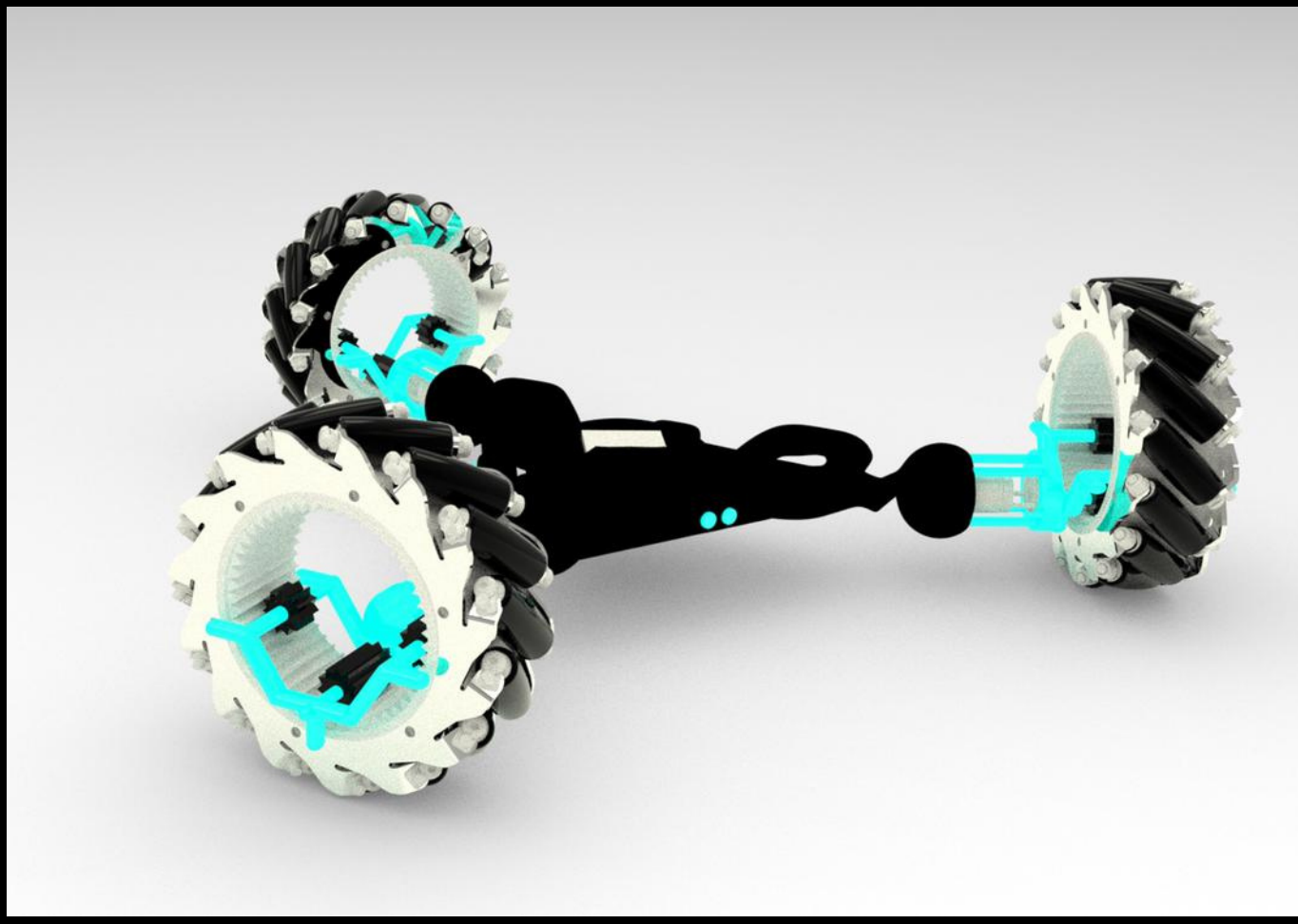
TRINI

ISDN 2400 PHYSICAL PROTOTYPING



LOG BOOK

SAMMI HO & KELLY LAI

TRINI

Three Omni wheel Arduino car

With only three motors, instead of replacing by any mechanism that can drive four wheels with the same setting, we aim to work beyond our belief - Cars are not only with two or four wheels, but also with three wheels. More importantly, they can work with each other smoothly.

