I was given a task to lead a small team and design an arm that could expand and retract for the 2023 FIRST Robotics Competition game. The game required a robot to pick up cones and cubes of the floor and place them on shelves of different heights. Following the guidelines and the game manual an arm had to be designed to play the game. The arm was the center piece of the robot. It would have a claw on the head of it to pick up the game pieces and the back of it would be connected to a shoulder that would let it rotate and adjust angels. The arm also had to be designed so that it could flip the robot back up if it fell on its side.

Elevator mechanism: To make the arm expand and retract a simple yet effective design had to be made. This design consisted of two guide arms and a singular central arm (2 x 1 aluminum tubes) that would be the one that would expand or retract. Each arm had custom guard bearings on it along with a chain with two gears to move the central arm. The entire system was powered by a Falcon 500 Motor.

Once the design was finalized and modeled by the inventor I ran multiple Finite Element Analysis on it to make sure that it could push up its own weight in case we needed the robot to flip itself in case it had flipped.