

Engineering Portfolio

EST. 2009

CYBIRDS

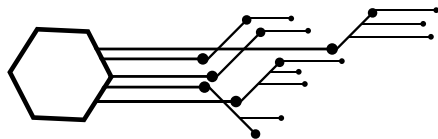
EDGEWATER, MD



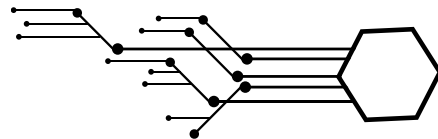
As a 14 year old team, sustainability has proven to be essential for our team to return each year with eager new members. The Cybirds team attends expos, STEM fairs, and science fairs to get students and potential mentors excited about robotics.

As our senior members graduate from FTC (sadly), we have to continue recruitment to ensure our the continuation of the Cybirds team. That's why one of our focuses is to motivate older members to mentor new recruits so that they're ready to lead the team in the future. Training is important. Between resources like tools, parts, and team shirts, we're lucky to have so many amazing sponsors that donate money and materials. Cybirds members and mentors have contacts with numerous businesses, big and small, and the community offers great support. We're extremely grateful for their help! Using whiteboards, engineering design paper, and other tools for sketching, the Cybirds visualized each possibility in order to determine the best approach. For newer members, drawing out different parts like lifts, arms, and claws helped to demonstrate the function and visual aspect of each idea as it was being discussed. This combination helped the Cybirds to effectively select a chassis, lift mechanism, grabbing mechanism, wheels, and other moving parts throughout the season. Currently, the Cybirds robot will park in the corresponding space during autonomous (the diagram may change depending on red/blue alliance assignment). The Cybirds visited Central Elementary for the Tiger Trot, an annual community fundraising event. At events like this, we teach

The Cybirds team is run by Captain, Mitchell Lee, a junior at South River High School. Sub team captains include Henry T, head of programming, Leo M, head of build, and Elsa G, head of business. The FTC Cybirds are based in Edgewater, Maryland at South River High School. Since 2009, the team has promoted STEM values through community outreach events, the goal being to



About Us



WHO WE ARE

3583



CYBIRDS

The FTC Cybirds are based in Edgewater, Maryland at South River High School. Since 2009, the team has promoted STEM values through community outreach events, the goal being to support and encourage those interested in robotics and other STEM fields.

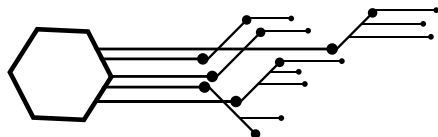


THE TEAM

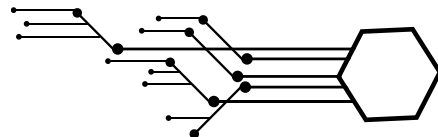
Team #3583 is lucky to have many returning members this season. The Cybirds team is run by:

- Captain Mitchell L, a junior at South River High School.
- Henry T, head of programming,
- Leo M, head of build
- Elsa G, head of business.

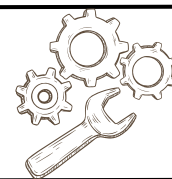




Team Bios



MEET THE TEAM



3583

Mitchell L - Team Captain

"I originally joined FTC looking to expand my knowledge of engineering and have fun building robots, and now as this year's team captain, I enjoy educating new members and watching them succeed."

Elsa G -

Business Sub Team Captain

"I joined FTC with my best friend as a freshman, and now we're both gaining tech experience and teaching new recruits about the basics of FTC, programming, business, and build. When I'm not at FTC, I'm a member of Civil Air Patrol."

Amelia A - Build Team Member

"As a new member, I chose to join FTC because I was interested in the prospect of building and programming a robot from scratch and competing against other teams."

Vincent S - Build Team Member

"I Joined the Cybirds last year as a build team member. I chose to continue this year to learn more skills and have done some work on the design phase in the very beginning. I enjoy learning new ways to think and take inspiration from others."

Leo M- Build Team Member

"I joined FTC because I am passionate in STEM. I love building and designing even more so. In FTC I get to grow and learn in an environment full of very smart individuals. In my personal time I like to play video games and play around with hobby grade foam blasters, mostly dissecting them."

Alex H - Build Team Member

"This is my 4th year with FTC. I love to design and make things with my hands, so I thought joining Build would be perfect. I also think that it's fun to work with power tools because you can learn a lot about how things work."

Yoshua A - Build Team Member

"I joined FTC this year because I like to build and I wanted to grow these skills with people who share similar interests! Outside of robotics, I like to compete in FBLA and play basketball."

Zayan G - Build Team Member

"As a second year build member with FTC, I can say FTC has brought many experiences to me during my time here. FTC showed me a new hobby of working with robots and mechanical machines. The teamwork and leadership taught me so many new things."

Henry T - Programming

Sub Team Captain

"This is my 3rd year with FTC. I love programming and solving problems. FTC allows me to do both, while also providing an opportunity to learn about how programming is applied in the real world."

Jacob - Build Team Member

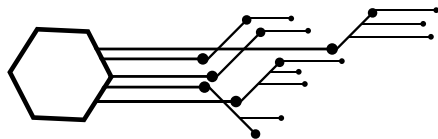
"As I was going into high school, I knew I wanted to join a club related to engineering, and FTC sounded perfect! Although my interests in engineering have evolved to programming, I've had lots of fun becoming a 'Cybird' member."

