

# **MakeX Robotics Competition Blue Planet**

## **2018 Competition Manual V1.3**



Compiled by the MakeX Robotics Competition Committee

**Update records:**

Date	Version	Modified points
February 1 <sup>st</sup> , 2018	1.1	Publish the first version of the Blue Planet competition manual.
April 9 <sup>th</sup> , 2018	1.2	Words and expressions are improved
		Scoring standards for a few tasks are adjusted
		More detailed explanation and regulation for scoring status
		Added reminder for contestants to adapt to uneven arena in advance
		Added description and limit about the start-up area
		Added ways to choose tasks and the announcement of schedule
		Added the definition and content of Qualifying and the Championship
		Added further explanation and requirements about Robot and reminder for contestants to add robot weight
		Redefined the standard robot restart and standard way of referee “ask and answer”
September 5 <sup>th</sup> , 2018	1.3	Added some new rules and corresponding explanation
		Added details of all the tasks and judging rules
		Added reminder for appeal requirement
		Added production of fuel gas from household waste – the figure of moving direction for robot from Red team.
		Added Rule R9, regulation about if team has to leave or cut off the competition
		Added reminder of robot returning back to the start-up area
Updated top-view image of the arena		

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# 1. Competition Introduction

## 1.1 About MakeX

MakeX is a platform of robotic competitions for guiding the growth of young people. It aims at inspiring people's enthusiasm for creativity, sharing, and collaboration by Robotics Competition, Makerathon, and STEAM Carnival. Its core activity, the MakeX Robotics Competition, is an international robotics competition originating from China, which is STEAM education centered. It is committed to promoting innovation in science, technology and education through high-level competition events, guiding young people to learn science, technology, engineering, art and mathematics and apply such knowledge in practical problems. Meanwhile, MakeX builds a competition culture where young people are encouraged to create in collaboration and grow in sharing.

## 1.2 About MakeX Robotics Competition

MakeX is dedicated to providing young people a platform to cultivate self-discovery, self-improvement and self-achievement ability and building a better education environment.

MakeX encourages young people to cooperate by sharing, create in collaboration and grow through creating, to achieve their own values through competition.

MakeX aspires to be a global leading robotics competition brand focusing on the STEAM education.

## 1.3 About MakeX Spirit

**Core spirit of MakeX:** Creativity, Teamwork, Fun, Sharing

**Core spirit of MakeX Starter :** Helpfulness, Friendship, Communication

### **Creativity**

We advocate curiousness and innovation. We encourage all contestants to create unique high-tech works with their talents, and dare to challenge themselves for continuous progress!

### **Teamwork**

We advocate solidarity and friendship. We encourage all contestants to have a sense of responsibility and enterprising spirit, and sincerely work with our partners for win-win development!

### **Fun**

We encourage contestants to have a healthy, optimistic mentality in the competition, and have a taste of joy and growth in challenging to make their life brighter!

### **Sharing**

We encourage contestants to have an open mind all the time as a maker to share their knowledge, responsibility and joy with their teammates, competitors and the society!

## **1.4 2018 Season**

MakeX Robotics Competition is hosted by MakeX Robotics Competition Committee, founded by Shenzhen Hulu Maker Co., Ltd., and supported by Makeblock Co., Ltd. In 2018 Season, MakeX Robotics Competition Committee will invite teams from all over the world.

## **1.5 Entry Requirements**

MakeX Robotics Competition aims to provide young people with a high-quality, influential and appreciative robot competition platform. Young people who meet the age standards can sign up via MakeX official website. Each team consists of 1~2 contestants and 1~2 mentors. Each team must have its own number as a distinctive symbol. The number will be automatically generated after creating a team on MakeX official website.

## **1.6 Competition Schedule**

2018 MakeX Robotics Competition will be carried out across the world and is mainly divided into Points Races, Regional Competitions, Overseas Competitions and 2018 MakeX World Championship. Contestants will experience more about the robotics technology from MakeX. After Points Races, Regional Competitions and Overseas Competitions, qualified teams can participate in the 2018 MakeX World Championship and fight for the first place. Meanwhile, outstanding teams will be selected to attend World Robot Competition in Aug 2018 and compete with other world champions.

2018 season, MakeX is waiting to have your sparkling ideas!

## 2. Task Introduction

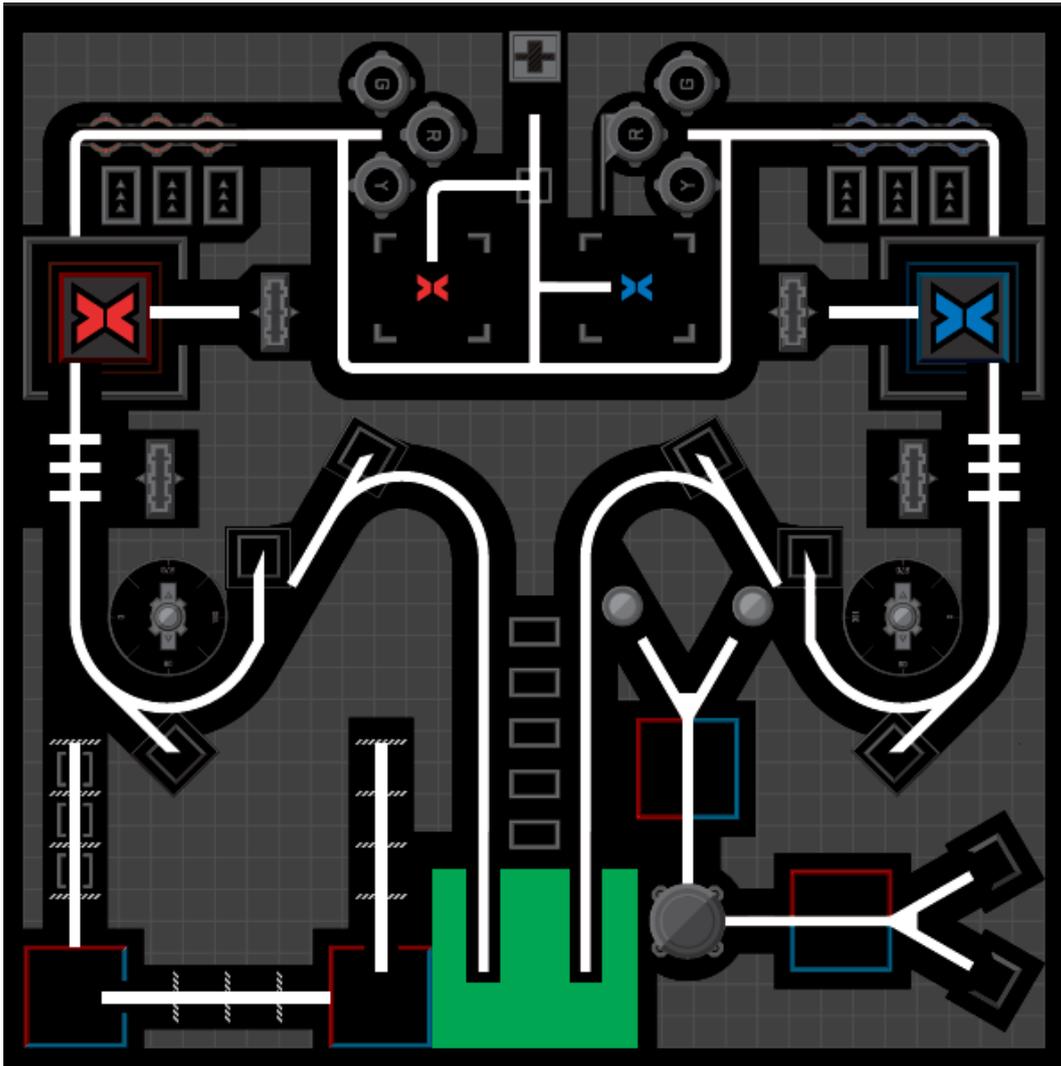
### 2.1 Theme

The theme 'Blue Planet', adopting the idea of creating robots with functions of monitoring and improving the environment quality to protect our planet, is designed for primary & junior school. MakeX Starter focuses on testing young people's ability on programming and operating of sensor. The robots need to automatically complete the tasks by following the pre-loaded programs and a rapid exchangeable mechanical structure. Tasks will be divided into 2 types: independent task accomplished by one team and alliance task accomplished by two teams together. The team who obtains higher points or spends less time will rank higher.

### 2.2 Arena

The size of the arena is 2m\*2m. The white guide line is 2cm wide, and the end of the line is marked to place the task model. Robot should be able to adapt the uncontrollable conditions such as fold or wrinkle. Debugging should be completed before the competition to avoid the deviation of performance caused by those unchangeable conditions. The light in the stadium is daily light. Team members can calibrate their sensors but the quality light is not guaranteed to be unchangeable. During the competition, the light may change. There may be unknown flashlight or fill light from cameras and other unknown light effects. The blue and red squares on the arena are robot starting areas. Multiple tasks can be carried out on the arena, including 7 independent tasks and 4 alliance tasks. The Red and Blue Teams have two independent starting areas respectively for their own use, and there are public starting areas for the tasks for both red and blue teams. The robot will be considered as inside the starting areas only if the vertical projection of mBot's chassis is completely within the starting areas.

