MAKE X

V 1.0

2020 MAKEX ROBOTICS COMPETITION

COMPETITION GUIDE

MAKE X CHALLENGE

INTELLIGENT INNOVATOR
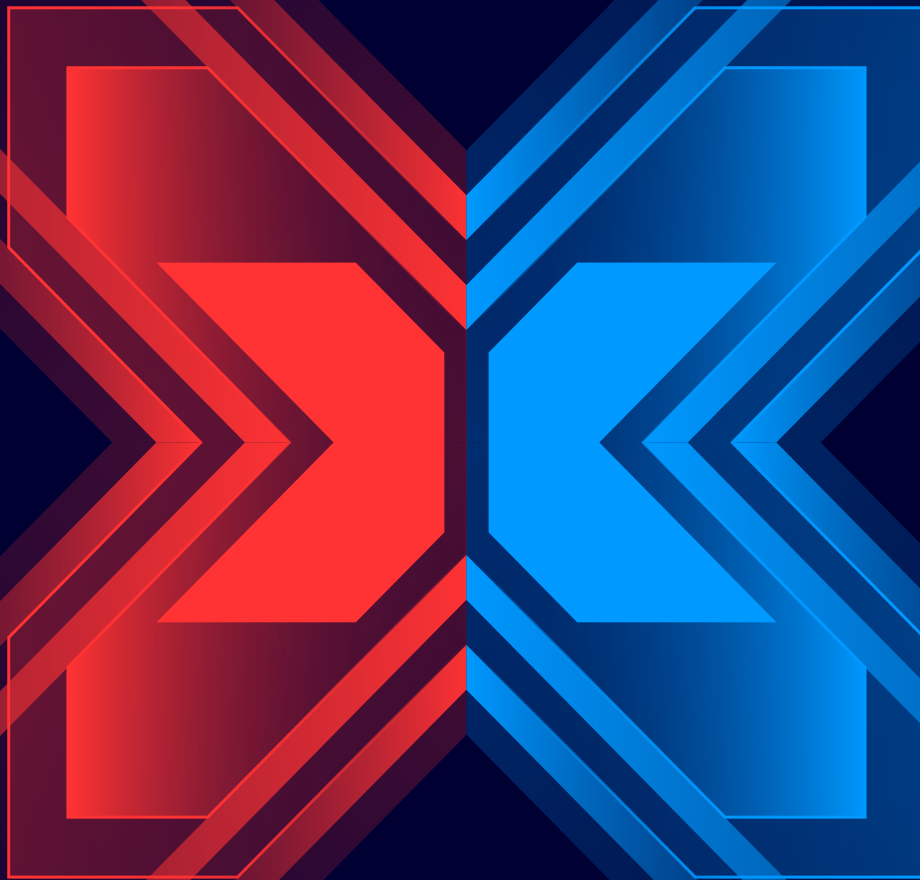
Updates:

Date	Version	Modifications Record
2019.12.10	1.0	Intelligent Innovator Competition Guide First Publish.

CONTENTS

1.   Introduction

1.1 About MakeX

MakeX is a robotics competition 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, etc.

MakeX Robotics Competition is hosted by the MakeX Robotics Competition Committee, organised by Shenzhen Hulu Maker Co., Ltd. and supported by Shenzhen Makeblock Co., Ltd. As the core activity of MakeX; it aims that through the competition, young people will discover the spirit of creativity, teamwork, fun, and sharing. It is committed to promoting innovation in science, technology, education through high-level competition events, guiding young people to learn Science (S), Technology (T), Engineering (E), Art (A) and Mathematics (M) and apply such knowledge in solving practical problems through the exciting and challenging competitions.

1.2 MakeX Spirit

Creativity: we advocate curiousness and innovation, encourage all contestants to create unique high-tech works with their talent, and challenge themselves for continuous progress!

Teamwork: we advocate solidarity and friendship, encourage all contestants to develop a sense of responsibility and enterprising spirit, and sincerely work with their partners for win-win development!

Fun: we encourage contestants to build a positive, healthy mindset in the competition. Enjoy the journey and grow in the process.

Sharing: we encourage contestants to have an open mind as a maker and share their knowledge, responsibility, and joy with everyone, including their teammates and competitors.

