Team Photo

Team Profile

Tatum- 10th Grade, Builder, School activities are Robotics. Hobbies include playing any video game he can get his hands on but he prefers minecraft.

Dane- 11th Grade, Builder, School activities are Robotics and football. Hobbies include Hunting, fishing, and hanging out with friends. He also enjoys farming

Chelsie- 10th Grade, Programmer and notebook. School activities are Robotics, Trap shooting, and track. Hobbies include sleeping, hunting, fishing. And hanging out with friends

Reece- 11th Grade, Builder, School activities are Robotics, Basketball, and football. Hobbies include hanging out with friends and playing sports.

Andrew- 10th Grade, Builder. School activities are Robotics and football Hobbies include CNC work, 3d printing, and making wood projects

My Projects

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My Projects

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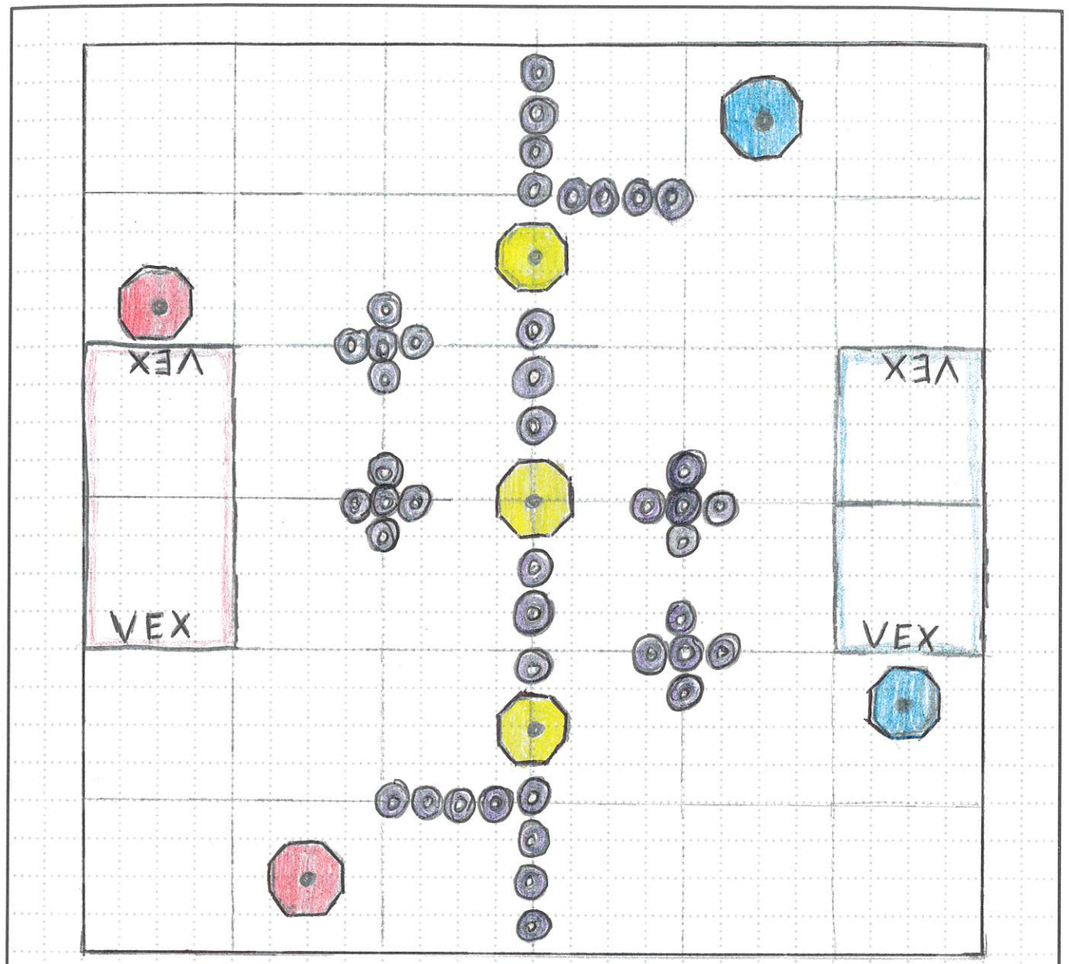
Project Management: Explanation of how and when this project is going to be completed. Who will be involved? What materials are needed? What is the time frame?



Tipping Point

The object of the game is to attain a higher score than the opposing Alliance by Scoring Rings, moving Mobile Goals to Alliance Zones, and by Elevating on platforms at the end of a match. It is played on a 12'x12' square field. 2 alliances one (Red) another (Blue). Teams each Compete in matches consisting of a 15 second Autonomous Period, followed by a one minute and forty-five second Driver controlled Period

project: Introduction to game designed by: Chelsie Nelson witnessed by: Tatum Carlson

date: 9/6/21

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Ring on / in a scored mobile Goal	Mobile Goal High Branch	10 Points
	Any other Mobile Goal Branch	3 Points
	mobile Goal Base	1 Point
Neutral mobile Goal	Either Alliance's Home Zone	20 Points
	Elevated on a Balanced Platform	40 Points
Alliance Mobile Goal	Correct Alliance's Home Zone	30 Points
	Elevated on Correct Alliance's Balanced PF	40 Points
Robot	Elevated on Correct Alliance's Balanced PF	30 Points
Alliance	Wins Autonomous Bonus	6 Points

Details: there are seventy two Rings and seven mobile goals on a VRC tipping point field. Each alliance has two alliance mobile goals, with the remaining three goals being neutral. Each Alliance also has a platform located in their Home Zone.

Rings scored on an alliance mobile goal will count for the respective alliance, regardless of where it ends the match. However, Rings scored on a neutral Goals will only count for an Alliance if the mobile Goal ends the match in their Home Zone!

As the match draws to a close, Robots will start heading back towards their alliance platforms. Alliances can earn additional points for each robot and mobile goal that ends the match elevated on a Balanced alliance Platform.

The alliance that scores more points in the autonomous period is awarded with six bonus points, added to the final score at the end of the match. Each alliance also has the opportunity to earn an additional Win Point by scoring at least one Ring on each of their alliance's mobile goals, and "Clearing" their autonomous win point line. This Bonus can be earned by both alliances, regardless of who wins the autonomous Bonus.

project Introduction to game designed by: Chelsie Nelson witnessed by: TaTum Carrlson

date: 9/6/21

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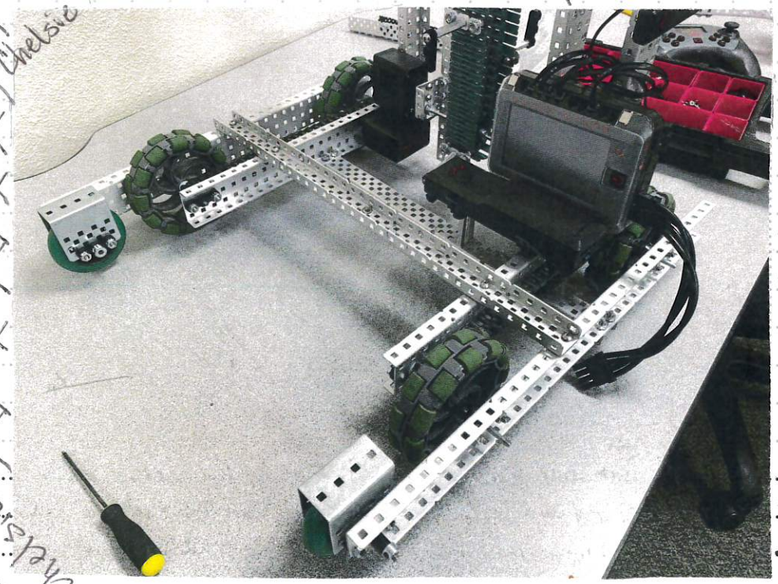
Our first practice we started on the chassis's basic design-with a standard 4 wheel 2 motor design we assembled the chassis using 1x3x1 C channel. As well as 1x2x1 C channel. We then had to afix the wheels to the chassis. Our first goal for our Robot was to score Rings on goals by using a chain drive with 6 hooks attached ran off a regular speed motor.

We built the frame work using 1x2x1 C channel held together by 1x12 flat plate for stability. This was attached to chassis that ran straight up + down. After further examing and building we had trouble lining up the belt and also trying to line up the rings for the intake.

we had to figure out a better system to line up the rings so with that we shifted our focus to building the Robot to be able to pick up the mobile goals and move them so we ended up taking off the Chain drive with hooks and regrouped. We then sat down and figured out our plan on the best way to pick up the mobile goals.



project Frame building designed by: Chelsie Nelson witnessed by: TaTum Carrlson

date: 9/7/21

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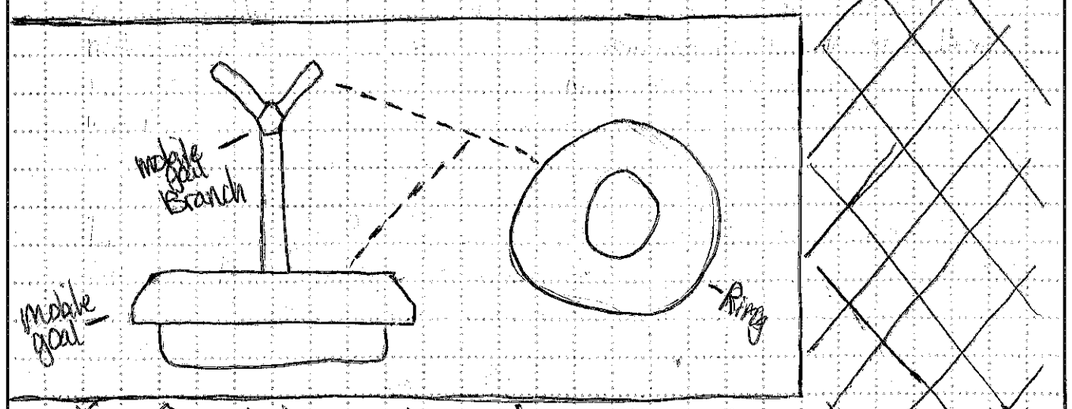
Our second practice, we disassembled the robot to reconfigure the intake, and to start building a lift system for the mobile goals. We thought a scissor lift would be the most efficient and would be the most durable.