During the competition, the independent tasks placement will be symmetrical along the center line of the arena.



## 2.3 Group and Tasks

Primary school group: each competition performs 4 independent tasks and 2 alliance tasks according to the difficulty level.

Junior high school group: each competition performs 5 independent tasks and 2 alliance tasks according to the difficulty level.

MakeX Robotics Competition Committee will publish the selected tasks for every competition. (The detailed information will be announced two to four weeks before.)

Independent tasks: Each team can complete the independent tasks to get independent score.

Alliance tasks: Red and blue teams need to cooperate to complete the alliance tasks to get alliance score.

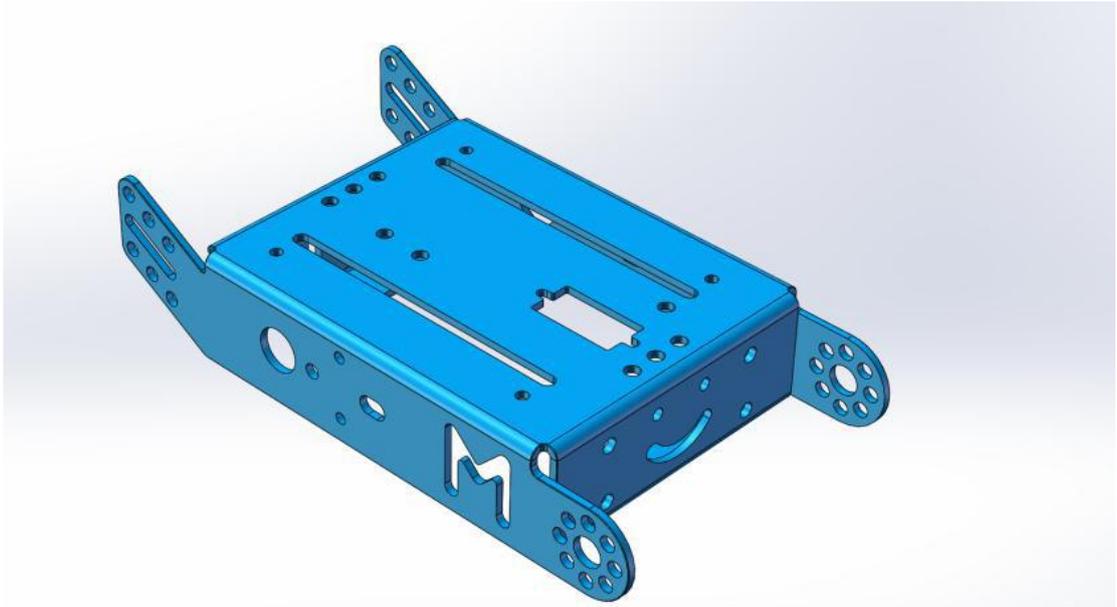
## 2.4 Scoring Description

- E1. Task score:** during the competition, the referee will decide the corresponding scores according to the performance after each task. Score of completed tasks will not be affected by further operations. Once all independent tasks are completed, teams can get their score for independent tasks. Once all alliance tasks are completed, the teams in alliance can get the score for alliance tasks. For task details please refer to the task introduction section.
- E2. Completion time:** the whole competition lasts for five minutes. When the contestant gives a sign to referee to end the competition in advance or the competition ends after five minutes, timing of the competition stops. The recorded time is the finished time of the competition for each alliance teams. The alliance teams who finished with shorter time will have advantages in ranking.
- E3. Single-session score of Qualifying** = score of the independent task + score of alliance task - penalty score due to violation of own team.
- E4. Single-session score of Championship Match** = score of the independent task of the Red team + score of the independent task of the Blue team + score of alliance task - penalty scores due to violations of two alliance teams (alliance teams penalty in sum).
- E5. Qualifying:** all teams should attend four Qualifying. Alliance is assigned randomly. Teams are ranked by the sum of four Qualifying scores, then the top ranked teams in the Qualifying enter the Championship Match round.
- 1) If the total scores of teams are the same in Qualifying's, the team with the higher independent task scores of four Qualifying will rank higher in the list.
  - 2) If the sum of independent task scores is still the same, the team which spent the shortest time in finishing four Qualifying will be put on the top of the list.
- E6. Ranking of Championship Match:** Each team is required to choose an alliance in the Alliance-Selection-Ceremony and then, compete three single-session with the same alliance during the Championship Match. Only the highest score among the three single-sessions will be chosen as final score of Championship Match for two alliance teams.
- 1) Ranking of teams is according to the score of Championship Match.
  - 2) If multiple teams have same final score, the team with higher alliance task score will rank higher on list.
  - 3) If alliance task scores are still the same, the team spends less completing time will rank higher on the list.
  - 4) If time is still identical and has impact on the ranking for top three teams, one or more extra matches are added for alliance teams.

**E7. Scores Ranking:** Except for the champion, runner-up and second runner-up, other teams will rank based on the scores of the Point Races.

## 2.5 Robot Components Description

- E7.** The teams must use mBot-TT motor or 130 high-speed DC geared motor (6V/312RPM) manufactured by Shenzhen Makeblock Co., Ltd.
- E8.** Except for 3D printing parts, all other parts on the robot should be manufactured or sold by Shenzhen Makeblock Co., Ltd. Other non-electrical & non-magnetic parts from market or self-made are allowed to use for counterweight only if they do not affect the function of electrical parts.
- E9.** Robot allows using only one 9g Micro Servo.
- E10.** The main board for mBot is mCore and only one mCore is allowed to use on robot.
- E11.** The initial size of the robot cannot exceed: 25cm (length) \* 25cm (width) \* 25cm (height).
- E12.** The maximum size of the robot cannot exceed: 30cm (length) \* 30cm (width) \* 30cm (height).
- E13.** The maximum weight of the robot including battery and any modification during competition is limited to: 5kg
- E14.** The power supply for robot must from the 3.7V battery in kit or the (4) AA battery holder. Only one battery component is allowed to use during competition.
- E15.** The robot must comply with '2018 MakeX Starter Blue Planet Pre-inspection Checklist'. Any offensive tool, unsafe power supply device or dangerous or polluted material is strictly prohibited in the preparation and competition period of 2018 season MakeX Starter Blue Planet.
- E16.** The electrical sensor must be manufactured or sold by Shenzhen Makeblock Co., Ltd. 2.4G Wireless Serial, Bluetooth Module or other remote controlling device is not allowed to use.
- E17.** The chassis of robot must be the mBot Shell which manufactured by Shenzhen Makeblock Co., Ltd. The mBot Shell mechanical structure should not have any deformation or change. During the competition, the chassis of robot should not be changed, otherwise, the team will be disqualified from the competition as using more than one robot. If the robot needs restarting, the vertical projection of robot mBot Shell must be within the starting area.



## 2.6 Robot Restart Description

- E18.** Contestants are allowed to restart and modify the robot anytime during the competition.
- E19.** If contestants decide to restart the robot, one contestant has to notify the referee before the restart, and after being approved by the referee, the contestant can take the robot out.
- E20.** Once the robot has been taken out, it could be modified or restarted, and the restarted robot has to be placed on any starting area. (E.g. the Red team can only put the robot back to the starting area of red square or the public start-up area for both the Red and Blue teams).
- E21.** If the restart is decided when the robot contacts prop(s), all scoring related with this(these) prop(s) before the start is valid but further attempt is not allowed.
- E22.** Competition time will not be stopped by robot restart, and pause is not allowed during the competition.

## 2.7 Robot Modification Description

- E23.** During the competition, after notifying the referee and getting referee's permit, the contestant can take the robot out for modification, which should be completed in the stipulated modification area. The modification time is counted included in the competition time. Pause is not allowed when the competition begins.
- E24.** Coding or changing robot pre-load program with any electrical device

is strictly prohibited. Otherwise, referees can disqualify the team.

- E25.** Contestants can switch the program through the on-board button on the mCore. Adjusting the mechanical structure of robot is also encouraged but any modification to robot must comply with rule E12.

