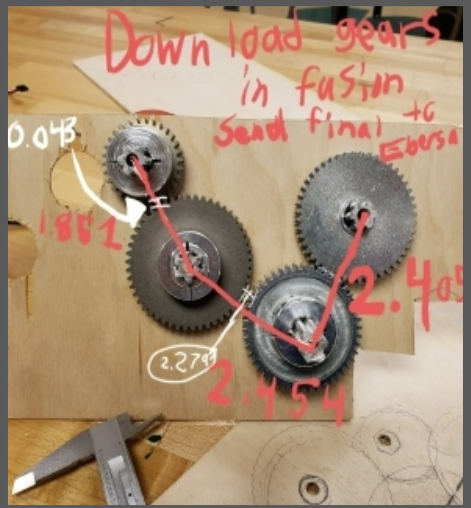
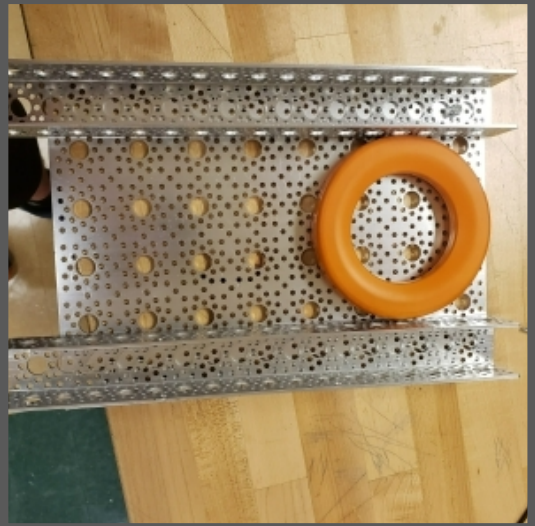
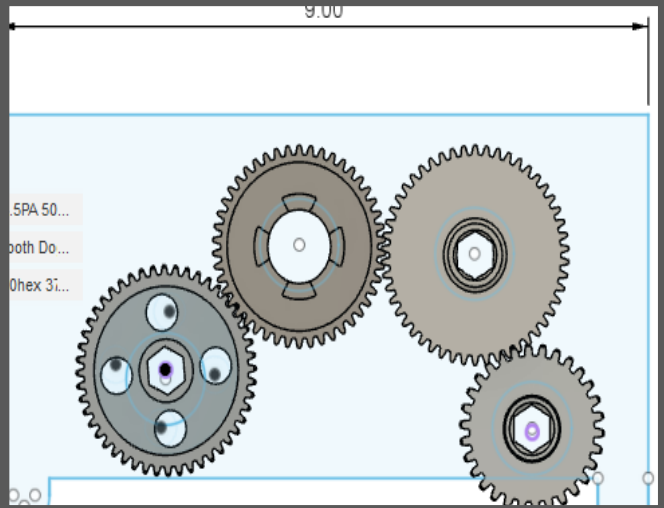
10th grade FTC







By: Zander Bean

10th grade 2020-2021

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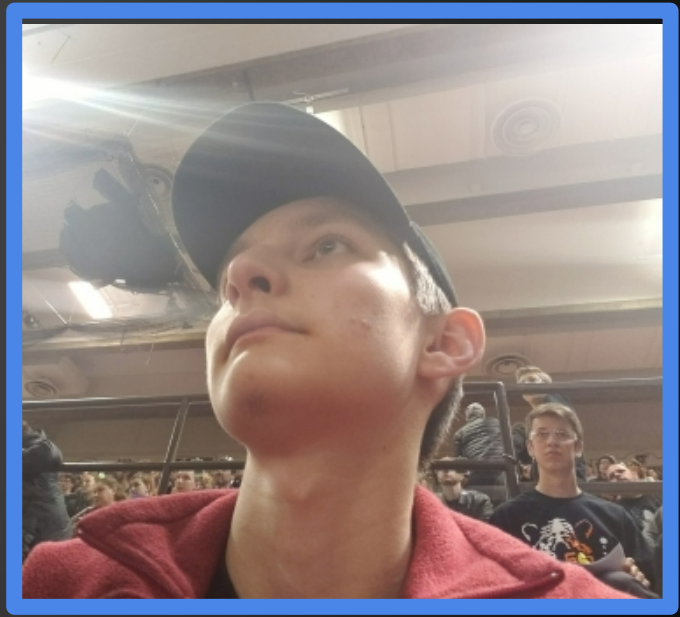
Who I am and my goals

The name is **Zander** and I've grown up a dreamer of engineering

My goals are:

Be a better group leader.

