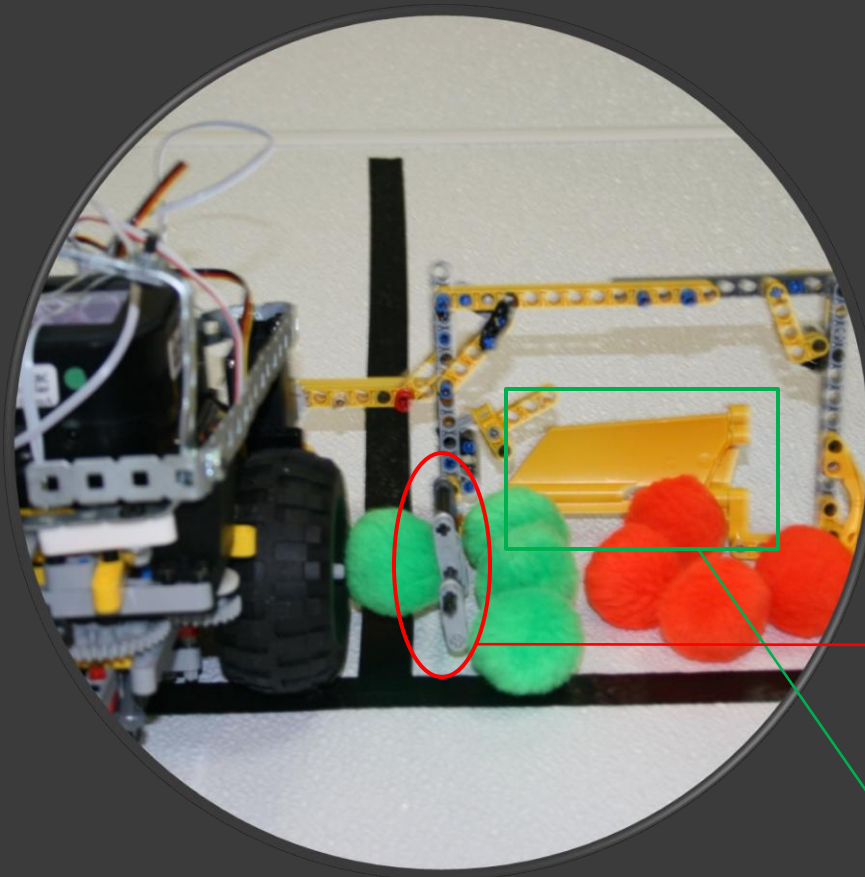


Team 192

EVOLUTION OF SYSTEM DESIGN

The CBC Robot – “FLOOR-E”

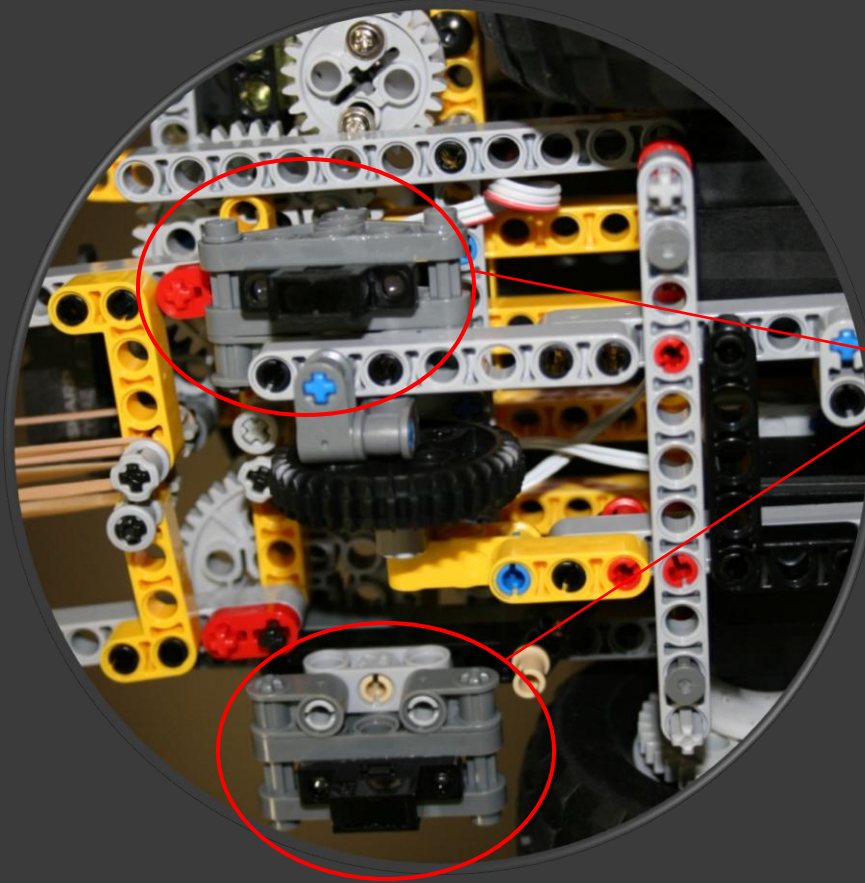
- The attachments on our CBC robot were finalized during the planning stages. The two basic attachments, the water reserve grabber on the front and the pom-sweeping “wall” on the back, were preserved throughout the building and testing process. We removed very few elements of our original designs, as their basic principles were sound, and instead focused on additions for improvement. The water reserve attachment remained the same, but the “wall” was changed and sensors were added. The camera attachment was also modified.



