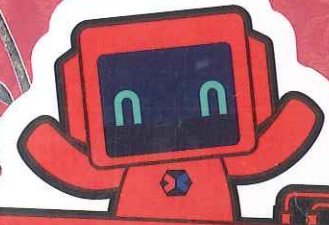


ENGINEERING NOTEBOOK



MAKE X

ACE MACHINA
X3600Z
MakeX Starter
Blue Planet

WE ARE CONNECTED FROM GEAR TO GEAR,

ACE  **MACHINA**

AND WE GOT NOTHING TO FEAR.

TABLE CONTENT

Date: _____

No.	Title	Page
1.	Team Information	1
2.	Game Outline	2
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16.	Daily Report	21 — 30

TEAM INFORMATION



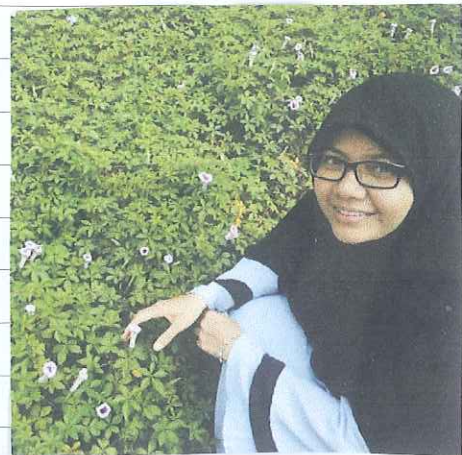
⚙️ Harith Najmi bin Mohd Azhari
⚙️ 16 years old
⚙️ Team captain
⚙️ Robot programming

⚙️ Muhammad Muhairis bin Azman
⚙️ 16 years old
⚙️ Loyal team member
⚙️ Robot building/structure

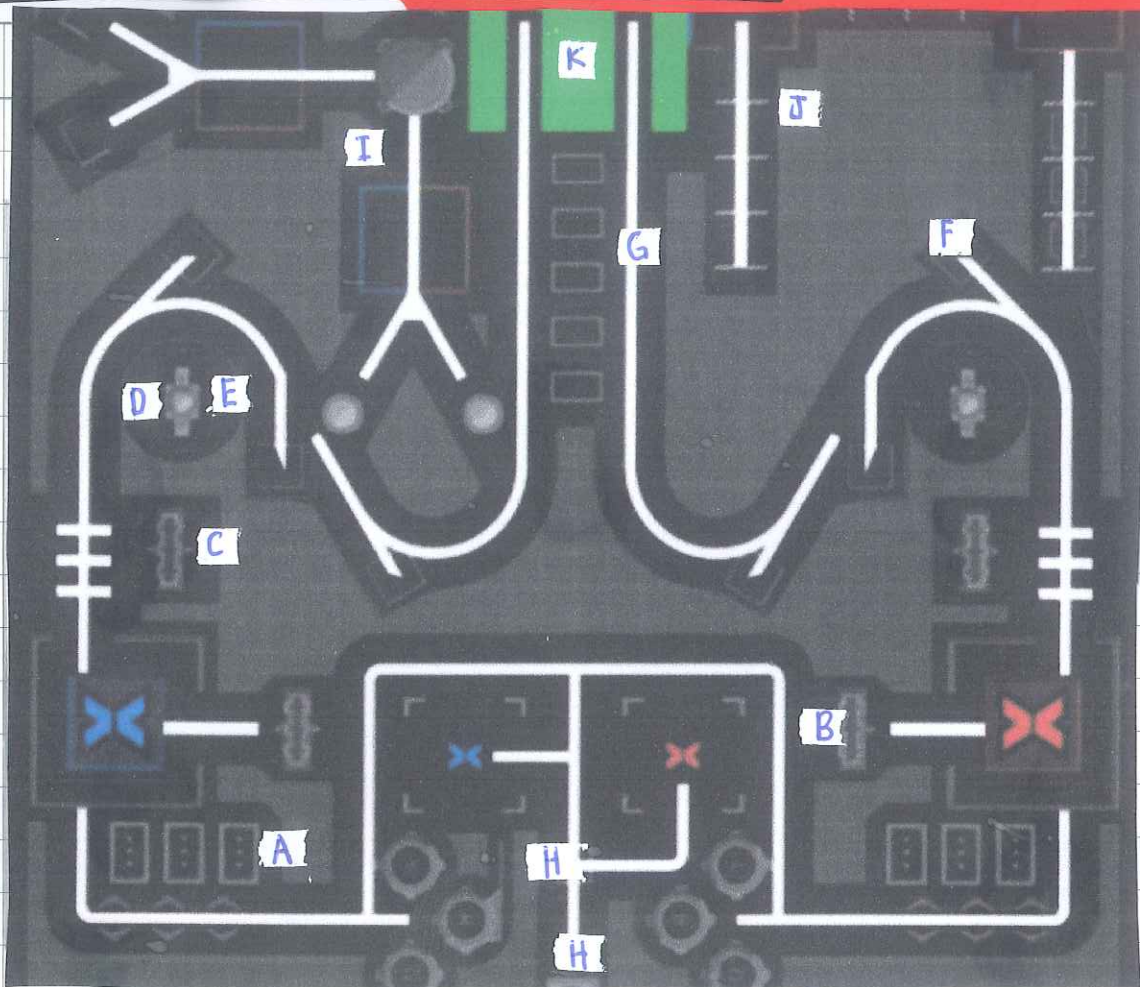


⚙️ Muhammad Arif bin Abd Rani
⚙️ Team Mentor I

⚙️ Wan Nurhasimiza bt. Wan Kamal
⚙️ Team Mentor II



GAME OUTLINE



INDEPENDENT

- A. Garbage sorting
- B. Obtain Air Quality Data
- C. Dismantle Thermal Power Station
- D. Turn off the Power Switch
- E. Dismantle Chimney
- F. Dispose Construction Waste
- G. Monitor ground water data