Eleanor - Business Team Member

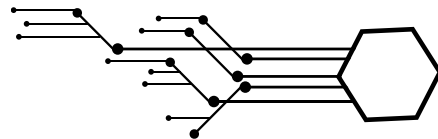
"I started FTC in 7th grade after hearing about all the fun stories my older siblings had. I've made a lot of friends on the team and learned the basics of build and programming too!"

Matthew T - Build Team Member

"When I started High School, I knew I needed to join a club. A friend in robotics convinced me to come to a meeting, and I really liked it. I knew then I wanted to join FTC, and I'm currently on my first year as a Cybirds build team member."



Timeline



SEASON SUMMARY

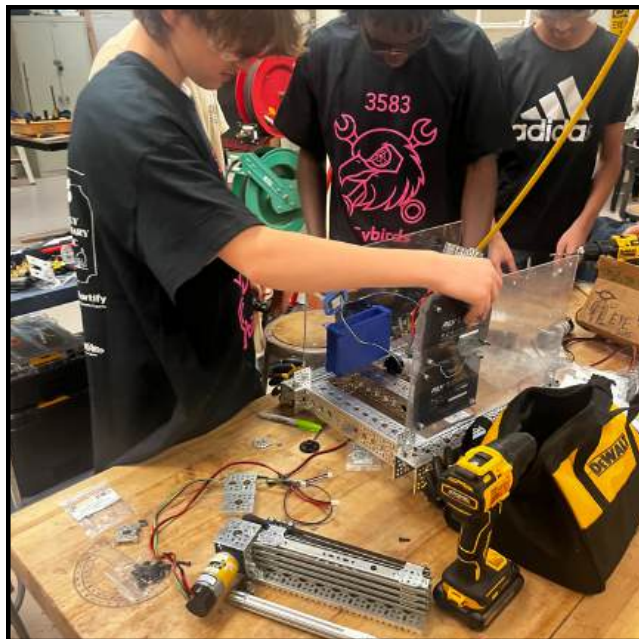
3583

October

- Design Matrixes
- Selecting Mechanisms
- Team Bonding
- Reviewing Regulations and Scoring

November

- Building the Chassis
- Planning Outreach
- Programming Practice
- Documentation
- Working on the Portfolio

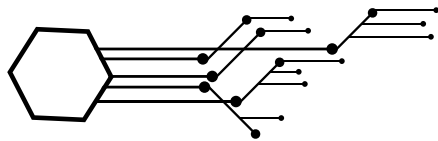


December

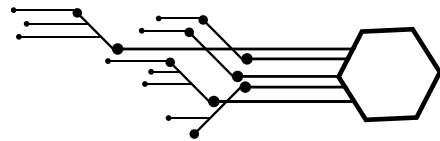
- Planning Competition Strategies
- Programming Autonomous and TeleOp
- Finishing the Portfolio
- Driving Practice

January

- Modifying the robot after the first qualifier
- Judging practice
- Revising the Portfolio
- Further plans with Spring Outreach



The Process



ENGINEERING DESIGN

3583



Programmers Working Hard!

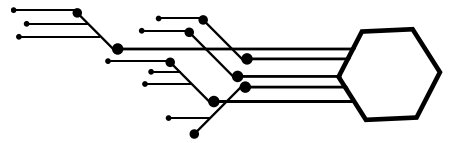
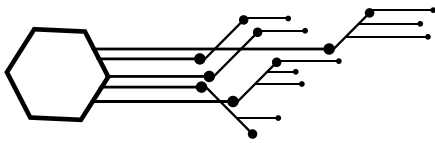


Practicing Shop Safety!



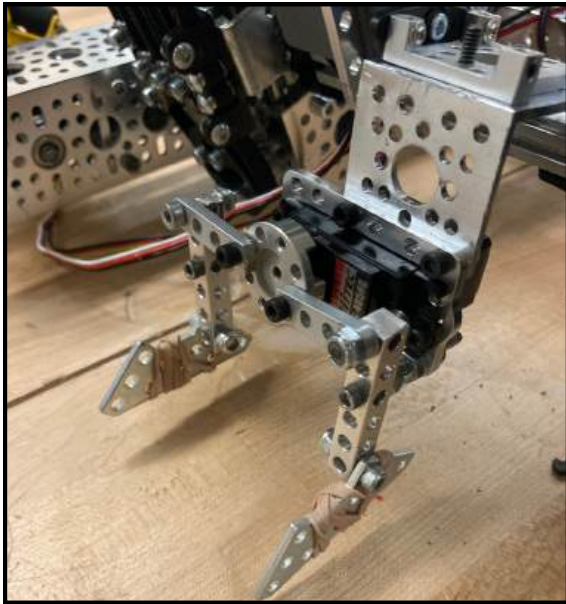
CYBIRDS

The Cybirds use the engineering design process to design and modify the robot throughout the season. First, the team watched the launch and started defining different components and regulations that had to be kept in mind throughout the season. Then, the Cybirds asked questions, researched possible strategies, and built components. Next, the team brainstormed possibilities for intake mechanisms, grab mechanisms, the chassis, wheels, and more. After narrowing down the possible solutions for each mechanism, the Cybirds selected contenders and drew up prototypes on multiview design paper and CAD. Finally, a design was chosen and the Cybirds started to build, testing each component as it was built. As problems arose, they were modified by retracing steps in the engineering design process.



