# MSE 312 FINAL PROJECT PRESENTATION

## TEAM : PHOENIX

(GROUP 25)

# AGENDA

- Introduction
- Basic Approach for Solution
- Actual adopted and Improved Solution
- Challenges and Justification
- Demonstration
- Q&A

# INTRODUCTION


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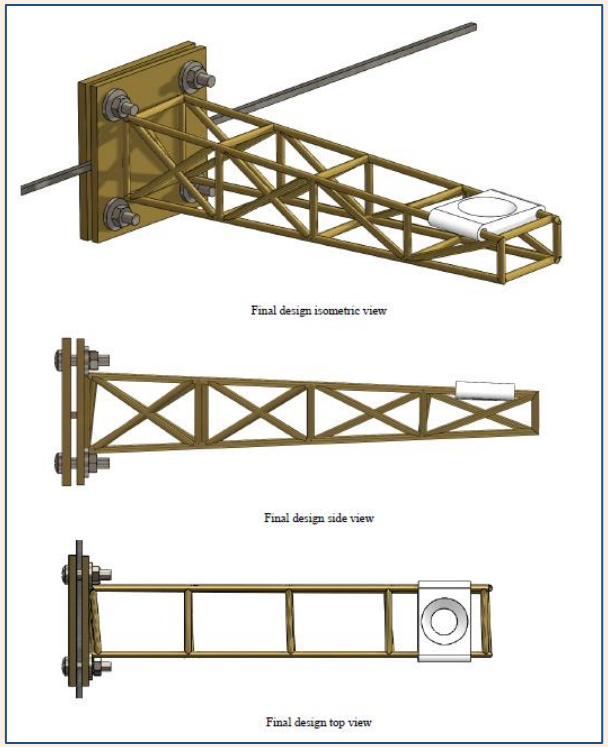
# FINAL DESIGN AND BASIC MECHANICAL APPROACH




Final Mechanical Design from – Mechanical section

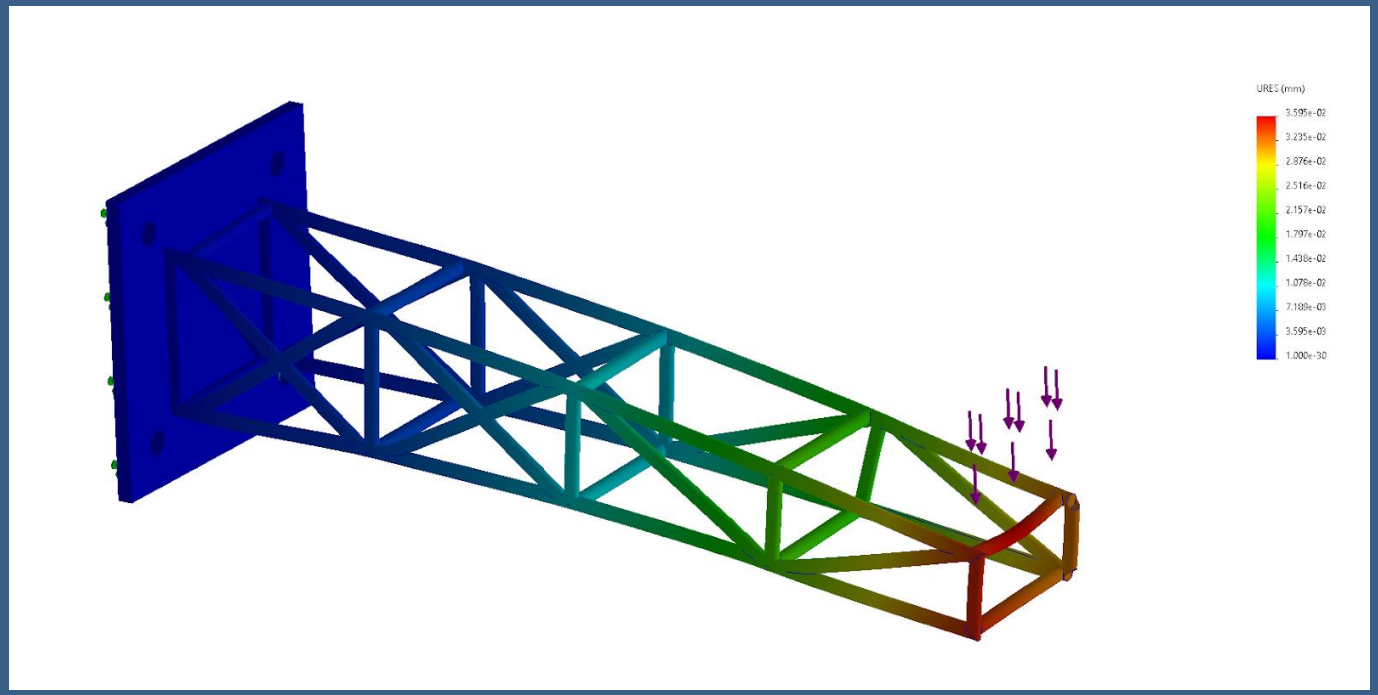
Use the knowledge from lab experiments as building blocks

