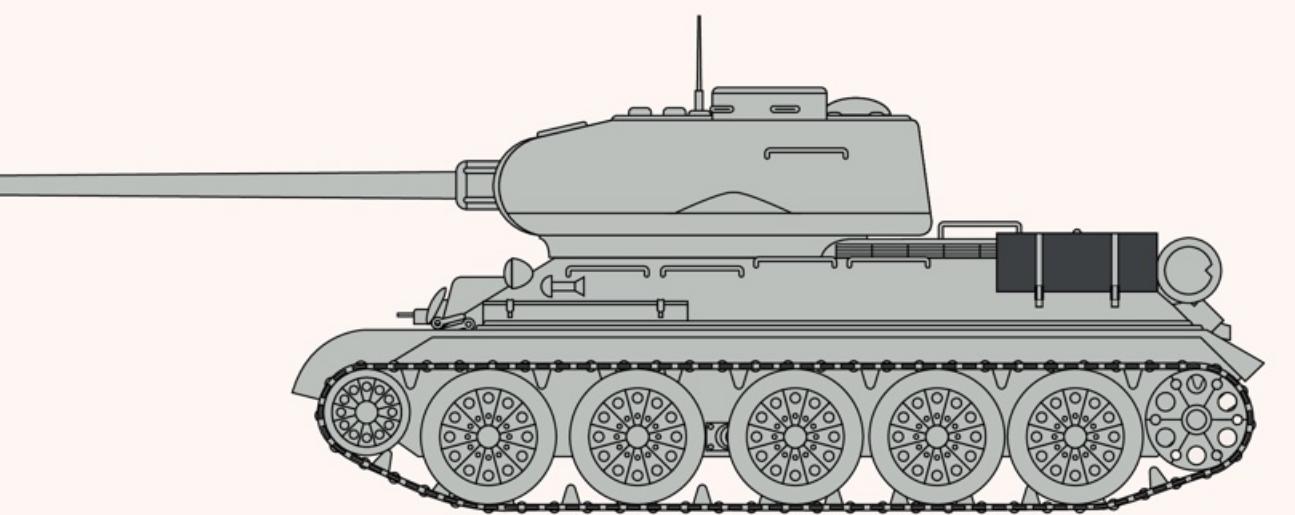
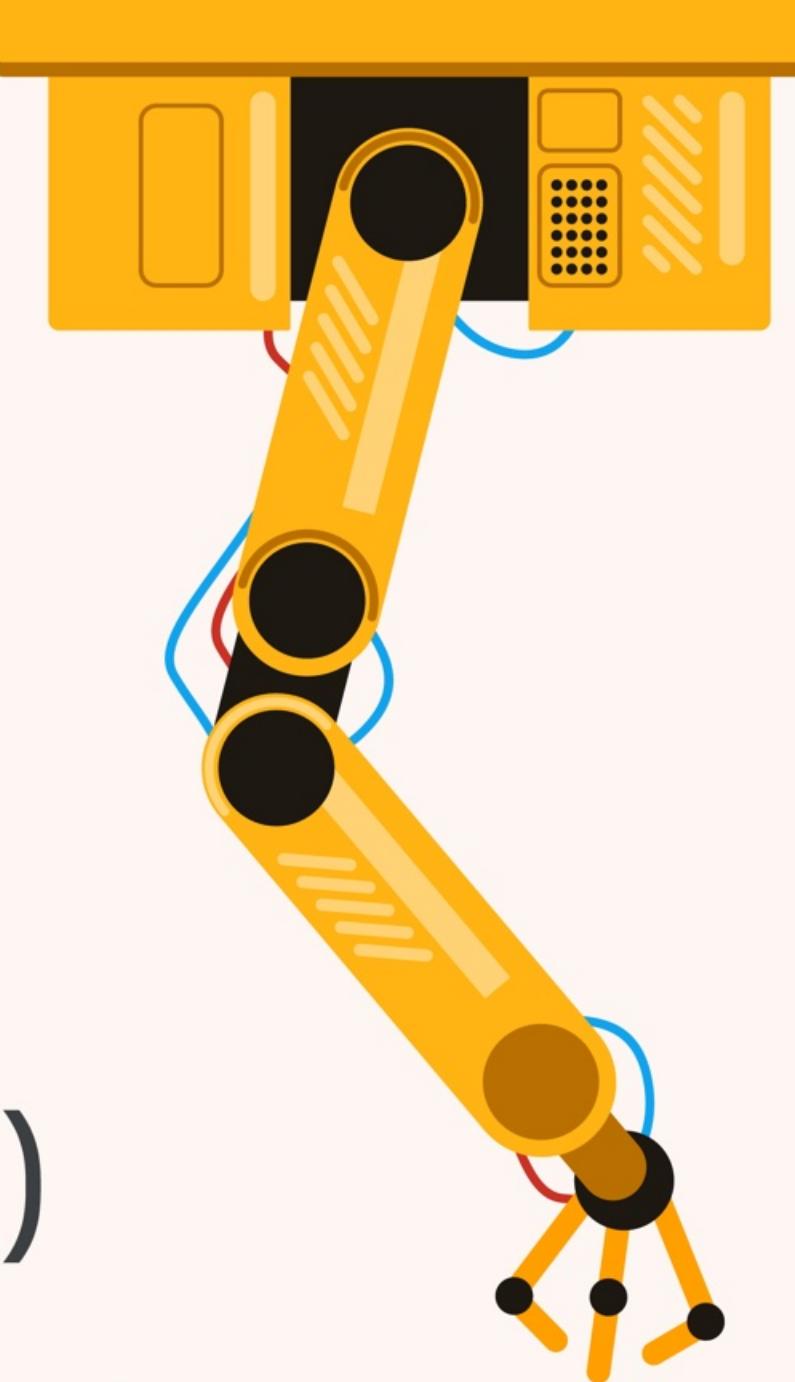
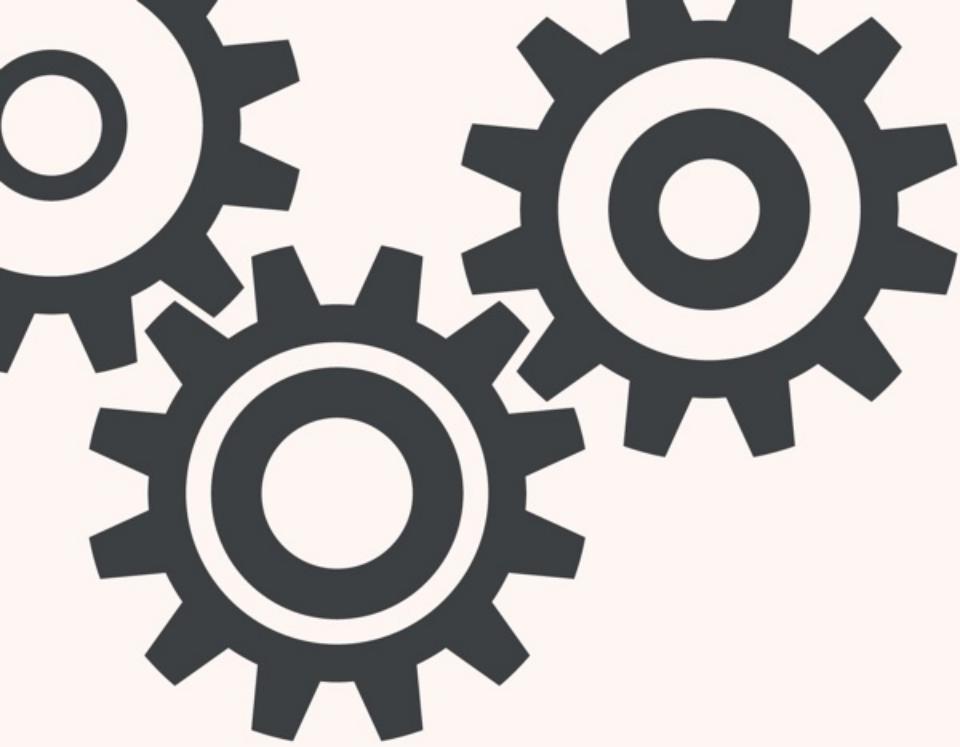


# TONK Project

- Presentation -





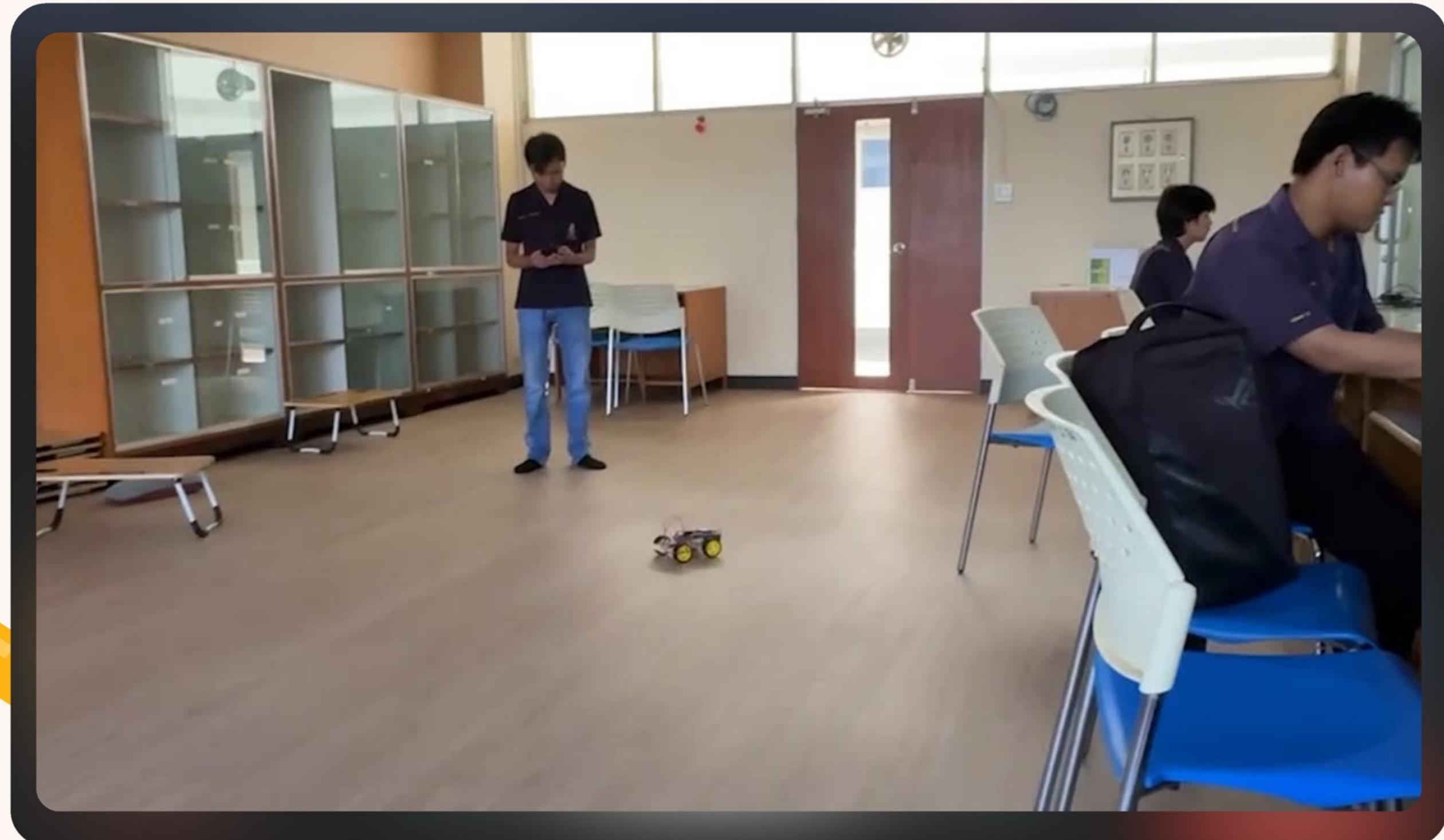
# Our Team

Chavatik Thorarit (066)

