

Brainstorming

Goal: Design and build a robot to successfully compete in 2021-2022 Vex Tipping Point Robotics Competition. Game consists of 7 goals scattered around the game field, 2 platforms on opposing sides, and rings to place on goals. Teams must effectively move and place goals on their side to score points. Additionally, teams may intake rings and place them on branches of the goals for points and park on the platform for a 40 point bonus at the end of the match.

Please refer to picture below for game details

Insert tipping point poster here

Initial design

- Lift idea: 2 bar forklift to move goals around the field and place them on platforms.
- intake design (ring scoring): Construct an intake utilizing vex fins over a plexiglass ramp where they will drop and get stacked on a pole. This pole would be connected to a 2 bar lift and bring up the rings to high branches of tall goals for a 10 point bonus per ring.
- H- 2 motor drive base

Final design:

- Lift idea: Pneumatic 2 bar claw lift to grab goals and place them around the field and on platforms
- Rear goal holder: Hold a second goal in the back of the robot.
- Intake idea: Intake utilizing vex fins to scoop up rings onto plexiglass ramps. Rings travel up ramp where they drop off into the goal held in the back of the robot (rear goal holder) for 1-3 point bonus per ring depending on if it lands on branch or in the barrel of the goal
- H- drive 4 motor base

Take a look at our engineering notebook below for more information

Materials:

- Screws
- Aluminum C- Channels
- Aluminum 1x1
- Steel 1x1
- Aluminum Stand-off
- Aluminum L- Channel
- Aluminum Trusses
- Aluminum plates
- Steel rails

- Aluminum axles
- Steel axles
- Shaft Collars
- Keps nuts
- Nyloc nuts
- Bearings
- Mesh
- Plastic High strength gears
- Plastic low Strength gears
- Omni wheels (6)
- Flex Wheel (2)
- Plastic Fins
- Plastic Chain
- Plastic sheets
- Plexiglass
- Pneumatics
- Pneumatic tank (2)
- Pneumatic tubes
- Pneumatic valve/ switch

Electronics

- V5 motors (8)
- V5 Brain
- Wires
- Inertial sensor (2)
- Pneumatic Solenoid (2)

Reflection

The construction of our Tipping Point robot was a great learning experience. We were able to increase our exposure to engineering while expanding our aptitude in the field. However, this STEM night project wasn't just about engineering and calculations but rather it helped us to further build up our team communication and chemistry.

- Overall: greatly enjoyed the event and the journey it took to get there. Future POE students are in for a very unique experience.

Video of Robot:

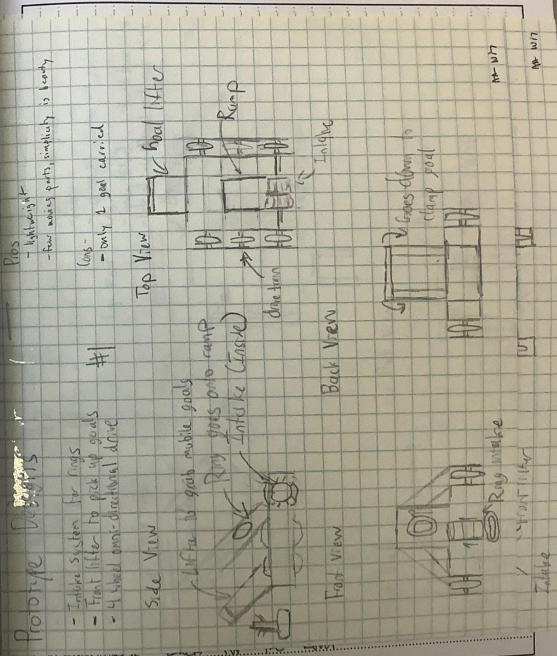
<https://drive.google.com/file/d/1qdVzTUG5ZQ0sFhmv00WK1vec6Asuymvo/view?usp=sharing>

ENGINEERING NOTEBOOK:

- In tournaments with multiple divisions
 - Elimination matches are best of 1 and the alliance that wins the division finals will be declared the division champion
 - When the division champions play each other, the finals matches are played as a best of 3 where an alliance needs two wins to receive the title of tournament champion
- In tournaments that qualify teams to the vex robotics
 - In tournaments that only have one division
 - Elimination matches are best of 1 from round of 16 up through the semi final matches. Final matches are a best of 3 where an alliance needs two wins to receive title of division champion
 - In tournaments that have multiple divisions
 - In the division elimination matches, elimination matches are best of 1 from round of 16 up through to the semi finals. The division finals matches are played as best of 3 where an alliance needs two wins to receive the title of division champion
 - When the division champions play each other, final matches are played as best of 3 where an alliance needs two wins to receive title of tournament champion

Small tournaments may have fewer alliances
 Fields may be raised or on the floor
 Students must be accompanied by an adult

