MAKE X

# ROBOTICS COMPETITION

2024 World Robot Contest MAKEX Asian Championship

MAKEX STARTER
ALL-CORE JOURNEY
全芯征途

# KS KB SANIC

## XTHST017




STARTER 2024

ENGINEERING NOTEBOOK

MAKE X



MAKE X STARTER

ALL-CORE JOURNEY

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# About MakeX

MakeX is an international robotics competition and education platform that promotes multidisciplinary learning within the fields of science and technology. It aims at building a world where STEAM education is highly appreciated and where young people are passionate about innovation by engaging them in exciting Robotics Competition,STEAM Carnival,Tech Event,Educational Conference etc.

As the core activity of MakeX, the namesake MakeX Robotics Competition provides exciting, challenging and high-level competitions in the spirit of creativity, teamwork, fun and sharing. It is committed to inspiring young people to learn Science (S),Technology (T), Engineering (E), Art (A) and Mathematics (M) and apply such knowledge in solving real-world problems.

## OUR SPIRIT

**Creativity** Discover and develop new ideas and new skills, curiosity,and the desire to use creativity and innovative thinking to create unique high-tech work. And also challenge ourself for continuous progress.

**Teamwork** Have open communication with partner, solidarity, friendship,encouraging all contestants to develop a sense of responsibility and enterprising spirit, and sincerely working with their partner for win-win development




**Fun** Enjoy and positive thinking, healthy mindset in the competition.Enjoy the journey,grow and develop together.

**Sharing** Have an openmind as a "Maker" and share their knowledge, responsibility and joy with everyone, including partnerand competitors.

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# MAKEX All-Core Journey Map

Competition Arena Isometric View
Areas on the competition Arena

MANUAL




Blue Team Operator Area

Red Team Operator Area

Blue Team Automatic Mission Operation Area

Red Team Automatic Mission Operation Area

AUTOMATIC

## Automatic Stage

### Independent Mission

- M01 Capturing Quantum Chip
- M02 Transiting Quantum Chip and Organic Crysta
- M03 Capturing Alphabet Cube
- M04 Intelligent Manufacturing
- M05 Processing of Contaminants
- M06 Stacking Storeroom

### Alliance Mission

- M07 Lighting the Antimatter Fuel Rods

## Manual Stage

### Alliance Mission

- M08 Operating Matrix Research Station
- M09 Placing Team Marker

# INFORMATION

## TEAM : KS KB SANIC

### Robot,Creativity,Learning,and travelling into the Future



## BABOON

Designer
Operator

Jirayu Sa-ngiam
Age 11
Primary 6
Kajonkietsuksa School
Thailand

Robotics Automation system is an important future in the 21st century. In our daily life,we probably have robots involved.That is reason why I am interested in robot training. The first robot that I know and impressed is "Mbot".Mbot make me learn about my own abilities, creativity, problem-solving, skills, teamwork, sharing knowledge and happiness with teammate and the competitors.This year I took my friend Mbot come to get the great experience in "2024 World Robot Contest MakeX Asian Championship".Let's go new journey.

## KEEN KEEN

Inthanat Rodsunthon
Age 11
Prmiary 6
Kajonkietsuksa School
Thailand



MakeX is an international robotics competition and education platform that promotes multidisciplinary learning in the fields of science and technology. It aims to create a world where STEAM education is highly valued and to inspire young people to be passionate about innovation.This competition also provides opportunities to gain valuable experience in national-level robotics competitions. I am excited to experience the thrilling competitions and to challenge my own potential.



## COACH GAILY

Ms.Gaily Noreen Samson
Digital Education Teacher
Kajonkietsuksa School

## COACH PATRICK

Mr.Dhechazet Chiangin
Founder,
The CodeSanook Coding and Robotics training center

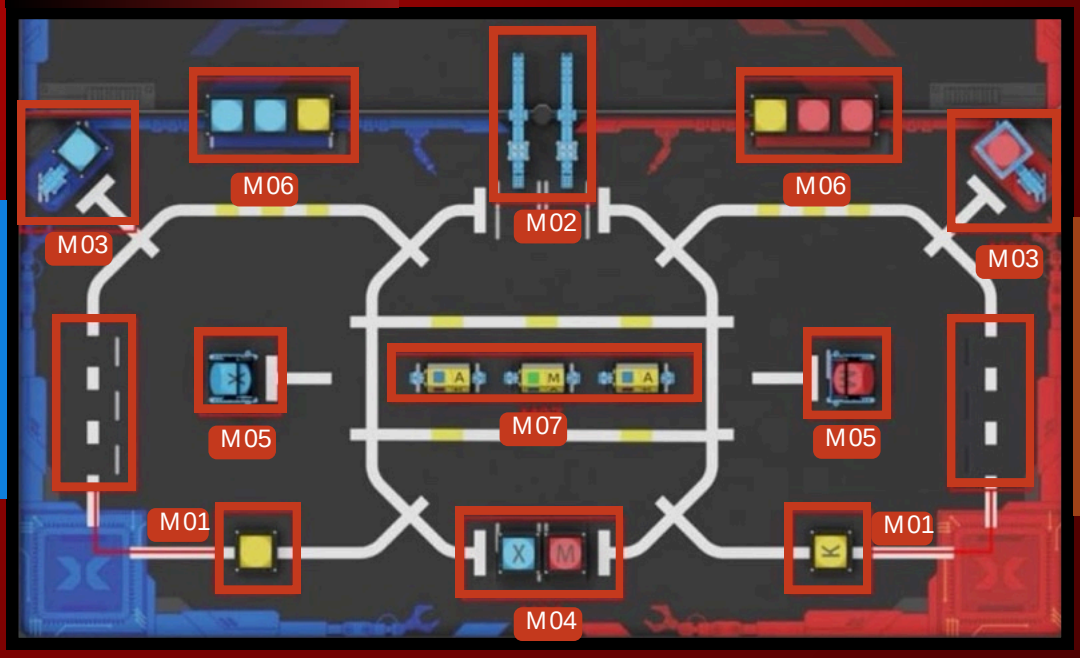


# MAKEX All-Core Journey Map

## Competition Arena Isometric View

## Automatic Stage

### Areas on the competition Arena




Blue Team Automatic Mission Operation Area

Red Team Automatic Mission Operation Area

## Independent Mission

**M01** Capturing Quantum Chip (20 points/each)

The robot meticulously relocate the quantum chip (symbolized by a yellow alphabet cube) and the organic crystal (represented by a yellow cube), along with their respective bases, from their initial positions.

**M02** Transiting Quantum Chip and Organic Crystal (30 points/each)

The robots to meticulously transport the organic crystal (represented by a yellow cube) or the quantum chip (symbolized by a yellow alphabet cube), along with their bases, to the designated transfer area.

**M03** Capturing Alphabet Cube (30 points/each)

Robots are tasked with employing the Logistics Distributor (a cube ejection mechanism) to acquire the blue and red alphabet cubes.

**M04** Intelligent Manufacturing (20 points/each)

Robots are tasked with stacking these sorted items on the elevated manufacturing table (high placement table) and retrieving the alphabet cube from the same for future operations.

**M05** Processing of Contaminants

(Red/Blue cube "M" or "X" 10 points/each) (Red/Blue Alphabet Cube 30 points/each)

The robot transporting the data cube (a red or blue alphabet cube). The mission further involves relocating the red or blue alphabet cube positioned in the device's mounting to the manual area.

**M06** Stacking Storeroom (Red/Blue Alphabet Cube 30 points/each) (yellow cube 10 points/each)

The robot identifying and selecting the red or blue alphabet cube from the storeroom, yellow cubes, and conveying them to the manual mission area.

## Alliance Mission

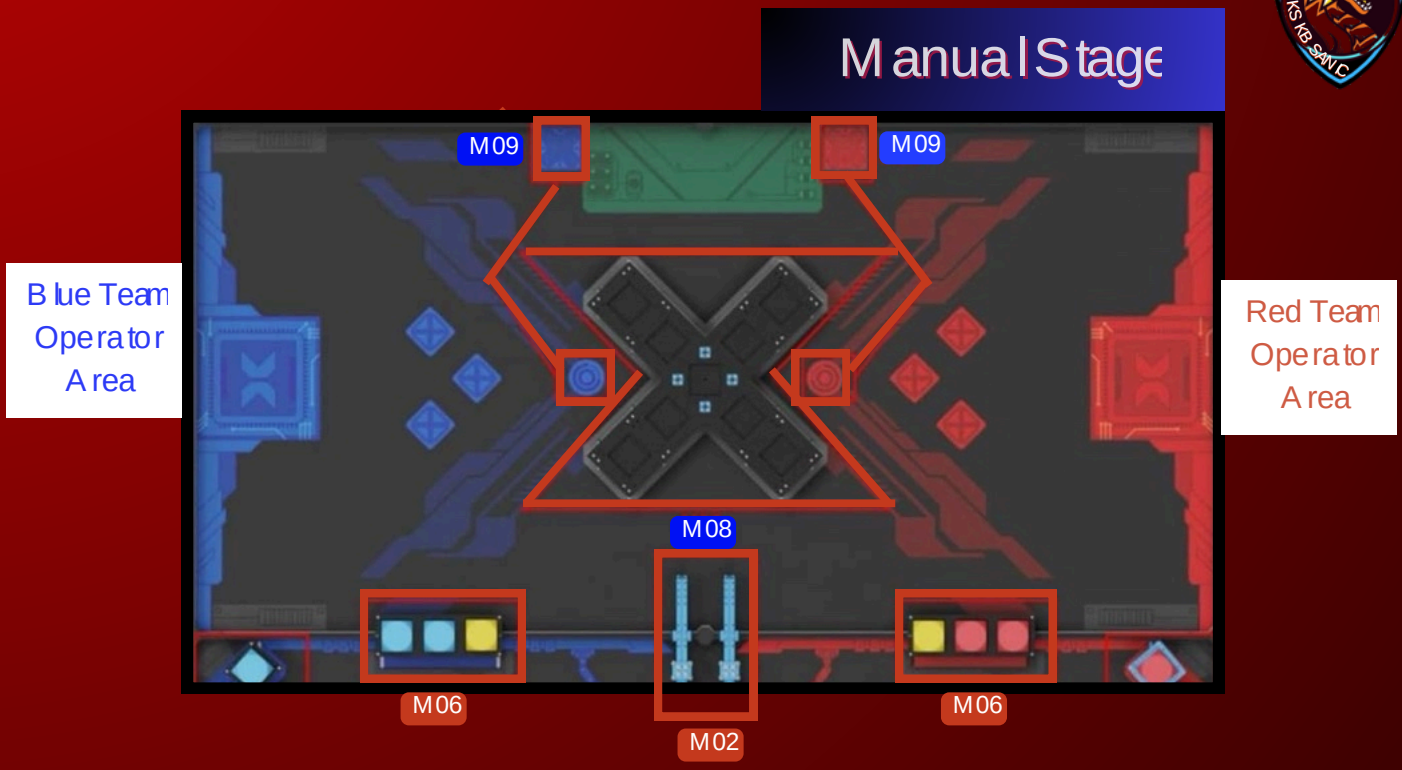
**M07** Lighting the Antimatter Fuel Rods (30 points/each)

The robot is required to automatically toggles the antimatter fuel rods (rotary cylinders). Three cylinders are horizontally positioned in the center of the automatic mission area. Each cylinder has five sides, each marked with a specific color and alphabet. The initial sequenc of the cylinders is set according to the prop card.

