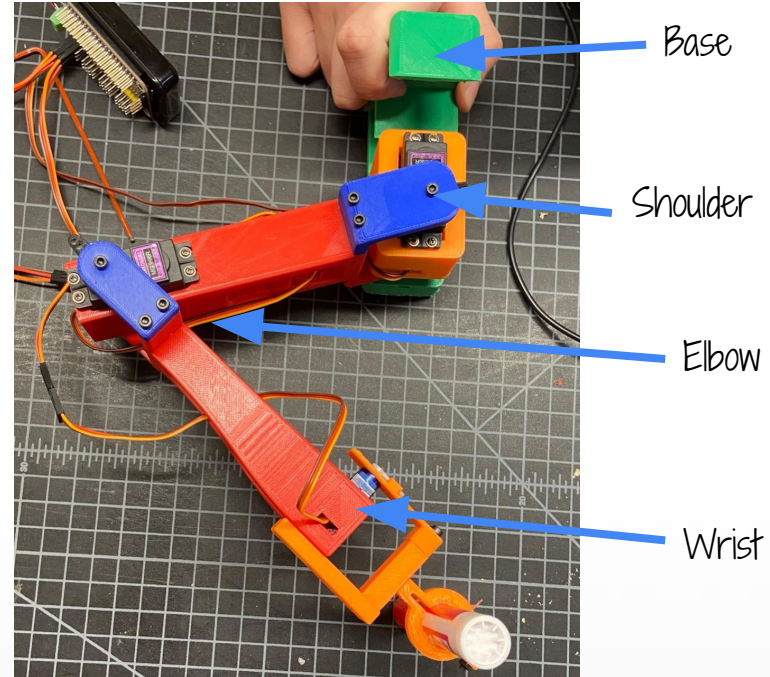


# DrawGüd

Ben McDermott, Ronan Gissler, Taylor Korte

# Servo Control and Design Changes

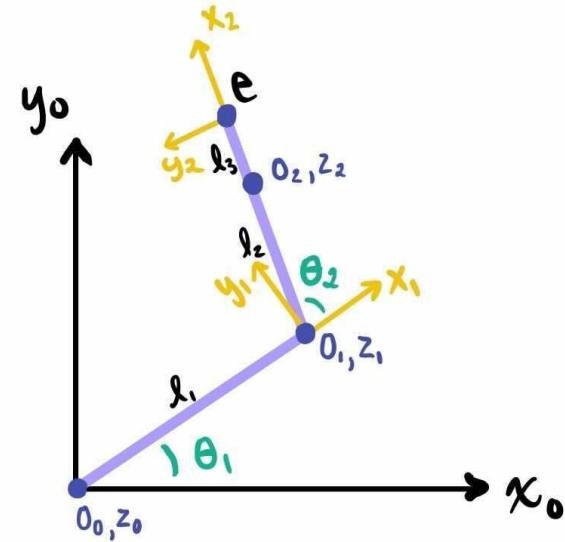
- ❑ Used the PCA9685 library and linear interpolation to correlate servo angle to pulse width
- ❑ Redesigned base to better secure to whiteboard and added spots for pi and battery
- ❑ Changed arm design to accommodate big servo at the elbow joint for higher joint torque



# Kinematics

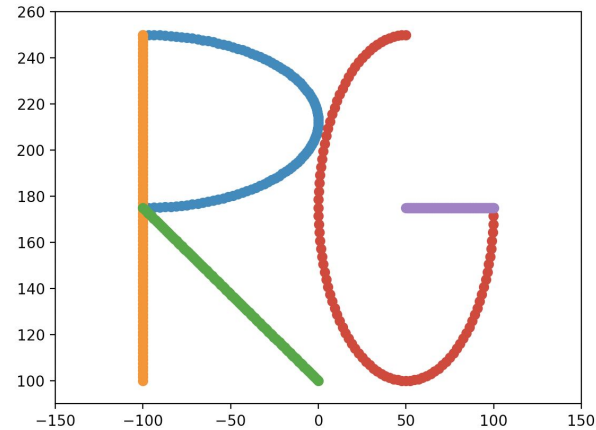
- ❑ Used the Mathematica template to find the angles for our robot
- ❑ Converted the Mathematica formulas to Python
- ❑ Limited the angles by choosing the joint position that is closest to our current joint position

Link #	$a_i$	$\alpha_i$	$d_i$	$\theta_i$
1	$l_1=143.2$	0	0	$\theta_1$
2	$l_2=139$	0	0	$\theta_2$



# Letter Mapping

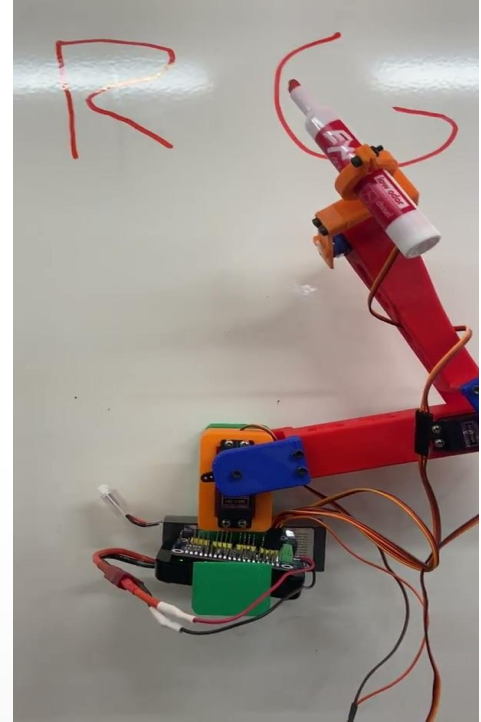
- Created a function for drawing straight lines by using the numpy function linspace to find equally spaced points between two points
- Drew curved lines by scaling and translating the equation of a circle
- Scaled the letters to fit into the range of motion of the arm



```
def DrawR(num_points):  
    topx = np.cos(np.linspace(math.pi / 2, math.pi * 3 / 2, num_points))  
    topy = np.sin(np.linspace(math.pi / 2, math.pi * 3 / 2, num_points))  
  
    topx *= -100  
    topy *= 100/2 * 37.5/50  
    topx -= 100  
    topy += 200 + 25 / 2  
  
    line_up = DrawStraightLine([-100, 100], [-100, 250], num_points)  
    line_down_across = DrawStraightLine([-100, 175], [0, 100], num_points)
```

# Creativity and Innovation

- ❑ Used python's input function to allow the user to type the initials they want the robot to write
- ❑ Magnets allow robot to be mounted on white board
- ❑ Wrist joint is used to keep marker pressed to whiteboard and lift marker in between strokes
- ❑ Colorful!



Thanks!