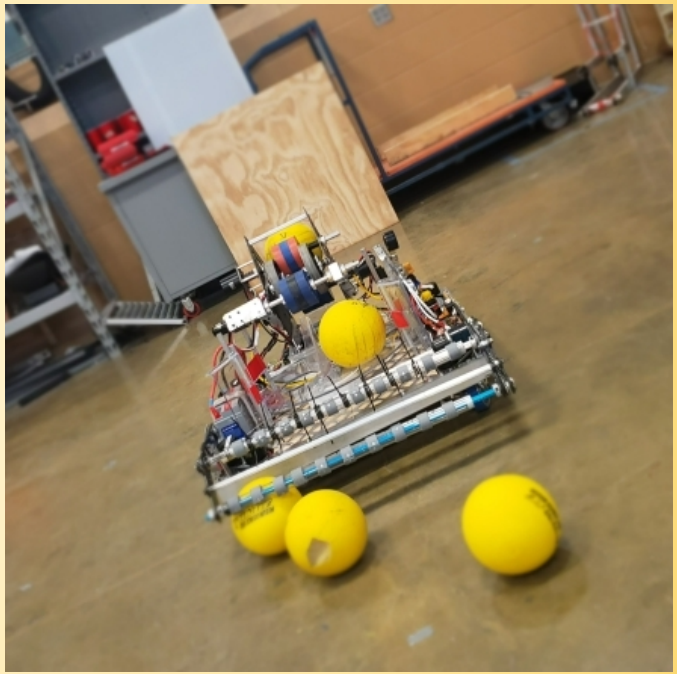
Start and build a successful mechanism while promoting teamwork.



Promoting teamwork:

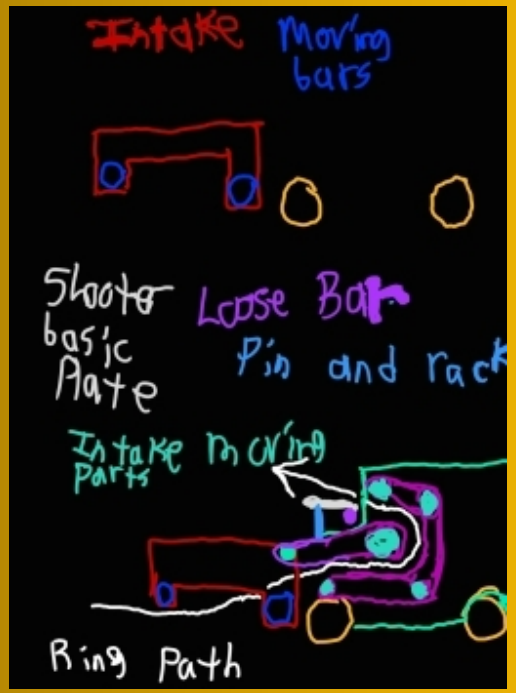
How I start and build teamwork

1. Let everyone know they can use help
2. Have something for each person to do
3. Find out what to do next while they build
4. Always be available to help anyone, anytime



