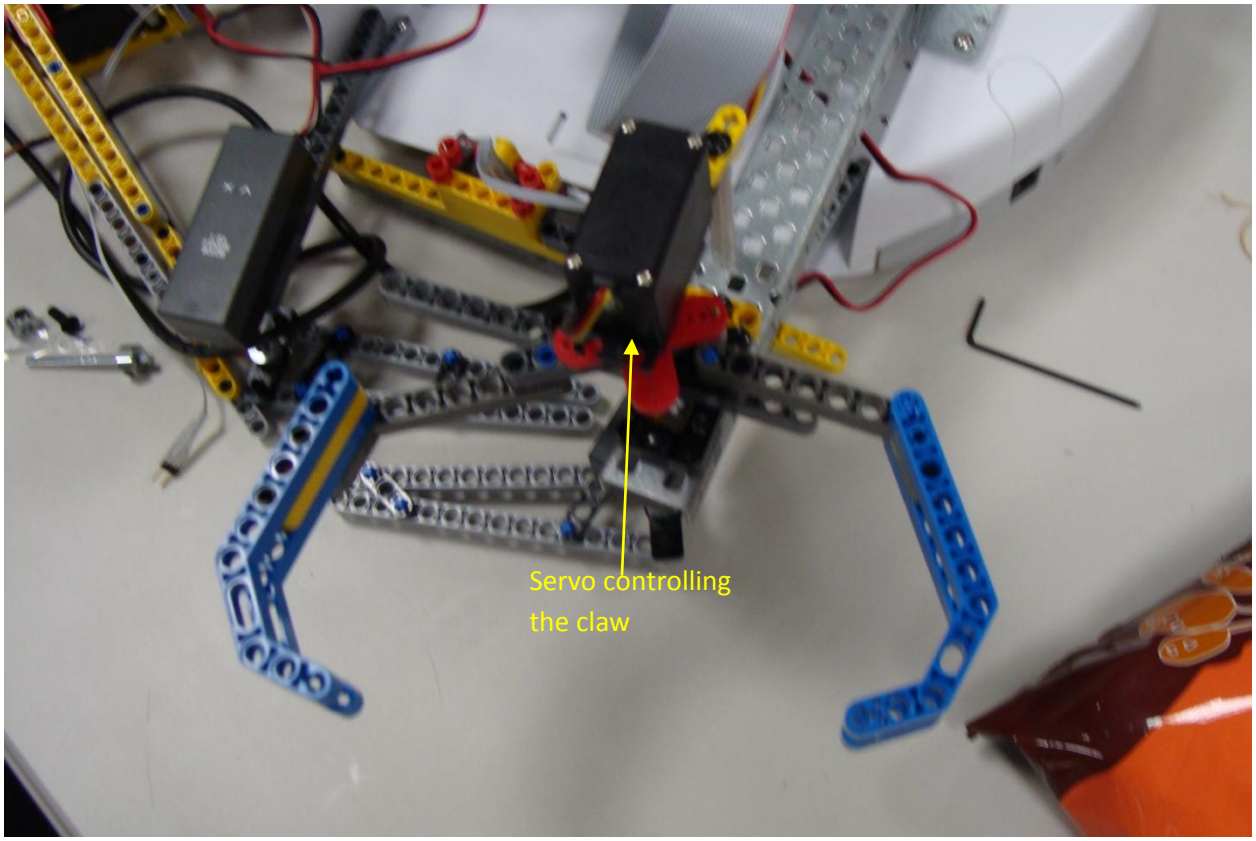
MECHANICAL DESIGN

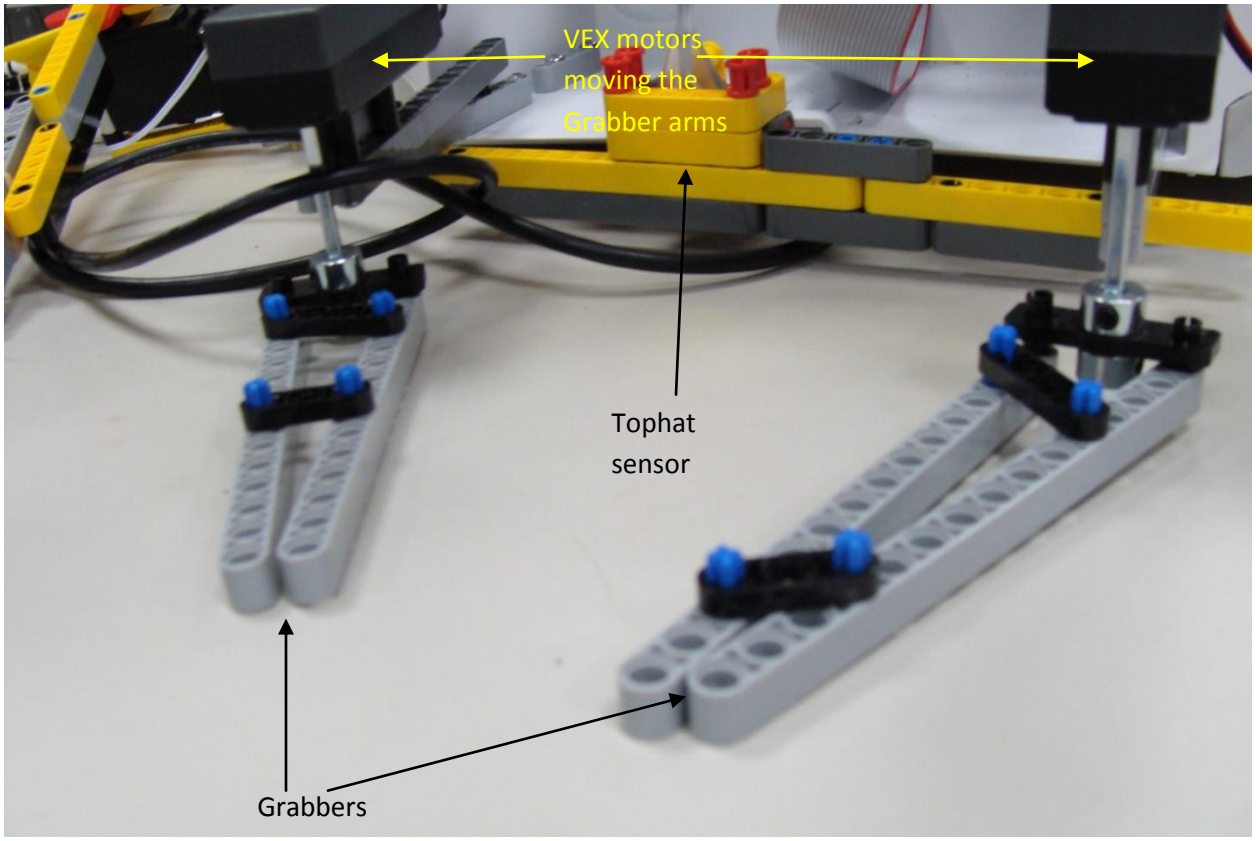
Table of Contents

Botguy Claw



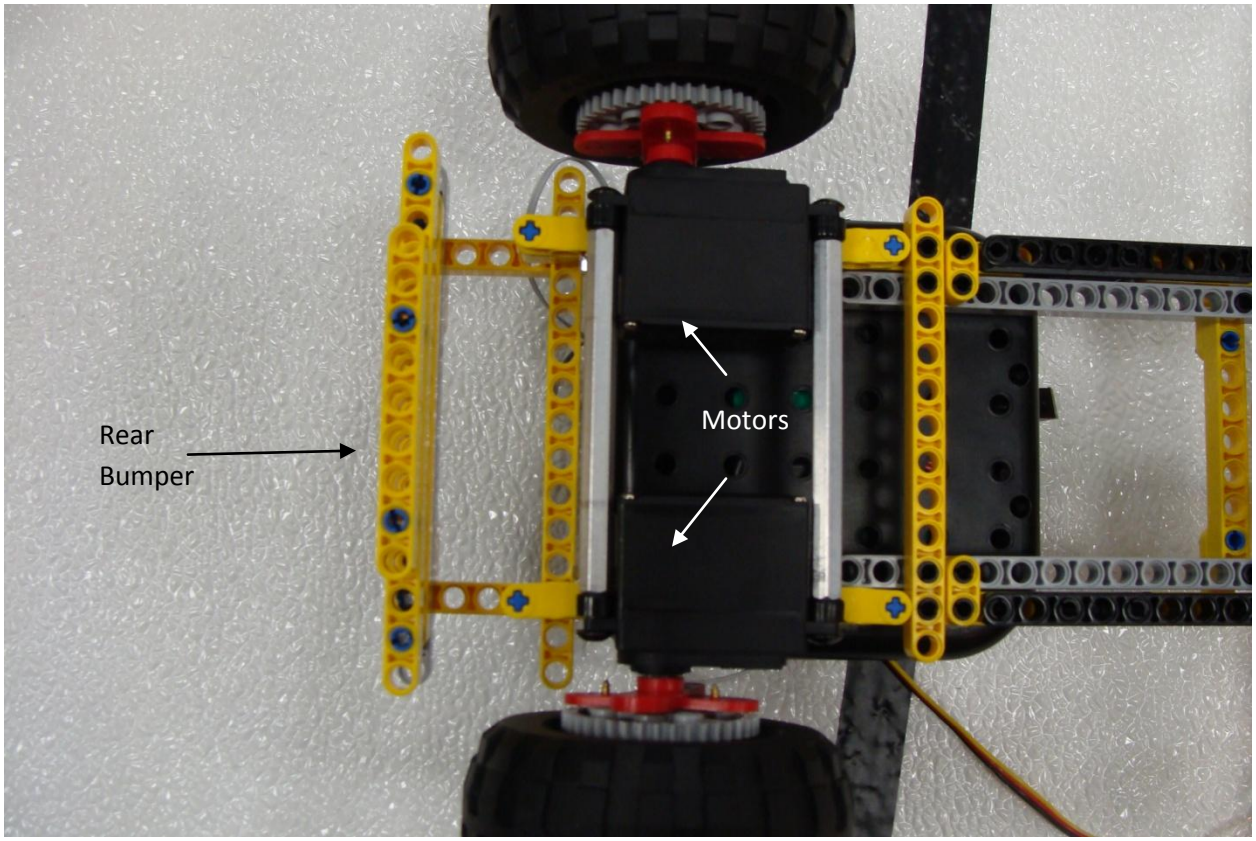
We chose this particular claw design for our robot due to its effectiveness in holding botguy. We had everyone on the team construct some kind of claw to grab botguy and then evaluated the effectiveness of each claw. In order to evaluate the effectiveness we tested all of our prototype claws by placing botguy in them and then seeing how long each of them could hold botguy while being shaken with a small amount of force. The claw displayed here was the result of our tests, capable of actually holding botguy while being moved a great deal. The claw not only gets an extremely strong grip on botguy, but it also has a fairly large grabbing range.

Grabber Arms and Tophat Sensor



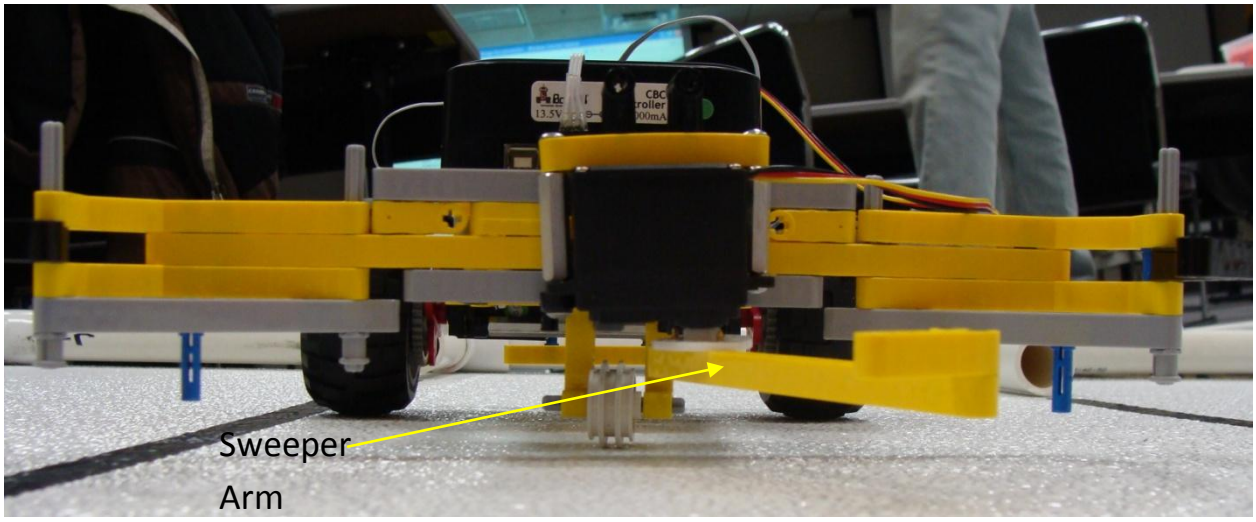
This picture depicts two different aspects of our robot. The grabber arms seen here are designed to obtain the poms located inside cups and hold them while our robot moves. We assigned a group of people to work on building these grabbers, which they worked on independently from the rest of our team. They evaluated the ideas they came up with by testing how they fit on the robot and if they did fit on the robot they checked whether the grabbers actually worked. The design seen above is our final design, which is capable of folding to fit in the starting box and also capable of having each grabber arm move independently from the other. This picture also shows the Tophat sensor we mounted on our robot. The tophat was developed in a similar method to the grabber arms, but the group of people working on the tophat sensor mount consisted of two people, considerably less than the amount of people working on the tophat. There isn't really much to say about the tophat mount, it holds the sensor up and does not allow it to drop.

CBC Drive Train



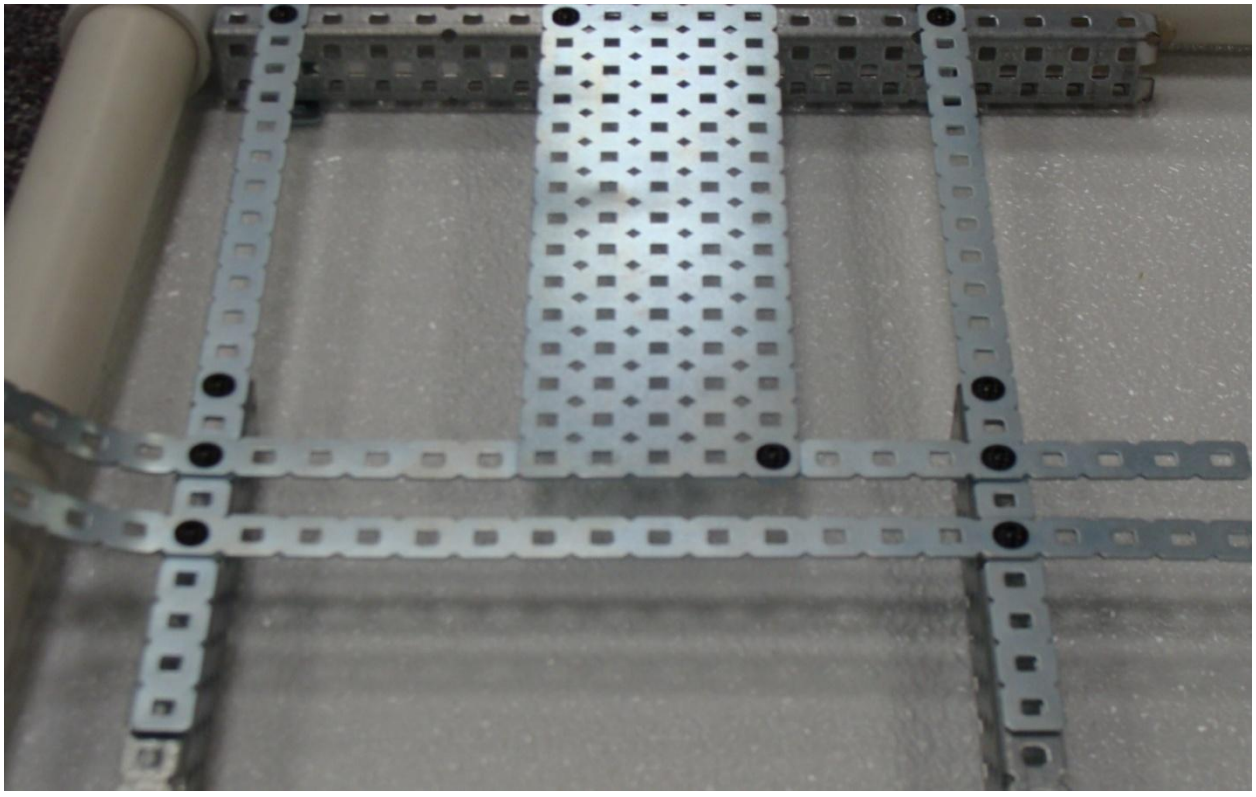
This picture depicts the drive train of our CBC robot and also the rear bumper which we attached to it. The drive train holds the motors together using a pair of metal bars, a technique which we discovered while experimenting with various methods for holding the CBC's motors together. The Evaluation process which we used for the drive train was a very simple one as we evaluated whether the drive train would fall apart or not. This drive train was the most stable of our designs, its usage of metal makes it virtually unmovable, making the robot very stable. It is also possible to see the rear bumper in this picture. The rear bumper had no real evaluation process in its design, we simply built it and found that it worked, so we used it. We found it stable enough that no further designs would be needed.

CBC Claw



This image depicts our CBC claw, a large immobile piece of Lego's designed to hold as many scoring objects as possible. We spent a considerable amount of time designing this claw and we actually broke into two different groups to work on it. Group one worked on the overall design of the larger claw while Group two worked on the smaller sweeper arm which was placed inside the claw. Group one evaluated the effectiveness of their various designs and came up with our current one, a claw which is both compact, but has a very large grabbing range. Group two did not have such an easy job designing the sweeper arm. The initial design which group two proposed looked a lot like what can be seen in the diagram, but without the hooked end. Group two was continually frustrated in their claw design in that it could not effectively hold a PVC coupler. Many other designs were tested in their ability to hold the coupler, but in the end it was realized that the addition of a single piece could vastly improve the robots efficiency. Thus we added the hooked part which can be seen on the end of the sweeper arm.

CBC Platform



This is the platform which we use to drive the CBC over the pipe in the starting box. We spent a long time evaluating how we could build our platform using the minimum amount of pieces. This design actually did not use the least pieces, but was extremely stable, a feature which we considered more important than using two or three less pieces. This platform was tested by measuring whether the CBC could get over the pipe with it and then attempting to get over the pipe with the CBC while using this. Our platform is a solid construction and it can easily support the CBC's weight and remain in the same place while the CBC drives off it.