

SUMO 2 DESIGN PROCESS

Benjamin Adler, Megan
Anderson, Dominick Doyle,
Anjali George





SUMO ONE: BARBIE & KEN

1

CODE STRATEGY

Prioritize defense
Evade opponent

2

OBSERVATIONS

Not able to fight back
Issues with motors & speed
Able to evade well

3

CODE STRATEGY

Prioritize offense
Seek out opponent & attack

4

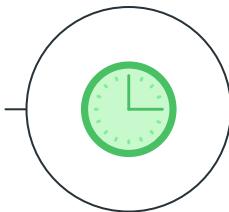
OBSERVATIONS

Sensors left exposed
Significant damage post attack
Nonfunctional motors

AREAS OF IMPROVEMENT

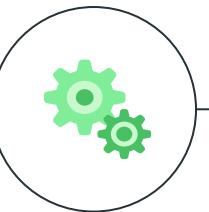
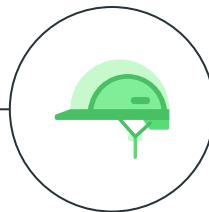
SPEED

Increase speed to better attack & evade



PROTECTION

Protect sensors, and internal wiring



POWER

Optimize pushing power

TRACTION

Prevent sliding & push back opponent

SUMO 2 GOALS

1

2

3

OBJECTIVES

Push opponent out
of the circle

FUNCTIONS

Stay within the circle
Avoid damage
Use hunting strategies

CONSTRAINTS

Size & Weight

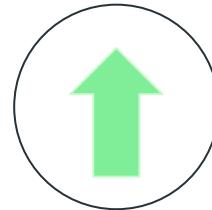
SUMO 2: GENERATION



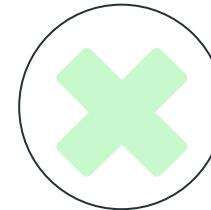
IDEA GENERATION



BRAINSTORMING

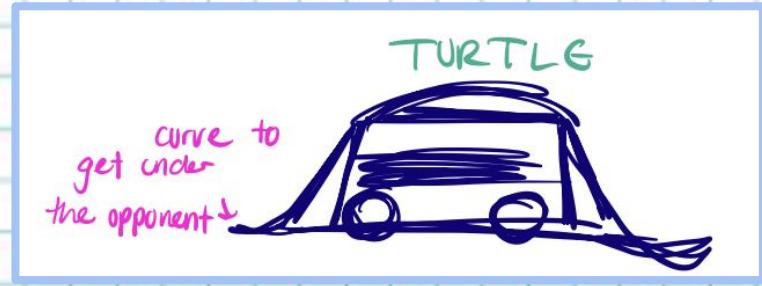
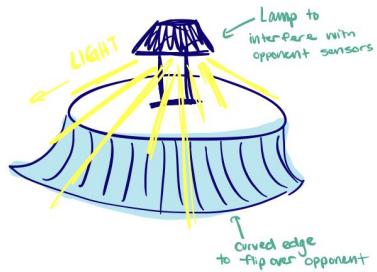
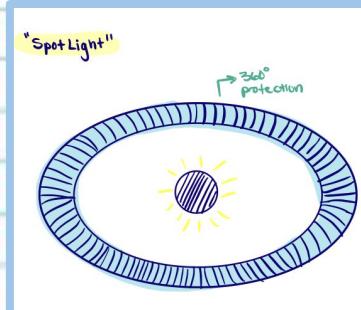


SCAMPER

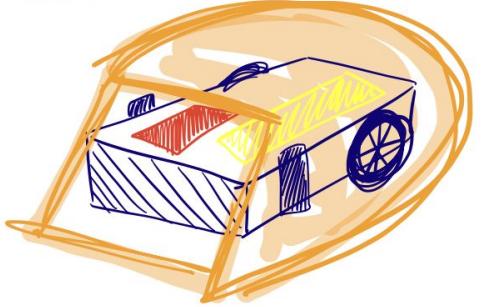


INVERSION

CONCEPTS

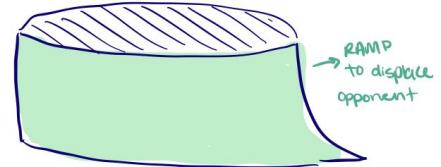
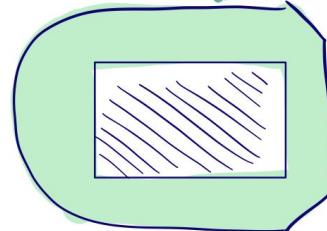