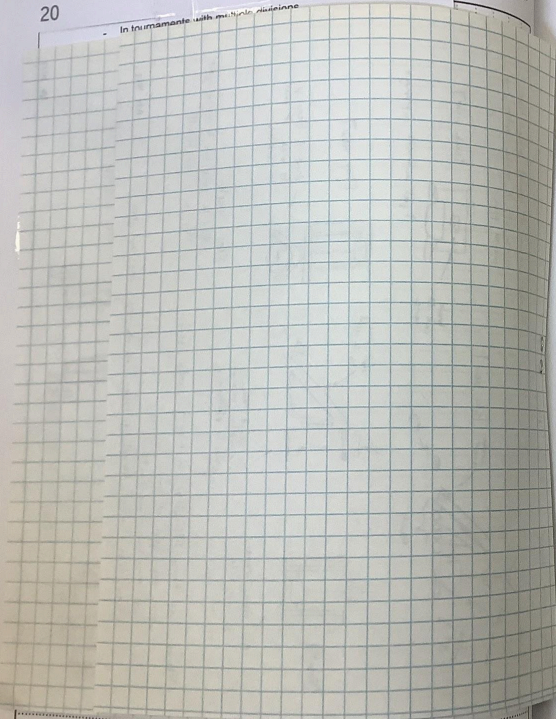
Mt W17



PROTOTYPE DESIGNS

- Engine system for crabs
- Front lifter to pick up goals
- 4 wheel drive directional drive

project: First Meeting designed by: Amun Aguel witnessed by: P. MORAN
 date: 10/7/20



project _____ designed by: _____ witnessed by: _____ date: _____

First meeting 10/7

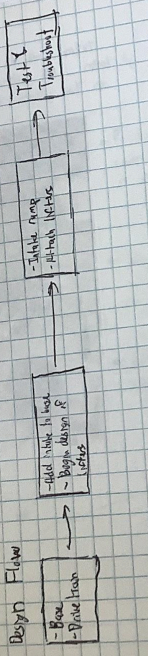


- Went to our first meeting and introduced ourselves to each other
- Watched several videos relating to the new Tipping Point competition
- Aaron created notes on the VEX Game Manual
- Brainstormed possible ideas for the robot
- Analyzed old designs used by the prior competition team.

Summer 7
Introduced ourselves to each other
Familiarized ourselves with Tipping Point
Brainstormed Ideas for the Robot

project First Meeting designed by: Aaron Aguel witnessed by: P. MONT date: 10/7/22

Chosen Option: EPR
 Option Z has the opportunity to secure the project points with the use of lift a front and back lifter. This will be added before adding the front and back lifter. The front and back lifter will be added before adding the front and back lifter. The front and back lifter will be added before adding the front and back lifter.



10/19/19

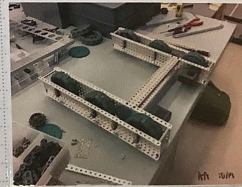
works of previous team's robot
 der using an intake similar to what I done
 using a intake aids instead of bands

Update 10/19

- Finished disassembly of the entire previous competition team robot
- Finished base of the robot
- Started working on intake

Base of Robot ->

* May consider using an intake system in the center with one belt with fins to lift into mobile seats.



- Reassembled old field goals

Summary
 Reassembled old robot
 Finished base
 Started work on intake

project Update 10/19 designed by Aaron Ayaghi witnessed by SRT date: 10/19/19

PROPRIETARY INFORMATION all information is the property of, and solely owned by the Designer.