MakeX spirit is the cultural cornerstone of the MakeX Robotics Competition. We hope to provide a platform for all contestants, mentors and industry experts to exchange ideas, study and grow up, and help young people acquire new skills during creation, learn to respect others in teamwork, gain an enjoyable life experience in the competition, take delight in sharing with the society their knowledge and responsibility, and work hard to achieve their grand aspiration of changing the world and creating

the future！

1.3 About 2020 Season

The theme of the 2020 MakeX Challenge is "Intelligent Innovator". Industry is the lifeblood of modern economic development. However, traditional factories are gradually challenged and replaced by intelligent manipulators and modern manufacturing machinery. The background of Challenge 2020 season is set in a huge modern factory. The two Alliances will use high-precision vision sensors, mechanical control and other technologies to perform a series of operations, such as sorting out quality products and toss production materials into their opponent's smelter, so as to finish high-quality modern production.

2.　　Participation Requirements

2.1　Contestants

The number of contestants in each team is 2-8. The age requirement of the Intelligent Innovator contestants is between 11 and 18 years (birthday between 2/1/2001 to 31/12/2009). At the start of the season, contestants should be enrolled students in the compulsory education stage (students from different education systems should meet the age requirement).

2.2　Mentors

Each team must have 1 or 2 mentors. The mentor shall be over 18 years old.

2.3　Team Number

Team number will be regarded as the only identification of the team during the whole competition.

Each team will automatically obtain the team number after creating the team on MakeX official website.

2.4　Identification Symbols

Each team must have a team logo, team name, and team slogan. Teams are encouraged to use uniforms, flags, posters, badges, base decorations, etc. to show the team culture.

2.5　Team Roles

Participation in MakeX Robotics Competition means more than just a few minutes competing. MakeX encourages young people to participate in team building. Everyone in the team can play their respective roles as operator, observer, engineer, project manager, publicity manager, and so on. By participating in MakeX, the contestants will not only learn professional knowledge requested in the project but also master the necessary skills such as public relations, publicity, project management, and so on.

3.   Registration and Application

3.1   Registration

Contestants and mentors can use mobile phone numbers (E-mail for the overseas team) to register MakeX official website accounts. Please fill in personal information and choose the corresponding identity. Identity for the account cannot be modified once created.

3.2   Team Creation

Mentors can create teams in the "My Team" list on the profile page on MakeX official website. To create a team, members need to prepare the name, the logo, the slogan, and the introduction to the team and select school (or organization) and the country. Once the team name is filled in, it cannot be modified.

3.3   Team Management

Mentors can find teams successfully created in the "My Team" list on the profile page on MakeX official website and modify the necessary information of the team, but the team name and team number automatically generated by the system cannot be altered. The team's historic achievements will be shown in the "Record Data" list, which can be public or private in the privacy setting. Mentors can add the registered contestants through E-mail address on the team management page. Contestants of the same team can be replaced in different seasons.

3.4   Competition Application

Mentors can access the registration page from the "Competition List" on the profile page or the home page of the MakeX official website. The application will be completed after filling in the registration information.

More details about the application, please check the "MakeX Official Registration & Competition Application Guide" published on MakeX official website.

3.5　Competition Management

In the "My Competition" list on the profile page, mentors can also manage the competitions or cancel the competition applications.

4.   Competition Procedure

MakeX Committee reserves the rights as well as final interpretation to modify the competition rules, annual points, competition system according to the practical situation in each competition. All teams shall pay close attention to the notices and announcements published before each competition.

4.1 Agenda

The agenda of each competition will be determined according to the actual situation. Teams need to complete the onsite registration and inspection before the start of the competition.

4.2 Onsite Registration

When a team arrives at the venue, the mentor should show the ID cards (or passport) to the staff on onsite registration and get the competition materials. The mentor should inform the team members about the fire evacuation passage, match schedule, arena, practice field, and pits area, etc.

If teams need to replace team member after online registration success, but before the competition, please inform the MakeX Committee in advance and apply again on the website.

Onsite registration and robot inspection will be closed once the match schedule is generated.