Steps of building intake

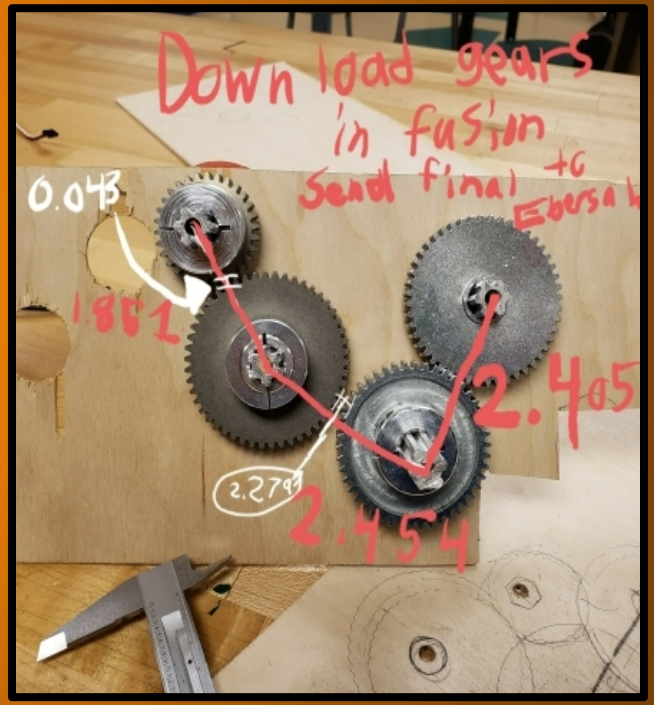
Brain stormed many ideas and a constant contact system to the ball the entire time its in intake which worked best



These are the only ideas drawn out left out of the many.

Intake prototype of FTC

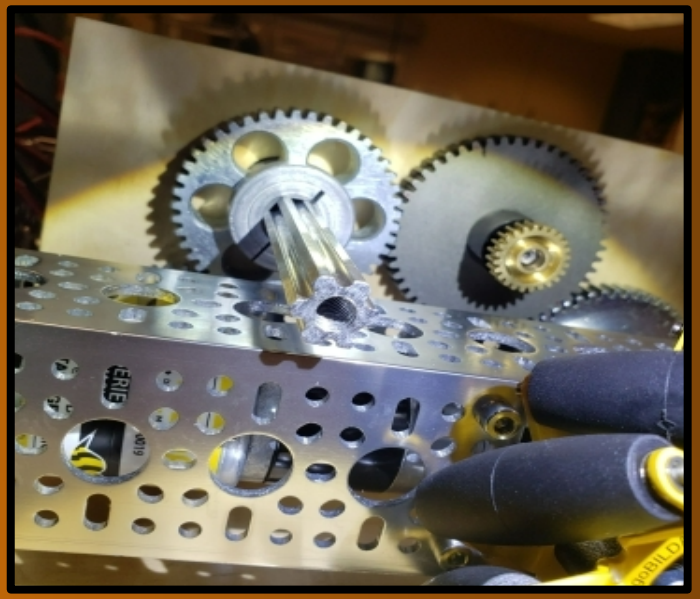
I built this prototype to use one motor to move 4 bars. I learned that gears friction can add up, leading a low efficiency system.



I learn notes are best taken by writing on a picture of the things or make a video so you have something visually explaining what your doing.