## 2.8 Operation Rules

- R1. Late arrival:** It is competing team's responsibility to show up on time. Also, the referee has the right to disqualify the team that does not arrive on time.
- R2. Start the robot in advance:** Contestants should start the robot only after the referee announces the starting signal. If the robot is started in advance, the contestants will be warned for the first time and the competition restarts. If the robot is started in advance for the second time, the referee can disqualify the team.
- R3. Foul contact with the arena props:** Contestants are strictly prohibited to touch the arena props during the competition. Each contact with the arena props is considered to be a violation. 20 points will be deducted for one violation. If the team takes the advantage by foul contact with props, the related points are deemed to be invalid. However, the robot deviating from guide lines will not be punished.
- R4. Misconduct guidance:** During the competition, parents or mentors of the teams are not allowed to guide or support the team in any form. If misconduct guidance occurs, the referee can disqualify the team.
- R5. Dangerous robot:** Safety issues must be comprehensively considered along the designed, test and compete period. Robots should not destroy arena props or hurt people. Dangerous robot is determined during pre-check by referees and dangerous robot needs to modify its risky design before competition.
- R6. Excessive behavior:** If contestants or other related person have impolitely and seriously influenced the competition and safety of the audience, resulting in the pause of the competition, it will be considered as excessive behavior. Excessive behaviors include but not limited to: behaviors which seriously violate the competition spirit and repeated or overt foul; uncivilized behaviors towards the contestants, coaches, staffs of competition or participants; repeated or overt acts which violate safety rules, etc., Team with excessive behaviors will be disqualified from the competition
- R7.** Competing teams are not allowed to bring laptops and other programming devices into the site. Team violating the rules will be disqualified from the competition.
- R8.** Inside the competition arena, any wireless contact device(include but not limited to 2.4G Wireless Serial, Bluetooth Module or IR Remote

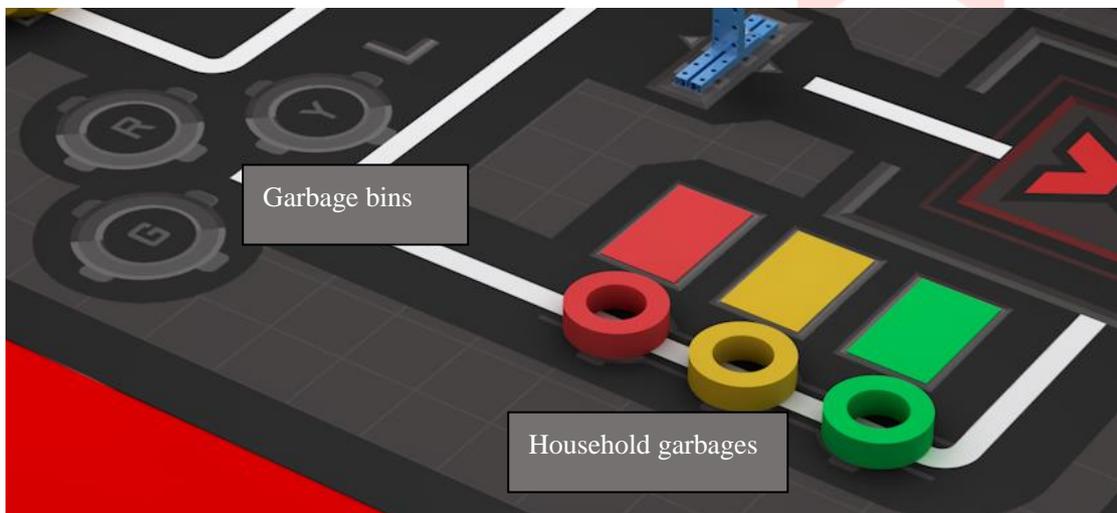
Control) is strictly prohibited. Otherwise the team can be disqualified from competition due to manual controlling the robot.

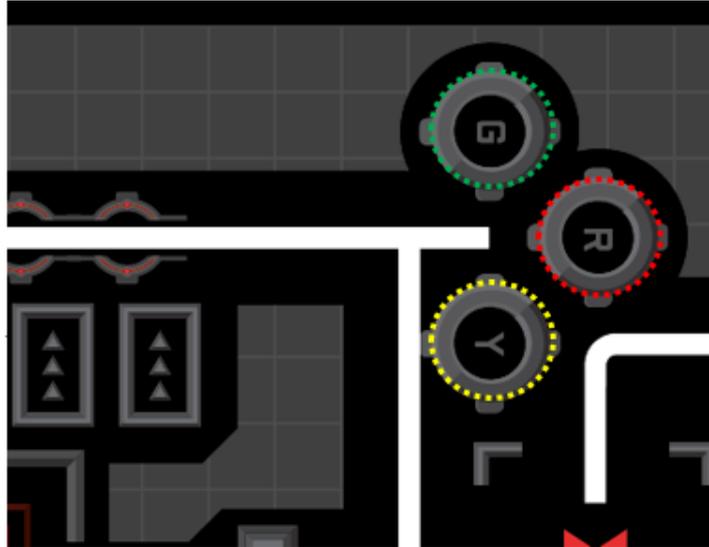
- R9.** After check-in for the competition, if team has to leave or cut off the competition, the team must inform the MakeX Robotic Competition Committee immediately with the reason. The competition will keep the original process.

## 2.9 Independent Tasks

### 2.9.1 Garbage Sorting:

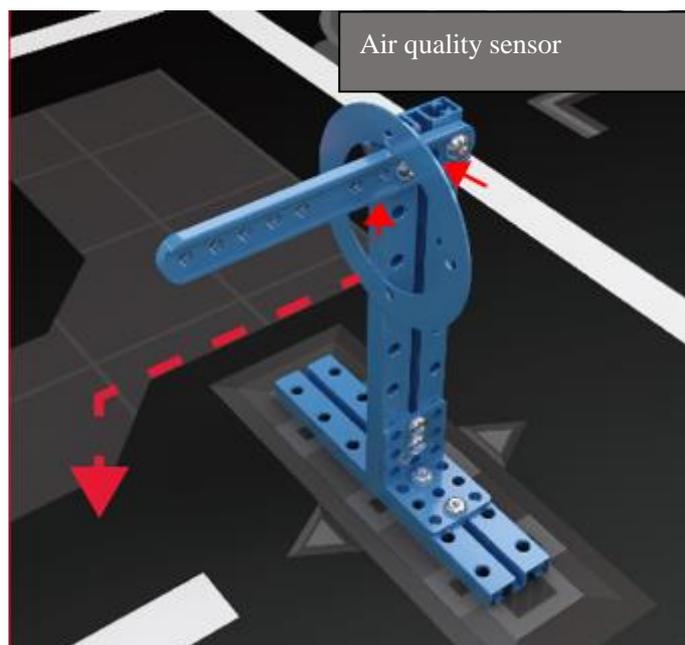
- 1) Three types of household garbage, red, green and yellow, and three types of garbage bins located at the arena. The garbage are placed randomly with corresponding color cards. As shown in Figure below.
- 2) **Junior high school group:** Three garbage are randomly placed and robot needs to put each of them inside the correct garbage bin (R-red, Y-yellow and G-green). Each garbage worth 30 points and team can get points only if the sorting is correct.
- 3) **Primary school group:** Only one household garbage with arbitrary color will be placed at the closest position respect to the garbage bins. If the robot sorts the garbage correctly, this task is completed and the team gets 90 points.
- 4) Only if the vertical projection of household garbage enters the garbage bin area and keeps at least 2 seconds, the task is completed.





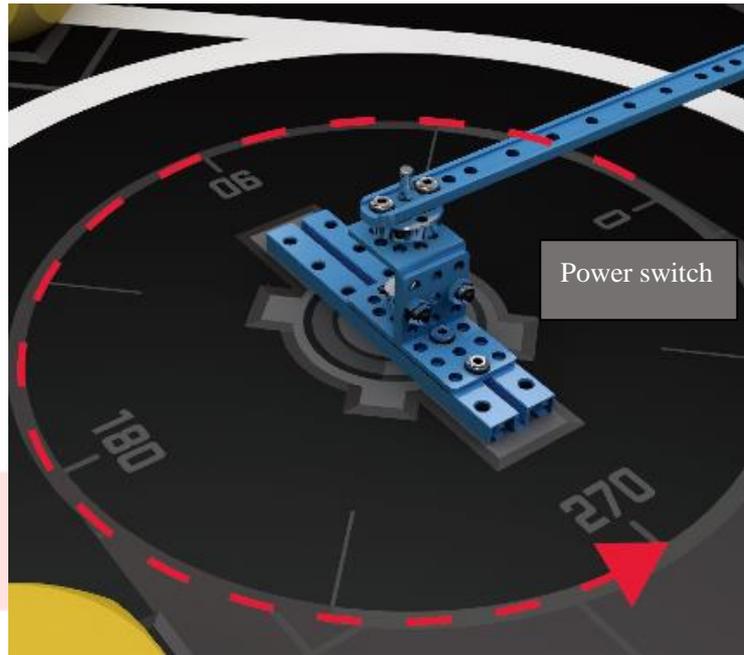
### 2.9.2 Checking Air Quality

- 1) The data collector (the ring) of air quality sensor (the supporting aluminum device) is hanging on the arena as shown in the figure below.
- 2) **Primary school group:** Robot needs to remove the air quality data collector from the air quality sensor. The collector's vertical projection should not overlap with the air quality sensor's vertical projection. The team gets 30 points for completing this task.
- 3) **Junior high school group:** Robot needs to remove the air quality data collector from the air quality sensor and deliver the device to the starting area. If the vertical projection of the air testing device enters the starting area, the team gets 30 points for completing this task.
- 4) The initial position of data collector is placed on the top beam between the first and second hole as shown in the figure below.