We want to be able to score more efficiently and also to have the ability to move the goals.

At this time we are having problems on the set up and the scissor lift. The placement of goal intake too is a problem because it doesn't want to line up right to be able to pick up the goal. We're still doing trial and error for this intake.

After our second practice we still need a lot more time for designing and planning. We all think with some more time we'll have a Reliable Robot that can both pick up mobile goals and score rings.



project Intake & Lift Set-up designed by: Chelsie Nelson witnessed by: Dane Arveson

date: 9/8/21

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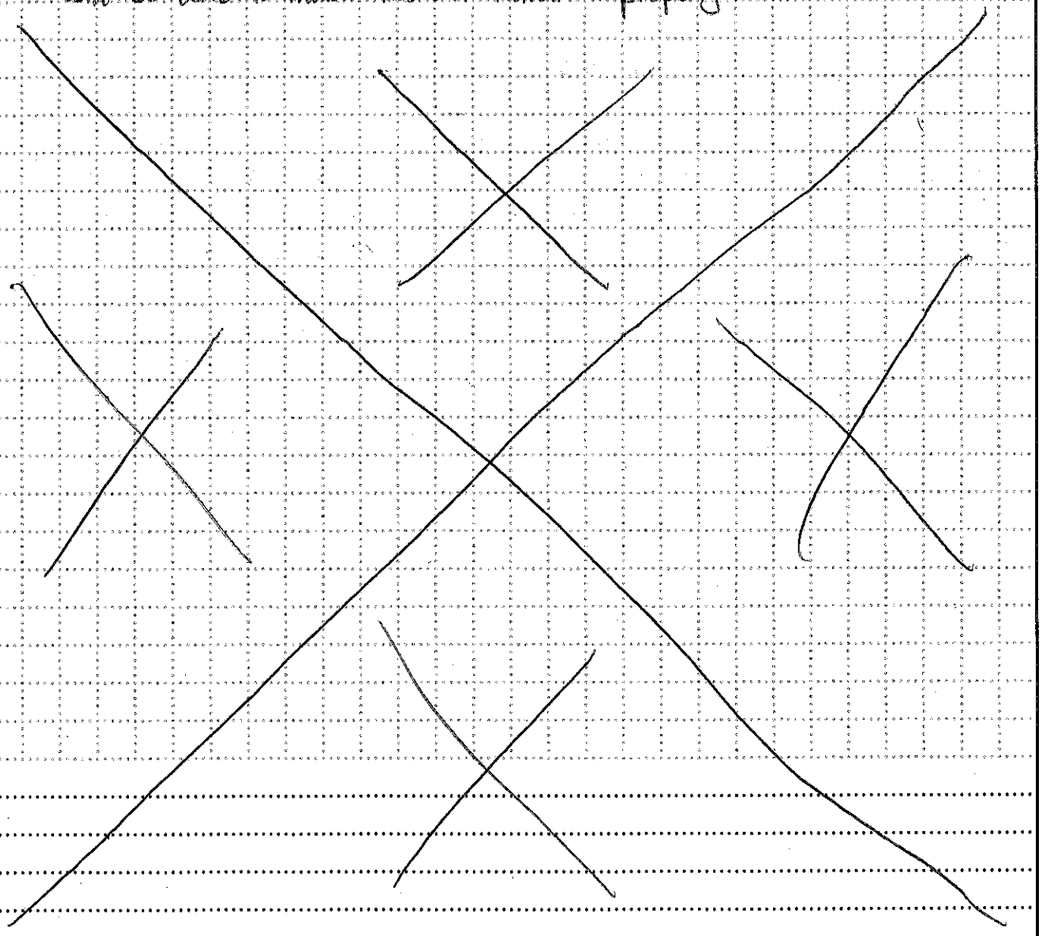
We widened the drives to get more room for the mobile goal mover. We needed to be able to fit goals within the robot to be able to grab them with the fork. Most of our first design didn't work, we either struggled with it not fitting the goal in the forks, or our lift wouldn't lift the mobile goal.

In order for us to fix these problems we had to find a design using both: the correct height and be able to fit around the bottom collar of the goals and we also needed to make sure that the motors will be able to make the lift function properly.



project Robot modifications designed by: Chelsie Nelson witnessed by: Dane Arveson

date: 9/14/21

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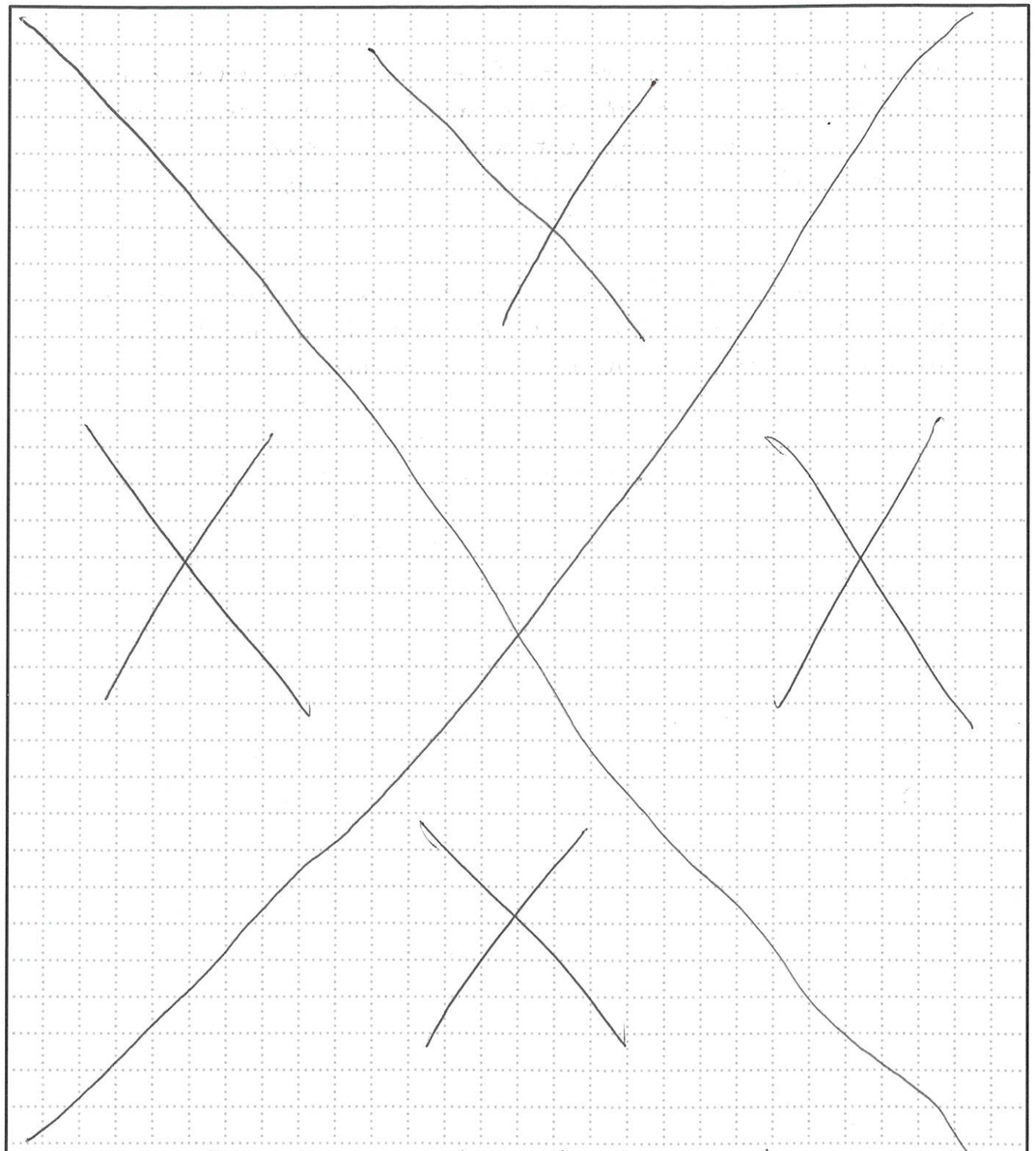

We are currently working on making a 4bar lift. Since the scissor lift didn't have enough power to lift a mobile goal. our main goal is to be able to lift a goal on the balance platform. We found it very difficult to build the bar lift and for it to work with our robot design.

project 4-bar lift designed by: Chelsie Nelson witnessed by: Dana Arveson

date: 9/15/21

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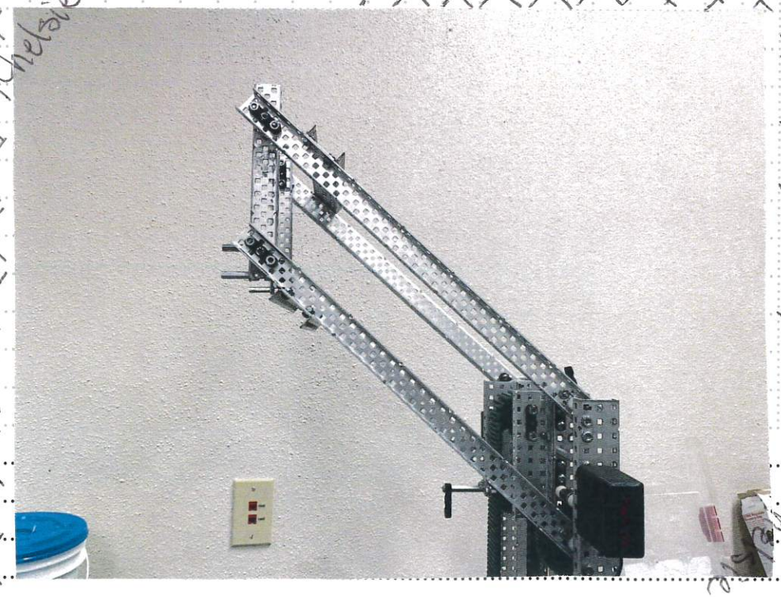
we were finally able to get the 4bar lift on our robot and if to work we had to adjust the height and length of it once we got it on our robot. But after the adjustments we were able to lift a mobile goal up with no problem.