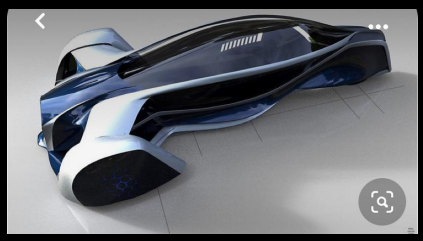
To retain the function of a car, having four directions of movement, specialised wheels are designed, named omni wheel. With only three wheels, this contraption is named Trini.

CONTENT

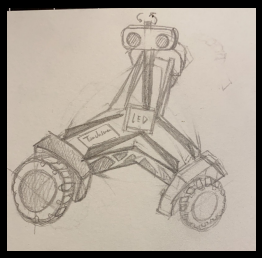
PLANINNG

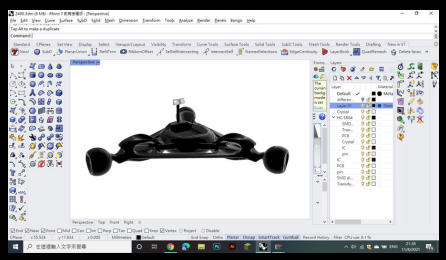
4/9 - 4/11 : RESEARCH AND IDEATION

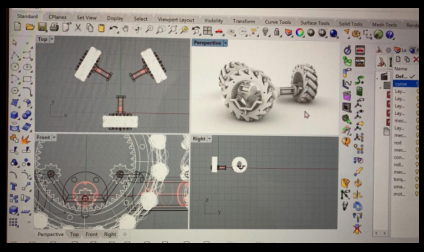
- Research on the type of wheels
- Research on model's cover design
- Working out Sketch and CAD prototypes
- Ideation of LED light function



