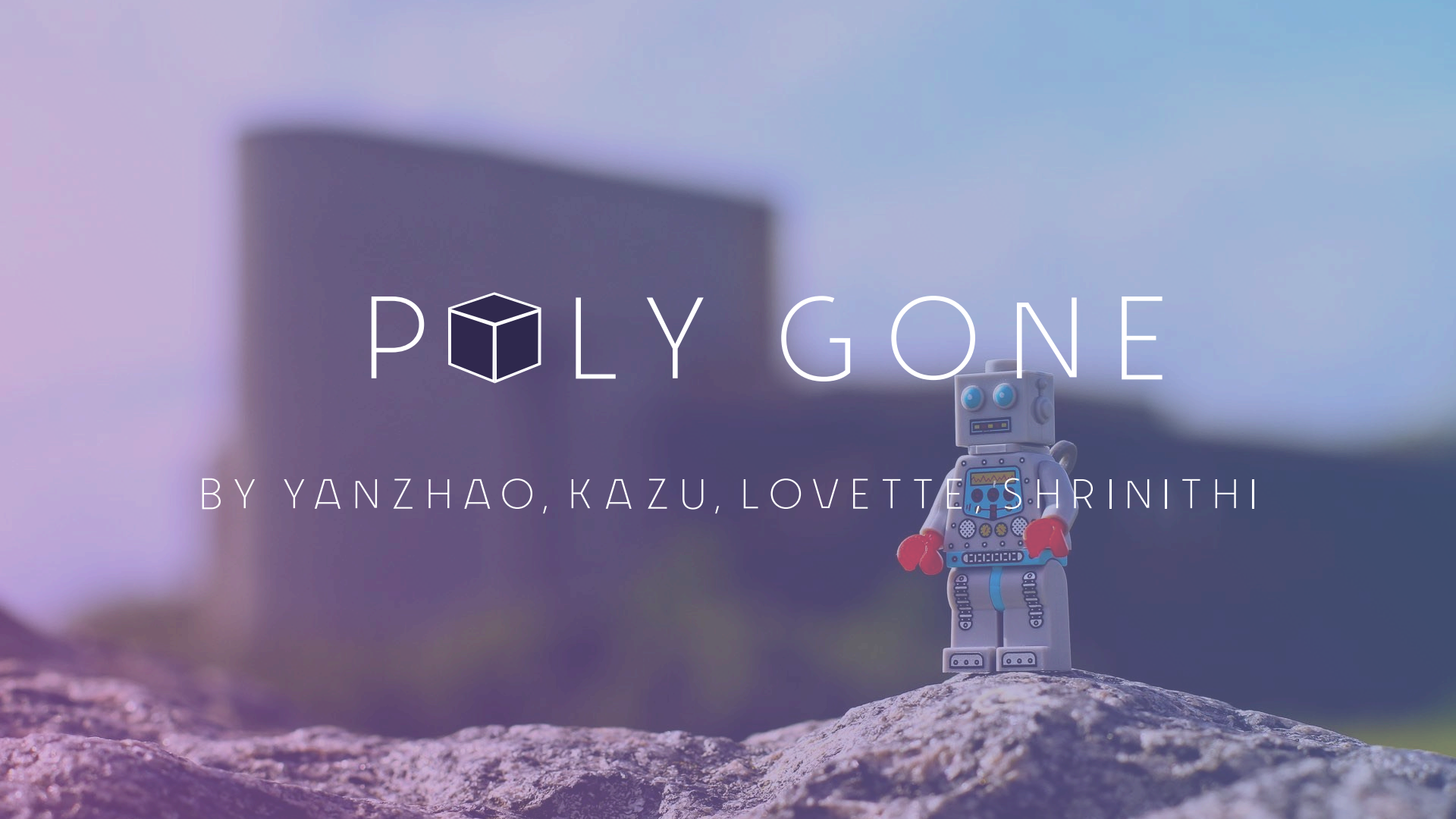
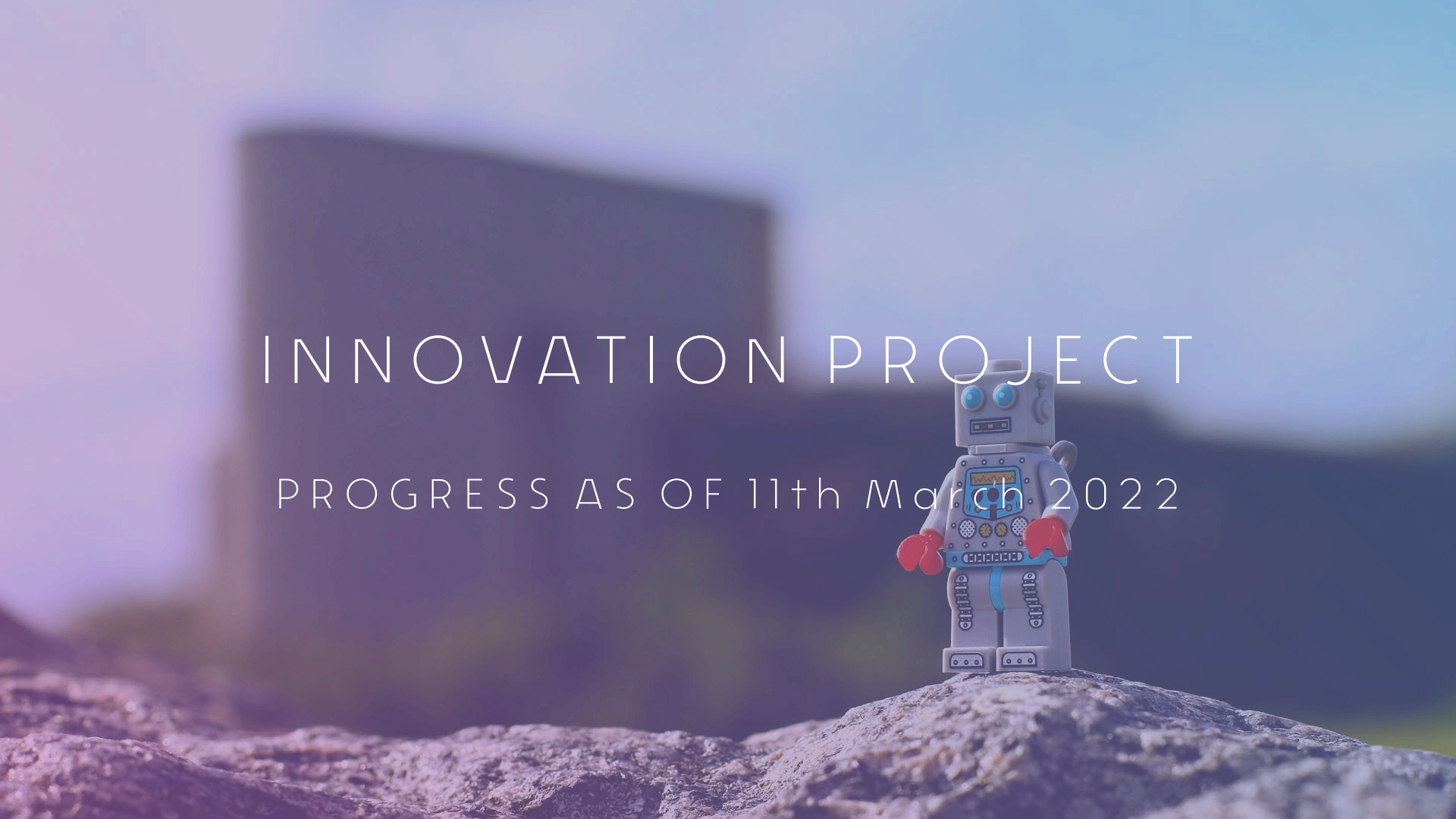
POLY GONE

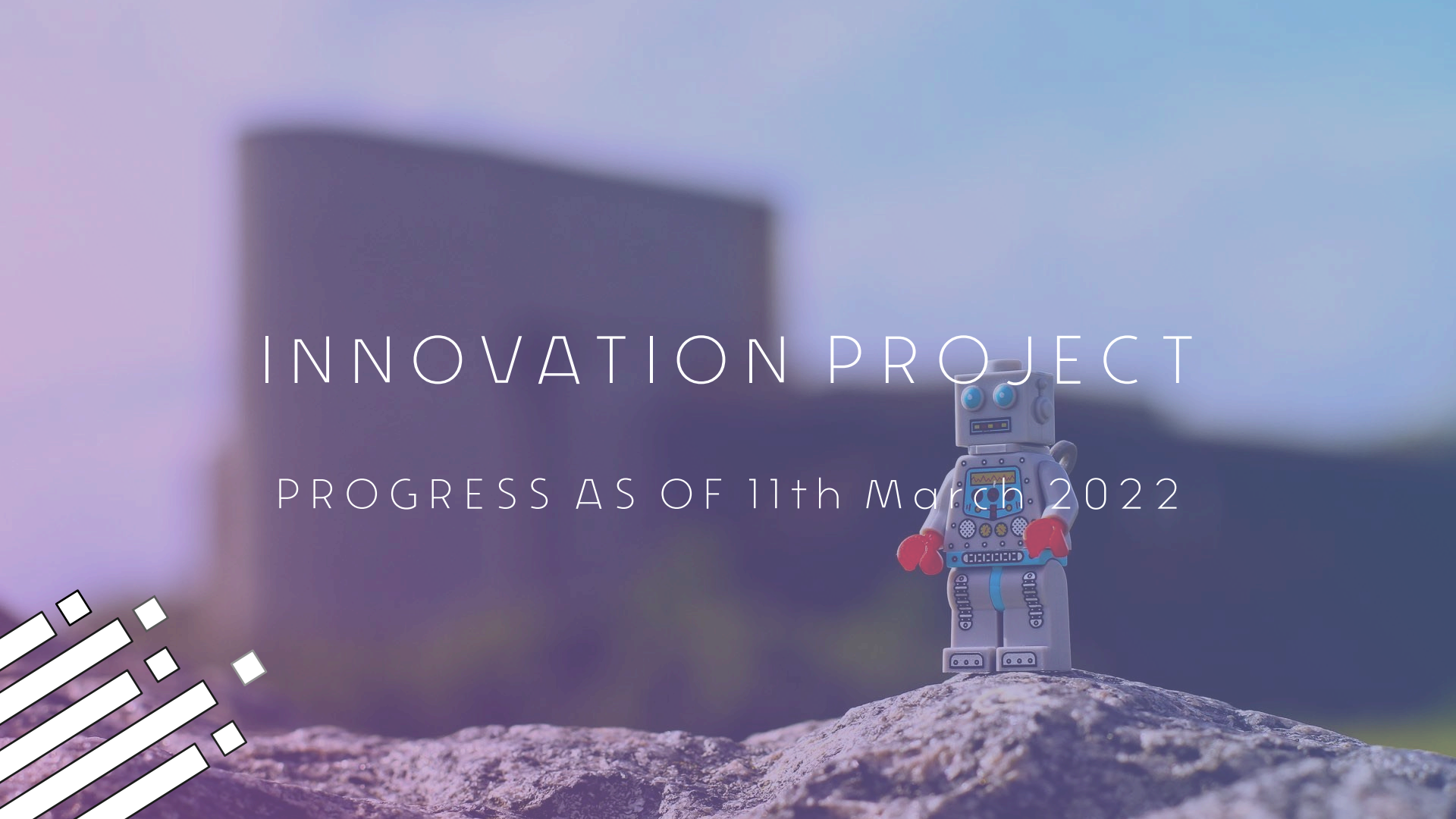
BY YANZHAO, KAZU, LOVETTE, SHRINITHI



INNOVATION PROJECT

PROGRESS AS OF 11th March 2022





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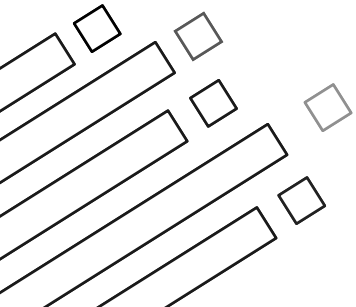
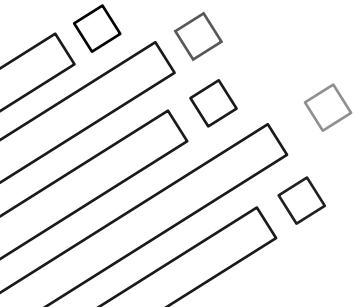