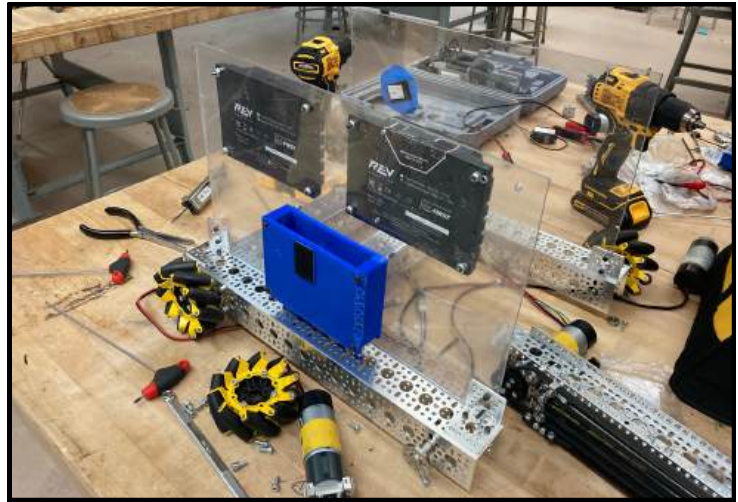
DESIGN CHOICES

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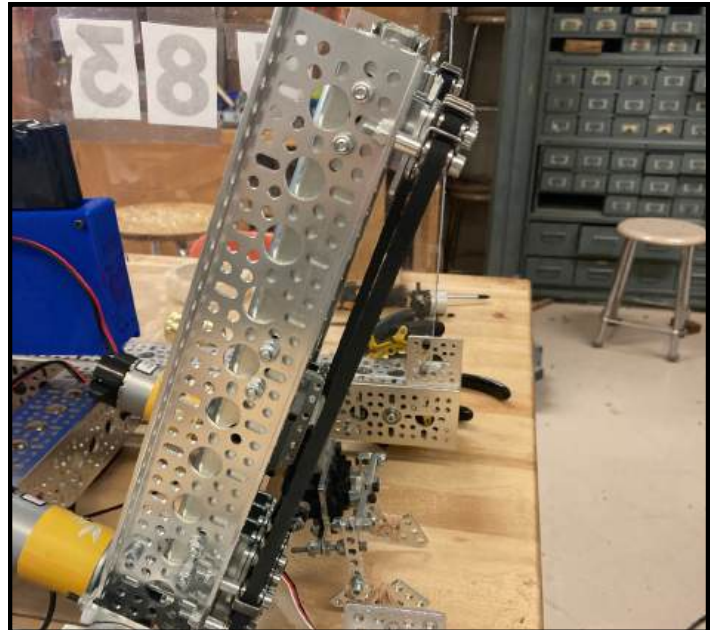


The Claw

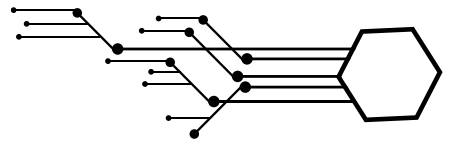
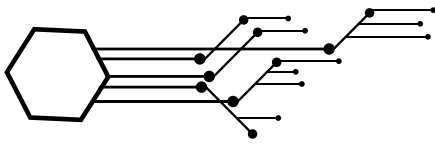
The mechanisms that make up the Cybirds robot are a claw to intake pixels and a 4 stage linear slide, which lifts the claw to the backdrop. These mechanisms were chosen by comparing the advantages and disadvantages of each part at the beginning of the season. Cybirds chose this lift mechanism through brainstorming, comparing speed, ease of build, cost, weight, effectiveness, and more.



Robot Assembly - "The Thang"



The Linear Slide

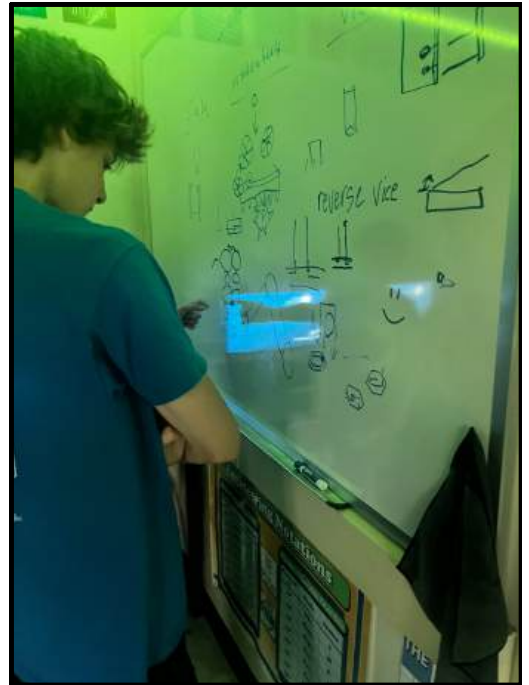


THE SELECTION PROCESS

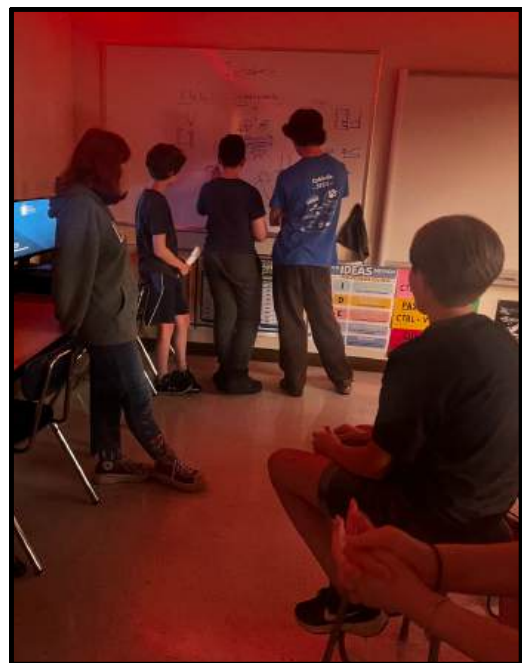
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Choosing Components

Using whiteboards, engineering design paper, and other tools for sketching, the Cybirds visualized each possibility in order to determine the best approach. For newer members, drawing out different parts like lifts, arms, and claws helped to demonstrate the function and visual aspect of each idea as it was being discussed. This combination helped the Cybirds to effectively select a chassis, lift mechanism, grabbing mechanism, wheels, and other moving parts throughout the season.