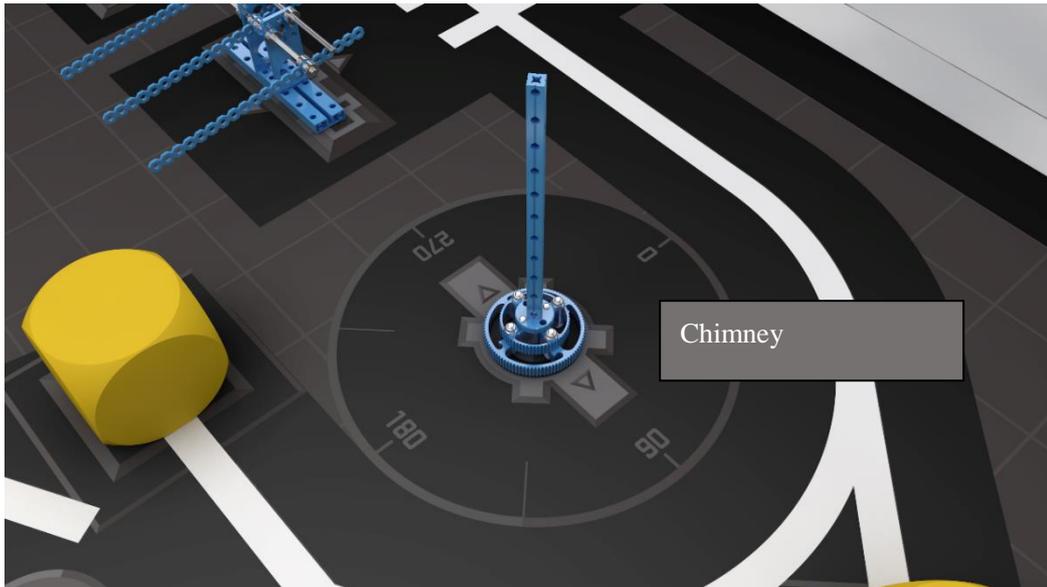
### 2.9.3 Power Supply Switching-off

- 1) The power switch is fixed on the arena and the rotor can freely rotate as shown in the figure below.
- 2) Robot needs to rotate the horizontal switch more than  $270^\circ$  as cutting off the power supply. The switch must experience a stroke of  $270^\circ$ . (Rotating from  $0^\circ$   $90^\circ$   $180^\circ$  to  $270^\circ$ ) The team gets 20 points from completing this task.



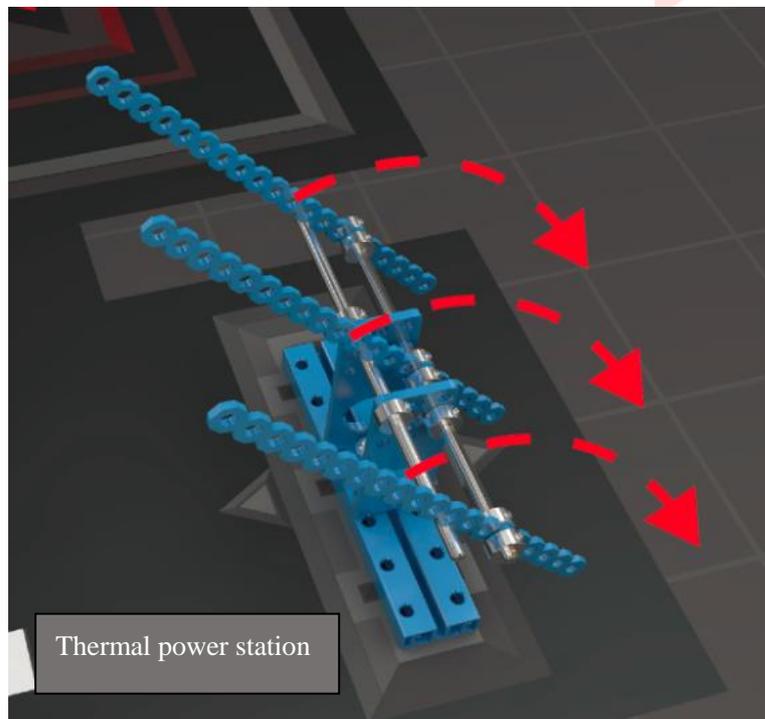
### 2.9.4 Dismantle Chimney

- 1) The chimney is fixed on the arena shown by the figure below.
- 2) Robot needs to change the chimney on the arena to the falling status, the team gets 20 points for completing the task.
- 3) The falling status is only defined as the top and bottom of chimney are contacting with arena at the same time.



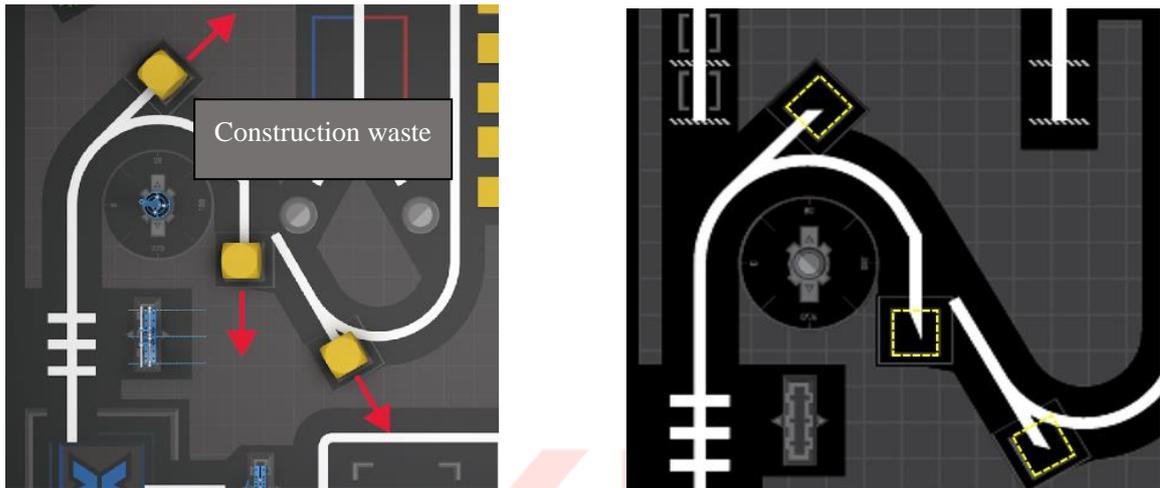
### 2.9.5 Dismantle Aging Thermal Power Station

- 1) The aging thermal power station with three plants is fixed the arena shown by the figure below.
- 2) Robot needs to push the three plants tilted to the other direction, the task is considered to be completed as shown in the figure below. The team gets 20 scores for dismantling each plant.
- 3) The plants must reach the lowest position and completing a full stroke. If the plant is trapped by any other structures, the task is not completed.



### 2.9.6 Dispose Construction Waste

- 1) Three huge construction wastes located at the arena as shown by the figure below.
- 2) Robot needs to transport huge construction waste out of the gray square area and the projection of waste must partially or totally exit the square area. The team gets 20 points for completing each waste transportation.
- 3) The exit direction of waste must along with the white guide line.



### 2.9.7 Monitor Groundwater Quality

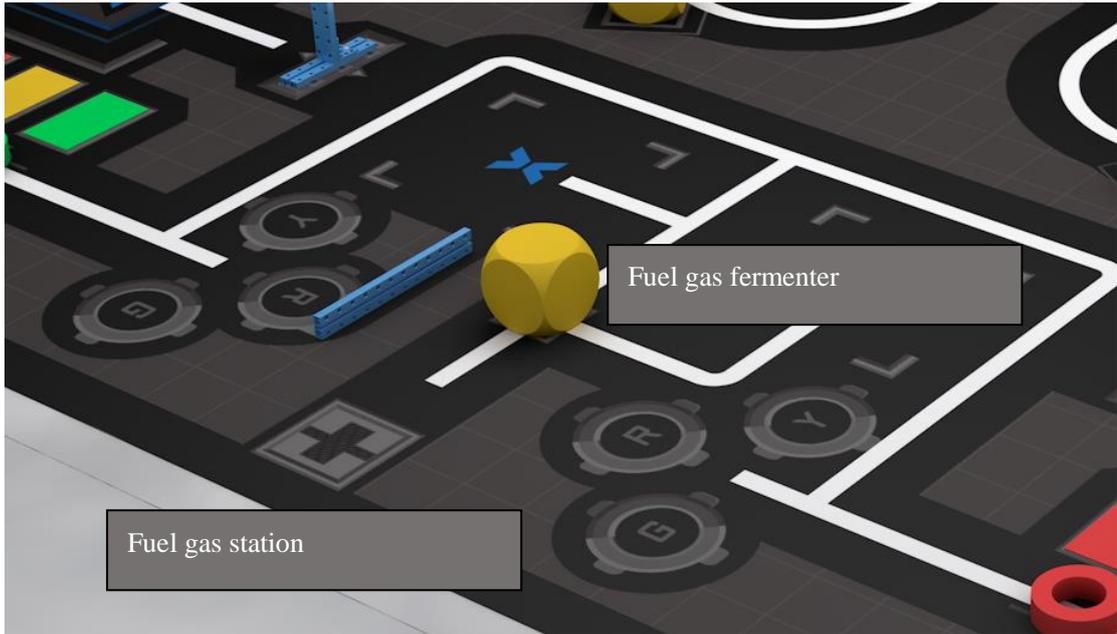
- 1) Five groundwater monitoring stations located at the arena as shown by the figure below.
- 2) Robot needs to detect water quality at five monitoring stations and display the quantity of abnormal station on the LED Matrix. The color of abnormal monitoring station is yellow and the quantity and sequence of abnormal monitoring station are random. If robot displays the quantity correctly, the team gets 20 points for completing this task.
- 3) The robot must display the monitoring process by showing the quantity of abnormal station in the incremental way. (Robot must not directly display the value after the whole monitoring process. E.g. From '0' to '2' or more without showing '1') the correct number must keep shown on the LED Matrix for at least 2 seconds.