ALLIANCE

- H. Conversion of household garbage to fuel gas.
- I. Plant the desert
- J. Clean water
- K. Forest ball

SCORE

Garbage sorting	90
Obtain Air Quality Data	30
Dismantle Thermal Power Station	60
Turn off the power switch	20
Dismantle chimney	20
Dispose Construction Waste	60
Monitor Ground Water Data	20
Conversion of household garbage to fuel gas	10/20
Plant the desert	40
Clean water	20
Forest Ball	10
Total	380

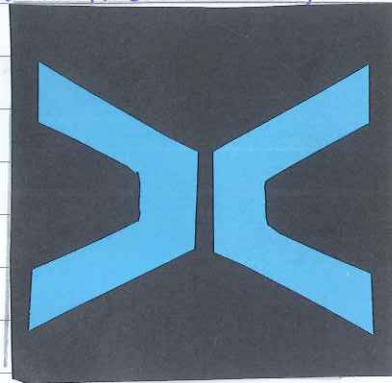
GAME OVERVIEW

⚙️ The Blue Robot and Red Robot begin in their starting zone. The team can discuss to choose which task to do first. Score all the tasks within 15 minutes. Marks will be deduct if the team commit "VIOLENCE". Violence happens if the team break the rule such as touch the robot without the judge permission.

Red Robot Starting Zone



Blue Robot Starting Zone



⚙️ DESIGN STATEMENT

* Design, build and compete with other team that can efficiently score all the tasks.

⚙️ CONSTRAINTS

- * A. Robot size not exceed $30 \times 30 \times 30$ cm
- * B. The robot weight not exceed 5 kg.
- * C. MakeBlock materials only.



OFFENSIVE STRATEGIES

1. Add the motor speed

Reason: Finish the tasks early and get the best time record.

2. Program: Shorten the wait/delay duration

Reason: Make the robot more faster

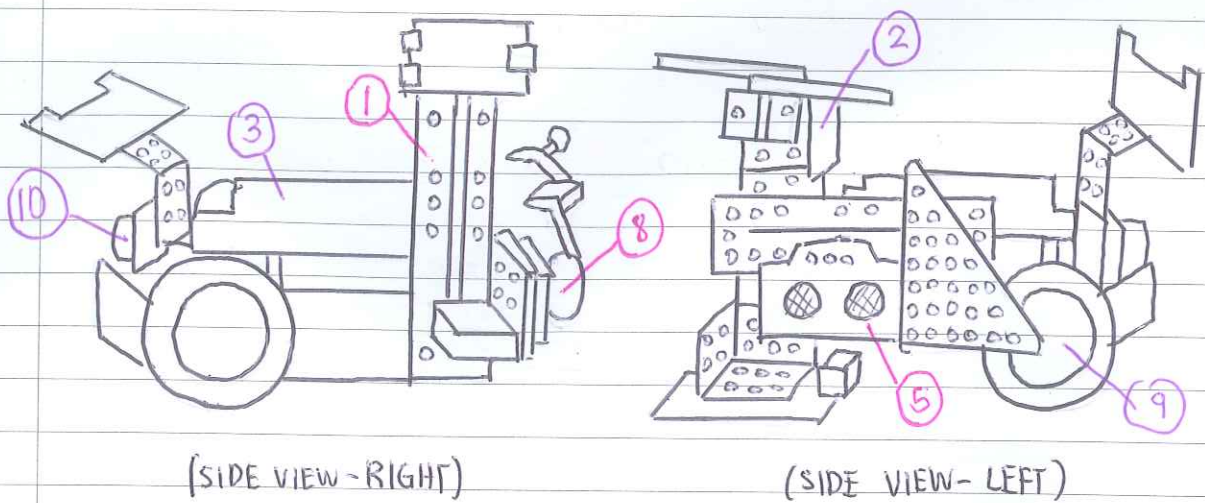
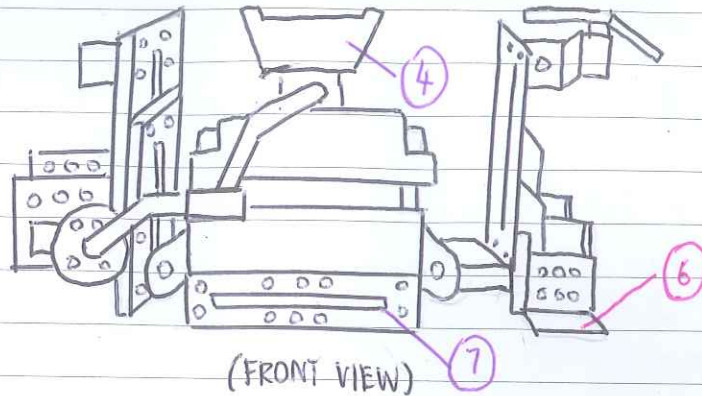


