Version 4: 12/30/25 CAD & Design Part

Design Process: We used the Engineering Design Process to create our robot. We first defined the problem, which was that we had to consistently get the artifacts into the basket without any form of extension past 18 inches. After doing some background research from the game manual, we learned that we could use a shooter device to score, so we began brainstorming ideas. We first thought of using a gecko wheel aimed sideways to shoot, but realized that it wouldn't have enough compression and consistency. We decided to prototype our CAD with a Rhino wheel instead, and we created a curved piece to allow for angled shooting. We tested this, but realized that since the angle was fixed, it was a lot harder to maintain consistency in shots as the distance changed. We thought of using programming, but realized that it would only partially solve the problem. We then came up with a redesign with a "hood" that can change the angle of the shooter piece, so we could adjust that to the proper angle each time. We realized that this solution met our requirements, so we stuck with it for our league meet number 2.

Game Strategy: We used a small drivetrain to purposefully allow for faster movements and quicker parking of our robot. We also used the limelight camera to allow us to align to a near-perfect angle for shooting, greatly improving our accuracy and reducing the precision required by the driver. Our team mainly focuses on shooting as many artifacts as possible without worrying about the color, since we haven't implemented a sorting system yet.

CAD Iterations:

Shooter Iteration 1: Our original shooter was powered by 2 motors and had no adjustable hood, so it was slower and less accurate.

Shooter Iteration 2: We switched to using just 1 motor to prevent programming issues with the PID.

Shooter Iteration 3: We added an adjustable hood so we could shoot from different distances.

Shooter Iteration 4: We switched from chains to belts to power our shooter because it's more efficient. However, it's less customisable easily, so that is a small downside.

Intake Iteration 1: Our original intake took up quite a lot of space and was slower because of the bad spacing.

Intake Iteration 2: Our intake became thinner, and we added rubber band intakes to allow for smooth intaking even against walls.

Intake Iteration 3: Our intake changed the rubber bands and added SWYFT© wheels and custom silicone rollers to allow for smooth intaking of artifacts.

Kicker Iteration 1: We had a thin stick-like device that would push the artifacts up to allow them to be shot out of the shooter, but it was too thin, so it often got stuck inside the artifacts, which led to wasted time and points.

Kicker Iteration 2: We temporarily added some zipties and surgical tubing to make the kicker a little thicker, which half-solved the problem, but the kicker still occasionally got stuck in artifacts.

Kicker Iteration 3: We made the kicker significantly thicker so that it was now impossible for an artifact to get stuck inside of it, which allowed us to not worry about any problems with that.

Storage Iteration 1: Our original storage could only hold 3 balls, but one would have to hang outside the intake, which is inconvenient because sometimes the 3rd one couldn't shoot until we re-intaked it again.

Storage Iteration 2: Our new storage added more space, so we could store 3 artifacts much easier, so shooting all 3 was possible.

Game Strategy + Advantages:

Strategy	Advantage(s)
3 Ball storage	Maximum time saved when driving
Wide Intake	Easy Precision for the driver
Auto Aim with Fusion (Limelight / Odemetry)	No Need for exact precision / less stress on the driver
2 Autons (Far / Close)	Compatibility with Alliance
Custom Intake Rollers	Fast & Reliable Intaking
Turret	Saves time turning the robot when we could turn just a part
Adjustable Hood	Shots from different distances

Tutoring: Our team did many tutoring activities to support young minds. One was STEM tutoring to enable students to create their own innovative designs and perform necessary calculations to achieve success in STEM activities, including VEX and FTC.

Volunteering: Our team volunteered at the Houston Humane Society, walking and playing with dogs while supporting the shelter. This helped socialize the animals and gave us a meaningful way to give back to the community. We also volunteered at the Houston Food Bank to help prepare food and meals for people with food insecurity. Next, our team was involved in volunteering at our school sales and other school related activities, demonstrating school spirit and an interest in helping classmates and those around us in a school environment.