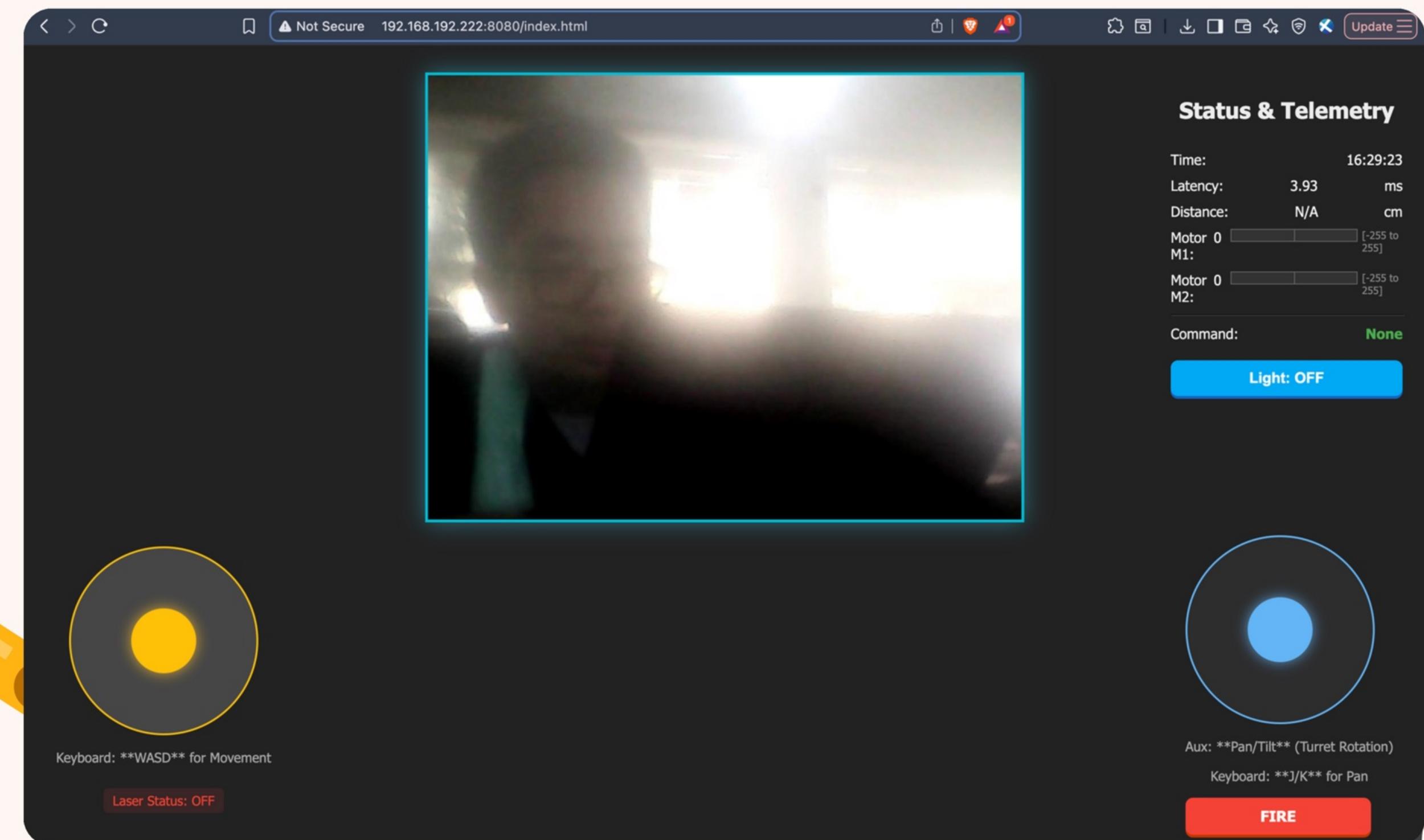
Pattarapon Kitcharoen (230)

Sarankorn Chaisuntranon (289)

# Preview



# Website UX UI



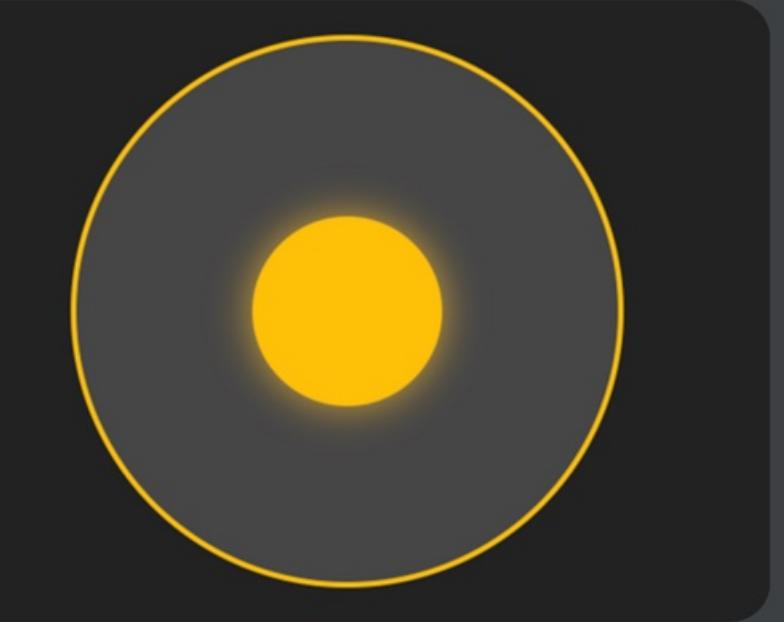
# Function

## Live Video



มีการสตรีมวิดีโอ ด้วย Library  
OpenCV ผ่าน Python

## Virtual Controller



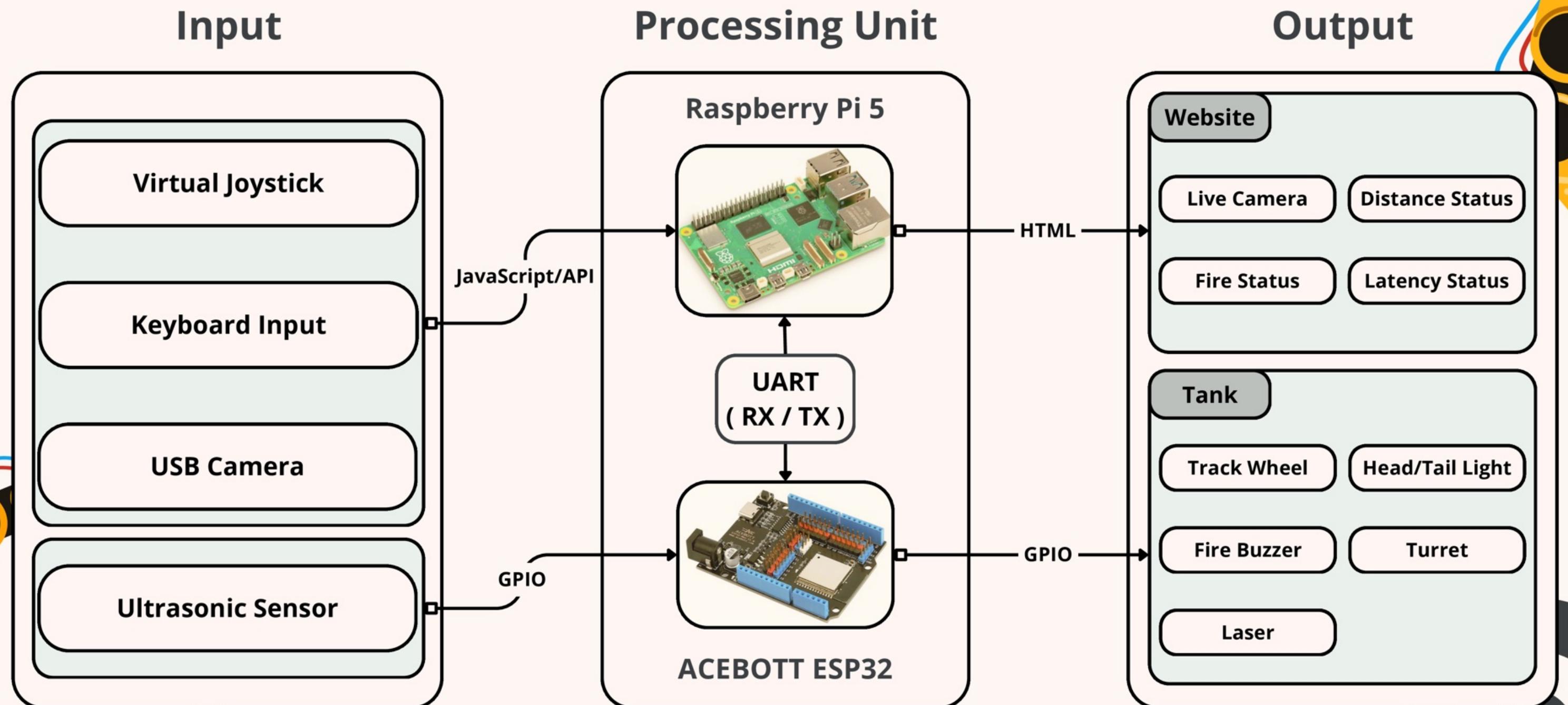
มี Virtual Joystick สำหรับ  
ควบคุมบน PC และมือถือ

## Keyboard Input

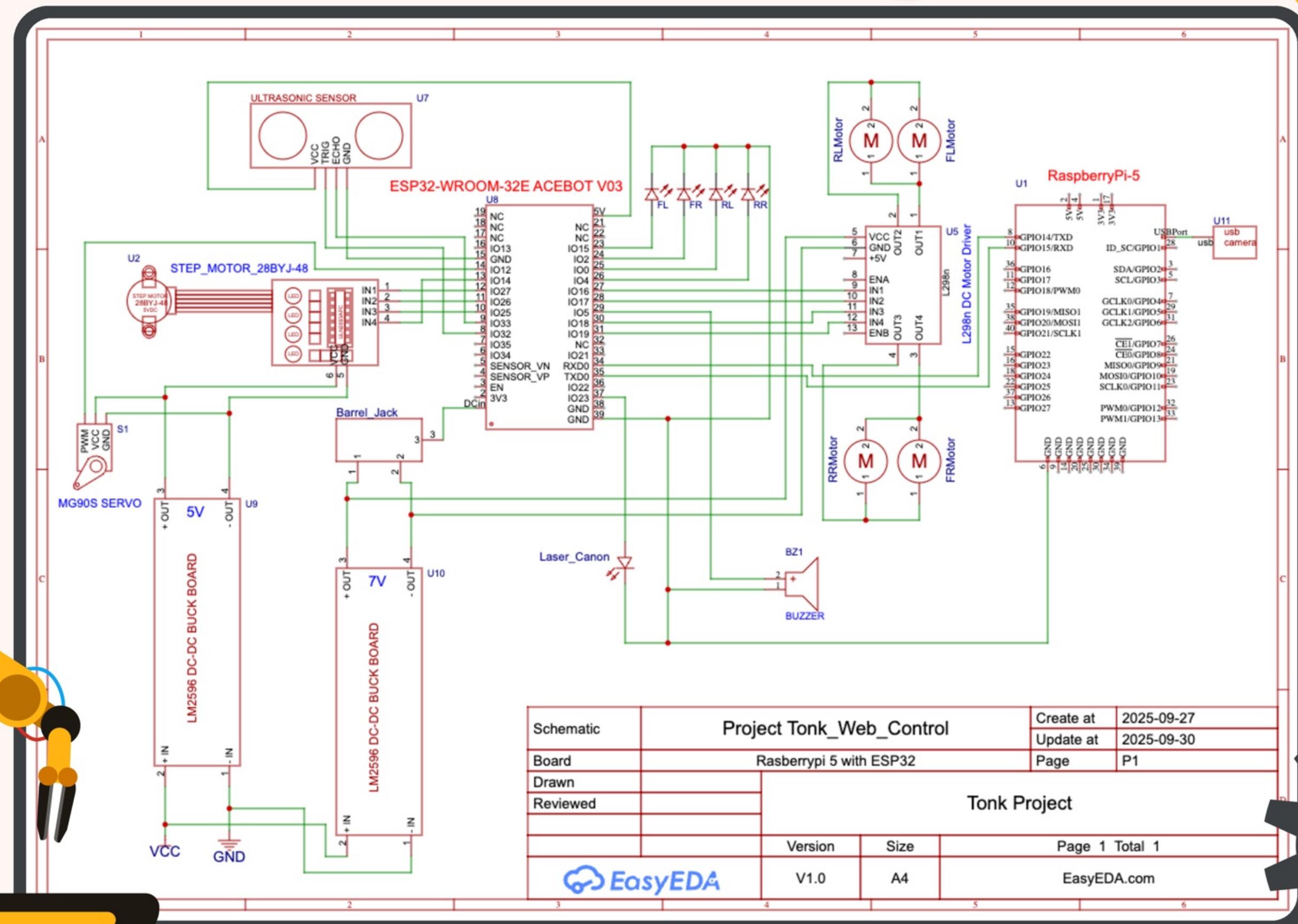


สามารถควบคุมผ่านแป้น  
คีย์บอร์ดได้ (W, A, S, D)

