



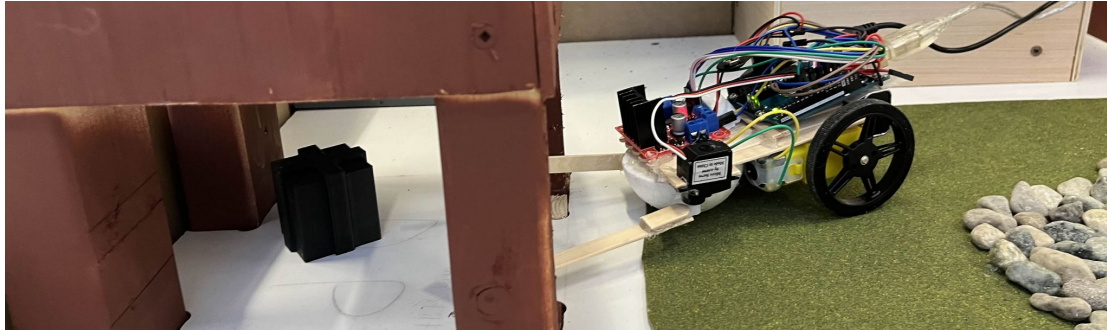
# GiftLifter 3000

WEC Senior Design 2025

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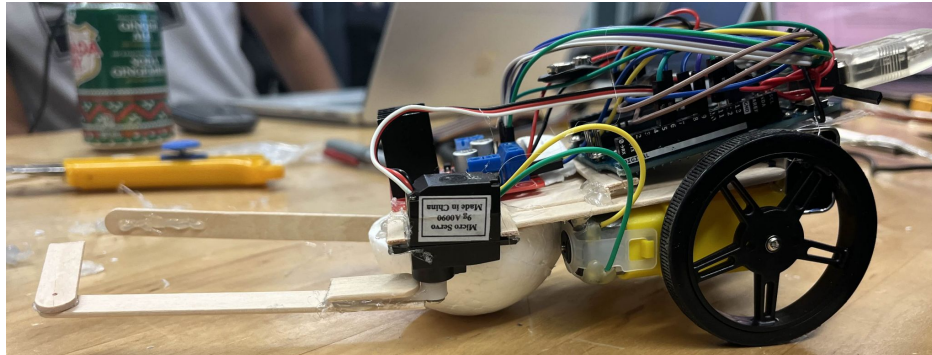
# Requirements

- Sizing:
  - 4x5 inches to ensure we can drive around all obstacles to collect all packages
- Price
  - Goal is to keep <\$4000 for 10 bonus points
- Ease of construction
  - Solution needs to be feasible within 6 hour time building constraint



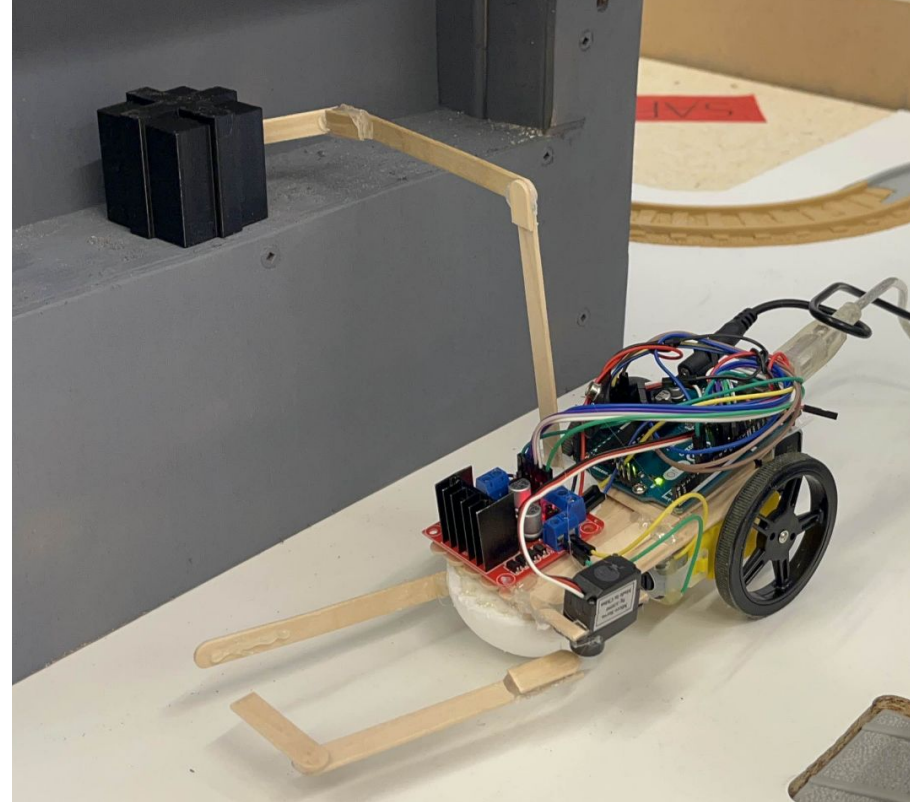
# Component Selection and Placement

- Cheapest components were used in all cases!
  - Popsicle sticks
  - Large hot glue stick
- Thinner wheels selected to keep robot small to be able to reach all presents
- Battery placed behind rear wheels for better traction
- Arduino placed at the back for ease of connecting the tethered USB cable
- Arduino secured by threading screws we got from our servos into popsicle sticks hot glued to base

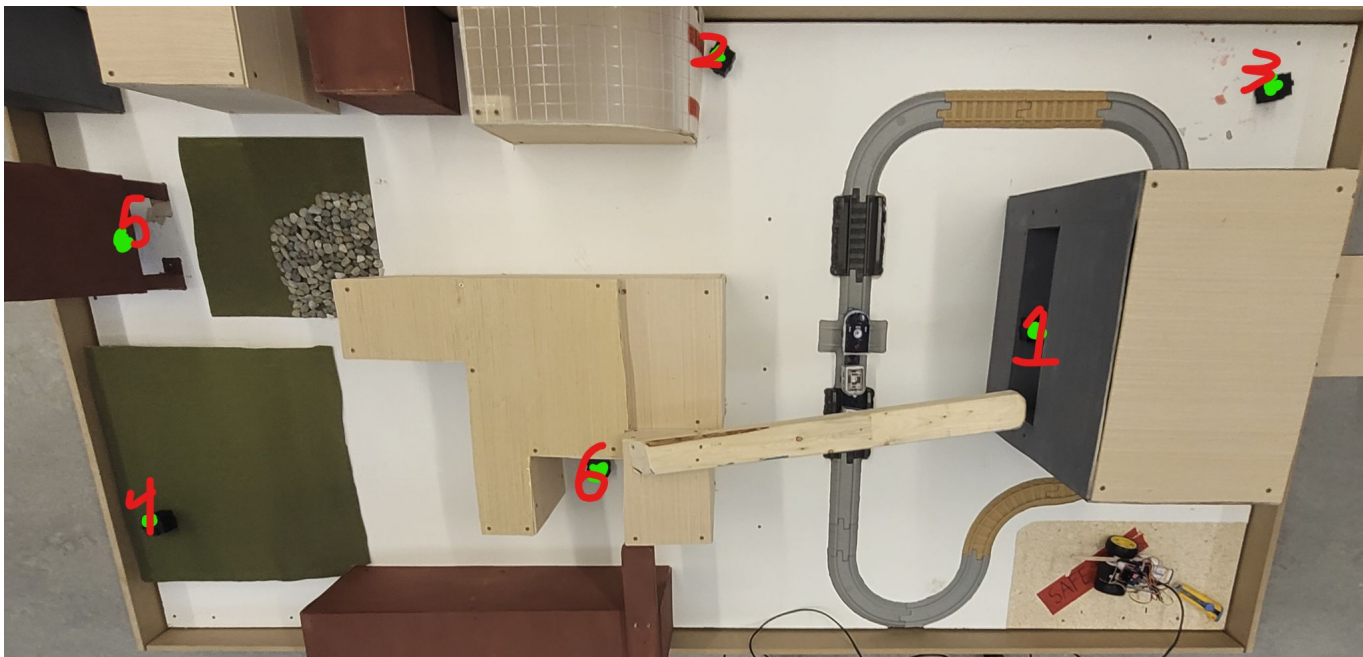


## Design Philosophy

- Servo-actuated claw for reliable and accurate picking
- Detachable flag used to knock over present on ledge to grab from the ground
- Rear-wheel drive, making it favourable to reverse over the tracks
- Varying speed settings allows for precise control while picking and faster speed when crossing tracks