DEFENSIVE STRATEGY

1. Decrease the speed

Reason: The robot can read the line efficiently and not miss the line. In other word, 'play safe'

ROBOT INTRODUCTION

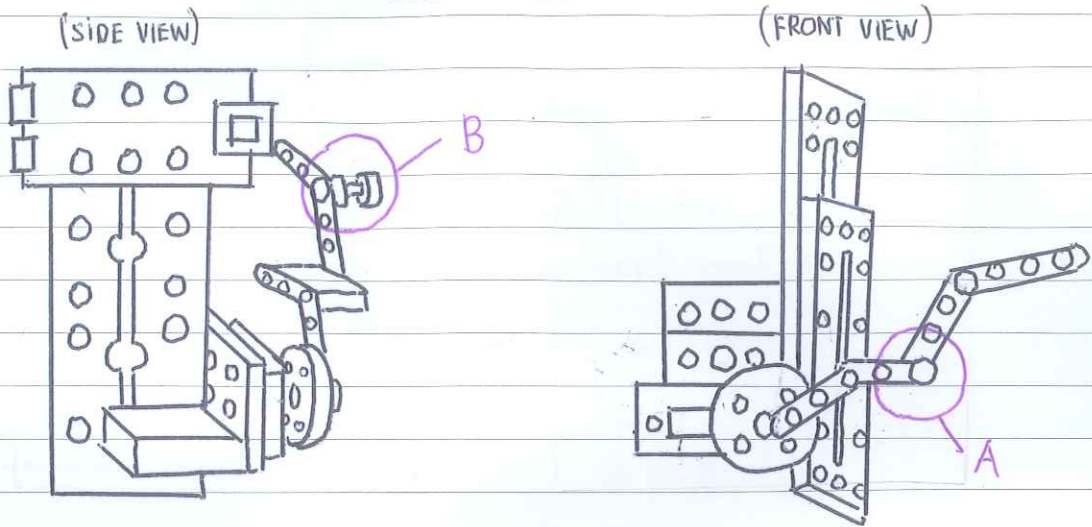


1. Wing A
2. Wing B
3. MCore
4. LED Matrix
5. Ultrasonic Sensor
6. Color Sensor
7. RGB Line Follower
8. Servo Motor
9. Wheels
10. Speaker

MASS 815 g

SIZE 22x24x12

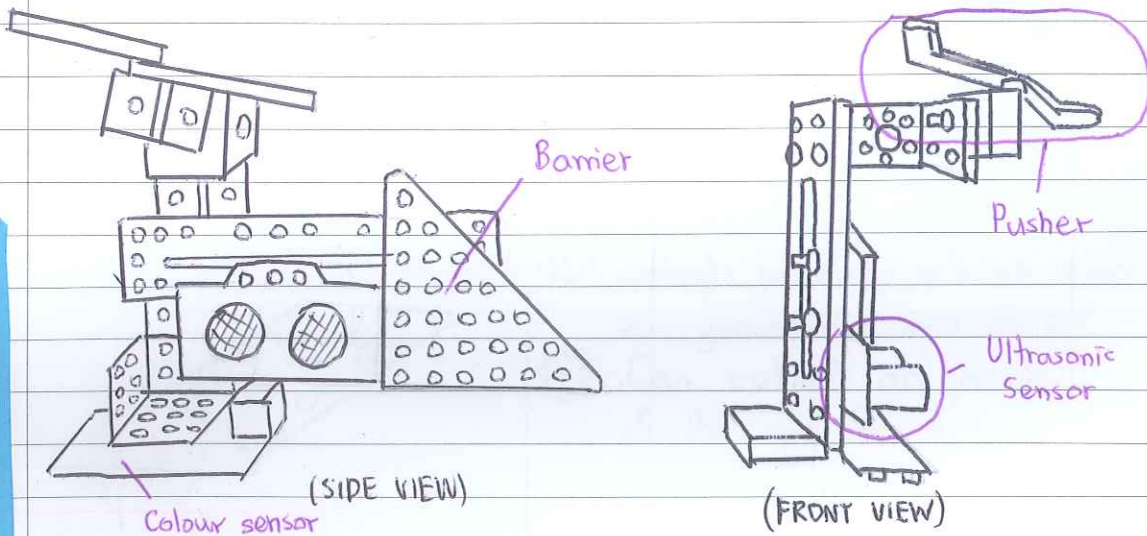
PARTS



⚙️ This wing has Servo Motor

A: To hook the garbage in 'Garbage Sorting'

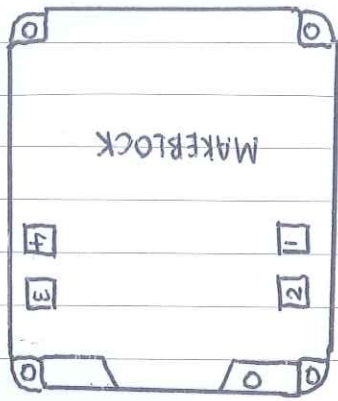
B: To hook the ring in 'Obtain Air Quality Data'



⚙️ This wing has Pusher, Barrier, Ultrasonic Sensor and Colour Sensor.

