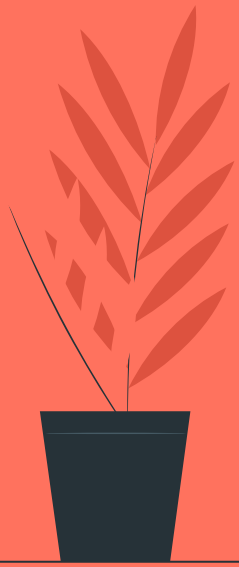
Team Hachiko

Meet the Team!



Mechanical Team

Allana Ilagan (Team Lead)

- 4th Year MAE Major

Colin Nisbet

- 4th Year MAE Major

Angelina Licos

- 1st Year MAE Major

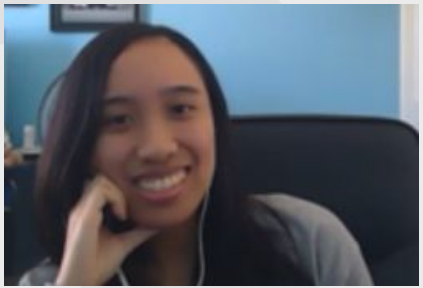
Electrical Team

Johnny Tran

- 4th Year Computer Engineering Major

Gabe Villena

- 3rd Year CS Major



Arianne Agno

- 2nd Year Computer Engineering Major

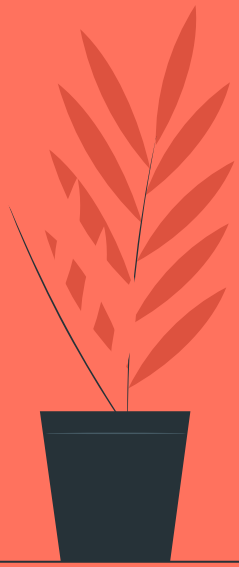
Outline

- Design Goals
- Our Design (CAD)
- Connecting and Electrical Components
- Manufacturing and Assembly
- Voice and Servo Control
- Doggo!
- Video

Design Goals

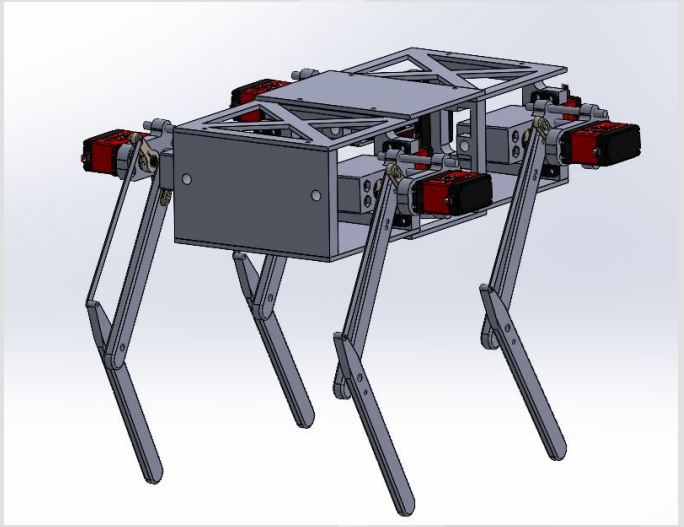
- Mobile
- Remote Controlled
- Autonomous
- Voice Controlled

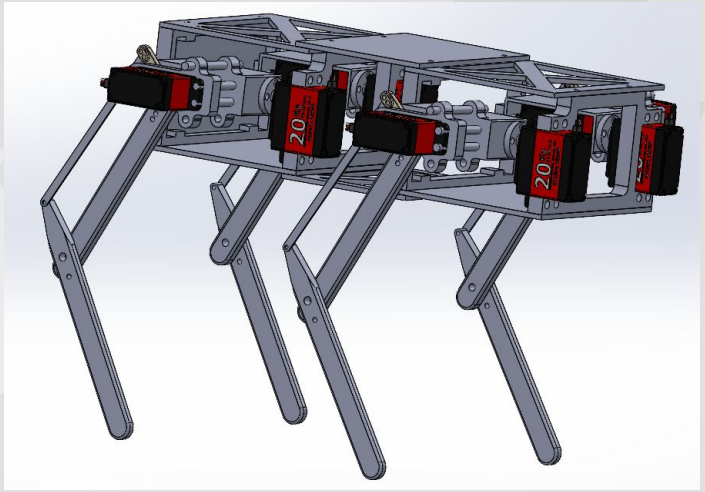
Our Design



Mechanical Design

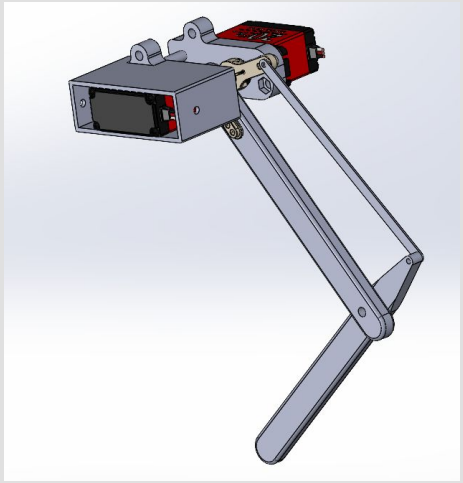
- Initial Design was focused on 3 main areas:
  - Doggo leg Design
  - Doggo frame Design
  - Connections

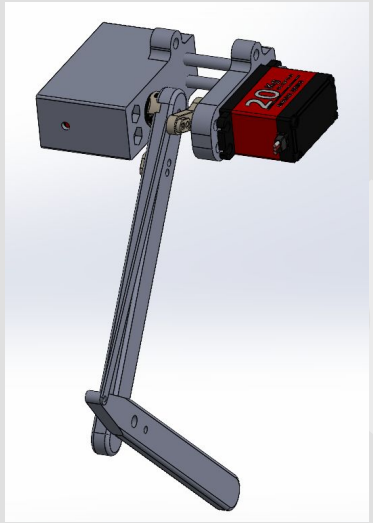


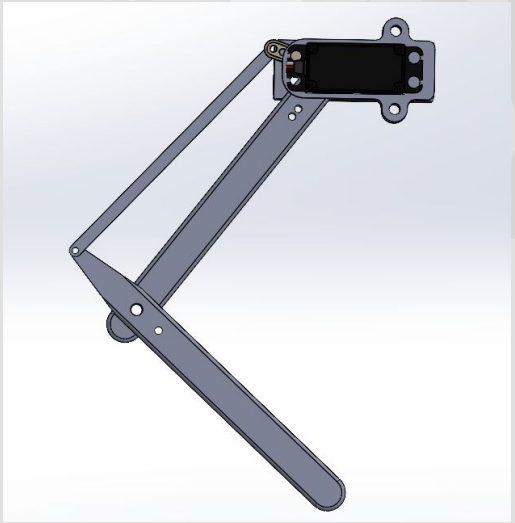


Doggo Leg

- Each leg has 3 rotational degrees of freedom, leading to a total of 12 degrees of freedom for entire doggo
- Leg design required that all 3 servo motors necessary for 3 rotational DoF must be on the leg itself, separate from the frame.

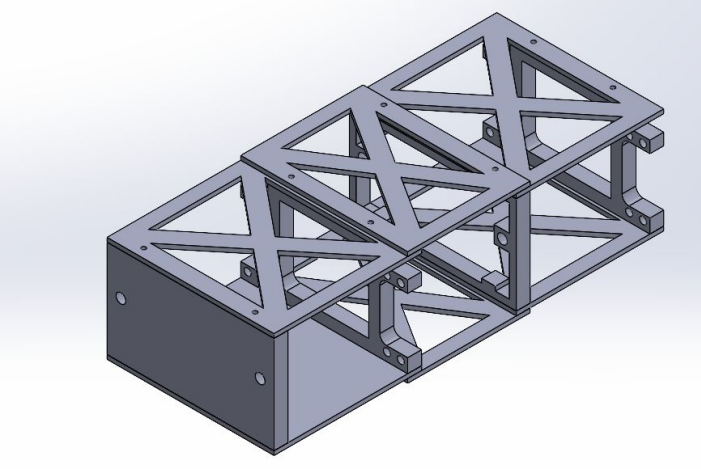


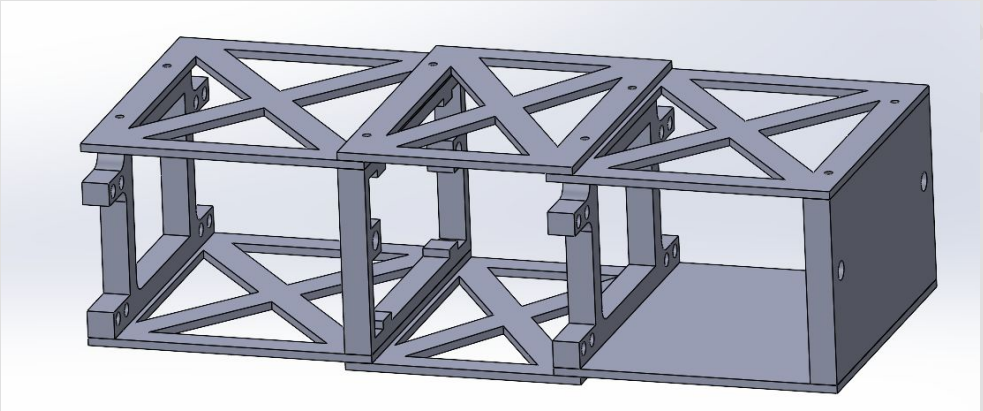




Doggo frame

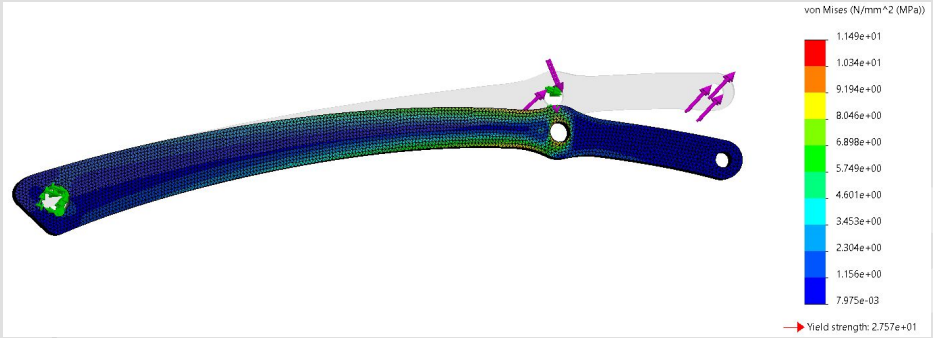
- Some time was put into frame to ensure that:
  - Electrical components had enough space on the robot
  - Legs of the robot were supported effectively

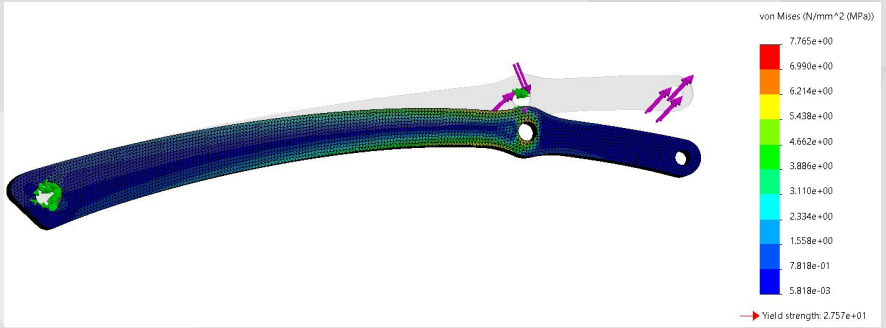




Finite Element Analysis

- Through SolidWorks FEA Analysis, we found that our legs were not thick enough to support the torques applied from the servos
- To solve this, we decided to increase the thickness of our 3D Printed Legs





Connecting Components

- Lots of types of different bearings and supports
  - Ball Bearings
  - Linear Bearings
  - Servo Horns

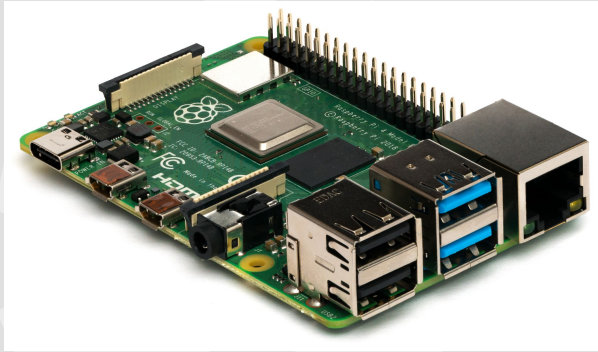
Electrical Components

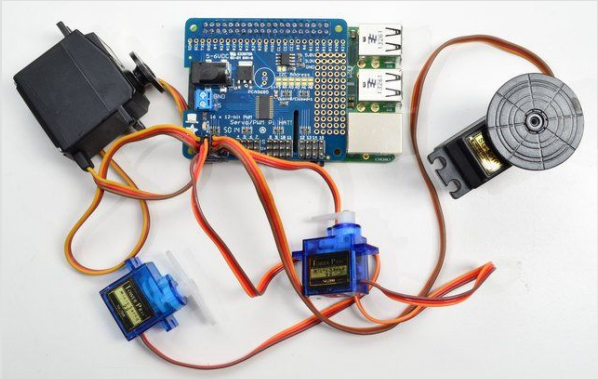
Servos!

Raspberry Pi!

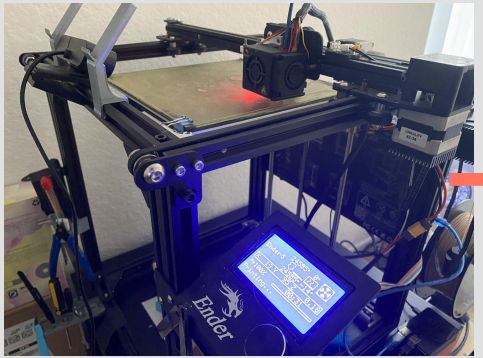
Adafruit Servo Hat!

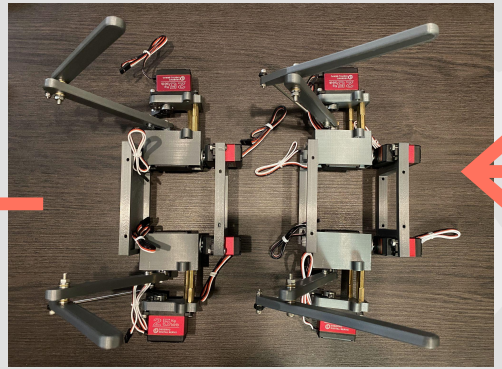
Battery Hat!

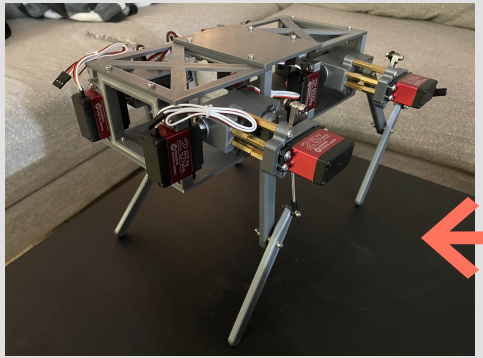




Manufacturing and Assembly

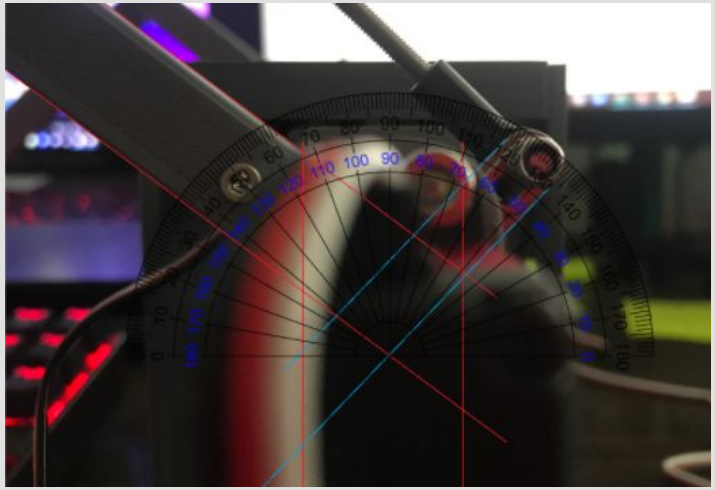






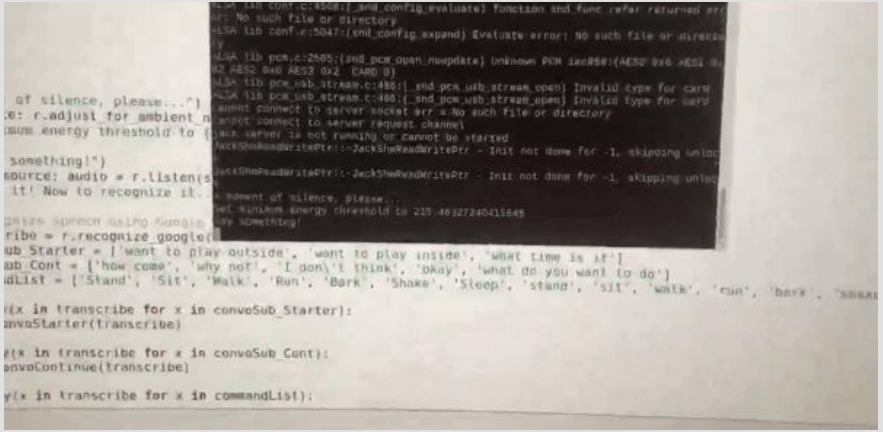
Servo Control

- Control utilizes provided Adafruit servo HAT tutorial for our specific board, incorporating the library “Adafruit CircuitPython ServoKit”
- Angles for leg positioning were hardcoded for simple movements
- Accessed only from voice command when standard dog command is given

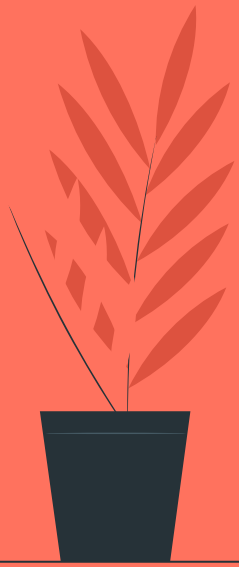


Voice Control

- To utilize voice control, we included a voice recognition library by “Voice_Assistant”, Google’s voice recognition, and an usb microphone
- This library allows the microphone and a voice recognizer to be an object within the code, act as a source input for voice, and have that voice be translated into commands
- The commands that we recognize are stand, sit, walk, run, bark, and shake. If one of these commands are detected in the translation, the code will go into a function where either servo angles will be changed or audio files triggered

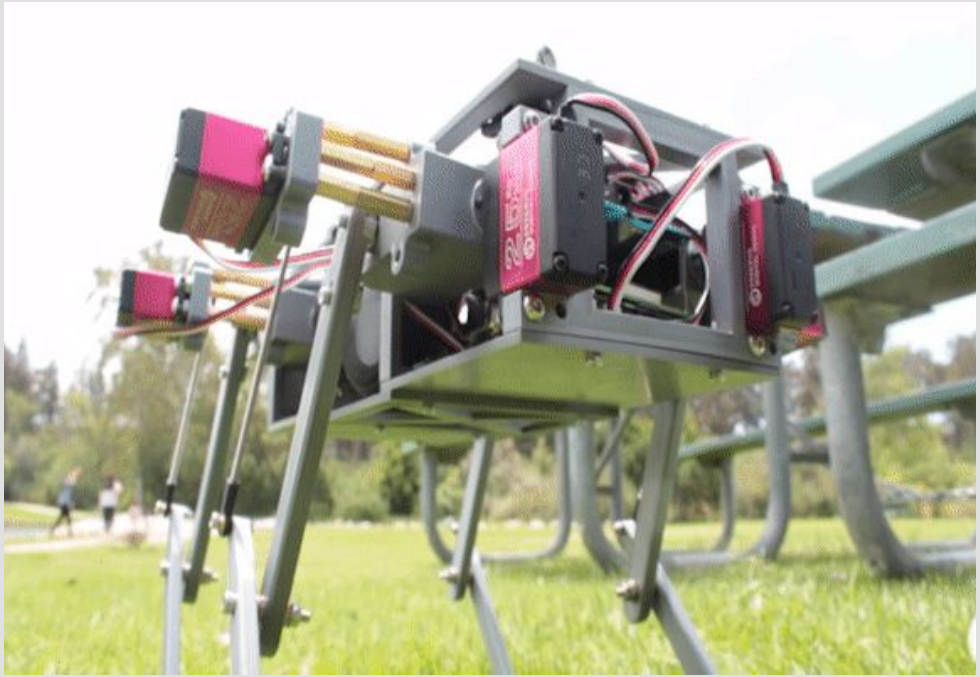


Now Introducing...



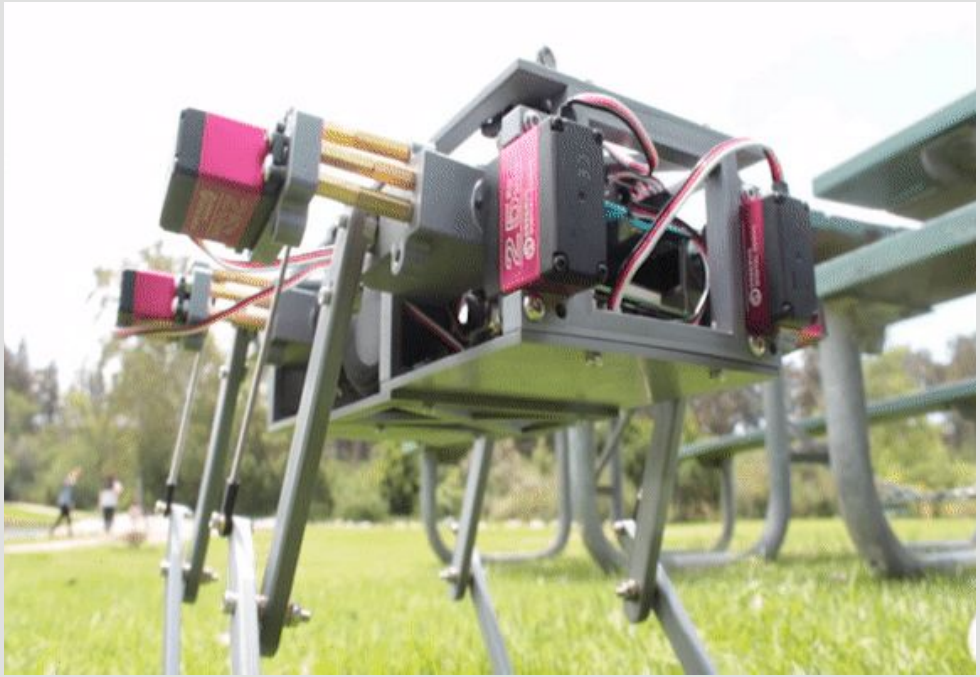
Our Doggo!!!!