The Sweeper “Wall”

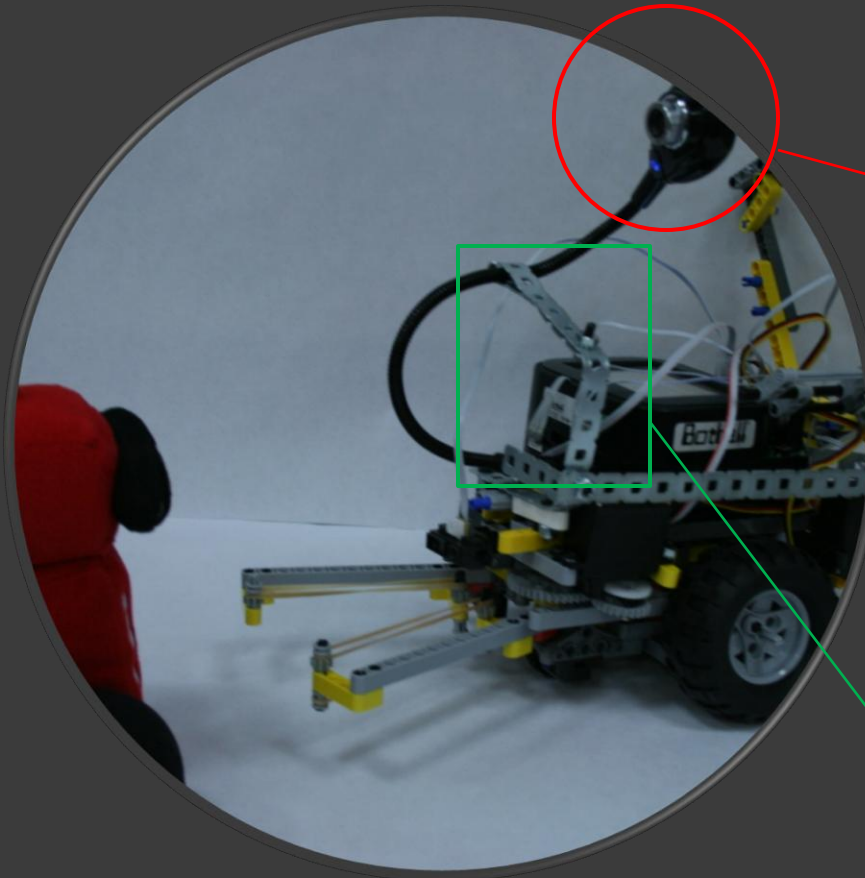
- The CBC robot lowers the “wall” over the PVC piping. When the robot moves forward, the poms on the side of the piping are swept off. The robot then carries the poms to the peak.
- We added an extra piece on the side of the “wall” to secure the poms, which were slipping out of the attachment as it carried poms to the peak.

WATCH THIS: The yellow “door” piece on the wall is controlled by gravity. Once the claw is off of the PVC piping, the “door” falls shut, trapping the poms and preventing their escape.



“Top Hat” Sensors

- The two “top hat” sensors on the bottom of FLOOR-E were welcome additions to the original plan, an alternative to the less-accurate “dead reckoning” programming strategy.
- The sensors align the robot with the black line when it reaches the peak, allowing for better accuracy and increased maneuverability.