- Pusher : Push 'Dismantle the Power Station'
- Barrier : Prevent the '270° Power Switch' stuck to the robot.
- Ultrasonic Sensor : Scan the block, Do not need to turn
- Colour Sensor : Suitable place

3. MCore



Coding is programmed into the Mcore and controls the Mbot's movement and components.

(TOP VIEW)

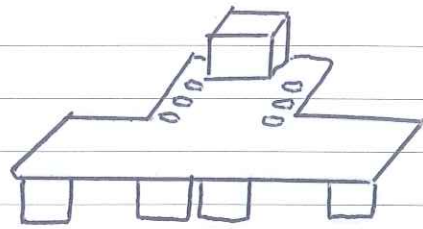
4. RGB Line Follower



Measure light intensity information and convert it into electrical signals.

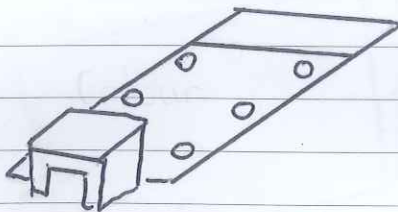


For this robot, this component is used to detect lines.



(FRONT VIEW)

3. ME Colour Sensor



(TOP VIEW)

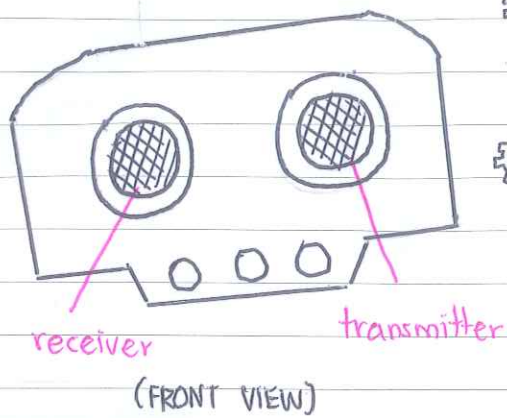


detects primary colours such as green, red and blue.



Can output an analog value of the specific colours.

6. Ultrasonic Sensor

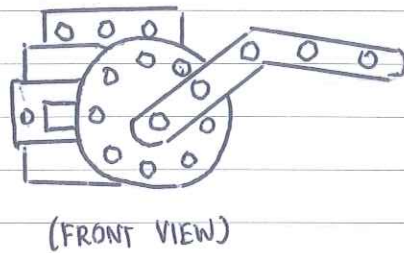


⚙ Used to estimate distance of an object placed in front of the sensor.

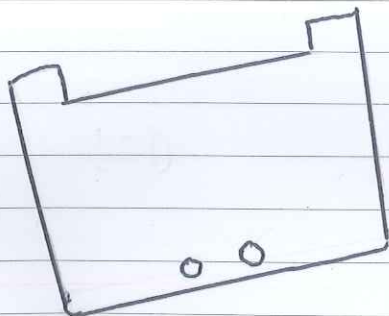
⚙ Sensor transmit waves and bounced back to receive, the time difference is used to calculate the distance of the object.

7. Servo Motor

⚙ Used with hook attachment to hook and bring things to the designated location.

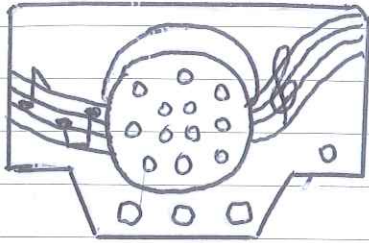


8. LED Matrix



⚙ Displays data such as RGB values, messages or symbols.

9. Speaker



(FRONT VIEW)

⚙️ Produce **sounds** from the data in the **SD Card** such as song and beat.

SCHEDULE

NOVEMBER

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30

- 8th - First training
- 9th - Briefing

- 15th - Robot Building
- 16th - 17th

Checking previous programming


- 18th - 'Plant the desert' programming
 - Robot Testing
- 19th - 'Obtain Air Quality Data' programming
 - Robot Testing

DECEMBER

- 22nd - 24th
 - Compiling the programs
- 25th - 26th
 - Performance training
 - Final check
- 1st - 2nd
 - Notebook

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30 31

- 6th - Competition

 Daily Report in the Page 21-30

DESIGN INSPIRATION/SKETCHES

A. YOUTUBE

⚙️ To make a best design, we surf the internet and watch some videos in Youtube about this competition. For example, we watched Turkey MakeX Competition.

B. TRAINER BRIEF

⚙️ We go to a Training Course and learn how to build an efficient robot with the trainer guidance. Also, we learn the basic of the robot programming.

C. SOFTWARE


⚙️ We use "MBlock" software to program the robot according the given tasks in the track.

D. MENTOR


⚙️ We not do it all by ourself, With mentors guidance, they lead our way to provide solution of a problem. We discussed for the best solution.

