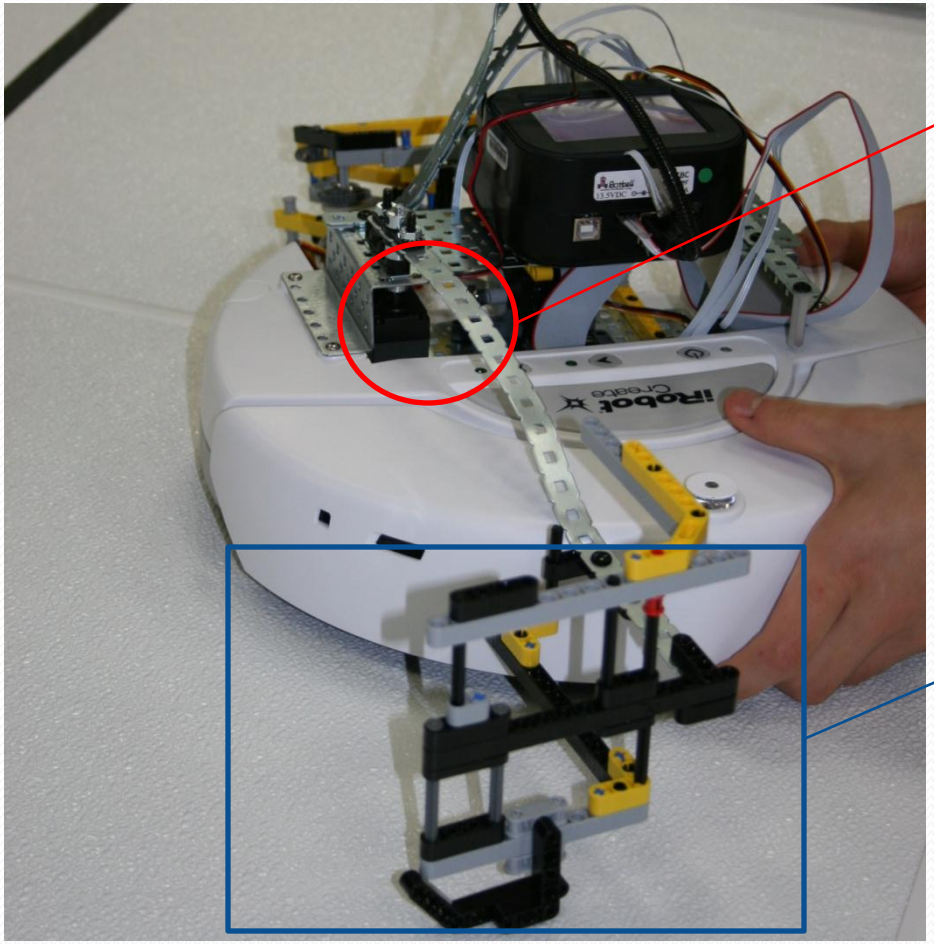
Team 192 – Mechanical Systems

Period Two Documentation

The iRobot Create

- Sweeper Arm
  - Function: This claw-like attachment sweeps Botguy and the foundations to the peak. We may also use it to move the water reserves and the fuel containers (with the fossil fuels and green objects inside of them) to the peak.
  - Evaluation Process: We always planned on using a sweeping arm to capture Botguy. It was the simplest design possible and easy to manipulate. We also realized that the arm would have many applications besides merely sweeping Botguy, and could be use to transport other objects as well.
  - Features: The Sweeper Arm is controlled by a single IFI motor. It sports a simple and efficient design, and does not take up much space when positioned behind or in front of the Create.