Prototypes of FTC

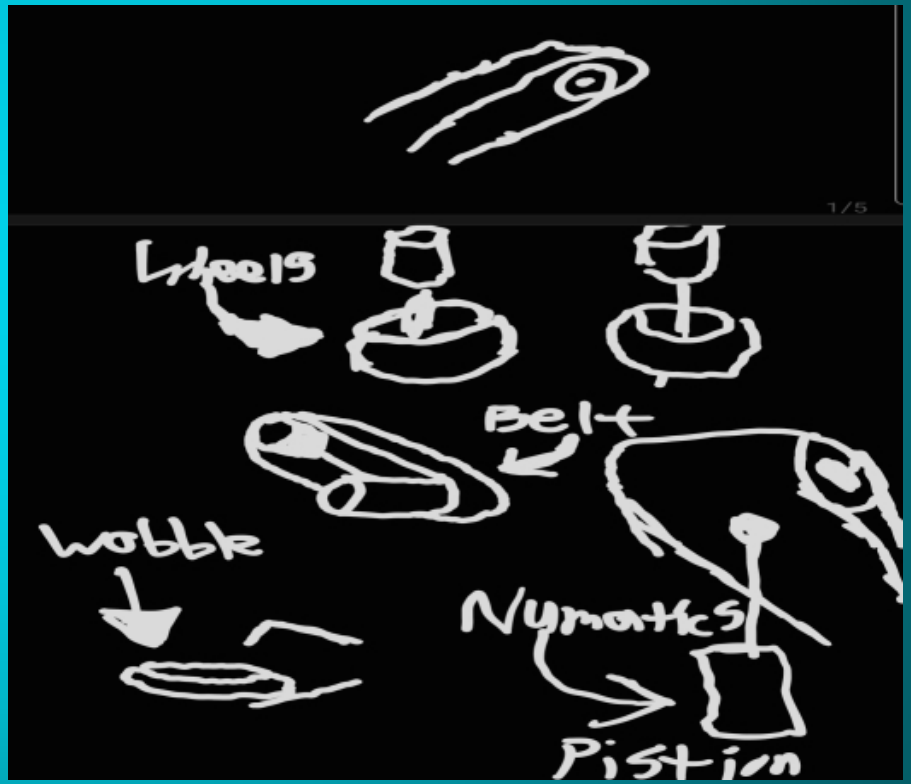
Next, I had to make the gears lighter, which I realized helped make the system more efficient.



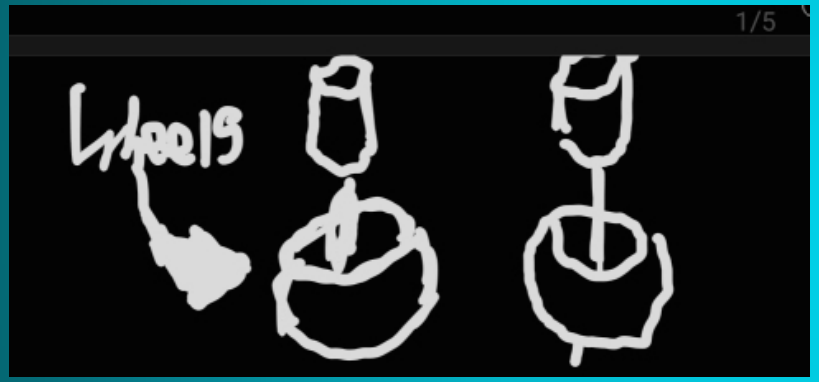
The intake system

The indexer system

I learned that drawing the idea out, then using objects, helps people see what your idea easier. I also learned that a smaller version or the real thing allows for faster progress.



Shooter design



I learned that compression helps build more force without using tons more force for range.

All ideas never made it

Lessons learned about how to make a quick prototype for learning purposes to learn if it will work. And using material that's easier to change into different forms helps makes prototypes easier and faster

Goals achieved during FTC

My goals are:

1. Build successful systems
2. Promote teamwork
3. Better prototypes

I achieved goal one and I have achieved it by many prototypes which led to me to learn how to make prototypes properly.

I learned you have to make it known what you're doing and that you're open for anyone to join, they can and have something for them to do when they join right away. They would not get bored and so you don't waste their time.

I learned by making multiple prototypes that making prototypes at a easy size and easy deforming material so it won't take much time to make a prototype and make it easy to take apart to make adjustments.

FRC

Goals

1. Get more involved
2. Have a better plan to build
3. Learn how to properly make parts for the robot to exact measurements.
4. Build parts and prototypes without wasting time and resources on ideas by predicting success of prototype

Achievements

1. Making a successful mechanism that is very easy to adjust and work around and functions above expectations.

2. Practicing interdependence with other students who are practicing it as well.

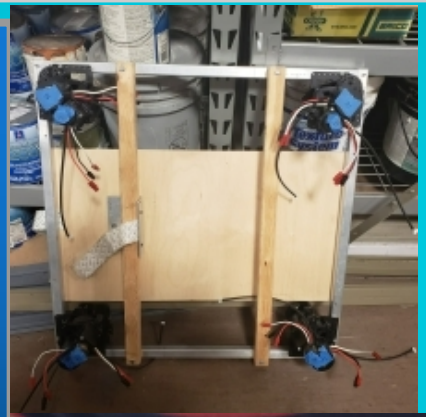
3. Building a mechanism that outperformed expectations.