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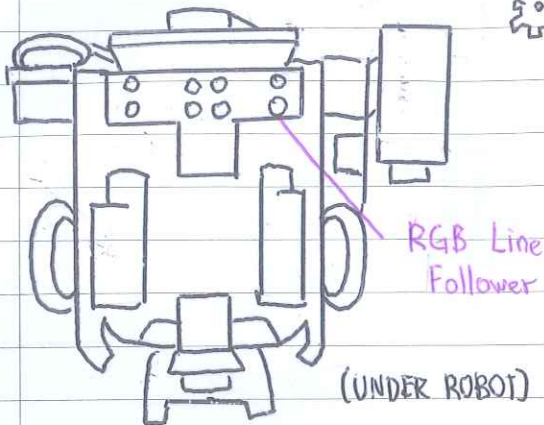
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TECHNICAL PRINCIPLE

1. RGB Line Follower

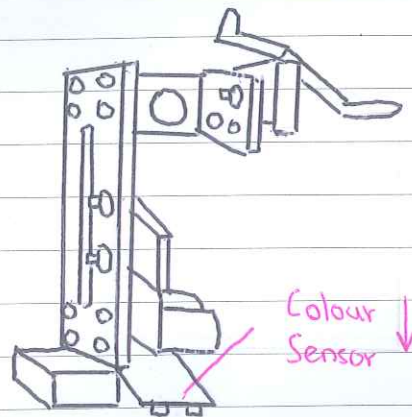


⚙️ For a better reading, we put RGB Line Follower under the robot.

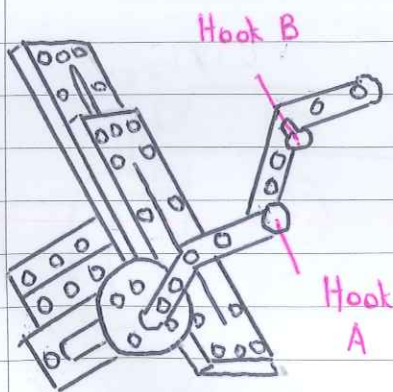
2. ME Colour Sensor

⚙️ We put our colour sensor lower for a better reading of colour value.

⚙️ With this, we can prevent surrounding light will effect the colour sensor reading.



3. Servo Motor

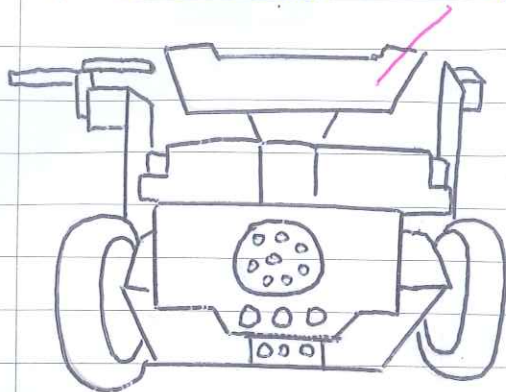


⚙️ There are two hooks in the Servo Motor attachment.

⚙️ One of them, A will hook the garbage in task 'Garbage Sorting'.

⚙️ B is to hook ring in the task 'Obtain the Air Quality Data'.

4. LED Matrix



LED Matrix

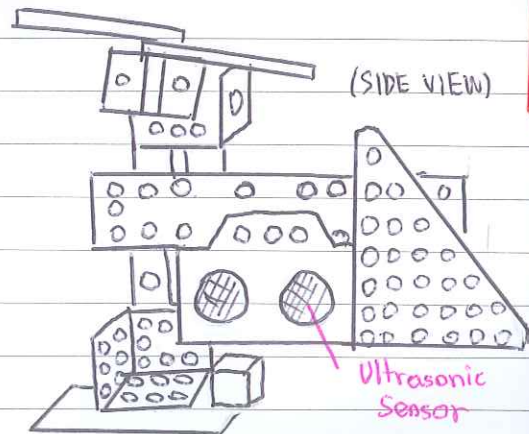
⚙️ We attached the LED Matrix at the back and on the robot for the judge to see a reading well.

(Robot Back)

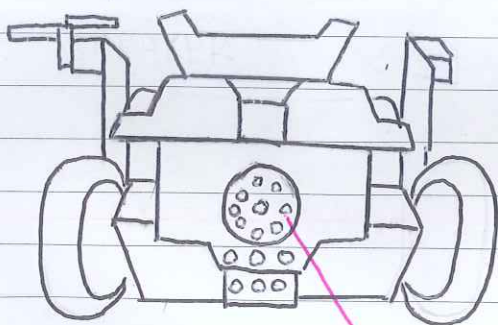
⚙️ We attached the Ultrasonic Sensor on the Robot side because:

- ✦ To scan the ^{1st} block while the robot facing with 2nd Block.
- ✦ The robot do not need to turn.

5. Ultrasonic Sensor



6. Speaker



(Robot Back)

Speaker

⚙️ We place the speaker at the back of the robot for the sound can be listen easier.

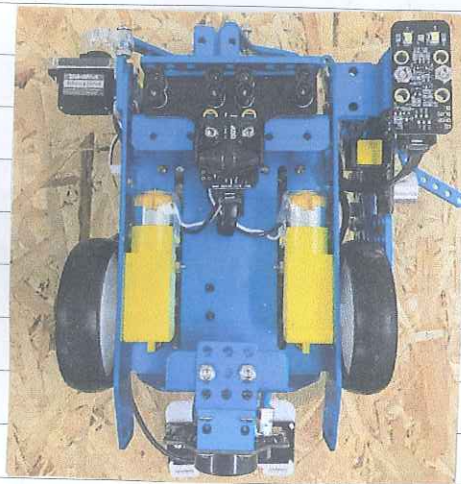
BUILDING STEPS

There are 4 steps:

- ⚙️ The robot take a few steps to build it. We attached the basic part of the robot such as MCore, Motor, wheels and battery
- ⚙️ Then, we installed the sensors to the robot. There are 5 sensors. They are Ultrasonic Sensor, RGB Line Follower, Color Sensor, LED Matrix, Speaker.
- ⚙️ Next, we installed the Wing A and the Wing B.
- ⚙️ As the finishing touch, we inserted the cable in each M-Core ports.