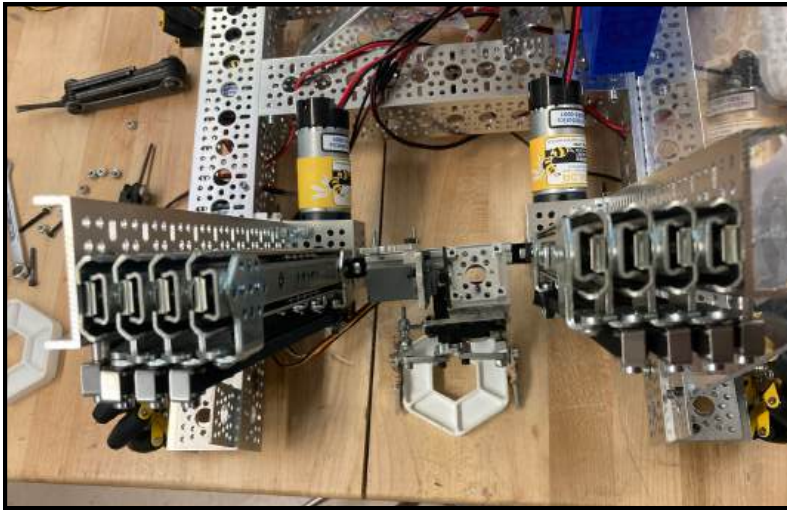


Brainstorming Solutions

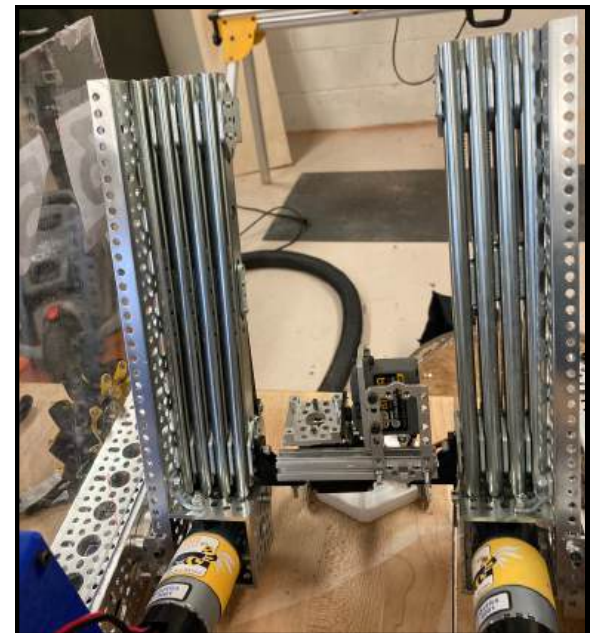
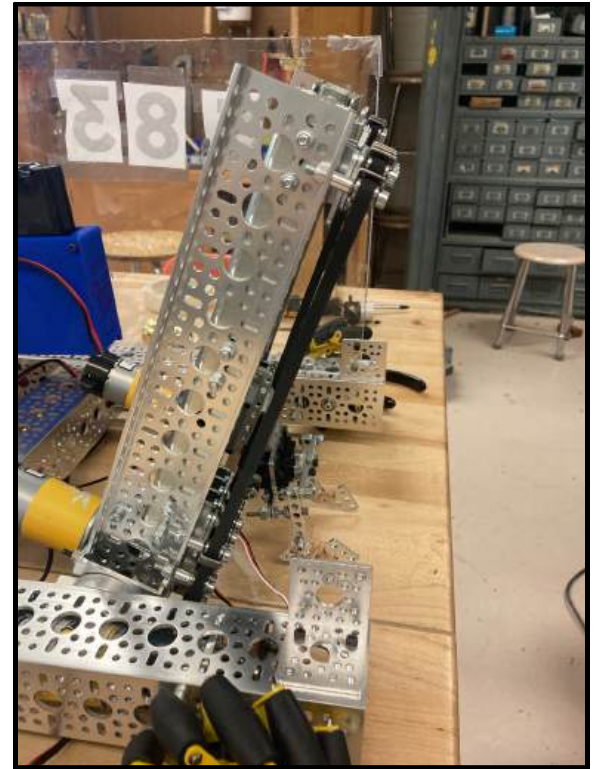


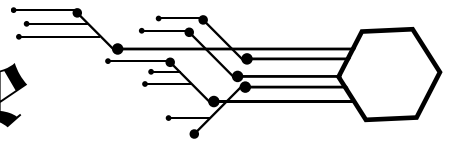
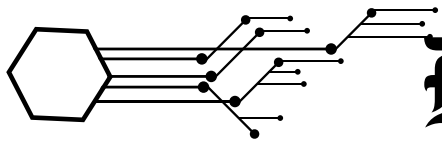
4 STAGE VIPER LINE SLIDE

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The Cybirds chose to use a 4 stage linear slide because a linear slide offers precision and accuracy, and it provides smooth and quiet operation. Additionally, the Cybirds team has worked with linear slide several times over the years, so there is also a greater level of knowledge regarding this mechanism.