# Field Strategy

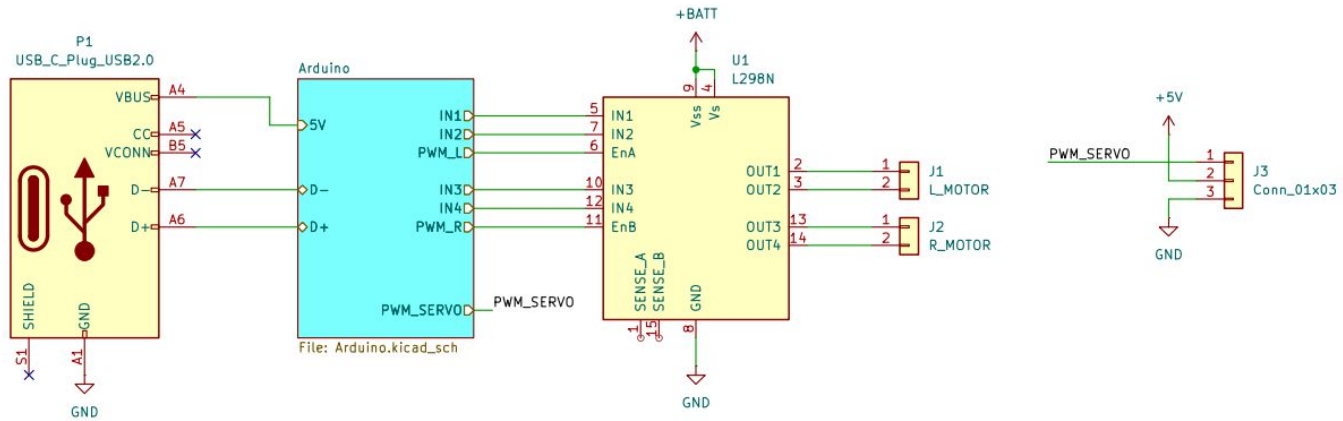




# Electrical

- Loads
  - 2x Brushed DC Motors for drivetrain
  - 1x Servo for grabber arm
- Supplies
  - 5V Arduino USB tether
  - 10 V External Battery tether
  - Dead 9 V Battery

# Electrical Schematic



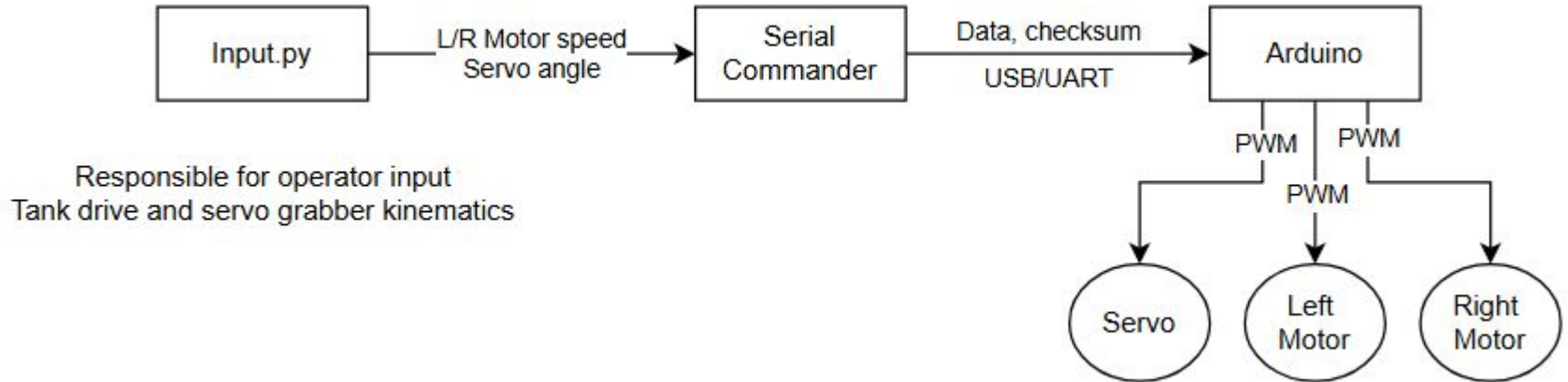


# Firmware

- Teleoperated control scheme using laptop and USB tether
- Keyboard controls:
- W - forward, S - back, A - left, D - right
- O - opens claw, P - close claw
- Arrow up - increase speed, Arrow down - decrease speed



# Firmware Diagram





# Budget

Item Name	Quantity Purchased	Unit Cost	Total Cost
Popsicle sticks	17	15	255
Glue stick	1	50	50
Servo	1	200	200
DC Motor	2	200	400
Wheels	2	100	200
Arduino	1	1500	1500
Motor driver	1	800	800
Styrofoam ball	1	50	50
Battery	2	150	300
Budget Goal	4000		
Spent	3755		
Margin	245		



**Questions?**