# MAKEX All-Core Journey Map

## Competition Arena Isometric View

### Areas on the competition Arena




## Alliance Mission

**M08** Operating Matrix Research Station

(Red/Blue alphabet cubes that meets the scoring judging 20 points/each

(Completion of two "MAKEX" arrangements 50 points/each

In the manual areas, there are no alphabet cubes initially. They are entirely contingent upon weather the red and blue teams have successfully transferred the corresponding props to the manual area during the automatic stage.

**M09** Placing Team Marker

(Self-made props that meet specifications 30 points/each

Robots are tasked with transporting and situating makers in thedesignated marking area.

Prior to match commencement, contestants are to place their team markers within the marking area on both sides of the manual loading area. The team markers, which are the contestants own props, must have their vertical projection fully within the square marking area.

The markers must meet specific dimensions: a height of greater than or equal to 120mm and a vertical projection area of less than or equal to 60 mm in diameter within a circular space.

# PROJECT TIMELINE

**W1**
- Introduction
- Competition Overview
- Team Assignment

**W2**
- Drafting Design
- Planning and Scheduling
- Mission Coding

**W3**
- Problem encounter and solution
- Mission Coding

**W4**
- Finalization of Design
- Mission Coding
-

**W5**
- Finalization of Coding
- Mission Simulation
- Evaluate



# MISSION FLOW

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step 1 M01

step 2 M02

step 3 M04 -M05

step 4 M06 -M03

step 5 M07

step 6 M08 -M09



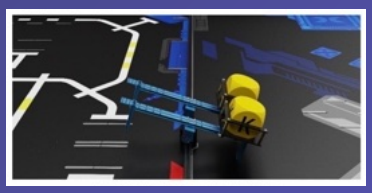
START

M01



M01:Capturing Quantum Chip

M02

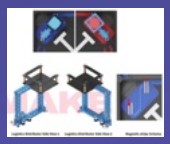


M02:Transiting Quantum Chip and Organic Crystal

M06 -M03

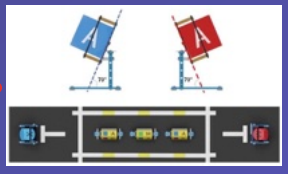


M06:Stacking Storeroom



M03:Capturing AlphabetCube

M04 -M05



M05:Processing of Contaminants



M04:IntelligentManufacturing

M07



M07:Lighting the Antimatter FuelRods

M08 -M09



M08:Operating Matrix Research Station



M09:Placing Team Marker

# SWOT Analysis

KS KB SANIC

## Strengths

- Good teamwork
- Robot design
- Stable programming

S

## Weakness

- Inconsistency result in mission 6-7
- Need time and good operator in manual stage

W

## Opportunity

- Growth in solving problems and finding solution
- Potential Innovation
- Promising technology

O

## Threat

- Better ideas or strategies
- More time to practice with a liance.

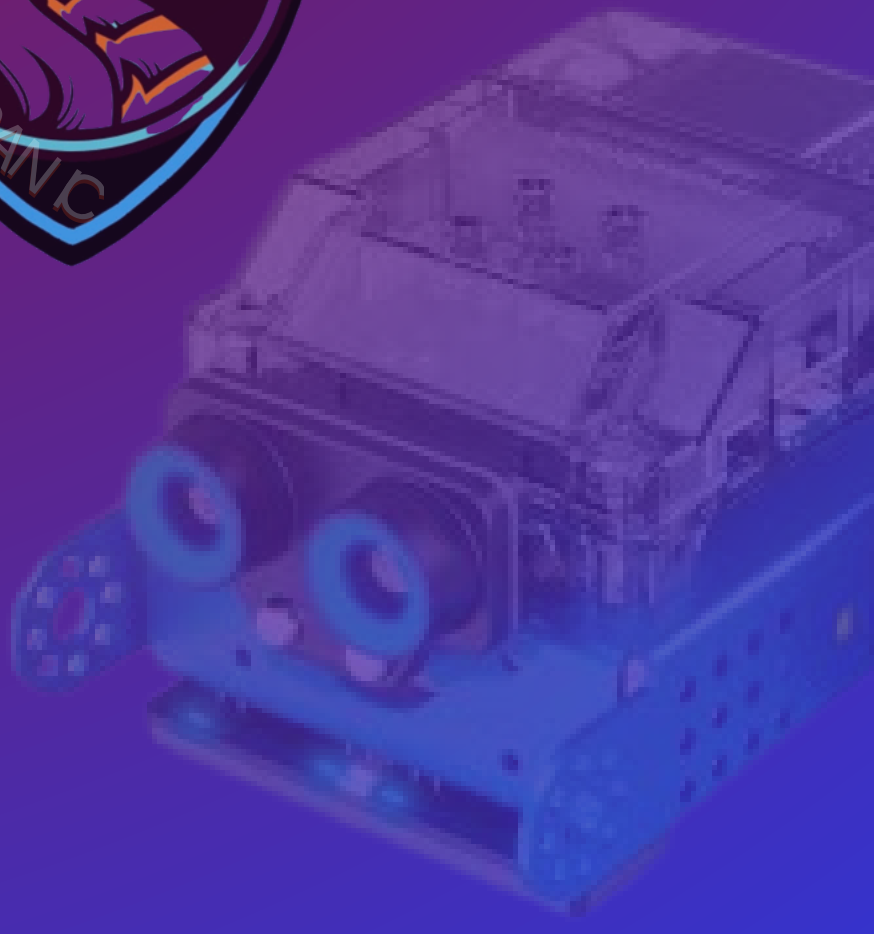
T



MAKEX

# TECHNICAL INNOVATION



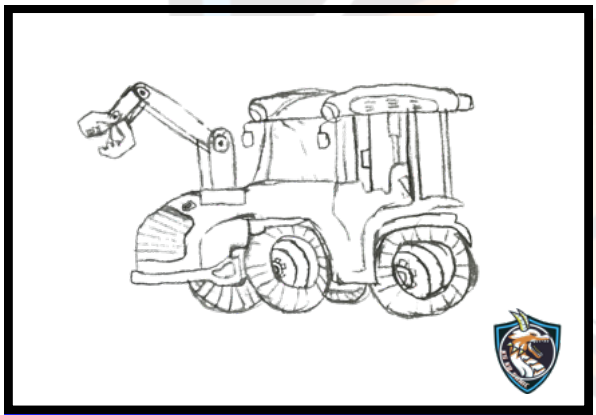
# TECHNICAL INNOVATION

## DESIGN INSPIRATION

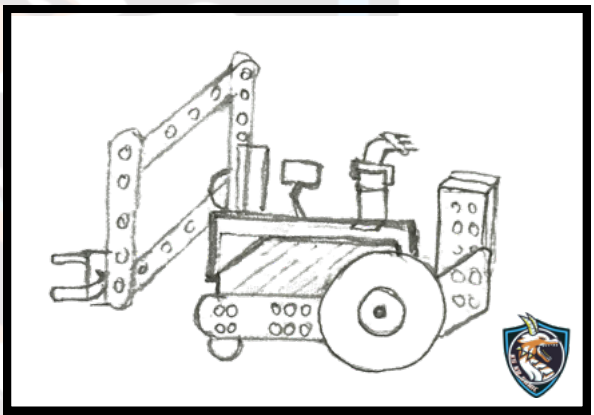
### All-Core Journey

We design "Robot" inspired by truck,designs to suit the intelligentmanufacturing industry

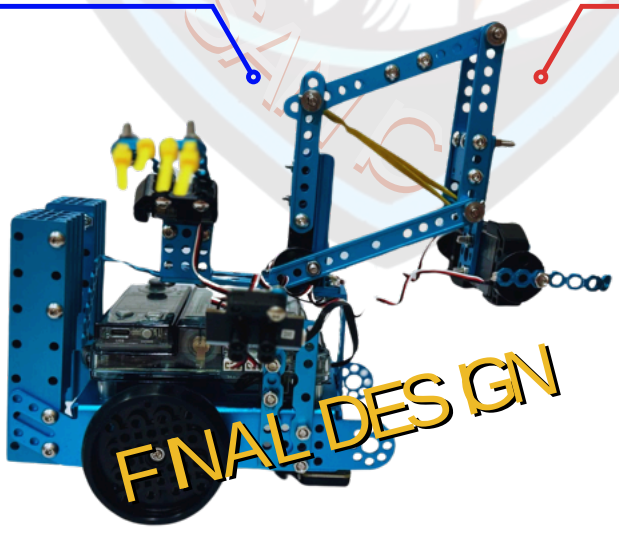
For each mission, we design robot to explore core resources support key energy needs for the future of smartmanufacturing and promote sustainable development in the intelligen manufacturing industry.