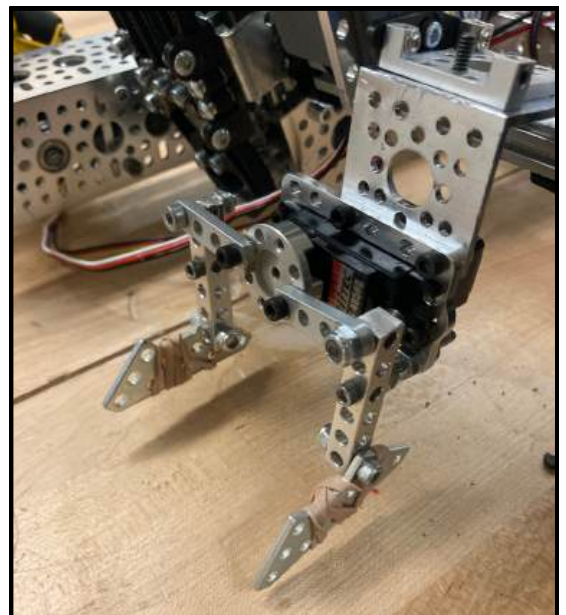
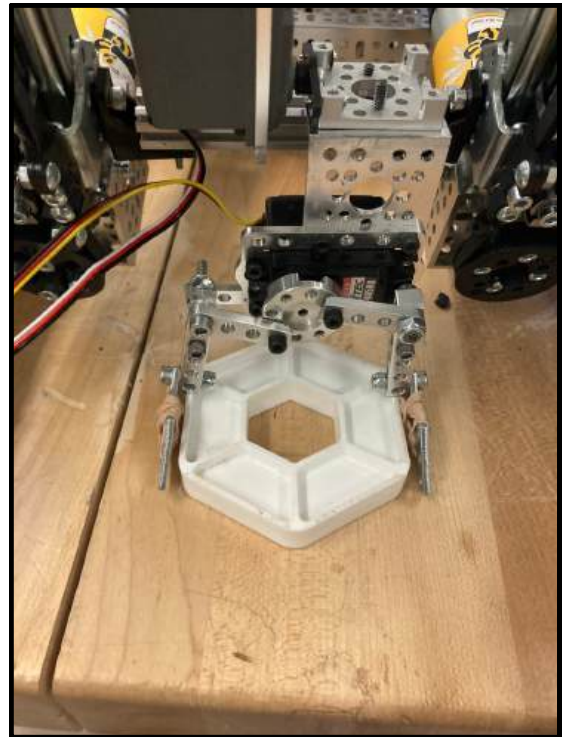
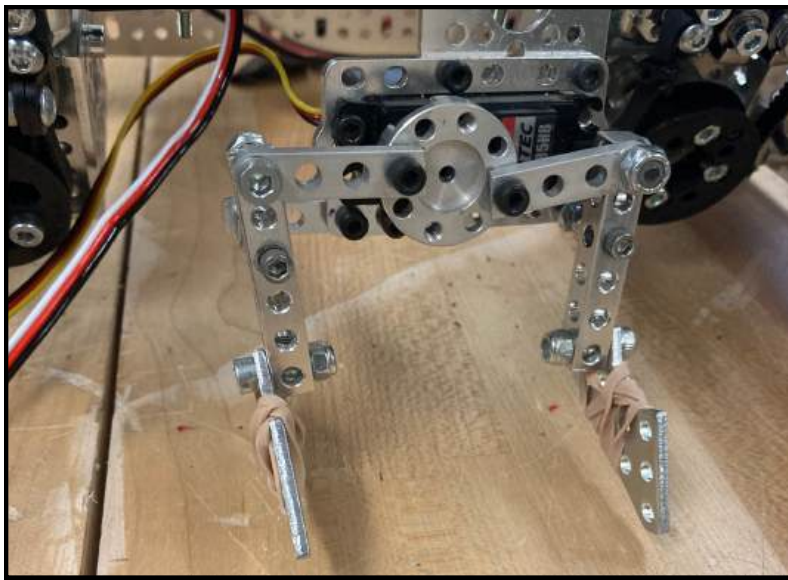




CLAW MECHANISM

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The Cybirds claw takes in one pixel at a time, and drops it onto the backboard to create murals and score points. The Cybirds chose this mechanism because it gives us more control of the grip of the pixel, by pinching it between the claw.