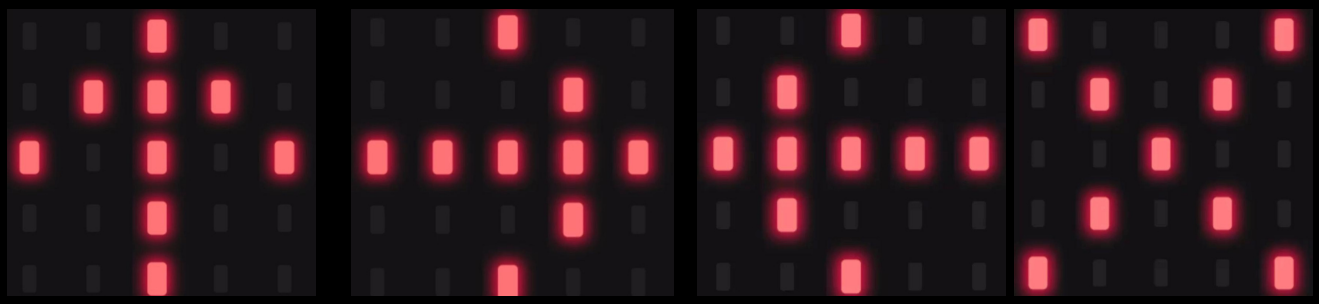
RESEARCH ON CAR'S COVER DESIGN







SKETCH AND 3D MODEL DESIGN

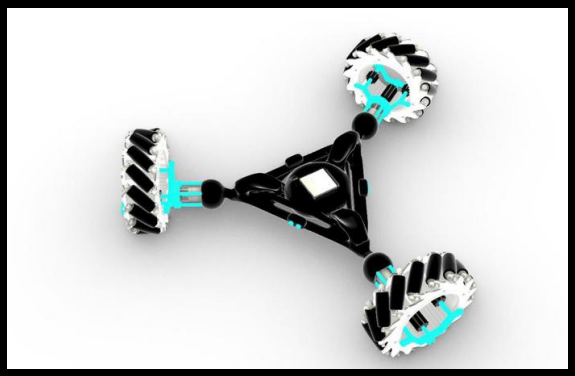


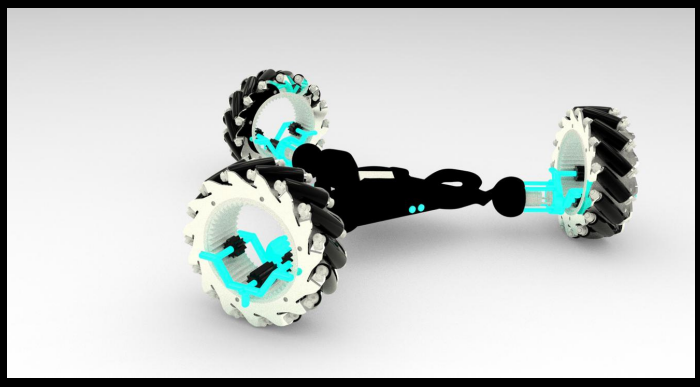
LED LIGHT FUNCTION

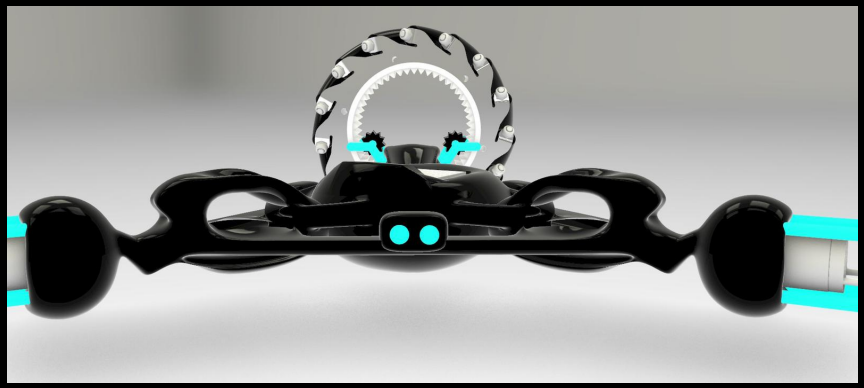
PROGRESS

4/12 : FINAL PROJECT PROPOSAL PRESENTATION

- Finished model rendering
- Presentation of wheel details and components
- Planning on the car design