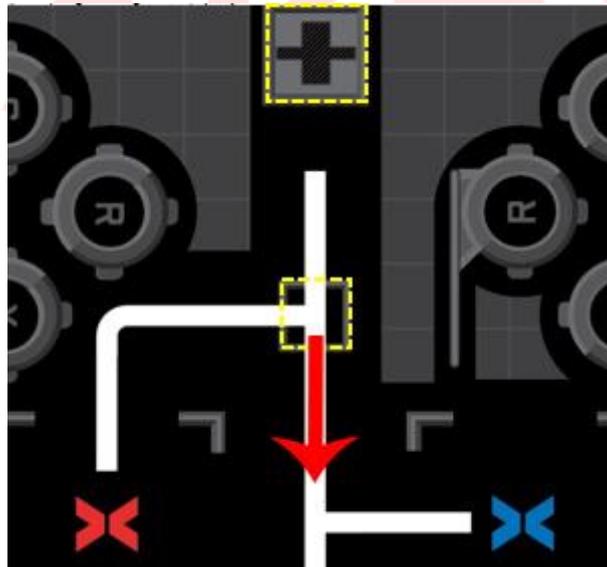
## 2.10 Alliance Task

### 2.10.1 Production of Fuel Gas from Household Waste

- 1) The fuel gas fermenter and the fuel gas station are located on the arena as shown by the figure below.
- 2) The robot of the Blue team needs to start from the blue starting area and push the fuel gas fermenter from the traffic junction to the gas station for fuel gas production. The robot of Red team needs to pass the traffic junction.
- 3) The robot from Red team must start after the successful scoring of Blue team. The performance of Red team will not be judged if Blue team failed the transportation of fermenter.
- 4) If the stationary vertical projection of the fuel gas fermenter partially or totally enters the area of gas station, the Blue team gets 10 points. If the robot of the Red team passes by the traffic junction and the vertical projection of red robot completely leaves the traffic junction, the Red team gets 20 points.
- 5) The household waste must enter and stay at the gas station for at least 2 seconds. During that period, the waste should not have any movement or rotation, otherwise, the task is failed.

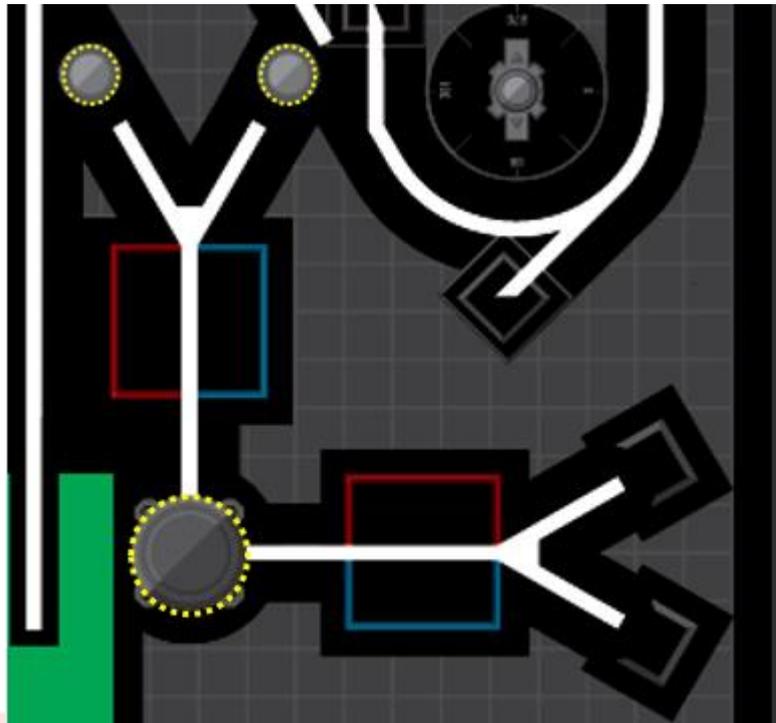


6) The front and rear part of robot from Red team must pass by the traffic junction in sequence. The direction of entering and leaving the traffic junction should be vary. To pass by the junction, the robot must completely cover the traffic junction. Partially or only covering with tires is not accepted. The moving direction for Red team is given by figure below.



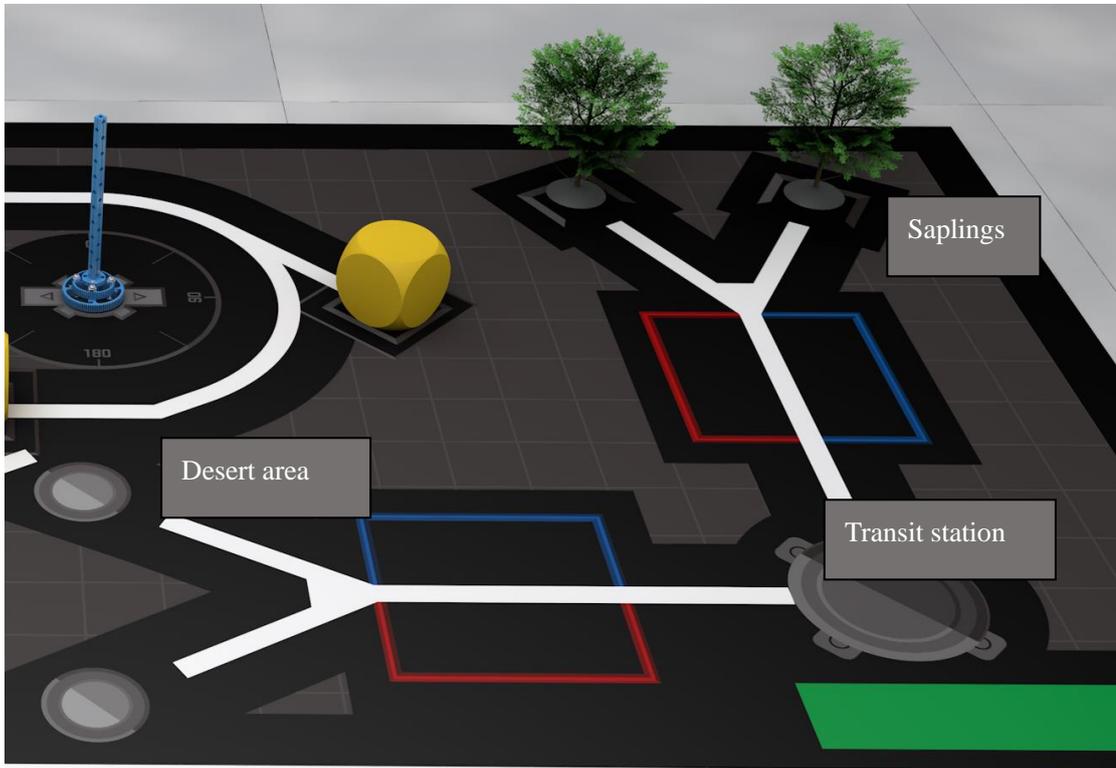
### 2.10.2 Tree Planting in Desert

- 1) Two saplings, one transit area and two desert areas are located at the arena as shown by the figure below.



- 2) Stage 1: One robot from alliance team needs to transport saplings to the transit station and the other robot needs to transport saplings from the transit station to desert areas. The stationary vertical projection of saplings partially or completely entering the transit area or finishing 'Handover', the alliance gets 10 points for each sapling. 'Handover' means the sapling is contacted by two robots in sequence. Stage 2: If the stationary vertical projection of saplings totally or partially enters the desert areas, the alliance gets another 10 points for each sapling.
- 3) The alliance can finish and score only one time for each sapling between transporting the sapling to transit area or finishing the 'Handover'. If both of them are finished, the first attempt made by robot will be evaluated for scoring.
- 4) For this task, if only one robot from the alliance finishes all two stages planting, only the attempt in first stage will be evaluated for scoring. Two alliance robots must cooperated with each other and finish two stages in turn to get full points for this task.
- 5) In stage 1, the stationary vertical projection of sapling must partially or completely enter the transit area and stay inside the area for at least 2 seconds without any extra movement. If restarting is required by alliance, the robot and its stationary vertical projection must not have any contact with sapling and its stationary vertical projection. Otherwise, the sapling will be considered as 'unhealthy' state and alliance will lost chances for scoring on this sapling.