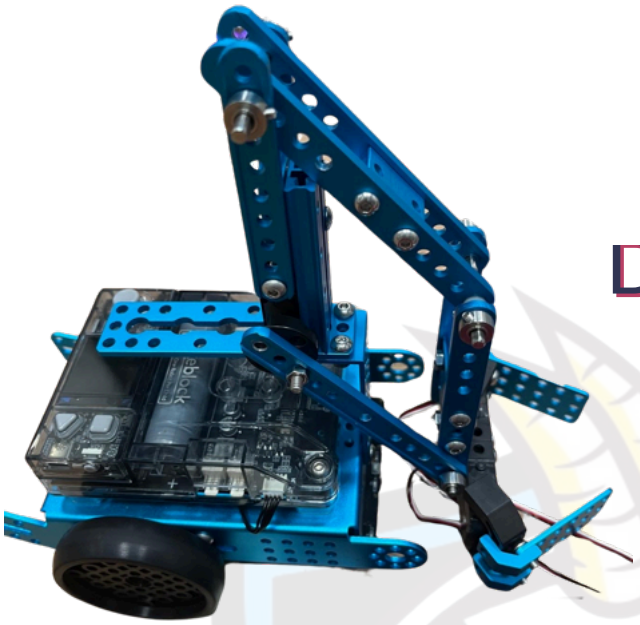
Sketch



Robot Design

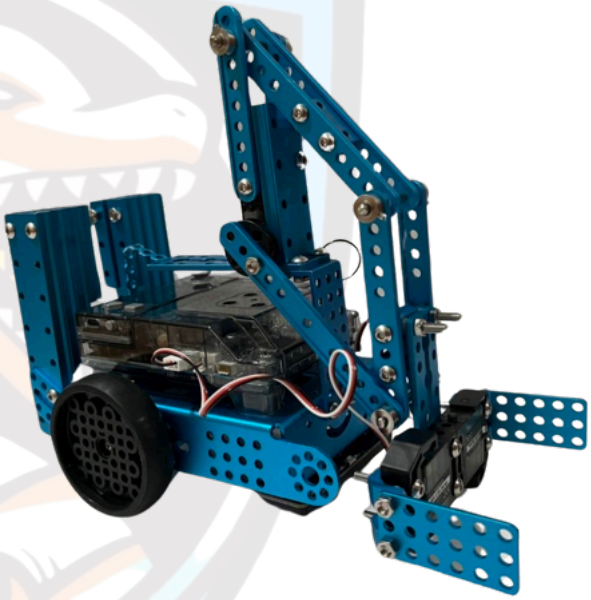


# TECHNICAL INNOVATION



DESIGN VERSION 1

DESIGN VERSION 2

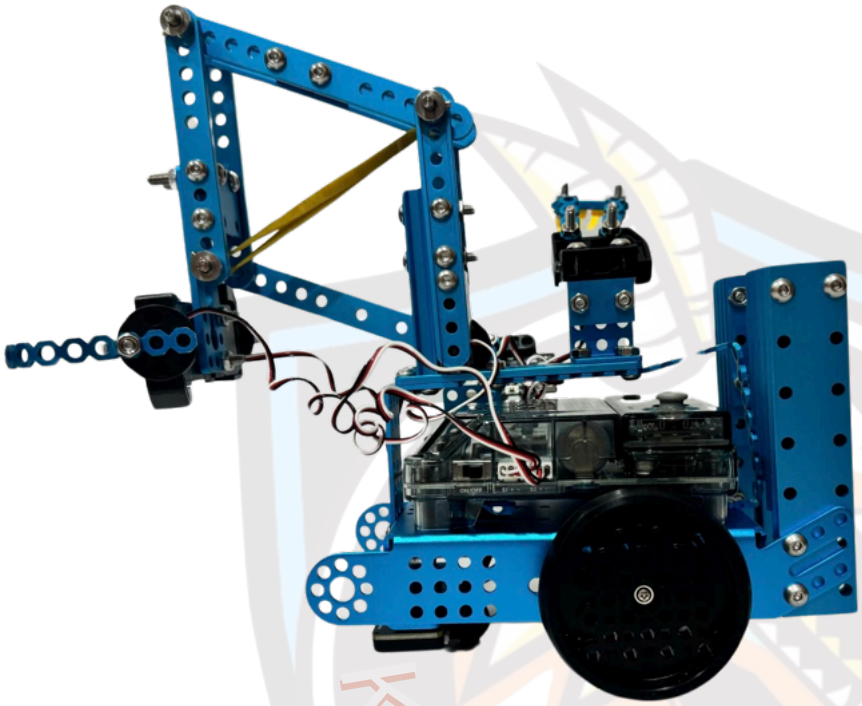




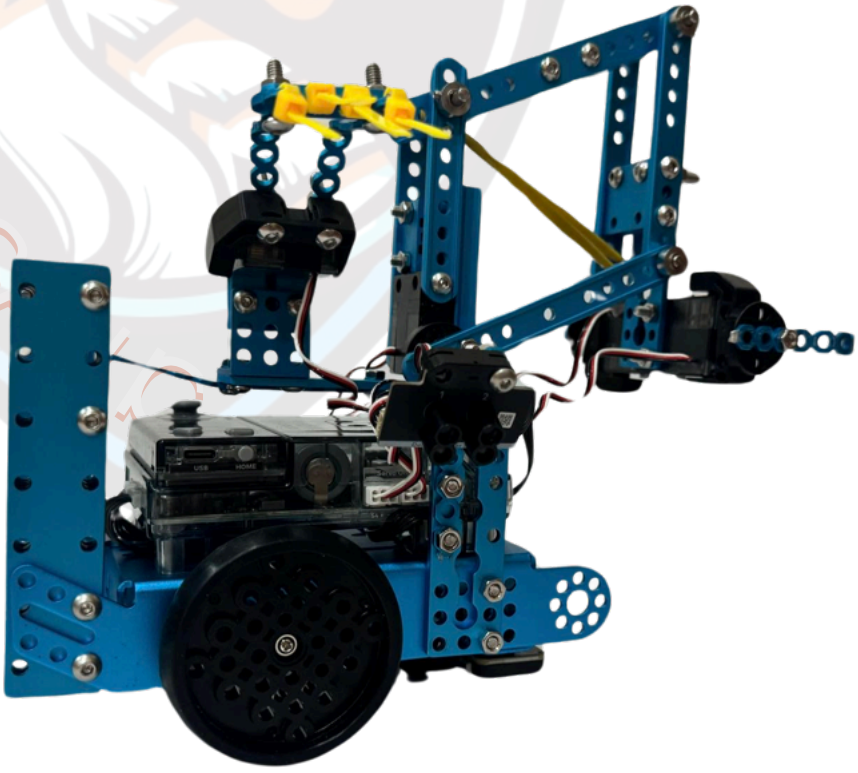
FINAL DESIGN

# TECHNICAL INNOVATION

## KS KB SANIC ROBOT

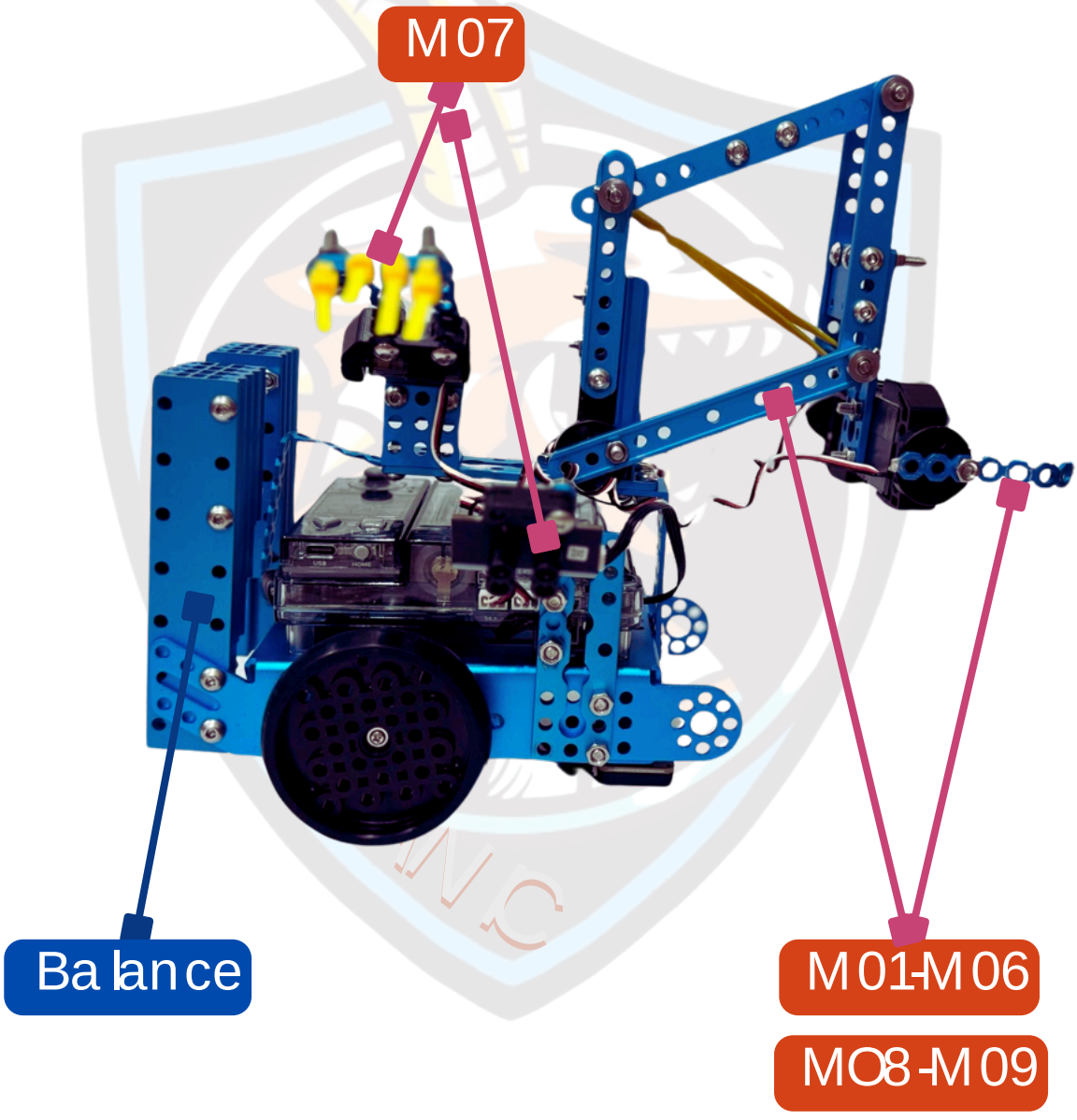


LEFT SIDE

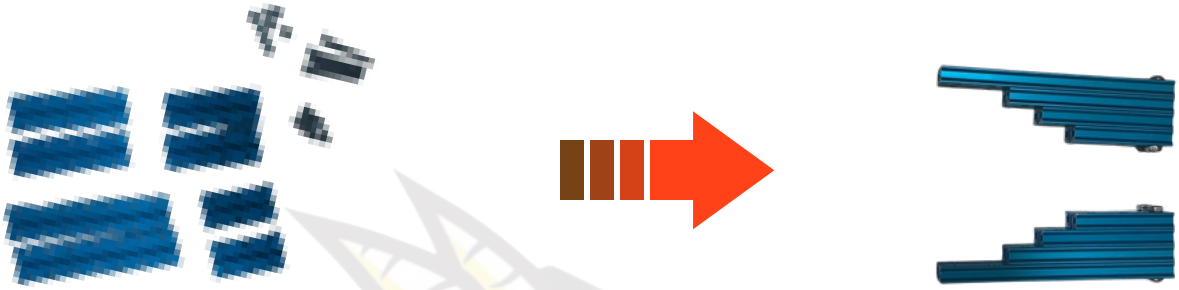


RIGHT SIDE

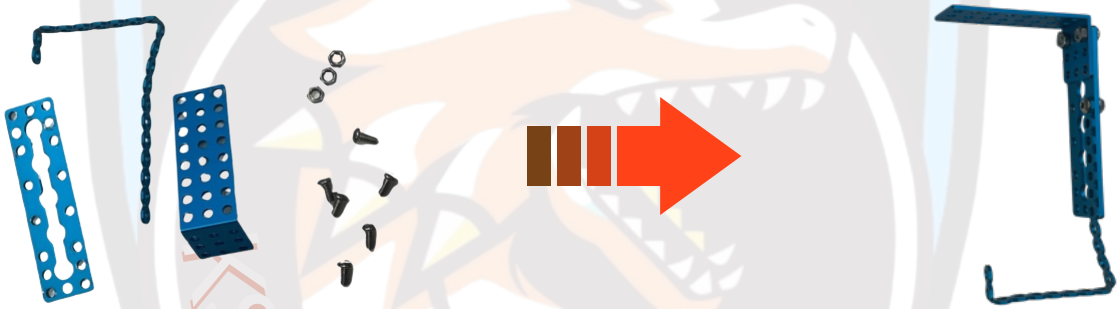
## ROBOT AND MISSION



## Step 1



## Step 2



## Step 3



## Step 4



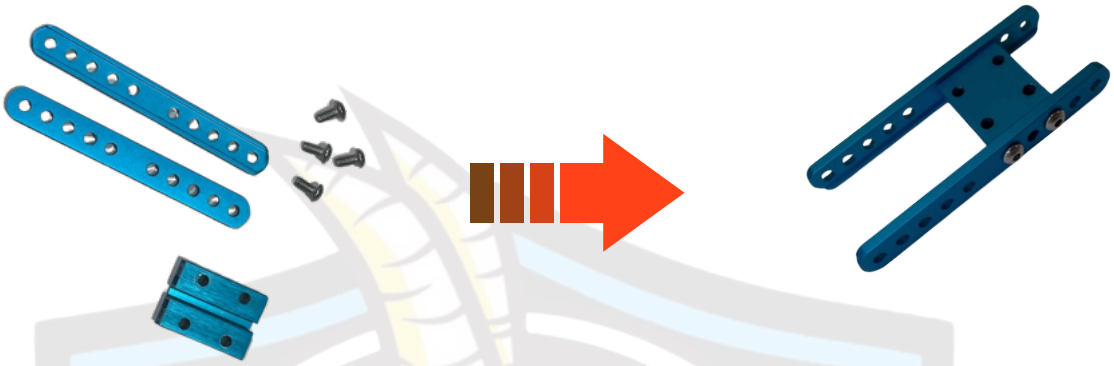
## Step 5



## Step 6



## Step 7



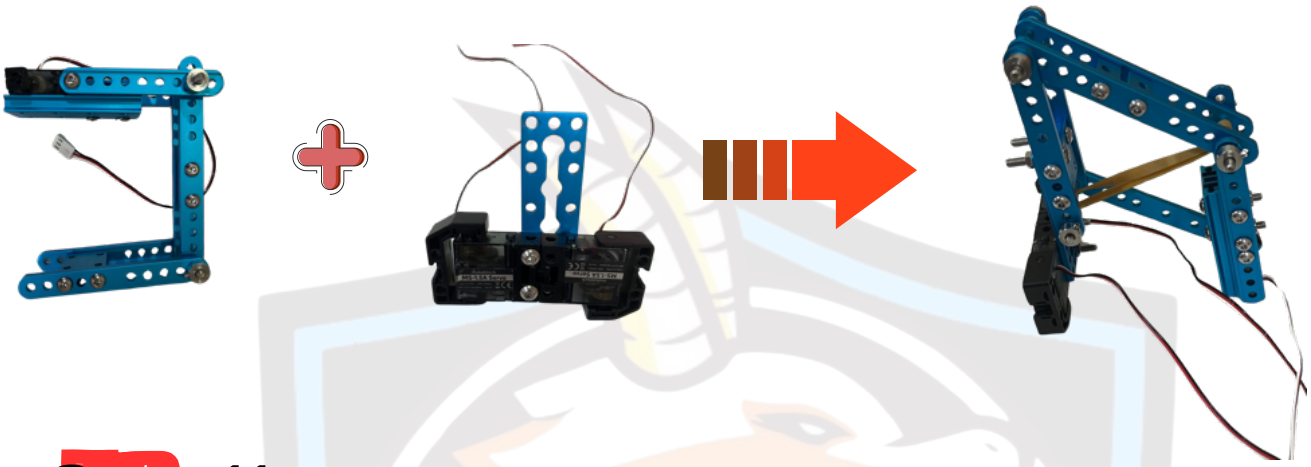
## Step 8



## Step 9



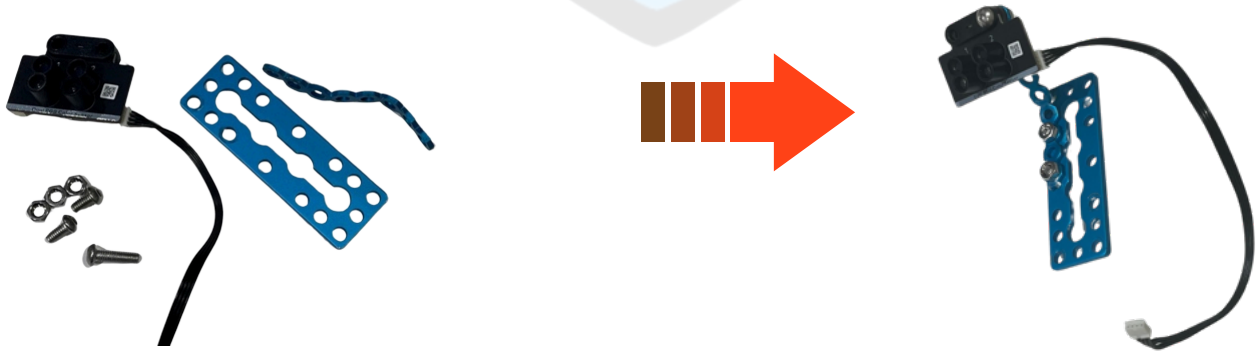
## Step 10



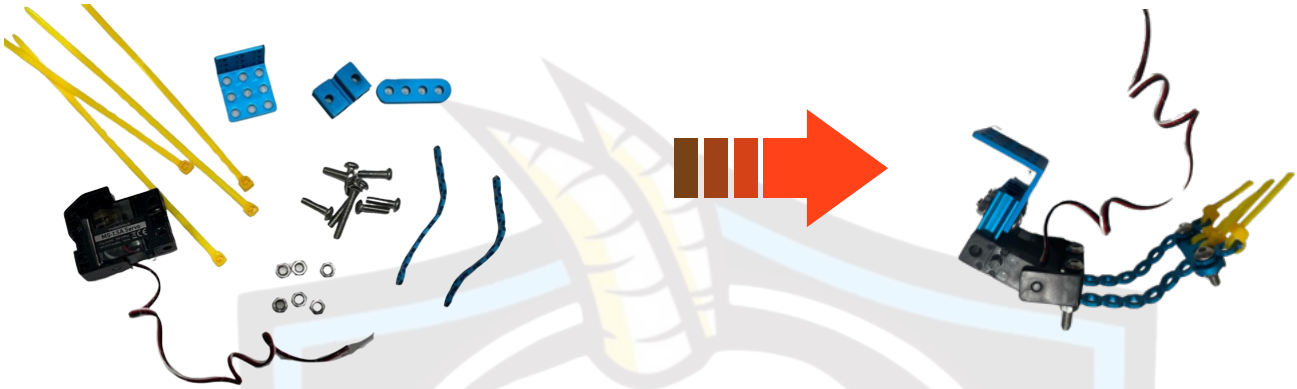
## Step 11



## Step 12



## Step 13



## Step 14



# MASCOT DESIGN

## Mascot : Sanic



Name: Sanic

Team : KS KB Sanic

Nationality: Thailand



### Inspiration :

Sanic is a cat mascot That resemble a robot from the 22nd century, well-known among children worldwide "Doraemon"

I was inspired by Doraemon because he is intelligent robot, advance technology, more creativity. Doraemon show us that robots can move and bring joy to people like "Mbot". So we decided to design the mascot as "Sanic Cat"

# GALLERY

Creativity Sharing

Fun Teamwork Mobility









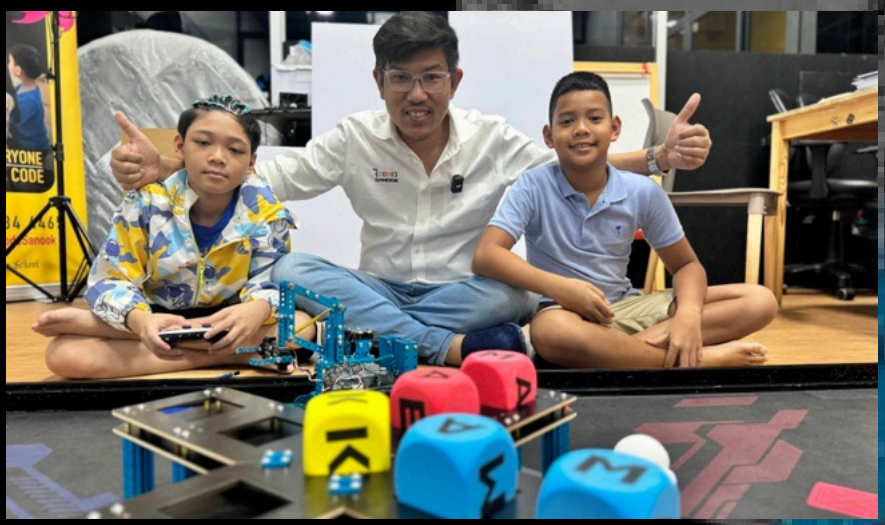


# - ALL-CORE JOURNEY -






















# Problem encountered and Solution

## Problem 1 Robot

**Problem** Robot (version 2) hand holding is too big ,when it catch the cube , itw ill attach to the equipment.

**Solution** Change robot design .

## Problem 2 Robot

**Problem** The robot's arms in front, causing the robot to have weight thrown forward .

**Solution** Use steel to act as a counterweight behind the robot.

