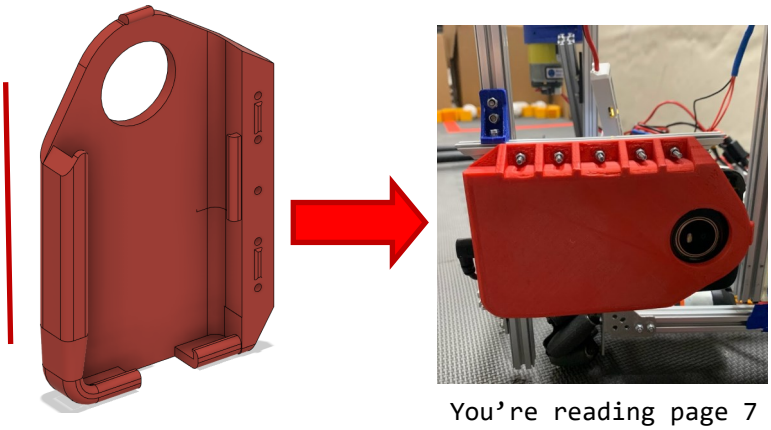




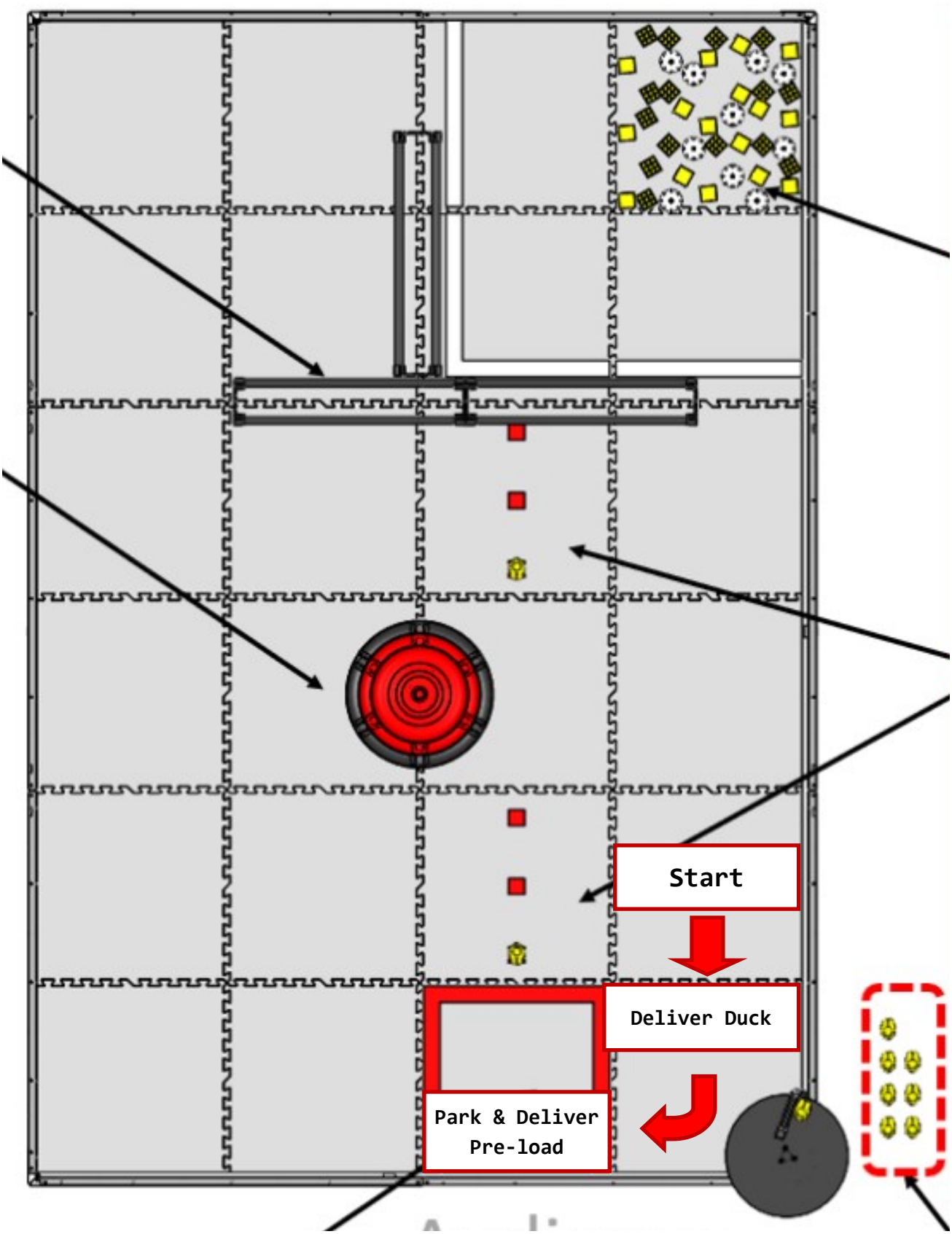
Miscellaneous

Some other parts that needed designing where our Team Scoring Element (left) and a mount for the Robot Controller (right).