"JELLY BEAN"



"LIME"

CURVED EDGE TO LIMIT CONTACT POINTS

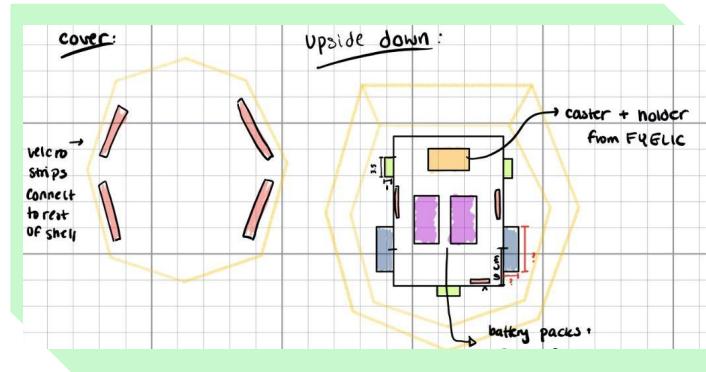
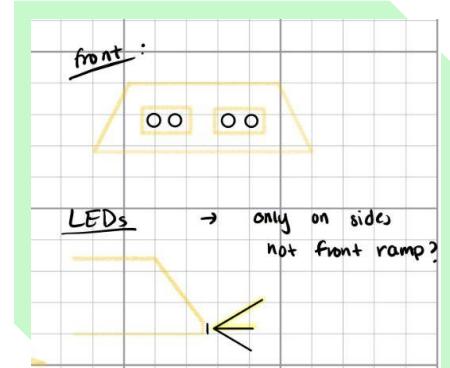
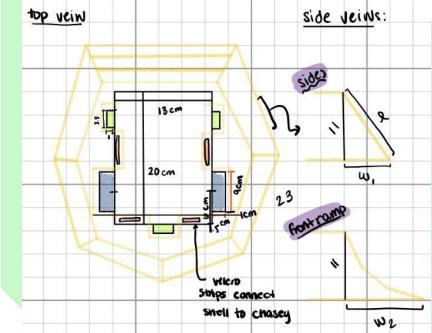


PRIORITIZE

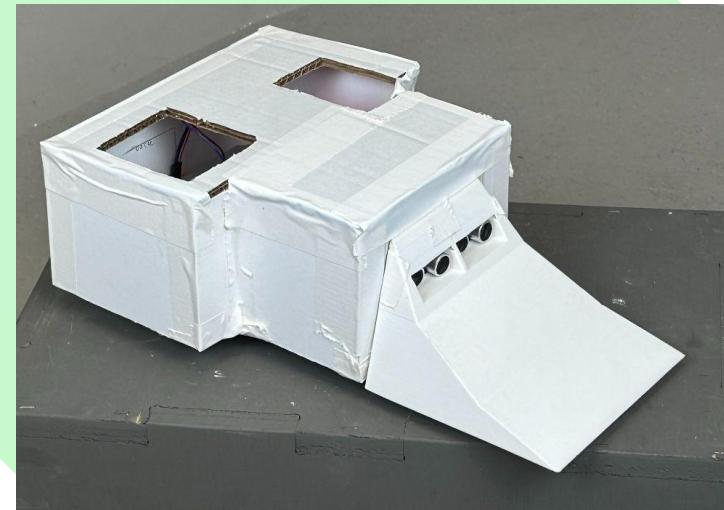
Objectives	Shell/ Protection	Wheel Traction	Speed	Power	Weight	Ramp	Code/ Strategy
Shell/ Protection		.5	1	1	0	1	1
Wheel Traction	.5		.5	.5	.5	0	0
Speed	0	.5		1	1	1	0
Power	0	.5	0		.5	0	0
Weight	1	.5	0	.5		1	.5
Ramp	0	1	0	1	0		0
Code/ Strategy	0	1	1	1	.5	1	
Totals:	1.5	4	2.5	5	2.5	4	1.5