## Problem 3 code

**Problem** When the robot is low battery , itm ake mission error. But we think that wrong code .We write new code and charge battery .When we do mission again , robot is also error .We just know low battery is can make error mission .

**Solution** If robot cannot do mission , cheak battery first.

## Problem 4 code

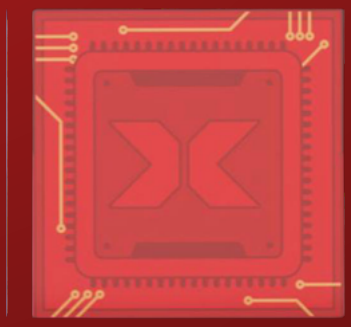
**Problem** If you use line follow code , itw ill take a long time and lighter oors

**Solution** Use code to walk in a straight line instead .So that the robot follow mission better.

# APPENDIX Codes



APPEND



Red Code:



## M01: CAPTURING QUANTUM CHIP

(20 POINTS/EACH)

## M02 TRANSITING QUANTUM CHIP AND ORGANIC CRYSTAL

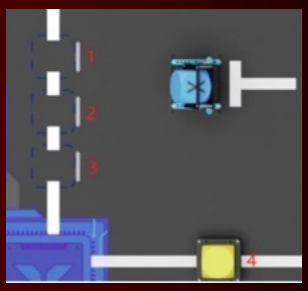
(30 POINTS/EACH)

CODE RED

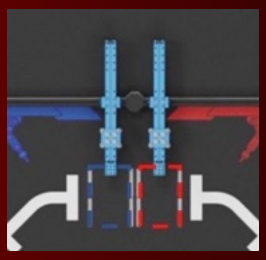
Automatic Stage

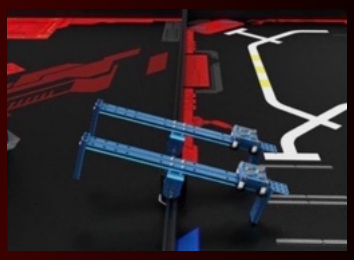
```
when button A pressed
wait 0.3 seconds
M1 and M2
```

```
define M1 and M2
set servo angle S1 35 °, S2 70 °, S3 180 °, S4 70 °
wait 0.3 seconds
walk with gyro 30 1.6 0.7 63
set servo angle S1 35 °, S2 120 °, S3 180 °, S4 120 °
wait 0.3 seconds
one wheel four direction 30 73 2 FW L
move forward backward 90 35 BW
walk with gyro 40 1.6 0.7 98
set servo (1) S1 angle to 165 °
one wheel four direction 30 71 2 FW R
moves forward 9 cm until done
set servo (1) S1 angle to 110 °
wait 0.1 seconds
set servo (1) S1 angle to 60 °
set servo angle S1 servo (1) S1 current angle (°) °, S2 70 °, S3 180 °, S4 70 °
moves backward 9 cm until done
set servo angle S1 20 °, S2 150 °, S3 180 °, S4 150 °
moves forward 10 cm until done
set servo (1) S1 angle to 90 °
wait 0.6 seconds
moves forward 2 cm until done
set servo (1) S1 angle to 150 °
wait 0.3 seconds
set servo (1) S1 angle to 110 °
moves backward 5 cm until done
```