After the lift was on we shifted focus to the inside of the robot we started with shortening up the inside chasis rail to be able to fit our mobile goal bracket. We also started building a pivoting bracket to be able to carry the goal.

we decided mounting the bracket to our robot would help pickup and move the mobile goals better. We did encounter some struggles when it came to mounting the bracket to the robot. the main problem was just the design of the bracket, another problem was to be able to stop the pivot so it wouldn't go to far.

We quickly rebuilt the bracket and mounted it to the robot, we shortened it and made the width smaller.

Chelsie



project 4-bar lift designed by: Chelsie Nelson witnessed by: Dana Arveson

date: 9/21/21

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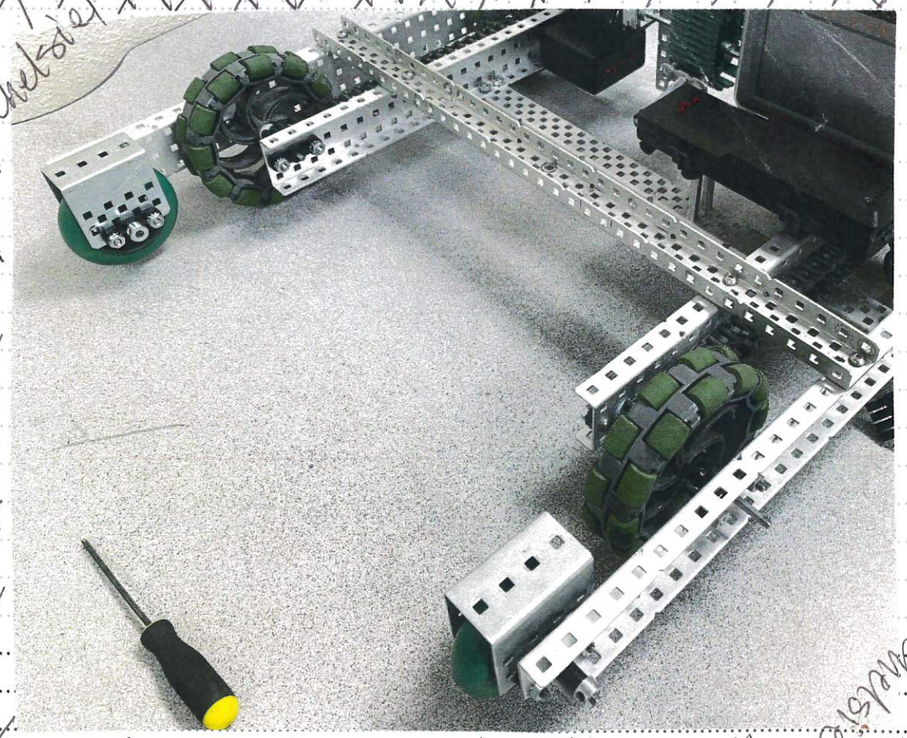
Today we got the battery clip into place and mounted the brain. our first day test driving our robot we found it's not balanced and we have metal catching so we can't drive up on the platform. we also needed to add weight to our robot so it wouldn't tip over when we lifted goals or turned to fast.

Instead of adding weight we added 2 more wheels to the front for more support. Also to help us get on the platform. we ended up cutting the extra metal that was catching in the back. Adding the 2 wheels worked and we are able to get on the platform. We struggled with some metal bending since the wheels were a quite of bit smaller than the others. but we were able to get it to work



project Test driving designed by: Chelsie Nelson witnessed by: Dane Arveson

date: 10/15/21

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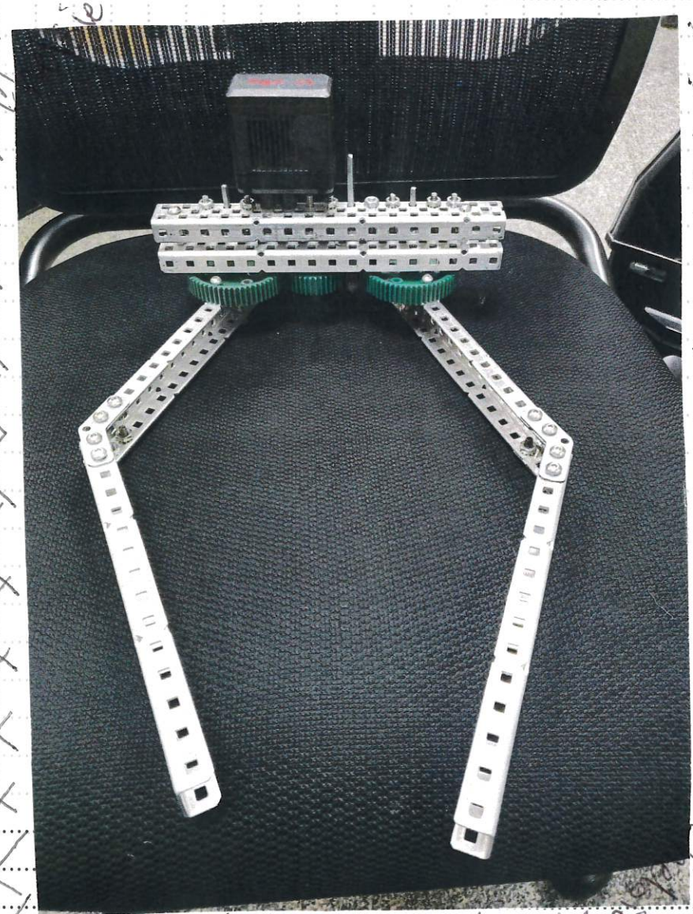
we had to come up with a way to score efficiently and the passive intake we had wasn't working the way we wanted, so we scrapped that intake and decided to go with a moveable claw to pick up the mobile goals and put them on the platform.

The claw will be able to move up and down and also open and close. with adding 2 motors for the claw we're now up to 6 motors total on our robot.



project Claw assembly designed by: Chelsie Nelson witnessed by: Andrew G England

date: 10/16/21

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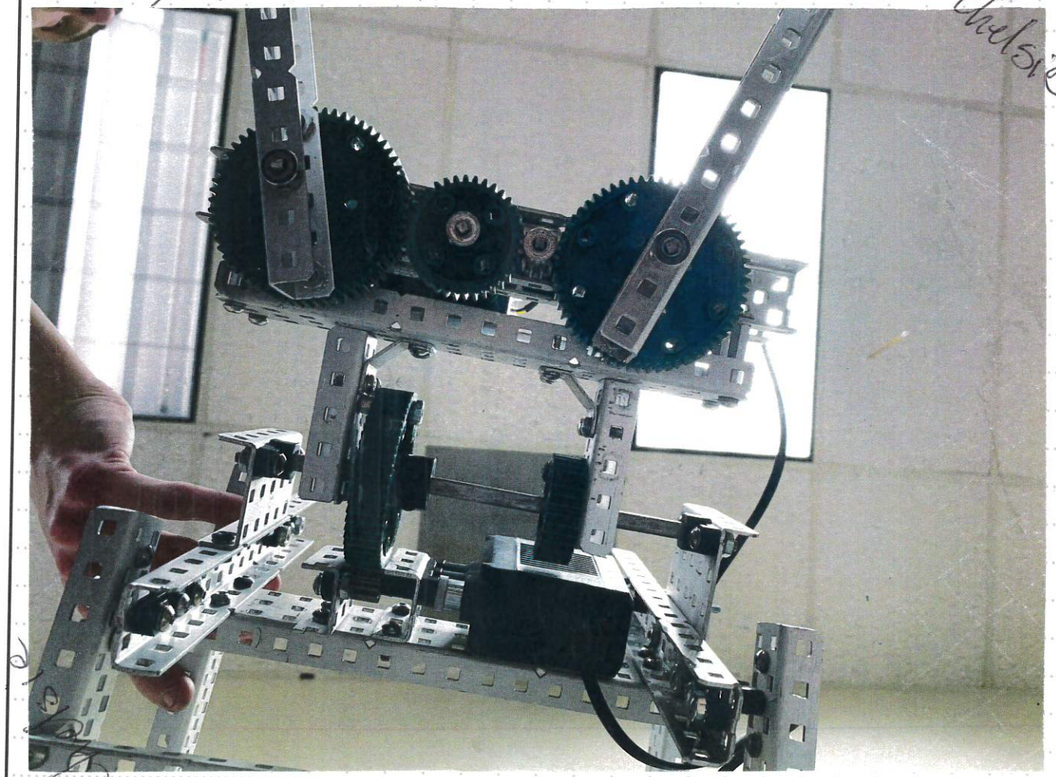
Chelsie



We decided to attach the claw to the Robot with a joint we'd decided to do this so we can both fit inside the 18"x18"x18" starting size and also be able to adjust the claw positioning during a match.

project Claw assembly designed by: Chelsie Nelson witnessed by: Andrew G. England

date: 10/12/21

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We ran into a small problem with torque and the motor not being able to support the weight of the goal while trying to lift. Also the shaft is bending so we changed to a higher strength shaft.