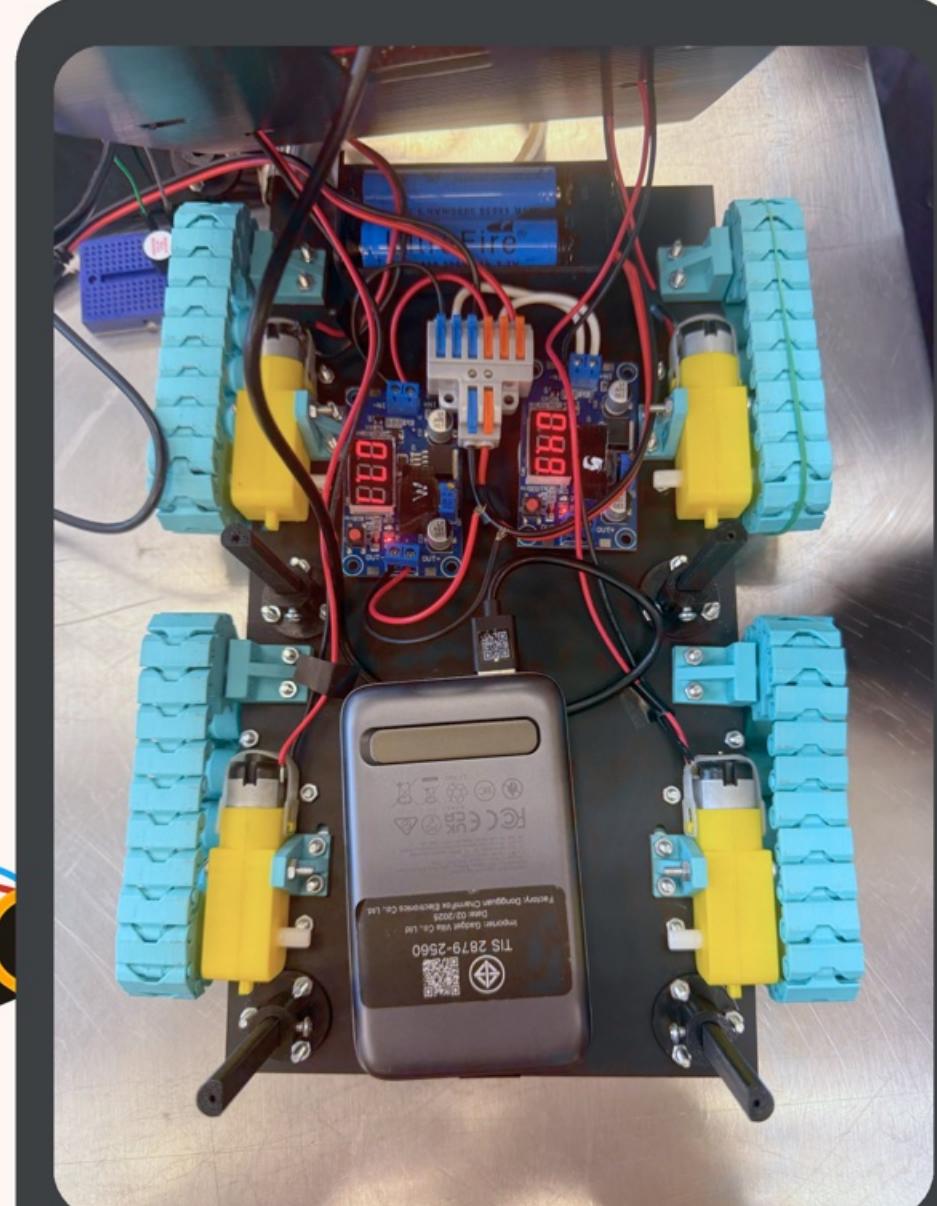
# Block Diagram



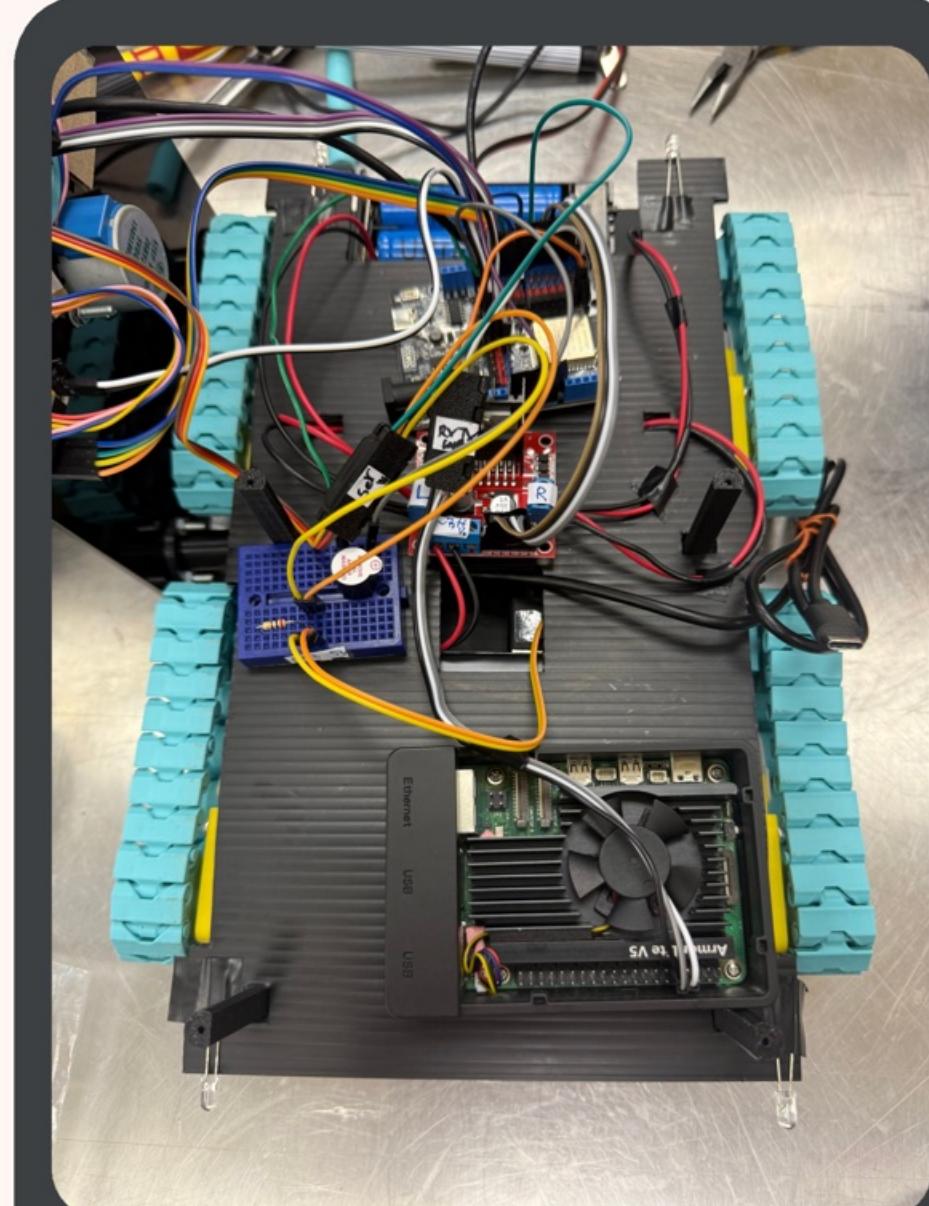
# Schematic Diagram



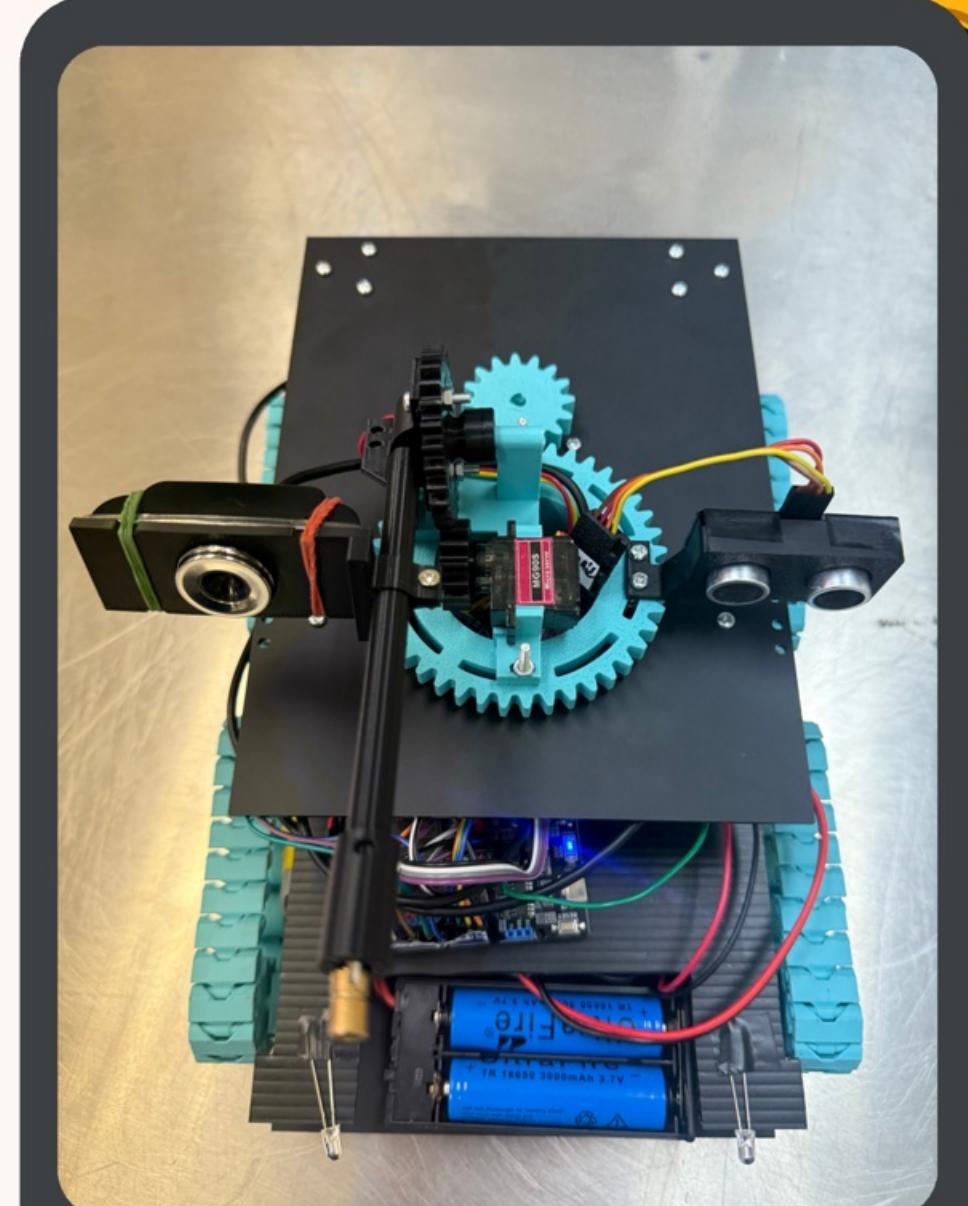
# Layer



1st Floor

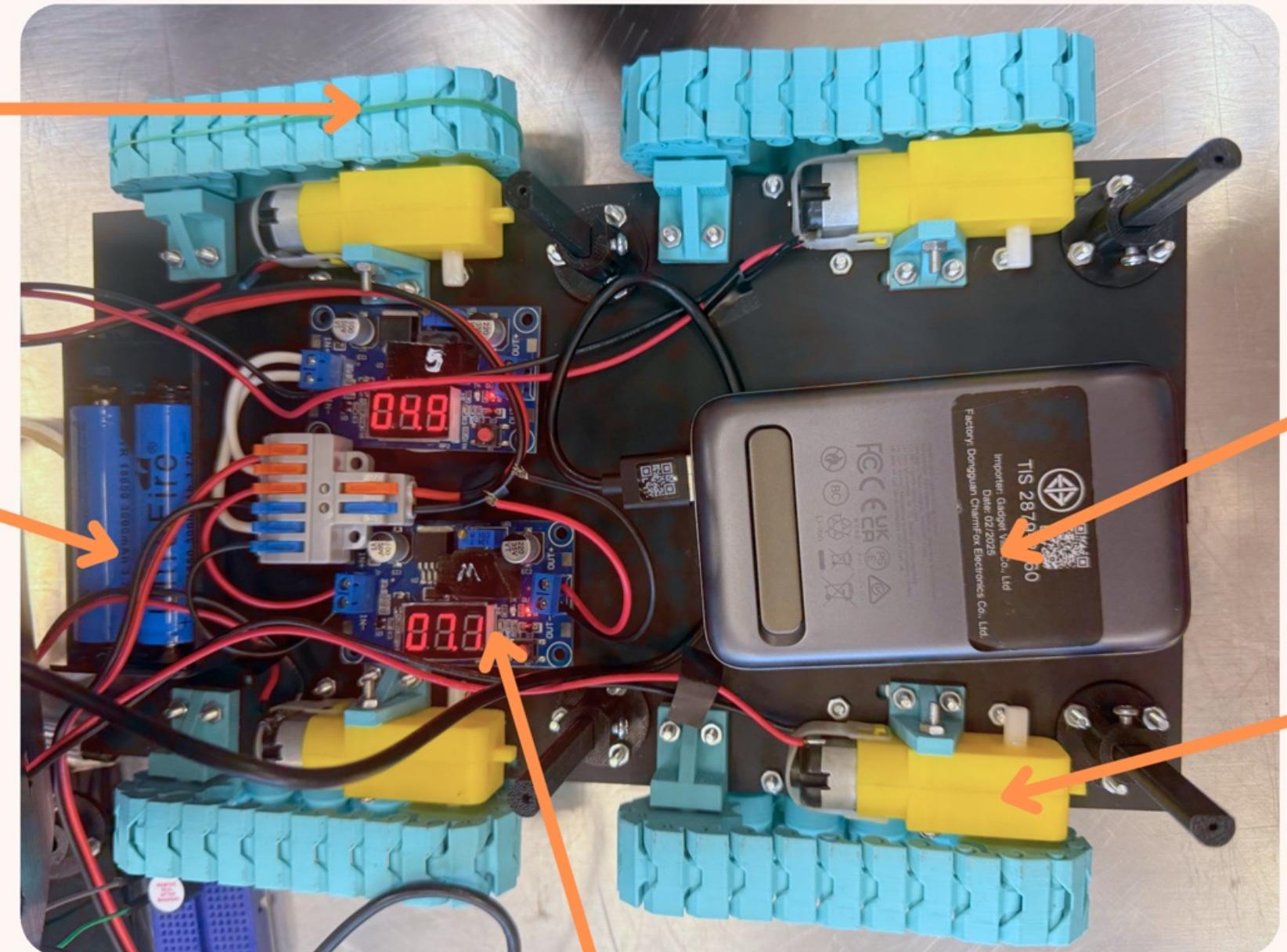
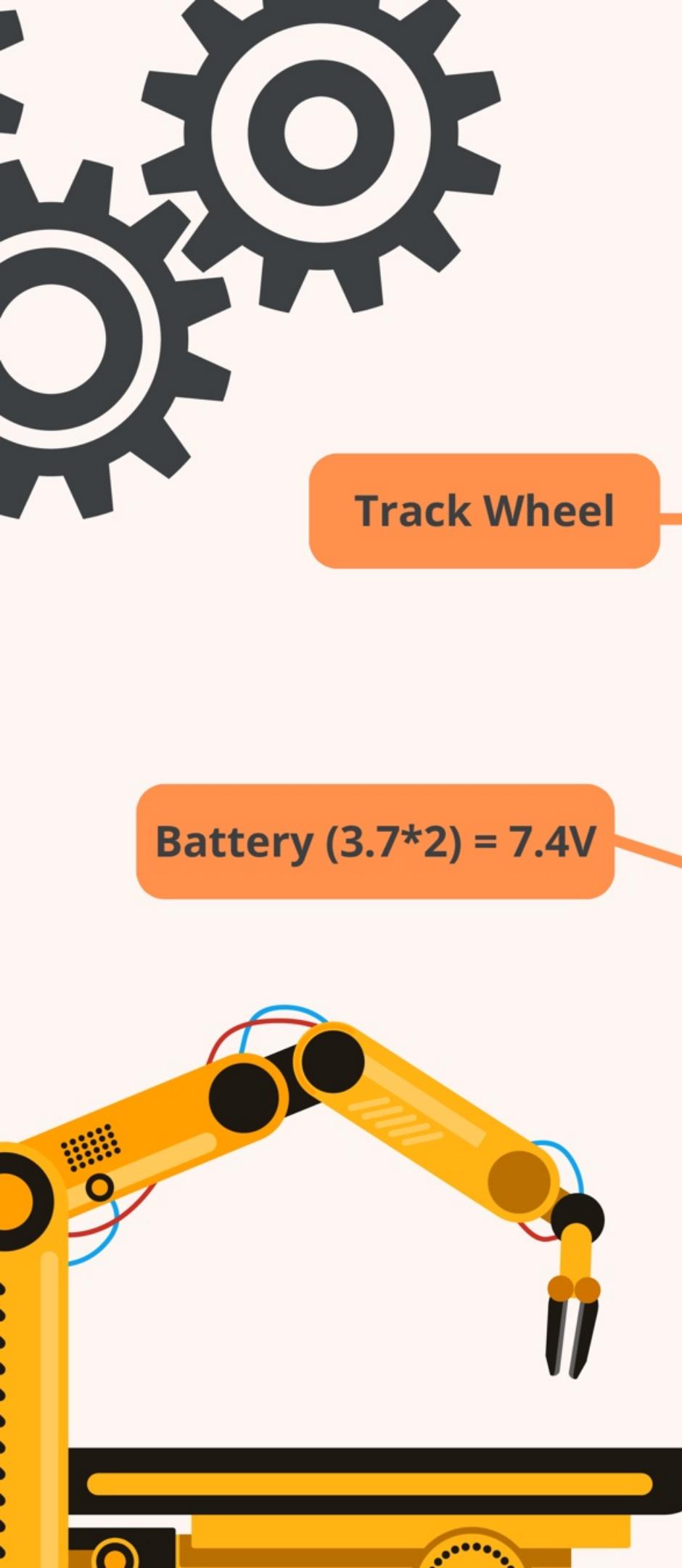