project

PROPRIETARY

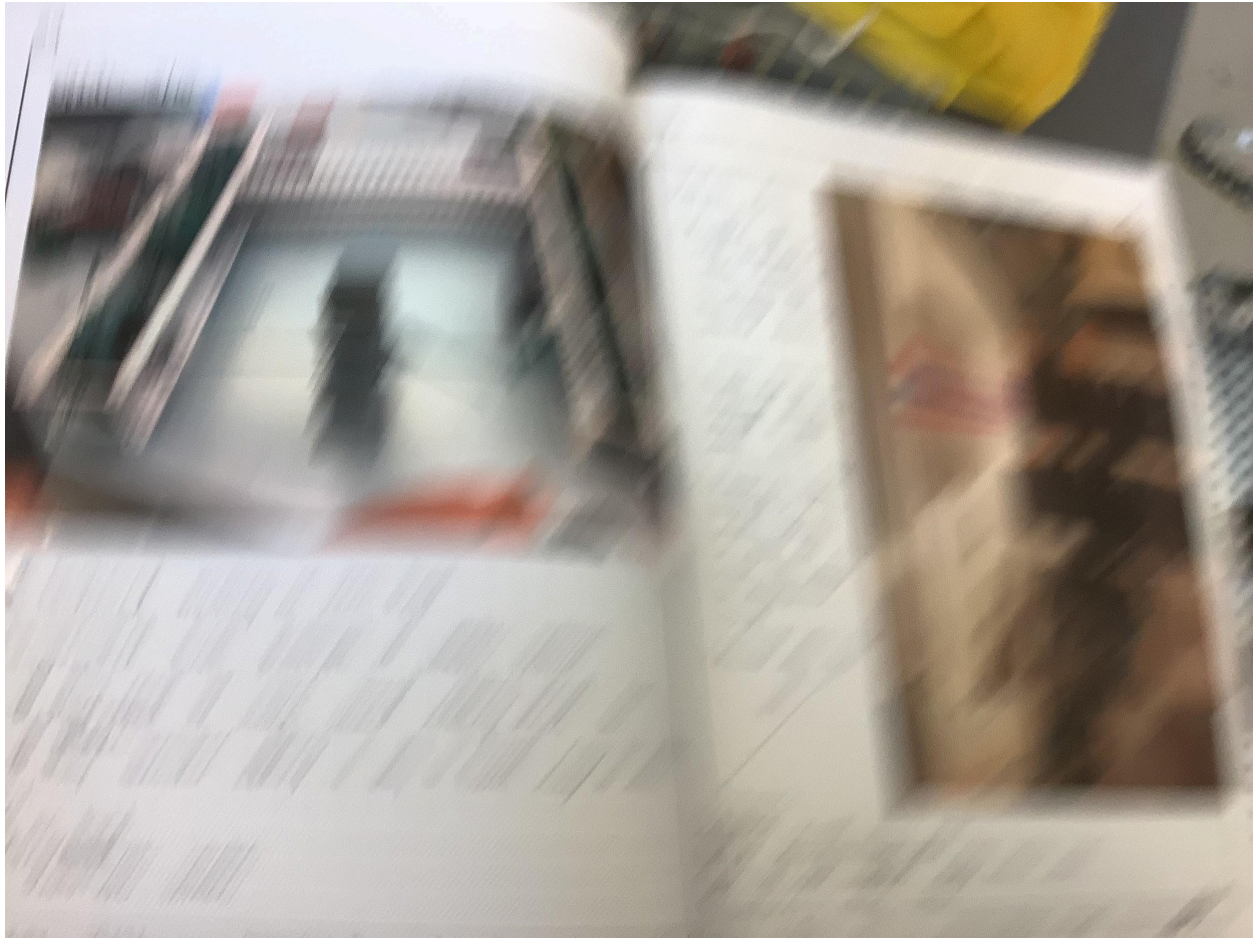
project Update 10/19

designed by: Aaron Ayaghi

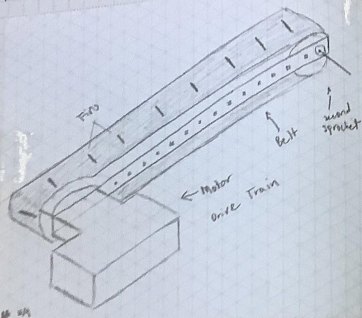
witnessed by: SRT

date: 10/19/19

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Update 11/9

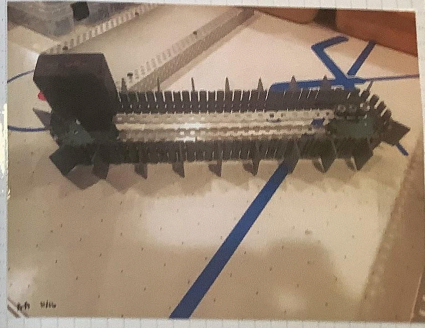


- Brainstormed ideas for the drive train
- Selected design is taped above
- Used belt/bread with fins, may need to adjust number or length of fins
- Continued work on field

Summary
Brainstormed ideas for drive train
Worked on field

Project Update 11/9 designed by Bryan Hyatt supervised by Professor
date: 11/9/14

Update 11/16

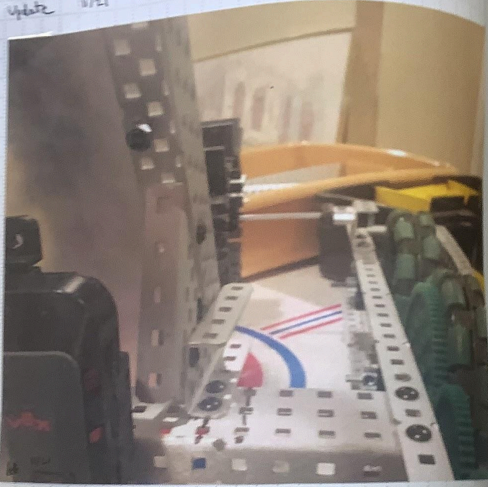


- Constructed brainstormed drivetrain
- started off with small/medium fins, 3 teeth between each
- Finished basic slide for the rings
- Worked on field

Summary
Constructed drive train
Worked on field

Project Update 11/16 designed by Bryan Hyatt supervised by Professor
date: 11/16/14

Update 11/21



- Attached the slide to the robot
- Plan to place drive train on top, in between two previous intake

Summary

Attached drive train to slide
Plan to add drive train

Project Update 11/21

designed by: Aaron Byers

witnessed by: [Signature]

date: 11/21/21

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Update 11/25



- Attached drive train to base, need to find a way to attach to slide

Summary

Attached drive train to base

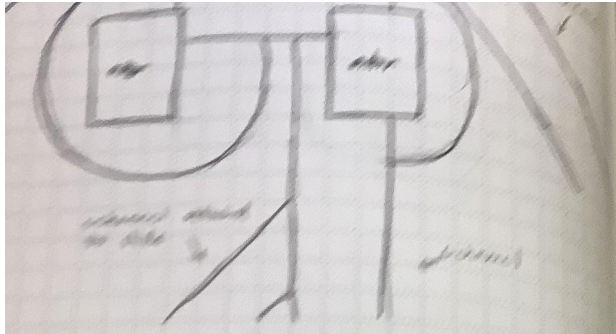
Project Update 11/25

designed by: Aaron Byers

witnessed by: [Signature]