EasyTruck

A Truck Managing App



PolyGone, FLL 2022

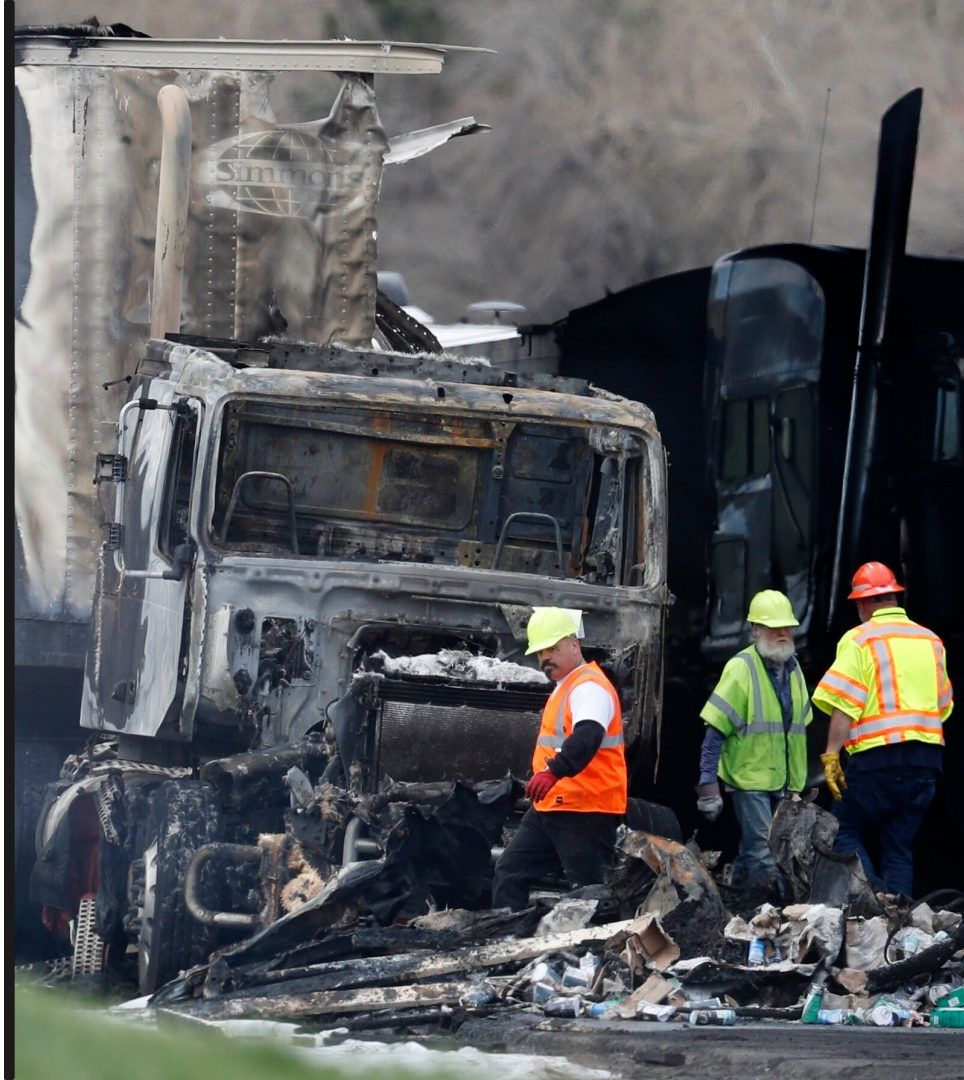
1 out of 5

Truckers in the US get in a serious accident each year, which amounts to more than 450,000 accidents every year!

US, 2019. The Data was taken from here (1)

The Problem

Truckers are crashing their truck in accidents, but why so?

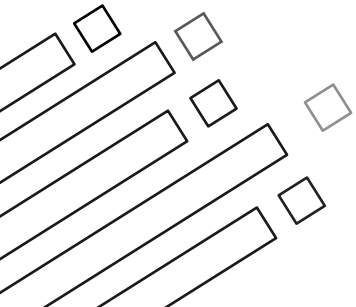


Our Research

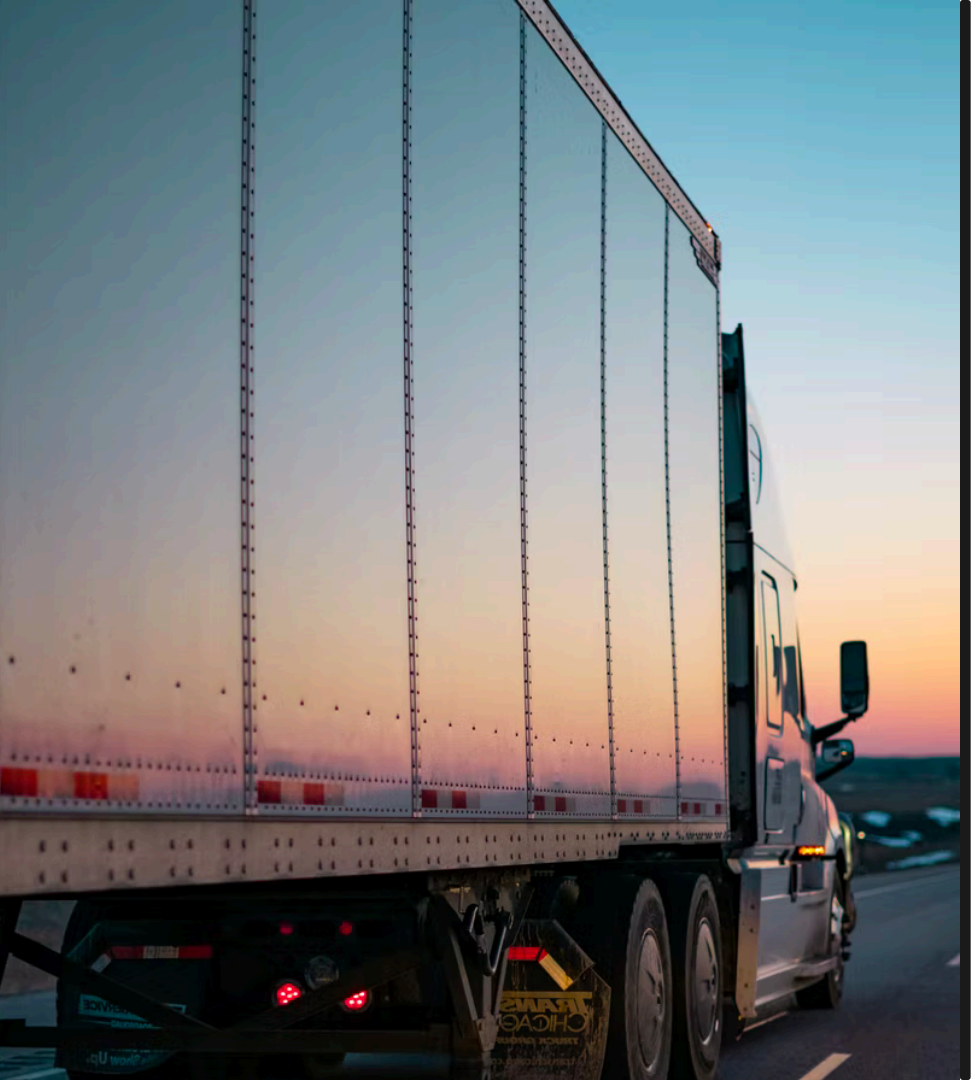
From our research we found that...

High and off center of gravity of the truck is the **main cause** of crashes.

Inclement weather, construction and fatigue are preliminary causes of crashes.



By building an app, we can help solve these problems.



Research

Main Cause

- **High & o center of gravity.**
  - When center of gravity is o centered or higher, it will increases the chances of the truck tipping over when making a at higher speeds
  - Increases chances of accident overall

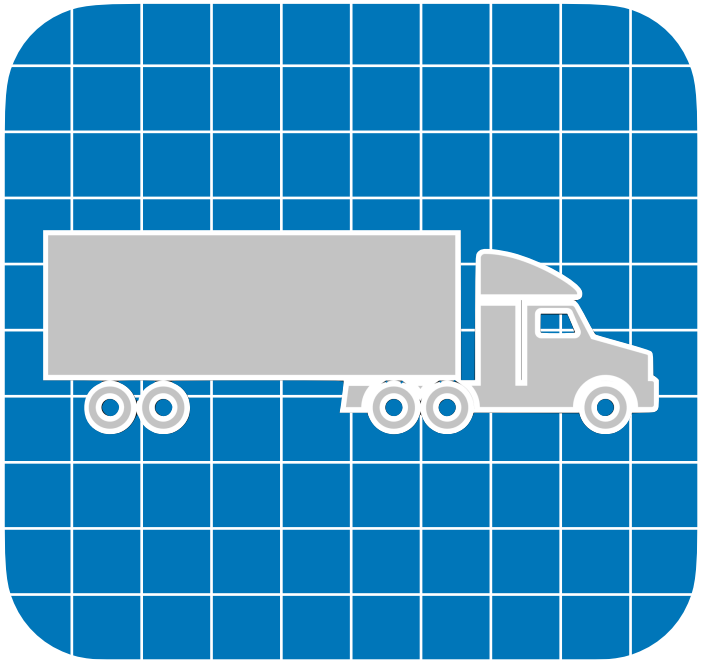
Research

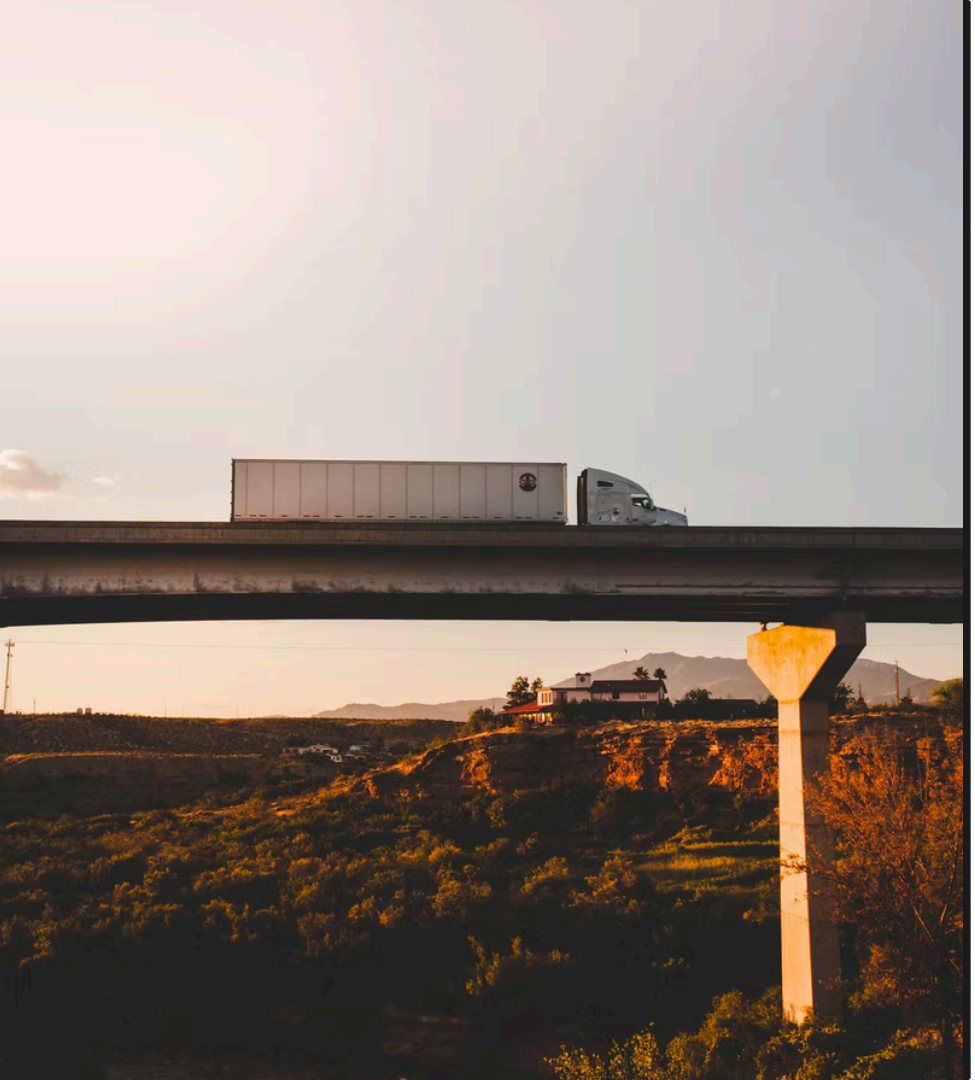
Preliminary Causes

- **Road Construction**
    - Maneuvering via road shoulder or median
- **Driving Fatigue**
    - Prone to mistakes and accidents
- **Severe Weather**
  Inclement weather
    - Reduces visibility
    - Challenging to vehicle

EasyTruck

The all-in-one easy-to-use trucking app





EasyTruck

Truckers will be able to

- Add their truck models
- Change the size and weight of their trucks
- Keep track of maintenance deadlines and checkups
- Add details such as any damage to any part of the truck
- Monitor the amount of hours they have been driving
    - notify them when they have being driving for too long

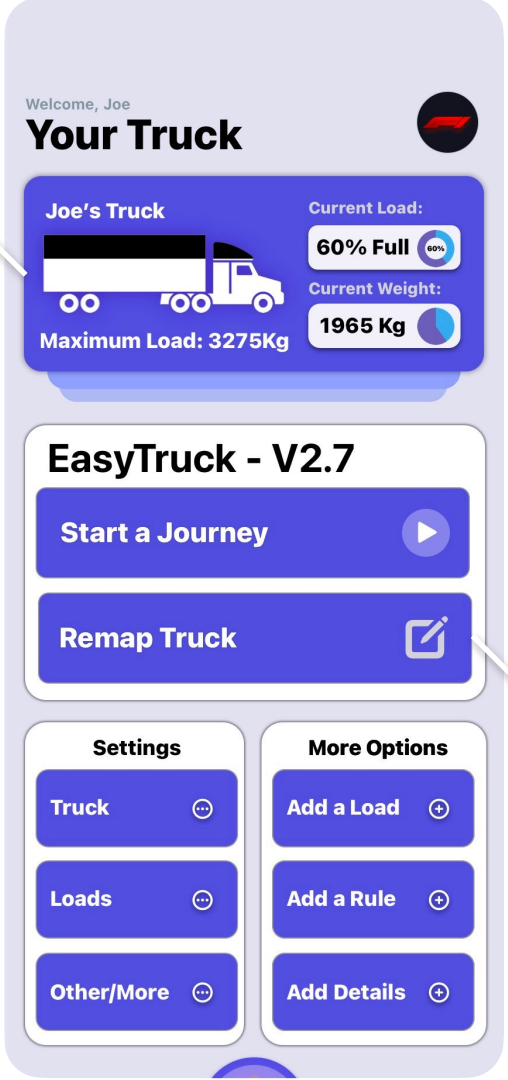
EasyTruck

The app will be able to

- Show the optimal arrangement of cargo
- Start a journey, and show the map
- Notify truckers of construction areas
- Change settings

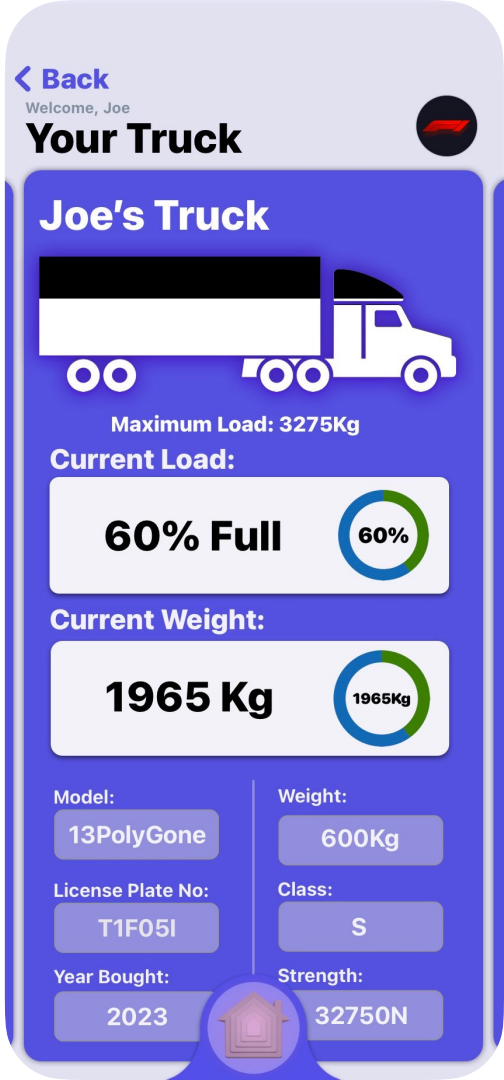
Home Page

Shows the main details of the truck and buttons to edit the loads and starting a journey



Truck Page

Shows a lot of details such as Model, Weight, License Plate, Class, Year Bought and Strength.



Truck Map

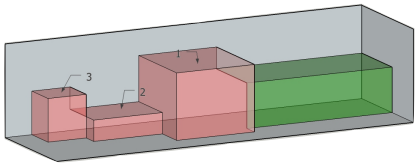
Shows the optimal area to move a load to, such as perfect fit, counterweight, and more

2

Welcome, Joe

Exit

Joe's Truck Map



Moving Load A: Perfect Fit

Next

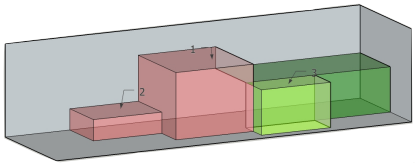
Highlights the moved load in bright green, the next load to move changes in colour

Truck Map

Welcome, Joe

Exit

Joe's Truck Map



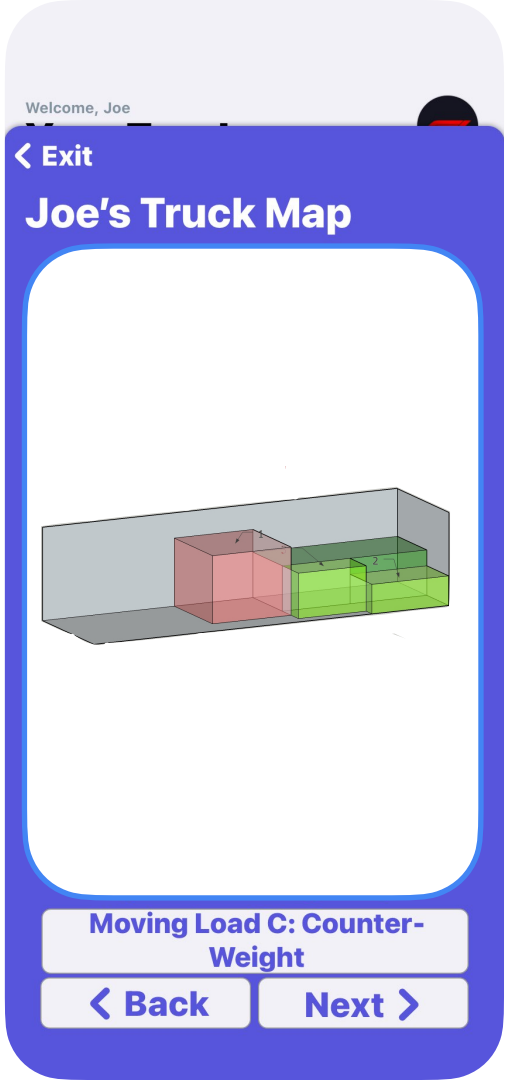
Moving Load B: Stability

Back

Next

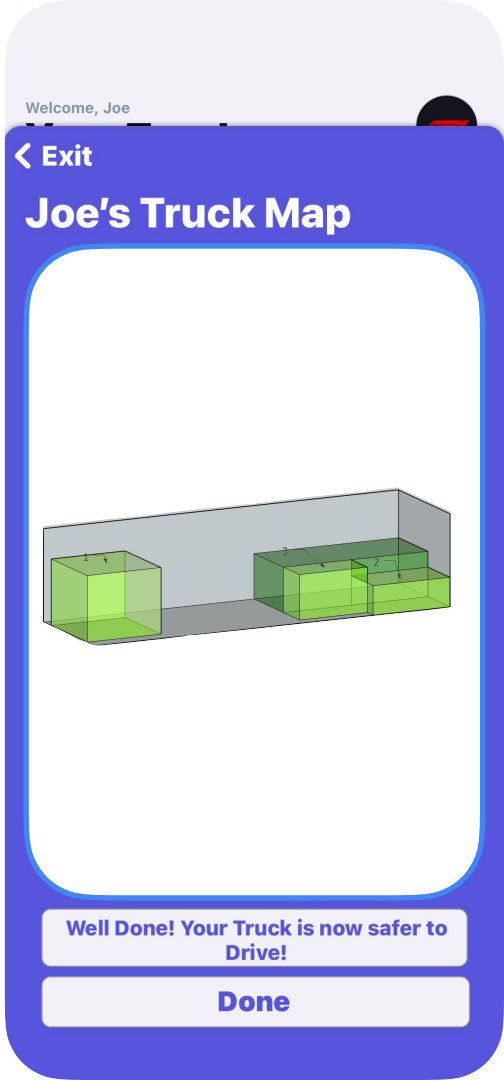
Truck Map

Each load is also in a movability index. The order depends on which load you can move first without needing to move others



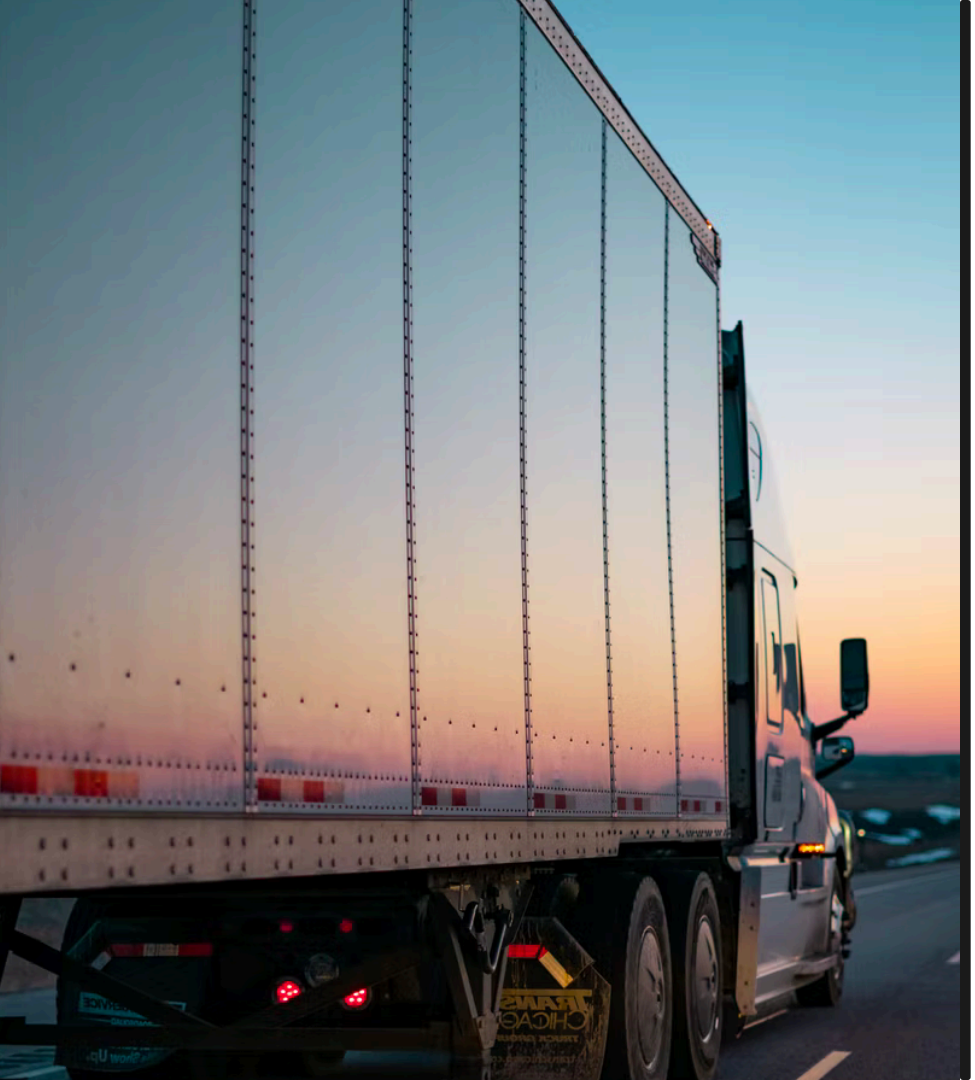
Once all are done, it shows “Well Done! Your truck is now safer to Drive!”

Truck Map



The Innovation model

A lego model that represents a truck



The Impact

- Our app will reduce accident rates and prevent crashes and
    - This will reduce the amount of interruptions in supply chains and allow cargo to reach destinations safely and more e iciently

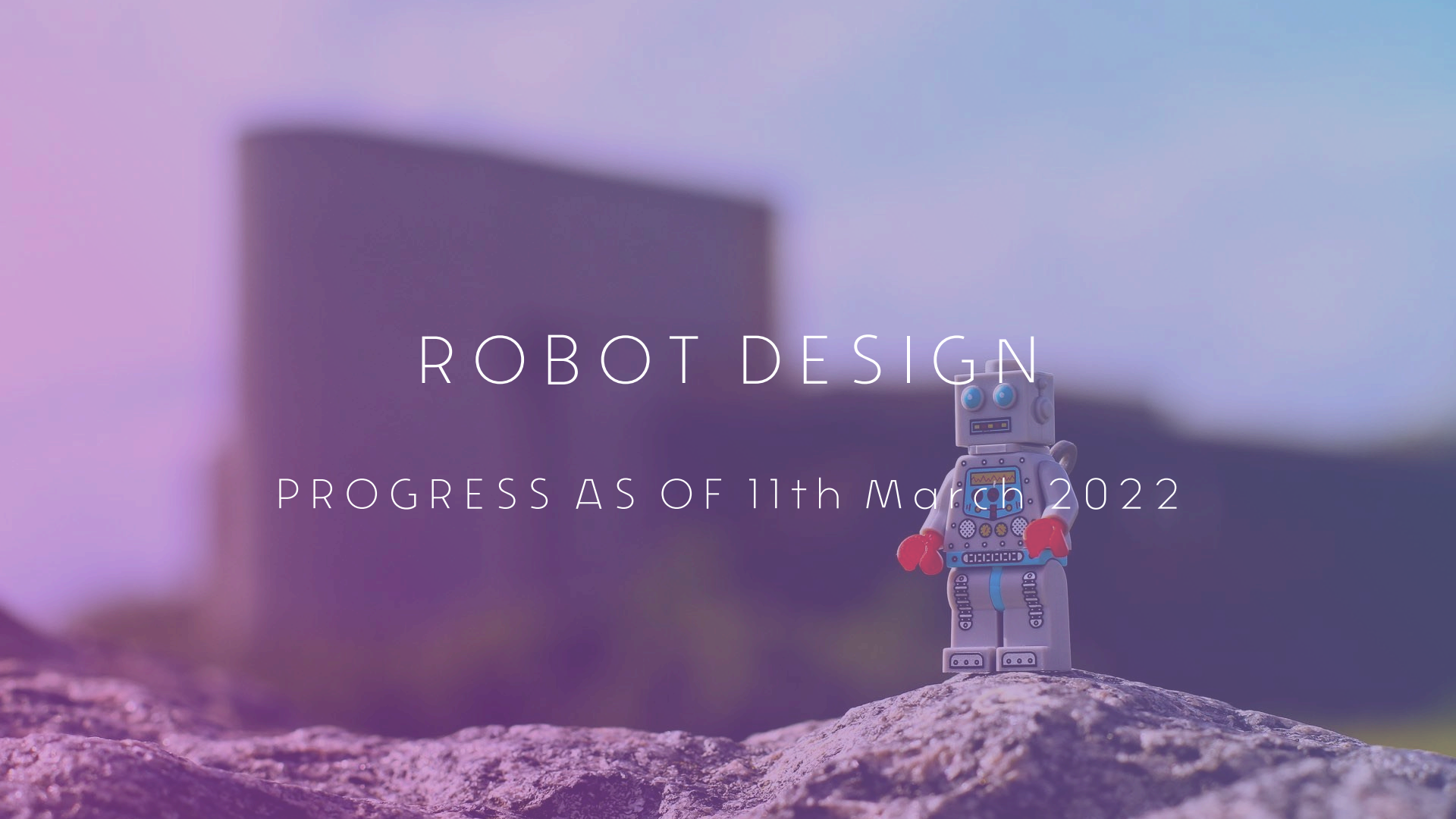

Welcome, Joe
Your Truck
Joe's Truck
Current Load:
60% Full
Current Weight:
1965 Kg
Maximum Load: 3275Kg
EasyTruck - V2.7
Start a Journey
Remap Truck
Settings
Truck
Loads
Other/More
More Options
Add a Load
Add a Rule
Add Details
Back
Welcome, Joe
Your Truck
Joe's Truck
Maximum Load: 3275Kg
Current Load:
60% Full
60%
Current Weight:
1965 Kg
1965Kg
Model:
13PolyGone
Weight:
600Kg
License Plate No:
T1F05I
Class:
S
Year Bought:
2023
Strength:
32750N

EasyTruck

A Truck Managing App

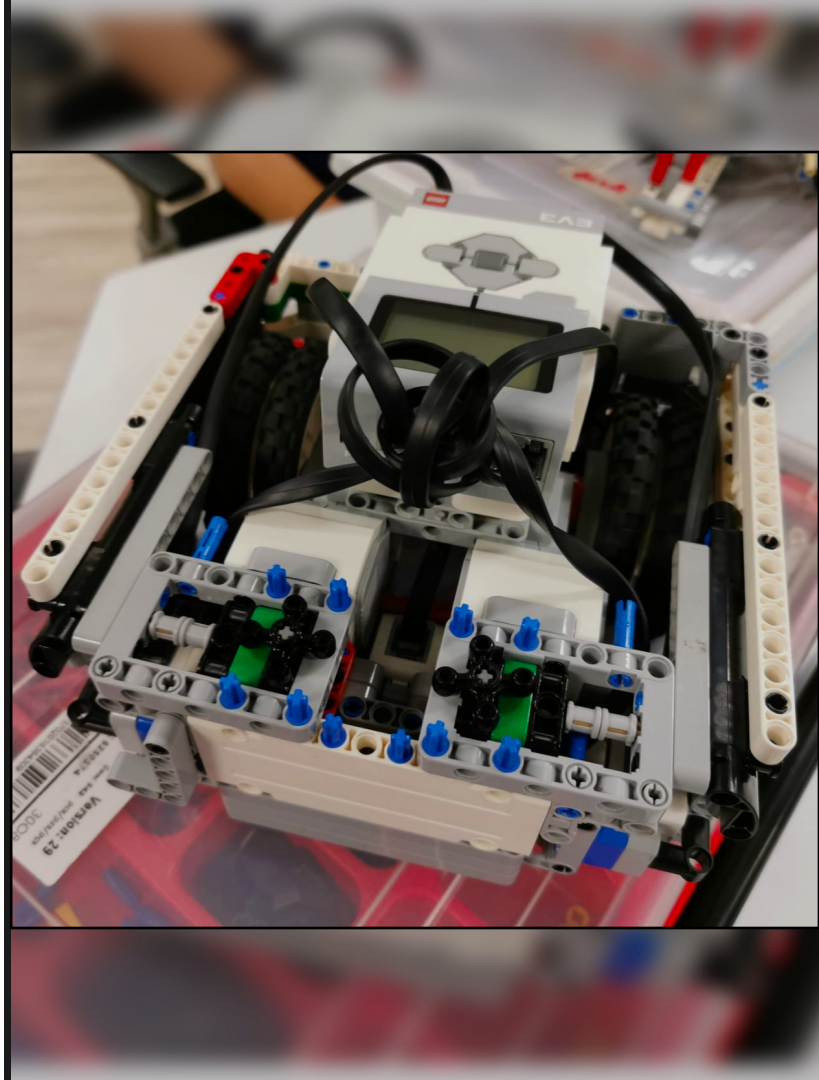
ROBOT DESIGN

PROGRESS AS OF 11th March 2022



PAST EXPERIENCE

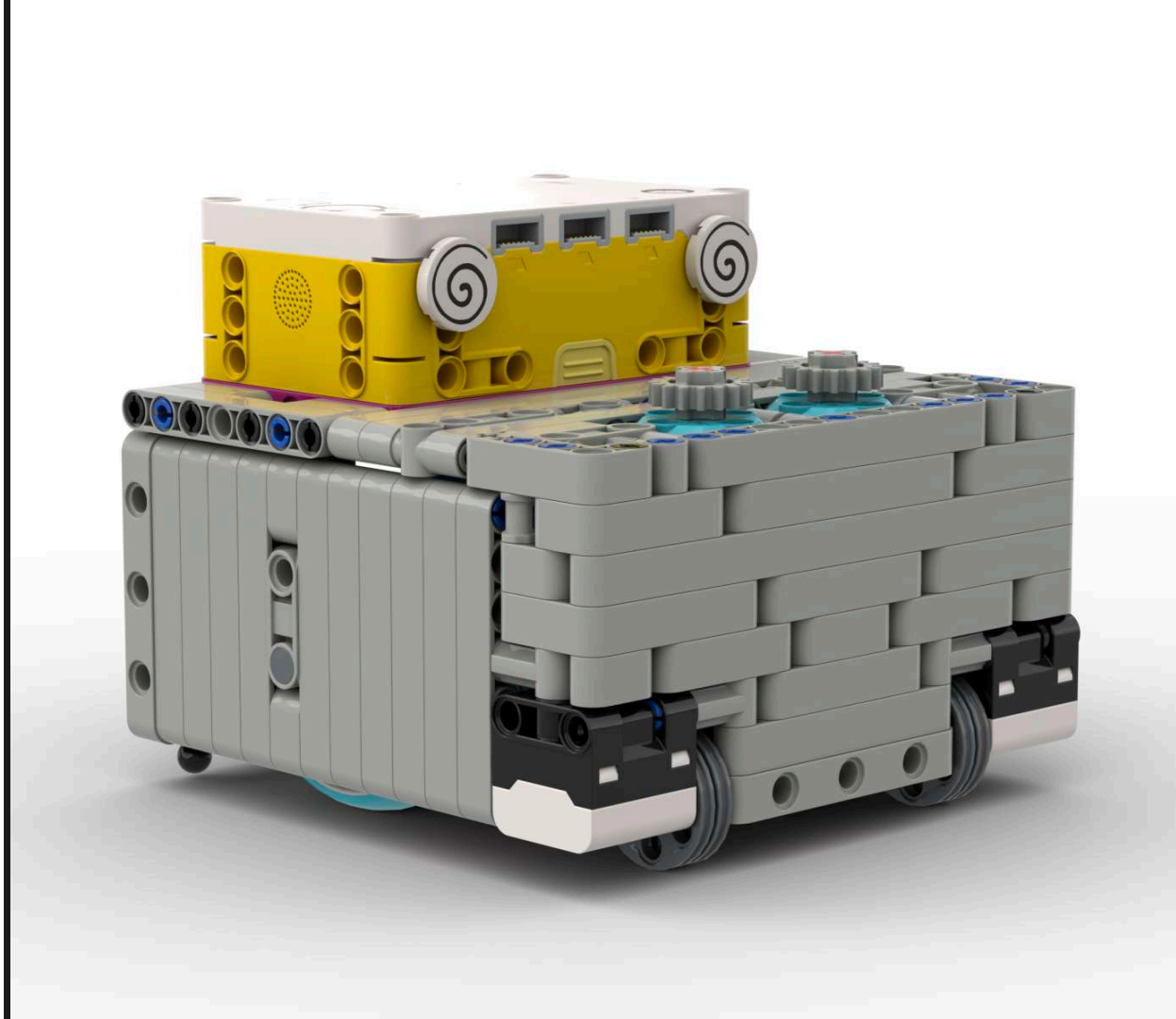
Our robot needs to
Be **reliable / accurate**
Be **small**
Be **modular**
Have a balanced **centre of gravity**



THE ROBOT

Our robot consists of three parts
- the body
- the brain
- the outer shell

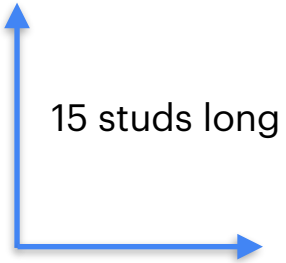
We used 3D modelling tools such as **Studio** and **blender** to render out our robot before building it.



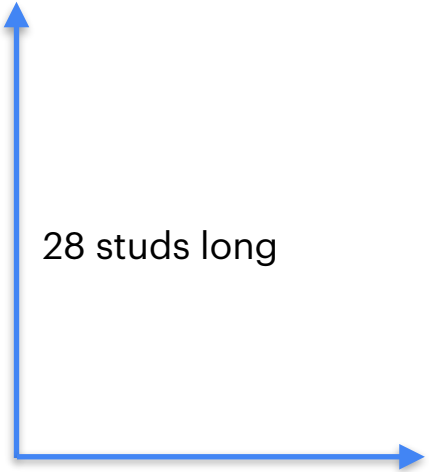
THE SIZE

Compared to our previous robot, it was tiny yet more accurate in terms of programming (as it is SPIKE)

NEW



OLD

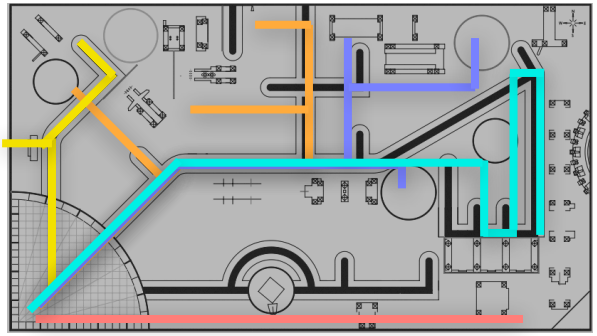


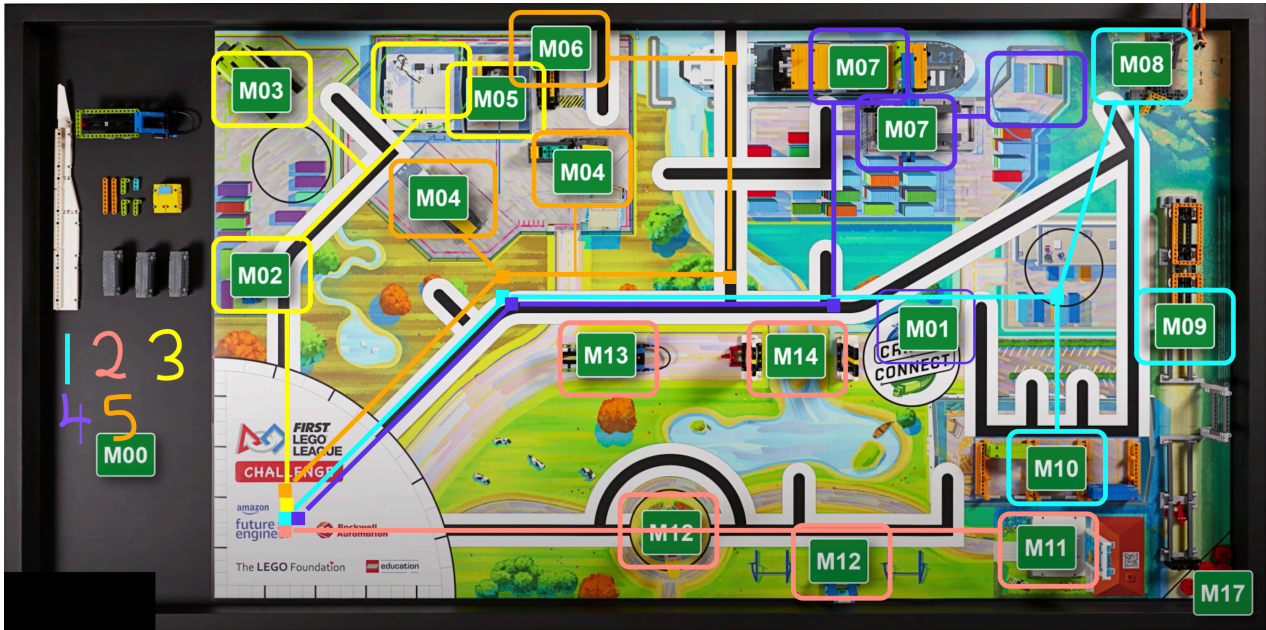
MISSIONS

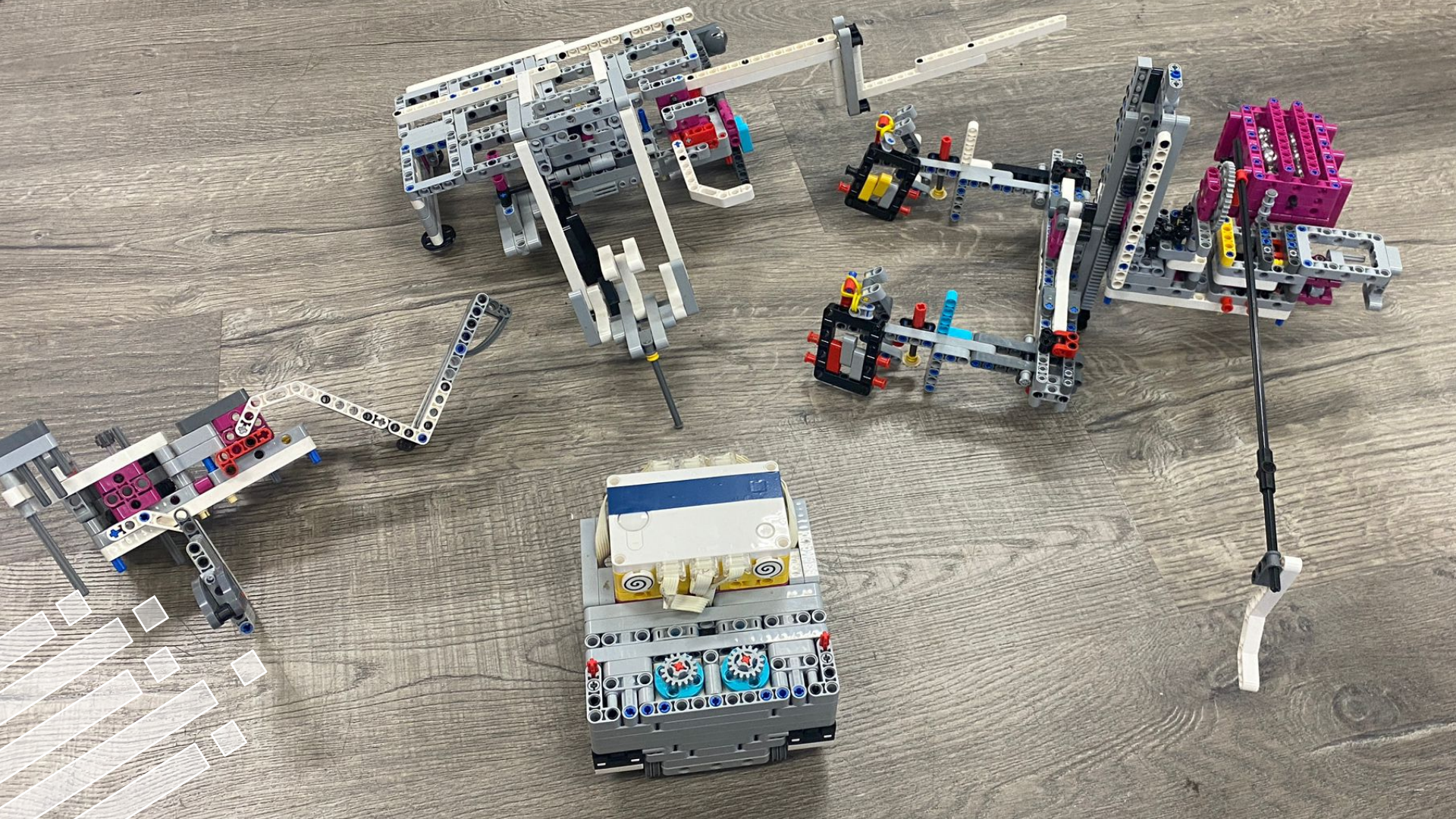
PROGRESS AS OF 11th March 2022

THE ORDER OF MISSIONS

1. M13 -> M12 -> M14 -> M11
2. M10 -> M08 -> M09
3. M01 -> M07
4. M02 -> M03 -> M05
5. M04 -> M06

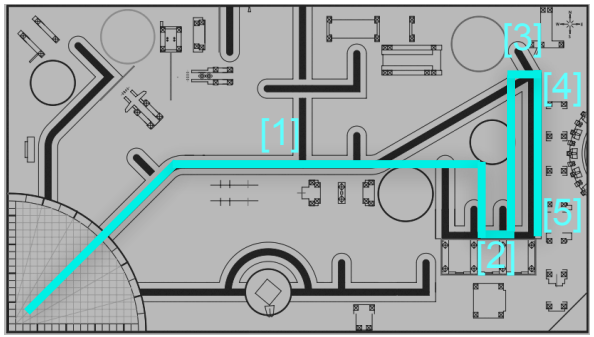


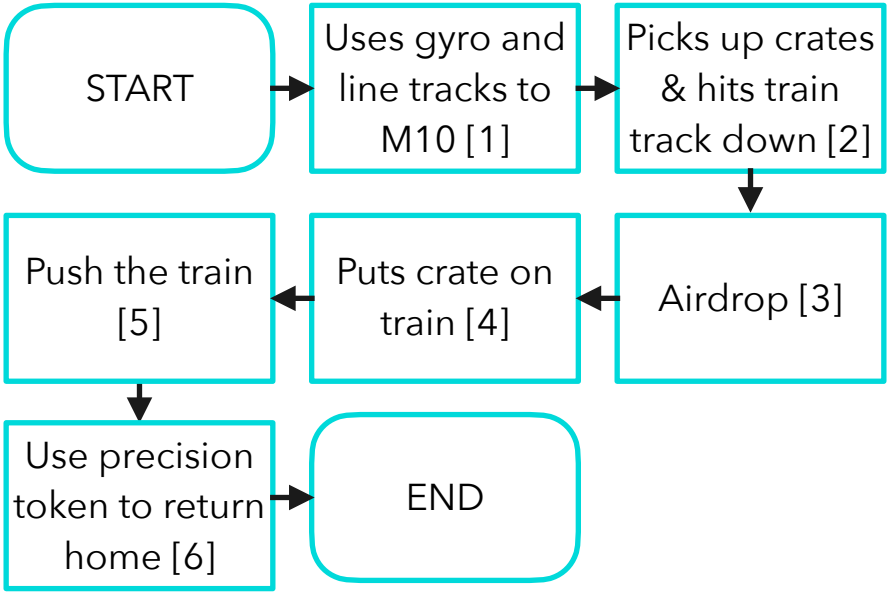




THE MISSIONS : RUN 1

- M10 -> M08 -> M09
- Uses Gyro & PDTrack
- Sacrifice precision token



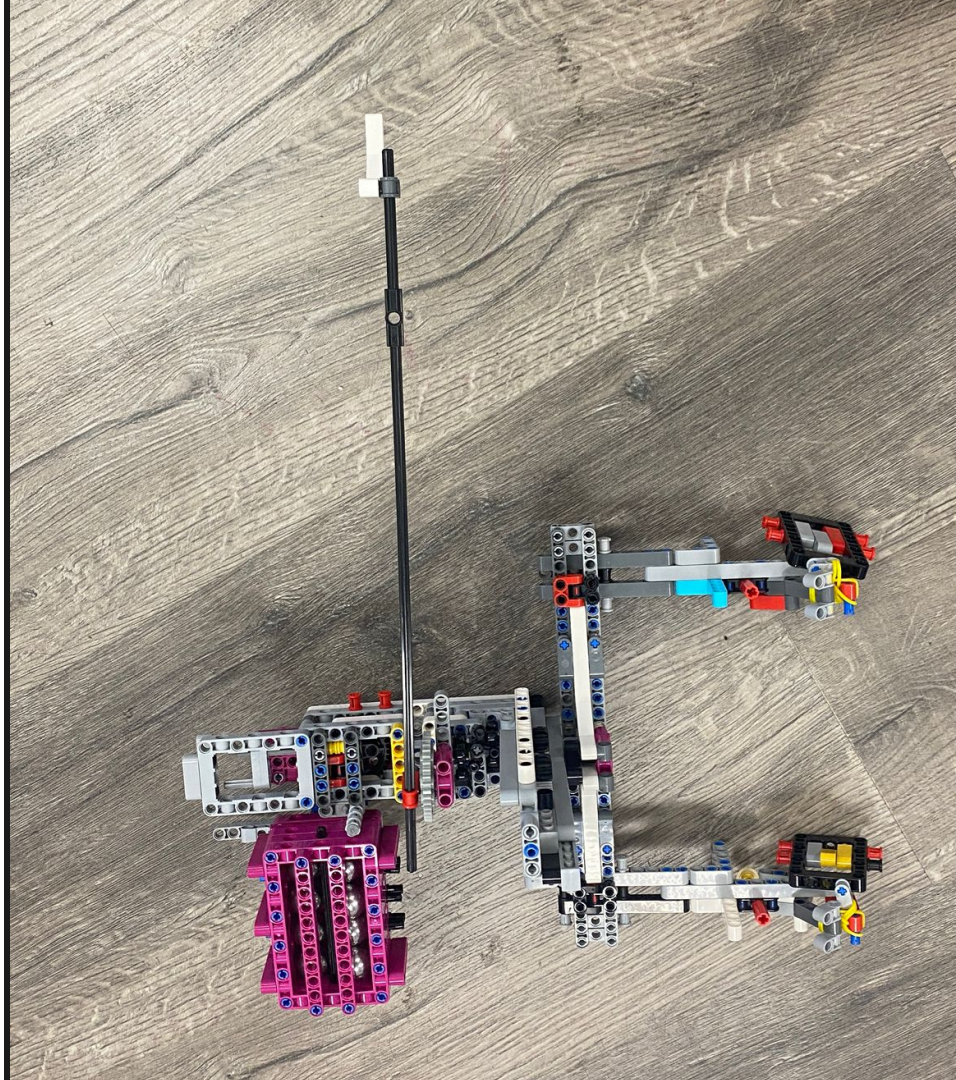


M 8,9,10

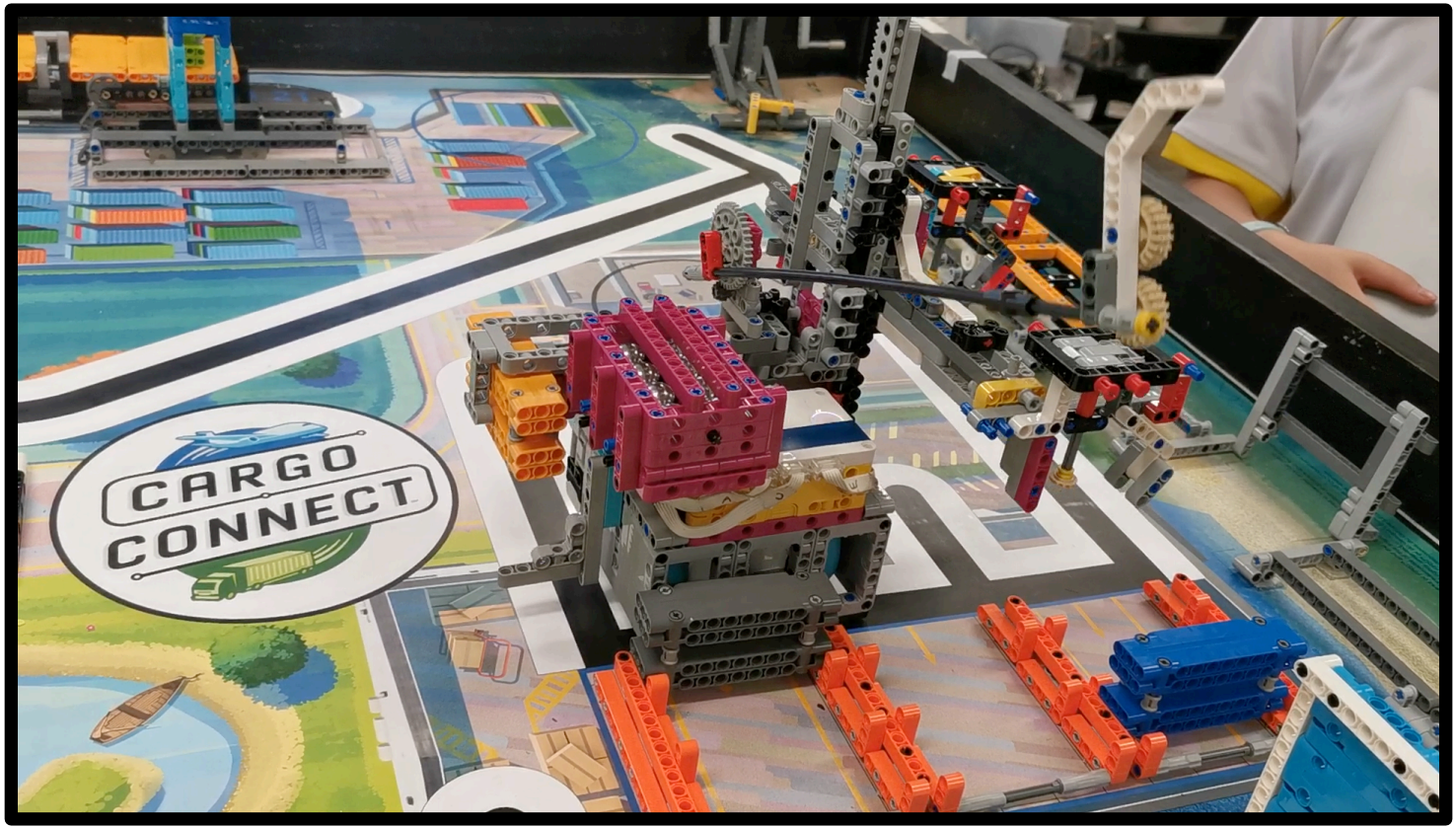
Picks up the containers at the mission 10, closes the railway track, drops the yellow package and pushes the train to the end of the rail.