2nd Floor



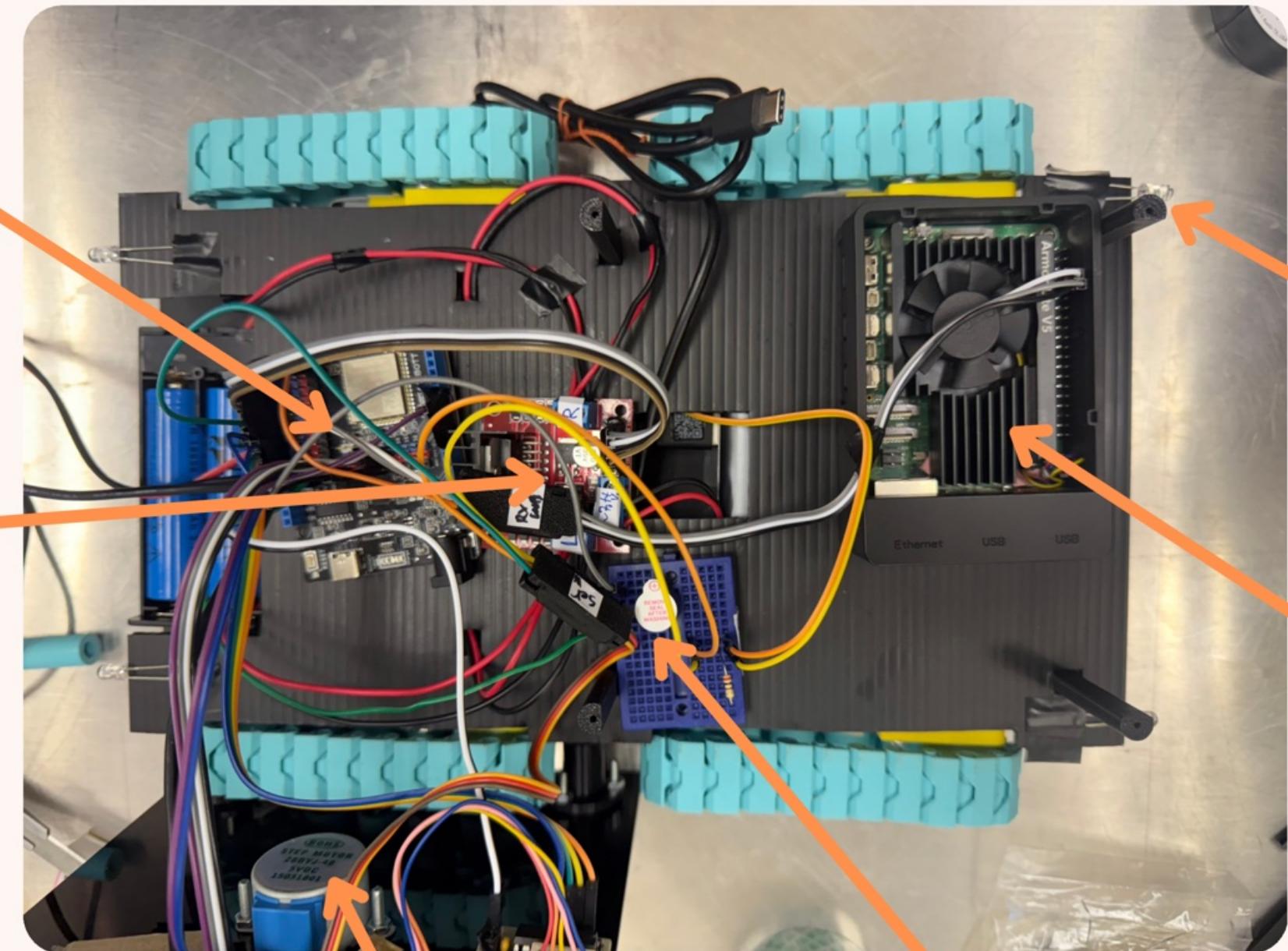
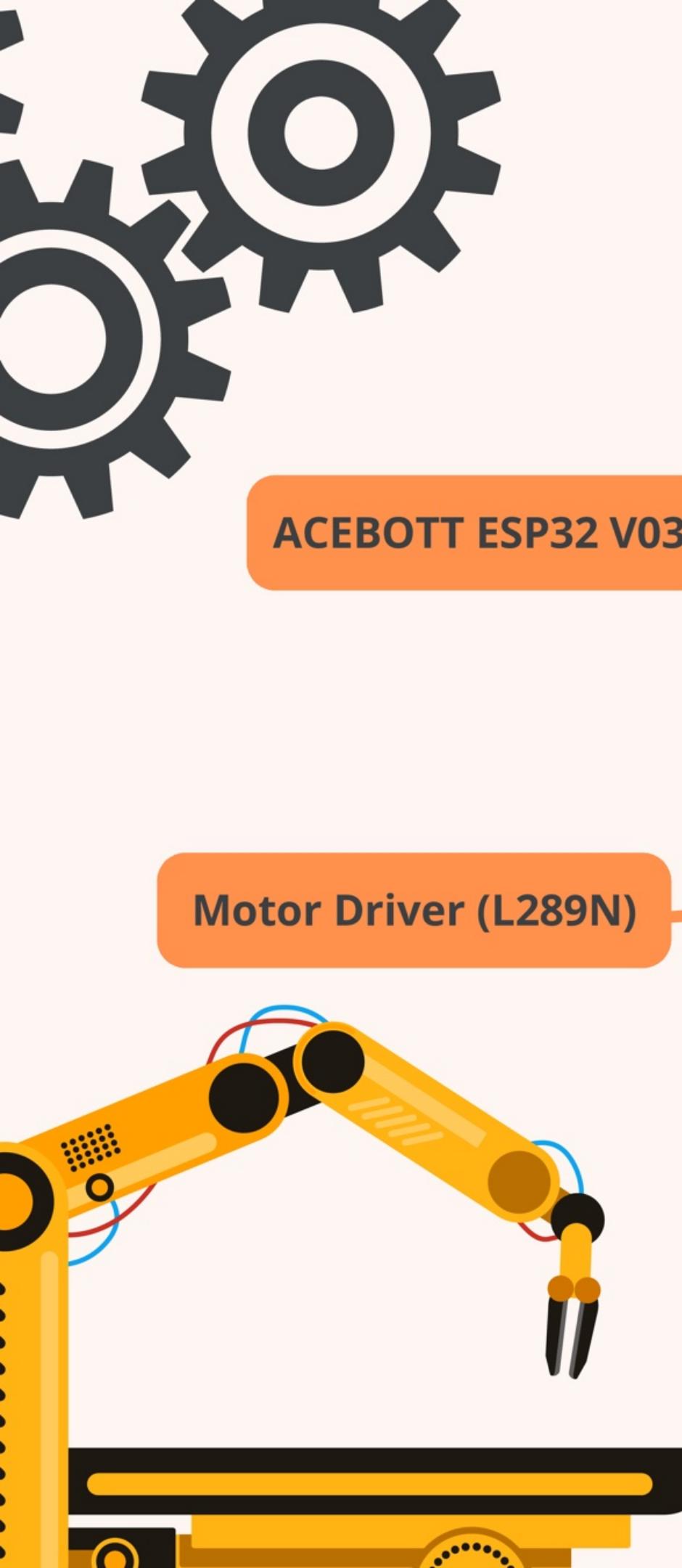
3rd Floor

# Layer 1st Floor



DC Voltage Converter

# Layer 2nd Floor



ACEBOTT ESP32 V03

Motor Driver (L289N)

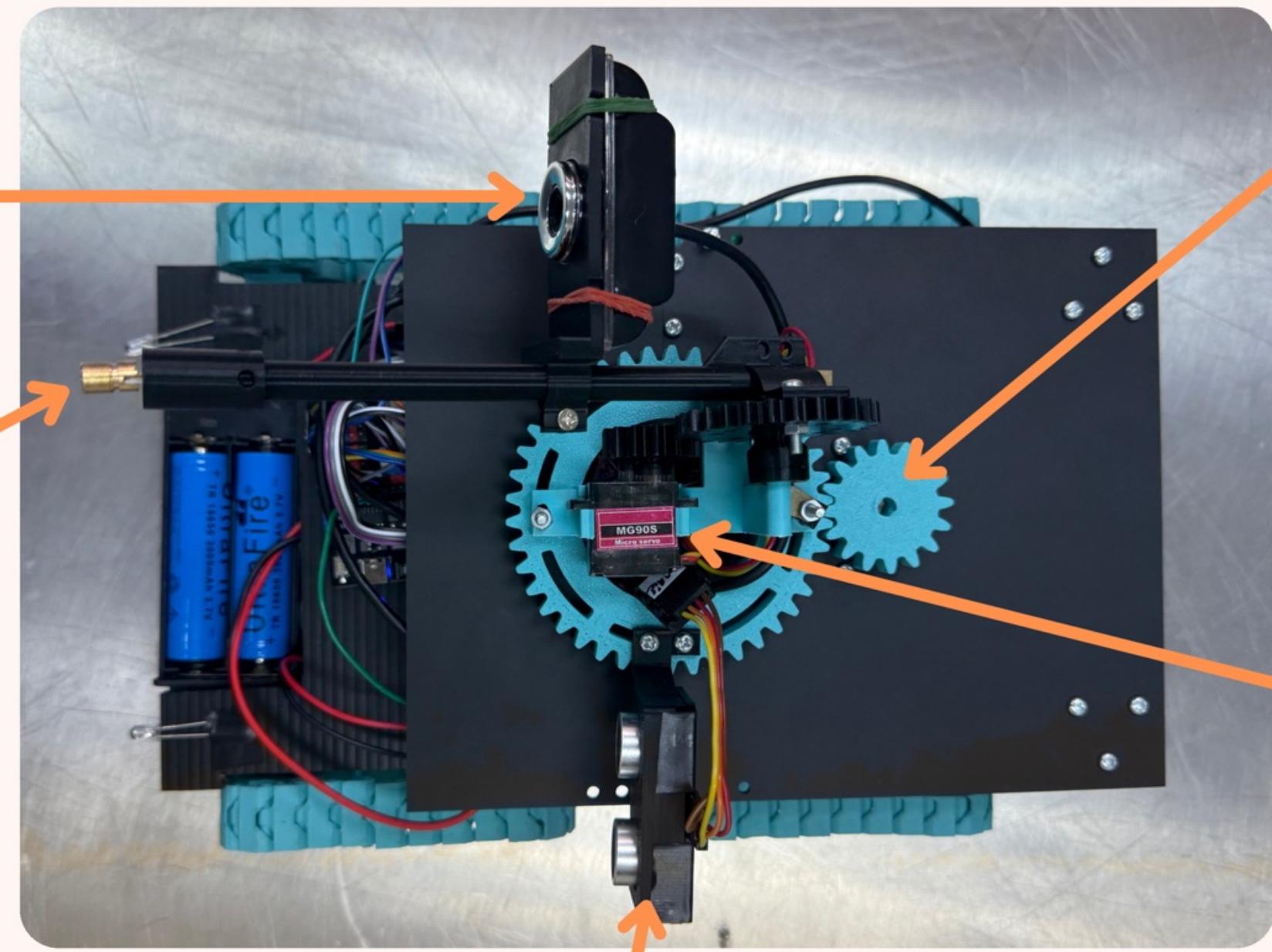
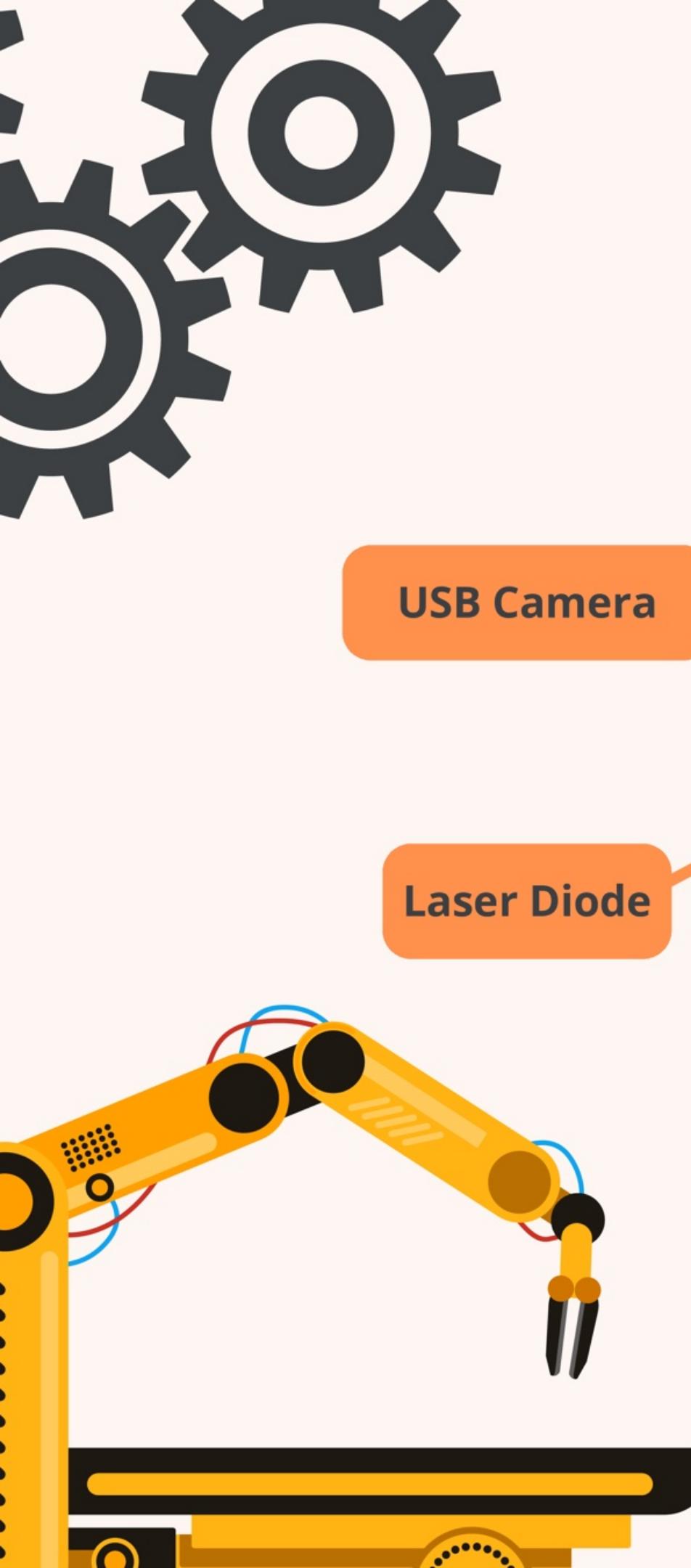
Step Motor