- 6) To finish a successful 'Handover', two robots must contact the sapling simultaneously for at least 2 seconds. If robot throw or push the sapling for 'Handover' without having 2 seconds simultaneously contact, the stage 1 'Handover' is failed.
- 7) If the sapling is at the 'unhealthy' state at the transit area, the second robot should not transport the sapling to desert area and no points will be scored.

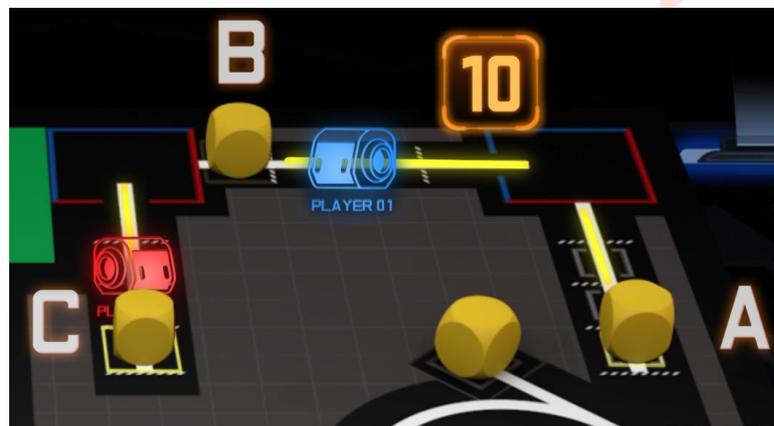
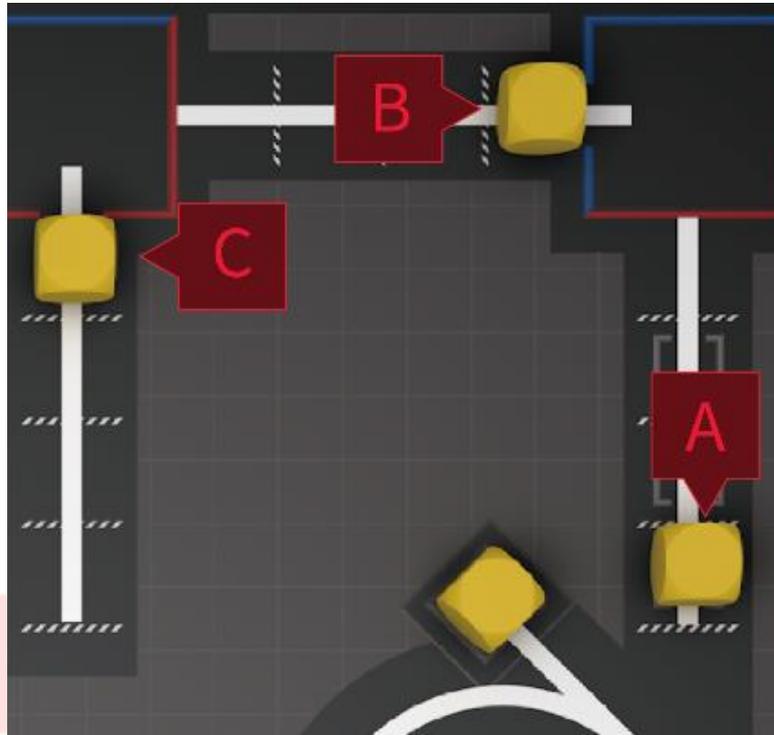


### 2.10.3 Water Purifier

- 1) Three pollution cleaners are located on the arena as shown in the figure below. The position of purifier A is randomly assigned in one of three gray scale-squares. The initial positions of purifier B and C are fixed as the figure shows.
- 2) Stage 1: One robot from alliance team detects the location of the purifier A and push the purifier B to the identical position respect to A. The alliance gets 10 points for finishing the stage 1. (Definition of Identical Position for stage 1: The distance between Right Starting Area and purifier B must equal to the distance between Right Starting Area and purifier A.
- Stage 2: By checking the position of purifier B, the other robot needs to push the purifier C to the identical position respect to purifier A. The alliance gets another 10 points. (Definition of Identical Position for Stage 2: The distance between Left Starting Area and purifier C must equal to the distance between Right Starting Area and purifier A)
- 3) The stationary vertical projection of purifier must completely enters the correct area and keep the scoring status for at least 2 seconds. The task is failed if the stationary vertical projection of purifier has any contact with the

dashed scale.

- 4) Two stages must be finished in sequence. Stage 2 can only started when Stage 1 has been successfully finished (The first robot pushes purifier A to the correct location and stay for 2 seconds). If Stage 1 is failed, the performance of stage 2 will not be evaluated for scoring.



#### 2.10.4 Forest Dance

- 1) The dancing stage is located on the arena as shown in the following figure.
- 2) One robot enters the stage area and plays music, while the other robot enters into the stage area and dance by rotating or other motions. Two robots need to start the action synchronously for at least 3 seconds. The alliance get 10 points for completing this task.
- 3) To define if the robot enters the stage area, the vertical projection of mBot Shell must partially or totally within the stage area. During the performance,

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if any robot is not in the stage, the task will be failed.



## 3. Competition Process

### 3.1 Team Registration

After arriving at the venue, team members and mentors shall bring ID cards to the registration counter to sign in, register and get their material packages including competition brochure, entry gifts and other competition materials.

### 3.2 Engineering Notebook

Teams shall pack e-copy of engineering notebook, source code, photos of team members, robot photos, photos of building process and videos and send them to [share@makex.cc](mailto:share@makex.cc); its title has to be named as "2018 MakeX World Championship– team name- theme" (for example: 2018 MakeX World Championship- Voyage- Blue Planet).

### 3.3 Inspection

To make sure that participating robots comply with the competition rules and ensure the safety of participants and audiences, the Committee will carry out an inspection of all contestants and robots on the day of registration and before the competition.

All teams shall accept inspection on the day of registration and before the

competition, hereinafter referred to as "Competition Inspection" and "Pre-competition Inspection".

If an inspector identifies 2 robots identical to each other, the teams should alter or modify its robot and return for inspection until the robot passes. Failure to pass this test will result in immediate **Event Disqualification**.

Teams that have missed or failed to pass the inspection can correct their issues before inspection ends. Teams need to arrive at the inspection area at least 30 minutes before the competition, and their robots must pass inspection to compete.

### **3.4 Practice Matches**

Teams can practice in the pits after completing registration and inspection. Any team arrive first get the chance to practice first, other teams shall wait.

### **3.5 Contestants' Meeting**

Before the competition, the referee will gather all teams together and specify what needs to be paid attention to and under which circumstance participants will get penalty points.

### **3.6 Announcement of Competition Schedule**

Before the start of Qualifying, the MakeX Committee will announce the schedule, each team has one hour to plan, communicate with alliance teammates on cooperation, simulate the competition and adjust robots.

### **3.7 Start of Competition**

After confirming that participating teams are ready, the referee will countdown "three, two and one". Upon hearing the "start" command, contestants can touch the button to start the robot. Meanwhile, it's required that the vertical reflection of mBot base should be totally in the participant's own start-up area.

### **3.8 Restart the Robot**

If participants need to restart their robots, they should inform the referee by raising hands. Once get approval from the referee, contestants can take the robot out of the pit, restart or modify the robot and then put it back to start-up area of their own or the public start-up area of alliance teams. The score of the task completed before the restart will count as valid; props will remain unchanged with what's before the restart; repeated tasks accomplished before and after the restart will only get one-time score; the competition will not pause.

### **3.9 End of Competition**

Each competition lasts for five minutes. After the referee announces "three, two, one, the competition ends", contestants shall turn off the robot immediately and shall no longer contact any object on the arena. Any scores or penalty points occurred after the competition will be regarded as invalid. If alliance leader wants to end the competition ahead of schedule, he/she needs to inform the referee and record the time.

### **3.10 Score Confirmation**

The referee gives score based on real robot performance, the alliance leader shall sign to confirm the results.

### **3.11 Qualifying**

Teams shall participate in four Qualifying during which alliances will be formed randomly. Teams that get the highest sum of scores in 4 qualifying will rank top. (including independent task scores and alliance task scores); If two or more teams get the same total scores, teams get higher total scores in independent tasks rank higher; if two or more teams get the same total scores in independent tasks, teams finish the competition in shorter time rank higher.

### **3.12 Alliance Selection**

Qualified teams ranking the top 50% have the priority to choose their own alliance teammates for the Championship in sequence, also they have the right to refuse if been chosen, while the bottom 50% teams have to accept. Alliance teams formed in this

session will be alliance in the Championship. After the selection, participants in alliance teams will have 30 minutes to communicate with each other.

### **Proportion of eligible teams**

If the number of teams reaches 101 or more, 64 teams will be eligible for the following competitions.

If the number of teams is between 51-100, 32 teams will be eligible for the following competitions.

If the number of teams is between 26-50, 16 teams will be eligible for the following competitions.

If the number of teams is less than 26, 8 teams will be eligible for the following competitions.