4. Helped develop most of the robot with other students.

5. I was able to get correct measurements to the right 0.001 with a dial caliper.

FRC Drive train prototype

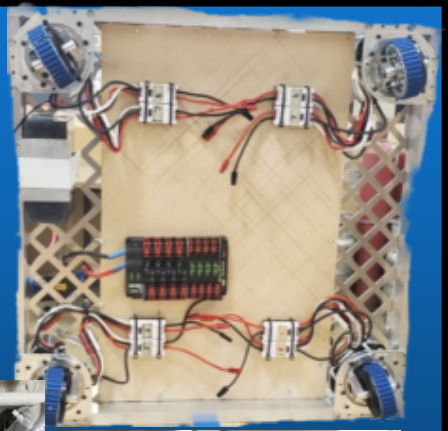
I learned that by using 1 by 1 rather than 2 X 4s to make a drivetrain prototype to account for all issues that will be encountered in the real drive train

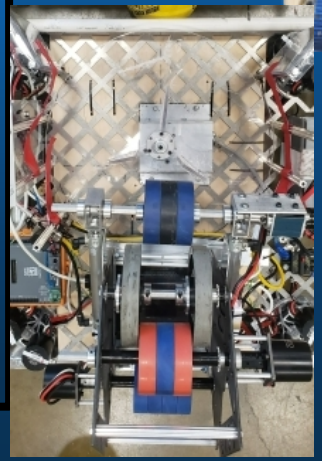


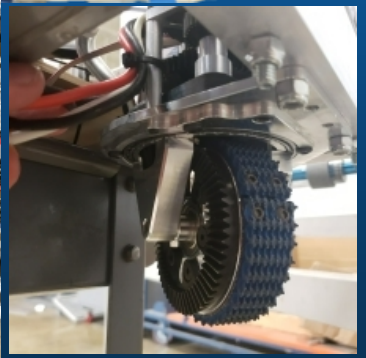
I learned that when building a prototype you use materials that are less expensive and are more common and easier to get so you could save the stuff that is good for the final product.

Final drive train

The drive train was welded and cut to 30 x 28 in frame.
I learned that when cutting drilling you clamp close to the point that your working at.



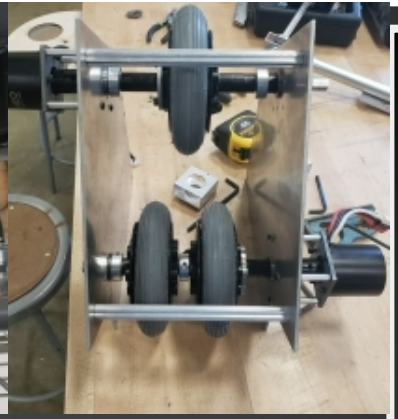


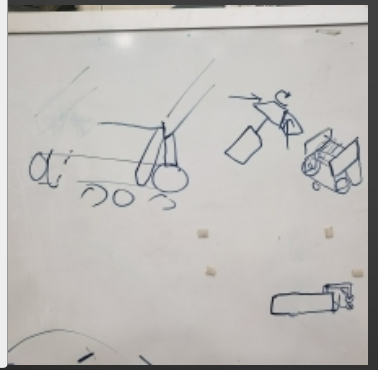


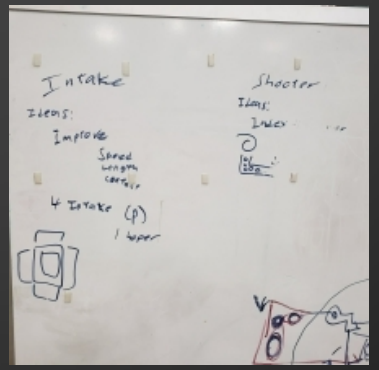
I learned prototypes are just made to find issues and so you know what to do when building the actual version and makes building it easier.