(TOP VIEW)



(UNDER THE ROBOT)

COLOUR VALUE TEST

YELLOW

	R	G	B	Average
POSITION 1	169	147	20	
	163	142	20	
	148	128	18	
POSITION 2	155	134	18	
	130	112	16	
	117	101	14	
POSITION 3	118	102	14	R: 117-169
	131	112	16	G: 101-147
	142	126	15	B: 14-20

RED

	R	G	B	Average
POSITION 1	136	17	11	
	89	10	7	
	95	11	7	
POSITION 2	131	17	11	
	94	12	8	
	88	15	7	
POSITION 3	91	16	11	R: 88-136
	112	12	11	G: 10-17
	123	15	7	B: 7-11

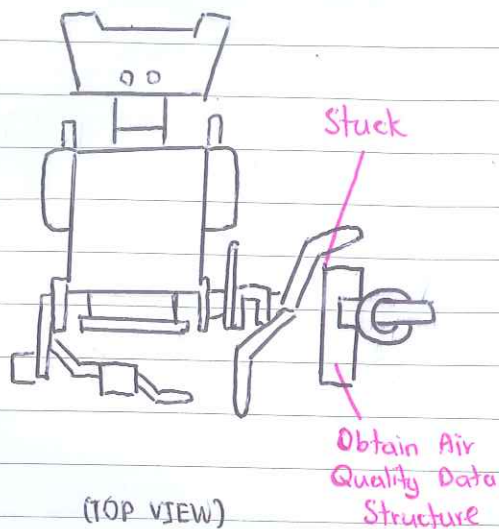
GREEN

	R	G	B	Average
POSITION 1	13	43	20	
	12	45	20	
	12	45	20	
POSITION 2	13	42	22	
	14	46	23	
	14	43	22	
POSITION 3	14	46	20	R: 12-14
	12	45	20	G: 43-49
	13	44	21	B: 20-23

Alhassan

2.12.2018

PROBLEMS AND SOLUTIONS



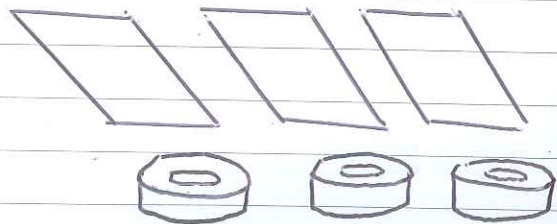
1. The Wing hit the 'Obtain Air Quality Data' structure

⚙️ The Wing hit the structure and stuck

Solution: We make the 'Pusher' adjustable
: Close or Open

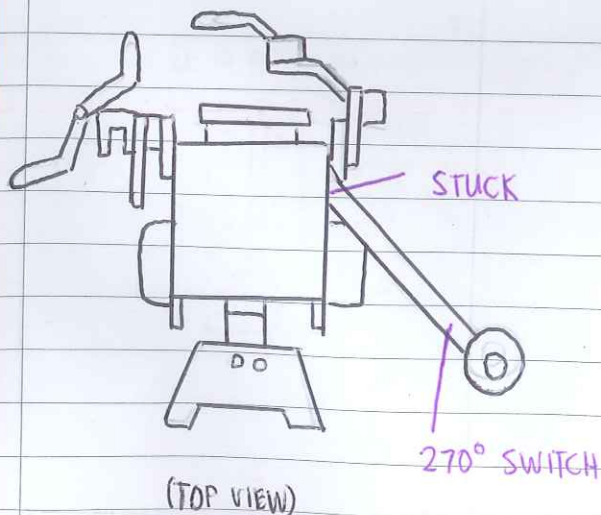
2. This task is hard

⚙️ The robot can not detect the colour card. The robot can't detect the line



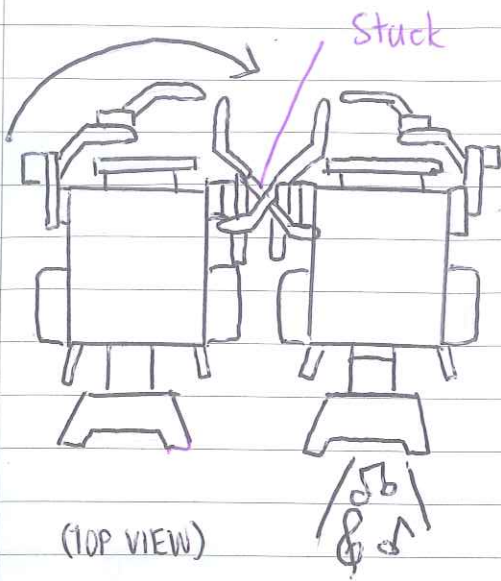
Solution: We discuss and tried over and over, never give up until it perfectly done.