## **3.13 Championship**

The highest single-session score among three Championship Matches will be taken as the final score in the Championship Match. Alliance teams with the highest final score will rank at the top. If there is more than one team obtaining a same final score, the alliance with higher alliance task score ranks higher; if they have the same alliance task score, teams finishing the match in a shorter time rank higher.

## **3.14 Awarding and Closing Ceremony**

Awarding and closing ceremony is set to reward teams for their achievements and efforts made in the event. Prize will be awarded to the Championship, runner-up, second runner-up and some outstanding awards.

# **4. Awards**

## **4.1 Champion**

The top-ranked alliance teams in the Championship Match will be the champion of MakeX robotics competition.

## **4.2 Runner-up**

The second-ranked alliance teams in the Championship Match will be the Runner

up of MakeX robotics competition.

### **4.3 Second Runner-up**

The third-ranked alliance teams in the Championship Match will be the 2nd runner up of MakeX robotics competition.

### **4.4 Best Design Award**

Marcel Dassault, a famous French aircraft industrialist once said that” For an airplane to fly well, it must be beautiful”.

The Best Design Award is set to celebrates creativity and sense of art in design, expecting to encourage all teams to think outside the box, adopt unique design and structure and create a perfect mix of aesthetics and technology with their own hands.

Key Criteria:

1. Present the design draft of their robot.
2. Their robot is distinctive in some aspects.

### **4.5 Best Teamwork Award**

MakeX Robotics Competition advocates unique team culture., During the competition, all teams can present their team culture in various ways: designing team posters, flags, logos, badges as well as team culture related gifts, which can for one hand promote better team communication and for the other hand allow audiences to appreciate a distinctive team culture and philosophy. Team with the best performance in this aspect will be awarded Best Teamwork Award.

Key Criteria:

1. During the competition, teams can present their team culture in various ways,
2. They can show their team by designing team posters, flags, logos badges, etc.
3. They can apply to the committee for participating in the shows for opening and closing ceremony

### **4.6 Technological Innovation Award**

A team will have a continuous motivation only if he has the spirit of innovation. The Innovate Award is set for the team whose robot has a significant breakthrough and innovation in the technology field, hoping that all teams can think outside the box and make new progress during and after the competition.

Key Criteria

1. Teams should also specify and emphasis in engineering notebook that which part of the robot features significant technology innovation.

## **4.7 Morality Award**

Competition is definitely not only about scores and points, but more about how to help participants grow through competition.

This award is set for the team that can obey safety rules, keep the pits clean and tidy, actively cooperate with the Committee, and maintain the order.

Key Criteria:

1. During the competition, the team can obey safety rules, keep the pits clean and tidy, actively cooperate with the Committee, and maintain the order.
2. During the competition, the teams can respect and comply with the competition regulation and present a positive professional image.

## **4.8 Sportsmanship Award**

Sportsmanship Award is presented to a team that demonstrates willingness to help other teams, respect and abide by the rules of competition, compete with complete impartiality, not be dizzy with success nor discouraged by failure.

Key Criteria:

1. Team is courteous and helpful and willing to give a hand to others who are in trouble.
2. Teams can maintain the fairness and justice of competition and can solve the problems calmly when there are any contradiction or conflicts.
3. Team remains positive during the competition, not be dizzy with success nor discouraged by failure and grow in problem-solving process.

## **4.9 Dark Horse Award (MakeX World Championship)**

This award will be presented only in the MakeX World Championship to a team that emerges to prominence and made great progress and improvement in every aspect.

Key Criteria: team that has made extraordinary progress in the Championship and is selected unanimously by the Committee.

#### **4.10 Annual Points' Winner, Runner-up, Second Runner-up (MakeX World Championship)**

Annual Points' Winner, Runner-up, Second Runner-up will be awarded in the Championship to the top three teams with the highest total annual points.

**(For Chinese Teams Only)**

#### **4.11 Annual Points' Top Eight (MakeX World Championship)**

Annual Points' Top Eight will be presented to teams ranking 4 to 8 in total annual points. (For Chinese Teams Only)

### **5. 2018 MakeX Competition**

In 2018, the competition will be divided into Point Race, Regional Competitions, Overseas Competition and MakeX World Championship. Teams should participate Point Race and Regional Competition to win points and win qualification to participate in the MakeX World Championship.

#### **5.1 Point Race (for Chinese Teams Only This Year)**

According to the number of teams, the race is divided into four types: A, B, C and D. Different types of teams will obtain points of 160 to 30 according to the rankings.

In the rankings, in the 1st and 2nd places are two champion alliance teams; in the 3rd and 4th places are two runner-up alliance teams; in the 5th and 6th places are two second runner-up teams; the teams in the 1st to 6th places are ranked in accordance with final results. All other teams are ranked in accordance with the results of the qualifying competition. Specific information is shown in the table below:

<b>Points</b>	<b>160</b>	<b>140</b>	<b>120</b>	<b>100</b>	<b>70</b>	<b>50</b>	<b>30</b>
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Small Point Race ( 6-12 )	\	\	\	No.1-2	\	No.3-4	No.5-12
Level A ( 13-25 )	\	\	\	No.1-4	No.5-8	No.9-12	No.13-25
Level B ( 26-50 )	\	\	No.1-4	No.5-8	No.9-16	No.17-25	No.26-50
Level C ( 51-100 )	\	No.1-4	No.5-8	No.9-16	No.17-25	No.26-50	No.51-100
Level D ( 101-200 )	No.1-4	No.5-8	No.9-16	No.17-25	No.26-50	No.51-100	No.101-200

\* The types are based on the number of teams, and in the brackets is a range for the number of teams.

## 5.2 Regional Competitions

The top-four teams in Regional Competitions will have the qualification to MakeX World Championship, and rest teams will obtain points by Point Races regulations.

## 5.3 MakeX World Championship

Qualification ranking of 2018 MakeX Champion will follow the rule: teams will be divided into different groups by their ranking based on total points of the whole season, according to number of team, some teams could step into next qualification in each group by a certain ratio.

Take 27 teams as an example:

Group	A	B	C	D
Ranking by	1	2	3	4
the whole	8	7	6	5

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<b>season points</b>	12	11	10	9
	16	15	14	13
	20	19	18	17
	24	23	22	21
	.....	27	26	25

Each team will have 4 random competition in the group, ranking of each team is based on the group points which is determined by competition results. There are 8 teams could step into MakeX World Championship from size of 27 teams.

Group	A	B	C	D
<b>Ranking by the group points</b>	A1	B1	C1	D1
	A2	B2	C2	D2
	A3	B3	C3	D3
	A4	B4	C4	D4

In the Alliance selection, taking 32 qualified teams as an example, qualified teams should follow the order of A1-B1-C1-D1-D2-C2-B2-A2-D3-C3-B3-A3-D4-C4-B4-A4 to make the alliance selection. Qualified teams ranking the top 50% have the right to select their own alliance teammates during the MakeX World Championship, teams ranking the top 50% have right to refuse if selected, teams ranking bottom 50% do not have right to refuse.

## **5.4 Regulation of Outstanding Award Points (for Chinese Teams Only this Year)**

Teams winning the outstanding award in Point Races and Regional Competitions could obtain extra 20 points, and points could be accumulated by multiple single award.

Point application: teams which win over 100 points will have qualification to step

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into MakeX World Championship, please check official information. Teams with higher point in 2018 season could be seeded teams in 2018 MakeX World Championship, and have priority in group stage and Alliance-chosen-Ceremony.

## 5.5 Appeal Process

### 5.5.1 Appeal requirements

- E26.** Appeals should be proposed in the "Effective Appeal Period" based on the prescribed process and follow the competition spirit of "civilized entries".
- E27.** Contestants could consult to referee if have any questions about competition results; after consulting, if contestants still have problems about competition results, contestants should not sign in competition result table and write down problems. Then, contestants could leave competition area and appeal to organization committee.
- E28.** Organization committee will not accept any appeal from contestants after contestants have sign their names in competition result table. Organization committee will judge contestants have agreed with completion results and have no arguments if contestants have sign their names.

### 5.5.2 Specific Steps

- E29.** The team leaders fill out the Appeal Registration Form firstly, and cooperate with Arbitration Committee. If necessary, both sides of the appeal have to go back designated competition area to be investigated. During the investigation, team leaders and contestants should present, the team leader who appeals has to present. The Arbitration Committee has the right to communicate with claimant without the mentors, parents, friends, and relatives being there. During the process, claimant should clearly express requirements and describe facts under stable emotion.

### 5.5.3 Effective Appeal Period

- E30.** Effective Appeal Period should be within 30 minutes after competition. Please check Program Brochure for specific time before competition.
- E31.** Appeal will be invalid and unacceptable if over Effective Appeal Period.

### 5.5.4 Arbitration Process

- E32.** The Arbitration Process consists of the referee, arbitration consultants, and competition technical directors. The Arbitration Committee takes responsibility for appealing in the competition and have the investigation,

which assists competition to be held successfully and ensure competition results to be fair. Any replay videos, pictures, or other materials that are inaccurate because of shooting angle could only be reference instead of direct evidence in the Arbitration Committee.