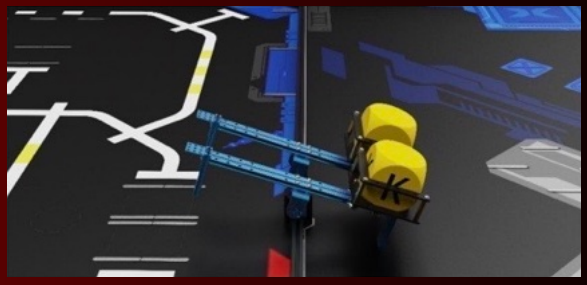


M01 initial placement





M02 initial placement



M02 Scoring judging

# Option :

## M04 NTELLGENT MANUFACTUR NG

(20 PO NTS/EACH)

## M05 PROCESS NG OF CONTAM NANTS

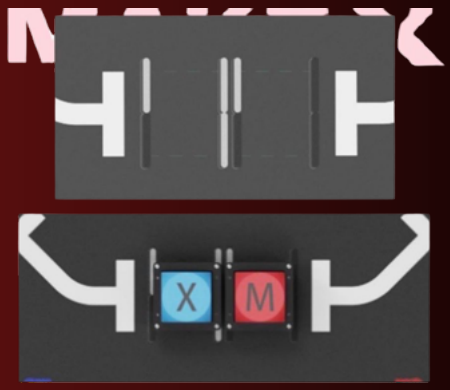
(10 PO NTS/EACH + 30 PO NTS/EACH)

CODE RED

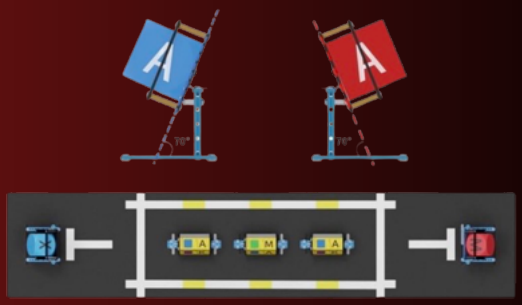
## Automatic Stage

```
define M4 option1
set servo angle S1 35 °, S2 70 °, S3 90 °, S4 70 °
wait 0.3 seconds
walk with gyro 40 0.4 0.2 30
set servo angle S1 35 °, S2 120 °, S3 90 °, S4 120 °
moves backward ▾ 24 cm ▾ until done
set servo (1) S1 ▾ angle to 90 °
wait 0.3 seconds
one wheel four direction 30 73 2 FW R
moves forward ▾ 4 cm ▾ until done
set servo (1) S1 ▾ angle to 35 °
wait 0.3 seconds
set servo angle S1 35 °, S2 70 °, S3 90 °, S4 70 °
wait 0.3 seconds
moves backward ▾ 4 cm ▾ until done
one wheel four direction 30 73 2 FW L
move forward backward 80 20 BW
set servo angle S1 110 °, S2 50 °, S3 90 °, S4 50 °
walk with gyro 45 1.6 0.7 78
set servo angle S1 110 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
set servo (1) S1 ▾ angle to 150 °
move forward backward 80 16 BW
one wheel four direction 30 71 2 FW R
move forward backward 80 20 BW
walk with gyro 48 1.6 0.7 46
one wheel four direction 20 80 2 FW R
moves backward ▾ 4 cm ▾ until done
set servo (1) S1 ▾ angle to 45 °
wait 0.3 seconds
set servo angle S1 45 °, S2 70 °, S3 90 °, S4 70 °
moves backward ▾ 4 cm ▾ until done
wait 0.3 seconds
set servo angle S1 45 °, S2 150 °, S3 90 °, S4 150 °
moves forward ▾ 14 cm ▾ until done
wait 0.1 seconds
moves backward ▾ 9 cm ▾ until done
set servo angle S1 130 °, S2 70 °, S3 90 °, S4 70 °
wait 0.2 seconds
moves forward ▾ 7 cm ▾ until done
set servo angle S1 130 °, S2 120 °, S3 90 °, S4 120 °
moves forward ▾ 1 cm ▾ until done
```

```
set servo (1) S1 ▾ angle to 165 °
moves backward ▾ 4 cm ▾ until done
one wheel four direction 30 88 2 FW L
walk with gyro 48 1.6 0.7 50
set servo angle S1 165 °, S2 70 °, S3 90 °, S4 70 °
moves forward ▾ 10 cm ▾ until done
wait 0.3 seconds
moves backward ▾ 5 cm ▾ until done
```




M04 initial placement



M05 initial placement

M04 INTELLIGENT MANUFACTURING

(20 POINTS/EACH)

M05 PROCESSING OF CONTAMINANTS

(10 POINTS/EACH + 30 POINTS/EACH)

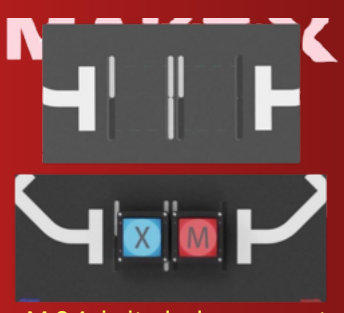
CODE RED

Automatic Stage

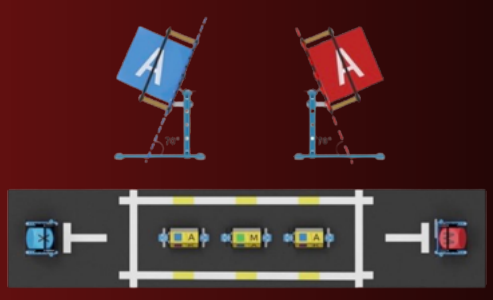
## Option 2

```
define M4 option 2
set servo angle S1 110 °, S2 50 °, S3 90 °, S4 50 °
walk with gyro 45 1.6 0.7 78
set servo angle S1 110 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
set servo (1) S1 ▾ angle to 150 °
move forward backward 80 15 BW
one wheel four direction 30 71 2 FW R
move forward backward 80 20 BW
walk with gyro 48 1.6 0.7 46
one wheel four direction 20 80 2 FW R
moves backward ▾ 4 cm ▾ until done
set servo (1) S1 ▾ angle to 45 °
wait 0.3 seconds
set servo angle S1 45 °, S2 70 °, S3 90 °, S4 70 °
moves backward ▾ 4 cm ▾ until done
wait 0.3 seconds
set servo angle S1 45 °, S2 150 °, S3 90 °, S4 150 °
moves forward ▾ 14 cm ▾ until done
wait 0.1 seconds
moves backward ▾ 9 cm ▾ until done
set servo angle S1 130 °, S2 70 °, S3 90 °, S4 70 °
wait 0.2 seconds
moves forward ▾ 7 cm ▾ until done
set servo angle S1 130 °, S2 120 °, S3 90 °, S4 120 °
moves forward ▾ 1 cm ▾ until done
set servo (1) S1 ▾ angle to 165 °
moves backward ▾ 4 cm ▾ until done
```

```
set servo (1) S1 ▾ angle to 165 °
moves backward ▾ 4 cm ▾ until done
one wheel four direction 30 88 2 FW L
walk with gyro 48 1.6 0.7 50
set servo angle S1 165 °, S2 70 °, S3 90 °, S4 70 °
moves forward ▾ 10 cm ▾ until done
wait 0.3 seconds
moves backward ▾ 5 cm ▾ until done
```




M04 initial placement




M05 initial placement

# M06 STACKING STOREROOM

(30 POINTS /EACH + 10 POINTS/EACH

# M03 CAPTURING ALPHABET CUBE

(30 POINTS/EACH)

CODE RED

Automatic Stage

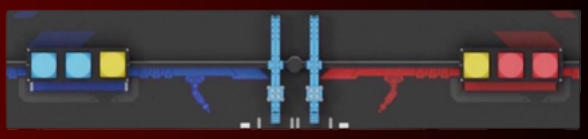
Option :

## Mission 6

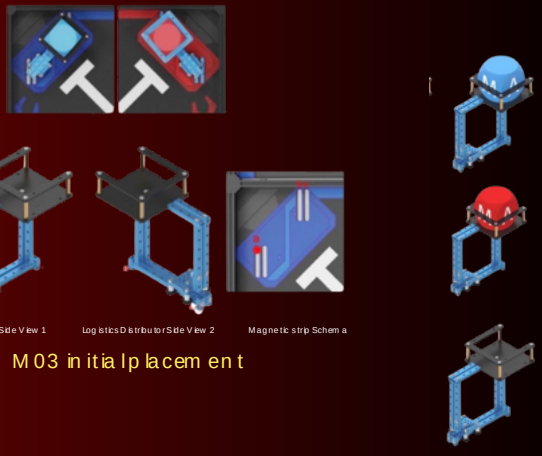
```
define M6 option 1
set servo angle S1 165 °, S2 90 °, S3 90 °, S4 90 °
walk with gyro 60 0.4 0.2 50
line follow mid line 20 0.4 0.2 0.3
line follow distance 20 0.4 0.2 28
one wheel four direction 30 71 2 FW R
moves backward ▾ 2 cm ▾ until done
set servo angle S1 90 °, S2 80 °, S3 90 °, S4 80 °
wait 0.3 seconds
set servo angle S1 90 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
set servo (1) S1 ▾ angle to 150 °
moves forward ▾ 11 cm ▾ until done
set servo angle S1 150 °, S2 90 °, S3 90 °, S4 90 °
moves backward ▾ 9 cm ▾ until done
one wheel four direction 30 71 2 FW L
line follow distance 20 0.4 0.2 9
one wheel four direction 30 71 2 FW R
moves backward ▾ 2 cm ▾ until done
set servo angle S1 90 °, S2 80 °, S3 90 °, S4 80 °
wait 0.3 seconds
set servo angle S1 90 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
set servo (1) S1 ▾ angle to 150 °
moves forward ▾ 11 cm ▾ until done
set servo angle S1 150 °, S2 90 °, S3 90 °, S4 90 °
moves backward ▾ 9 cm ▾ until done
one wheel four direction 30 71 2 FW R
```

## Mission 3

```
line follow mid line 30 0.4 0.2 0.35
set servo (1) S1 ▾ angle to 110 °
one wheel four direction 30 25 2 FW L
move forward backward 40 20 FW
moves backward ▾ 8 cm ▾ until done
one wheel four direction 80 20 2 FW L
one wheel four direction 80 20 2 FW R
```



M06 initial placement




M03 initial placement

# M06 STACKING STOREROOM

(30 POINTS /EACH + 10 POINTS/EACH

# M03 CAPTURING ALPHABET CUBE

(30 POINTS/EACH)