⚙️ Garbage Sorting Task



3. The switch structure stuck to the Robot

Solution: We added 'Barrier' to the robot, so the switch structure do not stuck to the robot.



4. Forest Dance/Ball

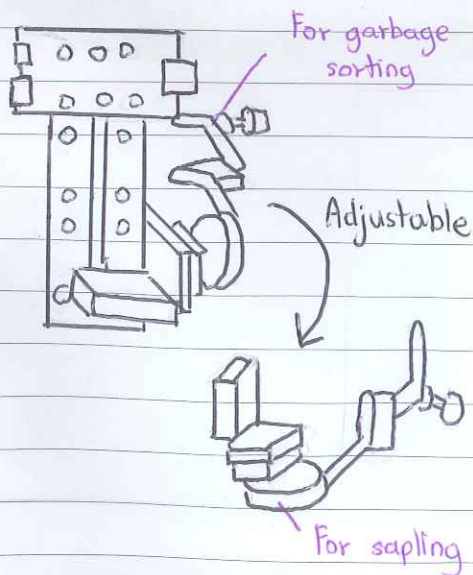
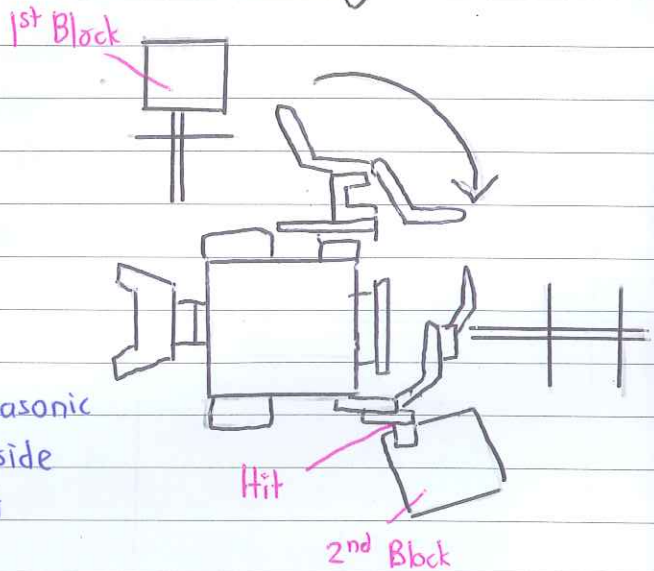
⚙️ When the robot rotate 360° to dance, it hit other robot

Solution: We programmed our robot to dance 'right and left' so, the robot looks like shaking.

5. Clean Water

⚙️ When the robot turn, the robot hit the 2nd Block

Solution: We attached the Ultrasonic Sensor on the robot side so, the robot did not need to turn



6. Plant the Desert

⚙️ The servo did not suitable to hook the sapling.

Solution: We make the servo structure adjustable, It can hook 'Garbage Sorting' and hook for the sapling.

SUMMARY

⚙️ We are currently satisfied with the MBot and its simple programming which is student-friendly and easy to conduct. As the programming, you should include a tutorial video or module with the programming system. This will help beginners understand the complex programming. As for the component, you should lessen the small component such as bolt and nut. Because it is easy to lose them. Make a lego-like component for the robot. Also, it can attract people.

SUGGESTION



⚙️ The MBlock software is good and easy to learn. But, please add Undo button if the user make mistake. Also, make software less lag and slow

⚙️ We have no trainer and always depend on our mentor. Our mentor is not have the experience like the trainer. So, let we have one of them to help us.



THOUGHTS AND FEELINGS

There are times that we feel despair during the process of completing the task given. However, whenever we found a problem, we work on together to find the best solution for it. That taught us the value of teamwork. When a team member is in need of help, the other members will try their best to lighten the burden that they carrying. We told each other not to keep our problems to ourselves but share it to us so that we can solve it together. Lastly, this competition taught us not to give up easily.

DAILY REPORT



Date 8.11 Page 1

Day 1,
8 November 2018,
10 a.m - 4 p.m.

⚙️ First training / meeting

1. We start our training at Universiti Kebangsaan Malaysia:
2. We meet SMA MAIWP students
3. Then, we analyse the track and the new tasks:
 - i. Forest Ball
 - ii. Plant the Desert
 - iii. Obtain Air Quality Data

Date 9.11 Page 2



Day 2

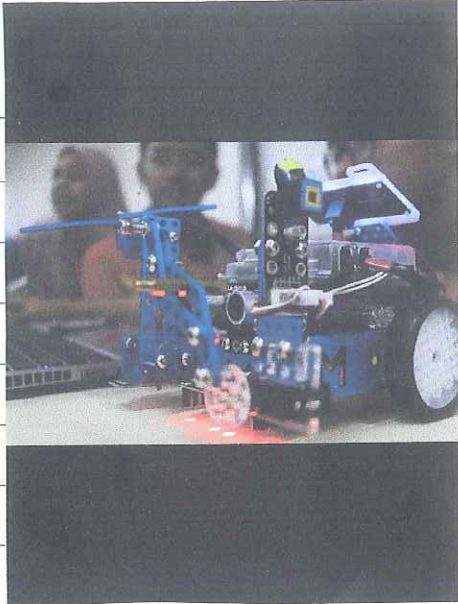
9th November 2018

9.00 a.m - 1.00 p.m

Briefing

1. The details of the competition and the other assignment such as video, notebook and ~~perform~~ performance details are by (the woman in green sbawf)
2. Then, we discuss the idea about the new assignments.

