

Marc - red

Pranav - green

Adnan - blue

Marc: Good morning judges. My name is Marc Leo, and I am the team designer.

Adnan: My name is Mhd Adnan, the electrical designer.

Pranav: My name is Pranav Jain, the app developer. Unfortunately, our fourth member Nathaniel, our mechanical designer, could not join us today as he has fallen ill. However, together we are (*all together*) CyberCrawlers.

Adnan: We believe that whatever we create, there is always something that we could improve. And so, we present to you 'ZED 2.0', an improved version of **last year's national champion**, 'ZED'.

Pranav: However, before this new car, we would like to talk briefly about ZED 1.0.

Marc: ZED 1.0 was created to be efficient, elegant, and award-winning. Well, all those boxes were ticked. ZED 1.0 won us the champions award, but we still believed that we could do better, as it had a few flaws that would have improved our score.

Pranav: So we decided to add features, and improve the current features. Hence, we are here today to present to you ZED 2.0.

Adnan: Our car 'ZED 2.0' is a 3D printed unique car with a sophisticated geometrical structure. It earned its name from a character in a popular video game. Also, the design of the car is almost like the edges and lines of the letter 'z'.

Marc: First, we will talk about the mechanical design. This car design allows all components to be housed within, while also having extra space available to add more features. First up, we have the adaptive shell. The shell of ZED 2.0 changes according to the car itself, based on the terrain it is driving over. This might have been the hardest part to design and then print, but we did it because we felt that it will help us to drive better on the track.

Adnan: Next up, we have the custom suspension we have built. We have designed this in such a way that we can manually control the suspension to go up or down depending on the terrain the car is driving on. We designed a special mount to hold the servo motors and then connected them to the main PCB. This was really hard to program on Arduino.

Pranav: The next feature we have added is the custom battery holders. We designed custom 3D printed battery holders for the car, to keep the power sources in a convenient place, where we can remove and keep them back easily.

Marc: Now, we have the trailer tow hook. We have designed our very own hook to use in the Trailer Tow challenge. Our hook is unique, and allows us to hook the trailer easily. We have also programmed it to be able to operate using an app (more on that later).

Pranav: Apart from the mechanical design, we also paid a lot of attention to the electrical side of things. We added some components to make sure that everything worked the way we wanted it to.

Adnan: There is a phototransistor attached to the top of the car to automatically turn on the headlights when it is dark outside. There is a gyroscope sensor that measures when the car tilts at an angle that is more than 25°, connected to a buzzer to alert us.

Marc: Along with this, we have added additional back lights that turn on whenever the car reverses. All of this is possible through the Arduino code and a custom PCB, that work to make everything function smoothly.

Pranav: Next, we will be talking about our app that we designed to control the car and make our final project a little more interesting. We designed the app on MIT App Inventor and added a few features to it. The app includes features that we can use to control the tow bar hook, the suspension control, and a feature to monitor the gyro sensor readings.

Adnan: We also added some unique features to showcase our team and give some more information about ourselves and our project.

Marc: We decided to make this app so that we could make our project a little more interesting and different from everyone elses.

Pranav: Now let's talk a little about the coding and programming side of our project. We used Arduino to connect all the motors and sensors, so we used C++ to code all the components. We did this on the Arduino app.

Marc: Some of the code was very hard to do, but we found new ways to program the same thing. We also looked online for inspiration to complete the complex and advanced codes.

Adnan: The servo motors that we used for the suspension control needed the most amount of code and it was the most complex.

Marc: The programming for the gyro sensor also required some difficult code, as we had to also send the readings to the app we made. Since a lot of these codes were hard, we spent a lot of time learning how to do advanced programming, and so we learnt a new skill along the way.

Pranav: We put in a lot of time and effort into making this car, but it didn't go without any challenges and issues. A lot of obstacles showed up on our path and we had to find innovative ways to solve them.

Adnan: The biggest obstacle on our path was COVID-19. There were a lot of restrictions that were there because of the virus, and so a lot of our team communication was also restricted.

Marc: However, we decided to make use of technology to tackle this challenge. We started meeting on Zoom to have team meetings and to discuss the progress of our project. We also had shared documents and presentations that we used to collaborate remotely, without risking an infection.

Pranav: Another problem we faced was complex and advanced coding requirements. Although our new features were very innovative and unique, they needed a lot of tough and complex codes that weren't readily available.

Adnan: So, we decided to turn to the internet to search for inspiration and find solutions for this problem. We found codes that helped us, and so we changed it to suit our requirements and used it so that everything functioned well.

Marc: Even though we had all these problems, we still found ways to work as a team and make sure everything was working well. From this, we learnt that no matter what obstacle shows up, if we work as a team, we can solve anything.

Adnan: And that's not the only thing we learnt. Throughout this entire competition, we learnt a lot of things along the way.

Pranav: We learnt how to collaborate on our work to make sure that everything was working well. We learnt that if we put our brains together then we could achieve whatever we wanted to. This is one of the most important lessons we learnt.

Marc: We also learnt how to analyze problems effectively and solve them in the best way possible. This was also very important, as we had a lot of issues along the way that required us to think critically and solve it.

Adnan: What I loved the most was that we all learnt a new skill in every field because of this competition. We were exposed to new ideas and new techniques, so we learnt something new everyday.

Pranav: Yes, during this competition, each one of us had something to teach the other. So we all learnt from each other. This helped to avoid conflicts among us, because we knew that each person had something to teach us.

Marc: Since we all had different skill sets, we also had different ways of tackling challenges. This diversity in our personalities helped us to look at problems and solve them in a different way.

Pranav: We were able to merge our methods of solving problems and find unique and innovative ways of finding a solution to each and every problem.

Adnan: This competition has been extremely helpful for us in many ways, and we just want to say thank you for giving us this opportunity.

Marc: Even if we don't come in the first place, we consider this a win because of everything we have learnt. Thank you for listening to us, have a great day ahead.

all together Thank you!