Integrate the two-button switch and make it functional

Be able to set a home position for the arm by pressing one button

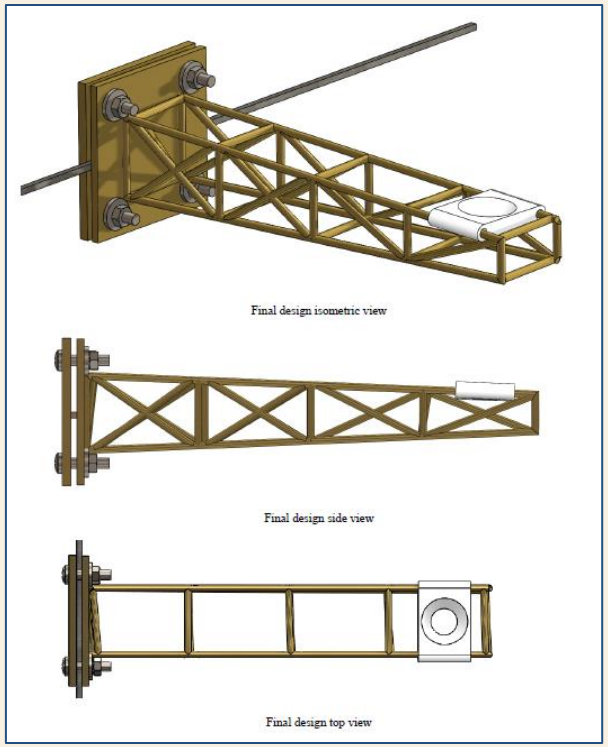
Shooting the ball when second button is pressed

# FINAL MECHANICAL DESIGN




1. When the load of 5N is applied, the deflection is about 0.003595 mm max
2. Experimental Deflection= 3-29 mm (100 times more)
3. Total weight 160g
4. Experimental rotational Inertia 547421.25 gmm^2 vs (28% more than SolidWorks)

# MECHANICAL DESIGN CHALLENGES




Soldering:

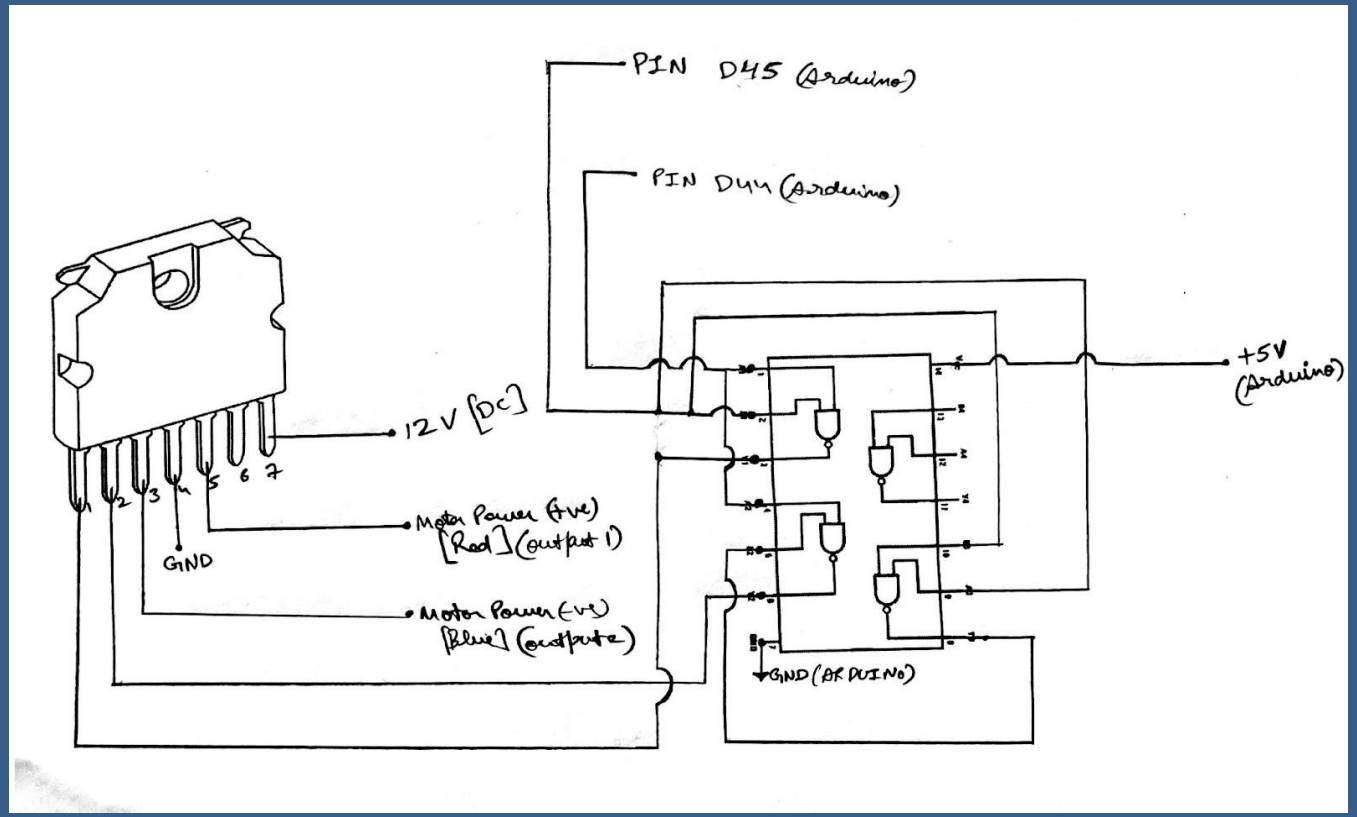
The brass trusses straight