After putting on the bigger shaft, we installed the claw again using larger bearings. We also added some weights to the back of the Robot to prevent tipovers while holding or lifting a goal.

Some of the struggles that we encountered had to deal with.
- how much weight to add
- the placement of the claw
- getting the bigger shaft to fit
- wrist motor shutting off

We got the weight figured out so it wouldn't tip over when we picked up a goal. The placement of the claw and getting the shaft to fit was the hardest to figure out. We ended up drilling the the robot a little to fit the shaft and once that was good the placement of the claw worked out and stopped hitting things.

We have a pretty good functional robot that works, except we haven't figured out why the wrist motor quits when we're trying to lift a goal.

project Robot modifications designed by: Chelsie Nelson witnessed by: Andrew G. England

date: 10/13/21

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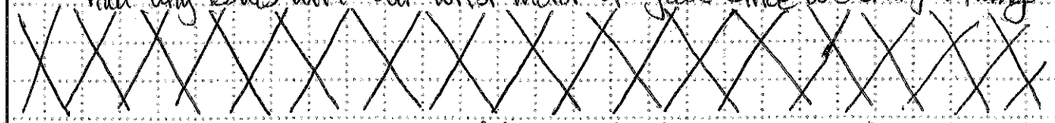
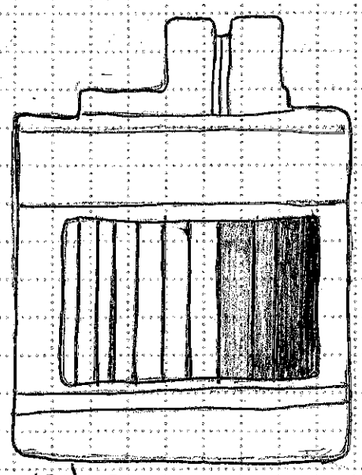
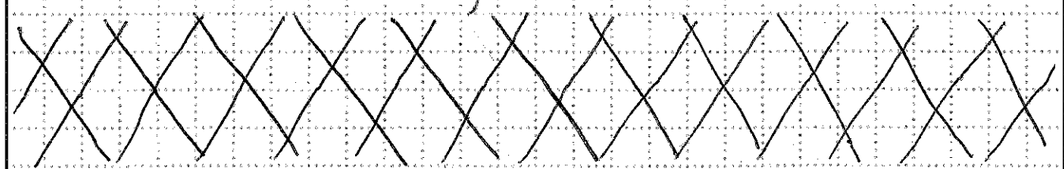
We determined what was wrong with our wrist motor and the gears slipping. After looking into it more in depth, we found that the gears were not lined up properly. Also, we noticed that the motor would lose connection. We changed the port and reprogrammed the wrist motor, and it seems to stay connected. As for the gears, we moved the location of the shafts which realigned the positions of the gears. We have not had any issues with our wrist motor or gears since we changed things.

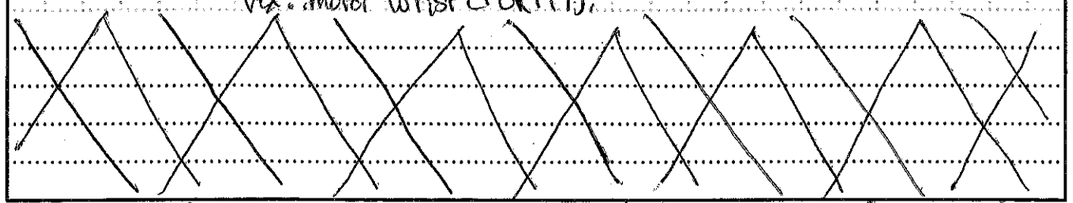





```
if(Controller1.ButtonA.pressing())
{
  wrist.spin(directionType::fwd, 50, velocityUnits::pct);
  wrist.spin(directionType::rev, 50, velocityUnits::pct);
}
else if(Controller1.ButtonB.pressing())
{
  wrist.spin(directionType::rev, 50, velocityUnits::pct);
  wrist.spin(directionType::fwd, 50, velocityUnits::pct);
}
else
{
  wrist.stop(brakeType::hold);
  wrist.stop(brakeType::hold);
}
```



Vex::motor wrist(PORT17);



project Wrist fixes designed by: Chelsie Nelson witnessed by: Reece Sundberg

date: 11/18/21

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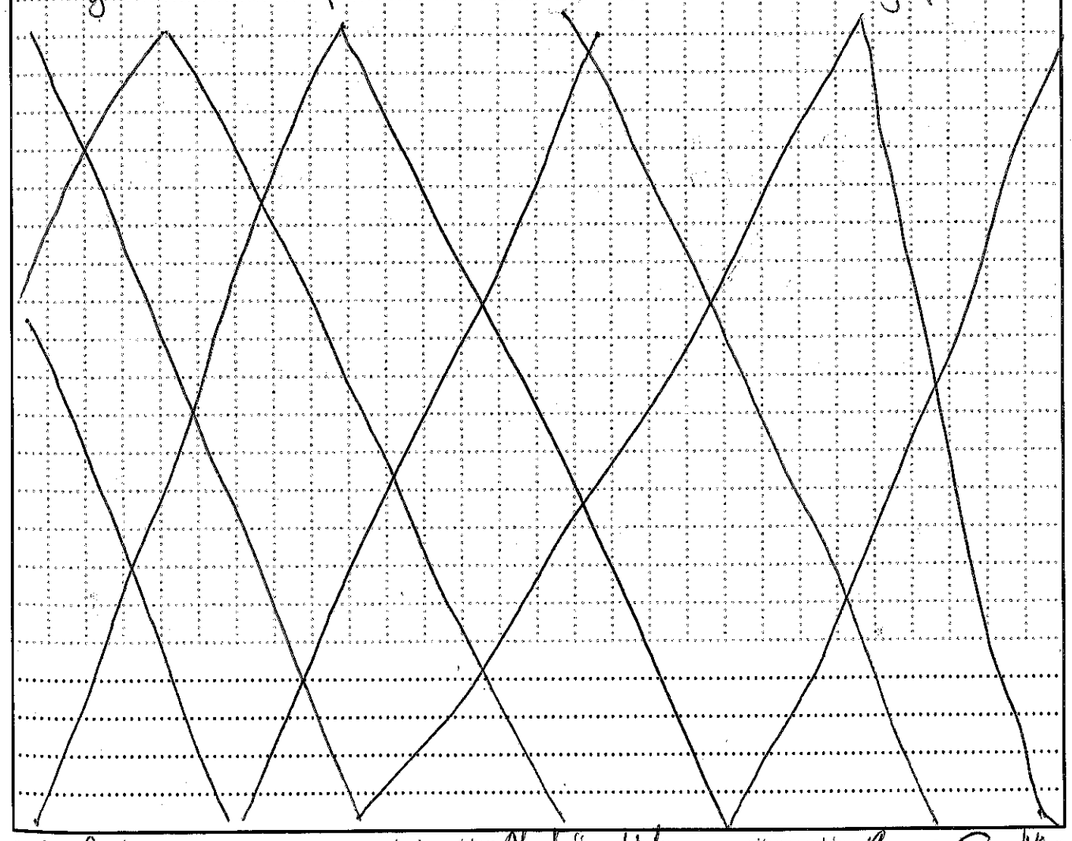
We have now started with autonomous. our main goal is to pick up the goal that is holding the platform unlevel and placing the goal on the platform to change the 20 points into 40 points.

During testing autonomous, we found that we were hitting the wall which was preventing us from turning. To fix this solution, we thought about making our drive a true H drive and we have now added a motor and wheel the opposite direction to be able to slide away from the wall.

We put the H drive on and we reread the rules and found out that for our autonomous, putting a mobile goal on the plat form does not count for any points.



