Wall-E 2.0

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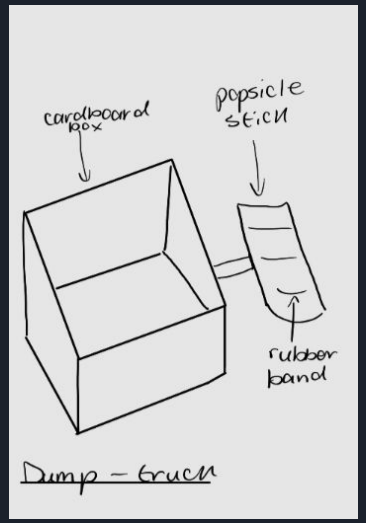
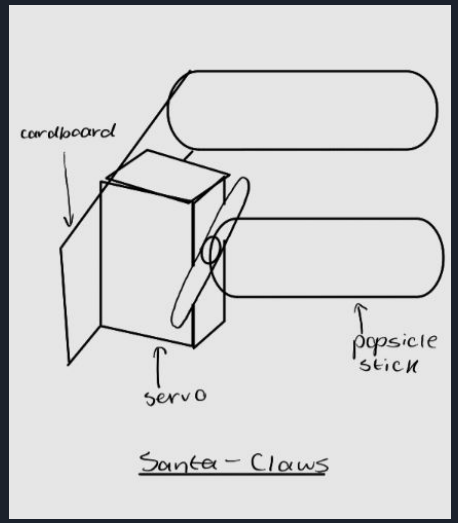
Overview

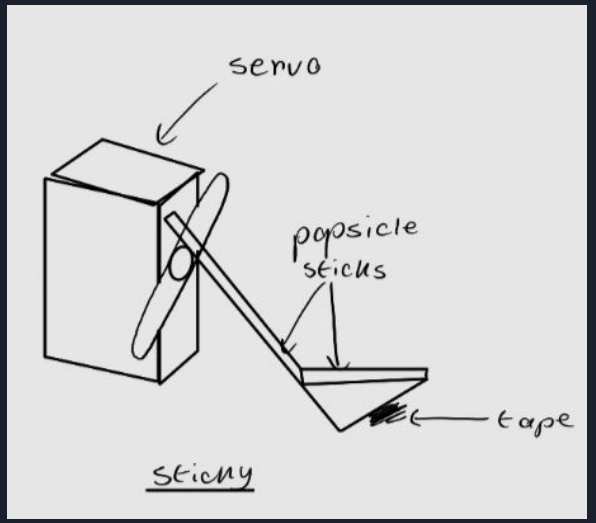
Online classes resulted in many students becoming increasingly lazy and disorganized. With a lot of classes becoming asynchronous, many people lost their daily routines and lived chaotically cooped up in their rooms.

The objective for the Senior Design category takes becoming organized in a literal sense with the objective to design and built an “organization-bot” that can sort objects based on colour, shape, and size. Its function will be to drive along a prescribed track drawn on the ground and detect objects along it, pick them up, and sort them according to those criteria. The objects will need to be lifted and dropped into 3 corresponding bins at the end of the track.