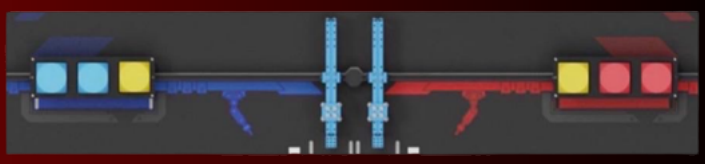
CODE RED

Automatic Stage

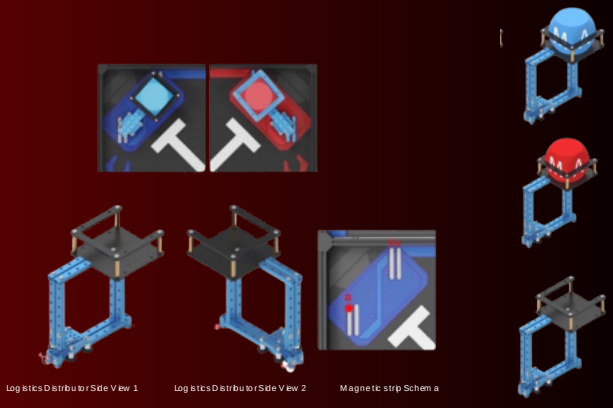
## Option 2

```
define M6 option 2
set servo angle S1 165 °, S2 90 °, S3 90 °, S4 90 °
walk with gyro 60 0.4 0.2 50
line follow mid line 20 0.4 0.2 0.3
line follow distance 20 0.4 0.2 37
one wheel four direction 30 71 2 FW R
moves backward 2 cm until done
set servo angle S1 90 °, S2 80 °, S3 90 °, S4 80 °
wait 0.3 seconds
set servo angle S1 90 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
set servo (1) S1 angle to 150 °
moves forward 11 cm until done
set servo angle S1 150 °, S2 90 °, S3 90 °, S4 90 °
moves backward 9 cm until done
one wheel four direction 30 71 2 FW L
line follow distance 20 0.4 0.2 9
one wheel four direction 30 71 2 FW R
moves backward 2 cm until done
set servo angle S1 90 °, S2 80 °, S3 90 °, S4 80 °
wait 0.3 seconds
set servo angle S1 90 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
set servo (1) S1 angle to 150 °
moves forward 11 cm until done
set servo angle S1 150 °, S2 90 °, S3 90 °, S4 90 °
moves backward 9 cm until done
```

```
one wheel four direction 30 71 2 FW R
line follow mid line 30 0.4 0.2 0.35
set servo (1) S1 angle to 110 °
one wheel four direction 30 25 2 FW L
move forward backward 40 20 FW
moves backward 8 cm until done
one wheel four direction 80 20 2 FW L
one wheel four direction 80 20 2 FW R
```



M06 initial placement




M03 initial placement

# M06 STACKING STOREROOM

(30 POINTS /EACH + 10 POINTS/EACH

# M03 CAPTURING ALPHABET CUBE

(30 POINTS/EACH)

CODE RED

Automatic Stage

## Option 3

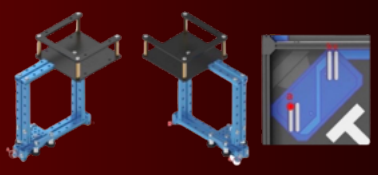
```
define M6 option3
set servo angle S1 165 °, S2 90 °, S3 90 °, S4 90 °
walk with gyro 60 0.4 0.2 50
line follow mid line 20 0.4 0.2 0.3
line follow distance 20 0.4 0.2 28
one wheel four direction 30 73 2 FW R
moves backward 2 cm until done
set servo angle S1 90 °, S2 80 °, S3 90 °, S4 80 °
wait 0.3 seconds
set servo angle S1 90 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
set servo (1) S1 angle to 150 °
moves forward 11 cm until done
set servo angle S1 150 °, S2 90 °, S3 90 °, S4 90 °
moves backward 9 cm until done
one wheel four direction 30 73 2 FW L
line follow distance 20 0.4 0.2 18
one wheel four direction 30 71 2 FW R
moves backward 2 cm until done
set servo angle S1 90 °, S2 80 °, S3 90 °, S4 80 °
wait 0.3 seconds
set servo angle S1 90 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
set servo (1) S1 angle to 150 °
moves forward 11 cm until done
set servo angle S1 150 °, S2 90 °, S3 90 °, S4 90 °
moves backward 9 cm until done
```

```
moves forward 11 cm until done
set servo angle S1 150 °, S2 90 °, S3 90 °, S4 90 °
moves backward 9 cm until done
one wheel four direction 30 71 2 FW R
line follow mid line 30 0.4 0.2 0.35
set servo (1) S1 angle to 110 °
one wheel four direction 30 25 2 FW L
move forward backward 40 20 FW
moves backward 8 cm until done
one wheel four direction 80 20 2 FW L
one wheel four direction 80 20 2 FW R
```



M06 initial placement





Logistics Distributor Side View 1 Logistics Distributor Side View 2 Magnetic strip Schema

M03 initial placement



# M07 LIGHTNING THE ANTIMATTER FUELRODS

(20 POINTS/EACH)

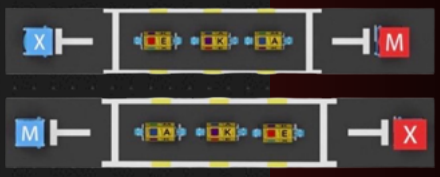
CODE RED

## Automatic Stage

```
define M7
walk with gyro 40 1.6 0.8 20
line follow mid line 30 0.4 0.2 0.25
one wheel four direction 30 71 2 FW R
line follow mid line 20 0.4 0.2 0.4
one wheel four direction 30 71 2 FW L
mid yellow 16 0.4 0.2 1
line align 20
moves forward 2 cm until done
repeat until dual RGB sensor 1 probe 1 detects color cyan ? or dual RGB sensor 1 probe 2 detects color cyan ?
    repeat 12
        increase servo (3) S3 angle by -10 °
        wait 0.1 seconds
    wait 0.3 seconds
    repeat 15
        increase servo (3) S3 angle by 8 °
        wait 0.1 seconds
mid yellow 16 0.4 0.2 1
line align 20
repeat until dual RGB sensor 1 probe 1 detects color purple ? or dual RGB sensor 1 probe 2 detects color purple ?
    repeat 12
        increase servo (3) S3 angle by -10 °
        wait 0.1 seconds
    wait 0.3 seconds
    repeat 15
        increase servo (3) S3 angle by 8 °
        wait 0.1 seconds
mid yellow 16 0.4 0.2 1
line align 20
repeat until dual RGB sensor 1 probe 1 detects color red ? or dual RGB sensor 1 probe 2 detects color red ?
    repeat 12
        increase servo (3) S3 angle by -10 °
        wait 0.1 seconds
    wait 0.3 seconds
    repeat 15
        increase servo (3) S3 angle by 8 °
        wait 0.1 seconds
set servo all angle to 90 °
```



M07 initial placement

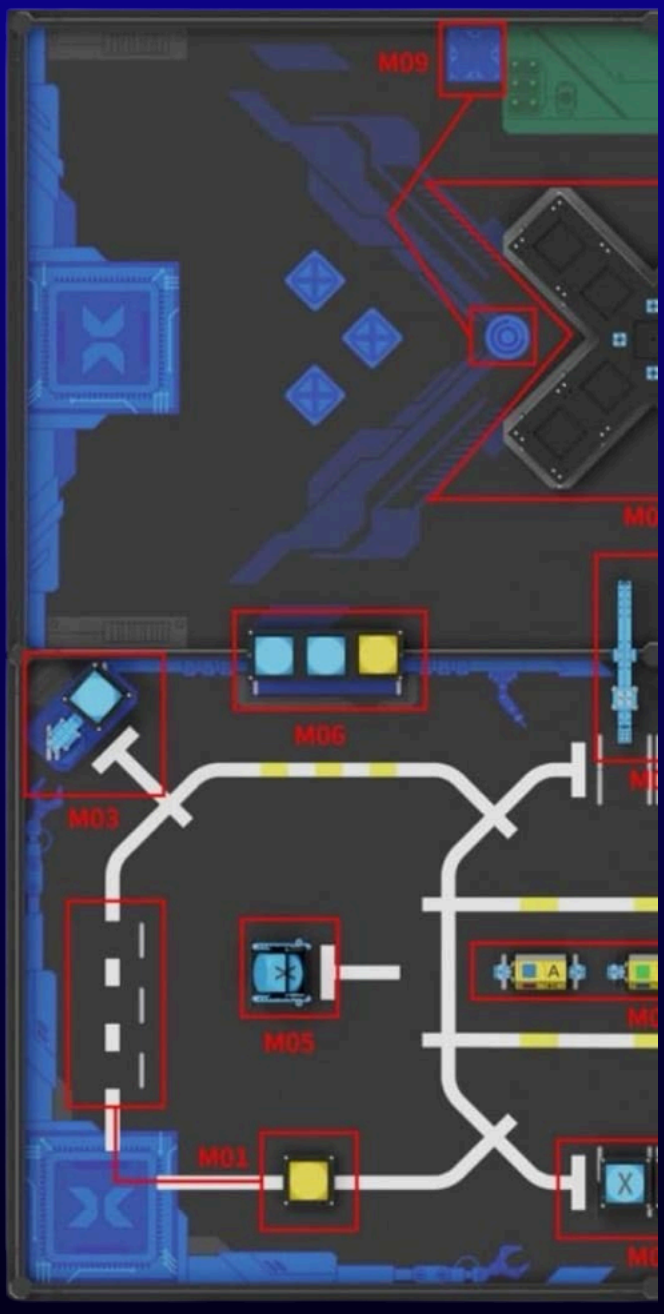


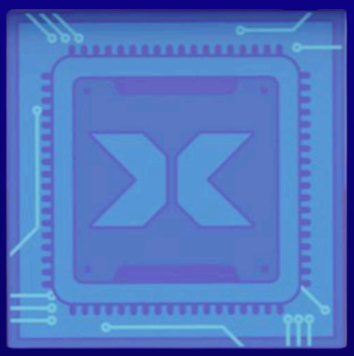
M07 initial placement



Antimatter FuelRods

# APPEND



## Blue Code

# M01: CAPTURING QUANTUM CHIP

(20 POINTS/EACH)

# M02 TRANSITING QUANTUM CHIP AND ORGANIC CRYSTAL

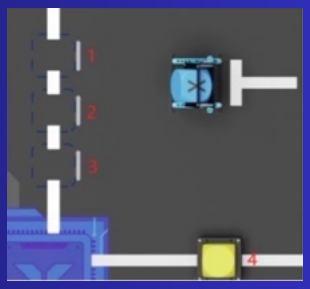
(30 POINTS/EACH)

CODE BLUE

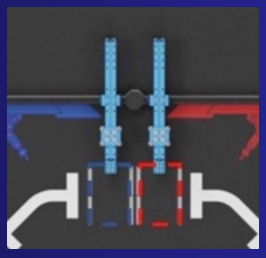
Automatic Stage

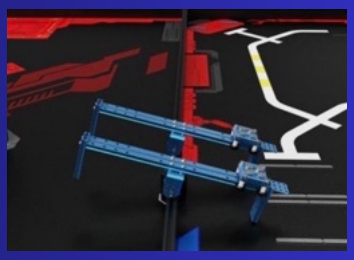
```
when button A pressed
wait 0.3 seconds
M1 and M2 blue
```

```
define M1 and M2 blue
set servo angle S1 35 °, S2 70 °, S3 180 °, S4 70 °
wait 0.3 seconds
walk with gyro 30 1.6 0.7 64
set servo angle S1 35 °, S2 120 °, S3 180 °, S4 120 °
wait 0.3 seconds
one wheel four direction 30 73 2 FW R
move forward backward 90 35 BW
walk with gyro 40 1.6 0.7 96
set servo (1) S1 angle to 165 °
wait 0.3 seconds
one wheel four direction 30 75 2 FW L
moves forward 9 cm until done
set servo (1) S1 angle to 110 °
wait 0.3 seconds
set servo (1) S1 angle to 60 °
set servo angle S1 servo (1) S1 current angle (°) °, S2 70 °, S3 180 °, S4 70 °
wait 0.3 seconds
moves backward 9 cm until done
set servo angle S1 20 °, S2 150 °, S3 180 °, S4 150 °
wait 0.3 seconds
moves forward 10 cm until done
set servo (1) S1 angle to 90 °
wait 0.6 seconds
moves forward 2 cm until done
set servo (1) S1 angle to 150 °
wait 0.3 seconds
set servo (1) S1 angle to 110 °
moves backward 5 cm until done
```