FINAL DECISIONS

Objective	Shell/ Protection	Wheel Traction	Speed	Power	Weight	Ramp	Code/ Strategy	Totals
Weights	1.5	4	2.5	5	2.5	4	1.5	
Design 1: JellyBean	8/12	5/20	5/12.5	7/35	9/22.5	7/28	X	130
Design 2: Turtle	8/12	5/20	5/12.5	7/35	9/22.5	4/16	X	118
Design 3: Snowplow	9/13.5	5/20	5/12.5	7/35	9/22.5	3/12	X	115.5
Design 4: Spotlight	7/10.5	5/20	5/12.5	7/35	9/22.5	5/20	X	120.5
Design 5: Lime	7/10.5	5/20	5/12.5	7/35	9/22.5	6/24	X	106.5
Design 6: Yoshi	9/13.5	8/32	9/22.5	7/35	9/22.5	9/36	X	148



YOSHI: **IMPLEMENTATION**



WHEELS & TRACTION



Wheels

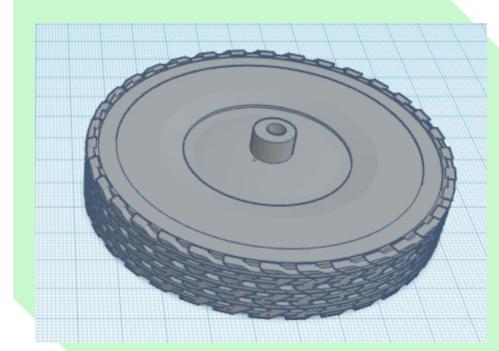
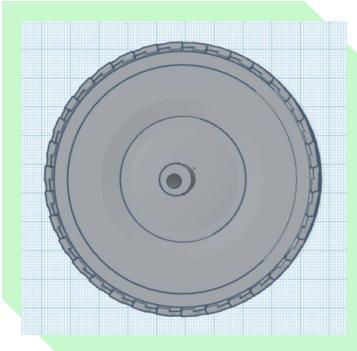
Increase speed while keeping the same motors by making larger wheels.