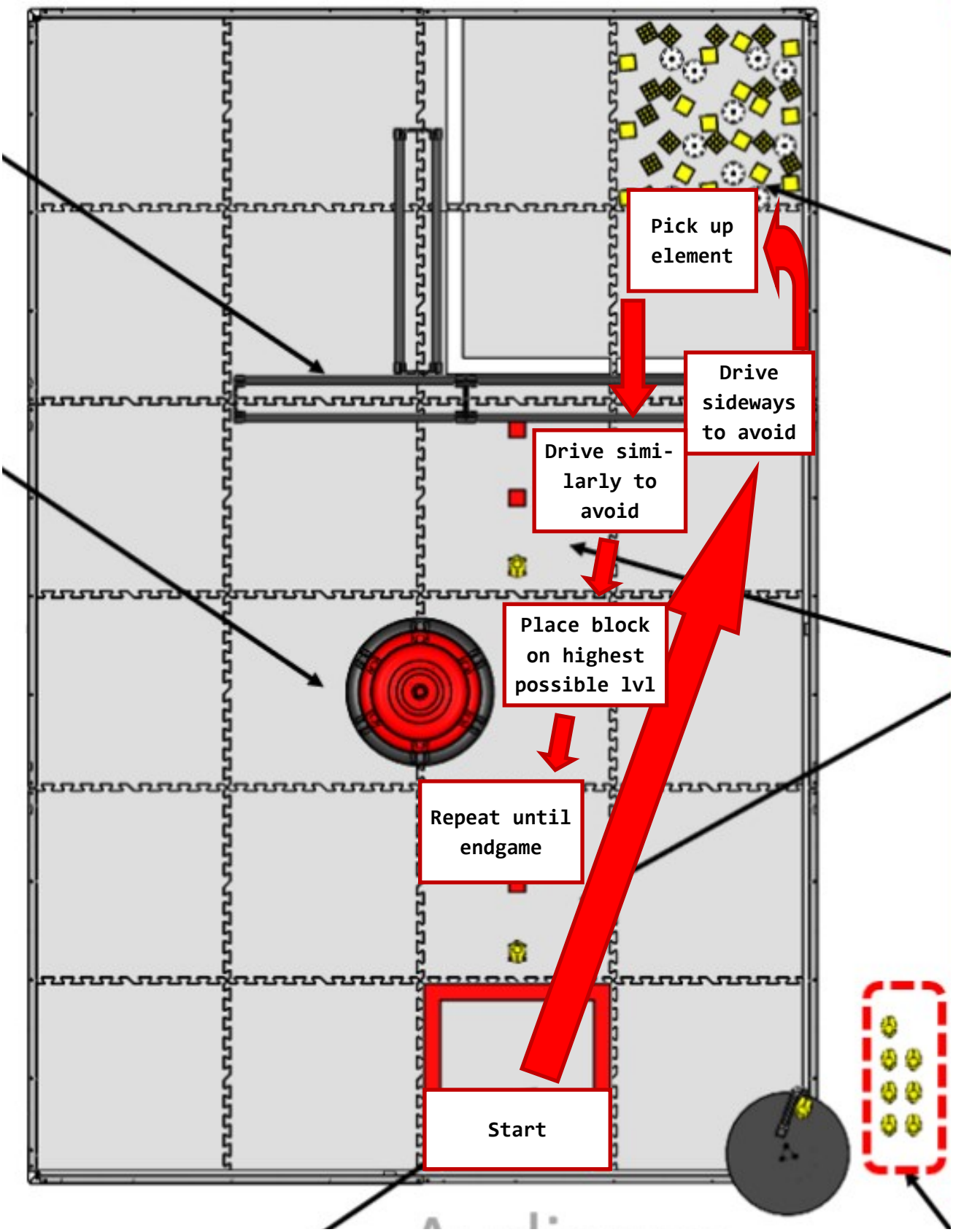




Autonomous Round Plan:



Driver Controlled (0-1:30) Plan:



End Game Plan: