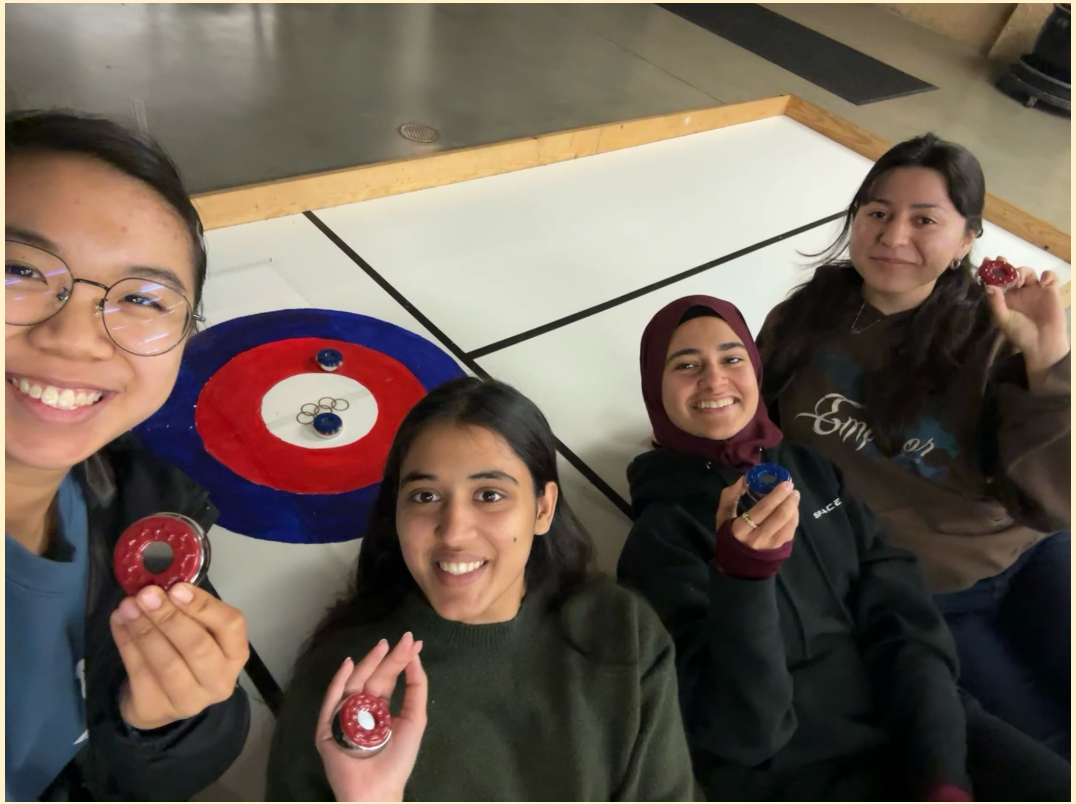
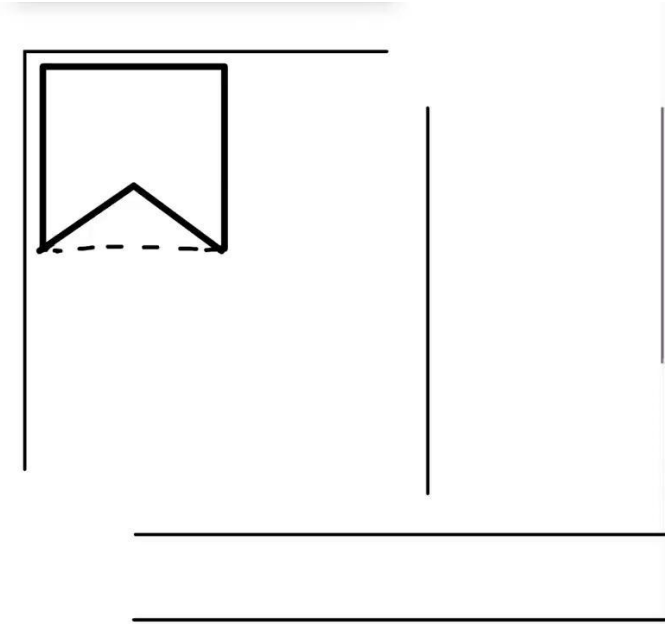


Team: ‘Curl’y Fries

Cindy, Isha, Milly, and Rahma

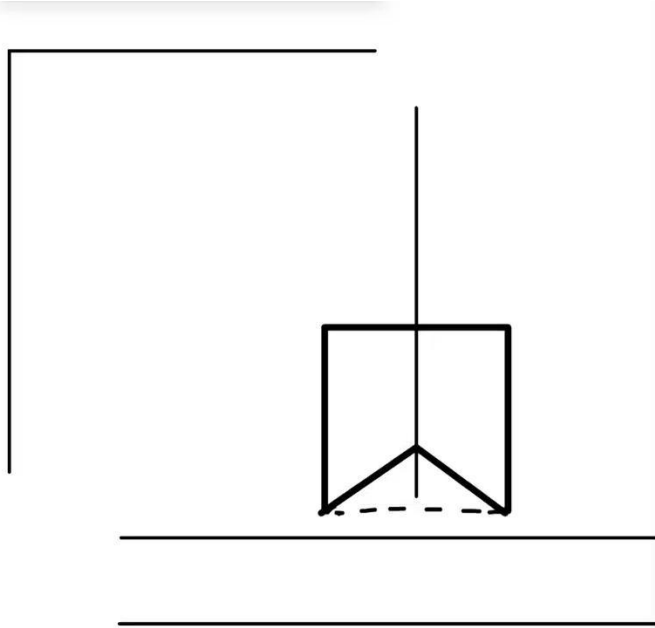
Overall strategy

1. Reorient + move to left bottom corner of the starting box/sheet (zero position)
    a. Achieved by minimizing ultrasonic sensor readings at left & back corners
2. Move rightwards to centerline
3. Move along centerline with front facing hog line
4. Stop at hog line detected by front IR reflectors
5. Shoot pucks



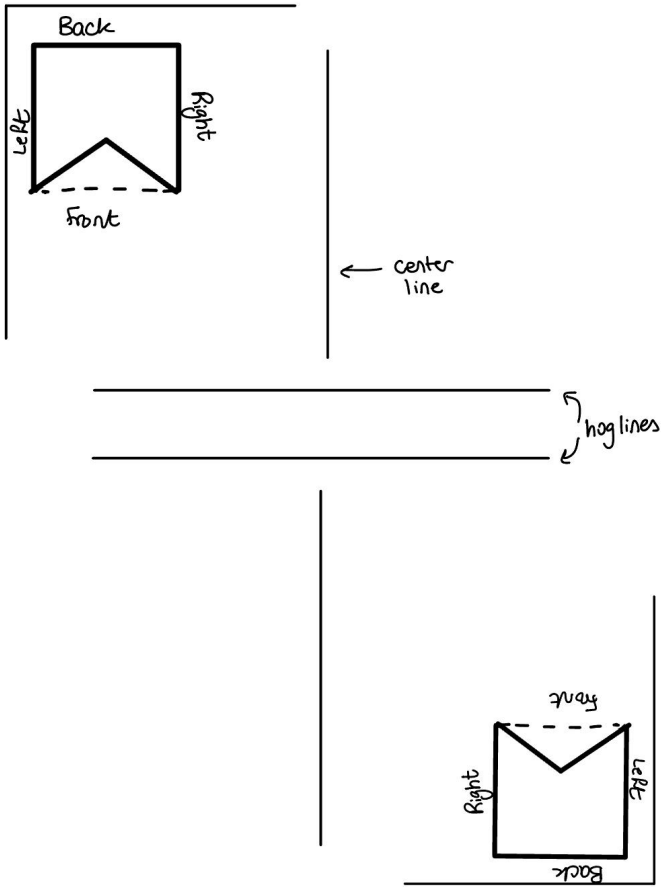
Overall strategy

6. Reverse until back ultrasonic sensor reading is minimized
7. Move leftwards until left ultrasonic sensor reading is minimized (zero position)
8. Reload plucks
9. Rinse, repeat



Navigation Strategy (PoR)

- Ultrasonic sensors for initial orientation
  - One on back side and one on left side
  - Need to test what values sensors read when facing edge walls, and set threshold in code
- Combination of line following and IR sensing to get to the center line
- Follow that line to get close to hog lines at a optimized shooting distance
  - IR Beacon signal unknown, need to test more. Will be safety net for now.
- Returning to A/B starting point using line following as well



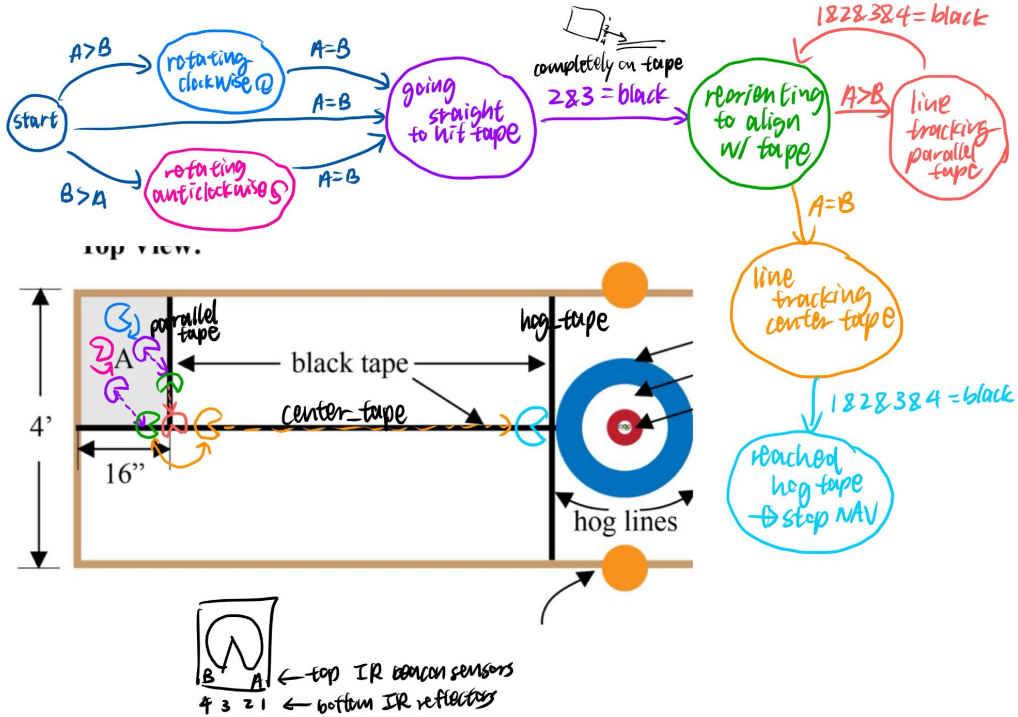
Navigation Strategy (Backup Plan)

2 IR beacon sensors at the top
4 IR reflector at the bottom

Stage 1:
Reorientation- comparing IR beacon sensor for the best direction to go straight first

Stage 2:
Hit the first tape

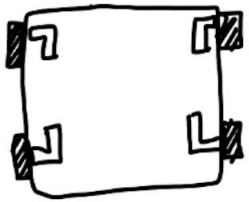
a. Parallel tape: line tracking-> hit center tape -> reorient (A=B)-> b
b. Center tape: line tracking -> hit hog tape -> STOP



Options for Wheel Arrangements

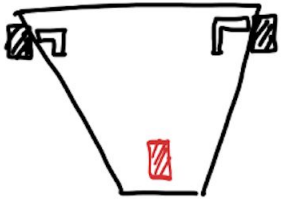
Option 1: Standard Wheels

1)



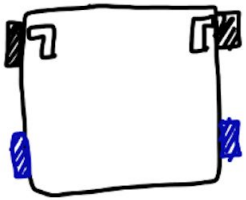
four wheel drive

2)



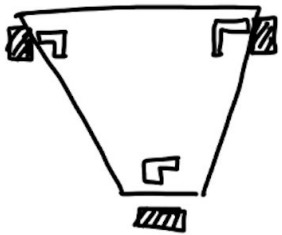
two wheel drive + caster wheel

3)



two wheel drive + two trailing wheels

5)



three wheel drive

Options for Wheel Arrangements

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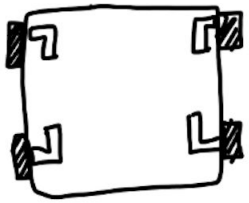
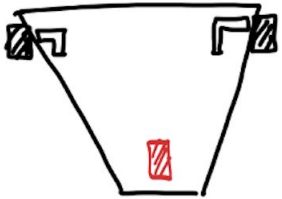
1)



four wheel drive

2)



two wheel drive + caster wheel

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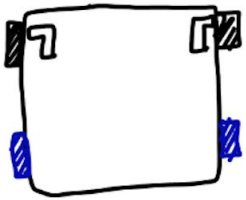
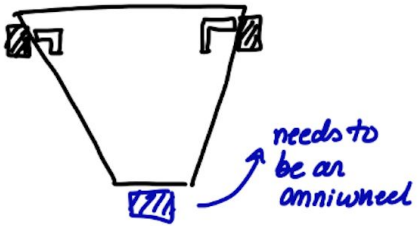


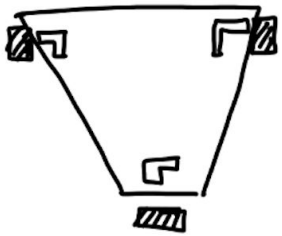
two wheel drive + two trailing wheels

4)



two wheel drive + one trailing wheel

5)

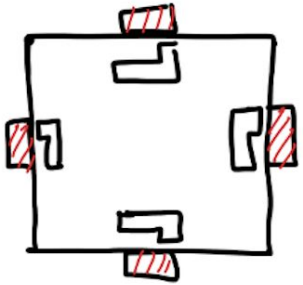


three wheel drive

Options for Wheel Arrangements

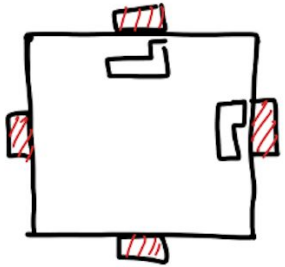
Option 2: Omni Wheels

1)



Four wheel drive

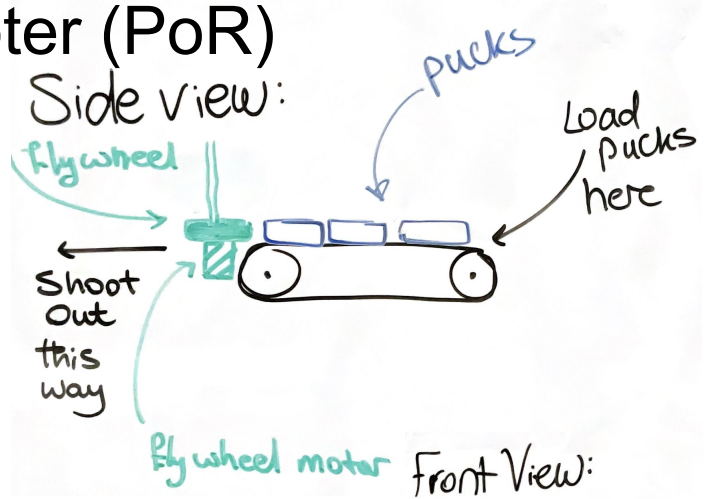
2)

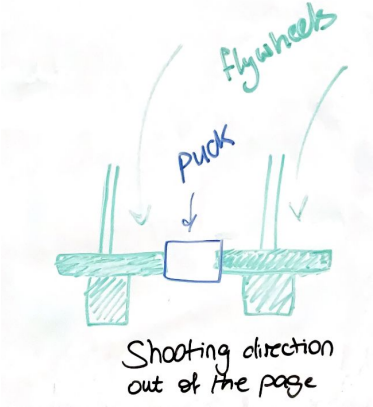


two wheel drive

Shooting Concept 1: Flywheel shooter (PoR)

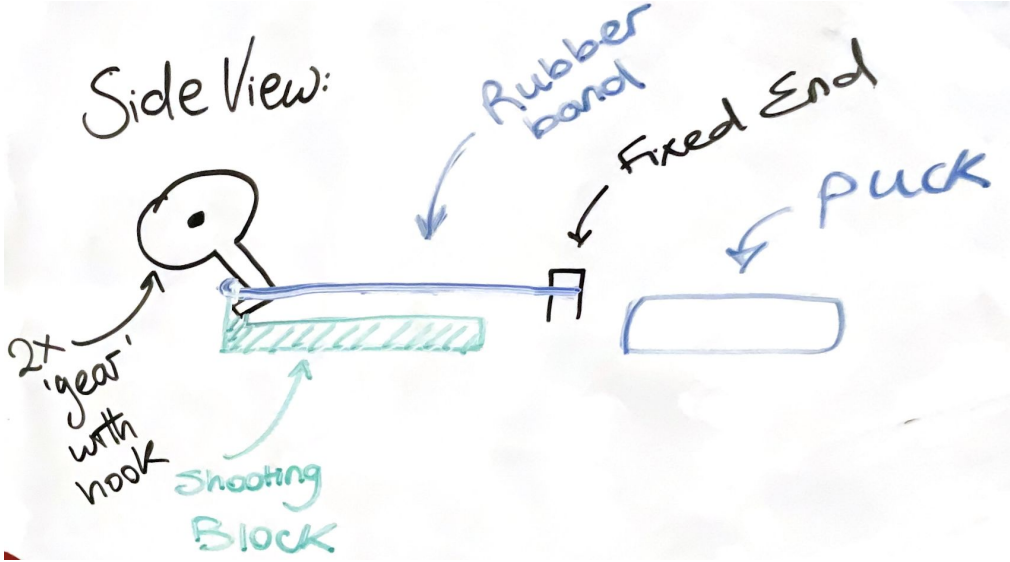
- Dual/Single wheel flywheel shooter
- Advantages:
  - Can control speed of flywheels and test rigorously
  - Easy to prototype and develop a proof of concept
  - Possible air-time with flywheel shooter if raised (under 1 inch still)
- Disadvantages:
  - Will it work on our heavy pucks?
- Puck storage: Rotating belt