Designing robot with Jake

I learned that speaking last you know everyone's ideas and you can use their ideas to build on yours or theirs.



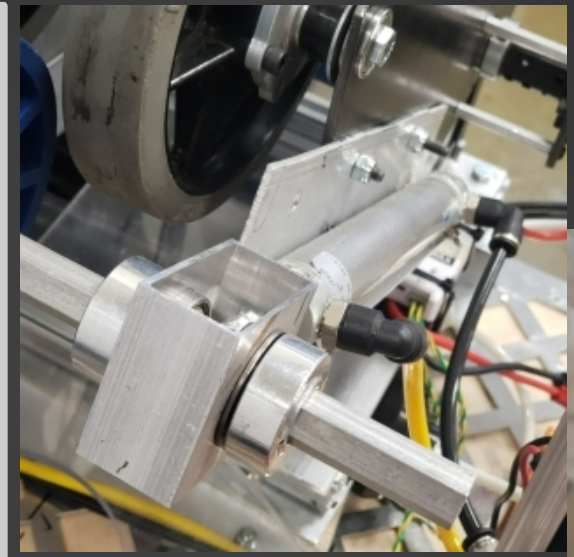


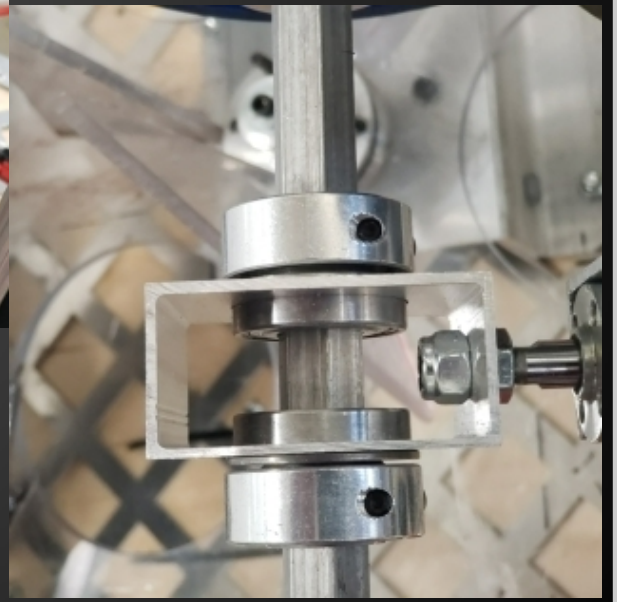


When we designed the robot we wanted to design a robot that would challenge and be something that we didn't do before so we decided a over bumper intake indexer, revolver indexer, and piston passage for balls to shooter.

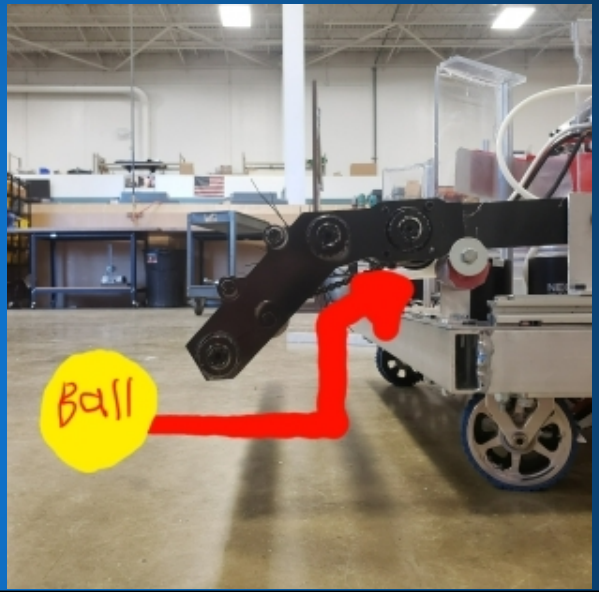
Piston system

I learned how to use a caliber very well making measurements with precision. Also learned how to use pneumatic systems.