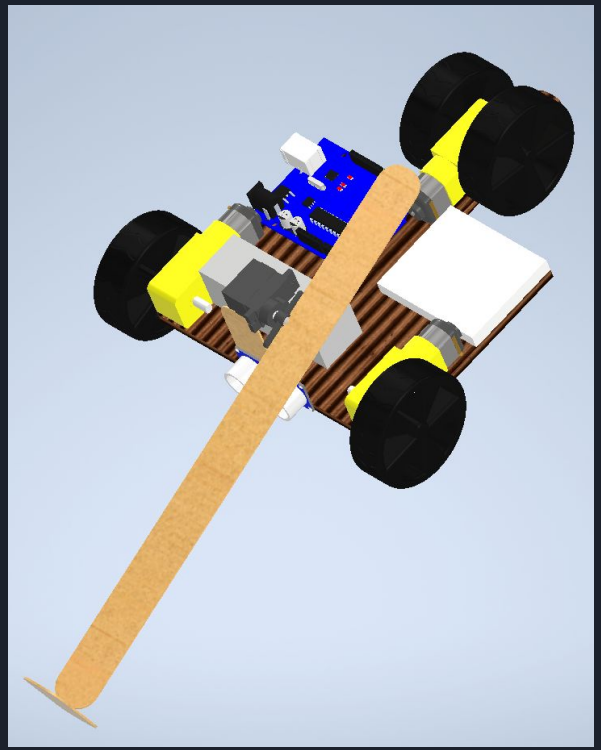
Brainstorming

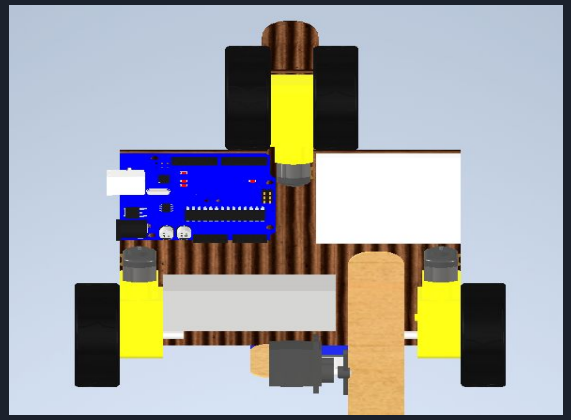


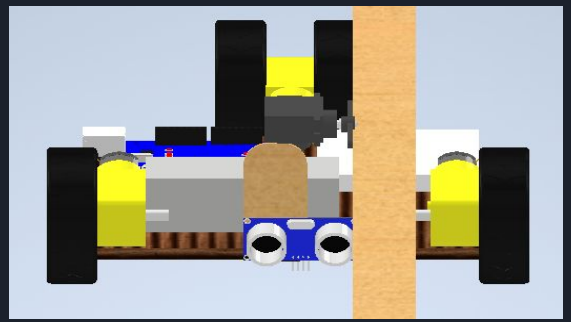




CAD Model

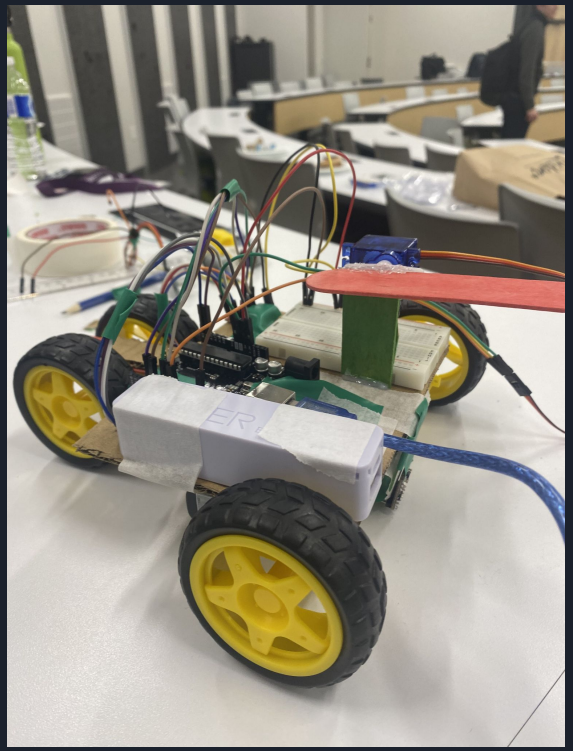






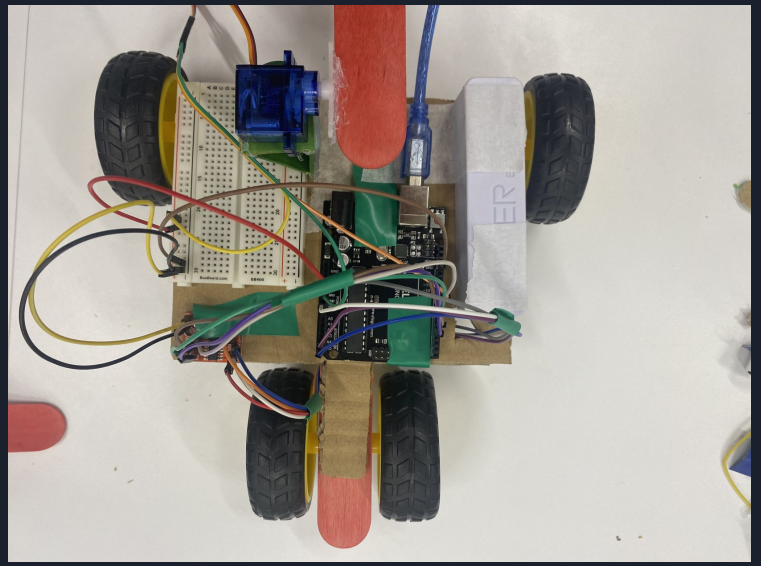
Final Prototype

- Detects block color
- Translates vertically and turns towards the block
- Picks up block and turns to path
- Detects path of block's color
- Translates to cup
- Drops block