project Autonomous designed by: Chelsie Nelson witnessed by: Reece Sundberg

date: 11/19/21

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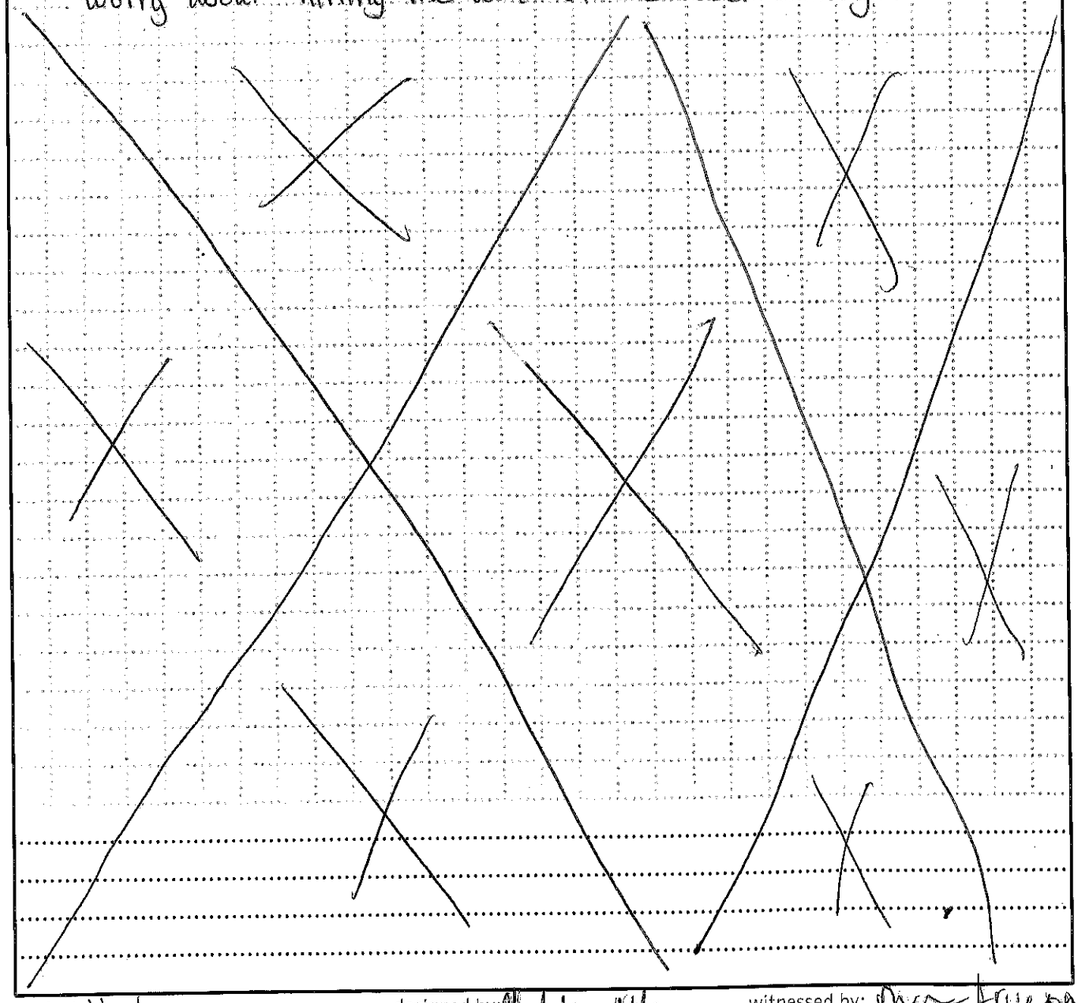
we had tried the H drive and it didn't work the way we wanted it to, so instead of wasting one of our motors on it we just took the wheel and motor off. So then instead of redesigning the robot we just figured out a different stradegy to score points in autonomous.

We decided to just have the robot drive forward and drag a yellow mobile goal back into our home zone. Then we didn't have to worry about hitting the wall or the robot turning.



project H-drive designed by: Chelsie Nelson witnessed by: Dave Arveson

date:

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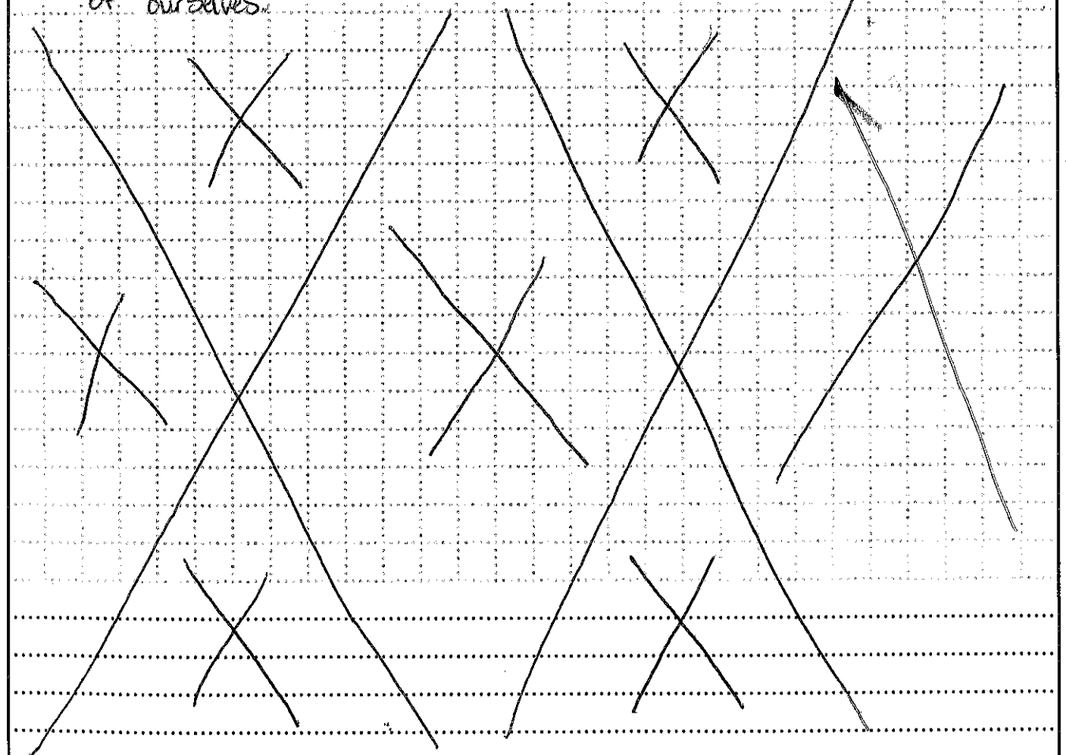
Tournament day it is and we didn't start out to strong. We had motors stop working in the middle of the match or our claw didn't work when we finally had a small break before our next match, so we took the robot back to our table and switched ports for the motors and put some re-enforcements on the claw

After we made those changes we ended up winning a few matches. We finished the tournament in 14th placed. which wasn't bad since it was the first tournament and we had problems with our robot.

We made it to the semi-finals and we lost but we learned a lot and what we needed to change on our robot we won the excellence award for the first time and we were all so proud of ourselves.



project Tournament Run designed by: Chelsie Nelson witnessed by: Dave Arveson

date: 11-20-21

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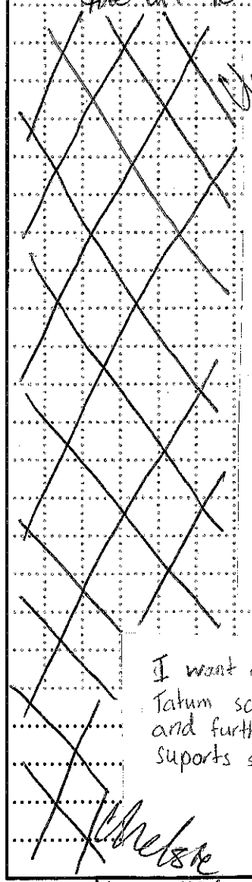
Our next practice after the tournament our team split up into different rooms and we wrote down all the ideas we had for the robot or improvements we wanted to see done to our robot.

We found that the best way to fix our robot we all got our thoughts and ideas out and there was no arguing or disagreement. When we came back together we shared our ideas and talked as a team.

We came up with together to re-design our claw but also to add 2 more motors onto our lift that would help the strength of the lift to actually be able to lift a mobile goal.

Chelsie



Robot Improvement List

- We need to be able to have a ring intake, that'd especially be nice for autonomous
- We need to make the robot function more efficiently we can't have mishaps like Saturday at State
- We could maybe put an extra motor on the lift so we can pick up the goals faster
- I think we should figure out a new claw design, so it doesn't have the two arms cross each other
- Pneumatics???

I want done with this robot is to improve on the claw by upgrading it to the design Tatum scatched out, I would like to improve the front wheels to extend close to the ground and further out. Last thing we need to improve is the rings getting stuck under the walls and suports so I figure a bullguard or a ring intake or simply a ramp.

Chelsie

Chelsie

project New Ideas designed by: Chelsie Nelson witnessed by: Pam Arveson

date: 11-23-21

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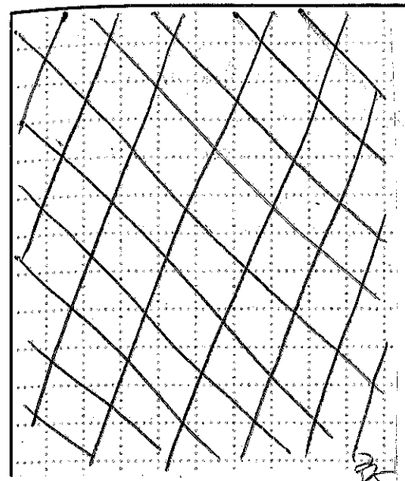


11-23-21

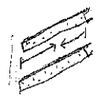
I think we should finish the design we are working on right now for the claw and I think we would benefit and add decals, and probably replace the brain of the robot because we are running low on ports and I think it is because of the brain we are having so many problems, maybe add a bit of a bumper on the front of the frame like the one KCE team so we dont get hung up on the rings again.