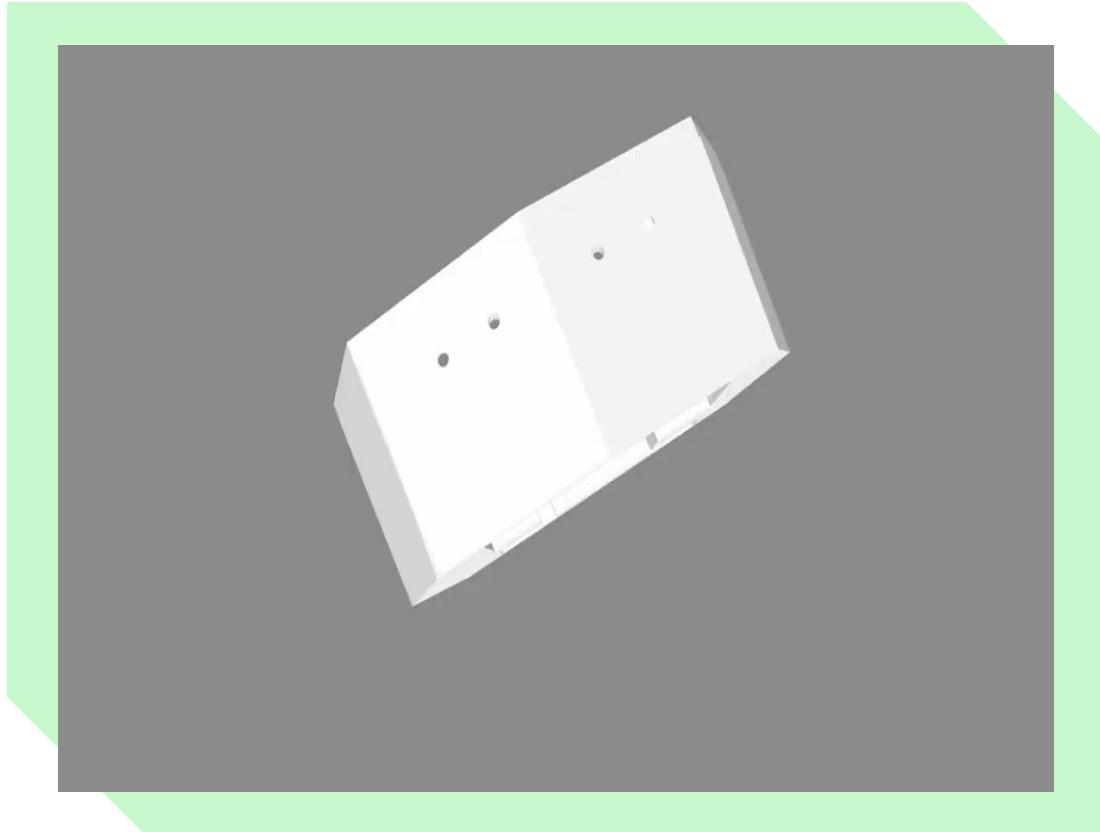
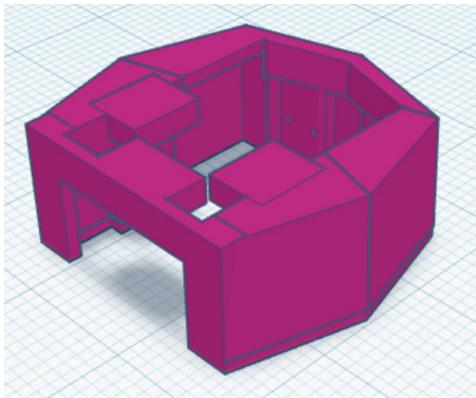
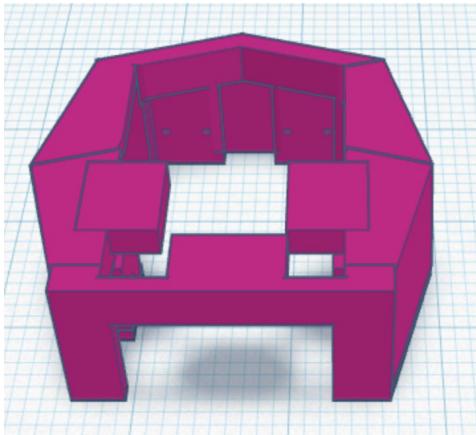
Traction