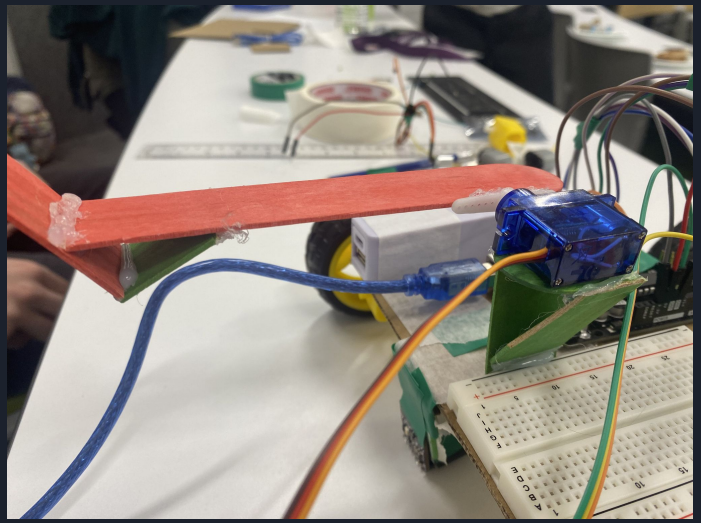
Electrical Defense

- Pins were sautered on the motor controller, RGB sensor, and motors
- Grouped wires by function
- Breadboard was used for common power and grounds



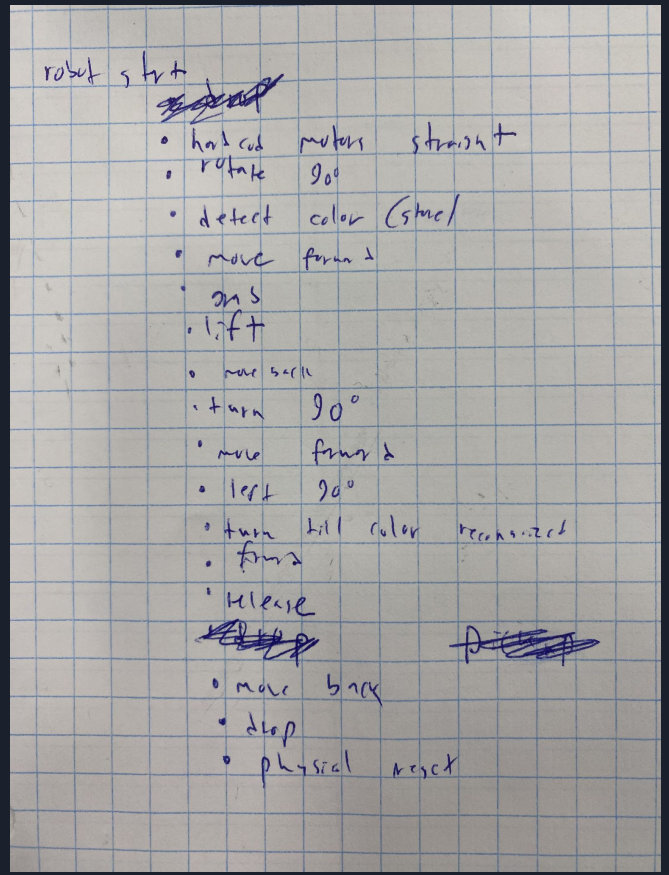
Mechanical Defense

- Minimized use of motors for translation using 2 wheel motors and L298N Motor Driver
- Use of popsicle sticks to stabilize chassis
- Servo raises arm



Software Defense

- Hard coded the distances the robot moves
- Used a single RGB sensor to detect colours for both the lines and the boxes
- Ultrasonic sensor was intended to be used for distance detection
- Autonomous movement and object pick up



Cost Analysis

Material	Amount	Cost
Female to male wires	10	50
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Soldering sessions	2	30
Electrical tape	1 roll	15
Net		145

Improvements

- Using ultrasonic sensor to detect location
- Improve grabbing mechanism
- Improve use of RGB sensor
- More time for testing and making the design more versatile

Thank you!