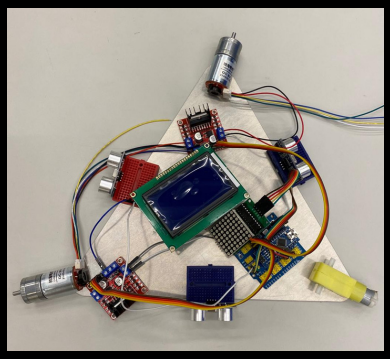


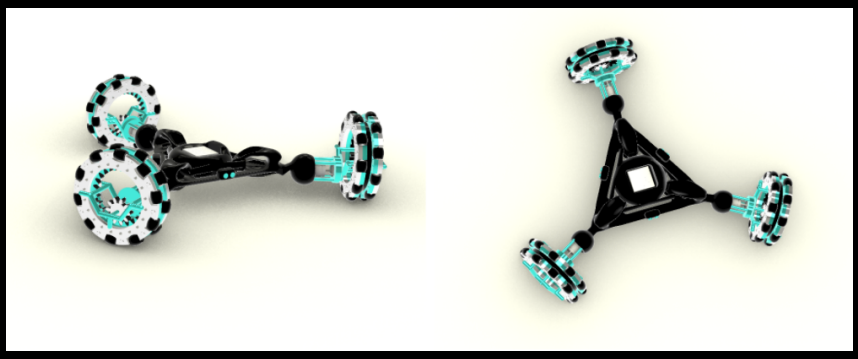


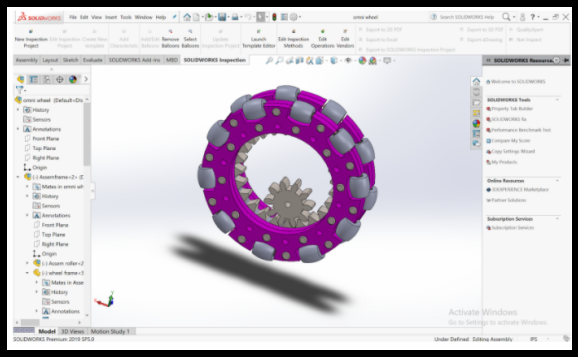
4/13-4/26 : MID-TERM PRESENTATION

- Changed wheel design from mecanum to Omni (Technical Restrictions)
- Bought Arduino components that are stated in the proposal
- Actual omni wheel reference
- Modified model body
- Arduino components positions
- LED coding

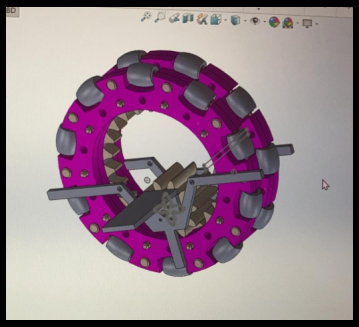
https://youtu.be/aUYUx8_UUho







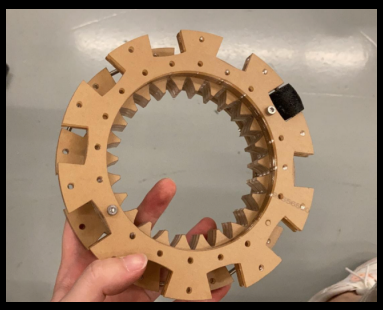
4/26 : COMPLETED WHEEL CONNECTOR DESIGN (T-SHAPED STRUCTURE)



4/28 : A 3D PRINTED PROTOTYPE ON THE CAR COVER MODEL FOR TESTING

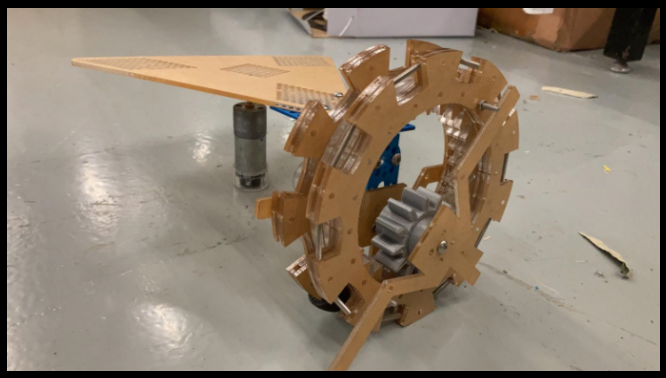
- Changed wheel design from mecanum to Omni (Technical Restrictions)
- Bought Arduino components that are stated in the proposal
- Actual Omni wheel reference
- Modified model body
- Arduino components positions
- LED coding