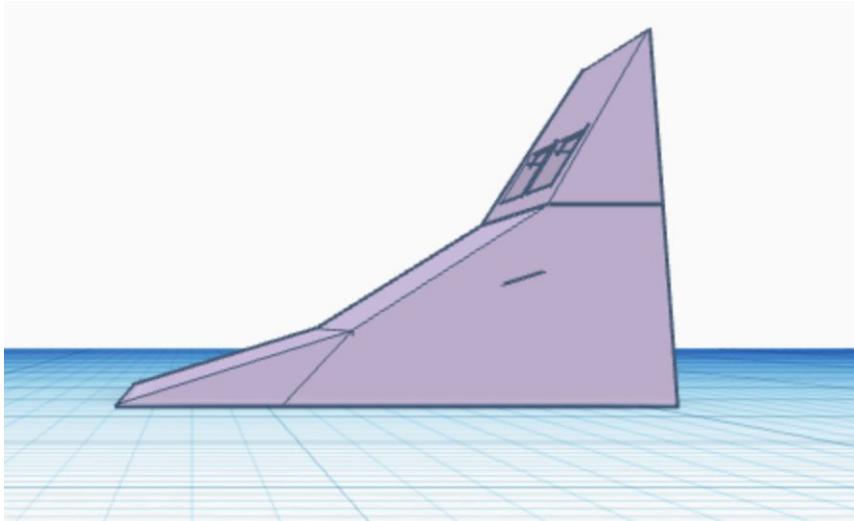
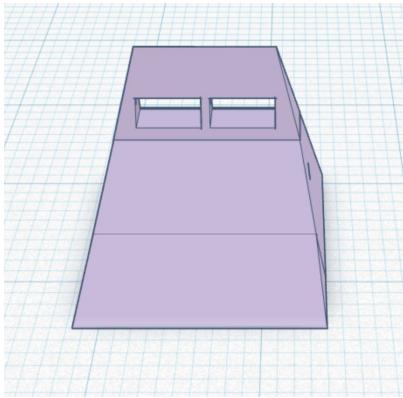
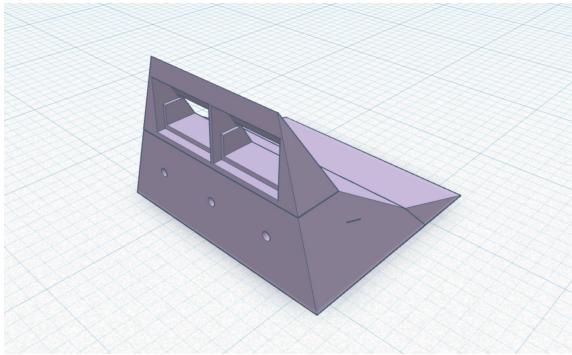
Compensate for 3D printed material with rubber cement.

$v_t = \omega r$	
Rotational Speed: $\omega = 4.75 \text{ rad/s}$	
RADIUS (cm)	SPEED (cm/s)
3.5	16.7
4.0	19.0
4.5	21.375
5.0	23.8
5.5	26.125
6.0	28.5



