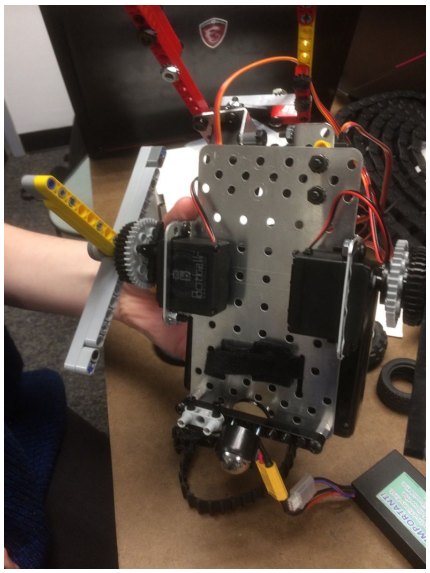
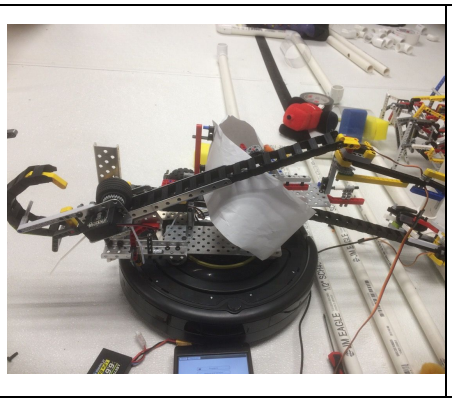
Greater DC/Virginia Region

Period 2 Mechanical Design

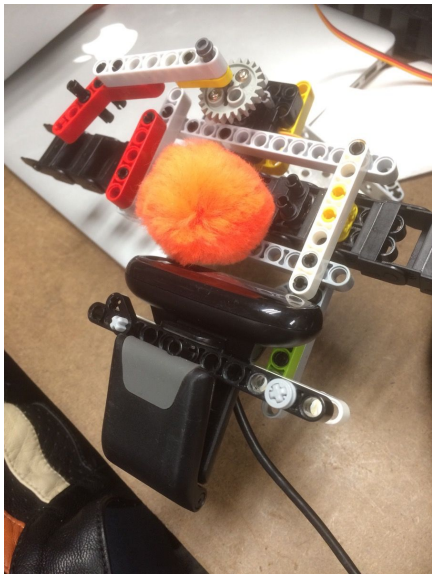
Drivetrain:

	Our drive train does not directly connect our “x-wheels” to the motors. Instead, we have servo horns which are screwed into the motor, and on those we have gears which are screwed into the horns. We then use pins to connect the x-wheels to the gear. We also considered using a traditional wheel to horn mount. The reason we didn’t go with the traditional wheel to horn mount is because it is hard to directly attach legos to the servo horns, as screws often fall through the pin holes. On the other hand, we can directly attach legos to gears through the use of pins.

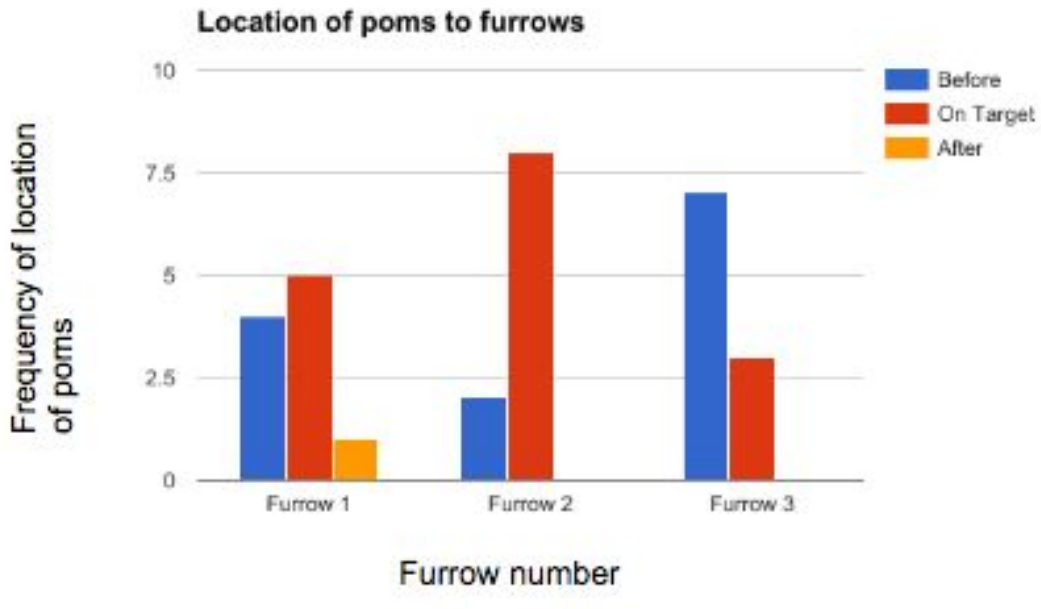
Effector:

	On our create we have a claw attached to an igus chain, allowing it to change elevation and reach the poms on the terrace. Initially, we considered using a standard claw on a rod attached to a fulcrum. We ended up not going with this design as when the claw was raised it stopped being parallel to the ground unlike with the igus chain.

Sensor Mount:

	We sandwiched the base flap of the camera between two lego beams which were connected by axles to secure it. We alternatively considered putting lego beams around the head of the camera itself. We ended up not going with this strategy as it was looser than the alternative, meaning that the poms would have always been in different locations in the camera's view.

Data:

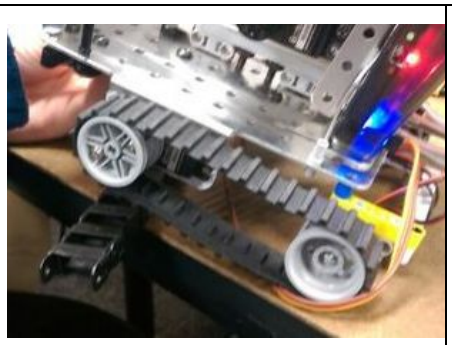


This graph records whether or not our create is able to precisely place poms into each furrow. We had the create attempt to put a pom into a furrow ten times for each furrow. If the pom landed not in the furrow it was aiming for but the area before it, we marked it on the graph as before. It the pom landed in the furrow we were aiming for, we marked it as on target and if it landed in the area after it, we marked it as after.

Data Evaluation:

Our data shows us if our igus chain pom dropper is able to precisely drop a pom into a specific furrow. This is important for we can't get the color multiplier if we can't drop poms into the exact furrow we want. For the first furrow, we needed to figure out how many motor ticks it took to move the pom down one furrow. Because of this it took many attempts until we were able to drop the poms on target. For the second furrow, we were able to simply double the motor ticks required to reach the first furrow, enabling us to have most our tests on target. In the third furrow, simply tripling the first furrow motor tick distance didn't work as our igus chain started sagging, causing our poms to fall short. We realized from these results that to not fall short at the third furrow, we must somehow reinforce the igus chain, preventing it from bending. Based on this conclusion, we linked legos through the igus chain. This caused the igus chain to bend less as it is harder to make legos bend.

Modified System:

	On our smaller robot, named Tiny Tank, we changed the movement system from using tires to using treads. The reason for this change is that Tiny Tank needs to be able to go up the ramp. Because of the tires low surface area as opposed to the treads, they were unable to bring up Tiny Tank. On the other hand, the treads large surface area allowed for easy driving up the treads. We will continue to test the treads by having them repeatedly take Tiny Tank up the ramp. Our goal is to be able to go up the ramp 9 out of 10 times.