4.3 Inspection

Robots can participate in practice matches and formal competitions only after passing the inspection. The inspectors will strictly check the safety of robots according to the inspection requirements. Teams can use the " MakeX Starter Robot Self-Check List " to check robots in advance. If the inspection fails, the team needs to adjust their robots and check again until they pass the inspection.

4.4 Engineering Notebook Submission

Paper engineering notebook: As the Intelligent Innovator requires the presentation process, 1 copy of the paper version shall be submitted by each team to the judges at

the presentation site. Engineering notebook will not be returned, please prepare one copy if you need to keep the original.

For details of the engineering notebook writing, please refer to" Appendix: Engineering Notebook Guideline".

4.5 Presentation

MakeX encourages contestants to develop their creativity and skills of making robots and to master the robotic theories by participating in the competition. The presentation takes about 10 minutes, using the methods of Q&A and onsite problem-solving to examine students' knowledge level of robots. All team members must participate together. Mentors are not allowed to accompany them during the presentation.

Each team should arrive at the presentation room on time, with 1 copy of the engineering notebook and the robot. All team members must be present together.

The judges will ask questions or require an onsite operation demonstration. Teams can obtain different points (5, 3, 2, 0) according to their onsite performance grade (S, A, B, C). The presentation points result will be shown on the MakeX official website after the Qualification Round. Teams obtaining 0 point in the presentation will not be able to enter the Elimination Tournament.

There shall be no irrelevant person offering guidance during the presentation, and the teams shall not bring any electronic communication device to ask for help. The teams will obtain 0 presentation point if the situations above are found.

4.6 Pits Area Decoration

Each team has its own space in the Pits Area, where teams can make a decoration, publicize, and canvas their teams for the Culture Sharing Award.

Teams can rest and debug robots in the Pits Area, so please keep the area clean and tidy.

4.7 Pre-competition Communication Meeting

Before the start of the competition, the committee will convene a meeting with all team operators to specify matters needing attention and situations when participants will get a penalty.

Only operators in each team need to attend this meeting without carrying the robot.

4.8 Schedule Announcement

The MakeX Committee will announce the match schedule at least 30 minutes ahead of the start of formal competition through the online official website and offline channels such as bulletin boards, screens, and other channels onsite.

4.9 Practice Match

Teams can participate in the practice match after completing onsite registration and inspection. The specific arrangement of the practice match is based on the announcement on site. Teams need to queue up for the practice match.

4.10 Qualification Round

Normally, each team is requested to participate in 4 matches during Qualification Round. The number of matches for teams to participate in may vary between different competitions, which is decided by the MakeX Committee according to the practical situation. Points will be obtained according to the winning or losing situation. Each match is conducted in the form of alliances confrontation. Each alliance consists of 2 teams. Each team's ally and the opponents will be allocated randomly by the system.

In each match of the regular competition, the two teams of the winning alliance will score 5 winning points respectively, and the two teams which end in a draw with the opponents will score 2 winning points respectively. Two teams of the losing alliance will score 1 winning point. The ranking points are the sum of the winning points in all matches plus the presentation points. Top-ranking teams will be promoted to the Elimination Tournament. If there are teams with the same ranking points, the ranking sequence will be determined according to the following rules:

1) Compare the total automatic stage points obtained in the Qualification matches. The higher the points, the higher the ranking.

2) If the above conditions are the same, compare the total competition points obtained in the Qualification matches. The higher the points, the higher the ranking.

3) If the above conditions are the same, compare the total net competition points obtained in the Qualification matches. The higher the points, the higher the ranking.

4) If the above conditions are the same, an additional match will be held. The winner will be the team with the higher total competition points. If both teams obtain the same total competition points, the winner will be the team with higher automatic stage points. The additional match will continue if the automatic stage points are the same again.

Winning points for the different competition are shown as follows:

Competition Type	Win	Tie	Loss
Points Race Regional Competition	5	2	1
National Competition	10	4	2
Intercontinental Competition	15	6	3

4.11   Alliance Selection Ceremony

In Alliance Selection Ceremony, promoted teams will select their alliance team in turn according to their Qualification Round ranking. The formed alliance will be named as "Alliance 1", "Alliance 2", "Alliance 3"… Promoted teams select the alliance in turn according to the ranking of the Qualification Round. When being chosen by other teams, promoted teams ranking top 50% can refuse for only once, promoted teams ranking bottom 50% cannot refuse. If the team is refused by other team, he can continue to choose another until the alliance is formed.