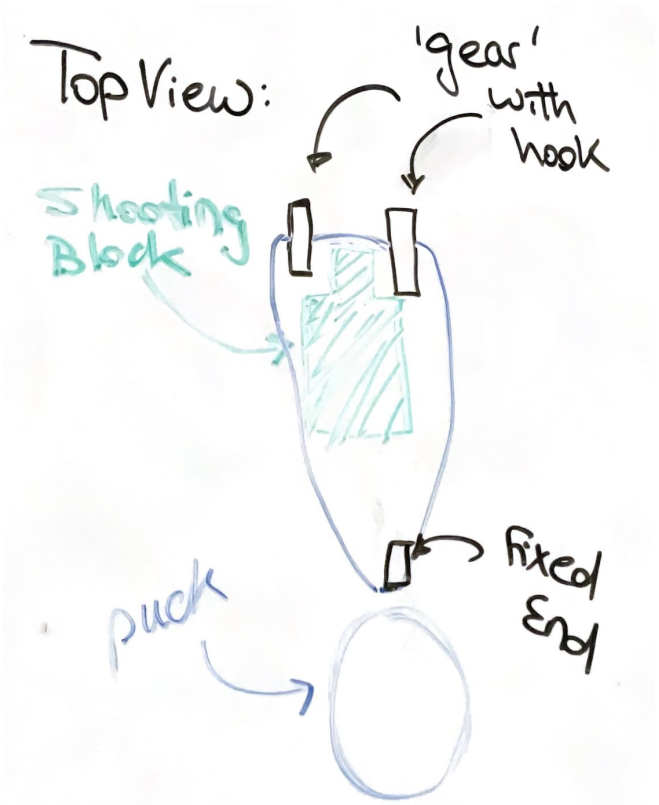
Shooting Concept 2: Linear Puncher (Backup Plan)

- Motor rotates a ‘gear’ with a hook tensioning a rubber band connected to a block.
  - When released, block pushes puck out
- Advantages:
  - More reliable push force compared to flywheel concept.



Shooting Concept 2: Linear Puncher (Backup Plan)

- Things to Consider:
  - Many different parts, harder to create a quick proof of concept
  - Friction between block and platform? Float block? Add rails?
  - Spatial constraints limiting how far rubber band can go back constrained by radius of sprocket gear? Switch to a spring system?
  - How will we feed the pucks in? Lift method/sideways belt



Key Milestones: Navigation

This week: get ultrasonic sensors, IR reflectors, omni wheels

- Check max and min sensor values test out values
- Think about max strategy: subdivide the 360/24 for 15 degree turning and save values and compare?

Backup plan: get IR beam detector

- Check how weak and unstable the signals are and how difficult it would be to process the data

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Responsible Engineers: Milly & Cindy

Key Milestones: Shooting

This week: Do some proof of concepts and choose final shooting mechanism

1. Test single and dual wheel flywheel shooter
    a. Arduino Uno, H bridge power driver, 2 DC motors, try out different wheels in lab stockroom
    b. Research more on flywheels - shaft, bearings
    c. Try different speeds, see if puck actually moves out
2. If flywheel shooter does not work, 3D print platforms for rubber band idea
    a. Manually check if rubber band mechanism generates enough force to move puck forward
    b. Brainstorm more ways to store pucks and feed them into the shooter

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Responsible Engineers: Rahma & Isha

Google calendar for meetings