Buzzer

LED Diode

Raspberry Pi 5

# Layer 3rd Floor



Sensor Ultrasonic

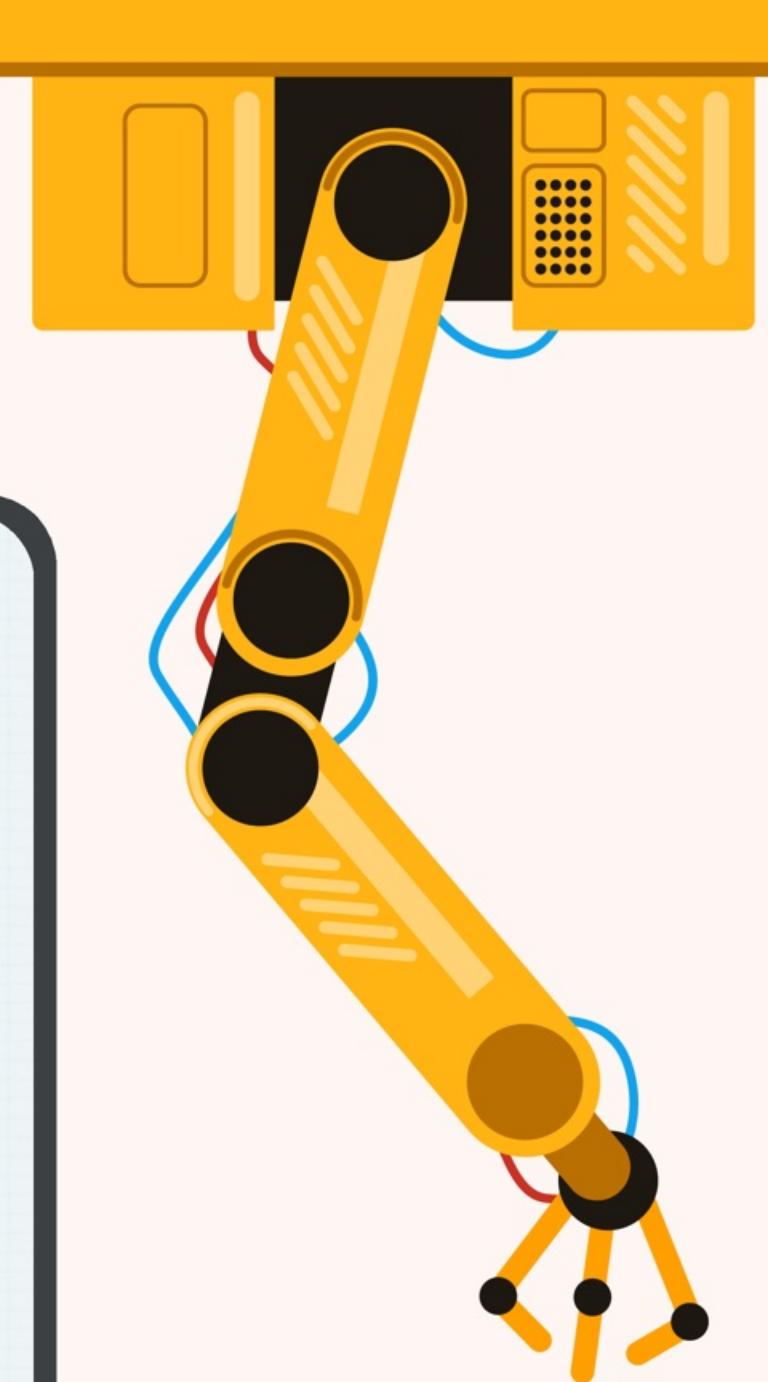
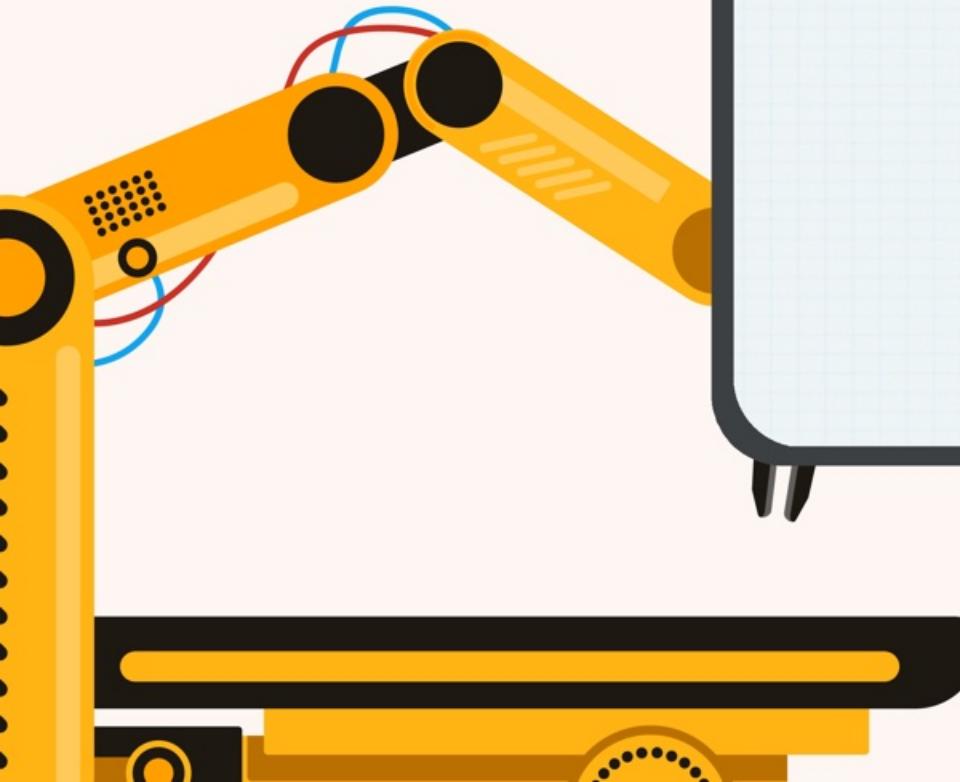
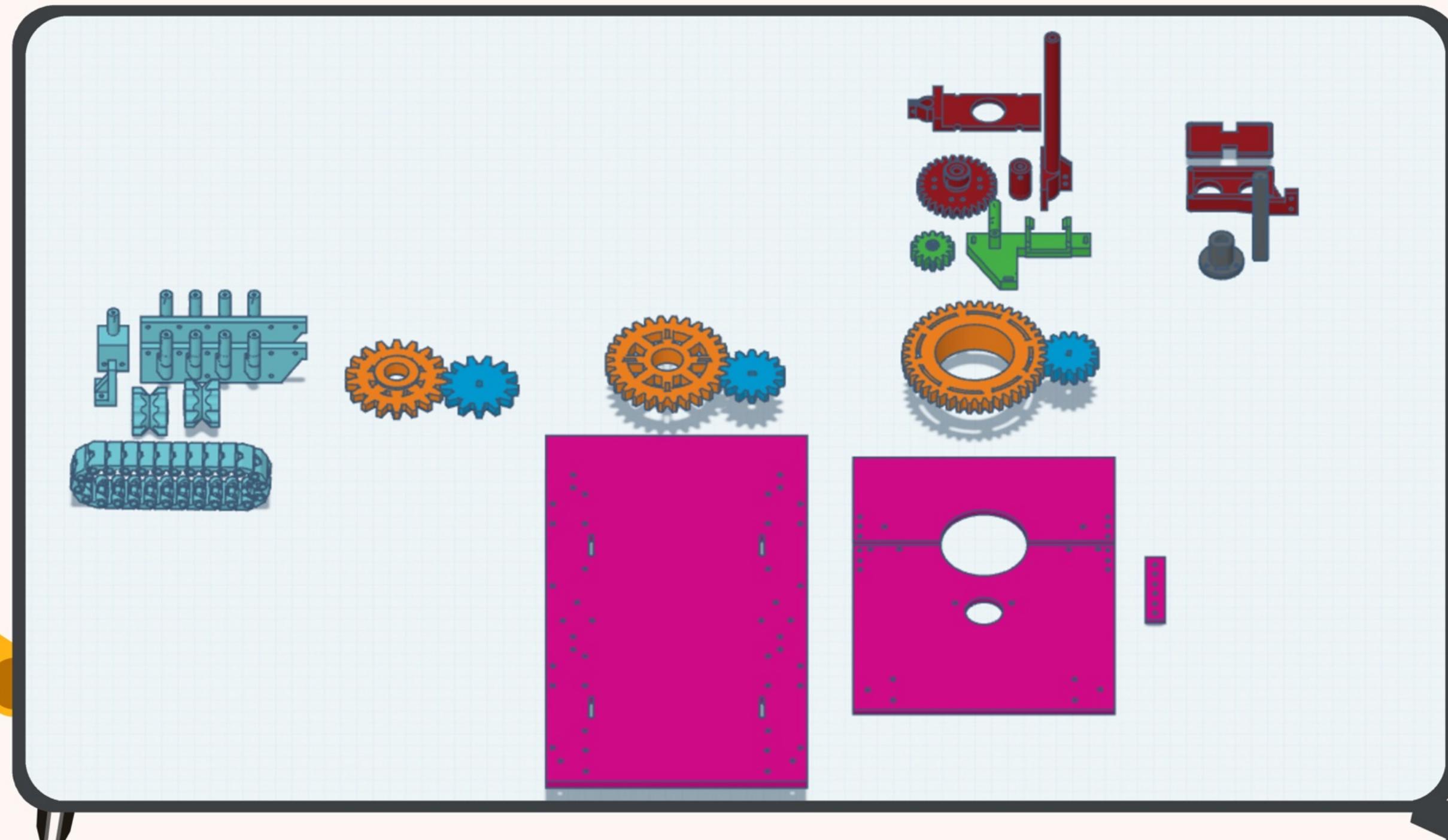
USB Camera