Robot Ideas

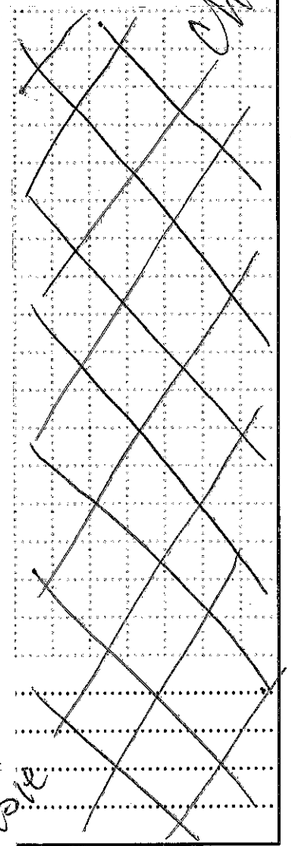
- New Claw - All aluminum grip
  - Better for gripping goals
  - All-aluminum allows for easier goal pick-up

- Bumper guard for rings - push rings out of way
  - Prevents jam-ups that keep the robot from moving
  - Partially acts as a front bumper against other robots

- Shorter lift (if needed for claw)
  - Can help fit in extension regulations (if needed)
  - Reduce amount of power/torque needed



- Remover/Relocate front wheels (if problem with rings continue)
  - Prevents small hang-ups in rings
  - May improve certain "catching" issues with objects



Chelsie

project New Ideas designed by: Chelsie Nelson witnessed by: Pam Arveson

date: 11-23-21

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project designed by: witnessed by:

date:

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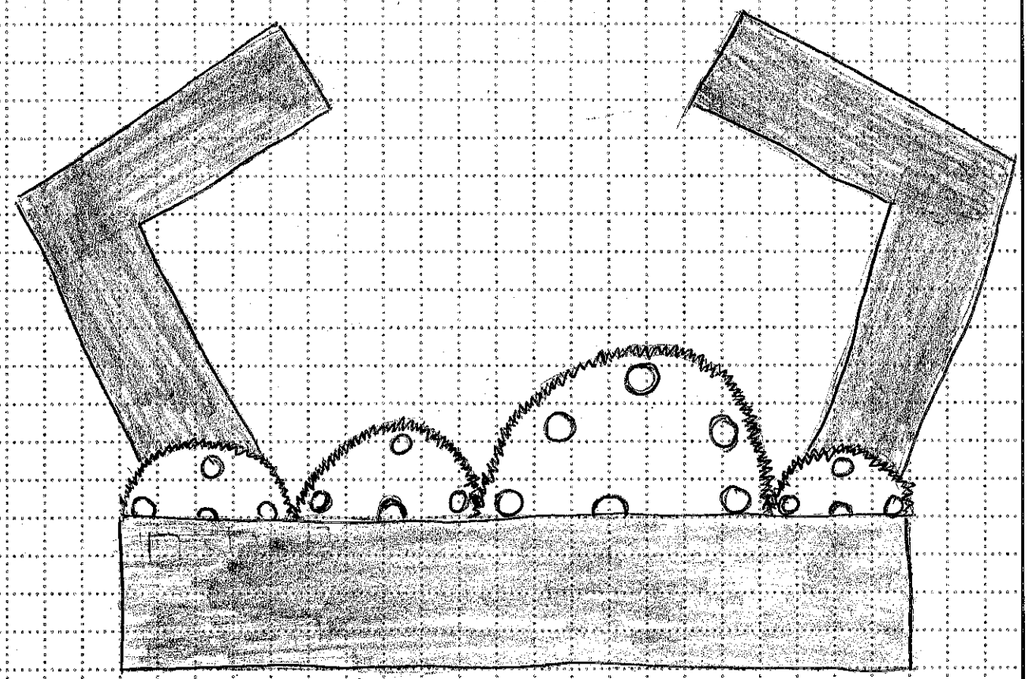
We re-designed our claw for a more effective and reliable claw. Instead of a curve to wrap around the mobile goal like we had, we made it a hook like claw. it now hooks around the goal and it wont slip out.



We also added grips to the end of the claw arms so the goals couldn't slip out of the claw. we held the mesh onto the claw with zip-ties and our claw is pretty reliable.

project New Claw Design designed by: Chelsie Nelson witnessed by: Ben Arvesen

date: 11-24-21

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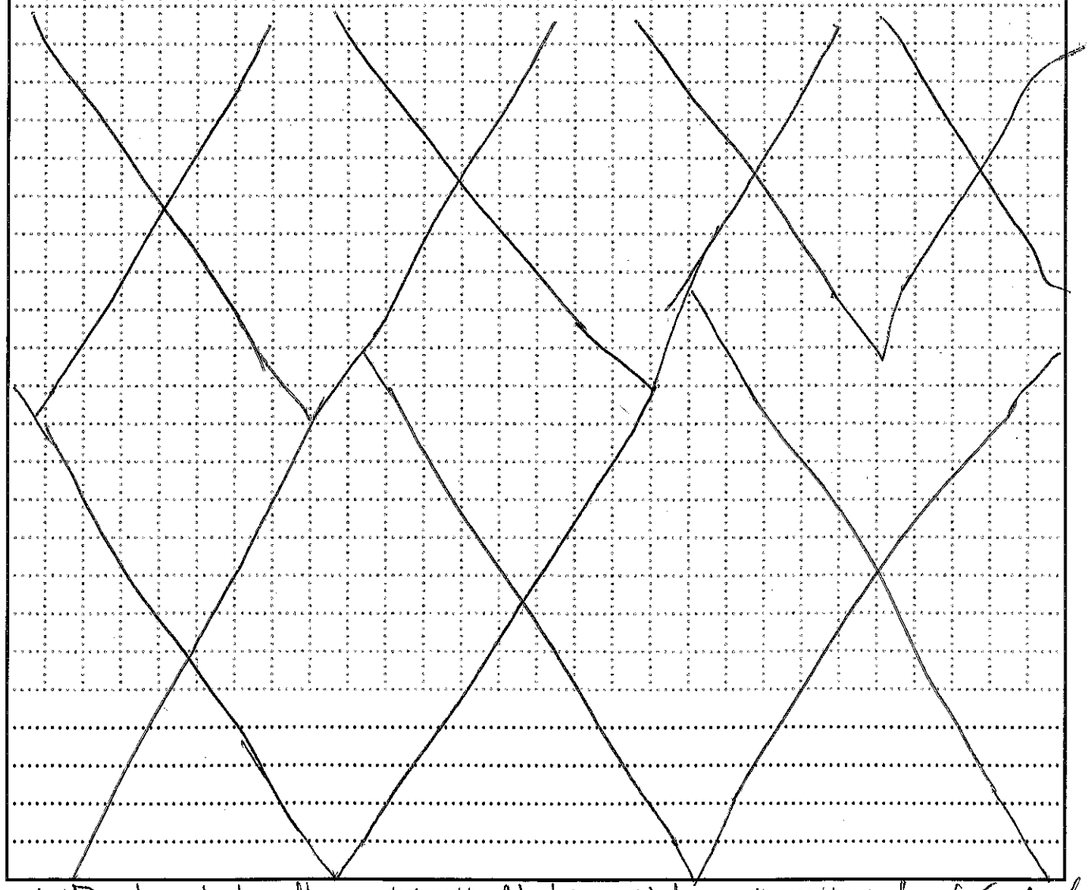
After we had our new claw done and put on the robot, We as a team decided we wanted to put duals on the back of our robot.

So we took the lift off redid our base frame. We had to move the inside bars closer together so we could fit all 4 wheels on the back but still be within size.

Also had to add more spacers to the 2 front wheels so they wouldn't slide around on the new widened space



project Dual put together designed by: Chelsie Nelson witnessed by: Andrew G Engelund

date: 12-15-21

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We all had a nice Christmas Break but now it was time to finish putting the duals on.

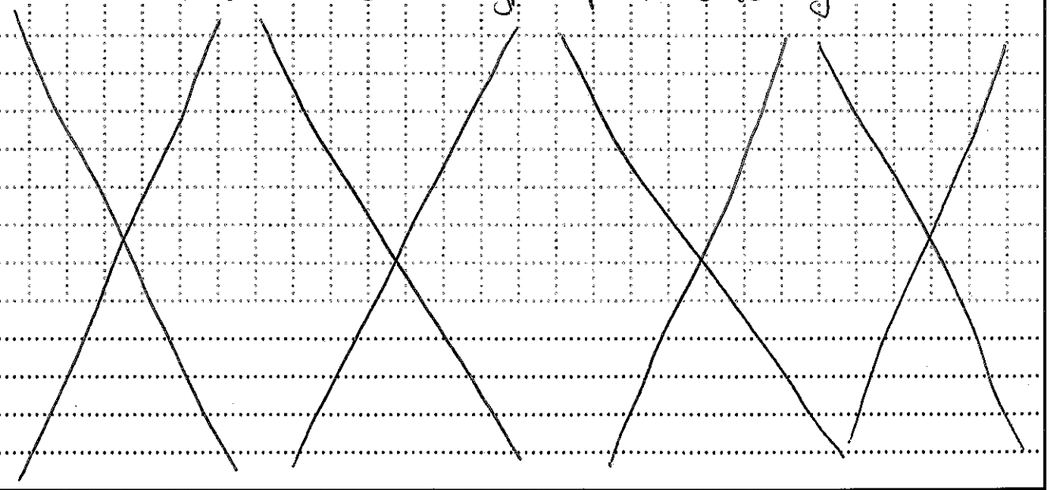
After we had moved the inside bars we started thinking about the best way to put the additional 2 new tires on.

We put them on a shaft and then had to figure out the best spacing for them to be put apart. After many different tries we got the spacing right and on the robot they went.

Meanwhile, our other builder was making small modifications to the lift and claw.

After both halves of the robot were done we put it back into one piece. Now it was time for a test drive. We put it on the field and it didn't move.