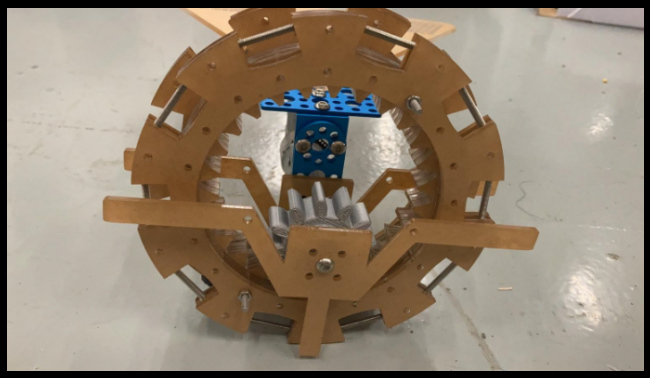
4/30 : TESTING WHEEL PROTOTYPE AND START PROTOTYPING T-SHAPED CONNECTORS

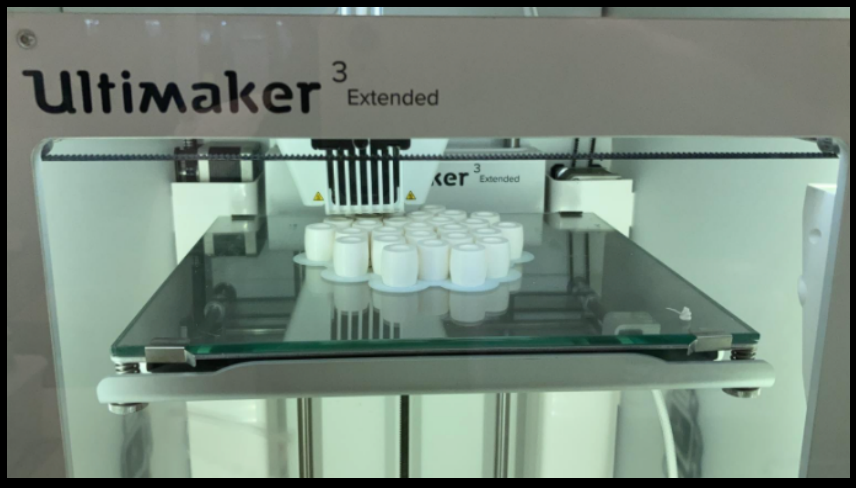


- *The pin going through each tire is made by cutting the screw head manually

https://youtu.be/O8zpaJlWM-Q





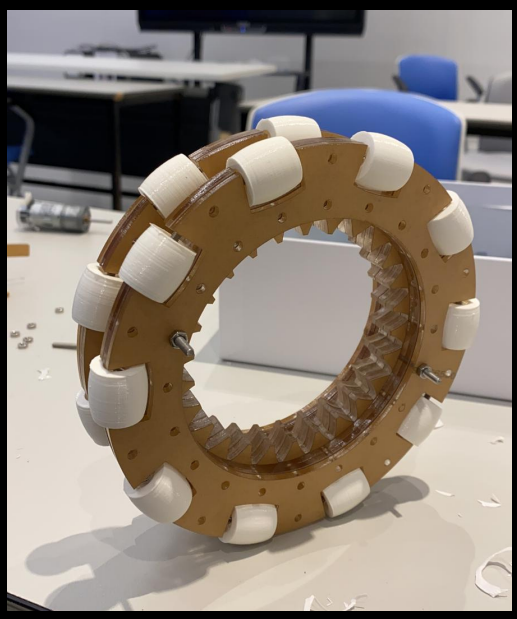


4/30 : TESTING WHEEL PROTOTYPE AND START PROTOTYPING T-SHAPED CONNECTORS

https://youtu.be/O8zpaJlWM-Q

- *The pin going through each tire is made by cutting the screw head manually

2/5 : CONTINUE ON WHEEL ASSEMBLY

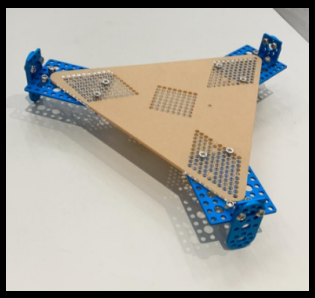


https://youtu.be/jbigGZYj18w

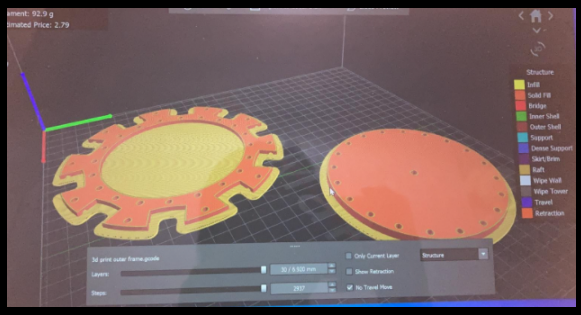
6/5 : WHEEL TESTING WITH 6V MOTOR

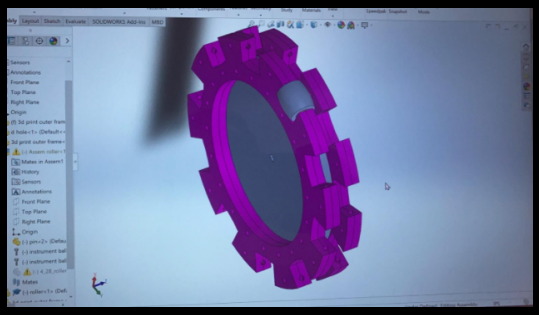
- Design of the centre of wheel is changed into D-shaped hole due to time restriction
- Weight of wheel is too heavy for the motor
- Rotation stop once I stop lifting