Laser Diode

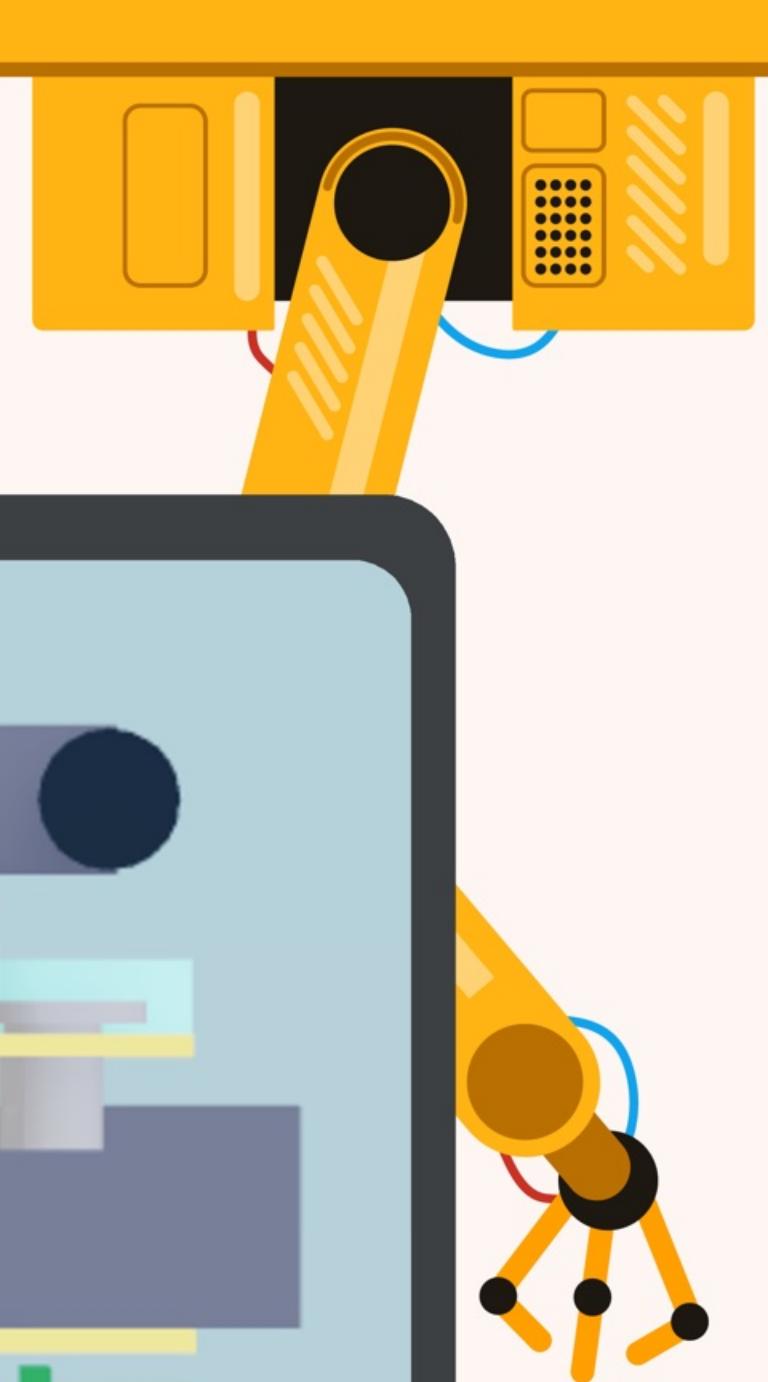
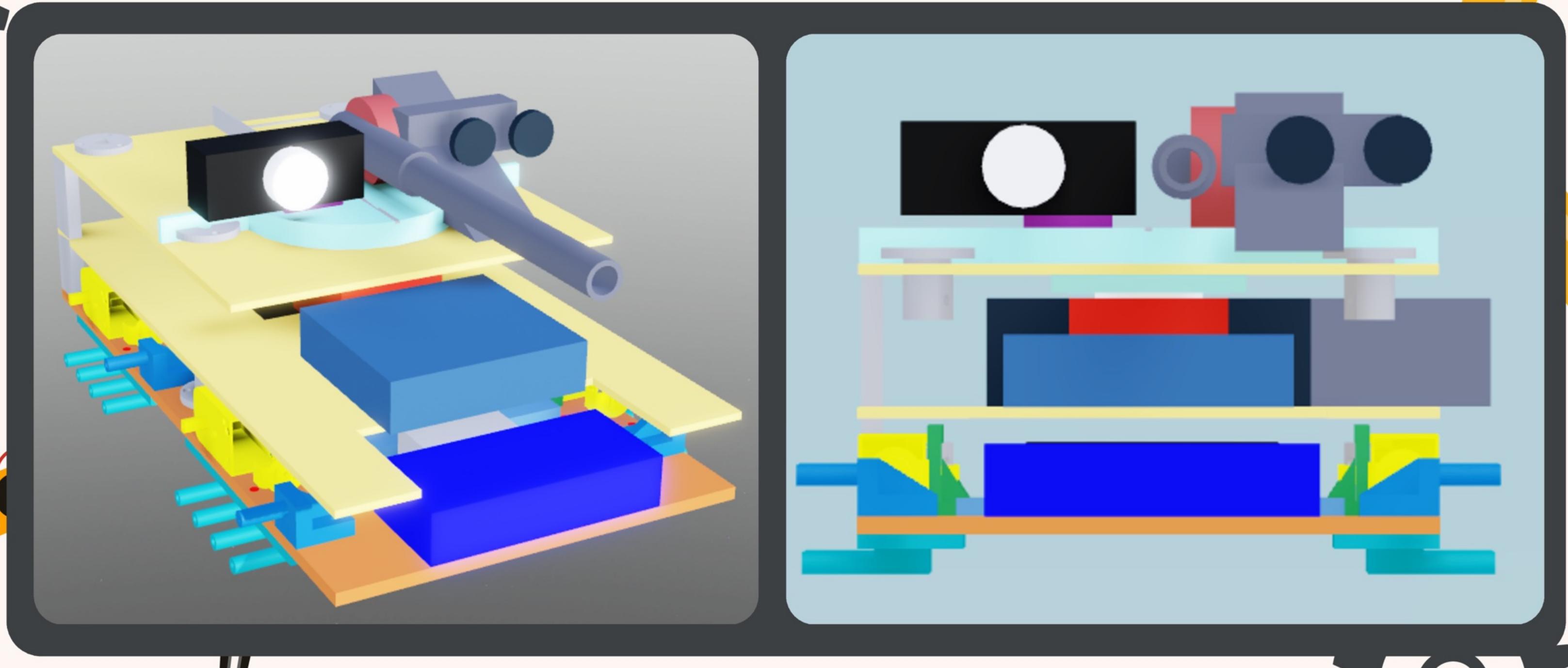
Step Motor