League Games Data Analysis:
Note: All is NP

Scrimmage:
Mean: 37.8 Points
Standard Deviation: 6.4931 Points

+ 35.97% Improvement

League 1:
Mean: 51.4 Points
Standard Deviation: 12.468 Points

+ 99.22% Improvement

League 2:
Mean: 102.4 Points
Standard Deviation: 20.597 Points

+ 4.00% Improvement

Orcanized Chaos Scrimmage:
Mean: 106.5 Points
Standard Deviation: 45.00 Points

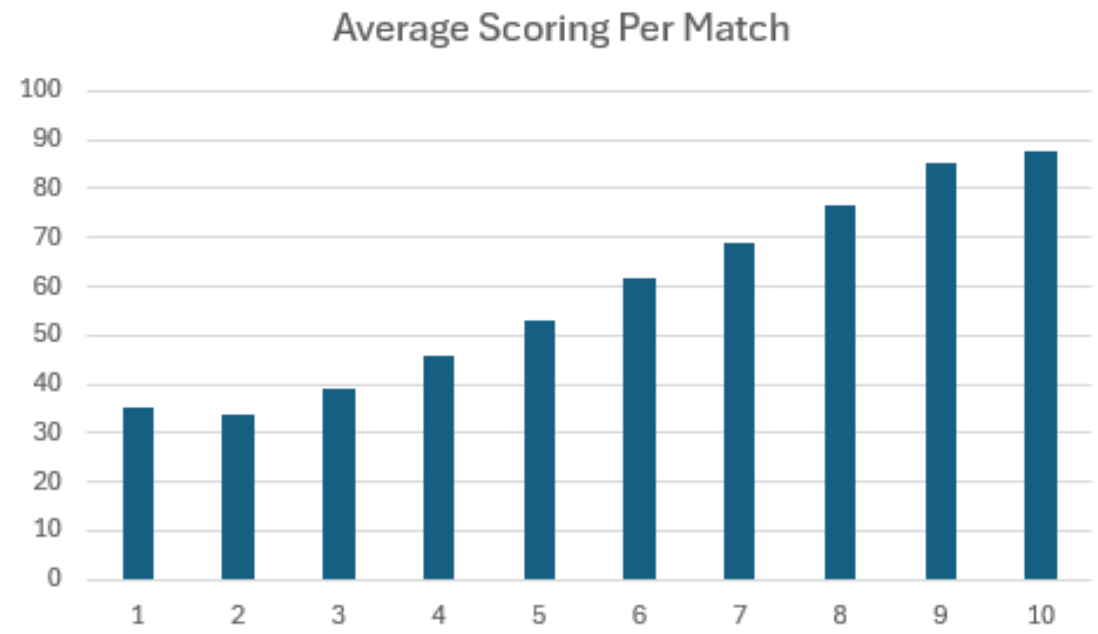
Win / Losses:
Scrimmage 1: 4W 1L

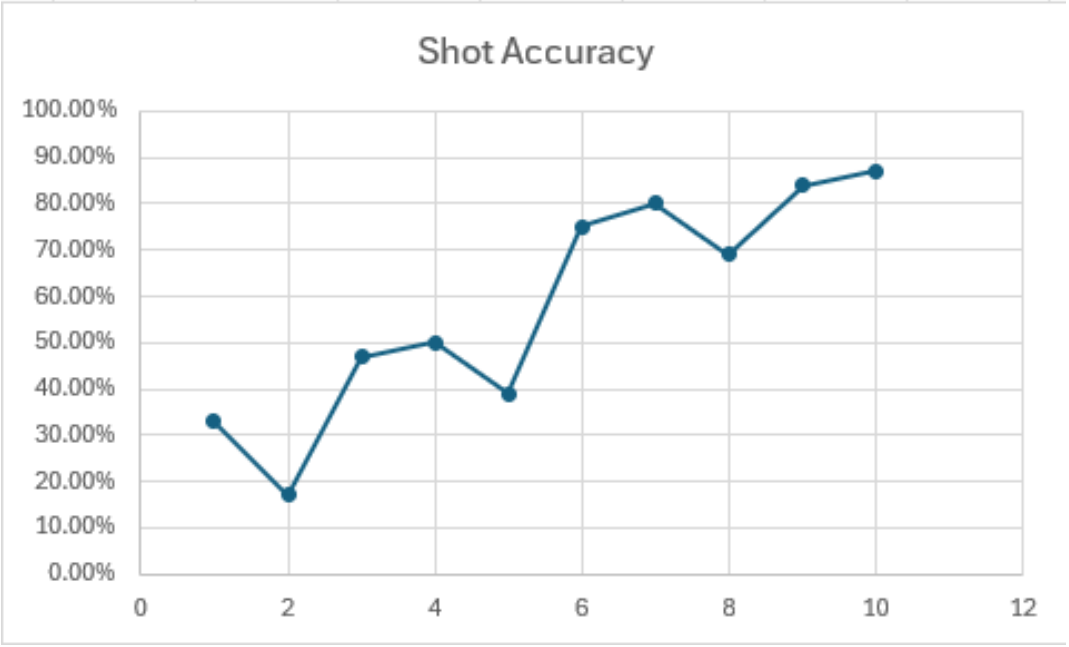
League 1: 3W 2L

League 2: 5W 0L

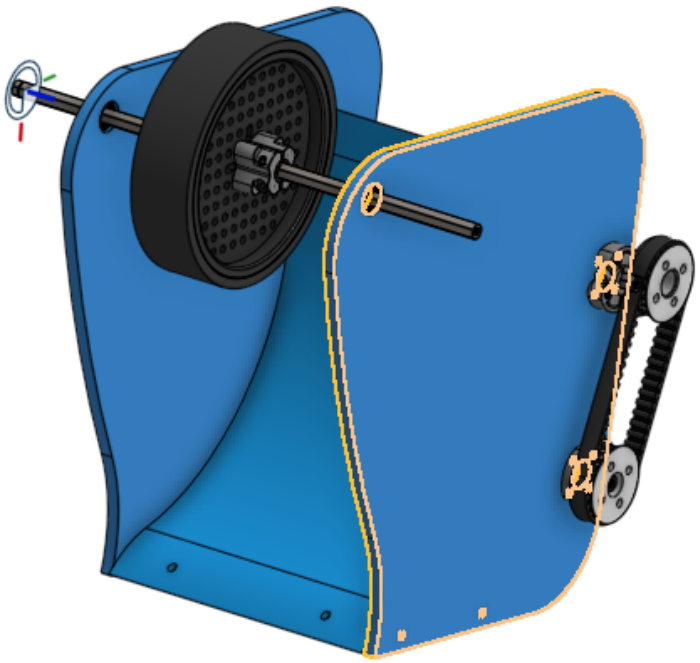
Scrimmage 2: 1W 4L

In leagues, if we score 55.09 points or more, we are expected to win the match.