Sweeper Arm



IFI motor

Simple sweeper arm design is efficient and effective

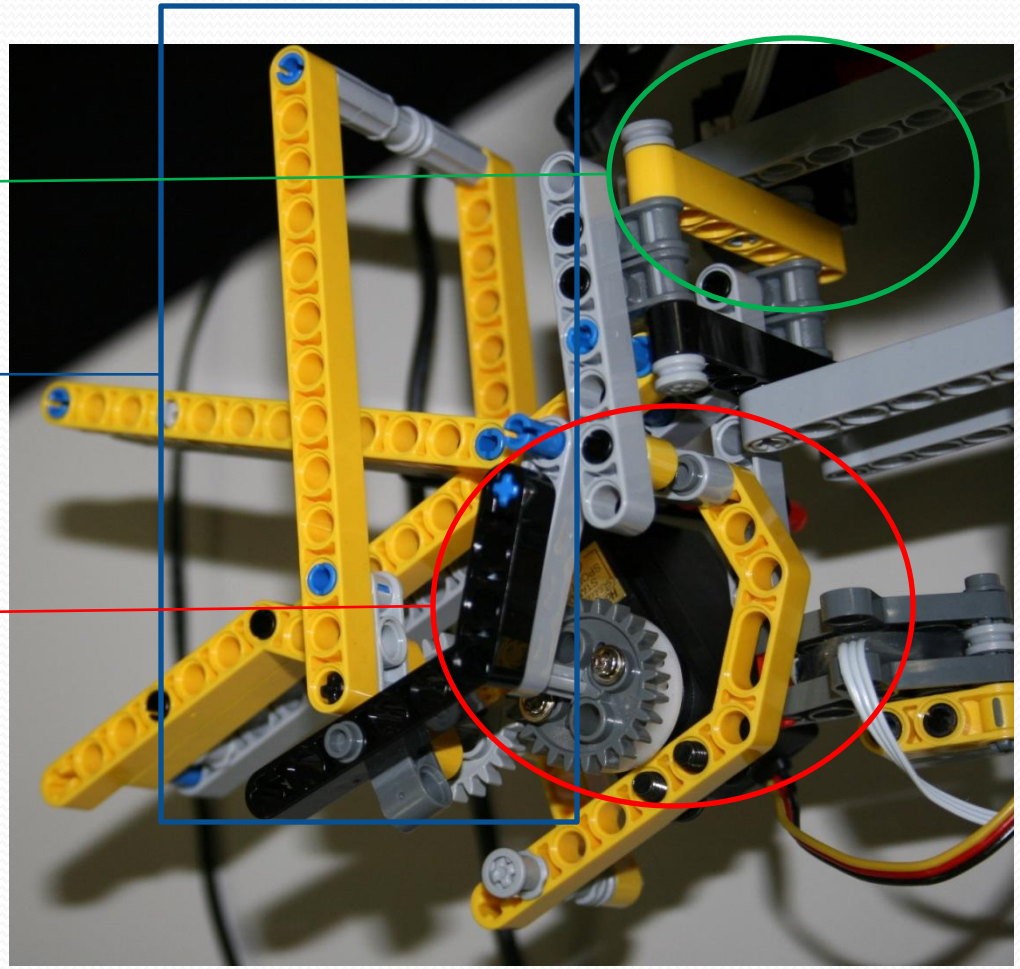
- Turbine Grabber
  - Function: This triangular claw, which grabs wind turbines when the gate on the front opens and closes, picks up the turbines and moves them to the peak, where it lowers them into the foundations.
  - Evaluation Process: We wanted an attachment which could hold and transport multiple wind turbines at a time, and this grabber accomplishes that objective. One of its most unique features, the claw's ability to raise and lower itself, was based off of a design successfully used by a team in last year's competition.
  - Features: The Turbine Grabber utilizes two servo motors. The first controls the "gate," which opens and closes to grab the wind turbines. The second servo motor raises and lowers the claw. The Grabber can hold at least two turbines at the same time, allowing for speedier transport.

Turbine Grabber

Second servo raises and lowers arm

"Gate" which opens and closes.

