Interview

Members

- Andrew
- Lucas
- Cyrus
- Siju
- Catherine
- Peam

Overview

- Engineering
    - Game Strategy
    - Process
        - Design & CAD
        - Building
        - Testing, evaluating and improving
    - Robot features
    - Coding - Caroline
- Business & Sustainability - Nandita
- Outreach - Caroline

Introductions

*motivate award

- Blu Cru from Explorer Post 1010 in Rockville, Maryland
- 6 members
- FTC for 8 years
- We'll be structuring our presentation today around three values that we outline in our mission statement: **innovation, community, and team building.**
- Everyone's names and role

Game Strategy

*think award

- Maximize points vs time and feasibility of design
- Minimize build time, buying new parts
- Combine engineering processes wherever possible— capping and normal blocks
- Focus on being competitive and good alliance to pick— focus on autonomous and end-game point values

Bot Design & Evolution

- Chassis
- Arm
- Grabber
- Carousel
- Lessons learned
    - Careful practice match score-keeping

        - Brainstorming as team, experimental process
    - “Finalize” designs for competition and practice driving

Programming
*control award
- Autonomous
    - Sensors
    - Key algorithms
- Driver controlled enhancements

Outreach
*motivate award, connect award
- Python programming workshops
- In-progress interviews
- RSC outreach

Lucas -

Hello Judges! My name is Lucas, and I am a senior at Richard Montgomery.

Catherine -

My name is Catherine, and I am a sophomore at Churchill.

Andrew -

My name is Andrew, and I am a junior at Richard Montgomery.

Cyrus -

My name is Cyrus, and I am a junior at Richard Montgomery.

Siju -

My name is Siju, and I am a sophomore at Churchill.

Lucas -

We are Team 6417, the BluCru, out of Rockville, Maryland. We have a long legacy to uphold, and hope to impress you in this competition. Catherine, why don't you start us off.

Catherine -

Thank you Lucas. When we started the season off, we decided very quickly that we wanted to have a versatile robot that can score on any hub, any level, and go everywhere easily. Superior mobility and versatility was a key aspect of this year's competition, as to score high you must be efficient, fast, and reactive to unexpected circumstances. With 3 other robots on the field, and such a tight chole point to navigate through, moving around our alliance and enemies is another thing we must keep in mind, in addition to the barriers. Because of this we decided to go for a mecanum wheel drive train and beveled gears, providing us both high clearance and a smaller frame. As you can see, our robot comfortably fits within a 12 inch width, which allows us to traverse both around and over the barriers with ease. This ensures that we would be able to score as many points in as many different situations as possible. From qualifiers to states, we heavily reduced our robot's profile, increasing the speed, agility, precision, and consistency.

Lucas -

The next key aspect of our robot is our arm. We chose to use an external scoring system this year, as the limitation on holding one piece of freight at a time severely lowers the efficiency of complex internal systems. The orientation of the arm on the robot allows for a consistent and

easy pickup, with a home position that keeps the arm out of the way. Currently the intake is set to reside inside of the chassis, giving us a lower profile.. We can then move the arm around the robot and set the height to whatever is necessary at that moment in time. The arm also extends outwards in order to both reach the ground and provide better range. However, none of this could be accomplished without our…

Siju -

…amazing intake! The intake that we are using is mounted at a 45 degree angle, allowing for the box to be flat with the ground. This transforms our old intake of a grabber into a much more consistent, faster, and easier intake. It can intake every single type of freight without trouble. It uses two different super speed servos to ensure a fast but secure intake, allowing us to move fast with no worry of dropping anything. When in the home position, our arm rests on one of the cross beams, putting the intake firmly within the robot. This minimizes any chance of it getting stuck on the field while moving.

Andrew -

Now, our robot may be pretty good. But it can't run without any code. Being a rookie coder this year definitely influenced our strategy for coding. We started off by making the simplest autonomous that we could think of, that still scored points. Once that worked flawlessly, we expanded, slowly adding more and more to the autonomous, like placing the block on the wobble goal, parking, and getting the duck off of the carousel, and I was able to learn and implement easy opencv using this webcam to visually detect the location of our marker and act accordingly during autonomous. This strategy of building up from the bottom has allowed us to have fallback code to use in case something just wasn't working. This allowed me to reach out of my comfort zone more and experiment with trying to improve the code, and made it easy to modify, understand, and improve.

Cyrus -

And finally, our outreach. Because of the continued relentlessness of the Covid-19 pandemic, we still have not been able to get as many outreach opportunities as we would have liked to. However, the opportunities that we did get are very important, and we believe very impactful to the communities they take place in. We ran exhibits demonstrating our robots to everyone of all ages at the rockville science center during its open house. Rockville science day is coming up, and we are scheduled to host a booth and let aspiring engineers drive our robot. The team helped run multiple different science and engineering related camps, from lego robotics to geology. We also volunteered as referees and judges during multiple FLL tournaments, as FLL was something that we all enjoyed so much, and want to continue to see thrive.