Servo

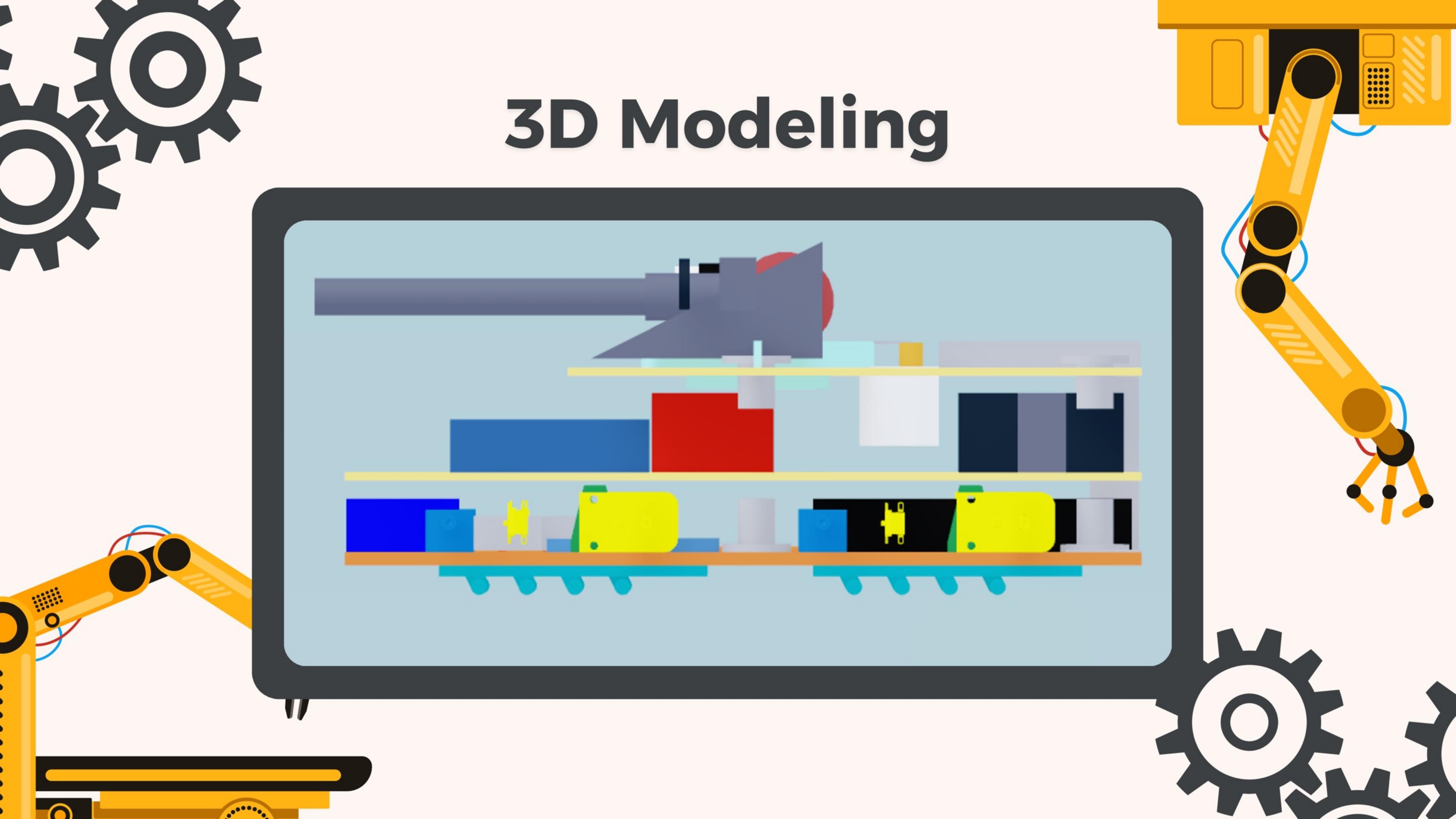
# Timeline Printing



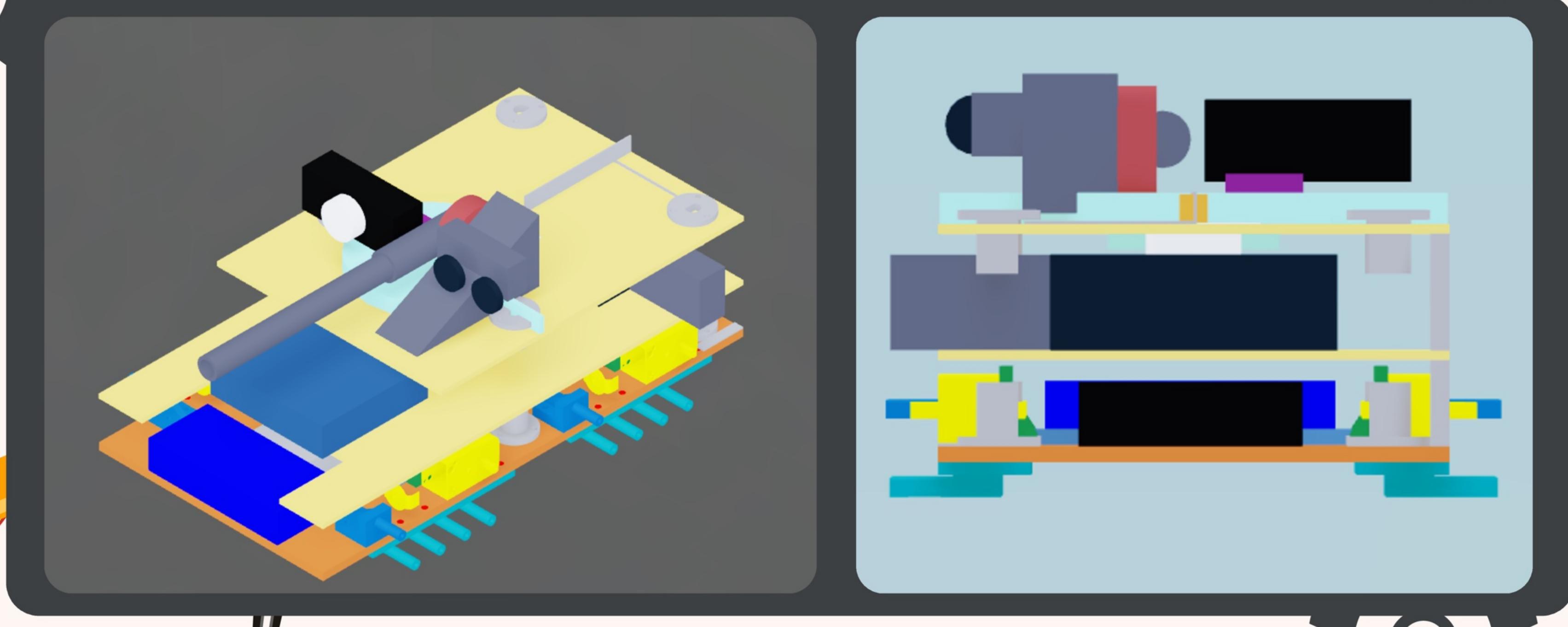
# 3D Modeling



# 3D Modeling



# 3D Modeling



# NRE Cost

## Calculate

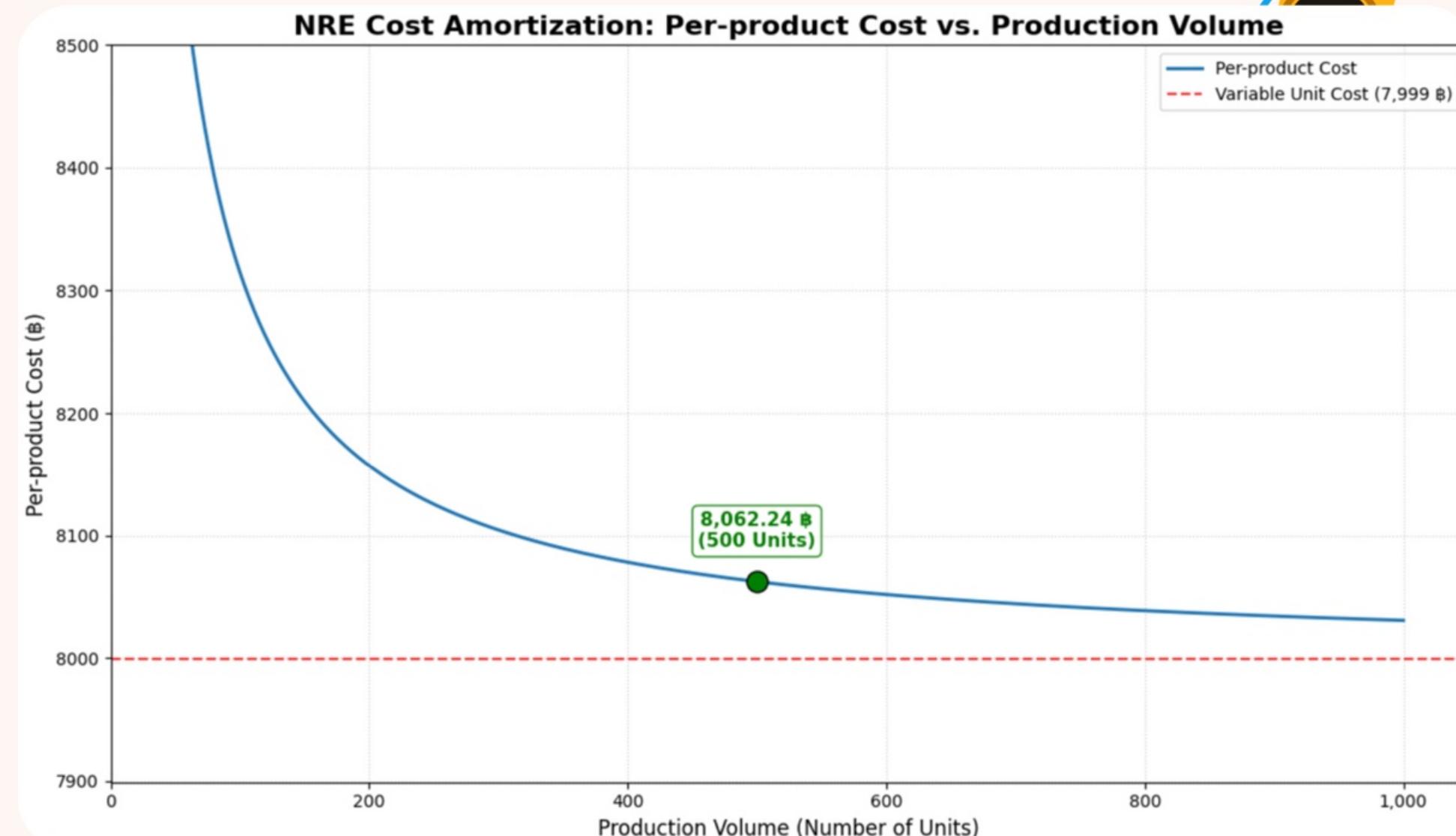
Unit Cost : 7,999 ₩

NRE Cost : 31,620 ₩

# of units : 500

$$\begin{aligned}\text{total cost} &= 31,620 + 7,999 * 500 \\ &= 4,031,120 ₩\end{aligned}$$

$$\begin{aligned}\text{per-product cost} &= 4,031,120 / 500 \\ &= 8062.04 ₩\end{aligned}$$



# 3D Print Cost

## 3D Print Pricing Calculator (THB) + ROI/Payback + Mixed + Method3 (g·hr)

### INPUTS (ແກ້ໄຂໄດ້)

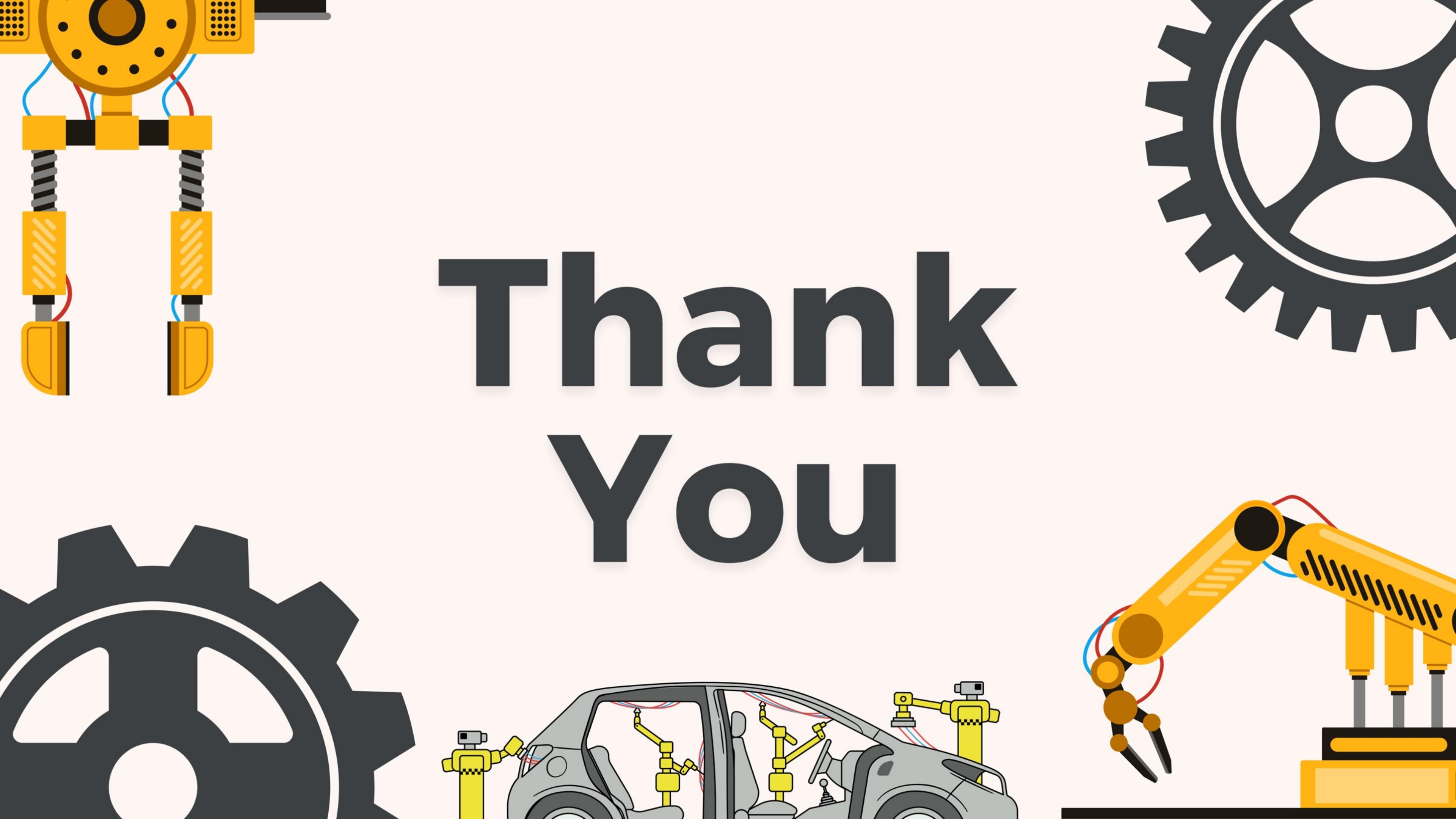
Material price per kg (THB)  
 Waste allowance % (base cost)  
 Job time (hh:mm)  
 Material used (grams)  
 Electricity cost per hour (THB)  
 Machine depreciation per hour (THB)  
 Care/setup per job (THB)  
 Profit margin %  
 Adj for material used % (e.g., 5% = 0.05)  
 Adj for time % (e.g., 5% = 0.05)  
 Machine cost (THB)  
 Planned printing hours per week  
 Weeks per month

|  |            |
|--|------------|
|  | ฿600.00    |
|  | 12.50%     |
|  | 18:00      |
|  | 1,400.00   |
|  | ฿1.00      |
|  | ฿80.00     |
|  | ฿80.00     |
|  | 30.00%     |
|  | 5.00%      |
|  | 5.00%      |
|  | ฿35,000.00 |
|  | 20.00      |
|  | 4.33       |

### OUTPUT SUMMARY

Price per gram (with margin)  
 Job price (per gram method)  
 Price per hour (with margin)  
 Job price (per hour method)  
 Job price (Mixed method)  
 Job price (Method 3 g·hr)  
 Methods difference (Gram - Hour)  
 Best (lowest) job price

|           |
|-----------|
| ฿2.121    |
| ฿2,970.07 |
| ฿165.004  |
| ฿2,970.07 |
| ฿3,113.37 |
| ฿3,113.37 |
| ฿0.00     |
| ฿2,970.07 |



The background features a white surface with several industrial and mechanical elements. In the top left corner, there's a yellow robotic arm with black joints and orange cables. Top right shows a large black gear. Bottom left is a large dark grey gear. Bottom center is a grey car body with yellow robotic arms welding it. Right side shows a yellow robotic arm with a gripper. The overall theme is automation and manufacturing.