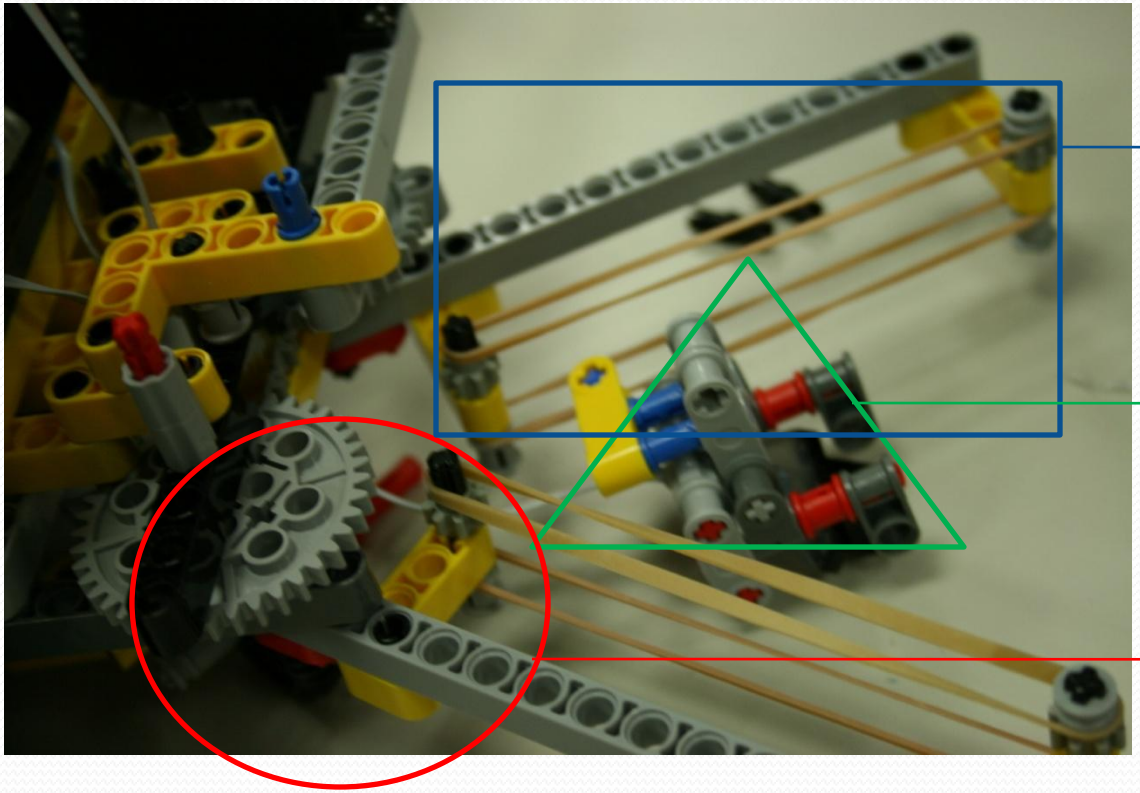
Servo which controls gate



The CBC Robot

- Pincher
  - Function: After the CBC robot locates the water reserves using the camera, his triangular attachment closes over the reserves, pinching them to hold them in place. The balls are then taken up to the peak to score the maximum amount of points.
  - Evaluation process: We initially considered a claw to grab the reserves, but, after testing, it proved to be too slow. This alternative design is has a decent margin of error when grabbing the reserves.
  - Features: A servo motor controls the pincher, and a touch sensor determines when the claw is holding something.This attachment is lightweight, quick, and accurate. The rubber bands on the bottom provide friction to further secure the water reserves, as the reserves are not very heavy.

Pincher



Rubber bands help secure water reserves

Touch sensor (currently detached)

Servo motor (visible beneath gear)