The alliance selection rule above is only for Points Race or regional competition. For other competition type such as intercontinental or national one please check the Notices or Program Brochure published before each competition.

The promoted teams who are not present before the start of alliance selection are deemed as voluntary, giving up the right to choose, and the promoted teams who are not present before the end of the alliance selection are considered to be as voluntary quitting the Elimination Tournament.

If it occurs that the promoted teams quit the Elimination Tournament, the promotion places will be extended to the following teams according to the ranking points after the Qualification Round.

In the 2020 season, the promotion proportion for each competition shows as below.

The promotion quota in each competition may vary according to the practical situation.

Promotion quota:

Teams in Qualification Round	Number of promoted teams
121 or more	64
65-120	32
32-64	16
12-31	8
6-11	4

4.12   Elimination Tournament

In the Elimination Tournament of the MakeX Challenge, the match schedule shows as follows. There will be 3 sessions in each match. The alliance who achieves ＂2 wins＂, or ＂1 win and 2 ties＂, can rise to the next round until champion, runner-up and second runner-up come out.

If the alliance achieves ＂1 win, 1 lost, 1 tie＂ or ＂3 ties＂, the winning alliance will be decided according to the following rules:

1) Compare the total automatic stage points obtained in 3 sessions. The higher the points, the higher the ranking.

2) If the above conditions are the same, compare the total competition points obtained in 3 sessions. The higher the points, the higher the ranking.

3) If the above conditions are the same, compare the total net competition points in 3 sessions. The higher the points, the higher the ranking.

4) If the above conditions are the same, an additional match will be held. This match only takes one session. The winner will be the alliance with the higher total competition points. If both alliances obtain the same total competition points, the winner will be the alliance with higher automatic stage points. The additional match will continue if the automatic stage points are the same again.

5.   Annual Points Plan

In the 2020 season, the competitions will be classified into Points Race, Regional Competition, National Competition, Intercontinental Competition, and World Championship. Teams can participate in different competitions to obtain annual points.

In each competition, the annual points that teams can obtain are based on the winning points they get for every single match. Champion alliance, runner up alliance, and second runner up an alliance in each competition, can obtain additional annual points.

Competition Type	Win	Tie	Loss	Champion	Runner up	Second Runner up
Points Race, Regional Competition	5	2	1	15	10	5
National Competition	10	4	2	30	20	10
Intercontinental Competition	15	6	3	45	30	15

For example, team X20000 gets the Champion place in one Points Race, and all the results show as below.

Qualification Round 1	Qualification Round 2	Qualification Round 3	Qualification Round 4	Annual Points from Qualification=13
Win(5)	Loss(1)	Tie(2)	Win(5)	
Top Eight Battle	Semi-final		Final	Annual Points from Elimination=15
Win(5)	Loss(5)		Win(5)	

The total annual points that team X20000 obtains = 13+13+15 = 43.

6.   Arbitration and Appeal

6.1 Results Confirmation

E1.   **Results confirmation:** When a single match ends, captains of both teams need to confirm the results with the referees and then sign the results form. Both teams shall not have any objection to the results of this single match after their signatures.

E2.   **Dispute settlement:** If the captains do not accept the results presented by the referee, they can reject to sign the results form. Instead, they need to write clearly about the situation on the remarks part of the results form and sign there.

6.2 Appeal Procedure

E3.   **Appeal requirements:** Appeals should be lodged within the "valid appeal period" by the prescribed procedure and the civil participation spirit.

E4.   **Appeal procedure:** The captain of the team needs to fill in the Appeal Form, then cooperates with the Arbitration Commission to investigate the real situation. Both sides will be required to arrive at the designated place if the Arbitration Commission requires. During the investigation, the captain of the appeal team must be present, and only captains or contestants of both teams can be present. The Arbitration Commission has the right to communicate with the appellant contestant alone, avoiding the mentor, the parents of the contestants, their relatives, or friends. The appellant contestant should express facts clearly and objectively, not being over-emotionally.