Date 15.11 Page 3



Day 3

15th November 2018

9.00 a.m - 4.00 p.m

Robot Building

1. With the new tasks given, we construct our robot a new structure.

New structure :

- i. Servo : Add one more hook for 'Obtain Air Quality Data' task.
- ii. Speaker : Forest Ball

Date 16.11 Page 4



Day 4

16th November 2018

9.00 a.m - 4.00 p.m

Checking previous programming

1. We make sure our robot programming from the previous competition (MakeEx National) work as well
2. We fix some errors and new programming because the robot structure different.

Date 17.11 Page 5



Day 5

17th November 2018

9.00 a.m - 4.00 p.m

Checking previous programming

1. We continue checking our robot programming and make sure it is work with the new robot structure
2. We revise and take informations from our mentor about the previous robot programming.
3. We complete checking, and it works.



Date 18.11 Page 6

Day 6

18th November 2018

9.00 a.m - 1.00 p.m

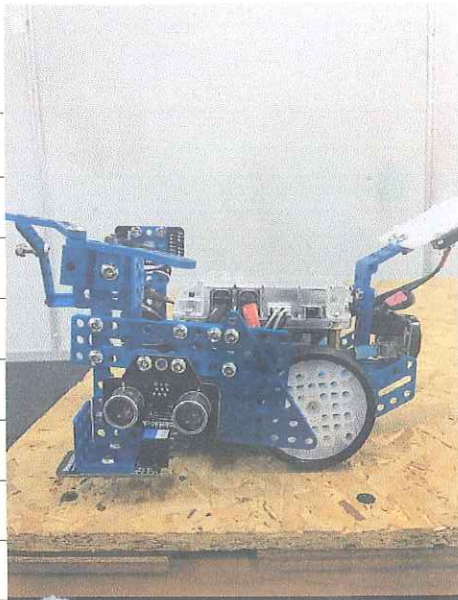
'Plant the Desert' programming

1. With the new Servo Motor structure, we program the robot to hook and move the sapling to the designated location.

Robot Testing

1. There are some errors occurred.
2. We discuss in our team and find a solution.
3. We successfully complete the task.

Date 19.11 Page 7



Day 7

19th November 2018

9.00 a.m - 4.00 p.m

⚙️ Obtain the Air Quality Data Programming

1. We program our robot to hook and bring down the 'ring' to the designated area

⚙️ Robot Testing

1. We try and change our robot programming until we get the best one
2. We successfully complete the task.

Date 22-24 Page 8

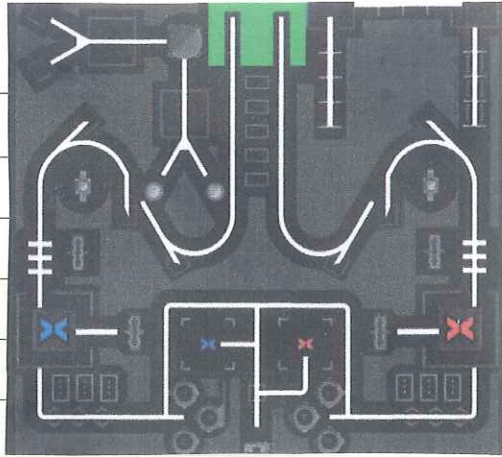


Day 8 until Day 10
22nd-24th November 2018
9.00 a.m - 4.00 p.m

Compiling all the programs

1. We compile all the robot programming from the previous and the new one into one.
2. We separate the program for the Red Robot and the Blue Robot.

Date 25-26 Page 9



Day 11 and Day 12
25-29 November 2018
2.00 a.m - 4.00 p.m

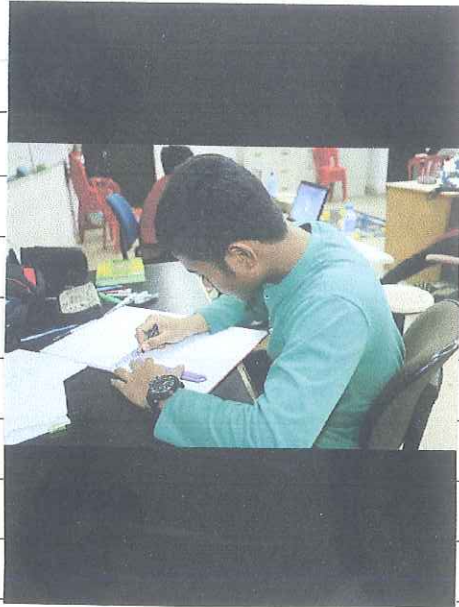
Performance Training

1. We learn and train the performance from SMA MAJWP students teach us.
2. Our performance is Silat, the martial art of Malaysia.

Final Check

1. We try and check the robot programming to make sure it works efficiently.

Date 1,2/12 Page 10



Day 13 and Day 14
1st - 2nd December 2018
9.00 a.m - 4.00 p.m

Notebook

1. With all the information in the training, we make an engineering notebook
2. We make a copy of the notebook

Mohammed

2.12.2018

10