date: 11/25/21

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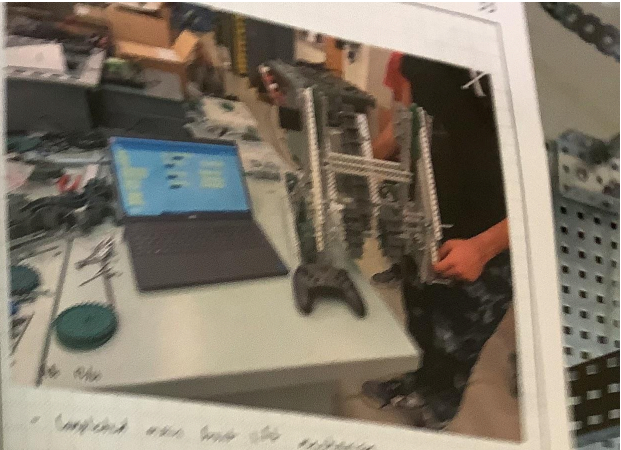


external design and mechanics for front and back
 and design of main body mechanism
 may need to add more components to the

Design of proposed 3D mechanism

Designed by: Arvin Hyeon

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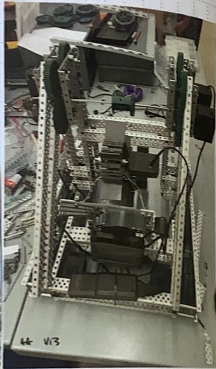
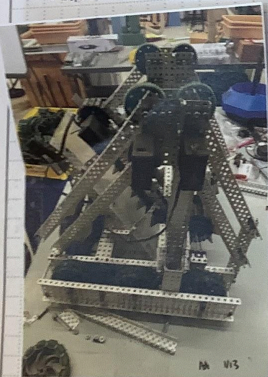
- Completed main body mechanism
 - Started work on side mechanism
 - Tested strength of wires
 - Continued work on side
- Summary
 Finished on the side

Designed by: Arvin Hyeon

All intellectual is the property of, and every record by the designer

Update 1/13

- completed basic mechanics for rear lift
- Attached separate motor to rear lift
- worked on front extension



AA

Summary

Completed part of rear lift
Worked on front extension

project Update 1/13

designed by: Amir Agrebi

witnessed by: Samuel

date: 1/13/22

Update 1/13



AA

- Finally completed the construction of the home field
- continued work on front lifter

Summary

Finished field
Worked on front lifter

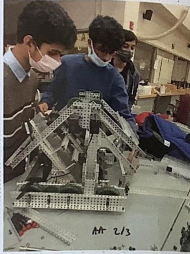
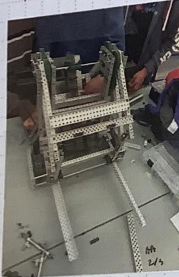
project Update 1/13

designed by: Amir Agrebi

witnessed by: Samuel

date: 1/13/22

Update 2/3



- Adjusted the design of the front lifter
- * Added reinforcements on the two channels connected to the gear
- Started working on back lifter

AT

Summary

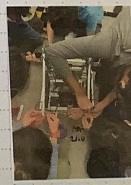
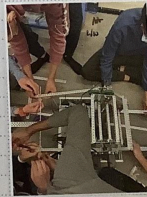
Adjusted front lifter
Started back lifter

Project Update 2/3 designed by: Aaron Ayres // witnessed by: [Signature] date: 2/3/22

Update 2/10



- Encountered problems while constructing the back lifter
- * Some issues were caused by low battery, remember to charge the batteries
- Re-adjusted front lifter
- Changed speed of intake motors to properly intake rings.



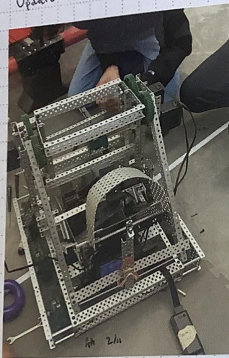
AT

Summary

Worked on lifters
Adjusted motors

Project Update 2/10 designed by: Aaron Ayres // witnessed by: [Signature] date: 2/10/22

Update 2/11



- Added dome to rear to redirect the rings better
- Made all final minor adjustments to the robot
- Prepared the school for the competition tomorrow.

AA

AA

Summary

Adjusted back lift

Project Update 2/11

designed by: Kevin Ayoubi

witnessed by: Patricia

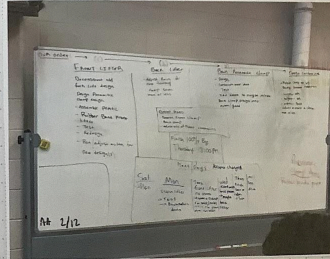
date: 2/11/22

Update 2/12 (First Competition)

- Reflected on our performance at the tournament

- Q6 lost 193 to 23
- QW lost 49 to 17
- Q23 lost 187 to 152
- Q27 lost 52 to 136
- Q34 won 55 to 28
- Q44 lost 43 to 123

- Had a brainstorming session



At 2/12

- Will replace front lifter with pneumatic version of back lifter with C-channel extension

Summary
1st competition scores + game plan

Project First Competition 2/12

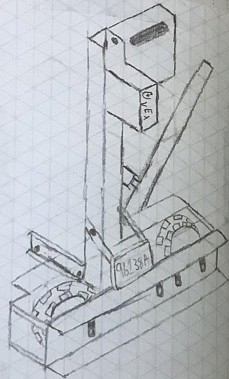
designed by: Kevin Ayoubi

witnessed by: Patricia

date: 2/12/22

Update 2/15

- Disassembled and stored old front lifter
- Installed new front lifter based on blueprint from previous day