Somewhere along the process our code got deleted so now it was time to type up the code again.



project Dual put together designed by: Chelsie Nelson witnessed by: Andrew G Engelund

date: 1-5-22

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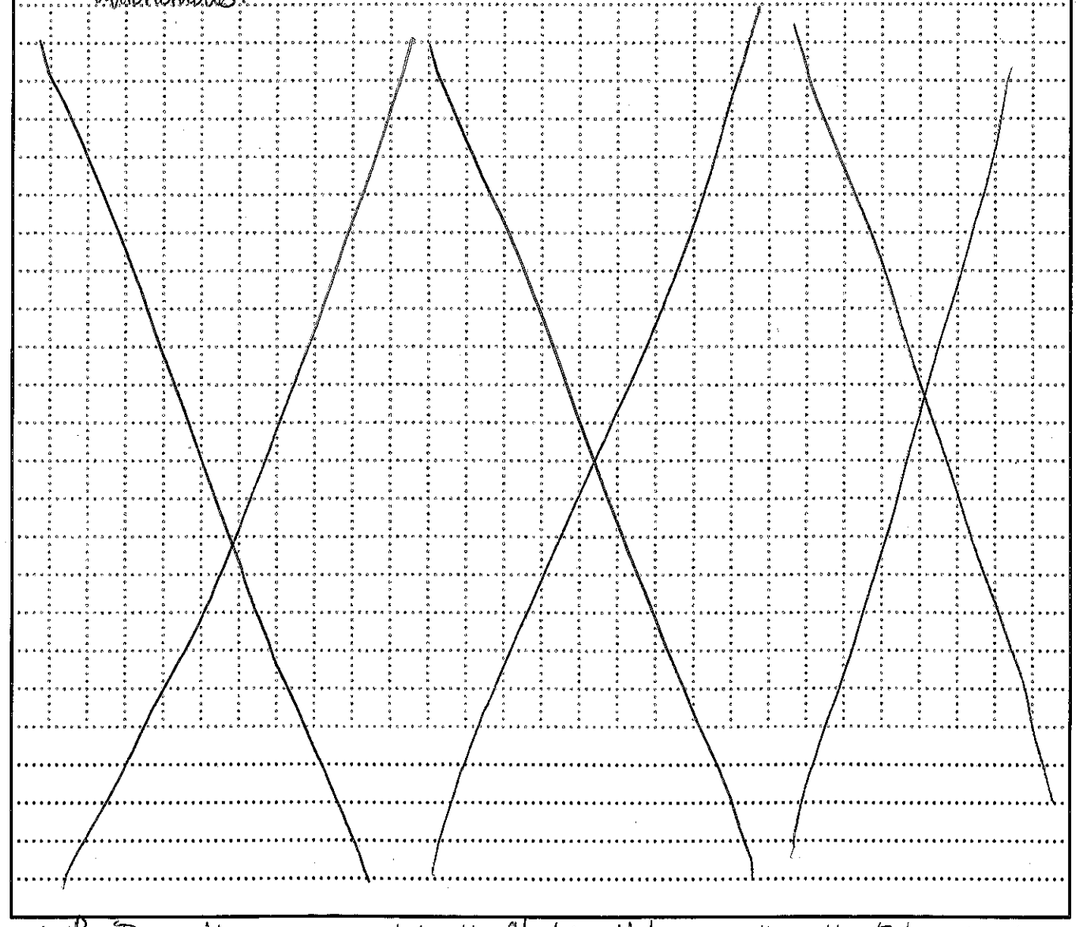
We had tried test running our robot and it didn't move so after looking everything over we found that our code was no longer saved on the controller.

So we sat down and started re-typing our old codes. A few hours later we had a working code and had our autonomous back. Now it was time to test drive our newly modified robot.

After driving for a little bit we came up with our minute autonomous.



project Re-Typing the program designed by: Chelsie Nelson witnessed by: Tatum Carrlson

date: 1-12-22

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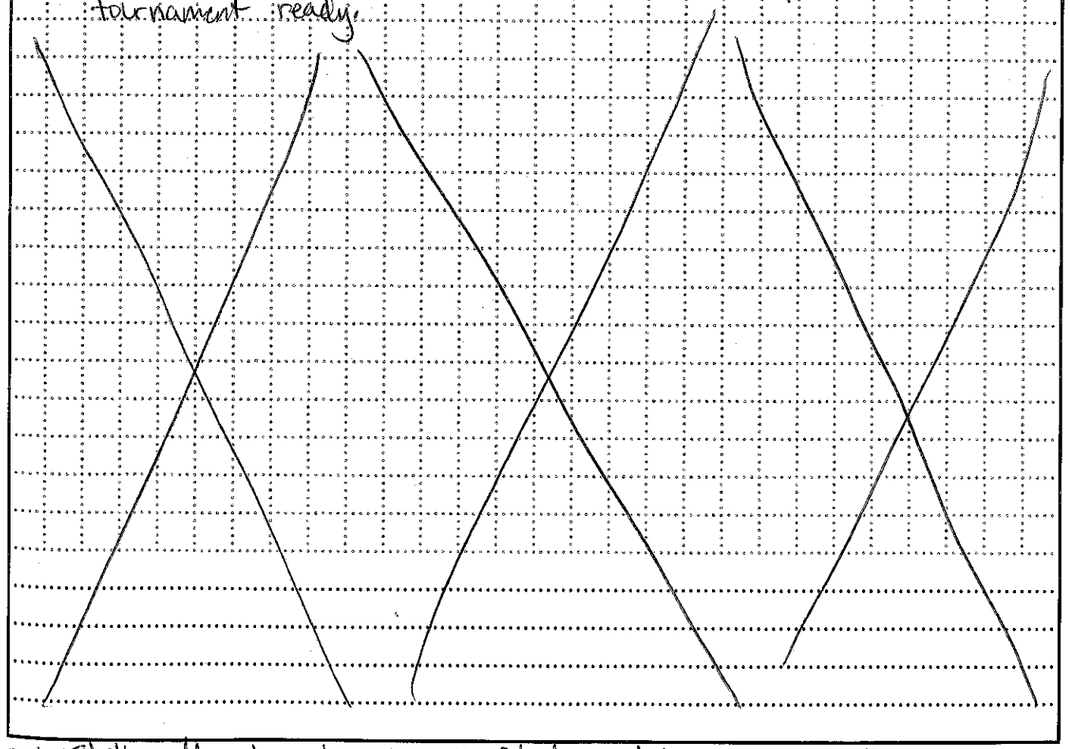
for our minute skills autonomous we decided the best way to score as many points was to push all of the yellow mobile goals to one side and then grab one red goal and bring that to the correct side.

Many attempts at this plan and we were still failing to complete our goal. So now were changing every degree in the program to get it just right. We found the simplest ways to succeed and finish this program was to work on it in sections. after our first section of the program was done we moved onto the next.

After many trial and errors we finally got our results that we were looking for. We ran it through a couple more times and then cleaned up. We're now tournament ready.



project Skills Minute autonomous designed by: Chelsie Nelson witnessed by: Tatum Carrlson

date: 1-12-22

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After the East Grand Forks tournament we found that we had to change the claw again. One of the rounds our claw was open and another robot came and ran into leaving our claw limp and unable to move anymore. So instead of a claw that opens in and out we wanted a claw that closed up and down.

We decided that a claw that moved up and down would be more reliable and would hold the goals better.

project Claw Re-design designed by: Chelsie Nelson witnessed by: Dianne Anderson

date: 2-23-24

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We had a little break from Robotics. We just couldn't find days to have practice. But we're back with our new claw on the robot and working how we wanted it to.

Our new claw was a design of a claw we seen at one of our tournaments. We have one motor and a gear that moves the claw. We have a piece of metal on the bottom that doesnt move and then a hook on the top that moves up and down that will allow us to clamp the goal and move it around

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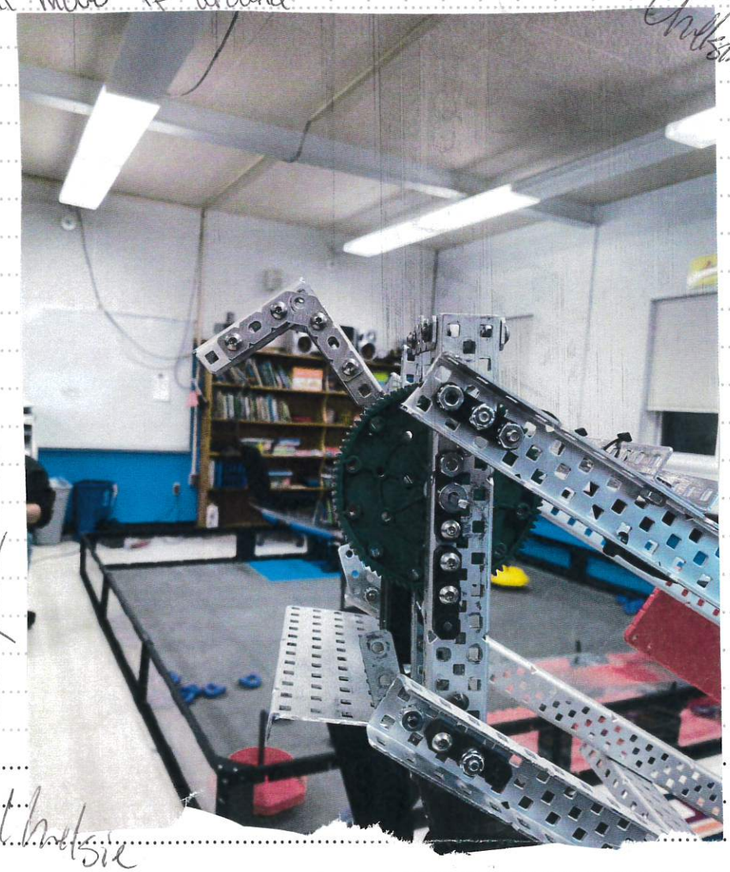