- He’s a very good boi
- An expert at following the “stay” command, even doing it on his own many times!
- Unfortunately, we found him abandoned and blind and have been nursing him back up to help



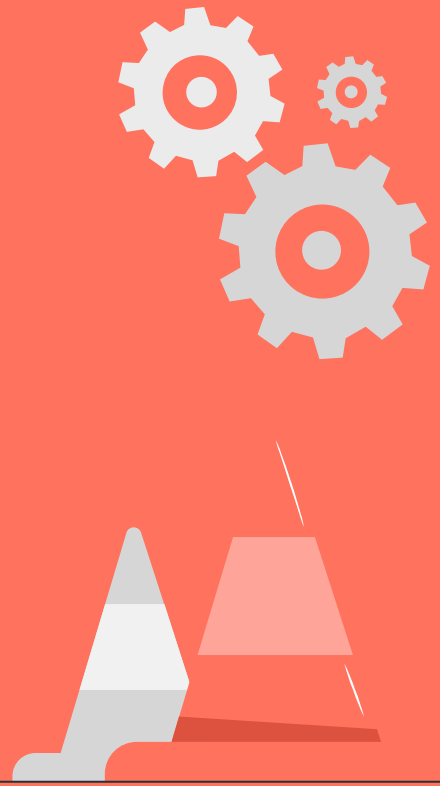
Our Doggo!!!!

- In all seriousness, we were unable to complete all the requirements, but we're ready to show off what he can do!



Video!!

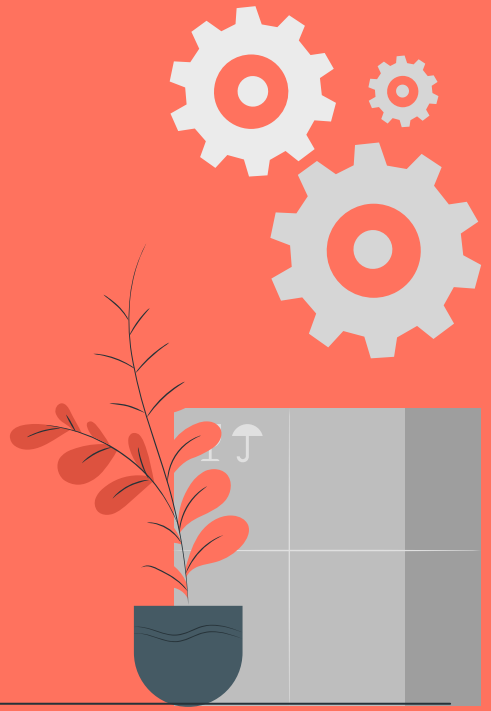
Closing Remarks



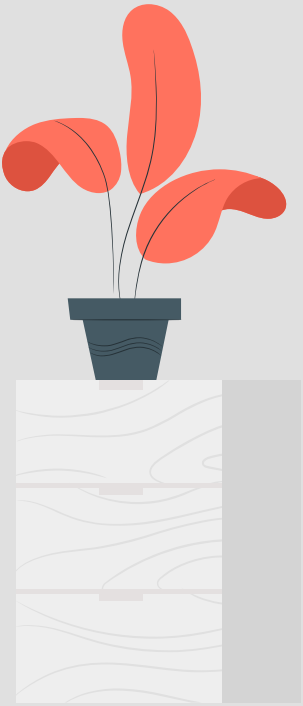
What We Learned

Doggos are complex and hard to build

Thank You!



Hi just some elements we can use to sprinkle around the slides




八千公
Hachiko