- Decided to add a directional wheel underneath
- Decided to print as 3D model to reduce the weight
- May consider using a stronger motor

https://youtu.be/EKbEvC51qt0



5/9 : WHEEL MODELS START TO PRINT

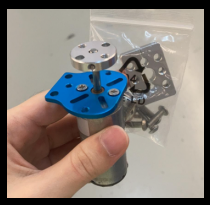




- https://youtu.be/jbigGZYj18w

10/5 : PROJECT TUTORIAL

- 12V motor is used
- Connectors between wheel and motor have been altered

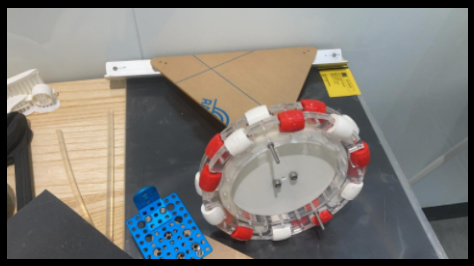


11/5 : PROGRAM WITH BLUETOOTH CONTROL

- Testing out with the program combining both the motor and LED systems
- Using the app named Arduino Car developed by ONE DAY OF CODE to control the movement of the car.

https://youtu.be/WxO2ikJ4ups
https://youtu.be/Bgv5sxg2Bfc

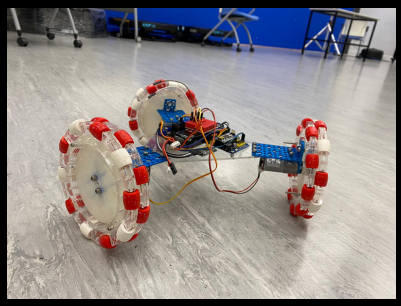
5/12 : WHEEL ASSEMBLY WITH LIGHTER STRUCTURES AND STRONGER MOTOR

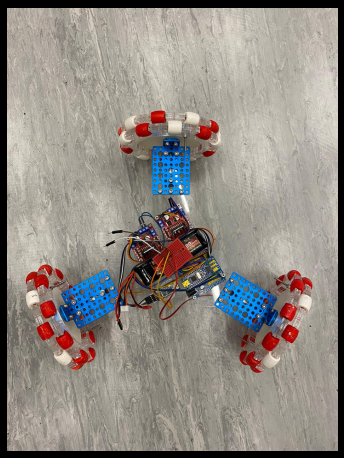


- *surface of rollers are coated with nail polish to increase the friction with ground