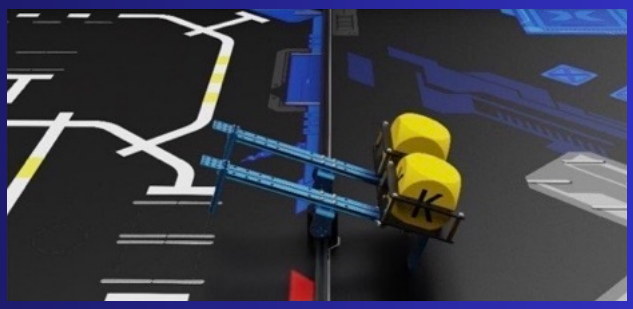


M01 initial placement





M02 initial placement



M02 Scoring judging

## M04 INTELLIGENT MANUFACTURING

(20 POINTS/EACH)

## M05 PROCESSING OF CONTAMINANTS

(10 POINTS/EACH + 30 POINTS/EACH)

CODE BLUE

Automatic Stage

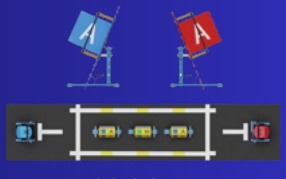
**Option 1**

```
define M4 blue option 1
set servo angle S1 35 °, S2 70 °, S3 90 °, S4 70 °
wait 0.3 seconds
walk with gyro 40 1.6 0.7 30
set servo angle S1 35 °, S2 120 °, S3 90 °, S4 120 °
moves backward ▼ 24 cm ▼ until done
set servo (1) S1 ▼ angle to 60 °
wait 0.3 seconds
one wheel four direction 30 85 2 BW L
moves forward ▼ 4 cm ▼ until done
set servo (1) S1 ▼ angle to 35 °
wait 0.3 seconds
set servo angle S1 35 °, S2 70 °, S3 90 °, S4 70 °
wait 0.3 seconds
moves backward ▼ 4 cm ▼ until done
one wheel four direction 30 73 2 FW R
move forward bckward 80 20 BW
set servo angle S1 110 °, S2 50 °, S3 90 °, S4 50 °
walk with gyro 40 1.6 0.7 80
set servo angle S1 110 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
set servo (1) S1 ▼ angle to 150 °
move forward bckward 80 16 BW
one wheel four direction 30 71 2 BW L
move forward bckward 80 20 BW
walk with gyro 40 1.6 0.7 46
```

```
one wheel four direction 20 85 2 FW L
moves backward ▼ 4 cm ▼ until done
set servo (1) S1 ▼ angle to 45 °
wait 0.3 seconds
set servo angle S1 45 °, S2 70 °, S3 90 °, S4 70 °
moves backward ▼ 4 cm ▼ until done
wait 0.3 seconds
set servo angle S1 45 °, S2 150 °, S3 90 °, S4 150 °
moves forward ▼ 14 cm ▼ until done
wait 0.3 seconds
moves backward ▼ 9 cm ▼ until done
set servo angle S1 130 °, S2 70 °, S3 90 °, S4 70 °
wait 0.3 seconds
moves forward ▼ 7 cm ▼ until done
set servo angle S1 130 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
moves forward ▼ 1 cm ▼ until done
set servo (1) S1 ▼ angle to 165 °
moves backward ▼ 4 cm ▼ until done
one wheel four direction 30 88 2 FW R
walk with gyro 40 1.6 0.7 50
set servo angle S1 165 °, S2 70 °, S3 90 °, S4 70 °
wait 0.3 seconds
moves backward ▼ 5 cm ▼ until done
```



M04 initial placement



M05 initial placement

## M04 INTELLIGENT MANUFACTURING

(20 POINTS/EACH)

## M05 PROCESSING OF CONTAMINANTS

(10 POINTS/EACH + 30 POINTS/EACH)

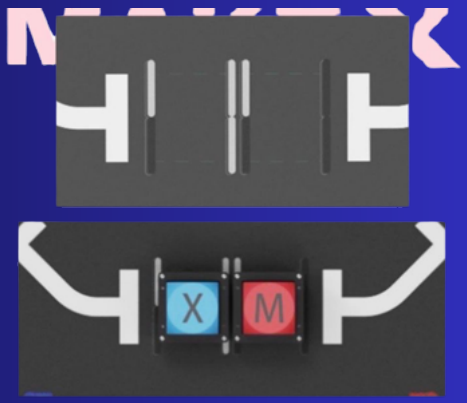
CODE BLUE

# Automatic Stage

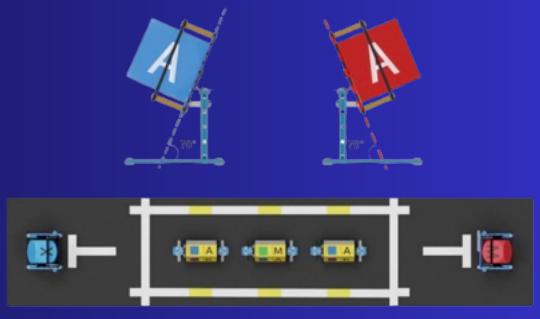
## Option 2

```
define m4 mode option2 blue
set servo angle S1 110 °, S2 50 °, S3 90 °, S4 50 °
walk with gyro 40 1.6 0.7 80
set servo angle S1 110 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
set servo (1) S1 angle to 150 °
move forward bckward 80 16 BW
one wheel four direction 30 71 2 BW L
move forward bckward 80 20 BW
walk with gyro 40 1.6 0.7 46
one wheel four direction 20 85 2 FW L
moves backward 4 cm until done
set servo (1) S1 angle to 45 °
wait 0.3 seconds
set servo angle S1 45 °, S2 70 °, S3 90 °, S4 70 °
moves backward 4 cm until done
wait 0.3 seconds
set servo angle S1 45 °, S2 150 °, S3 90 °, S4 150 °
moves forward 14 cm until done
wait 0.3 seconds
moves backward 9 cm until done
set servo angle S1 130 °, S2 70 °, S3 90 °, S4 70 °
wait 0.3 seconds
moves forward 7 cm until done
set servo angle S1 130 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
```

```
moves forward 1 cm until done
set servo (1) S1 angle to 165 °
moves backward 4 cm until done
one wheel four direction 30 88 2 FW R
walk with gyro 40 1.6 0.7 50
set servo angle S1 165 °, S2 70 °, S3 90 °, S4 70 °
wait 0.3 seconds
moves backward 5 cm until done
```




M04 initial placement




M05 initial placement

# M06 STACKING STOREROOM

(30 POINTS /EACH + 10 POINTS/EACH

# M03 CAPTURING ALPHABET CUBE

(30 POINTS/EACH)

CODE BLUE

Automatic Stage

```
define M6 opttion1 blue
set servo angle S1 165 °, S2 70 °, S3 90 °, S4 70 °
wait 0.3 seconds
walk with gyro 60 1.6 0.7 50
Line follow until cross stop middle line 20 0.4 0.2 0.3
Line follow to distance 20 0.4 0.2 28
one wheel four direction 30 73 2 FW L
moves backward 2 cm until done
set servo angle S1 90 °, S2 70 °, S3 90 °, S4 70 °
wait 0.3 seconds
set servo angle S1 90 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
set servo (1) S1 angle to 150 °
moves forward 11 cm until done
set servo angle S1 150 °, S2 70 °, S3 90 °, S4 70 °
moves backward 9 cm until done
one wheel four direction 30 73 2 FW R
Line follow to distance 20 0.4 0.2 9
one wheel four direction 30 71 2 FW L
moves backward 2 cm until done
set servo angle S1 90 °, S2 70 °, S3 90 °, S4 70 °
wait 0.3 seconds
set servo angle S1 90 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
set servo (1) S1 angle to 150 °
wait 0.3 seconds
```

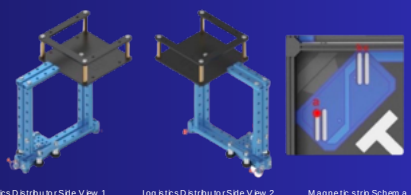
Option 1

```
set servo (1) S1 angle to 150 °
moves forward 11 cm until done
set servo angle S1 150 °, S2 90 °, S3 90 °, S4 90 °
moves backward 9 cm until done
one wheel four direction 30 71 2 FW L
Line follow until cross stop middle line 30 0.4 0.2 0.3
set servo (1) S1 angle to 110 °
one wheel four direction 30 25 2 FW R
move forward bckward 40 20 FW
moves backward 8 cm until done
one wheel four direction 80 20 2 FW R
one wheel four direction 80 20 2 FW L
```



M06 initial placement







Logistics Distributor Side View 1 Logistics Distributor Side View 2 Magnetic strip Schema

M03 initial placement

# M06 STACKING STOREROOM

(30 POINTS /EACH + 10 POINTS/EACH

# M03 CAPTURING ALPHABET CUBE

(30 POINTS/EACH)

CODE BLUE

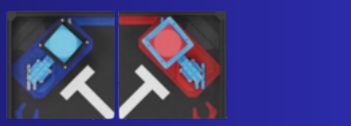
Automatic Stage

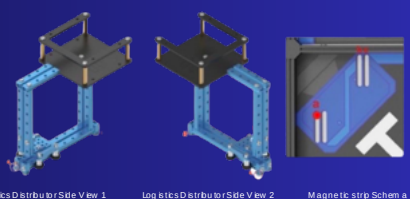
```
define M6 opttion2 blue
set servo angle S1 165 °, S2 70 °, S3 90 °, S4 70 °
wait 0.3 seconds
walk with gyro 60 1.6 0.7 50
Line follow until cross stop middle line 20 0.4 0.2 0.3
Line follow to distance 20 0.4 0.2 37
one wheel four direction 30 73 2 FW L
moves backward 2 cm until done
set servo angle S1 90 °, S2 70 °, S3 90 °, S4 70 °
wait 0.3 seconds
set servo angle S1 90 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
set servo (1) S1 angle to 150 °
moves forward 11 cm until done
set servo angle S1 150 °, S2 70 °, S3 90 °, S4 70 °
moves backward 9 cm until done
one wheel four direction 30 73 2 FW R
Line follow to distance 20 0.4 0.2 9
one wheel four direction 30 71 2 FW L
moves backward 2 cm until done
set servo angle S1 90 °, S2 70 °, S3 90 °, S4 70 °
wait 0.3 seconds
set servo angle S1 90 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
set servo (1) S1 angle to 150 °
wait 0.3 seconds
```

```
set servo (1) S1 angle to 150 °
moves forward 11 cm until done
set servo angle S1 150 °, S2 90 °, S3 90 °, S4 90 °
moves backward 9 cm until done
one wheel four direction 30 71 2 FW L
Line follow until cross stop middle line 30 0.4 0.2 0.3
set servo (1) S1 angle to 110 °
one wheel four direction 30 25 2 FW R
move forward bckward 40 20 FW
moves backward 8 cm until done
one wheel four direction 80 20 2 FW R
one wheel four direction 80 20 2 FW L
```