Drawn by Pranav Nayak (2/15/22)

- Clamp doesn't hold on to goals as much as we want to during testing

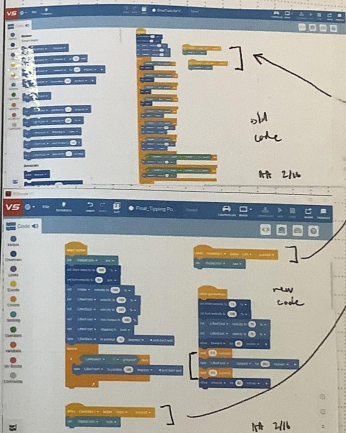
↳ Considering a redesign of clamp in order to get better grip

Summary

Added new lifter & clamp

Project Update 2/15 designed by: Pranav Nayak witnessed by: Shamir
 date: 2/15/22

Update 2/16



- While our new code had many changes compared to our old code, one thing that remained the same was the pneumatics code

- One of the biggest changes was improvements in code efficiency. We removed many blocks that we realized we weren't and printed little functionality to the robot. We also simplified some parts of the code in our robot with less blocks (provided cleaner and easier to understand code).

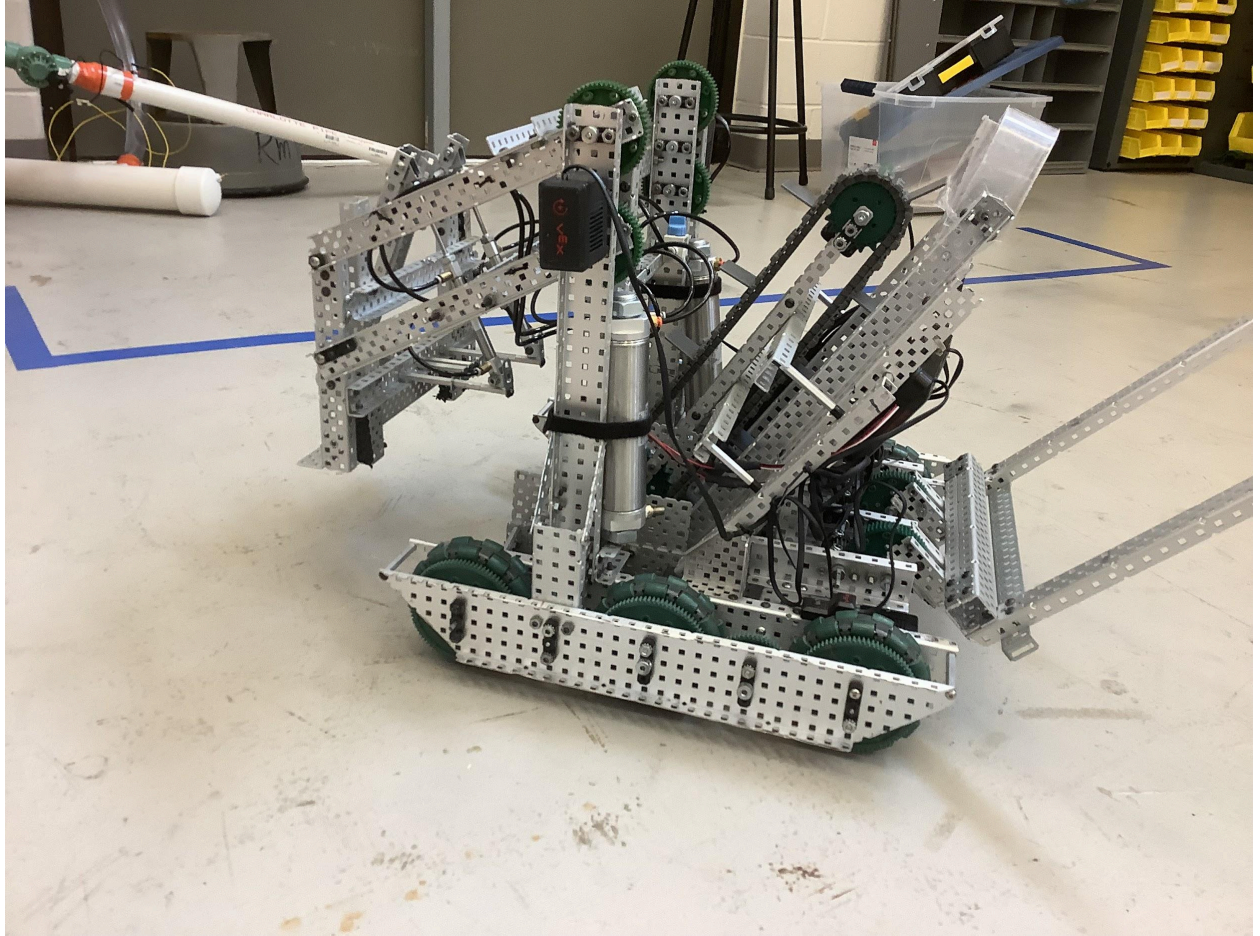
- For our autonomous section, we added wait blocks so that specific actions would happen in spaced out times. If we didn't add wait blocks, all our movements with the robot would happen all at once, leading to a very confusing disaster.