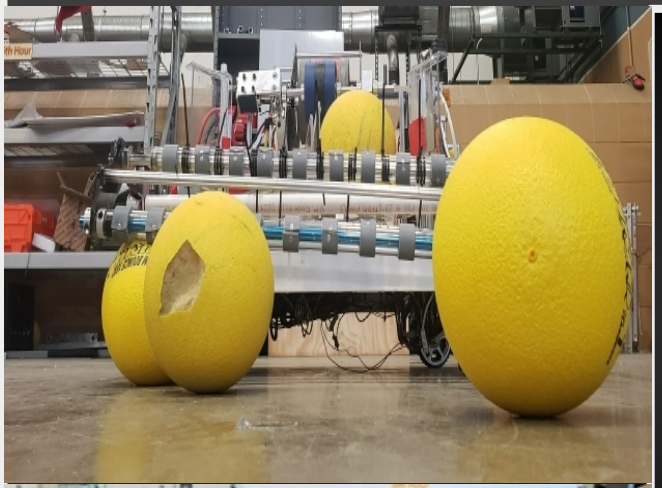
Step 1 Intake

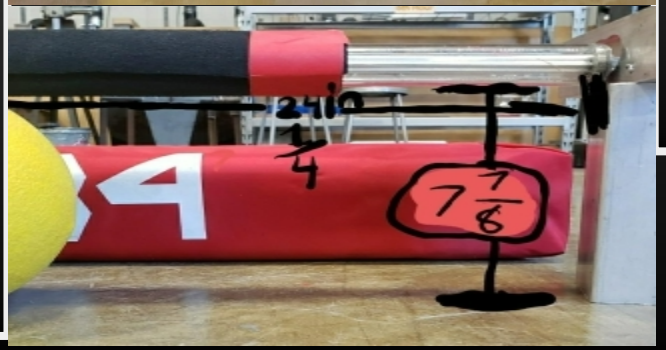


First step was to go over ideas of what's possible and find measurements that were must be taken into consideration when building the intake

Designs of intake

First design was about full contact system with rolling pins made of plastic to press the ball against the bumper to bring the ball from ground to indexer.





I started the project and build up the idea and it was similar to the idea in FTC but bigger and meant to be more efficient and fast at it’s job too.

After season project goal

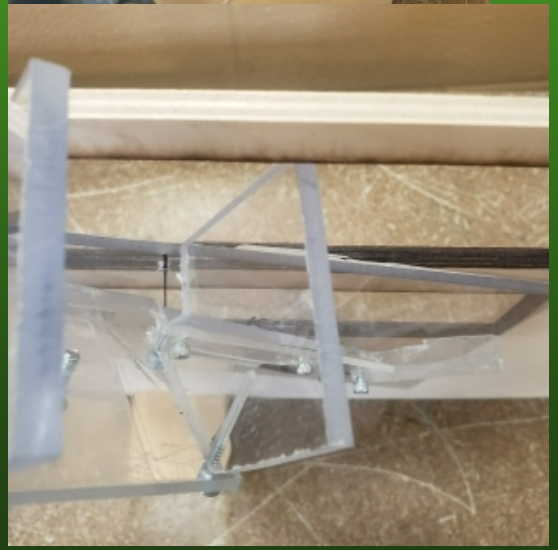
To build and make a sorter that sorts washers from everything else and have the sorter sort washers by size as a plus and must be done without much human labor





Prototype 1

So starting this I learned that to reduce any chance of jams I would have to make the whole system far from a being at any point or place that has a 90 degree angle to reduce the chance of any material item would catch a corner causing a jam.
From this prototype I learned I dream big and that I must use thick materials to make building easier



Prototype 2

Starting I made this one more rounded and made both the tube that the washers fall in round and the bolts and nuts a rounded tube as well. After building the prototype another issue that the washers couldn't be sorted because of other materials. I learned that tom make something good your going to do a lot before you get it right and that I have to make each material gain force during the falling part.