M06 initial placement





Logistics Distributor Side View 1 Logistics Distributor Side View 2 Magnetic strip Schema



M03 initial placement

# M06 STACKING STOREROOM

(30 POINTS /EACH + 10 POINTS/EACH

# M03 CAPTURING ALPHABET CUBE

(30 POINTS/EACH)

CODE BLUE

Automatic Stage

## Option 3

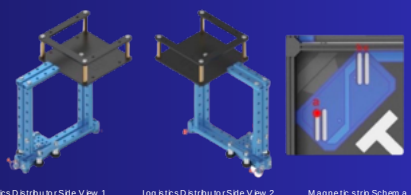
```
define M6 opttion3 blue
set servo angle S1 165 °, S2 70 °, S3 90 °, S4 70 °
wait 0.3 seconds
walk with gyro 60 1.6 0.7 50
Line follow until cross stop middle line 20 0.4 0.2 0.3
Line follow to distance 20 0.4 0.2 28
one wheel four direction 30 73 2 FW L
moves backward 2 cm until done
set servo angle S1 90 °, S2 70 °, S3 90 °, S4 70 °
wait 0.3 seconds
set servo angle S1 90 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
set servo (1) S1 angle to 150 °
moves forward 11 cm until done
set servo angle S1 150 °, S2 70 °, S3 90 °, S4 70 °
moves backward 9 cm until done
one wheel four direction 30 73 2 FW R
Line follow to distance 20 0.4 0.2 18
one wheel four direction 30 71 2 FW L
moves backward 2 cm until done
set servo angle S1 90 °, S2 70 °, S3 90 °, S4 70 °
wait 0.3 seconds
set servo angle S1 90 °, S2 120 °, S3 90 °, S4 120 °
wait 0.3 seconds
set servo (1) S1 angle to 150 °
wait 0.3 seconds
```

```
set servo (1) S1 angle to 150 °
moves forward 11 cm until done
set servo angle S1 150 °, S2 90 °, S3 90 °, S4 90 °
moves backward 9 cm until done
one wheel four direction 30 71 2 FW L
Line follow until cross stop middle line 30 0.4 0.2 0.3
set servo (1) S1 angle to 110 °
one wheel four direction 30 25 2 FW R
move forward bckward 40 20 FW
moves backward 8 cm until done
one wheel four direction 80 20 2 FW R
one wheel four direction 80 20 2 FW L
```



M06 initial placement



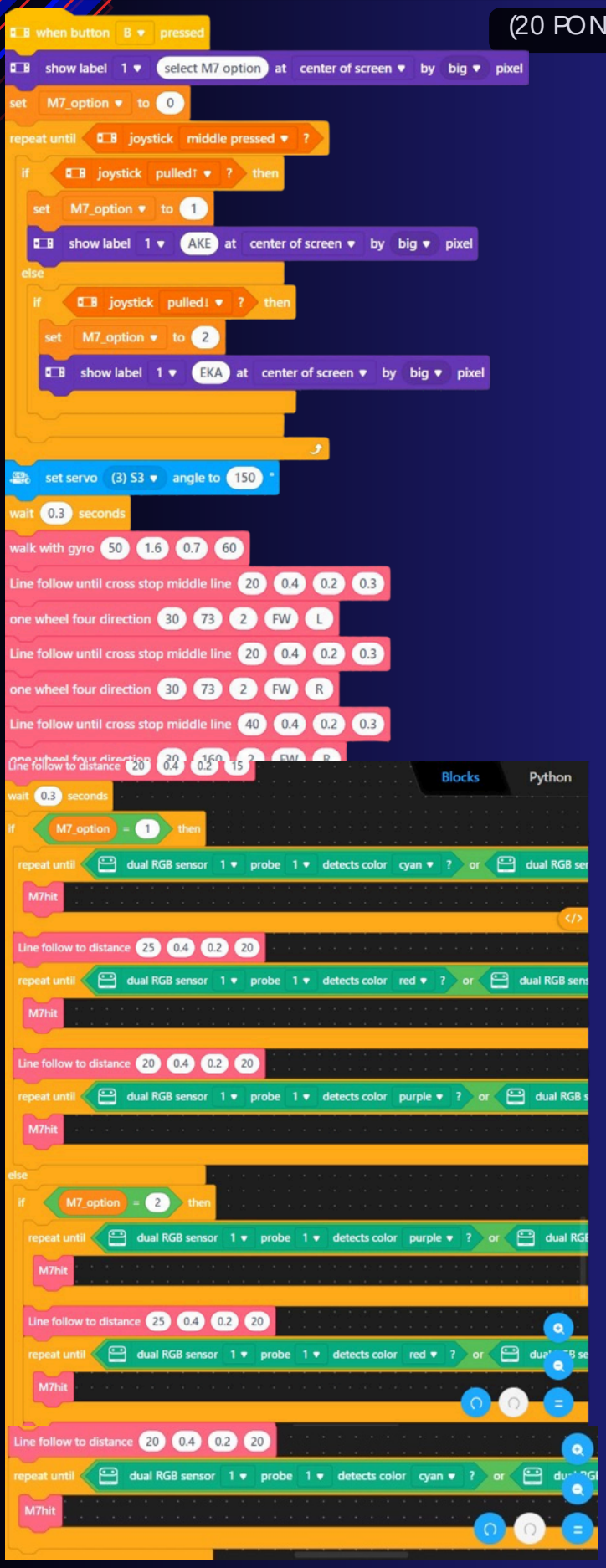





M03 initial placement

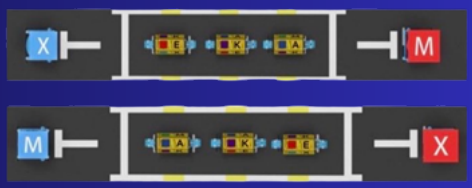
# M07 LIGHTNING THE ANTIMATTER FUELRODS

(20 POINTS/EACH)

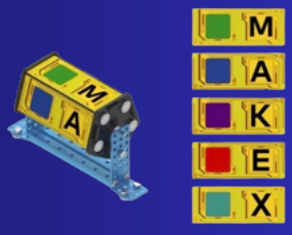





M07 initial placement



M07 initial placement



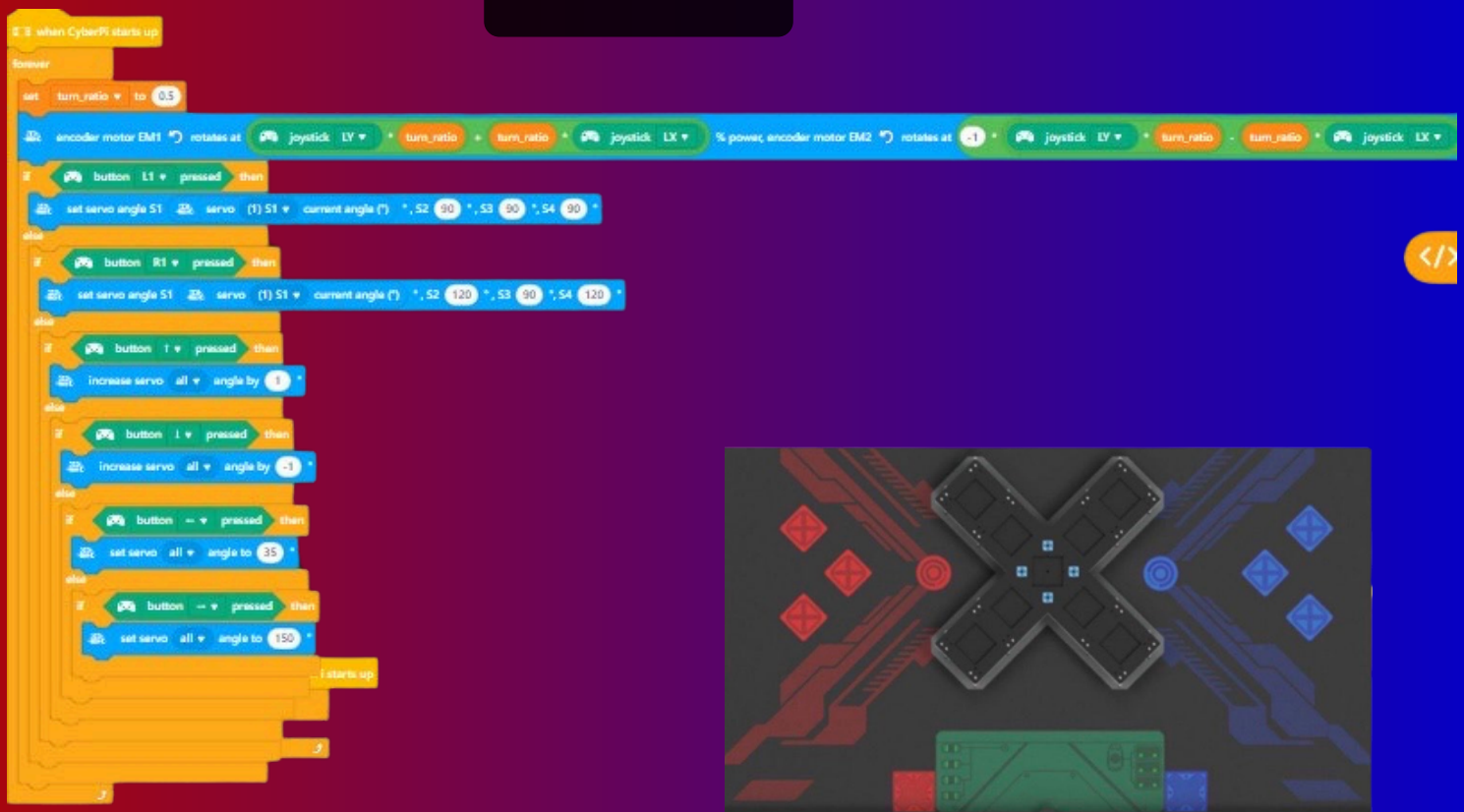
Antimatter Fuel Rods

[redacted]

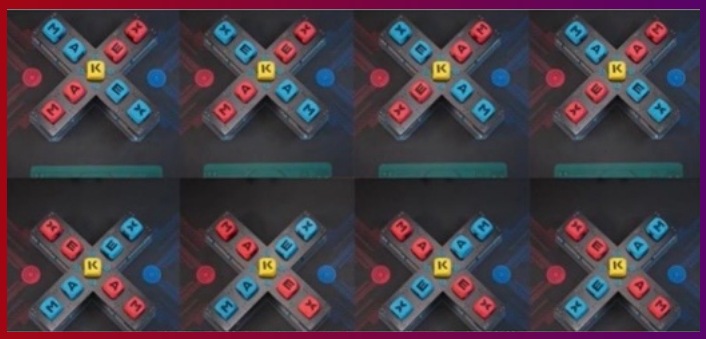
[redacted]

[redacted]

[redacted]







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