There are some cones printed as support and removed via finishing

14/5 - 15/5 MODEL GLUING AND ASSEMBLING



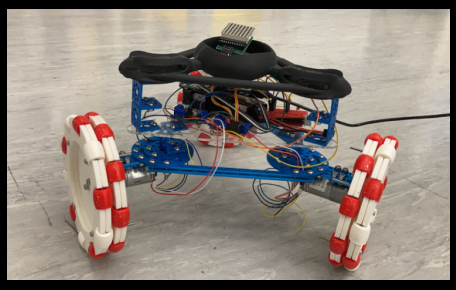


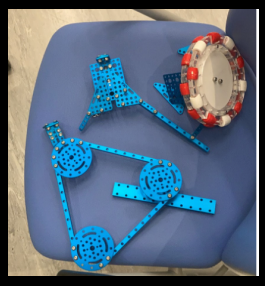
There are some cones printed as support and removed via finishing

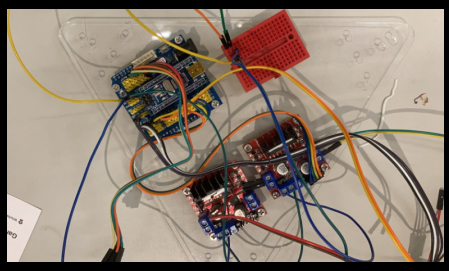
https://youtu.be/tM9RbLmavbQ
https://youtu.be/SWfYyqEO7Fg
https://youtu.be/9cMMH0skZF4

5/21 - 5/22 : SECOND PROJECT TUTORIAL

- Improvement on Arduino connections
- Improvement on car base (previous one too fragile)
- Modification on car wheels to prevent rollers from dislocation
- https://youtu.be/RLygwkRZSPQ

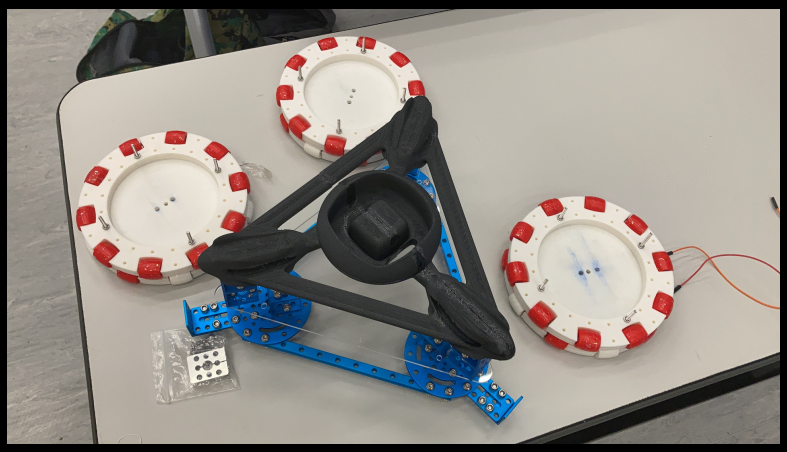






5/24 : ARDUINO MOTOR DRIVER ISSUES

It is found that the Arduino components (motor drivers and LED matrix are malfunctioning. All the components are removed to find out the problem.

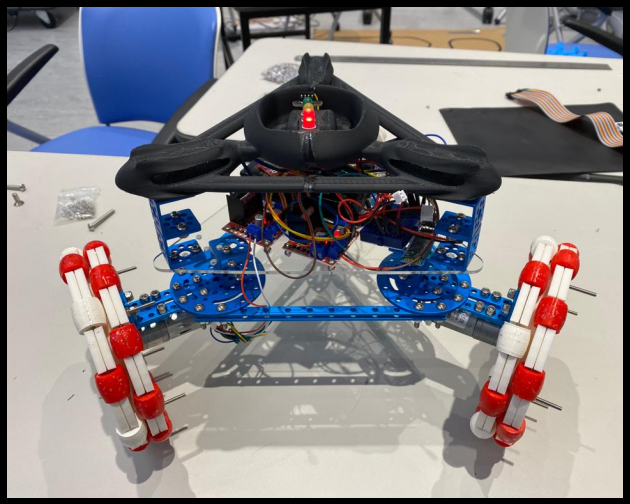


25-26/5 REFINEMENT ON THE INTEGRATED SYSTEM (HARDWARE AND SOFTWARE

- All codes are refined and the integrated systems are controlled by the bluetooth successfully.
- The rollers are repainted with the nail polish.

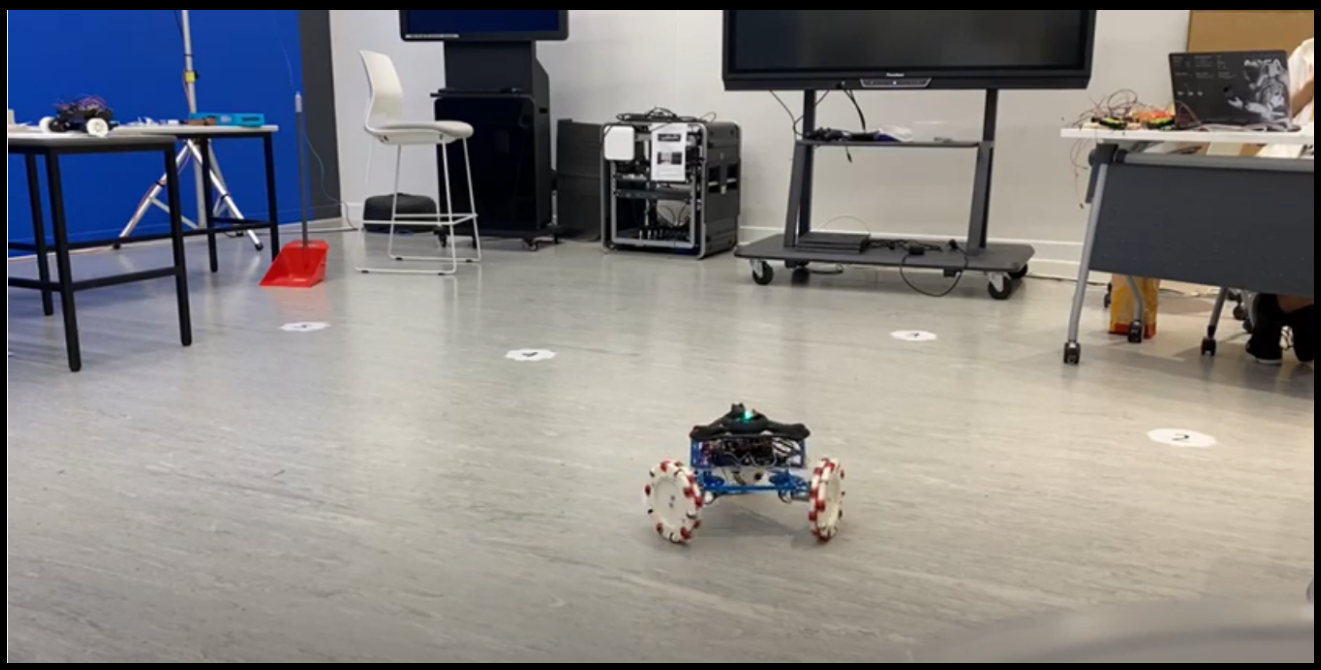
- https://youtu.be/O-nCDuPzJ5s

- The whole car is reassembled.
- The car is able to finish the whole task.



5/27 : TRINI TRIAL AND FINE TUNE

- wire tape with higher friction was applied to the rollers
- mobile control of Trini was tested
- ready for final presentation
- minimum time required: 34s
- https://youtu.be/IAuPJGkF9a4



5/28 : FINAL PRESENTATION

TRINI

ISDN 2400 PHYSICAL PROTOTYPING