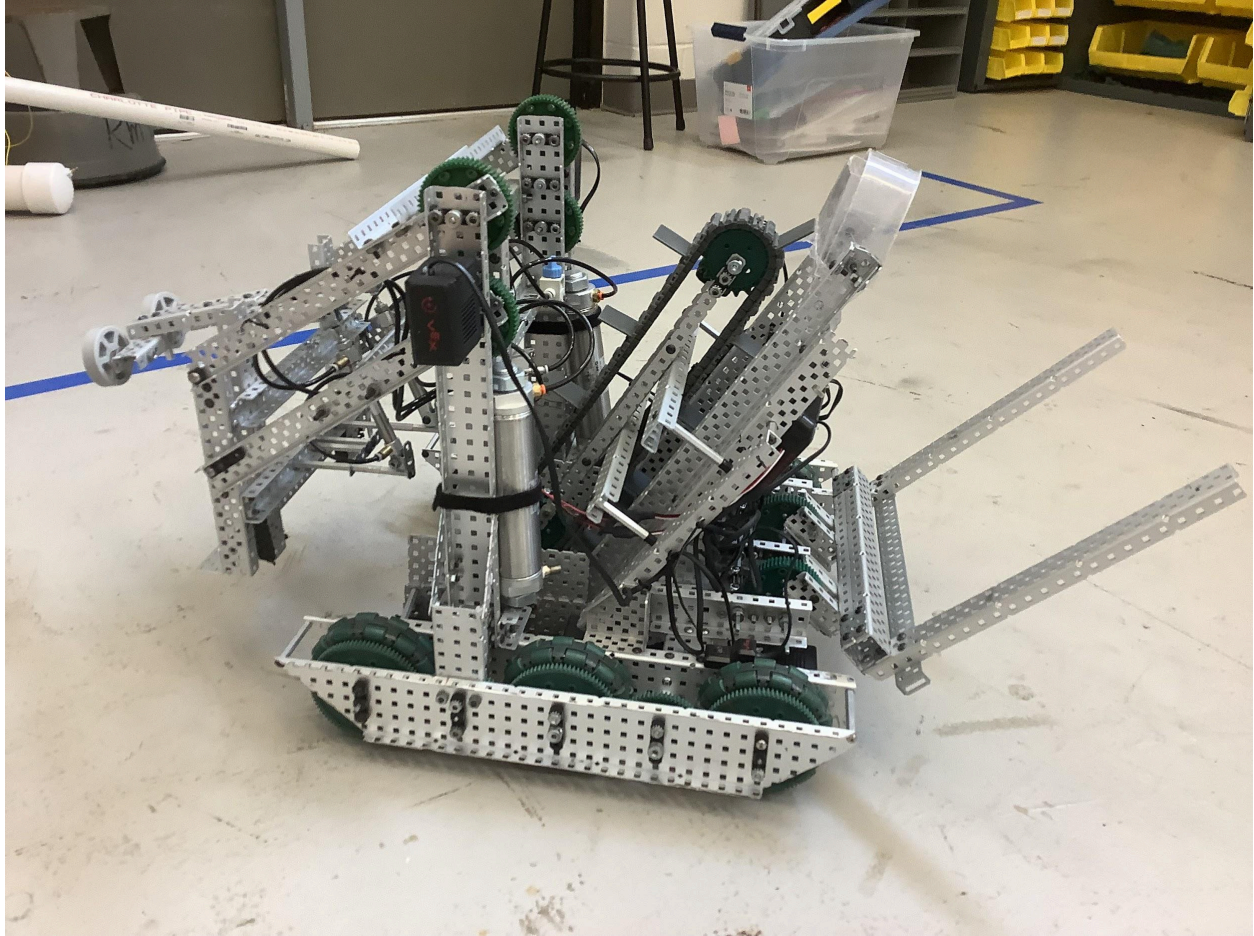
Summary

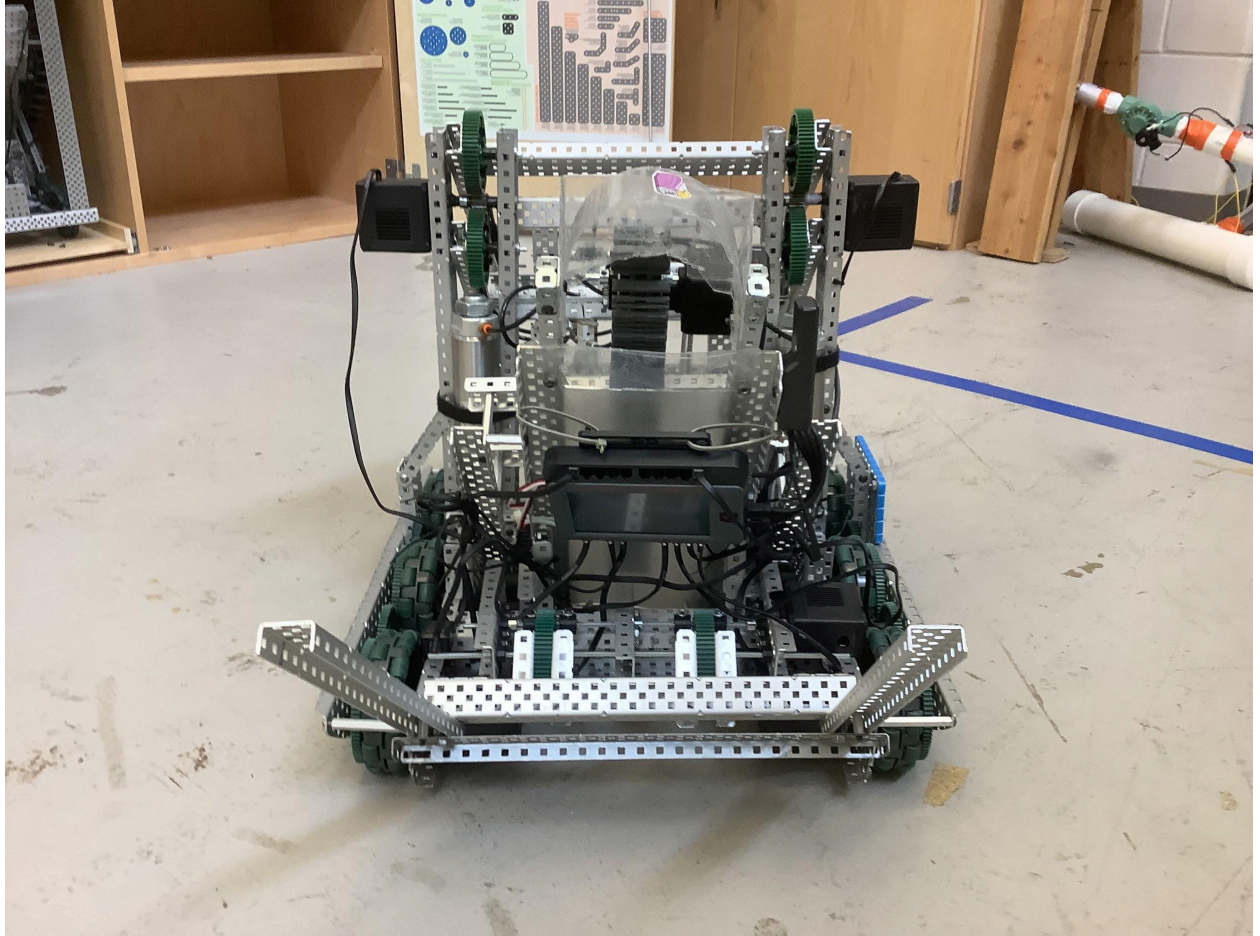
Redesigned code
Sketched new clamp design