# Thank You

# ຮູບພາພເມເຕີມ

| Include? | Category           | Description   | Qty | Unit | Rate (THB) | Total (THB) |
|----------|--------------------|---|-----|------|------------|-------------|
| TRUE     | Engineering        | ຄ່າອອກແບບ (16 ຊນ x 150)                                   | 16  | hrs  | 150        | 2400        |
| TRUE     | Prototyping        | ຄ່າປັບປຸງ 3D (filament 1400g, 18 ຊນ)                      | 1   | job  | 2970.07    | 2970.07     |
| TRUE     | Circuit            | ຄ່າອອກແບບວົງຈານ (5 ຊນ x 150)                              | 5   | hrs  | 150        | 750         |
| TRUE     | Coding             | ການເຂື້ອນໂຄດ (15 ຊນ x 300 ລວມ 3 ດັນ)                      | 15  | hrs  | 300        | 4500        |
| TRUE     | Testing/Experiment | ຄ່າການທົດລອງ (30 ຊນ x 300 ລວມ 3 ດັນ)                      | 30  | hrs  | 300        | 9000        |
| TRUE     | Parts              | ຈ່າຍເອງເພີ່ມເຕີມ (steppers, ສາຍໄຟ, ອະໄຫລ໌)                | 1   | lot  | 1500       | 1500        |
| TRUE     | ExistingAsset      | ອຸປະກຣນີ່ມືອຢູ່ແລ້ວ (webcam + RPi5 + ultrasonic + screws) | 1   | set  | 5000       | 5000        |
| TRUE     | Tooling            | ເຄື່ອງຕັດອົກລິດ ຍືນສຕານທີ່                                | 1   | unit | 1000       | 1000        |
| TRUE     | Prototyping        | PCB prototyping (est.)                                    | 1   | job  | 2500       | 2500        |
| TRUE     | Workshop           | Tooling / Jig (est.)                                      | 1   | job  | 1000       | 1000        |
| FALSE    | Spare Parts        | spare parts (est.)  | 1   | lot  | 1000       | 1000        |
| FALSE    | Certification      | External testing / certification (est.)                   | 1   | job  | 0          | 0           |
| FALSE    | Logistics          | Shipping / misc (est.)                                    | 1   | job  | 0          | 0           |
| FLASE    | Documentation      | Documentation / training (est.)                           | 1   | job  | 0          | 0           |
| TOTAL    |                    |   |     |      |            | 31620.07    |