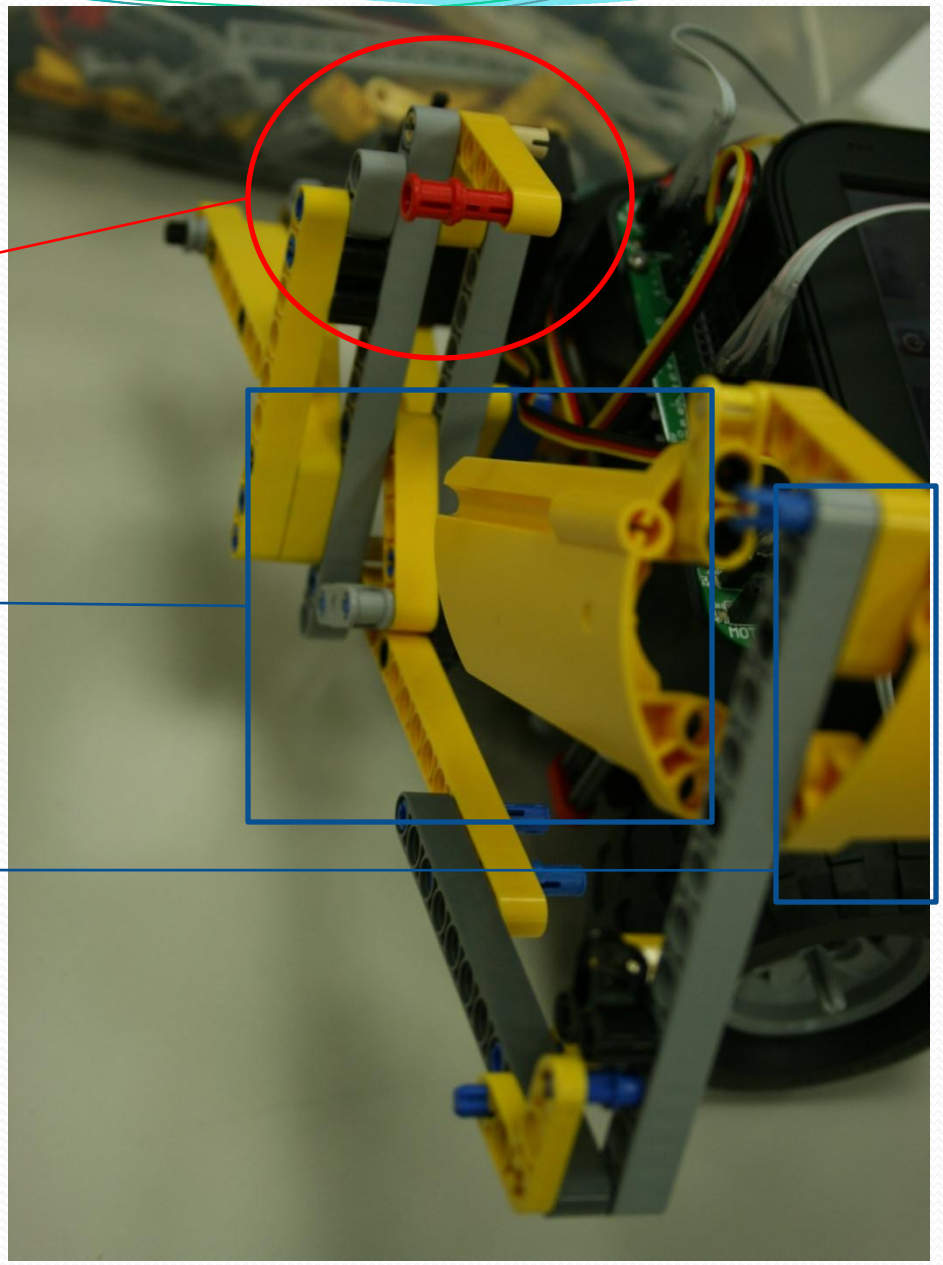
- The Wall
  - Function: The CBC robot backs up against the wall of the game board to orient itself. It then lowers the Wall attachment over the PVC. The yellow door swings up, allowing the robot to move forward and the attachment to sweep the fossil fuels and green objects off of the piping. When the robot reaches the end of the PVC, the yellow door swings shut, securing the green and orange poms and allowing the CBC robot to take them up to the peak.
  - Evaluation Process: Before coming up with this design, we rejected a few other, more standard, grabbers, which testing proved to be too slow or too inefficient. We were also running low on servo motors, and this attachment only utilized one servo, making it the most convenient option.
  - Features: One servo motor raises and lowers the attachment, allowing it to take up little space when not in use. The swinging door which closes behind the poms comes down by gravity and is not reliant on servo motors, making it a more efficient design.

The Wall

Servo motor raises and lowers attachment

Flap which comes over the PVC and is controlled by gravity

Part of arm which sweeps poms off of the PVC




Botball