6.3 Valid Appeal Period

E5.   **Valid appeal period:** Normally, the appeal should be lodged within 30 minutes after the end of the competition. Please check the Program Brochure for a specific effective appeal period before the competition.

E6.   **Validity of presence:** The appellant and the respondent must be present at the designated place on time.

E7.   **Appeal response:** Normally, the Arbitration Commission responds to the

appeal after the end of the competition on the same day or before the start of the competition on the next day.

6.4 Appeals Out of the Stipulation

E8. **Overdue appeal:** Appeals that are not lodged within the "valid appeal period" will be considered invalid and inadmissible.

E9. **Appeals for overtime presence:** If the appellant fails to be present on time or leaves without any reason during the investigation, the appeal will be considered invalid. If the respondent fails to be present on time, the Arbitration Commission will directly determine the arbitration result and render it as a final result.

R1. **Presence of extra persons out of the stipulation:** In case such persons as the parents, mentors of the appellants participate in the arbitration process without permission from the Arbitration Commission, the Arbitration Commission will warn the team in violation.

⊘ In case multiple warnings fail, there will be a disqualification.

R2. **Appeal's requests are not clear:** If the Arbitration Commission cannot understand the appeal or conduct the normal investigation due to the emotion factor, the Arbitration Commission will warn the team.

⊘ In case multiple warnings fail, there will be a disqualification.

R3. **Uncivil appeals:** Neither side shall make uncivil acts nor offensive behaviour and words.

⊘ In case multiple warnings fail, there will be a disqualification.

R4. **Appeals from other persons:** The appellant must be the contestant of the team, and the appeals from other persons will not be accepted.

⊘ In case multiple warnings fail, there will be a disqualification.

6.5 Arbitration Procedure

E10. **Arbitration Procedure:** The Arbitration Commission consists of the chief referee, the arbitration consultant, and the technical responsible person of the competition. The Arbitration Commission is responsible for accepting the appeals and conducting arbitration investigations, to ensure the smooth progress of the competition and the fairness and justness. The

playback videos and photographs of any competition may be inaccurate due to the shooting angle, which is only used as reference but not arbitration evidence.

E11. **The arbitration results:** The arbitration results can be divided into "maintaining the original result of the match" or "re-match" between the two teams, and the two teams shall not appeal again.

E12. **Additional remarks:** The Arbitration Commission determines the final arbitration result, and neither side shall dispute the result of the appeal anymore.

E13. **Implementation of the arbitration result:** If the arbitration result is a "re-match" between the two teams, the two teams shall have a re-match according to the time and arena stipulated in the Appeal Form. If either team fails to reach the arena within 5 minutes after the start of the match, the team shall be deemed to quit the match.

7.   Competition Statement

7.1 Update of Competition Documents

The official documents and files are including but not limited to the Competition Guide, Equipment Guide Book, Rule Video provided by the MakeX Committee. Contestants are obliged to pay attention to the updates of these documents and files before the competition. Any problem caused by the contestants not keeping up with updates of the documents and files is borne by the contestants themselves. All the official documents and files will be updated on the MakeX official website www.makex.io.

Competition Guide

The MakeX Robotics Competition Committee reserves the right to revise and improve the Competition Guide during the whole season. Contestants and mentors can download the latest version from the MakeX official website.

Q&A and Sharing

All contestants, mentors, and any robot enthusiast can raise questions or share their experiences on social media platforms. Anyone posting messages and replying should abide by the network ethics. Online speeches that are out of the stipulation will be banned or deleted.

7.2 Qualification Statement

The MakeX Committee reserves the right to disqualify any contestant for any reason, including but not limited to failing to meet safety or technical requirements, seriously violating the spirit or fairness of the competition.

7.3 Copyright Declaration

Shenzhen Hulu Maker Co., Ltd. reserves the copyright of this Competition Guide. Without the written consent or authorisation from Shenzhen Hulu Maker Co., Ltd, any entity or individual may not reproduce, including but not limited to any network media, electronic media or written media.