SHELL



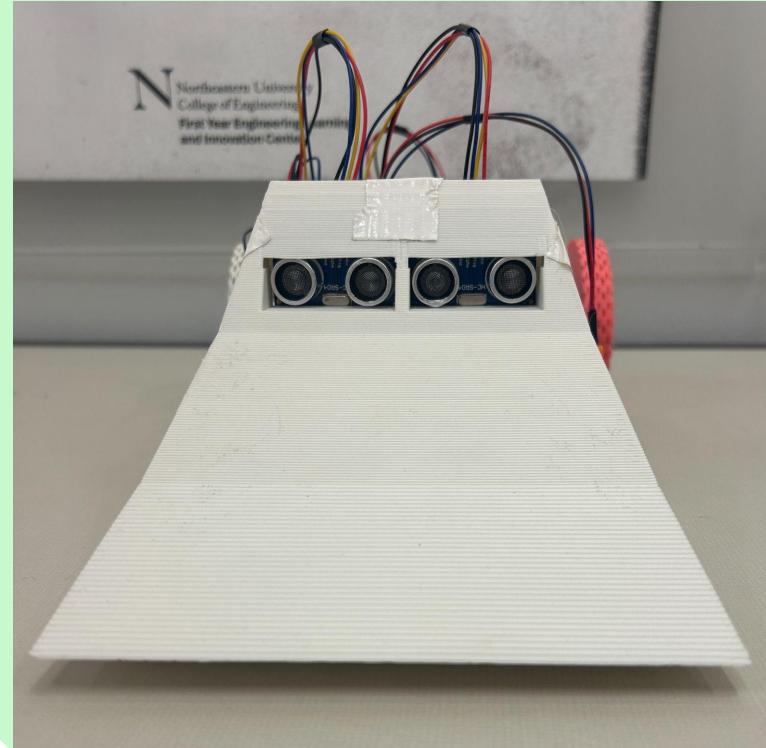


RAMP

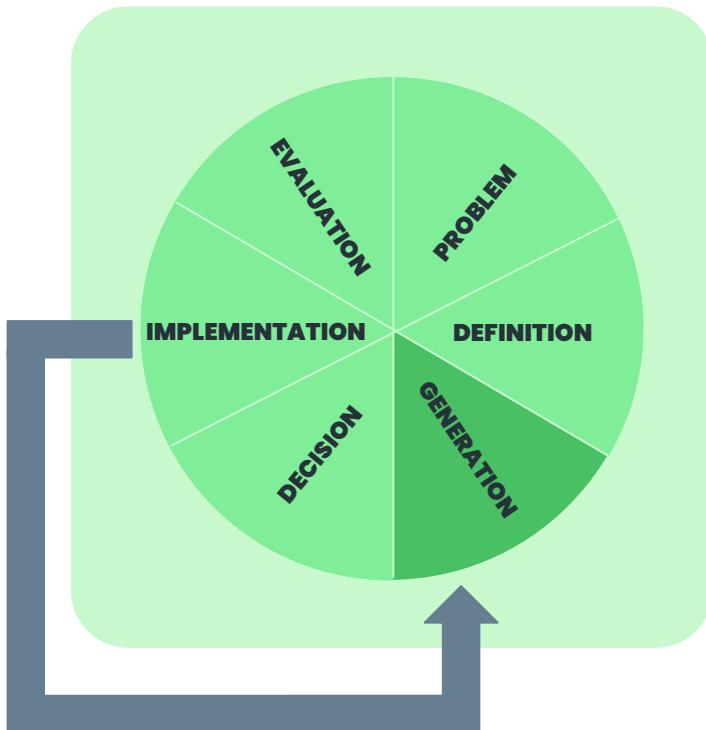
Yoshi's main attacking mechanism,
inspired by snow plows

