Jared eddington, Thomas Nguygen, Jacob Bausita, Jason Melera

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Extending Arm Mechanism

After countless hours or labor the Franklin high school robotics club members couldn't find a way to reach tall objects with our short clawbot. The extending arm mechanism was built as a way for robots to accomplish this task. This allows robots to be compact or lengthy when necessary. We got our inspiration from the Star Wars lightsaber toy because it starts compact and can extend into a larger rod.

This arm mechanism only includes the forearm so it must be connected to the elbow joint or the robot. The part ends with a flat, cylindrical magnetic plate so it can be connected to many different types of robots. However, we designed this forearm part specifically for humanoid type robots which is why the part is a representation of a human forearm.

To create our part we used the Autodesk Inventor 2020 software. First, we had to briefly design the general idea and find a way to extend the inner forearm piece. Then, after we finalized the ideas we drafted them into the Inventor 2020 software.

We learned the intricacies of designing a functional mechanism due to the lack of in person interactions and communication. Working together during the COVID-19 pandemic was difficult, but we used Discord to communicate and work as a group. This experience and challenge has taught us the importance of communication and teamwork. Most of our members learned how to use Autodesk Inventor from our CADD drafting class at school so this project has reestablished our understanding of how to use this software. The majority of our club members plan to go into Engineering careers and majors so most of us will be using this software or a

similar software in the future. If you are on a competitive robotics team, Autodesk Inventor is a great software for 3D drafting so you can use it to design your robot and draft parts for 3D printing. The 3D design software is very similar to other 3D design softwares for 3D printing. Since some of our club members plan to become Architects, civil engineers, mechanical engineers, and other similar fields, our knowledge of how to use 3D design softwares will definitely help us. Most engineers use some sort of drafting software so getting the basic understanding of how to use one will help us when we learn more intermediate softwares and design more complicated and intricate objects.

Lastly, in all honesty, we ran out of time to officially 3D print for our extending arm mechanism, therefore we do not have a picture of it. Instead, we have an exploded assembly AutoDesk Inventor photo that shows the separate parts of the mechanism that we hope can be used as an alternative for the photo of the 3D part.