Picture was never taken

After doing the second prototype I learned that when building this I will need to be committed which I was and kept myself encouraged and kept trying.

Prototype 3

This next prototype I added a drop which went down to a 23 degree angle with a crack for washers to fall thru but bolts to hit and then fly in the direction the degree pointed. This worked better but when you put big stuff in it jammed.

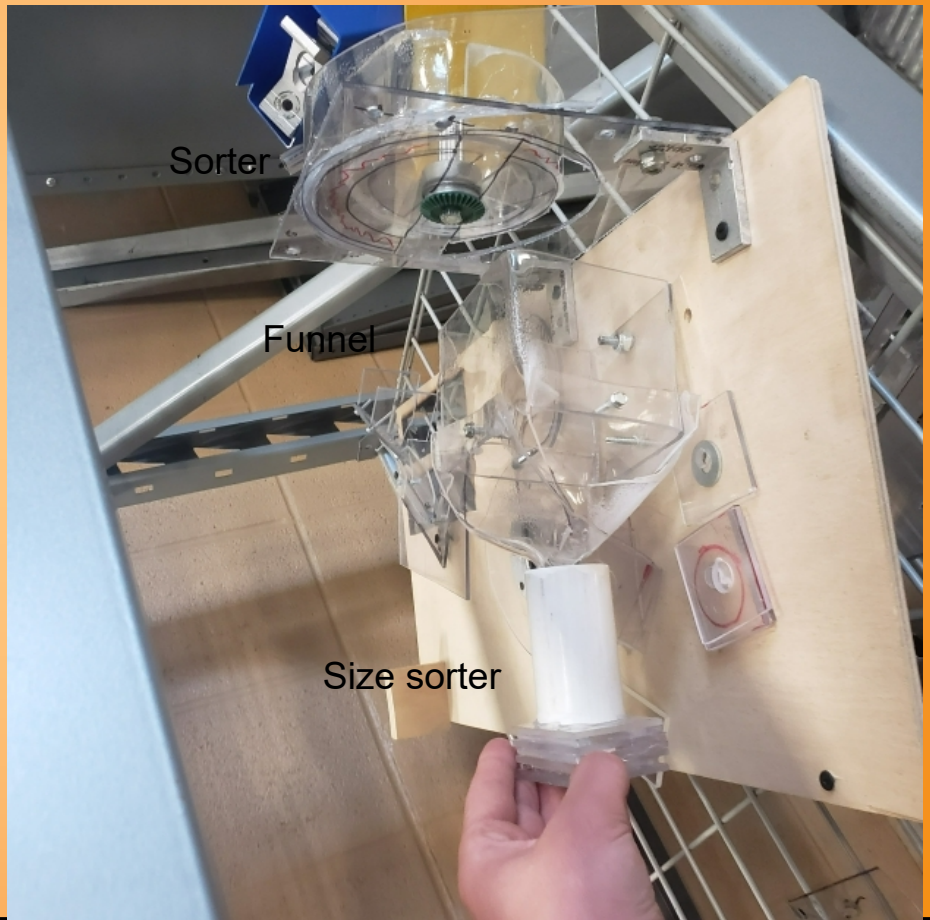
I build everything you see on these prototypes besides the board that holds each prototype.

Prototype 4

I added on to the idea before but added rounded the inside of the crack and then added a white tube for materials to fall and accelerate down the fall to insure more success.

Prototype 5

Again it failed because each piece had to fall just right so instead of just using gravity I turned to making a machine that uses both gravity and human power which is a spinning mechanism with a funnel under. And then a sorter system with a spinning wheel with a rode connected to the outer ring of wheel which spins to push make the forks go back and forth to push out only correct sized washers



Lessons learned

This second semester has taught me that making something hard takes a lot of prototypes and making the prototype use something that is much easier to work around and that using a vise on a table makes working on things much easier and to carry out a plan you must first get supplies then tools and find an open clean space that you can work with and not everything needs to be complicated and sometimes just need to be stupid simple to achieve what you want and need from something.