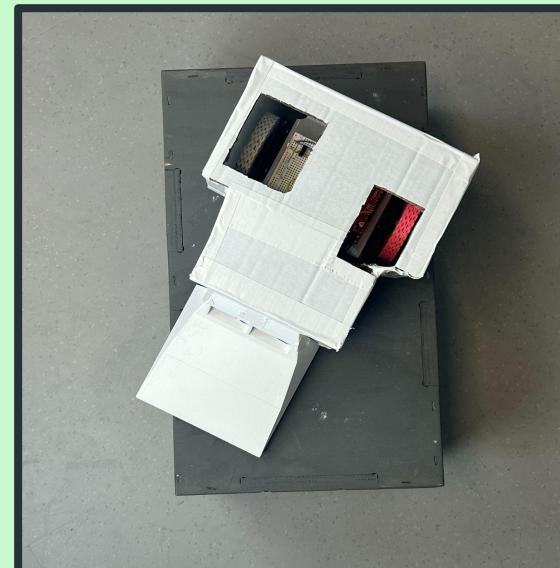
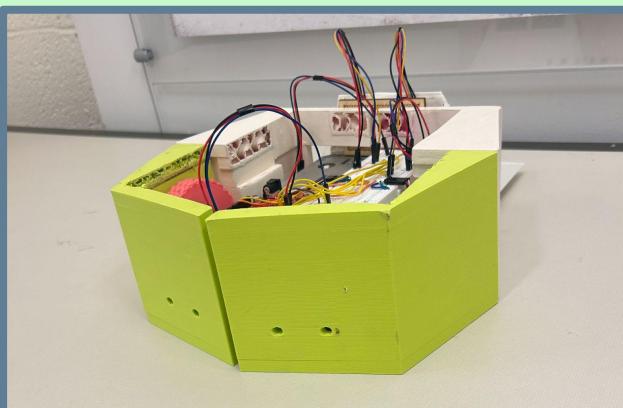
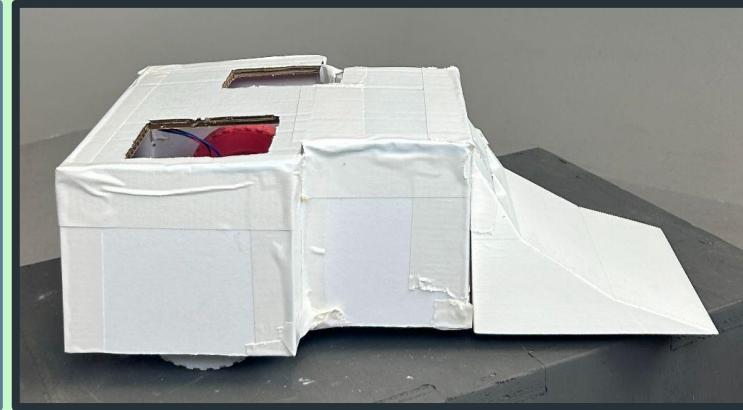
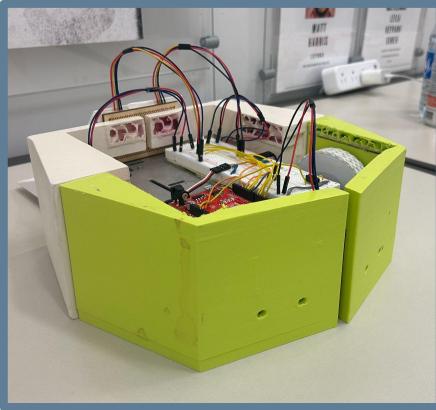
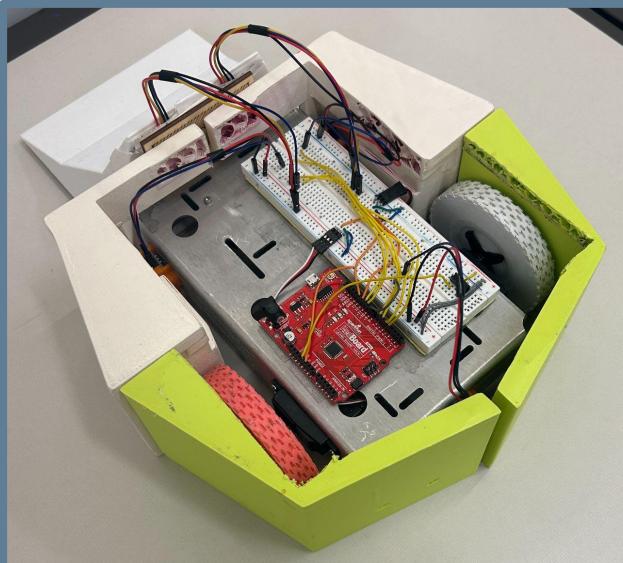
CODE

Utilizing two ultrasonic distance sensors in our code to better scan for opponent