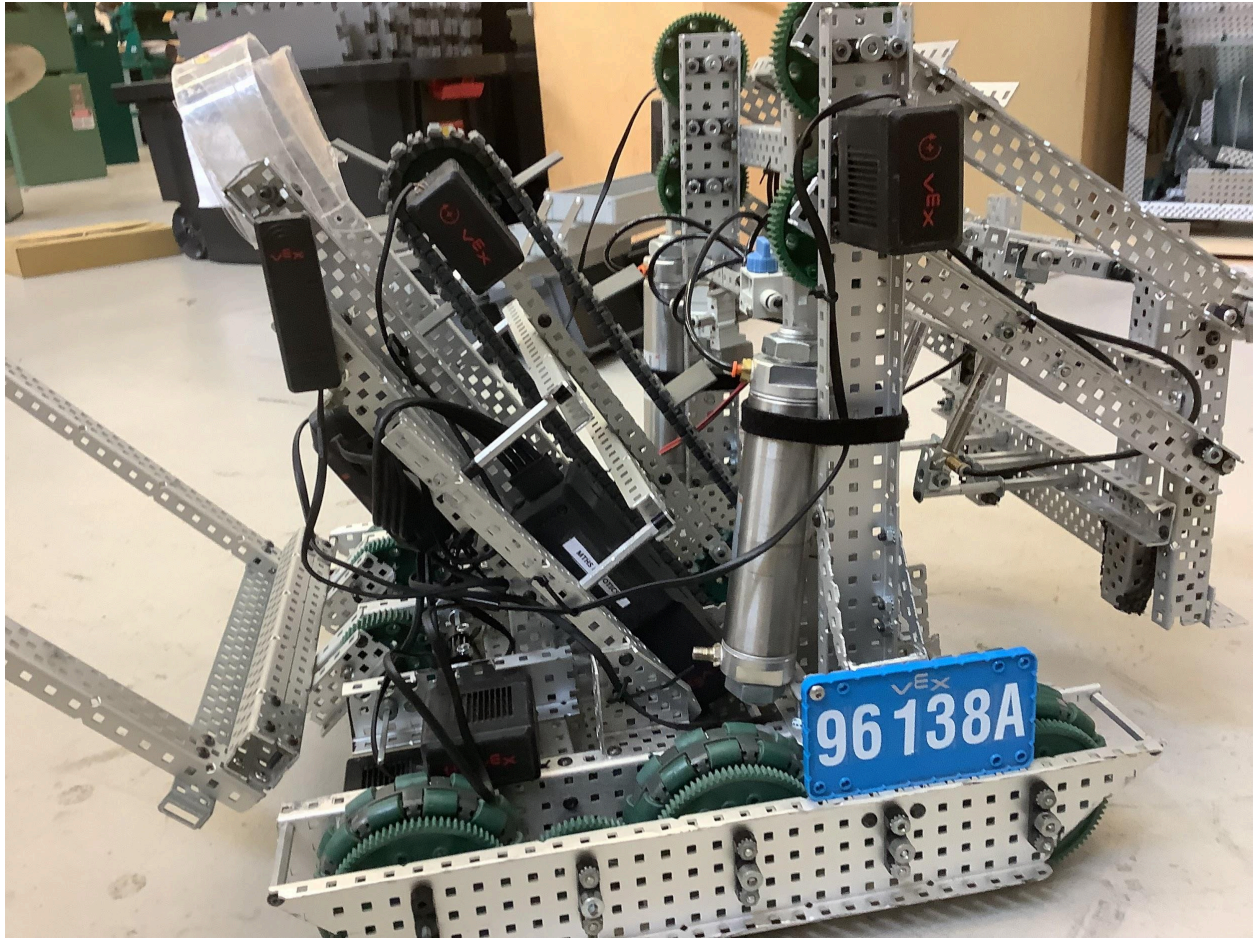
Project Update 2/16 designed by: Pranav Nayak witnessed by: Chaitan
 date: 2/16/22