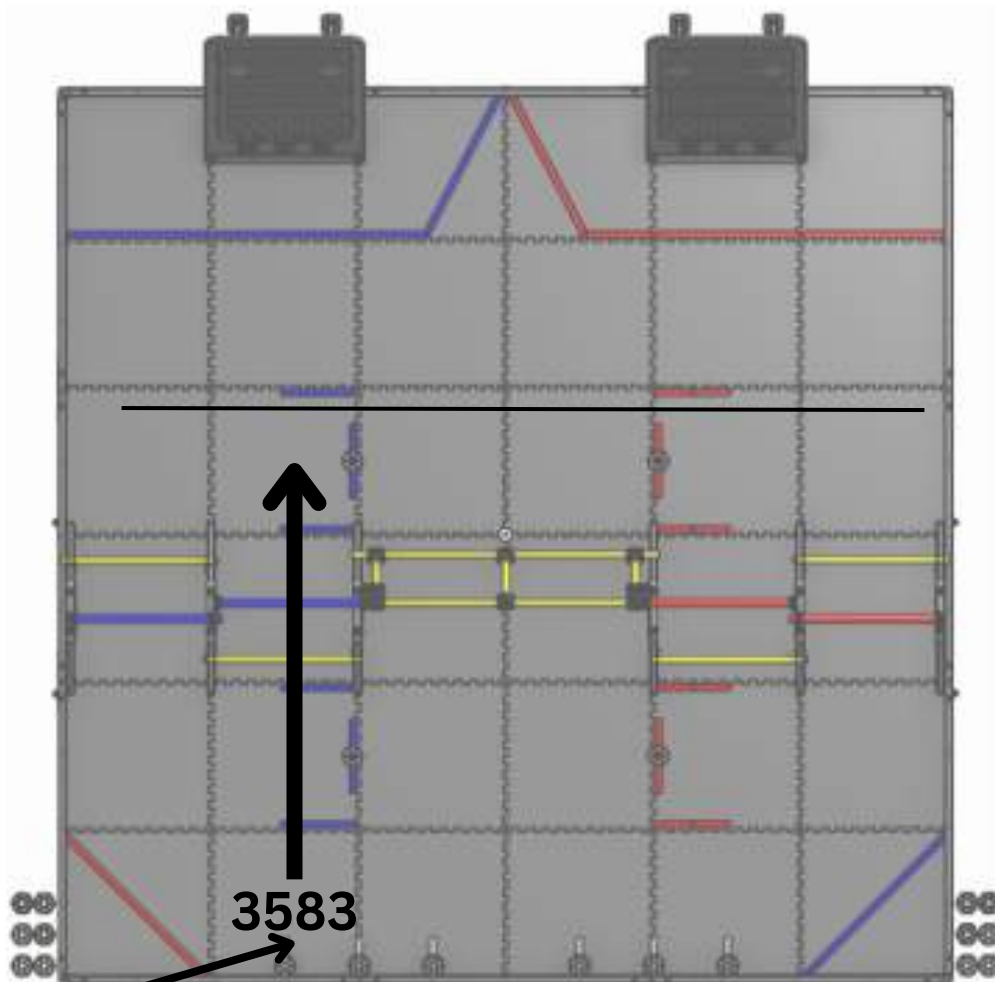
As seen in the images above, and to the right, the claw expands and contracts to pick up the pixel and carry it to the backdrop at the opposite end of the field. The shape of the claw is modeled to fit the sides of the hexagonal pixel in order to easily pick it up.



Strategic Control

AUTONOMOUS

3583



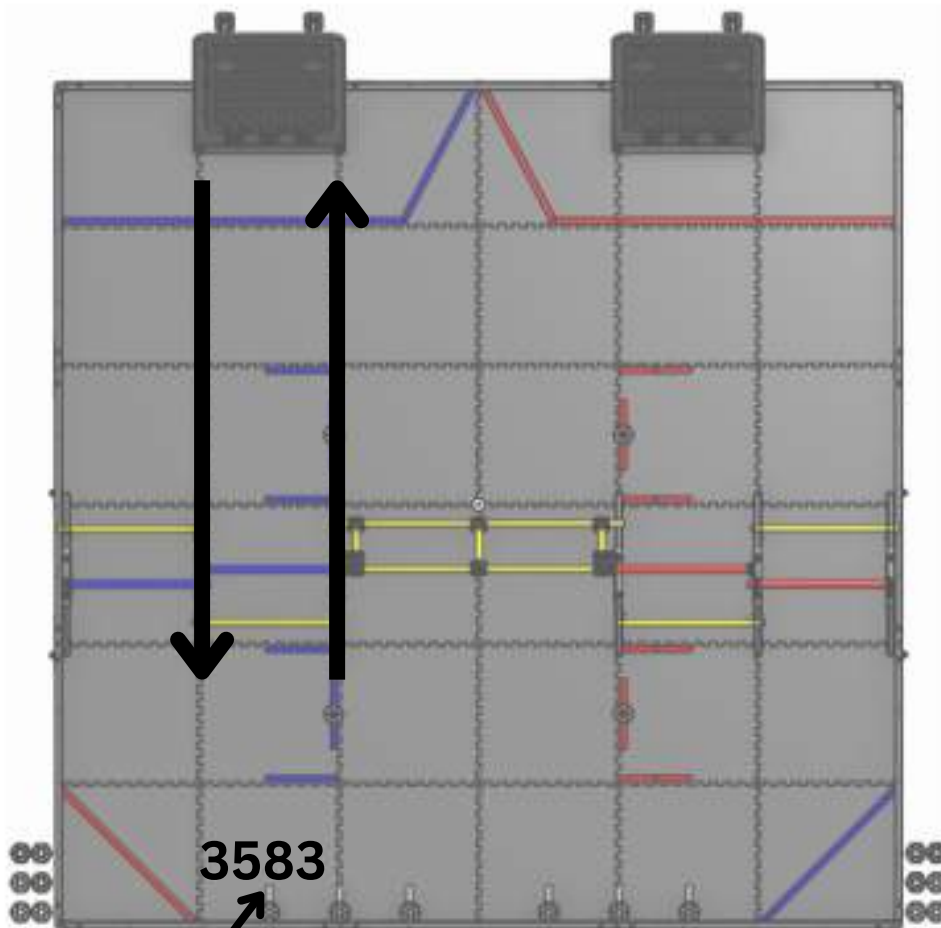
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Robot

Currently, the Cybirds robot will move a pixel and park in one of the three designated parking zones determined by the April tags. Because the Cybirds robot will only park at one zone, regardless of the given tag, the success rate of this strategy is around 33%
(the diagram may change depending on red/blue alliance assignment).