THE ENGINEERING DESIGN PROCESS







YOSHI: IN ACTION



WHAT WENT RIGHT

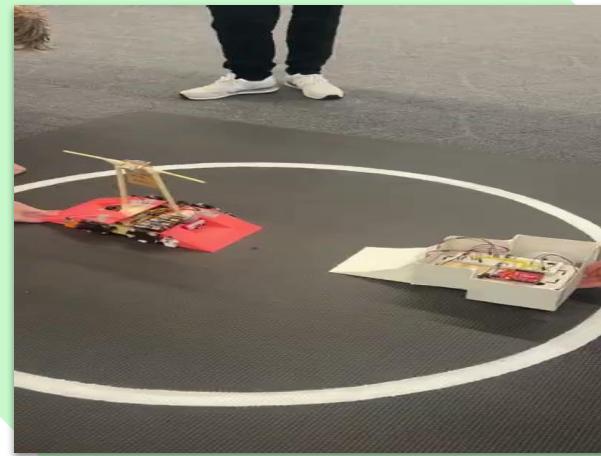


SCANNING

WHAT WENT WRONG



PINCHED WIRES



SHELL & PLOW HEIGHT

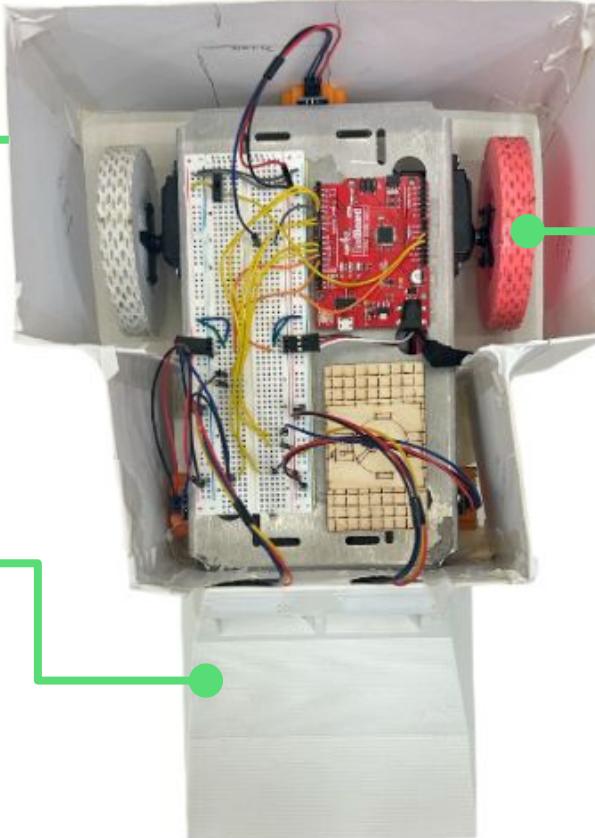
IMPROVEMENTS

Shell Material

Change from cardboard to 3D print material
(design shell to be thinner)

Shell & Ramp

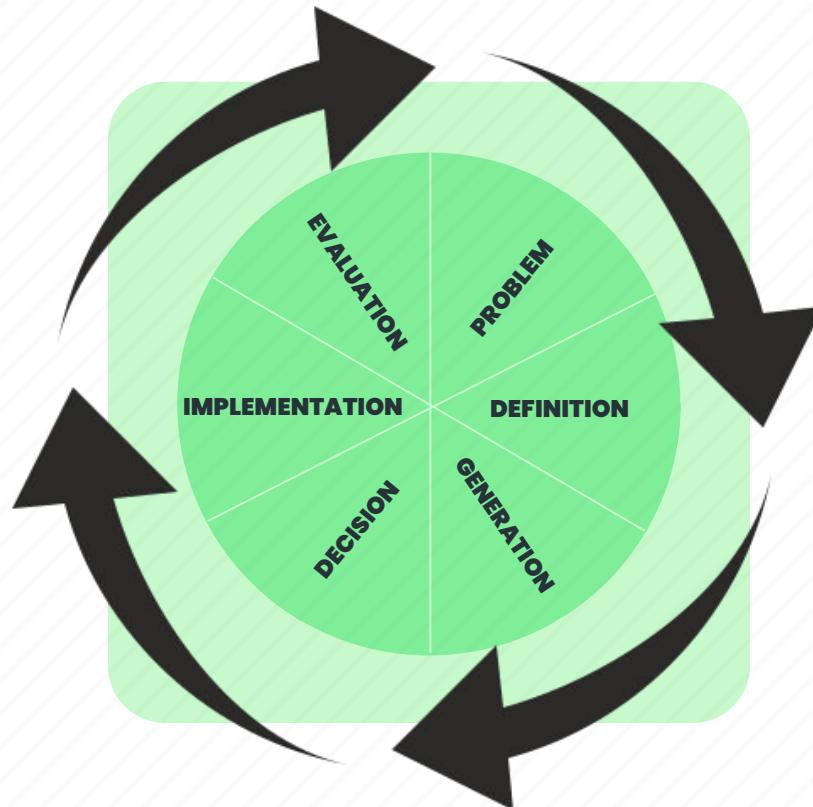
Decrease clearance to ground



Pinched Wires

Increase side clearance to stop wires from being pinched

IN CONCLUSION...



THANK YOU

**ANY
QUESTIONS?**