Cross x-sections

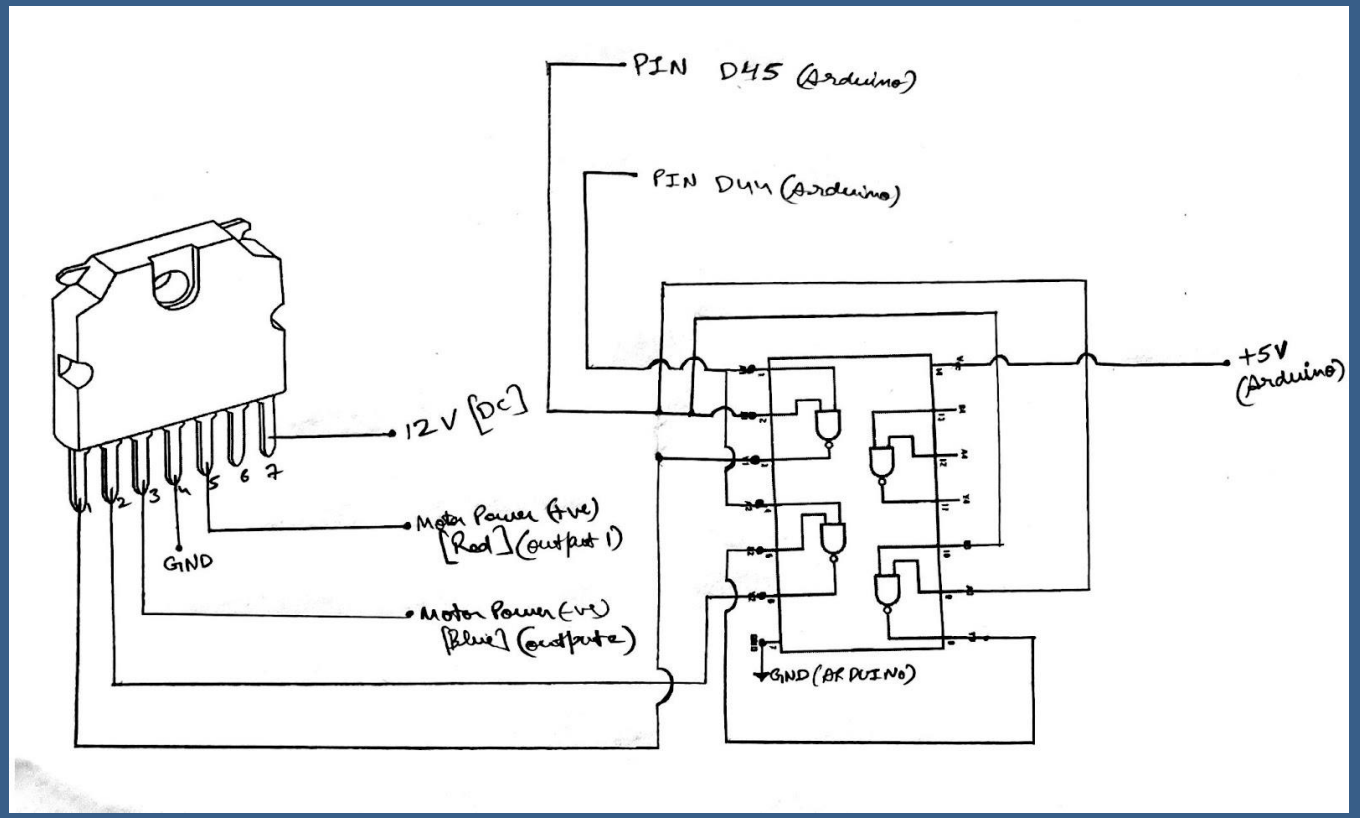
Hand Calculations:

MOI 3D dimension

# ELECTRONICS AND CONTROLS



# ELECTRONICS AND CONTROLS DESIGN

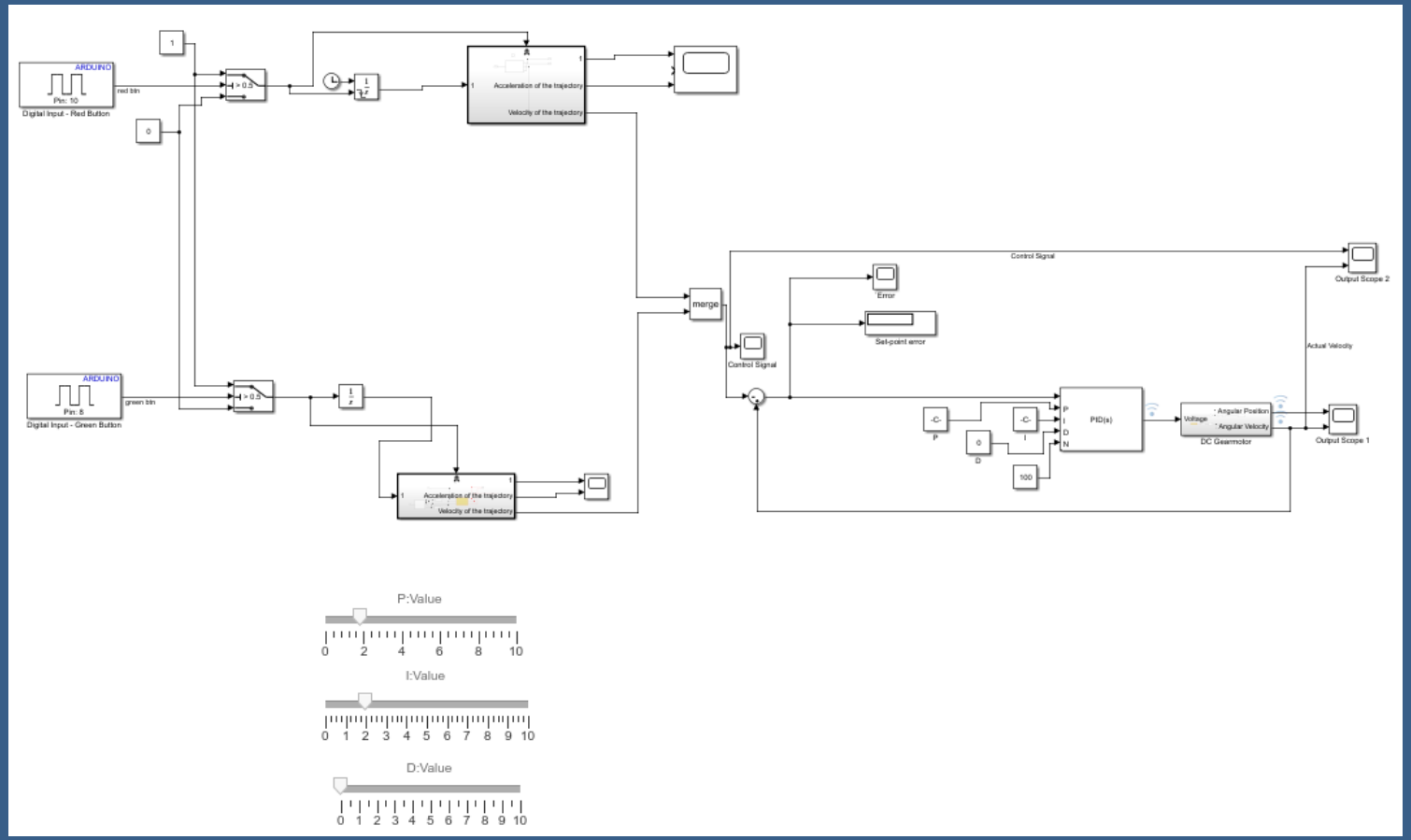



Utilizes the knowledge from the four electronics labs.

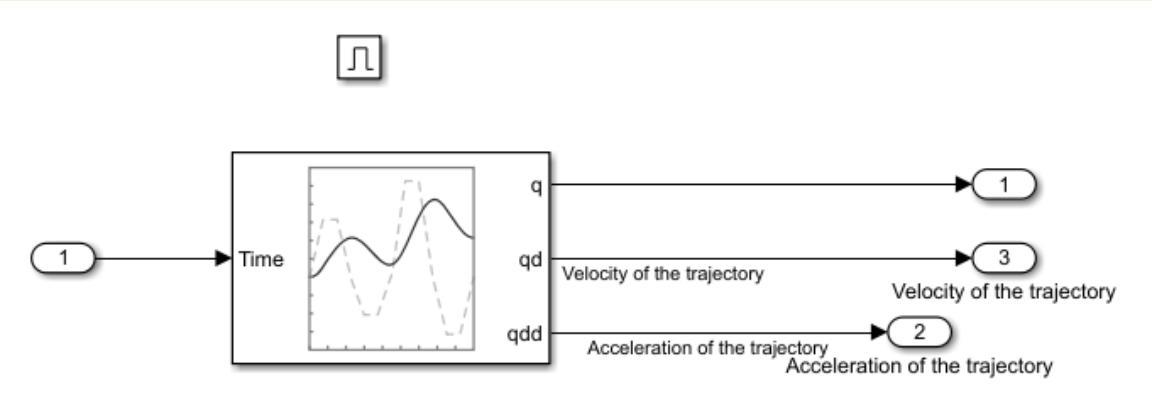
Drive a DC motor with a PWM signal

Provide different duty cycles to provide different input trajectories.

# CONTROL SYSTEMS DESIGN

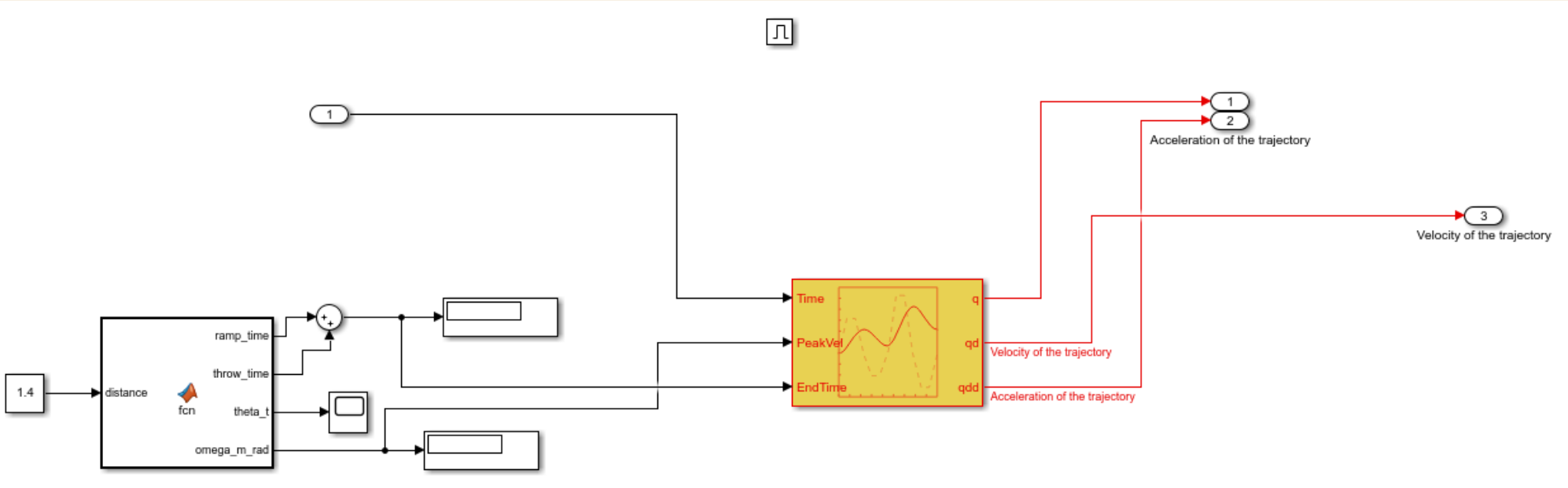


# CONTROL SYSTEMS UI

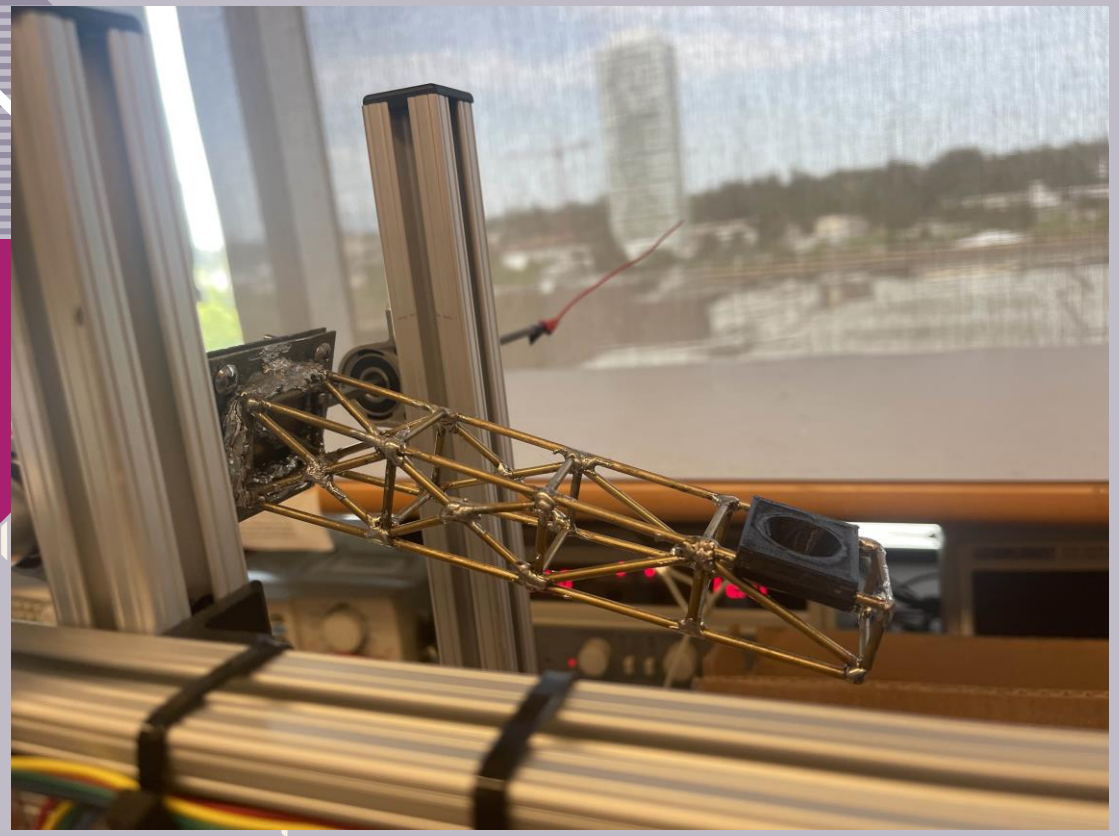



Red Button - Subsystem

Green Button - Subsystem



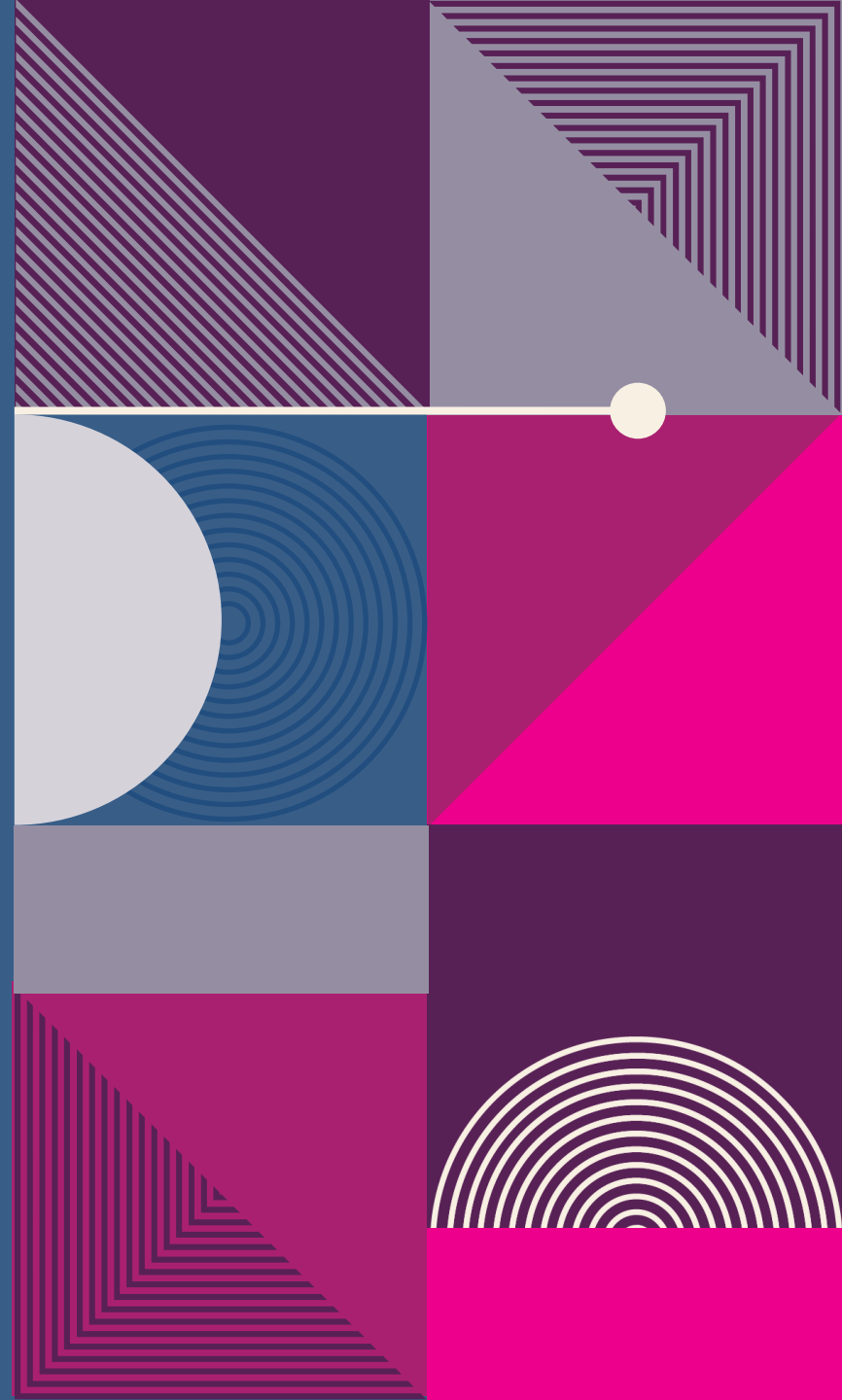
# LOADING POSITION



# SHOOTING POSITION

# CONTROLS CHALLENGES & HOW WE OVERCAME THEM

- Understanding the Trapezoidal Velocity Block and its operation
  - Used MATLAB's *help* to understand its functioning
- Motor Drive circuit: component failure
  - Replaced the faulty part and resoldered the new part
- Implementation of the projectile formula for variable distance
  - Optimized the system's response to hit target within 1[m]-1.4[m]




QUESTIONS

# THANK YOU

MSE 312 – Summer 2024

Team Phoenix

Group 25