Attachment Stats:

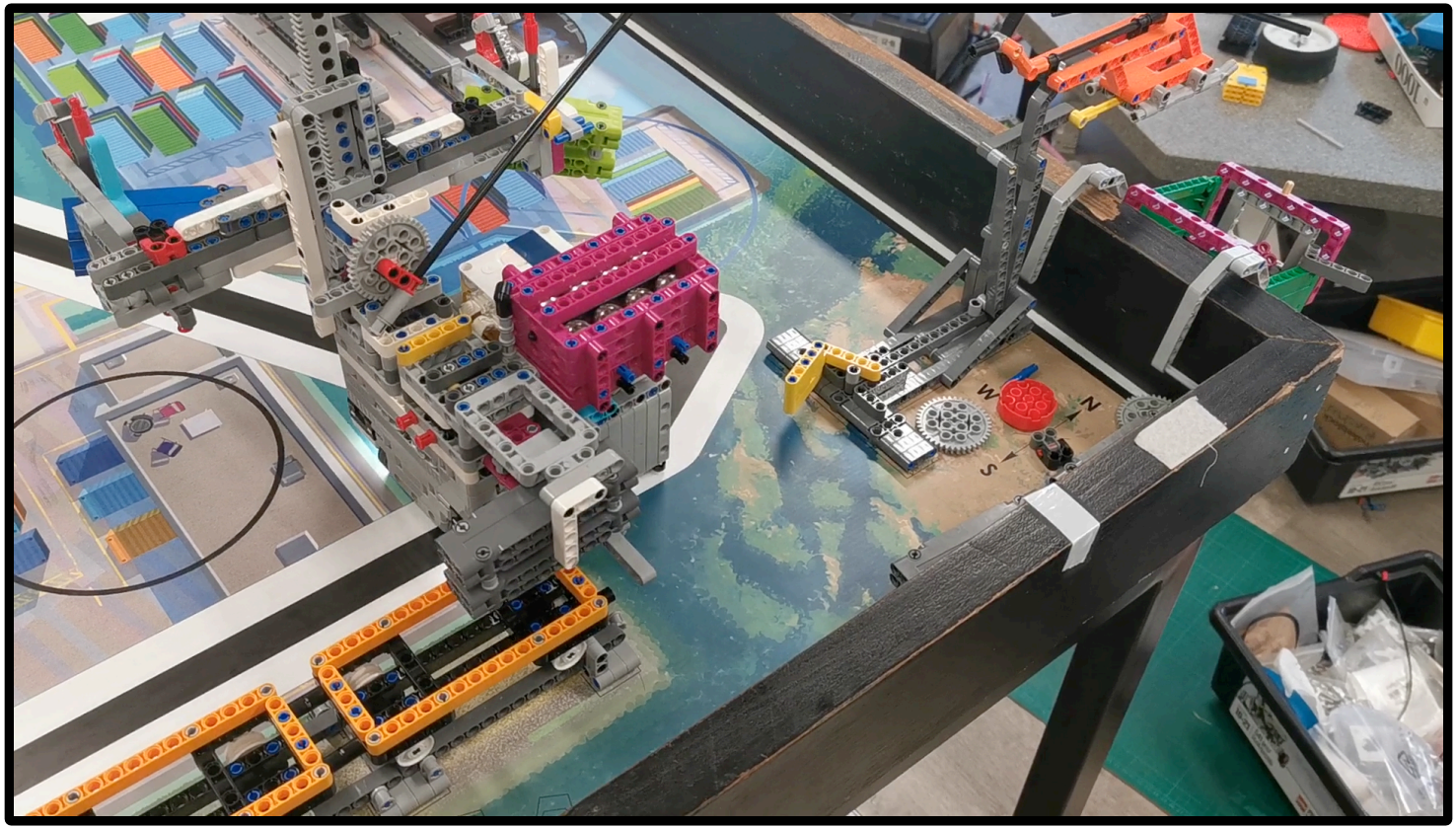
Version/Iteration #: 3



THE DEMO

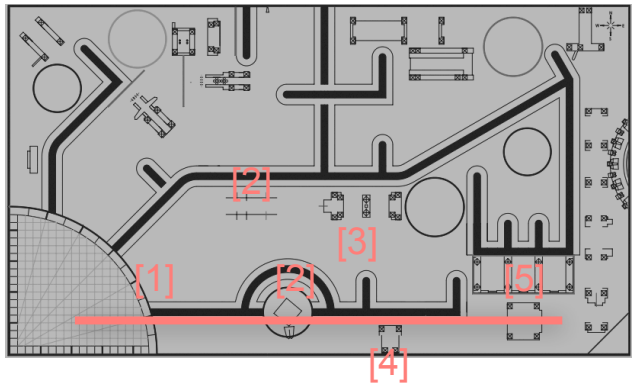


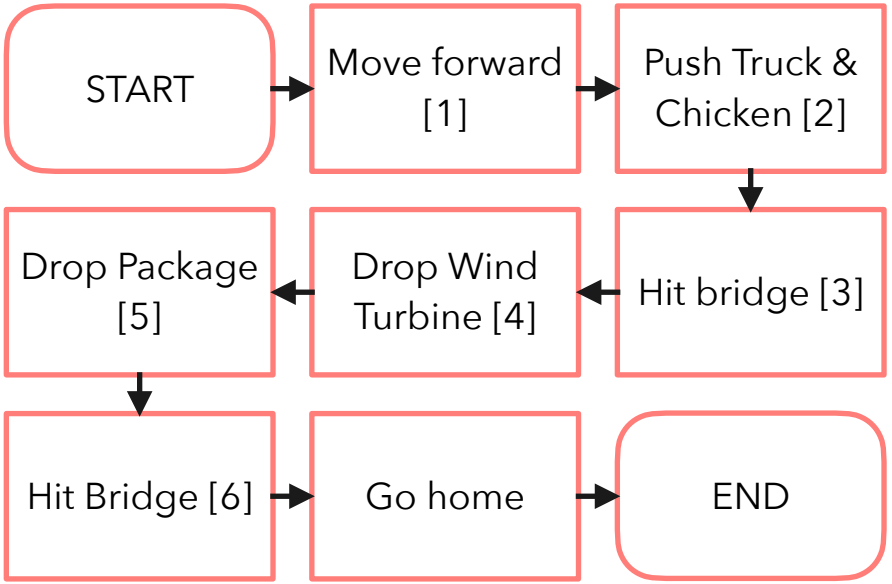
THE DEMO



THE MISSIONS : RUN 2

- M13 -> M12 -> M14 -> M11
- Uses Basic Movement



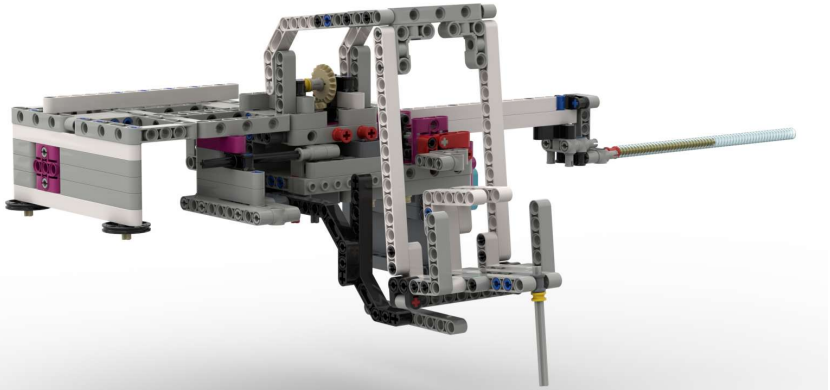


THE BIRD-CAGE

This attachment has four purposes:
- Trapping the chicken
- Dropping the turbine blade into the stand
- Dropping off the package at the doorstep
- Positioning the first platooning truck

Attachment Stats:

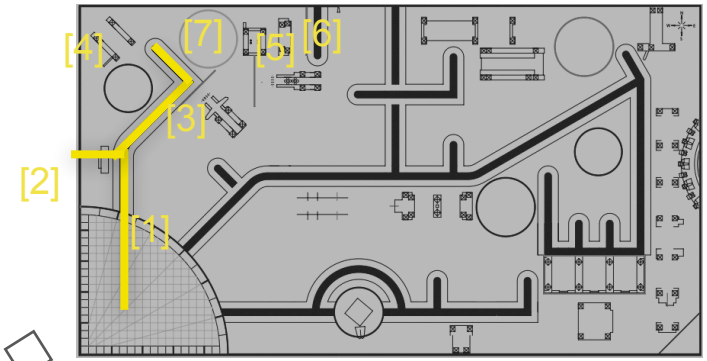
Version/Iteration #: 3

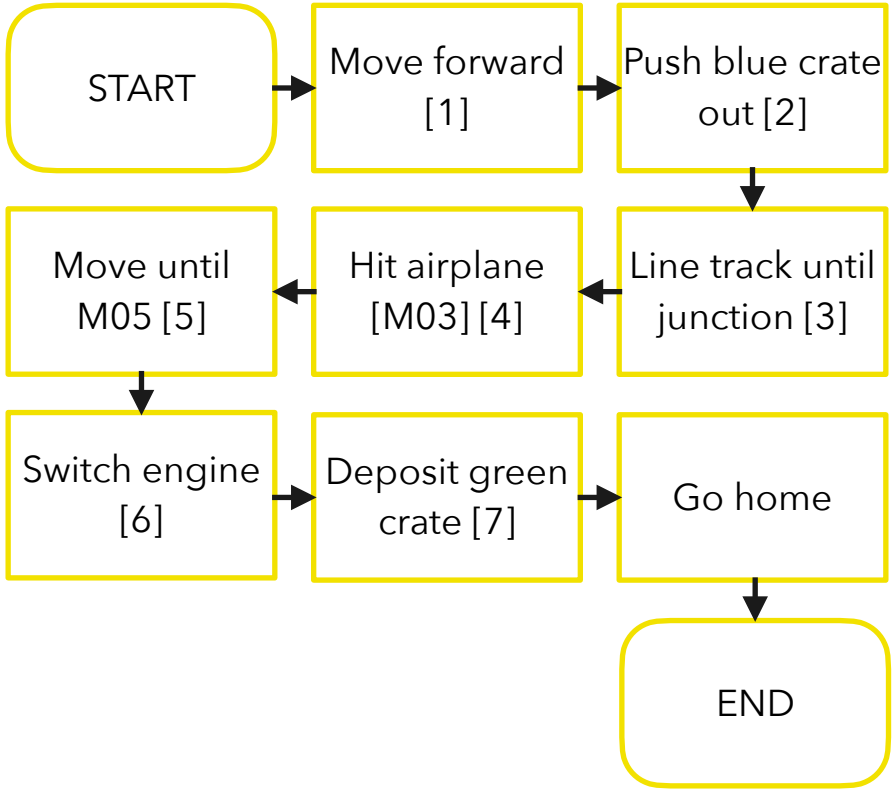


THE DEMO

THE MISSIONS : RUN 3

- M02 -> M03 -> M05
- Uses PDTrack





M 2,3,5

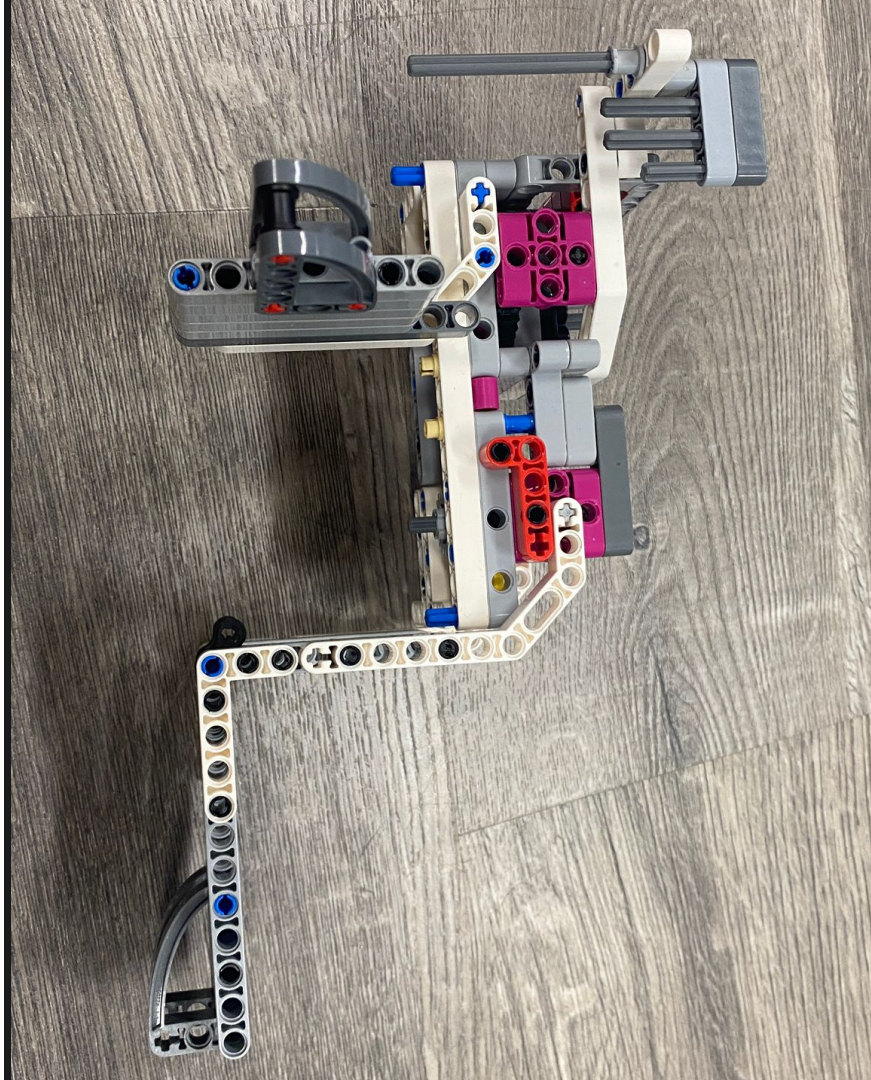
The finalized version, complete with a dropping mechanism and hitting arm.