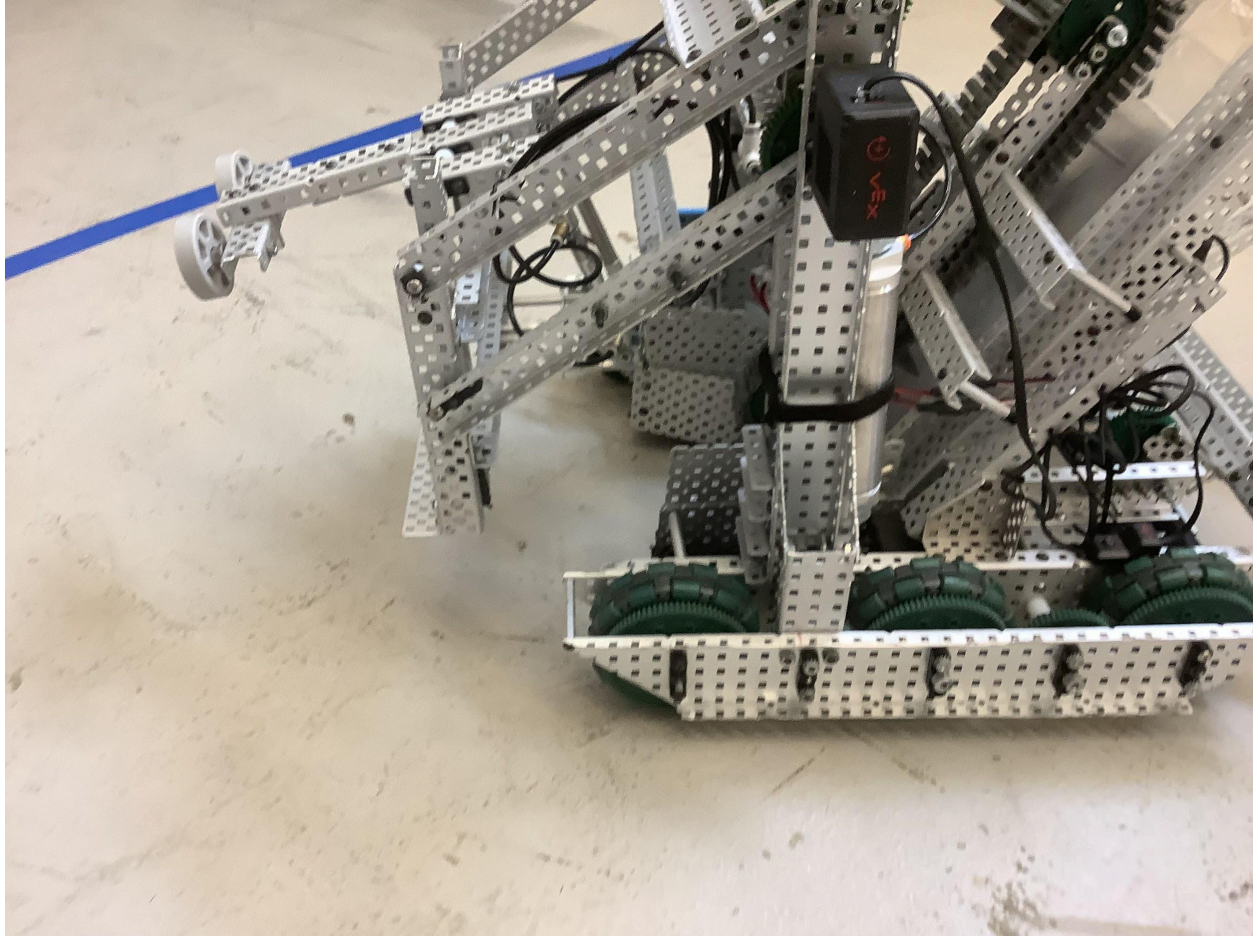
ROBOT:











Code:

<https://github.com/mridhanbalaji/Tipping-Point-Season-Code-2021---2020->