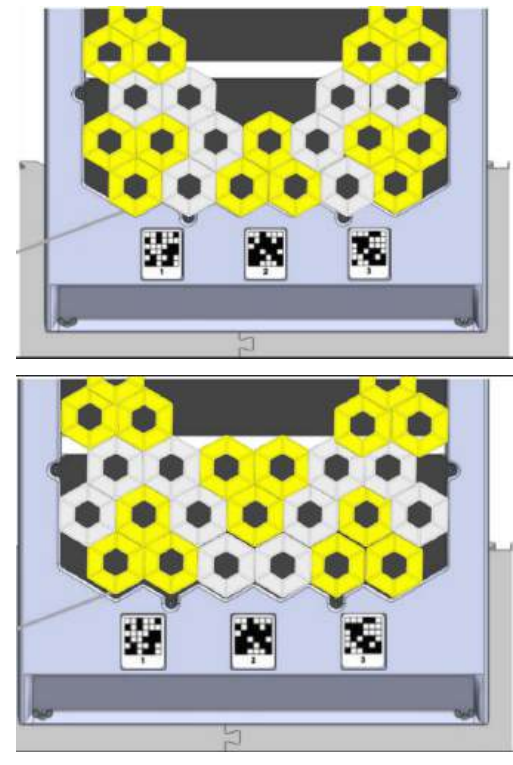
TELEOP - DRIVER CONTROL

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Robot

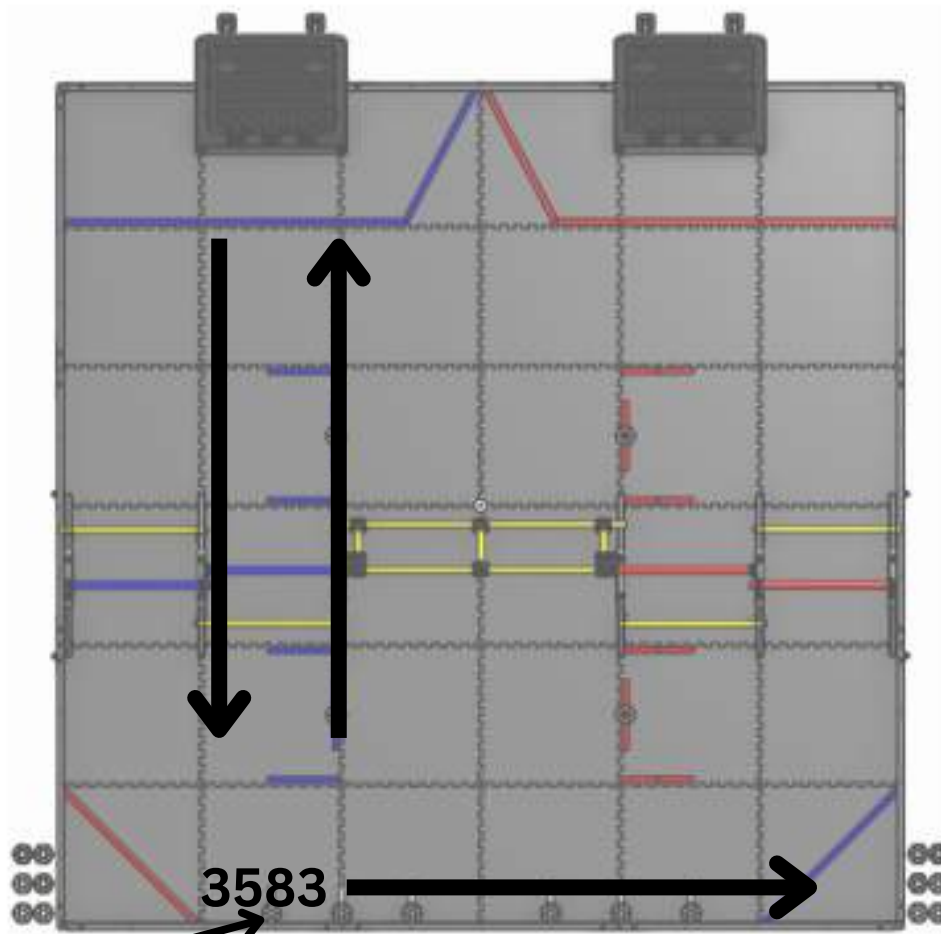
The Cybirds bot will travel to and from the backdrop repeatedly and collect pixels from the human player to build murals.



Above are the two types of patterns that the Cybirds have found are most optimal in scoring the maximum number of points.

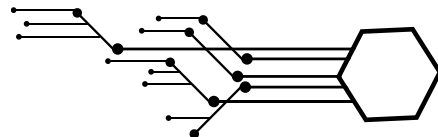
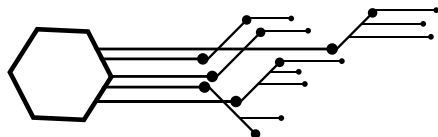
TELEOP - ENDGAME

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Robot

The Cybirds will continue to build as many mosaics as possible until there are about 10 seconds left. Before the game ends, the robot will hurry back to the parking station.