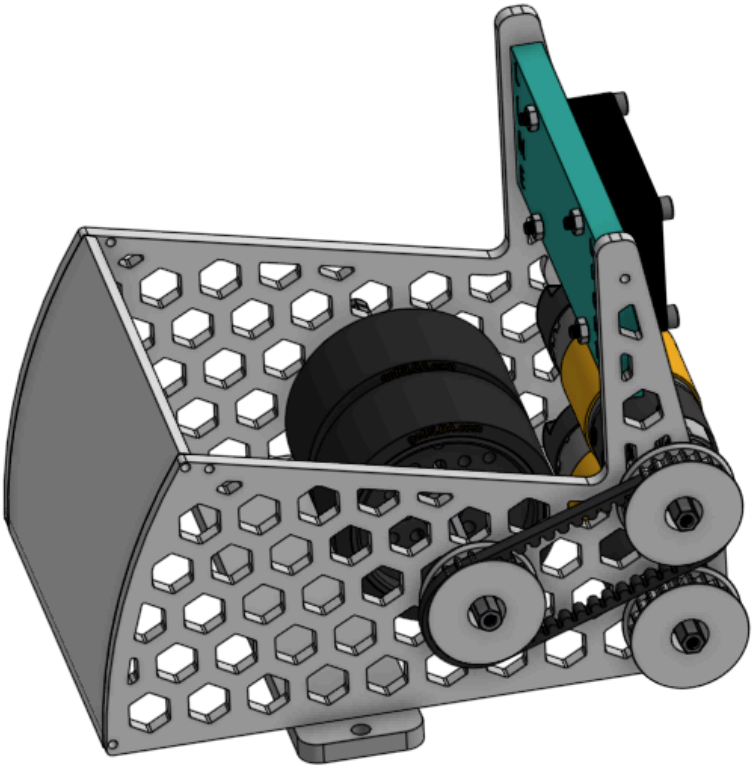




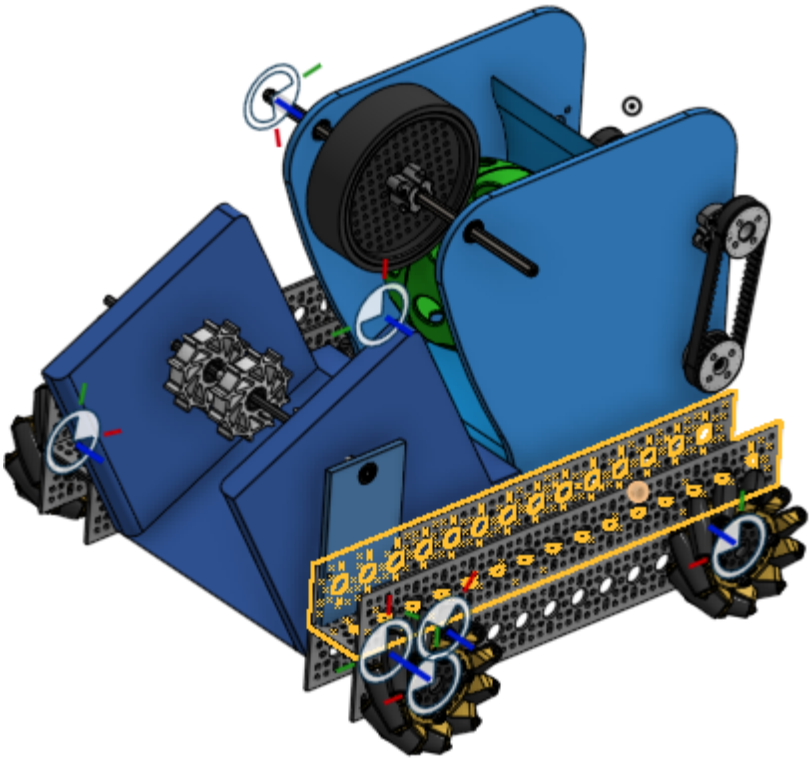
Shooter V1:



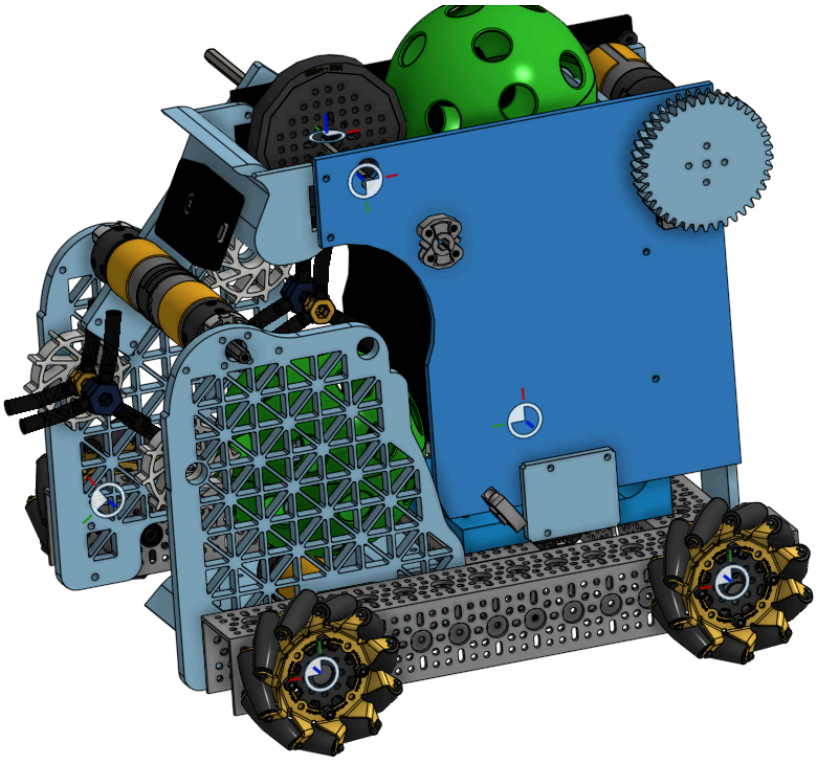