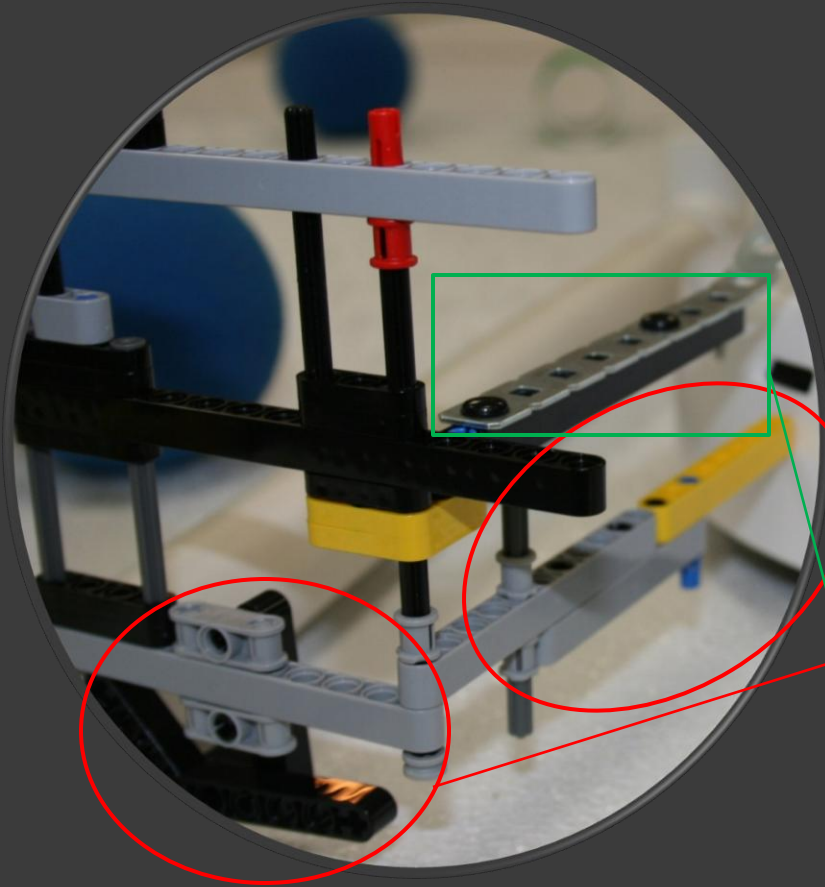
The Camera

- The camera was another unforeseen addition to FLOOR-E, and another alternative to “dead reckoning.”
- The camera locates the green poms, allowing them to be swept away by the wall.
- It also locates water reserves which were not picked up and swept away by the Create bot.

WATCH THIS: The metal on the side of the camera stabilizes it and keeps it in place, allowing the camera to continue to accurately seek out poms and water reserves despite potential bumping or jostling during the competition.

The iRobot Create – “Oh, No!”

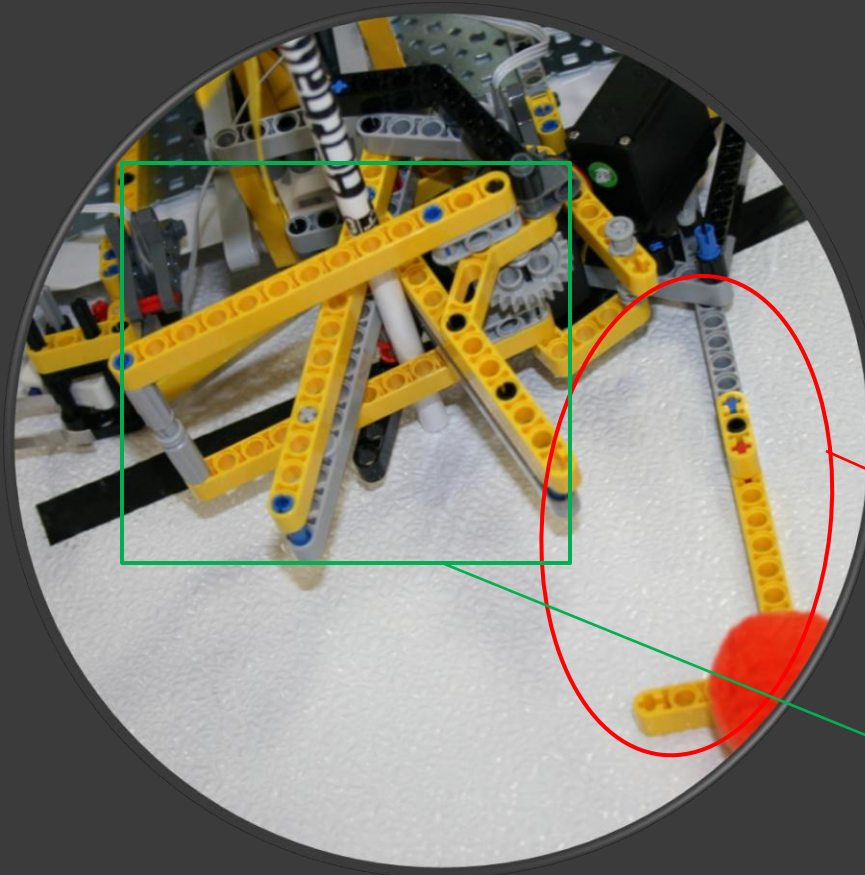
- As with the CBC robot, the Create robot’s mechanical designs were not greatly modified after the initial planning process. If they were, it was to add minor attachments, and not take any away. While testing the robot on the game board, certain modifications proved necessary to the robot’s success. We changed both of the large attachments – the sweeper arm and the turbine grabber, in fairly minor ways. Our largest change was adding a second sweeper arm to aid the turbine grabber.



The Sweeper Arm

- The overall design of the sweeper arm remained largely unchanged.
- We simply lengthened the claw to prevent loss of game pieces.
- We also added a skid at the bottom of the arm's claw. The claw was getting caught on the plastic connectors which keep the board together. The skid allows more freedom of movement.

WATCH THIS: The metal piece of the claw allows both horizontal rigidity and vertical flexibility.



The Turbine Grabber and Second Sweeper

- The design of the turbine grabber remained the same.
- However, we added a servo-controlled sweeper arm in front of the turbine grabber to clear the board so that turbines can be properly and easily placed.

WATCH THIS: The turbine grabber can raise and lower itself. This enables the Create to fit inside of the starting box at the beginning of the competition. It also makes it difficult to knock turbines out of the grabber when the arm is raised.