FINANCE & SPONSORS

3583

Item	Cost	Quantity	Total Cost	Notes
FIRST Nat'l Registration	\$295	1	\$295	
FIRST Chesapeake Registration	\$300	1	\$300	
Full Game Set	\$460	1	\$511.44	(\$51.44 Shipping)
Strafer™ Chassis Kit	\$449.99	1	\$476.99	(With tax)
Viper Slides	\$219.99	2	\$439.98	
1106 Series Square Beam(35 Hole, 280mm)	\$5.89	1	\$5.89	
2000 Series Dual Mode Servo (25-2, Torque)	\$31.99	1	\$31.99	
New Batteries	\$55	2	\$110	
Domain Name - FTCpower.org	\$45.98	1	\$45.98	
New Laptop for Programmers	\$619.60	1	\$619.60	
Box Cutters	\$2.49	4	\$10	
Team Shirts	\$19.59	17	\$33.03	
Sharpies	\$1.06	8	\$8.48	
			\$2,888	



ANNE ARUNDEL
COUNTY PUBLIC SCHOOLS



Crab Claw Travel
Travel Expeditions Adventures

The chart above presents the Cybirds spending
over the 2023-2024 season.

The team's expenses totaled to \$2,888.

Between resources like tools, parts, and team shirts,
we're lucky to have so many amazing sponsors that
donate money and materials. Cybirds members and
mentors have contacts with numerous businesses, big
and small, and the community offers great support.

We're extremely grateful for their help!

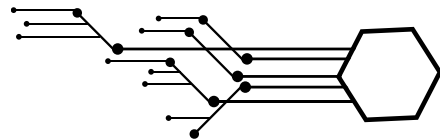
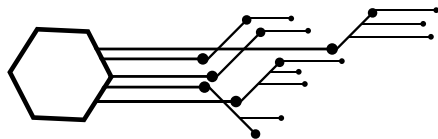


Power Hawks Robotics Club

PHRC, Inc.
Since 2009

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EdgeFortify
Operational Tech Security Experts



TIGER TROT 5.20.23

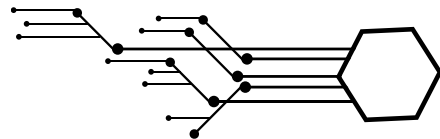
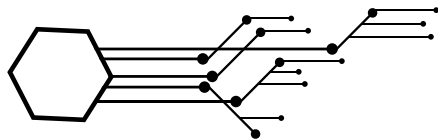
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On May 20th, 2023, the Cybirds visited Central Elementary for the Tiger Trot, an annual community fundraising event. At events like this, we teach kids about FTC and introduce them to simple STEM principles through first hand experience and presentations. We also let them drive the robot under supervision :)



The Cybirds reached more than 40 eager children and encouraged those who were present to spread the message of STEM and FIRST® to others within the local community. The team is currently preparing for this year's event this spring.



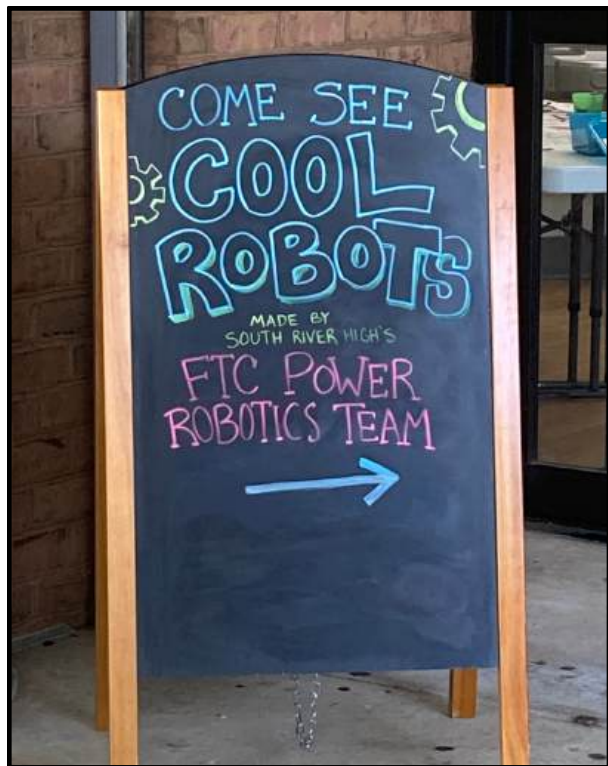


LIBRARY EVENTS

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Every year, the Cybirds host an outreach event during National Robotics Week in hopes of reaching a broader audience during this important week for FTC!

Our next National Robotics week event will take place *April 10, 2024* at the Edgewater local library. The Cybirds will teach kids ages 6+ about the FTC Cybirds and experiment with fun STEM labs like Ozobots, Lego We-Do, Makey-Makey, and Sphero Indi.



Our Welcome Sign!

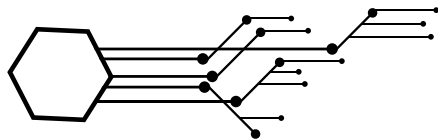


Testing the Robot before the August event

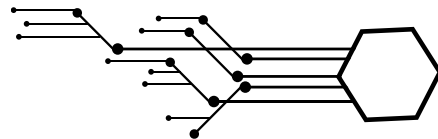
As of *August 16, 2023* End of Fall AA County Library event, the Cybirds have reached over 100 local kids presenting our robot and explaining different functions of different components while talking about STEM.



Edgewater Library



The Future



SUSTAINABILITY

3583



As a 14 year-old team, sustainability has proven to be essential for Cybirds #3583 to return each year with eager new members. The Cybirds team attends expos, STEM fairs, community events, and school club fairs to get students and potential mentors more excited about robotics.

As our senior members graduate from FTC (sadly), we have to continue recruitment to ensure the continuation of the Cybirds team. That's why one of our focuses is to motivate older members to mentor new recruits so that they're ready to lead the team in the future. Training is important to next year's team.