7.4 Disclaimer

All contestants in the 2020 MakeX Robotics Competition shall fully understand that safety is the most important issue for the sustainable development of the MakeX Robotics Competition. To protect the rights and interests of all contestants and organisers, according to relevant laws and regulations, all contestants registered for the 2020 MakeX Challenge - Intelligent Innovator, shall acknowledge and abide by the following safety provisions:

Contestants shall take adequate safety precautions when constructing the robots, and all parts used for constructing the robots shall be purchased from legal manufacturers. Contestants shall ensure that the structural design of the robots takes into account the convenience of the inspection and actively cooperate with the host of the competition.

When modifying and using the parts with potential safety hazards for the robots, it must conform to the national laws, regulations, and quality & safety standards. Those operations shall be manufactured and operated by persons with relevant professional qualifications.

During the competition, the teams shall ensure that all the actions such as construction, testing, and preparation will not do harm to their team and other teams, referees, staff, audiences, equipment, and arenas.

In the process of construction and competition, if any action that may violate the national laws, regulations, or standards occur, all consequences will be borne by the contestants themselves.

The competition kits and parts sold and provided by the supporter, Shenzhen Makeblock Co., Ltd., shall be used by the instructions. Shenzhen Makeblock Co., Ltd. and MakeX Committee will not be responsible for any injury or loss of property caused by improper use.

7.5 Competition Guide Statement

The official language for MakeX is Chinese. English or other language translations are prepared to facilitate the team's preparation process. All documents translated to English are for reference only.

The MakeX Robotics Competition Committee reserves the final interpretation of the MakeX Robotics Competition – Competition Guide for Intelligent Innovator.

Appendix: Engineering Notebook Guideline

2020 MakeX Robotics Competition
Engineering Notebook Guideline

*Instruction:

1. **The value of engineering notebook**: It helps the team establish files and record the whole learning process. Therefore, the record of the engineering notebook should run through the entire preparation process for the competition.

2.**Engineering notebook submission**: Teams can use online documents or handwriting. No matter which way to use, each team must submit a paper version onsite.

Paper engineering notebook: As the competition programs (Intelligent Innovator & Ultimate Warrior) require the presentation process, 1 copy of the paper version shall be submitted by each team to the judges at the presentation site. If there is no presentation process (Smart Links), teams will need to submit 1 copy of the paper version to the staff at the inspection area.

3. An engineering notebook will be required for the evaluation of all awards focusing on technology. Please refer to the Competition Guide for the evaluation criteria of each award.

Basic Requirements of Cover

The team name, team number, and competition program must appear on the outside cover of the engineering notebook.

Basic Requirements of Contents

1.   Directory contents

Creating directory content brings convenience for the presentation judges to review and quickly find the corresponding section.

2.   Process records

Every improvement of the robots should be recorded from prototype design, building a robot, to the debugging. **Keep pictures of all manuscripts, design drawings, calculation processes, circuit diagrams, etc., and insert them into the engineering notebook.**

1)   Schedule of robot building progress

2)   Design inspiration/sketch

3)   Technical principle (it can be disassembled into different parts)

4)   Production step by step (with clear pictures)

5)   Problems encountered and solutions

   Examples of problems:

   What technical failures did you encounter? Why did you fail? How did you solve the problems finally?

   What efforts have you made for the robots? What improvements have been achieved?

   Does your project progress schedule go as planned? What accidents or delays have occurred? How to fix it?

   Has there been any dispute among the team members?   How to settle it?

3.   Projects summary

1)   The structure and function of the project (with pictures and text enclosed)

2)   The technical innovations of the project

3)   Competition strategies for scoring and defence

4.   Team introduction

1)   A brief biography of each team member and their role on the team.

2)   Culture displaying (logo, team flag, slogan, posters, T-shirt, etc.)

3)   Excellent achievements sharing (Stories)

5.   Feelings and other things you want to share (optional)

1)   Achievement in the competition (Technical)

2)   Growth in the competition (Spiritual)

3)   Suggestions for competition

MAKEX

MakeX Robotics Competition Committee

COMPETITION GUIDE

Email:
makex_overseas@makeblock.com

Official Website:
(CN): www.makex.cc
(EN): www.makex.io

Instagram:
makexofficial

Facebook:
MakeX

Facebook Official Account