**E33.** During the process of appeal, judgements about equipment, size, and weight will be only measured by official referee group. The Arbitration Committee reject to accept any videos, pictures, or other materials from unofficial organization or individual.

**E34.** During the process of appeal, contestants will communicate with official referee alone without mentors. Appeal could be invalid if mentors participate.

### **5.5.5 Arbitration Results**

**E35.** There are two Arbitration results “uphold original judgment” and “Replay the match”. Both teams could not appeal after Arbitration results.

### **1.1.1 5.5.6 Replay Processing**

**E36.** System failure, site damage and other technical reasons will make the referee group decide that the competition is invalid; or due to force majeure, the competition is interrupted, the referee group will request to replay of both teams by writing confirmation after verification and discussion. There is no replay because of the interruption or even termination of the competition caused by any robot failure (including but not limit to mechanical/electrical/software/communication failure, etc.), operation error and insufficient battery.

## **6. Participation**

### **6.1 Contestants**

Requirements:

1. Contestants must be between 6-13 years old in primary school group and between 12-16 years old in junior high school group. Note that the age limit is determined at the time when the competition season begins.
2. Contestants must be students (Contestants from China must be students receiving compulsory education).

\* Contestants are qualified to participate in the competition only if they fulfill these 2 requirements both.

\* It's allowed that lower age group participate in the competition of the higher age group, but not vice versa.

## **6.2 Mentor**

Each team must include 1 or 2 mentors.

## **6.3 Team Number**

Each team must have its own number as a distinctive symbol. The number will be automatically generated after creating a team on MakeX official website.

## **6.4 Identification Symbols**

Each team must have a team logo, team name and team slogan. It is recommended that the teams show their team culture in the form of uniforms, team flags, posters, badges and base decorations.

## **6.5 Registration for the Competition**

Contestants and mentors need to sign in on MakeX official website with phone number (E-mail for overseas team), fill in personal information and choose corresponding identity.

## **6.6 Sign up for MakeX Competition**

Team mentors can access to sign-up page by entering into Competition List in My Profile or the sign-up part at MakeX home page, fill in required information and finish payment to complete signing-up for the competition.

## **6.7 Competition Information**

Competition information includes but is not limited to officially released documents including Manual, Kits Guidebook and videos about competition rules. Contestant is required to follow the updates of these information before the competition. Contestant himself is responsible for any problems resulting from his neglect of the latest competition information.

## 6.8 Competition Manual

The MakeX Robotics Competition Committee will keep revising and updating the *Competition Manual* as competition continues. Contestants and mentors can download the latest version of the *Competition Manual* on MakeX official website.

## 6.9 Program Brochure

Contestants are required to read, understand and abide by the latest *Program Brochure* before the competition.

## 6.10 Entry Requirements

The Committee has the right to disqualify any contestant for any reasonable reasons including but not limited to failing to meet any safety rules, technical requirements or not maintaining sports spirit and fairness of the competition.

## 7. Disclaimer

Contestants need to make sure robots are made under strict safety procedures and every parts and components need to be purchased from legitimate vendors.

Every component or mechanism needs to be altered or modified by professional technicians abiding by national laws and regulations and meeting **quality and safety standards**.

Contestant himself should take the responsibility if any violation occurred against any national laws and regulations, quality and safety standards.

## 8. Copyright Statement

This MakeX Rule and its content is copyright of MakeX Committee. All rights reserved. You may not, except with our express written permission, distribute or commercially exploit the content. Nor may you transmit it or store it in any other website or other form of electronic retrieval system.

Please read the Rule carefully, signing up for the competition on MakeX official

website means that you have read and will abide by the content of this Rule including the Disclaimer, and willing to take corresponding legal responsibility based on this Rule.

## 9. Appendix

### 9.1 Engineering Notebook of MakeX Robotics Competition - Blue Planet (template)

#### 1. Basic information

Team name		Team members	
Team No.			
Team slogan		Team leader	

2. Robot introduction
3. Personnel division
4. Building schedule
5. Design inspiration/sketches
6. Technical principle
7. Building steps (please attach with clear pictures)
8. Problems encountered and corresponding solutions
9. Summary of optimization direction
10. Suggestions for the competition
11. Thoughts and feelings (optional)

#### Requirements for Report

The report needs to be divided into a text section and a video section.

#### 1. Text section

- Please refer to "Engineering notes of MakeX Robotics Competition".
- Body font needs to Times New Roman 10pt, Title font needs to be Times New Roman 14pt.

#### 2. Video section

- At the beginning of the video, a note board is needed to display the following contents: team name, shooting date (accurate to the month).

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- The video covers demonstration of robot function, some moments of robot building and interview of team members.
- It's recommended that the video be shot in well-lit conditions, and the end of the film shall be coupled with the names of director and actors (nicknames can be used).
- Video lasts for 5 minutes at most, allowing to be edited.

**3. Materials required**

- Source program (in the form of appendix)
- Photo of team members
- Photos of robots
- Photos of building process
- Video (allow to be edited)

All materials need to be clear, photo can be attached to the document. Please create a separate folder to store photos, and package the folder together with the documents and video and send to MakeX Robotics Competition Committee.

**9.2 Pre-competition Robot Inspection Checklist of Blue Planet**

MakeX pre-competition robot inspection checklist (Blue Planet)					
School name		Team name		Team No.	
Competition date			Competition session		
Inspection time					
Robot size and weight					
No.	Inspection item	Specific requirements		Status	

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1	<b>Robot size</b>	<p>The initial size of the robot at the beginning of the competition shall not exceed: 25cm (length) * 25cm (width) * 25cm (height).</p> <p>The modified size of the robot in the process of the competition shall not exceed: 30cm (length) * 30cm (width) * 30cm (height).</p>	
2	<b>Robot weight</b>	<p>Each robot weight no more than 5 kg (including the weight after intensive modification and the battery installation).</p>	
<b>Safety Inspection</b>			
No.	Inspection item	Specific requirements	Status
3	<b>Dangerous structure</b>	<p>Robot needs to feature safety protection because in the process of loading and unloading, handling and transporting, its structure may cause harm to the personnel.</p>	
4	<b>Damage to the pits</b>	<p>Damage to the pits is prohibited in the process of loading and unloading, handling and transporting of the robot.</p>	
5	<b>High-power components</b>	<p>In the process of loading and unloading and operation, there shall be no high-power dangerous equipment.</p>	
6	<b>Unsafe energy storage equipment</b>	<p>Safety shall be guaranteed for unsafe energy storage equipment (springs), etc. in the process of use.</p>	
8	<b>Personnel safety</b>	<p>The contestants should wear goggles; long hair (if any) should be tied up; the contestants are prohibited to wear open-toed shoes to be in the site.</p>	

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8	<b>Materials strictly prohibited</b>	Flammable gases, equipment related to firework, hydraulics, switches containing mercury, exposed hazardous materials, unsafe weights, designs that may create entanglement and competition delays, sharp edges and corners, materials containing liquids or jelly, and any parts which possibly bring the robot's current to any part of the site.	
<b>Robot module</b>			
No.	Inspection item	Specific requirements	Status
9	<b>Main board</b>	Use the specified mCore.	
10	<b>Power</b>	Adopt 3.7DC Li-ion battery or 4 No. 5 Dry Battery and make sure they are fixed within the robot; only one power supply is used for each robot.	
11	<b>Other parts and accessories</b>	Except for 3D printing parts, all other parts on the robot should be manufactured or sold by Shenzhen Makeblock Co., Ltd. Other non-electrical & non-magnetic parts from market or self-made are allowed using for counterweight only if they are not effecting the function of electrical parts.	
12	<b>Servo</b>	Every robot features only one 9g servo	
13	<b>Sensors</b>	Only the electronic sensors produced and sold by the official equipment supplier "Shenzhen Makeblock Co., Ltd." can be used.	

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		It's prohibited to use remote-control modules including 2.4G signal module and Bluetooth module.	
14	Motor	Only mBot-TT motor and 130 high-speed DC deceleration motor can be used (6V/312RPM).	
15	Base	Only mBot base produced by the official equipment supplier "Shenzhen Makeblock Co., Ltd." can be used, and the base can't be physically altered or modified.	
16	Submit of the engineering notes	The engineering notes containing robot control source codes shall be submitted prior to the competition.	
17	Site pollution	Materials such as lubricants used by robots shall not contaminate the arena or other robots.	

**Participant Declaration Form**

I hereby declare that our team has read, understood and agree to abide by the rules and regulations of MakeX.

I promise that our robot and robot-building process strictly follow the MakeX rules and to make sure of that, we will double-check before and during the contest..

**Mentor's and team**

**leaders' signature:**

**Inspection personnel notes**

Signature:



## MakeX Robotics Competition Committee

E-mail: [info@makex.cc](mailto:info@makex.cc)

Official website: <http://www.makex.cc/en/>

Official forum: [bbs.makex.cc](http://bbs.makex.cc)

Facebook: [@MakeX](https://www.facebook.com/MakeX)

YouTube: [@MakeX](https://www.youtube.com/MakeX)

WeChat