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project Claw designed by: Chelsie Nelson witnessed by: Dianne Anderson

date: 2-23-24

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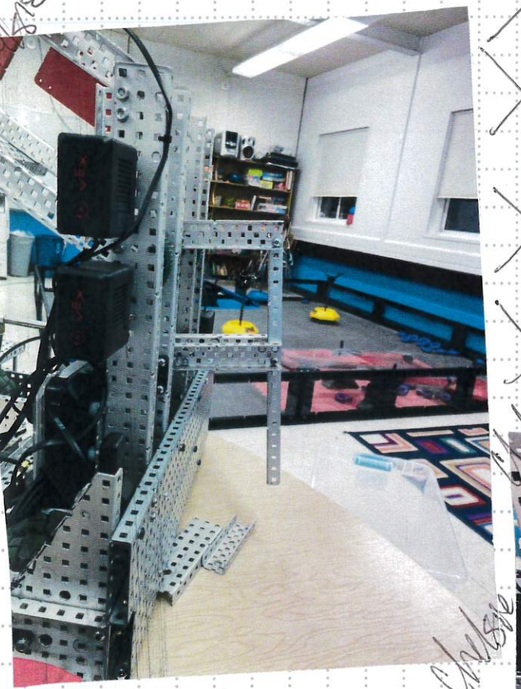

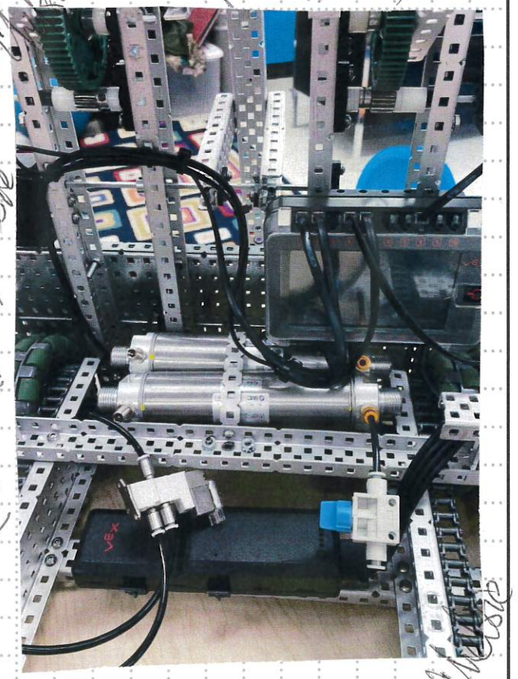

We also thought adding pneumatics to our robot would help us more in rounds by getting more goals at a time. We have 2 hooks on the side of the robot ran by pneumatics. And we have a hook on the back ran by our last motor.

project Pneumatics designed by: Chelsie Nelson witnessed by: Reece Sundberg

date: 2-23-22

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```
#pragma region VEXcode Generated Robot Configuration
// Make sure all required headers are included.
#include <stdio.h>
#include <stdlib.h>
#include <stdbool.h>
#include <math.h>
#include <string.h>


#include "vex.h"

using namespace vex;

// Brain should be defined by default
brain Brain;


// START V5 MACROS
#define waitUntil(condition) \
do { \
wait(5, msec); \
} while (!(condition))

#define repeat(iterations) \
for (int iterator = 0; iterator < iterations; iterator++)
// END V5 MACROS


// Robot configuration code.



#pragma endregion VEXcode Generated Robot Configuration

// ---------------------------------------------------------------------------
//
// Project: 4149C Main Code
// Author: Chelsie Nelson
// Created:
// Configuration:
//
// ---------------------------------------------------------------------------

// Include the V5 Library
#include "vex.h"

// Allows for easier use of the VEX Library
using namespace vex;

vex::controller Controller1;
vex::motor rightDrive (PORT13); //Set right drive to port 12
```

project Program designed by: Chelsie Nelson witnessed by: Reece Sundberg

date: 2-23-22

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```
vex::motor leftDrive (PORT2); // Set left drive to port 2
vex::motor rightLift (PORT5); //Set bottom right lift to port 5
vex::motor leftLift (PORT4); // Set bottom left lift to port 4
vex::motor rightLift2 (PORT15);// Set top right lift to port 15
vex::motor leftLift2 (PORT20); //Set top left lift to port 20
vex::motor claw (PORT8); // Set claw to port 8
vex::motor backClaw(PORT1); // set back claw to port 1


digital_out dig1 = digital_out(Brain.ThreeWirePort.G);// set left pneumatics to 3
wire port G

digital_out dig2 = digital_out(Brain.ThreeWirePort.H);// set right pneumatics to
3 wire port h



// Begin project code

void preAutonomous(void) {
// actions to do when the program starts
Brain.Screen.clearScreen();
Brain.Screen.print("pre auton code");
wait(1, seconds);
}

void autonomous(void) {
Brain.Screen.clearScreen();
Brain.Screen.print("autonomous code");
rightLift.setVelocity(50,velocityUnits::pct);
leftLift.setVelocity(50,velocityUnits::pct);

rightDrive.setVelocity(50,velocityUnits::pct);
leftDrive.setVelocity(50,velocityUnits::pct);

claw.setVelocity(50,velocityUnits::pct);


rightLift.rotateFor(100, rotationUnits::deg, false);
leftLift.rotateFor(-100, rotationUnits::deg, false);
rightLift2.rotateFor(100, rotationUnits::deg, false); //lift lift
leftLift2.rotateFor(-100, rotationUnits::deg);

claw.rotateFor(250, rotationUnits::deg); //close claw

rightLift.rotateFor(-160, rotationUnits::deg, false);
leftLift.rotateFor(160, rotationUnits::deg, false);
rightLift2.rotateFor(-160, rotationUnits::deg, false); //lower lift
leftLift2.rotateFor(160, rotationUnits::deg);

rightDrive.rotateFor(-1300, rotationUnits::deg, false);
```

project Program designed by: Chelsie Nelson witnessed by: Andrew Englund date: 2-23-24

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```
leftDrive.rotateFor(1300, rotationUnits::deg); //drive forward

claw.rotateFor(200, rotationUnits::deg, false); //close claw

wait(1,seconds);
rightLift.rotateFor(100, rotationUnits::deg, false);
leftLift.rotateFor(-100, rotationUnits::deg, false);
rightLift2.rotateFor(100, rotationUnits::deg, false); //lift lift
leftLift2.rotateFor(-100, rotationUnits::deg);

rightDrive.rotateFor(1100, rotationUnits::deg, false);
leftDrive.rotateFor(-1100, rotationUnits::deg); //backup

claw.rotateFor(-100, rotationUnits::deg);
}

void userControl(void) {
Brain.Screen.clearScreen();
// place driver control in this while loop
while (true) {



if(Controller1.ButtonA.pressing()) //If Button A is being pressed
{
dig1.set(true); //Extend right pneumatic piston
}
else if (Controller1.ButtonY.pressing()) //If Button Y is being pressed
{
dig1.set(false); // retract right pneumatic piston
}
else {}

if(Controller1.ButtonLeft.pressing()) // if button left arrow is pressed
{
dig2.set(true); //extend left pneumatic piston
}

else if(Controller1.ButtonRight.pressing()) //if button right arrow is pressed
{
dig2.set(false);//retract left pneumatic piston
}
else {}

this_thread::sleep_for(10);


rightDrive.spin(directionType::rev,Controller1.Axis2.position(percentUnits::pct),
velocityUnits::pct); //Right joystick drive
leftDrive.spin(directionType::fwd,Controller1.Axis3.position(percentUnits::pct),v
elocityUnits::pct); //Left joystick drive
```

project Program designed by: Chelsie Nelson witnessed by: Andrew Englund date: 2-23-24

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```
if(Controller1.ButtonR1.pressing()) //If button R1 is being pressed lift the lift
{
rightLift.spin(directionType::fwd,75,velocityUnits::pct);
leftLift.spin(directionType::rev,75,velocityUnits::pct);
rightLift2.spin(directionType::fwd,75,velocityUnits::pct);
leftLift2.spin(directionType::rev,75,velocityUnits::pct);
}
else if(Controller1.ButtonR2.pressing()) //If button R2 is being pressed lower
the lift

{
rightLift.spin(directionType::rev,75,velocityUnits::pct);
leftLift.spin(directionType::fwd,75,velocityUnits::pct);
rightLift2.spin(directionType::rev,75,velocityUnits::pct);
leftLift2.spin(directionType::fwd,75,velocityUnits::pct);
}

else //If no button is pressed hold the lift where it is
{
rightLift.stop(brakeType::hold);
leftLift.stop(brakeType::hold);
rightLift2.stop(brakeType::hold);
leftLift2.stop(brakeType::hold);
}

if(Controller1.ButtonL2.pressing()) //If button L2 is pressed
{
claw.spin(directionType::rev,50,velocityUnits::pct); //close the front claw
}
else if(Controller1.ButtonL1.pressing()) //If button L1 is pressed

{
claw.spin(directionType::fwd,50,velocityUnits::pct); //open the front claw
}


else
{
claw.stop(brakeType::hold); //If no button is pressed hold claw where it is
}


if(Controller1.ButtonX.pressing()) //If button X is pressed
{
backClaw.spin(directionType::fwd,50,velocityUnits::pct);//Lower the back claw
}
else if (Controller1.ButtonB.pressing())//If button B is pressed
{
backClaw.spin(directionType::rev,50,velocityUnits::pct);//Lift back claw
```

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project Program designed by: Chelsie Nelson witnessed by: Diane Anderson

date: 2-23-22

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```
}
else //If no button is being pressed
{
backClaw.stop(brakeType::hold); //Hold back claw where it sits.
}
}
}

int main() {
// create competition instance
competition Competition;

// Set up callbacks for autonomous and driver control periods.
Competition.autonomous(autonomous);
Competition.drivercontrol(userControl);

// Run the pre-autonomous function.
preAutonomous();

// Prevent main from exiting with an infinite loop.
while (true) {
wait(100, msec);
}
}
```

Chelsie

Chelsie

project Program designed by: Chelsie Nelson witnessed by: Diane Anderson

date: 2-23-22

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