Attachment Stats:

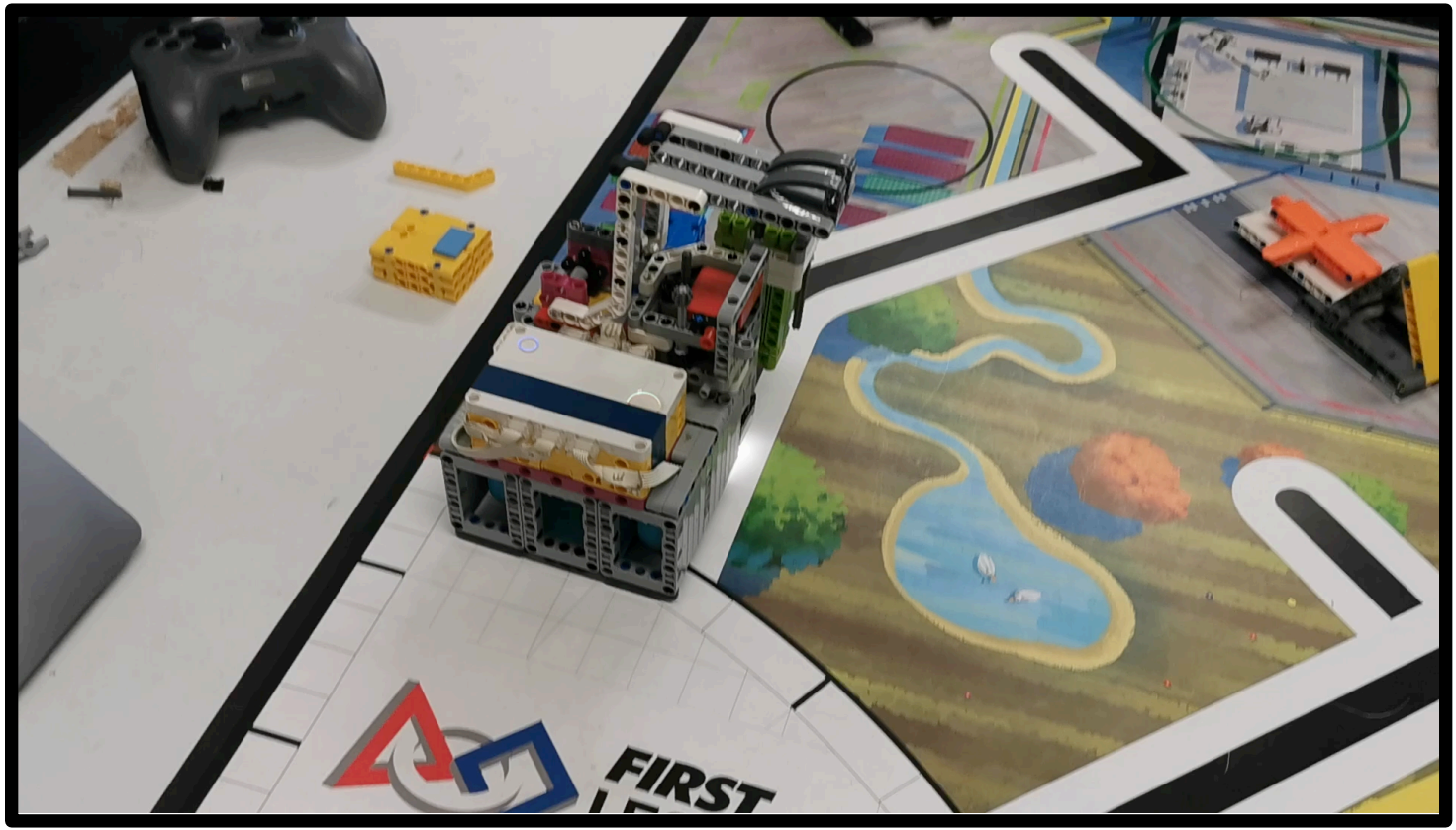
Version/Iteration #: 3

Built by - Yanzhao :D

Old Version

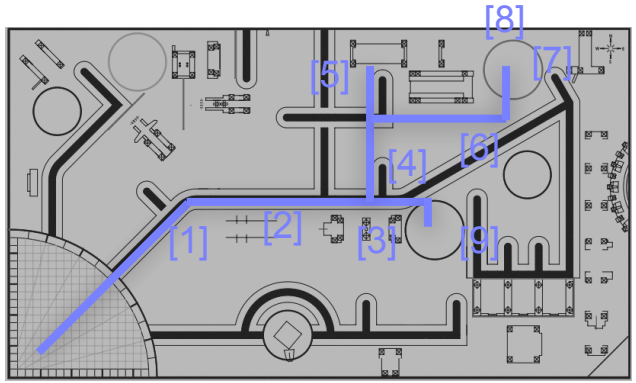


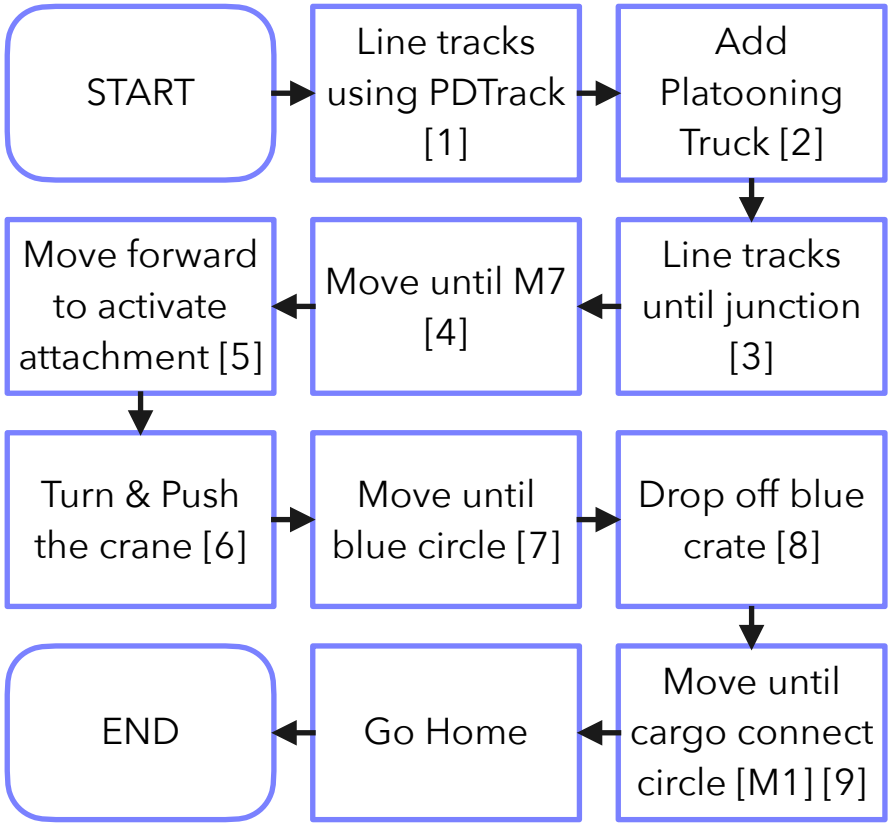
THE DEMO



THE MISSIONS : RUN 4

- M01 -> M07
- Uses Gyro & PDTrack



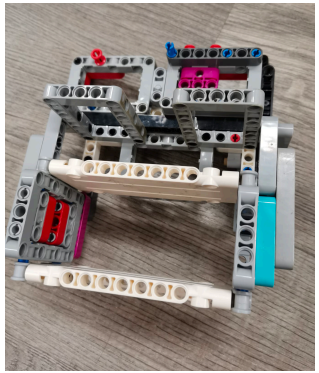


M1,7

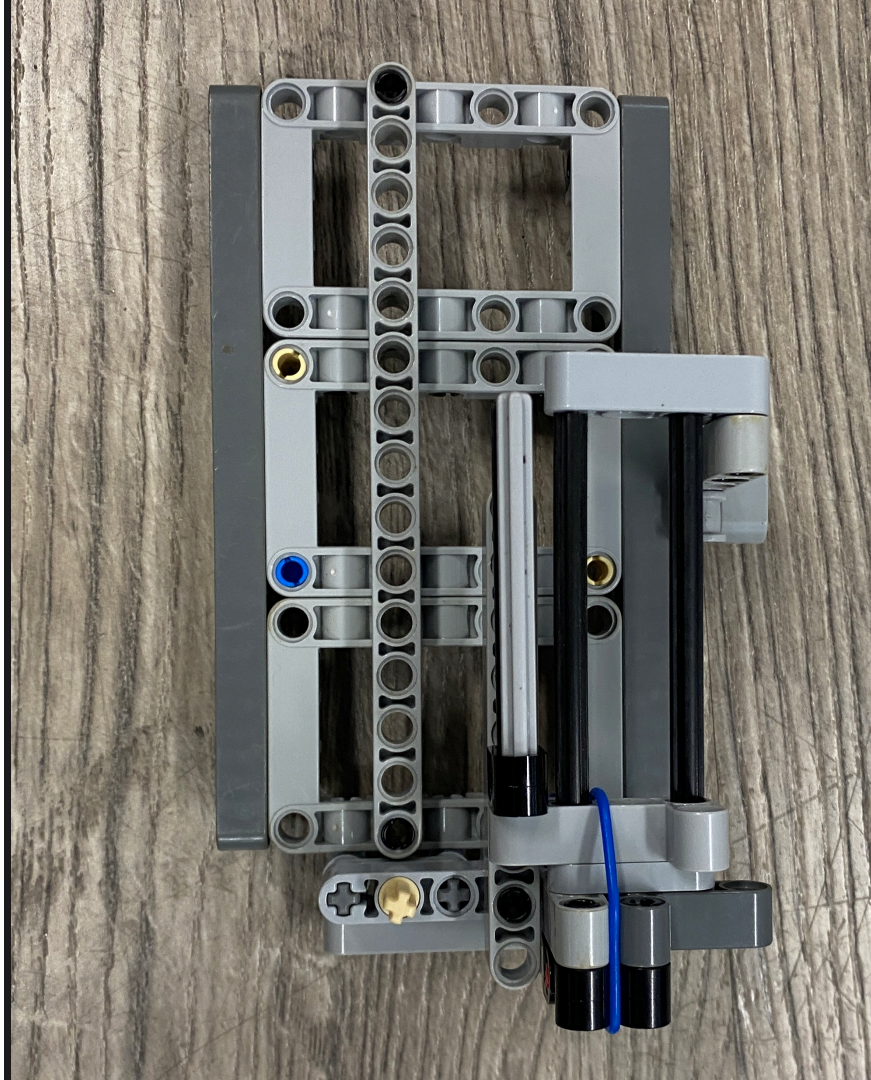
This is an analogue attachment, which is used to deposit the crates at mission 7. It does not use any motors

Attachment Stats:

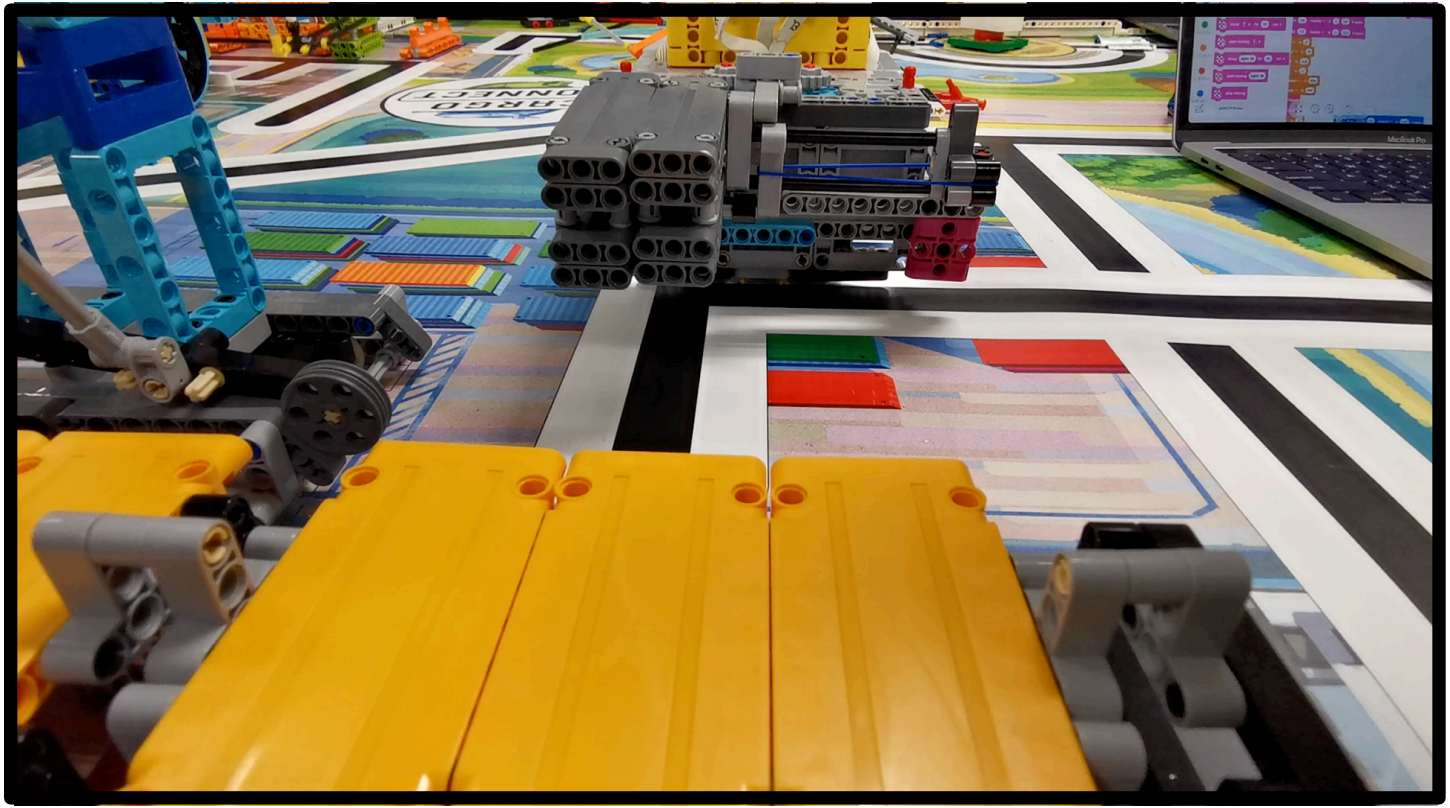
Version/Iteration #: 2



Old Version

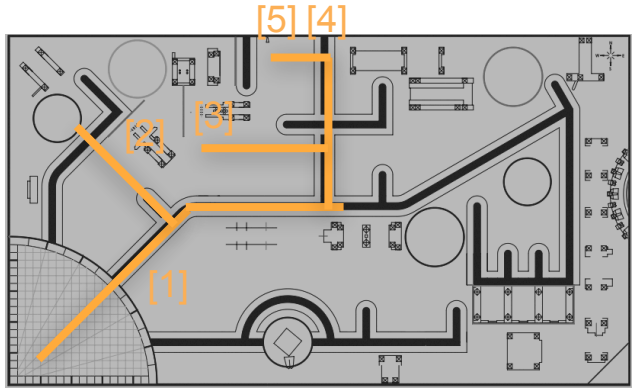


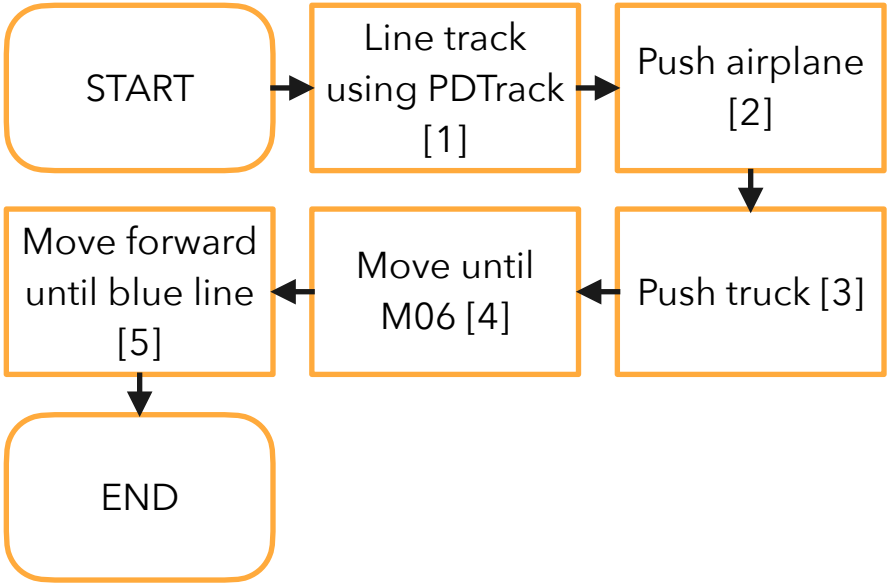
THE DEMO



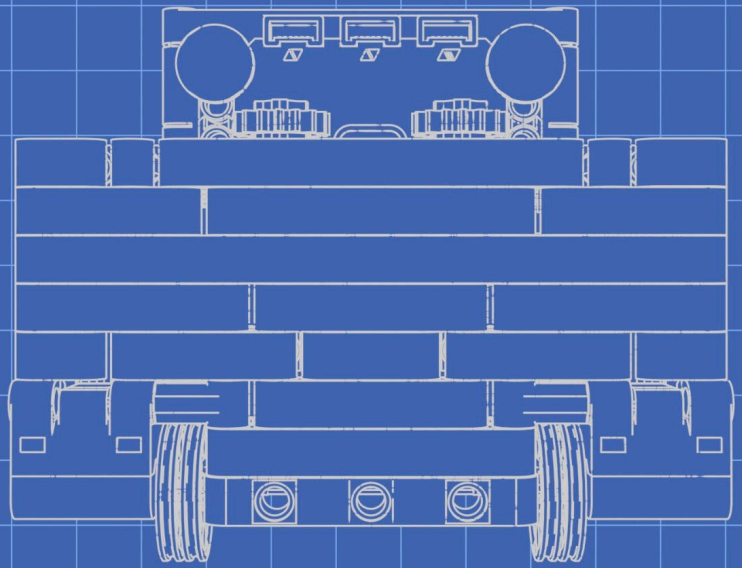
THE MISSIONS : RUN 5

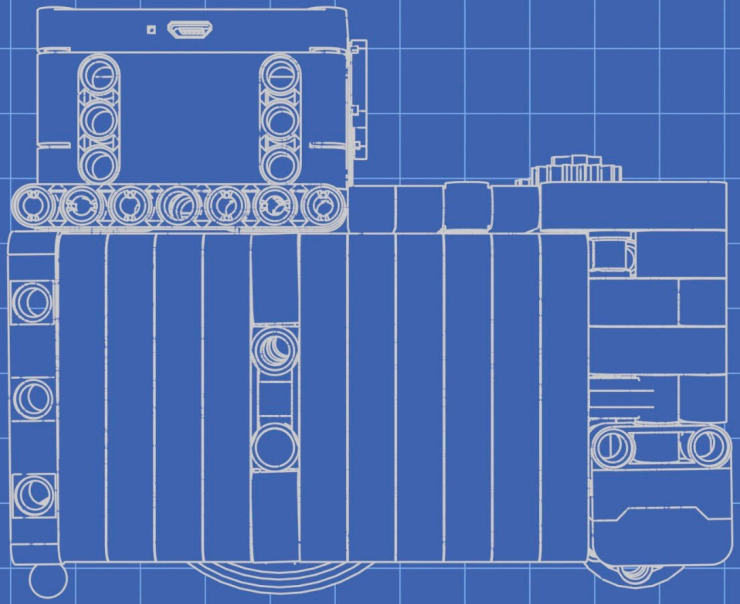
- M04 -> M06
- Uses PDTrack





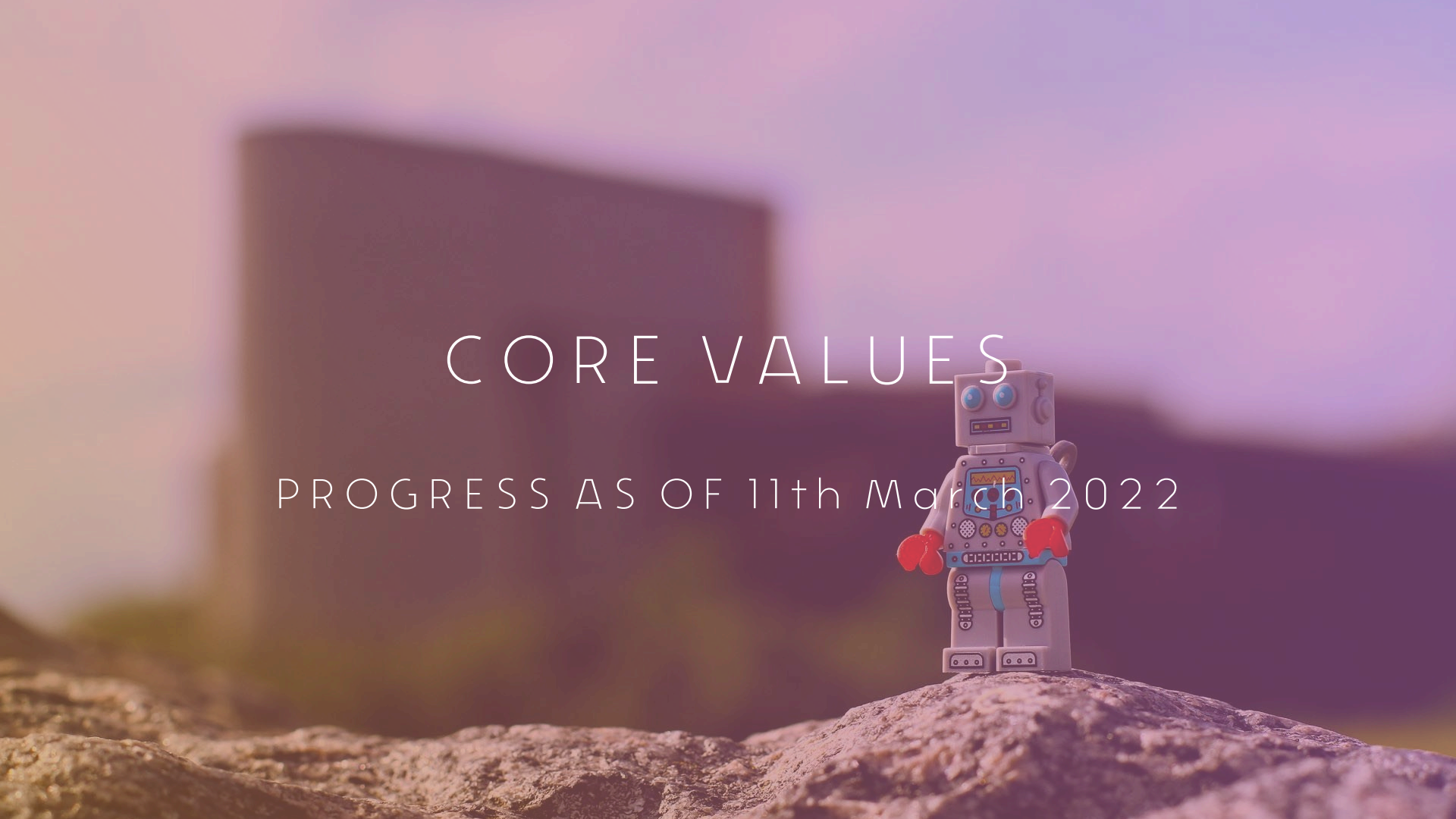
Any Questions?





CORE VALUES

PROGRESS AS OF 11th March 2022



OUR CORE-VALUES

ACCOMODATING

STRATEGY

COOPERATION

STANDARDIZATION

LEARNING

INFLUENCE

GRATIFICATION

INVOLVEMENT

ACCOMODATING

- Having a spirit of **competing yet helping others** is a virtue that we learned in FLL.
- Make sure each group member is **accountable** for their own work.
- We **discussed** different innovation projects and give tips to each other.

Kazu helping another group :D

STRATEGY

We assigned roles that matched our skill sets

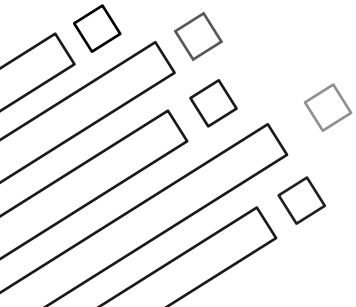
- **Yanzhao** was the all-rounder of our group who helped in all aspects.
- **Shrinithi** spearheaded the innovation project.
- **Lovette** was the main programmer of our group.
- **Kazu** built most of the attachments and managed the slides.

COORPERATION

- We **enjoyed working together** while programming and building attachments of the robot.
- Even though it did not work sometimes and we have disagreements, we **persevered** and would find a way to solve the problem.

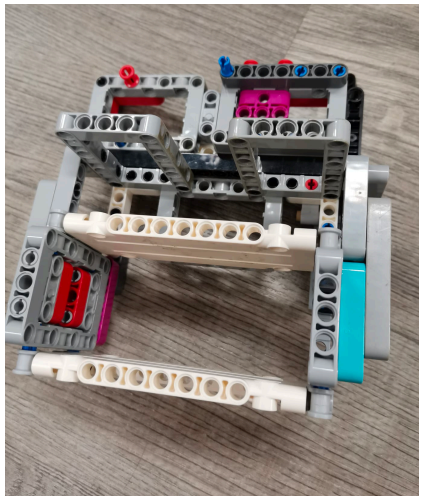
STANDARDIZATION

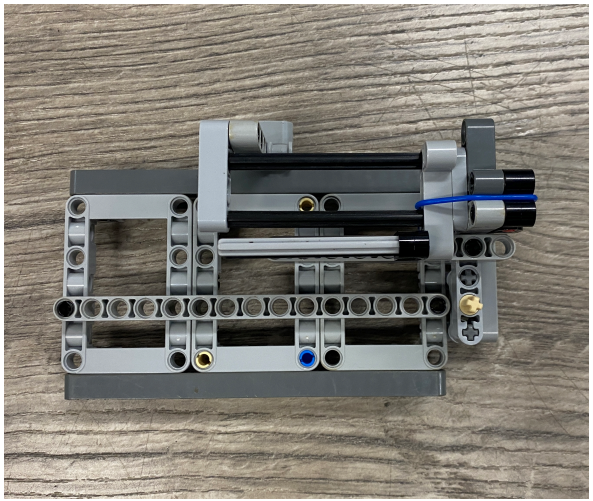
- **Standardized** latching system
  - Prevents the attachment from detaching
  - Easy base (to start building with)
  - Fast deployment
  - Minimize stress



LEARNING

- We did **multiple** prototypes (A lot) of our attachments.
- We learned how to use PDtrack as well as the built in gyro to make our robot movements **smoother** and **accurate**



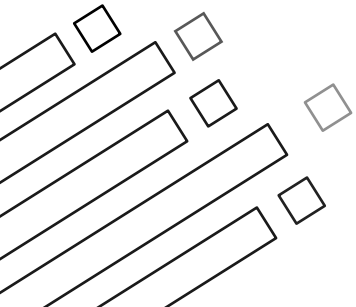


INFLUENCE

- FLL has taught us many lessons:
  - **Teamwork** - Putting our differences aside to work together as a team.
  - **Creativity** - Thinking out of the box, exploring new possibilities.
  - **Discussion** - Giving a listening ear, and being a positive speaker.

GRATIFICATION

- We learnt how to **enjoy the process**, and not just aim for points
- Only by having a **passion** can we do things to the best of our abilities.
- We **celebrated** our successes
- We **encouraged** each other



INVOLVEMENT

- Everyone in our group made **important** contributions to our team.
- **Maintaining order** was one of the main factors that allowed progress to be made.
- We assigned roles that **matched our skill sets**.


THANK YOU FOR LISTENING
- POLY GONE -