

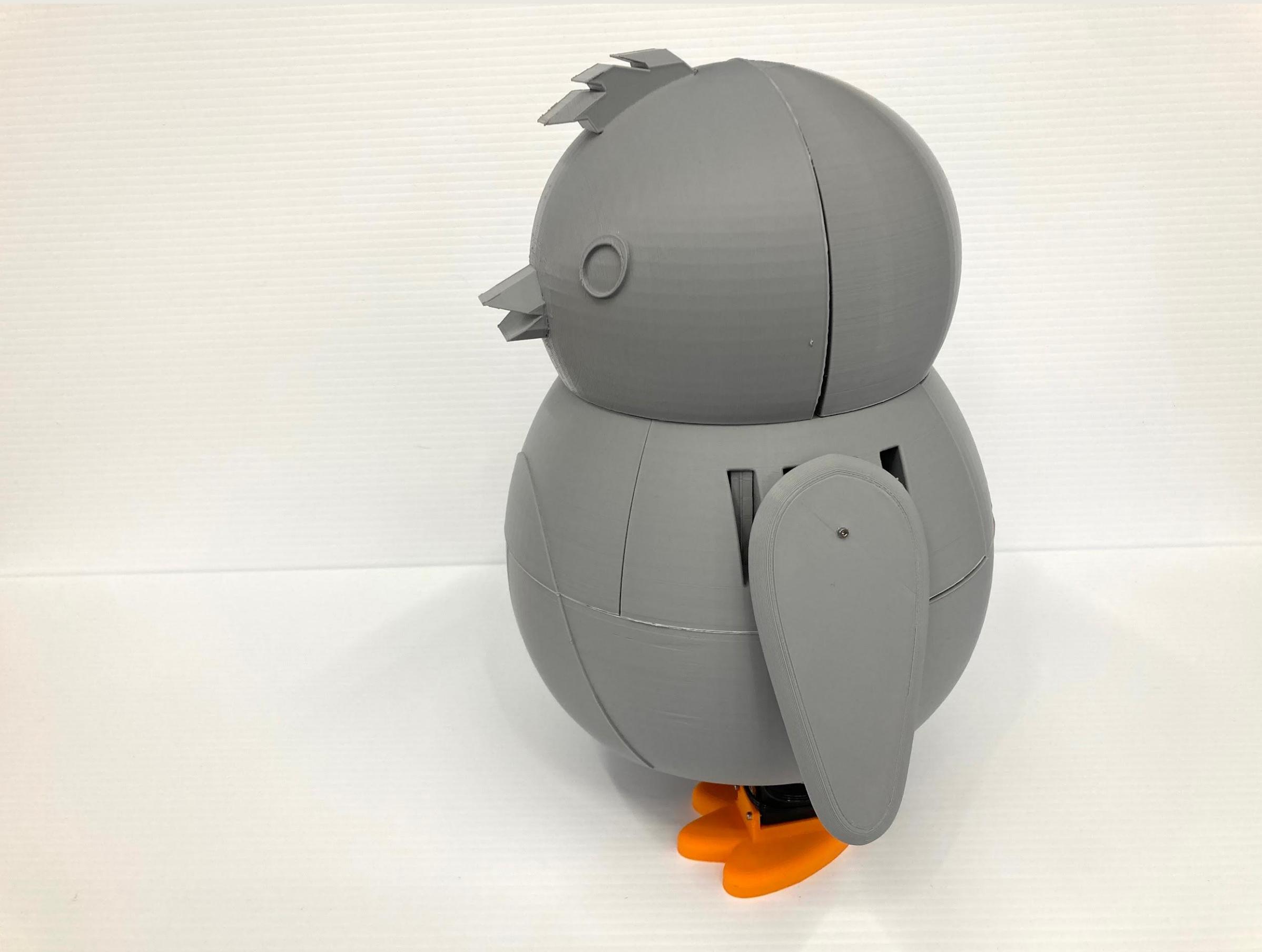
ECE 590: Robotics Studio
Final Presentation

PenguinBot

Lucy Huo
Spring 2023







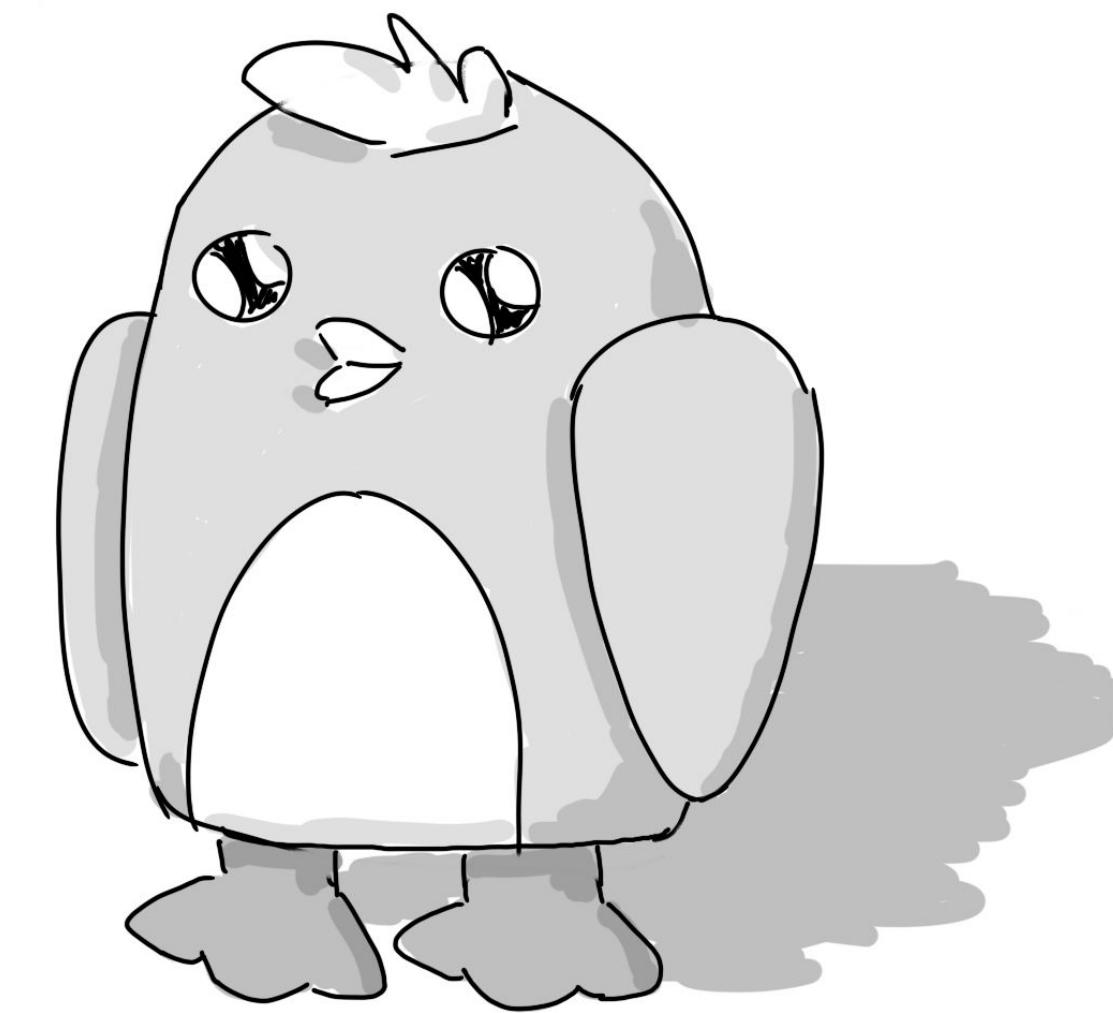
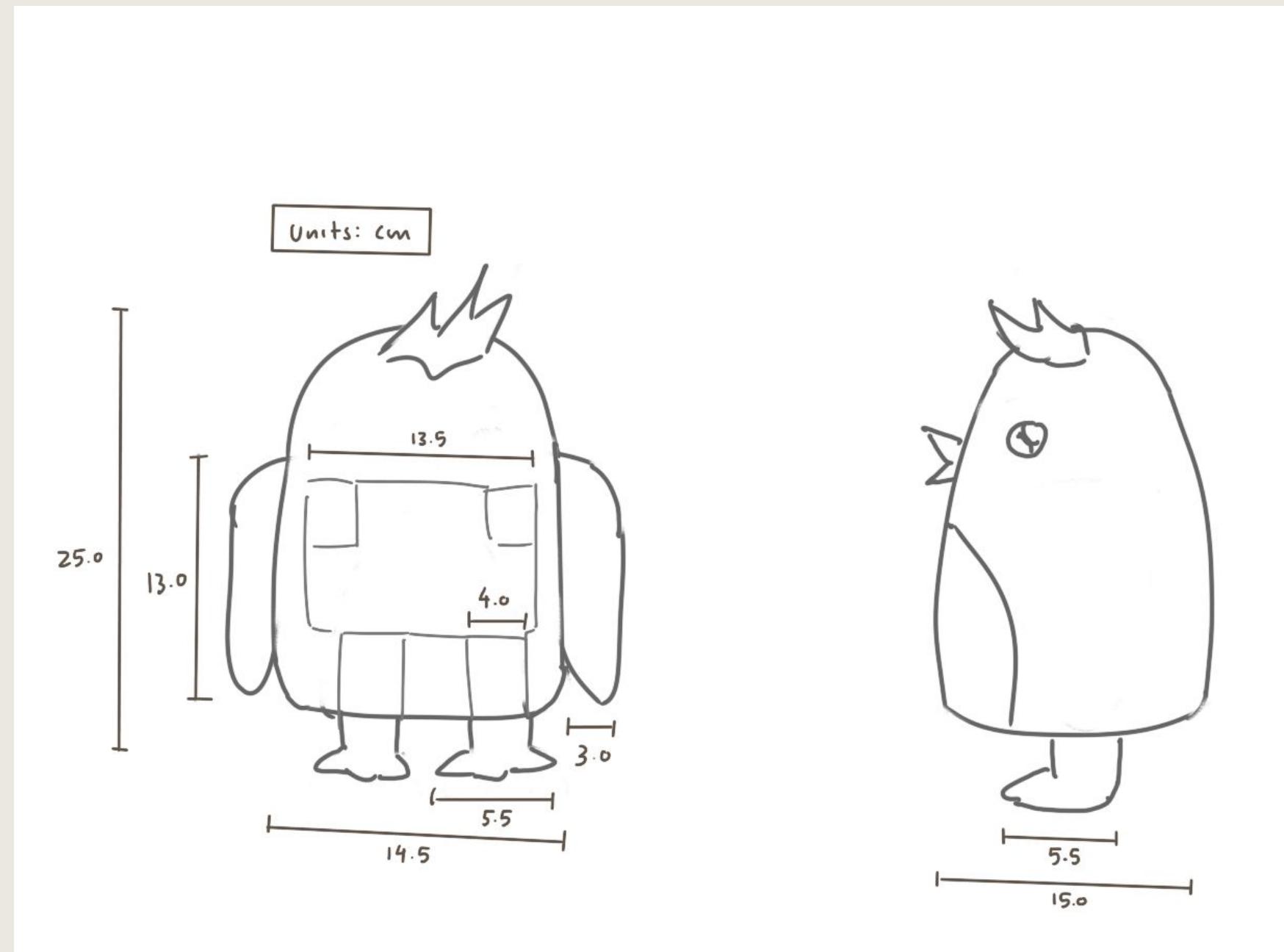
Walking Robot

- Link to video:

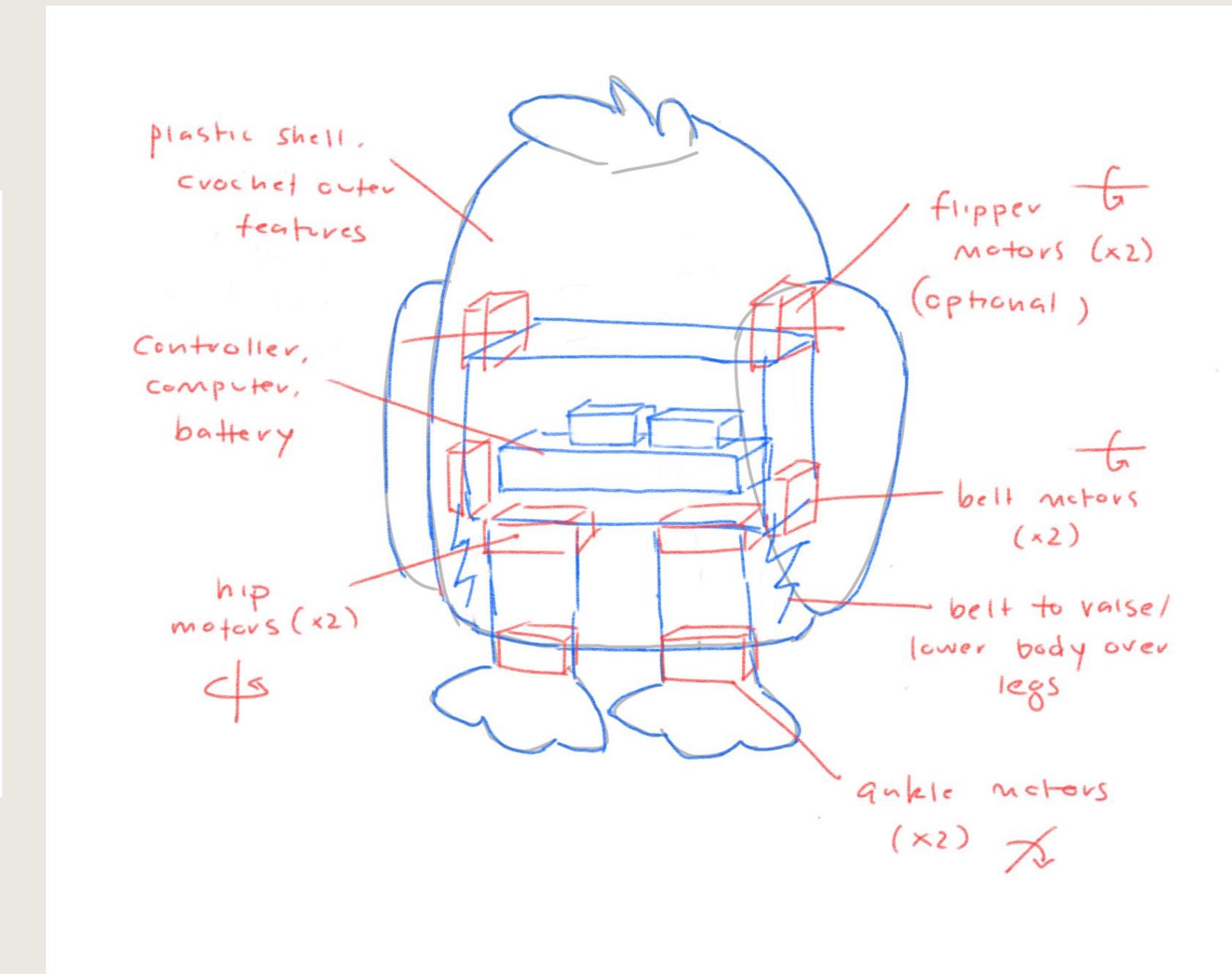
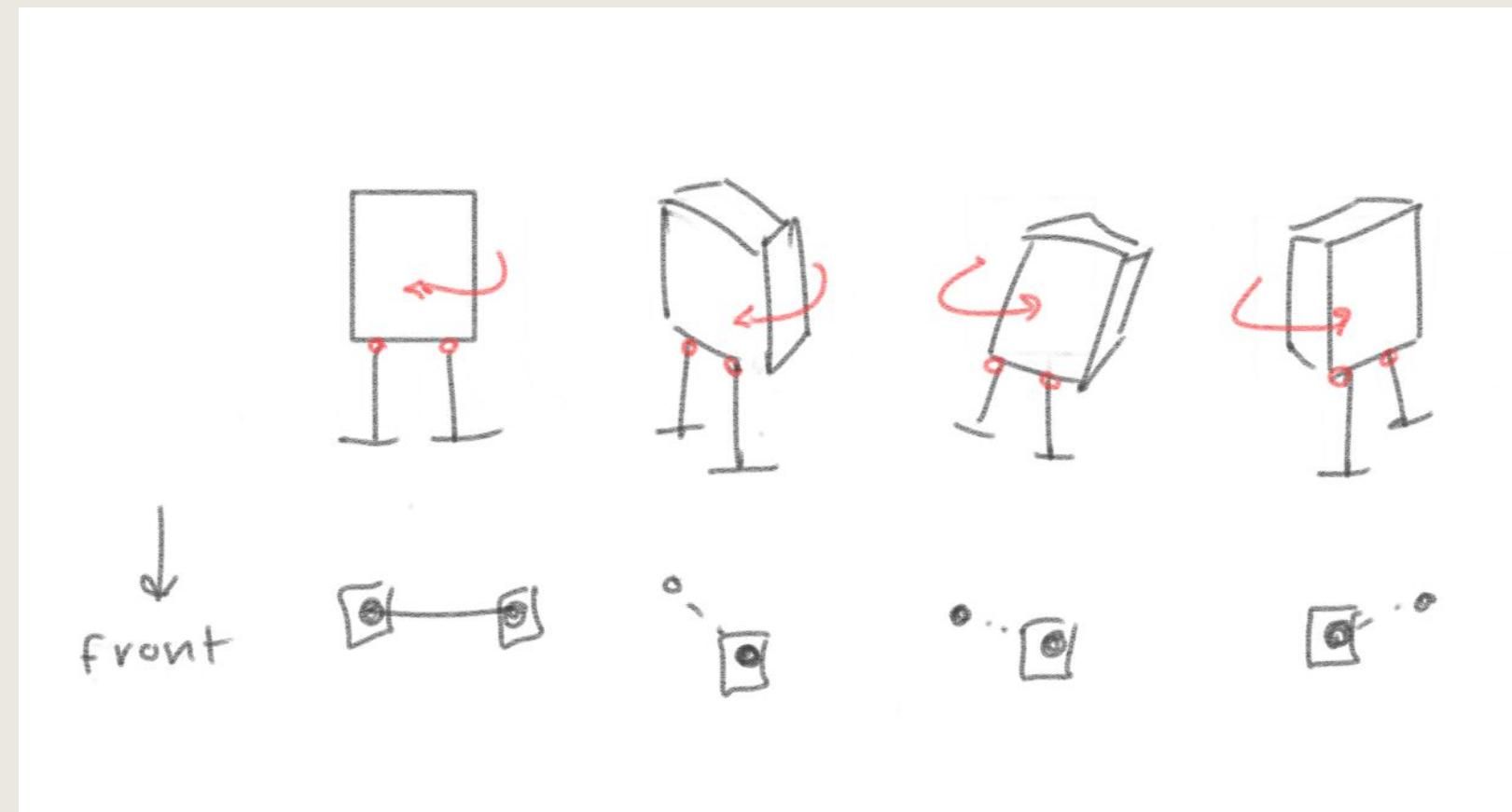
https://youtu.be/6R2sd1_W5kM



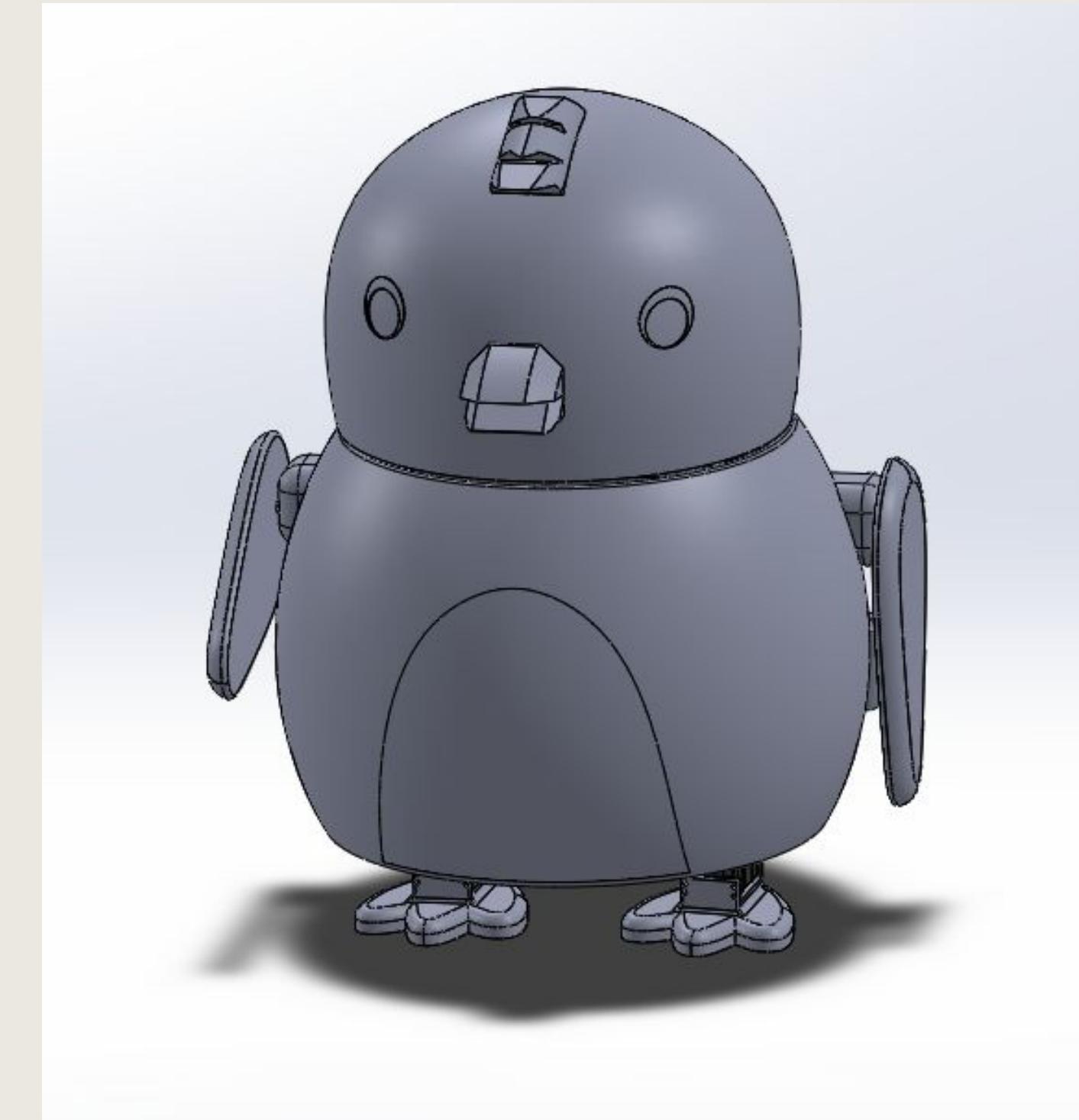
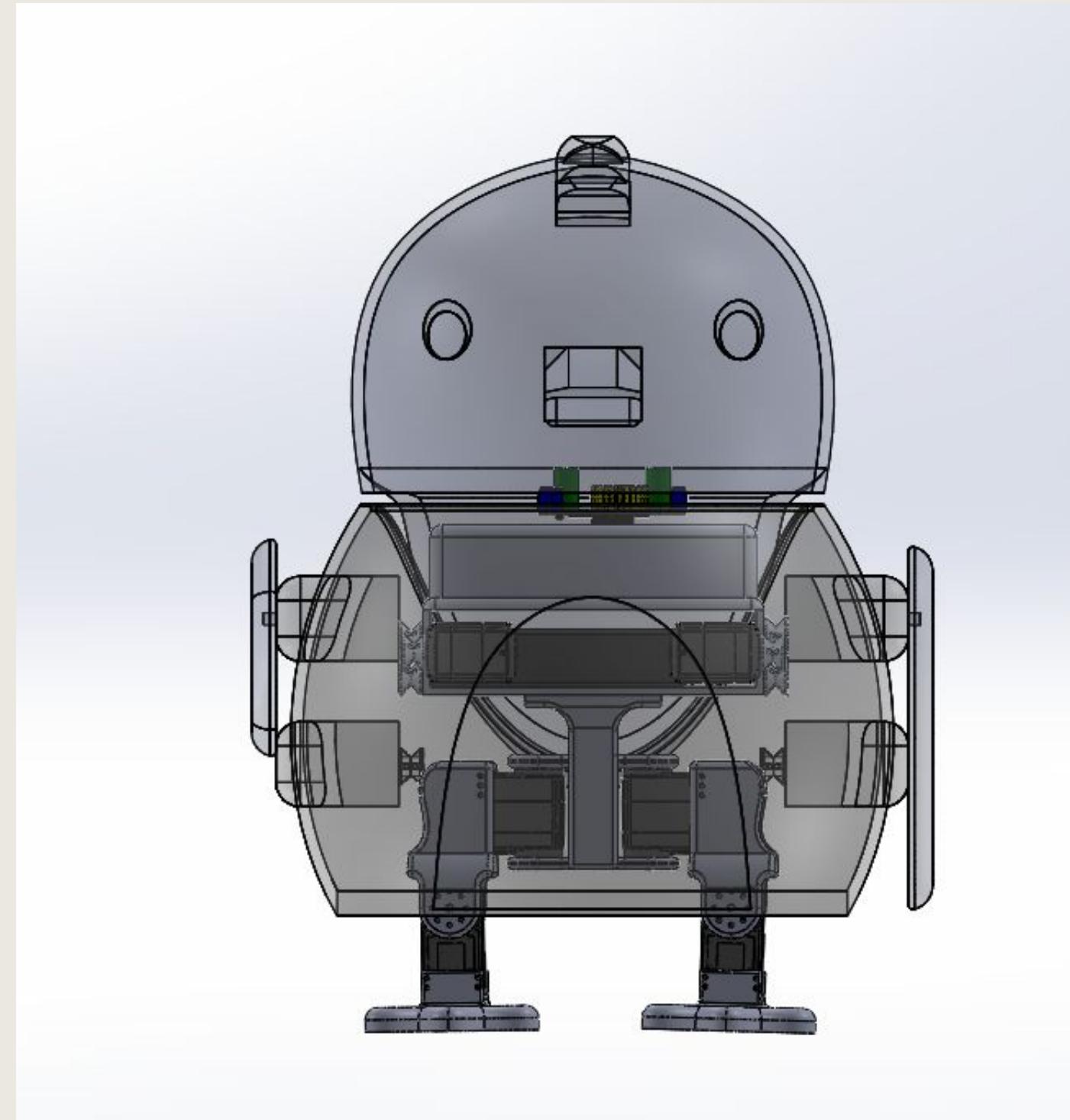
Concept Sketch



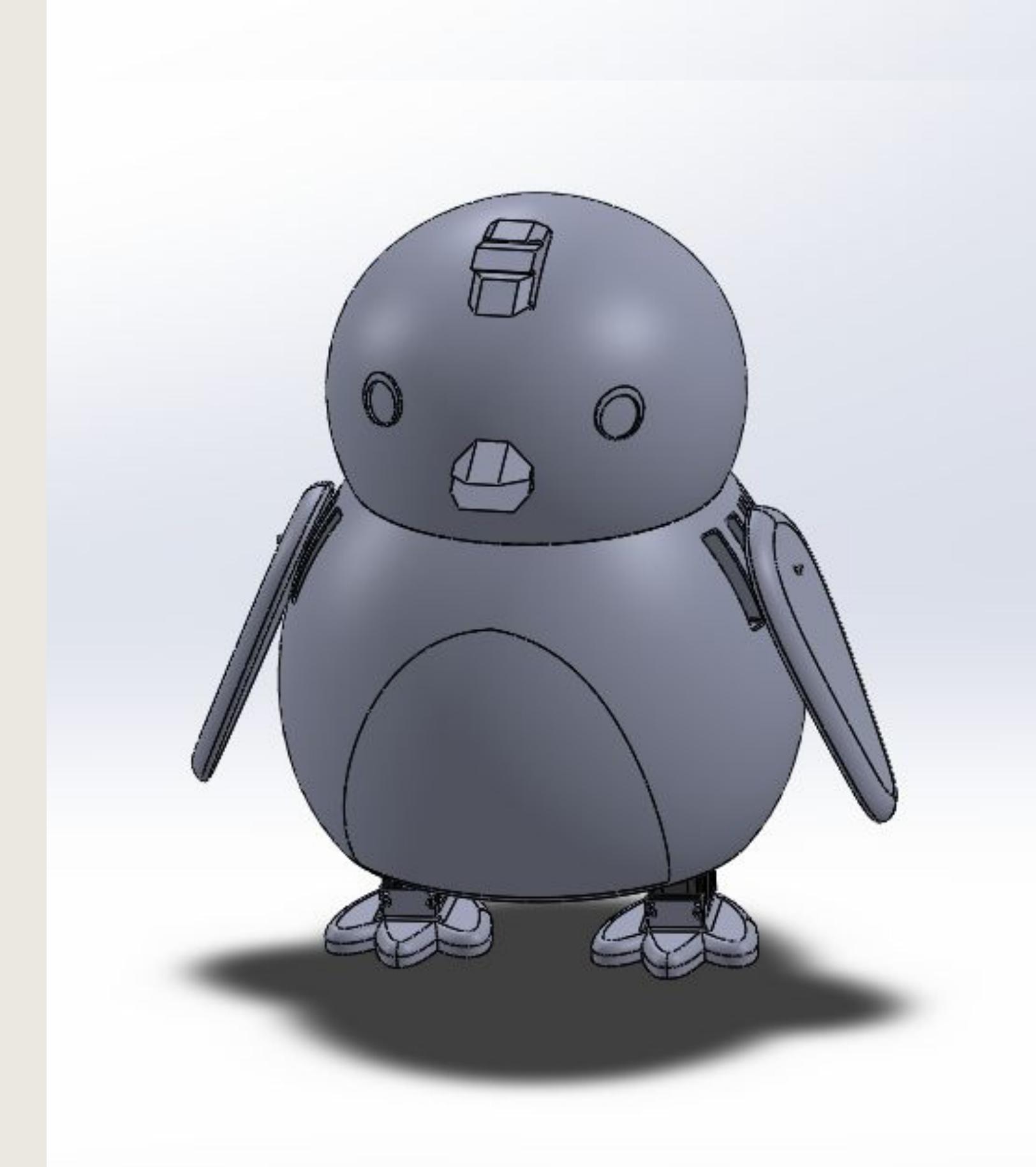
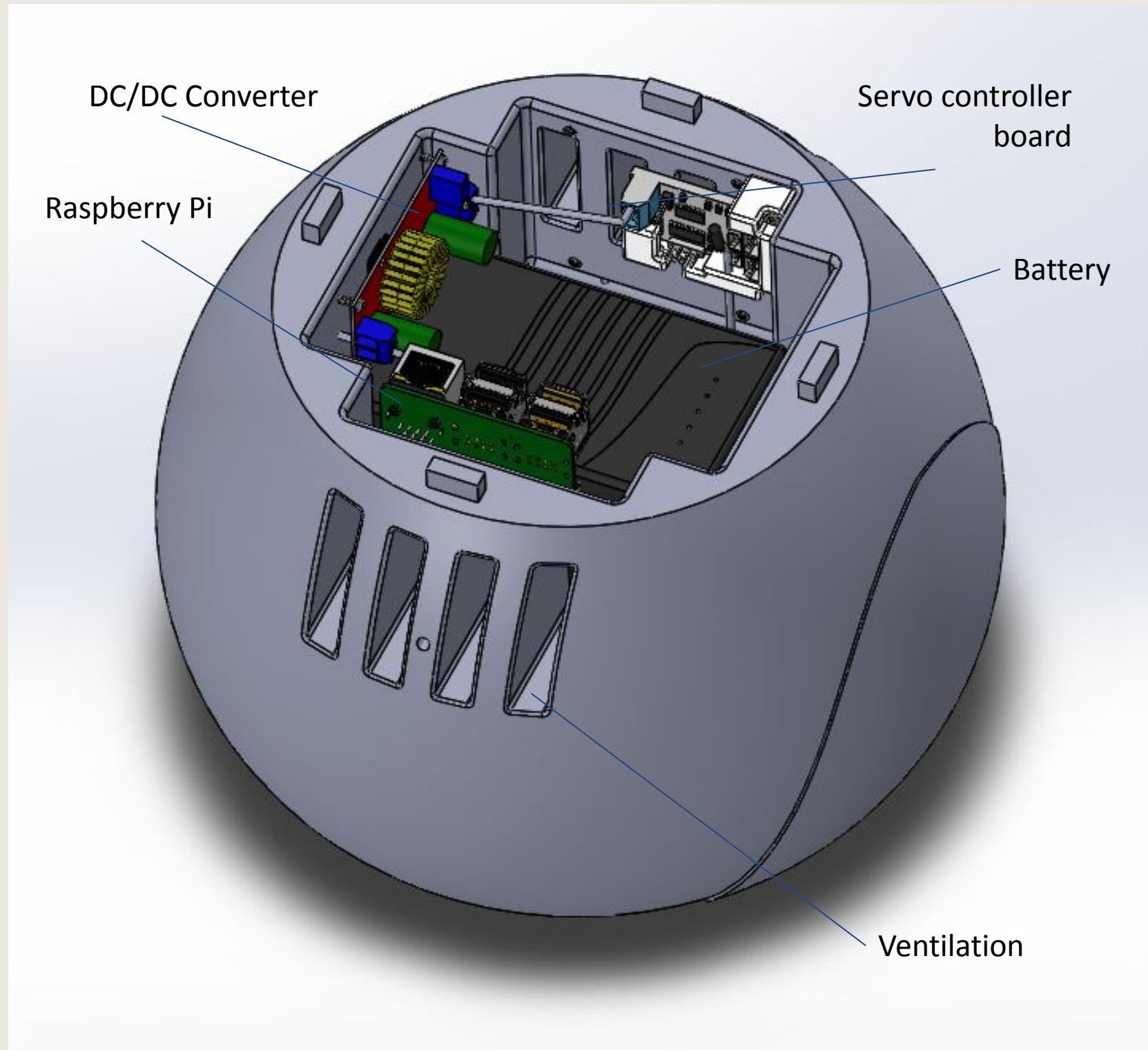
Hardware Design



Preliminary CAD

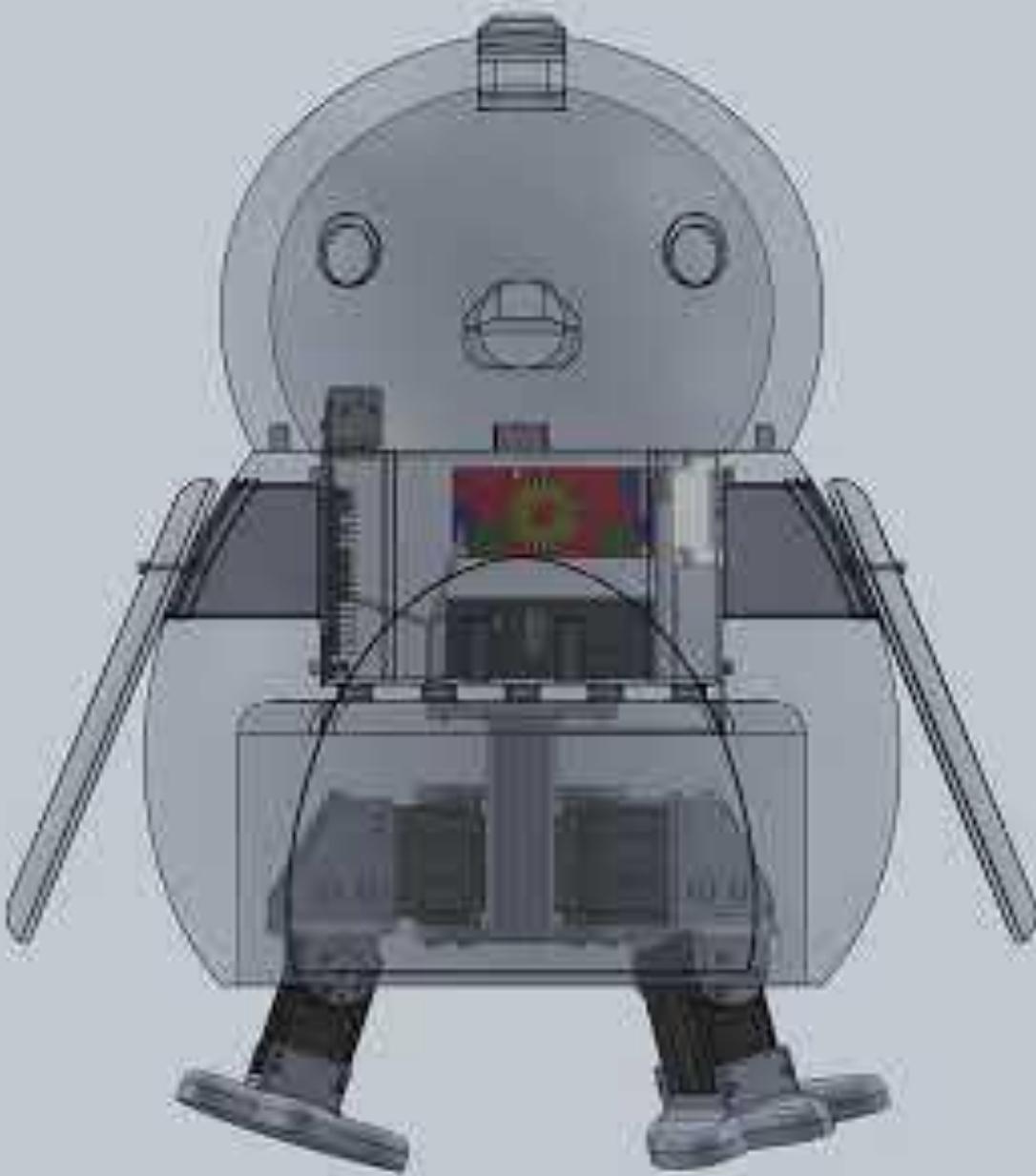


Detailed CAD

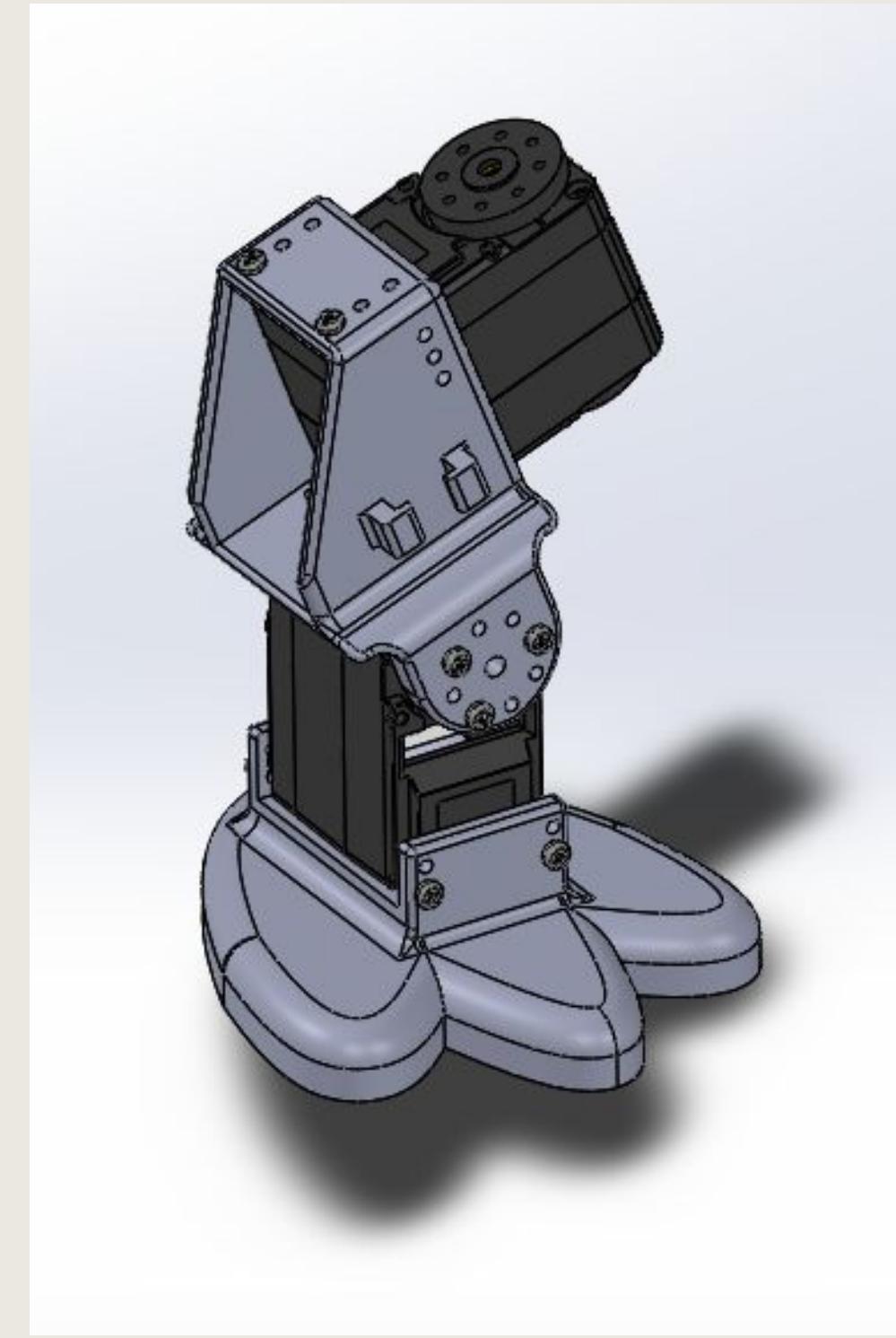


Joint Animation

- Link to animation video:
<https://youtu.be/sBjZZoo6AOQ>



CAD to Assembly



Assembled Leg



Video of Working Leg

- Video of working leg:

<https://youtu.be/XsArdePVw10>

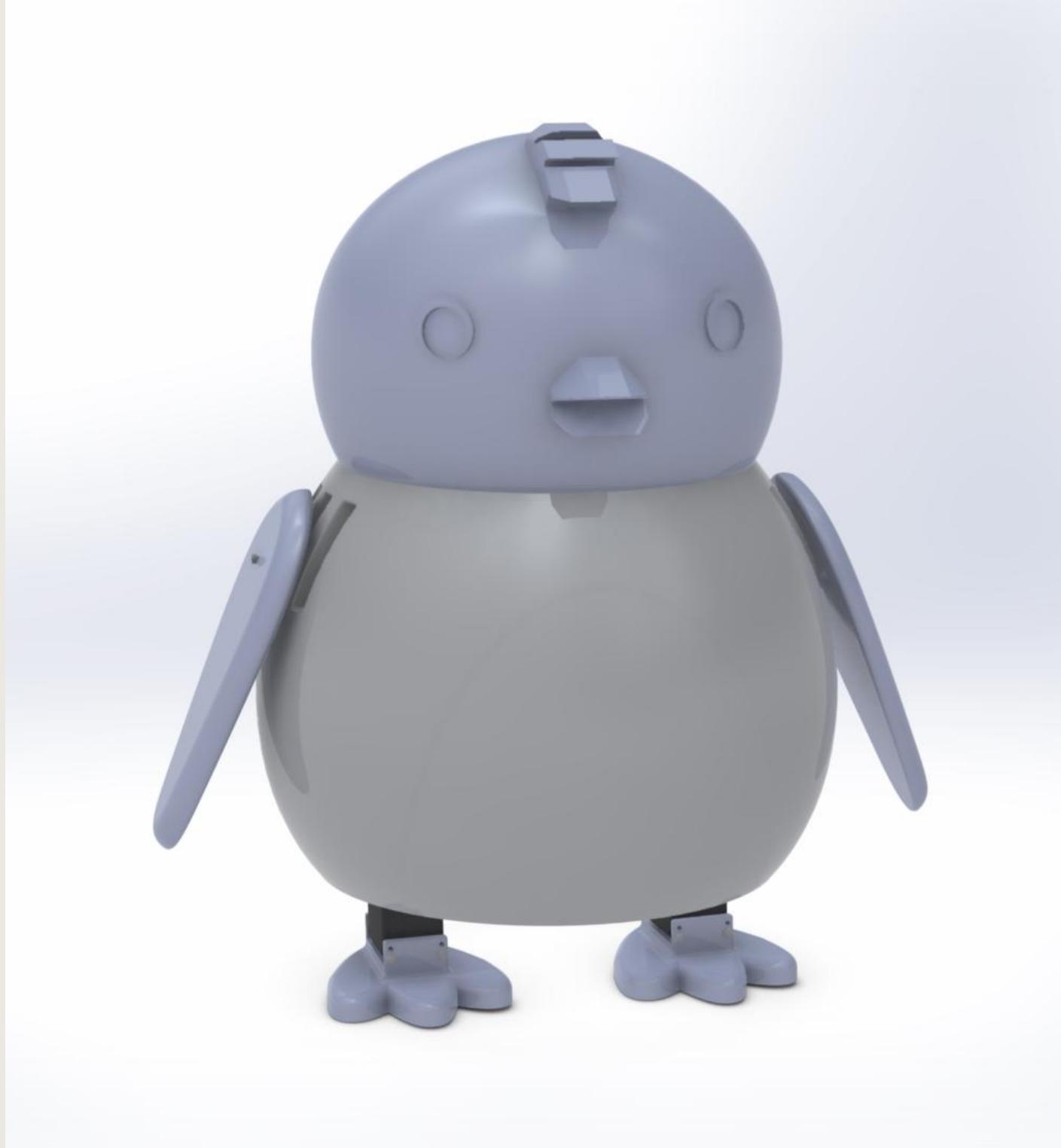
- Servos moving in sinusoidal motion pattern

- Video of initial reaction:

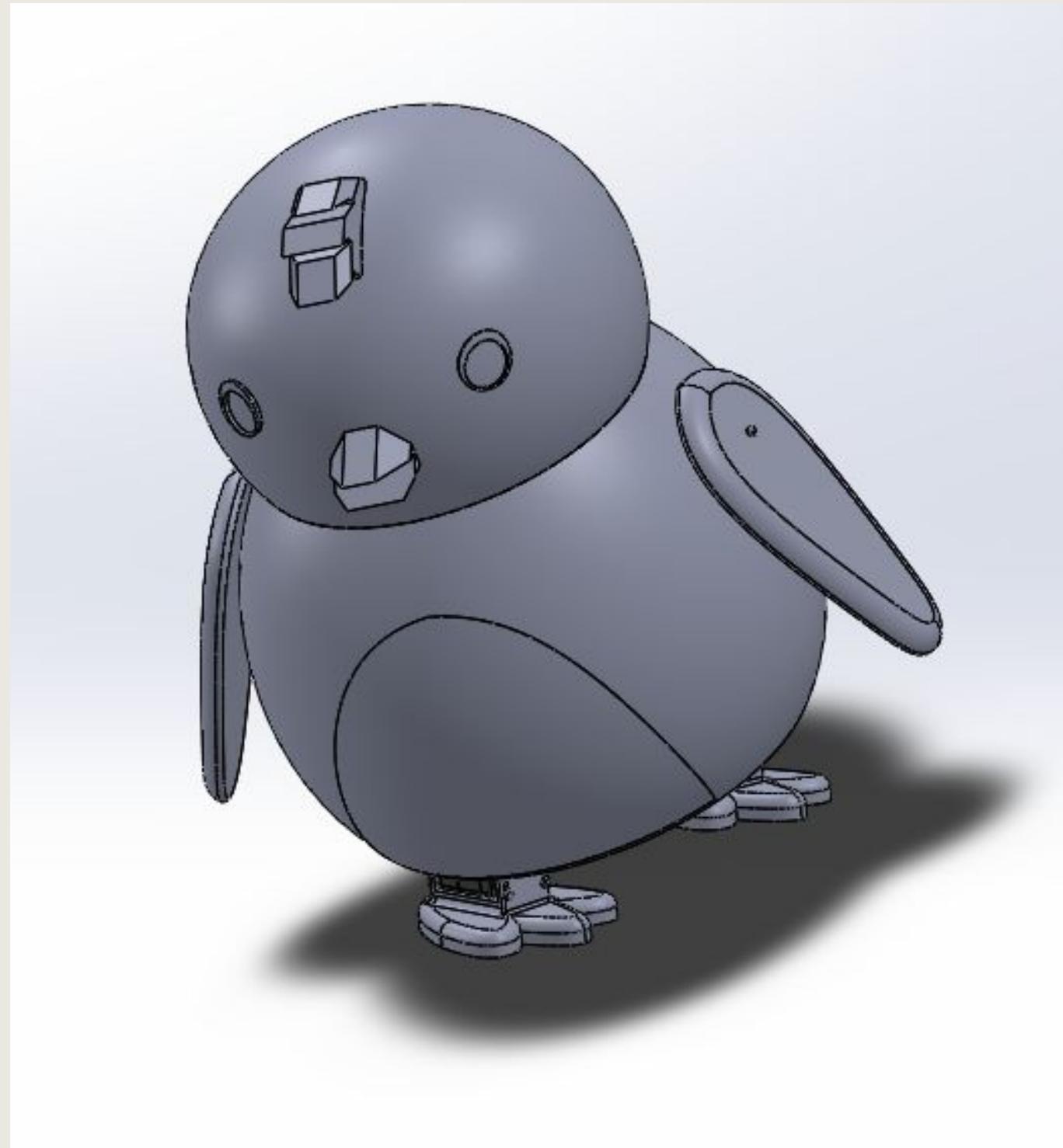
https://youtu.be/_kRITzSinRs



CAD to Assembly



CAD to Assembly

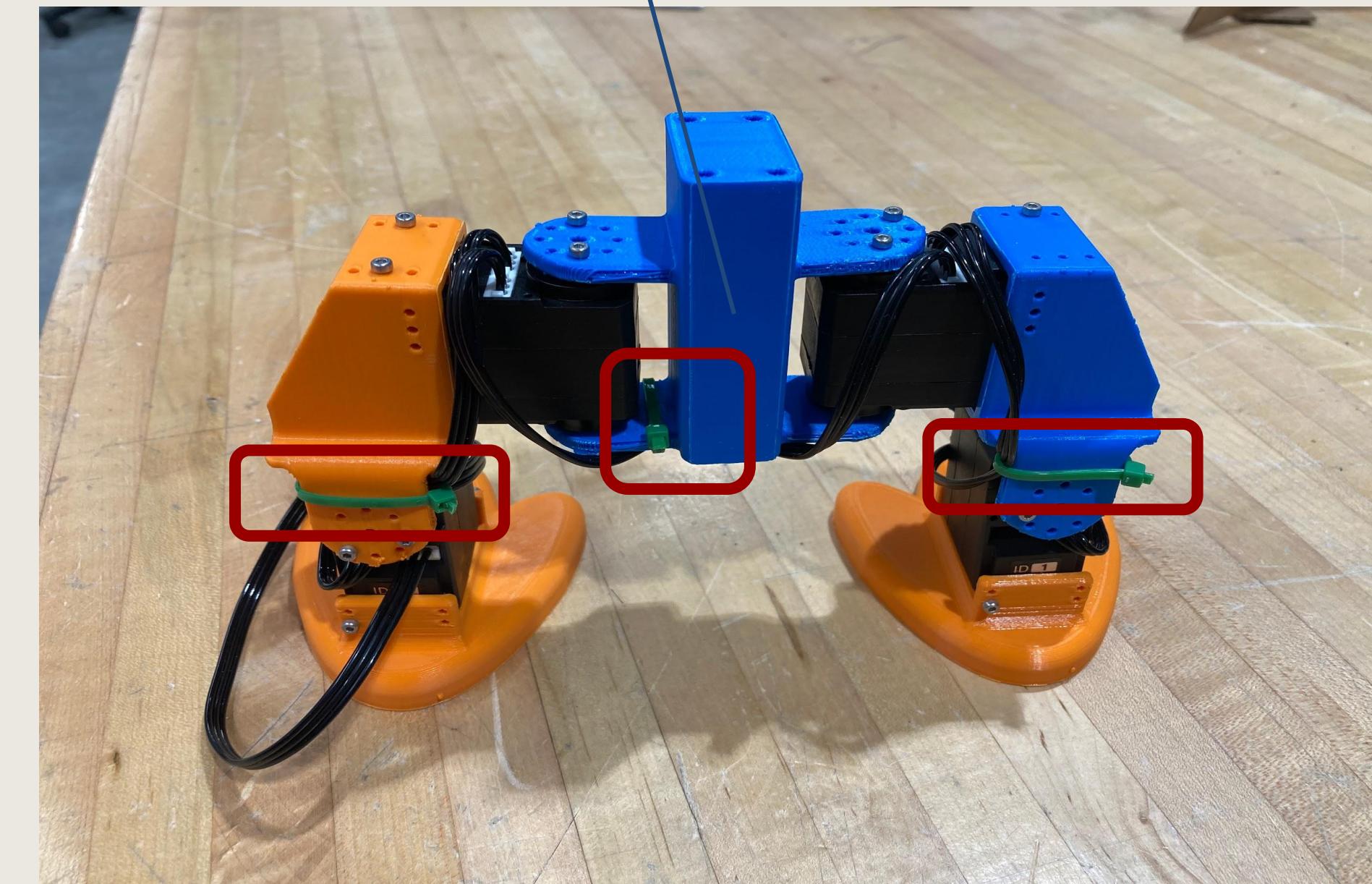


Assembly Details

- Modularity
- Cable management

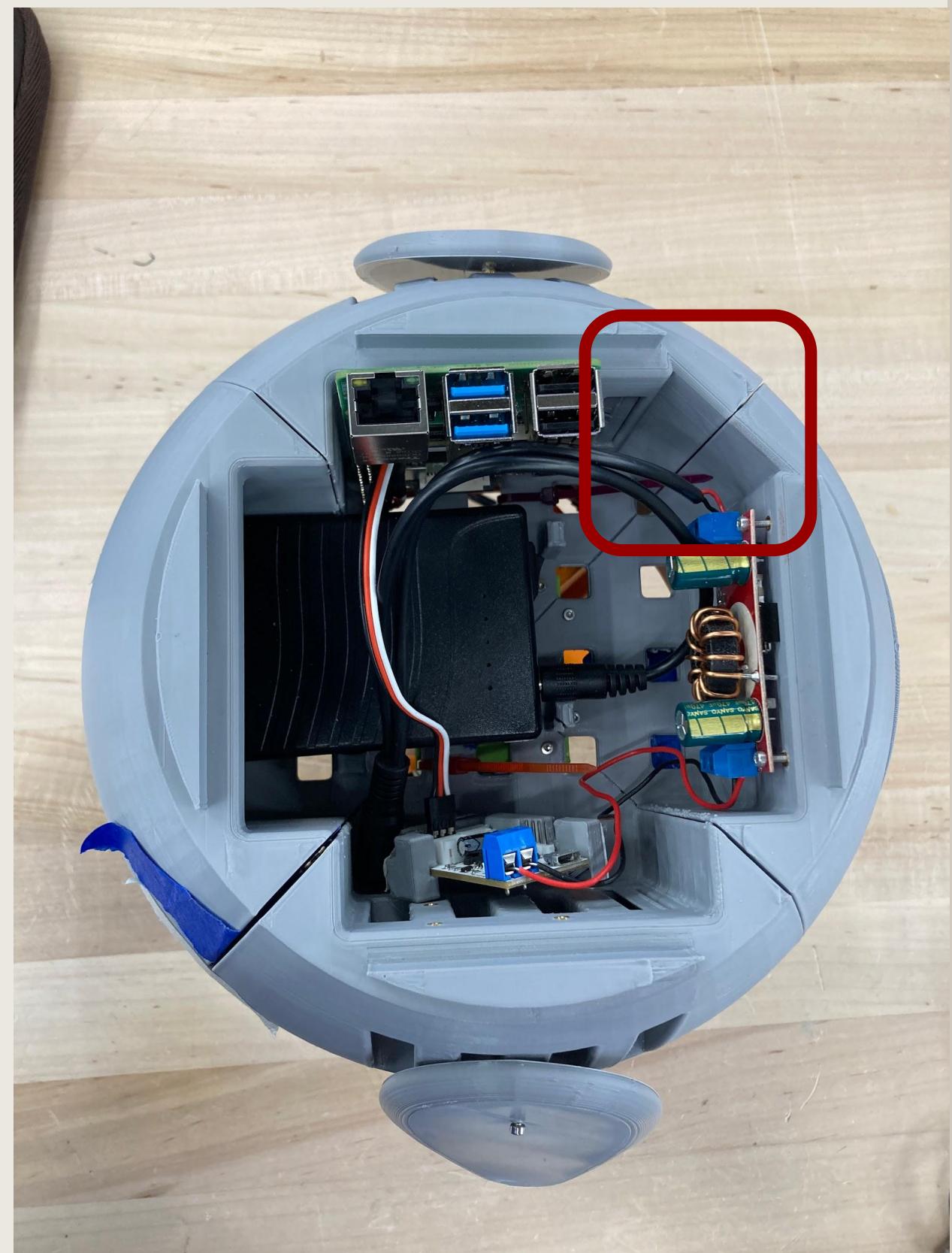
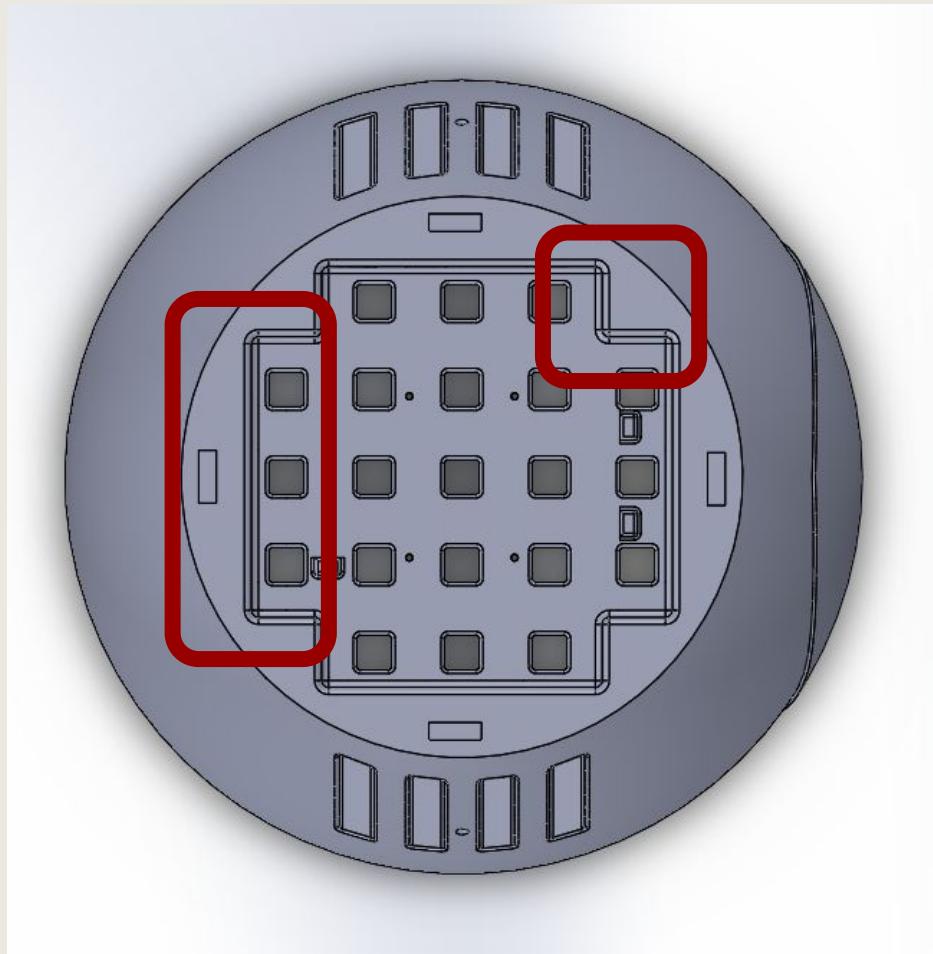


Final design required 8 segments for body and 2 segments for head



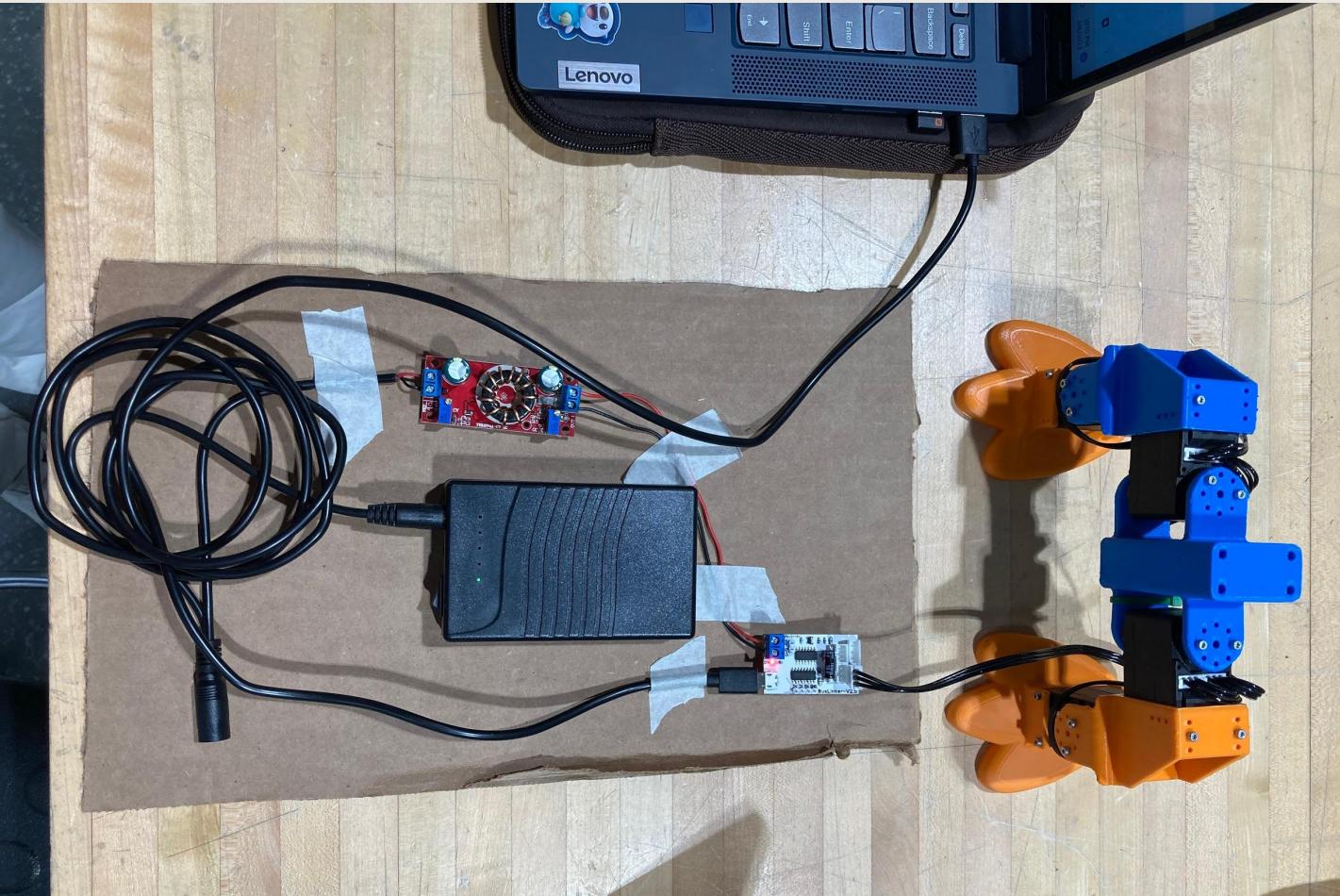
Form/Fit Issues

- Required iteration and modification of initial design



Scripting

- Servos are controlled using pylx16a library
- Test board to temporarily mount electronic components



```
45  
46     t = 0  
47     while True:  
48         # Two sine waves out of phase  
49         servo1.move(home1+sin(t)*20)  
50         servo2.move(home2+cos(t)*20)  
51         servo3.move(home3+sin(t)*20)  
52         servo4.move(home4+cos(t)*20)  
53  
54         time.sleep(0.05)  
55         t += 0.05  
56  
57
```

Moving Robot

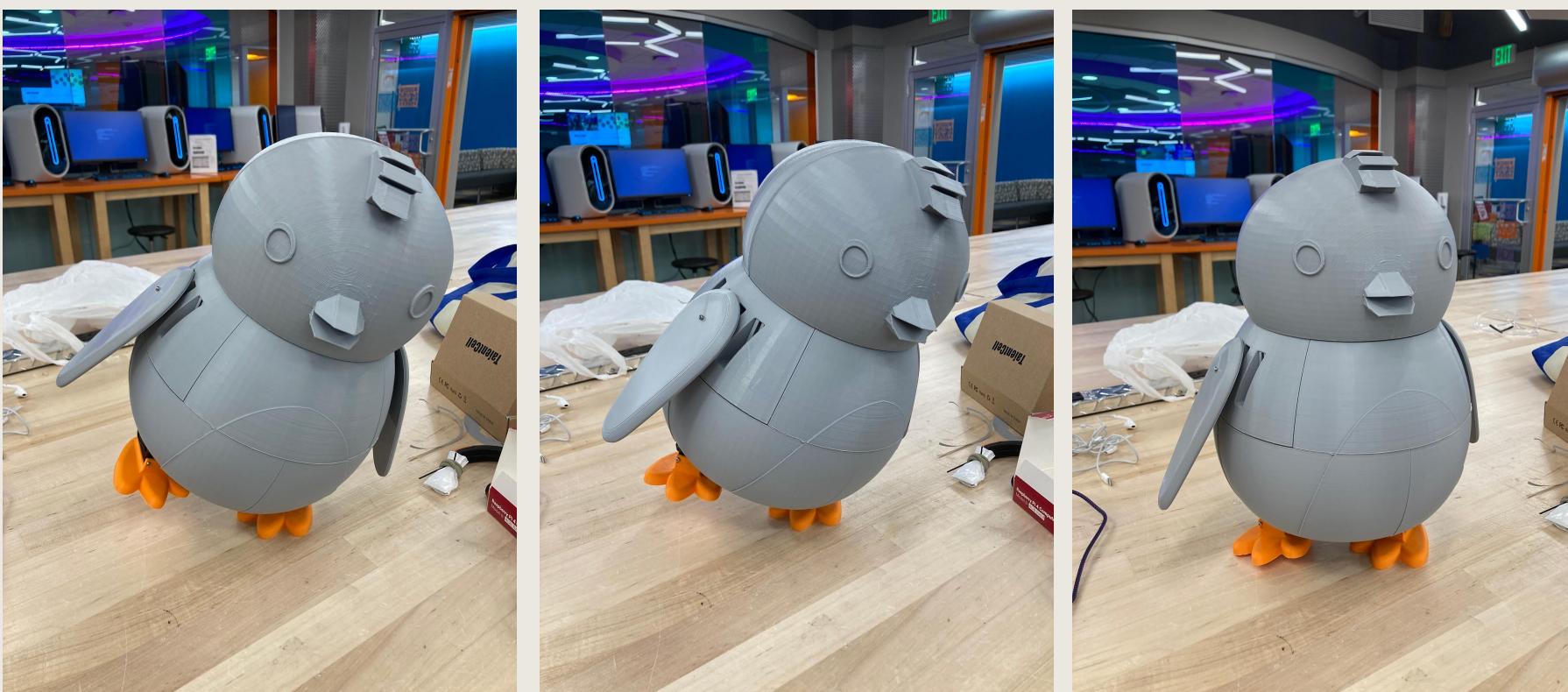
- Link to video of moving robot:

https://youtu.be/_1kcyyFjF2k

- Video shows robot running
hello-world.py



Gait Sequence



Walking Robot

- Videos of walking robot:

[https://www.youtube.com/playlist?
list=PLV9EPMPn6I_R7xMAPokyGD
HJkYsH8Et2w](https://www.youtube.com/playlist?list=PLV9EPMPn6I_R7xMAPokyGDHJkYsH8Et2w)