Shooter New:



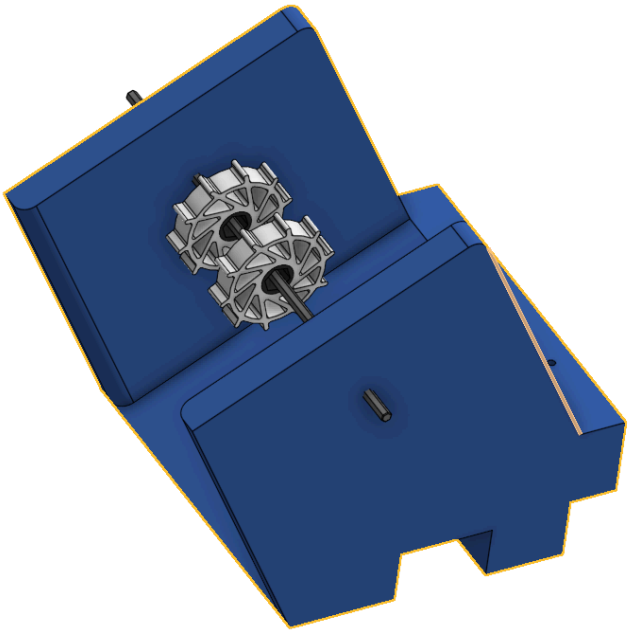
Full Bot V1:



Full Bot New:



Intake V1:



New Intake: