MAKEX

V 1.0

2020 MAKEX ROBOTICS COMPETITION

RULES GUIDE

MAKEX SPARK

FUTURE HOME
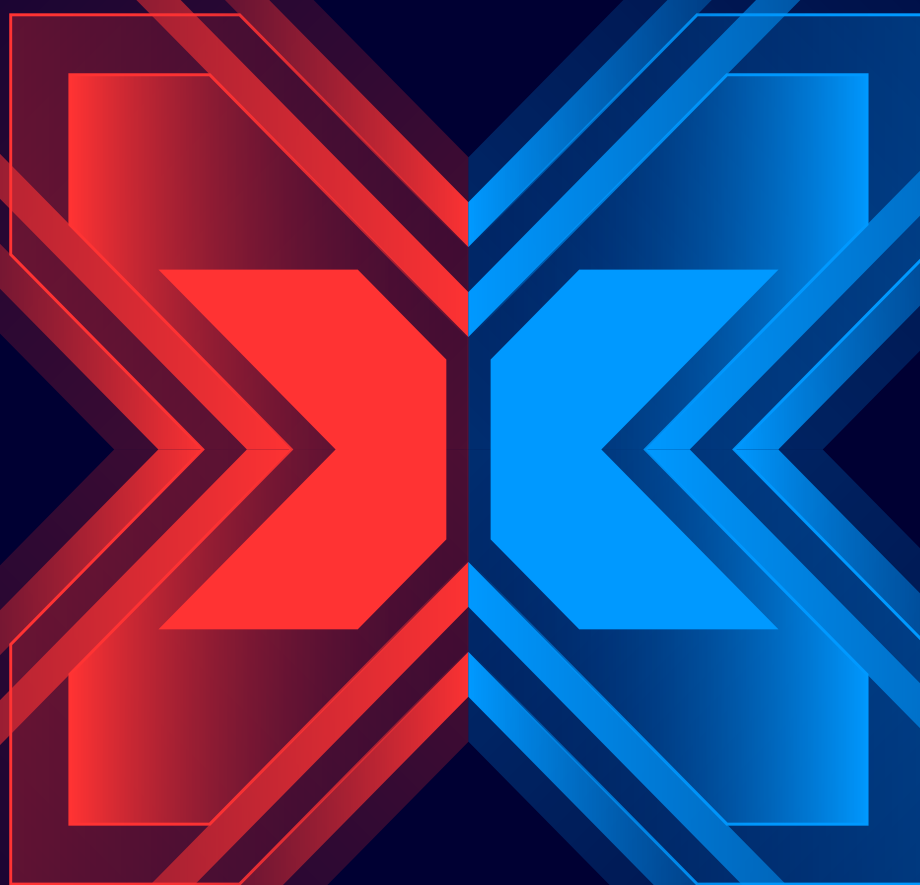
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1.   Introduction

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 Robots Competition is hosted by the MakeX Robotics Competition Committee, organized 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: explore new ideas and new skills, use creativity and innovative thinking to overcome real-world challenges.

Teamwork: have open communication with partners, work together towards a common goal and complete a task in the most efficient way for win-win development!

Fun: enjoy the fun and excitement in head-to-head competition and problem-solving process.

Sharing: have an open mind as a "Maker", share the joy, insights and experience with others.

MakeX spirit is the cultural cornerstone of MakeX Robotics Competition, which inspires young people to acquire new skills, improve teamwork, gain memorable experiences in the competition, share their insights and knowledge with their community so as to achieve their

grand aspiration of changing the world and shaping the future!

2. The Competition

2.1 About Spark

Future Home is a creative construction competition that comprises both online and on-site competitions.

Teams need to focus on the theme of each competition, carry out the projects through software programming and hardware construction, and display the projects to others.

With the characteristics of low entry threshold and flexible forms, Spark focuses on guiding teenagers to not only learn interdisciplinary knowledge and apply them on practical problems, but also improve their problem-solving and logical-thinking skills, developing their creativity and imagination. Through project-based learning with teamwork, Spark helps contestants improve communication and expression abilities, and fully feel the joy of sharing.

2.2 Participation Requirements

Teenagers aged 6 to 13 (inclusive) can participate in the competition. Contestants must be in teams of 2-4 members, and each team must contain 1-2 mentors.

2.3 Equipment

There is no fixed equipment set for this program. The specific conditions depend on each competition. The recommended equipment are as follow.

| Type	Recommended Equipment	Link
Software	 It is recommended that teams use mBlock, a programming platform developed by Shenzhen Makeblock Co., LTD. Contestants can choose mBlock for Web, mBlock for Windows, or mBlock for Mac.	https://www.mblock.cc/en-us
Hardware	 It is recommended that teams use Neuron series produced and sold by Shenzhen Makeblock Co., LTD. Makeblock Neuron is a programmable electronic building block platform for STEAM education. It contains dozens of different electronic modules such as LED panels, cameras, sensors, ultrasonic, and motors. Through simple combinations, various creative inventions can be created. With the easy-to-use flow-based programming software, the neuron can be "active" without complex code programming to bring concepts and ideas to life.	https://www.makeblock.com/steam-kits/neuron
	  It is recommended that teams use mBuild series produced and sold by Shenzhen Makeblock Co., LTD. The new series of electronic modules called mBuild is compact but powerful, and easy to use. It includes over 60 types of modules, supports infinite combinations, and can be used offline without further programming. Supported by mBlock, mBuild offers a wide range of opportunities to create interesting projects. The diversity of mBuild means that it can meet the needs of beginners, right through to professionals. It facilitates learning the basics of programming, developing advanced projects, teaching AI & IoT, joining robotics competitions and much more.	https://www.makeblock.com/mbuild

Other Materials	In addition, teams are encouraged to use common maker materials, such as laser cutting or 3D printing materials.	More equipment: https://www.makeblock.com/

2.4 Theme

The specific theme of each competition will be based on the annual theme of the program. The theme of each competition will be determined before the competition and will be announced on the official website or on site.

2.4.1 Program Annual Theme

In 2020 season, Future Home is the annual theme of the program. It is an imaginative journey of domestic life and artificial intelligence and other smart technologies.
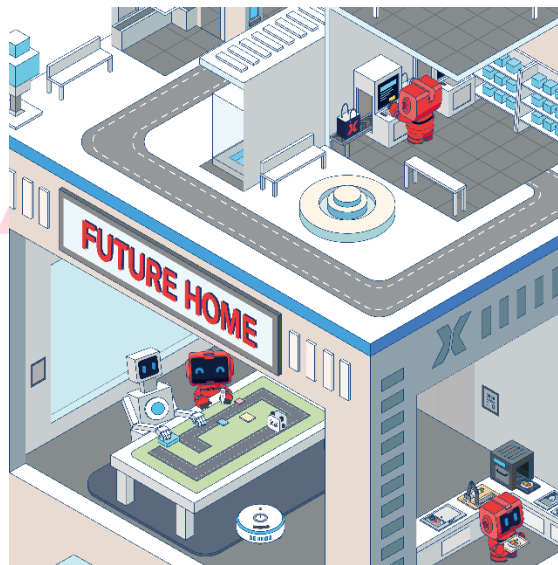
What is home?

Home is not only the housing facilities of the family, but also the family members, culture, environment and so on. It is about every aspect of life.

People leaves home for study, work and live at home every day. Have you ever observed your home carefully?

Do you know what makes a home?

What needs to be improved in the domestic life?

In the foreseeable future, AI will make a difference to our domestic life. In your eyes, how will AI be in the future? What changes will it bring to our domestic life?

Your goal: Do some research on the subdivisions of domestic life in hopes of creating a more comfortable, intelligent, and joyful home of the future. We are very looking forward to your ideas. Your ideas could be helpful to everyone, and your thoughts may improve our life in the future.

2.4.2   Theme Orientation

The themes of each competition may be different but will always be close to the annual theme. Contestants are encouraged to participate in as many competitions as possible to have a full and thorough understanding of the theme and increase the strengths. The theme of each match may cover the following elements. Mentors may instruct and prepare the teams based on these elements.

Practical Problems and Domestic Life

The program advocates interdisciplinary learning and emphasizes the interrelation between theory and realistic world. Contestants are encouraged to understand practical problems by themselves, and try to analyze and solve the problems in different ways. In this season, let's shift our attention to domestic life and focus on family-related matters that include but are not limited to family members, supplies, environment, and lifestyle. It is highly recommended for contestant to pay attention to details of domestic life, think hard about them, and record the findings.

AI Theory and Application

In this season, the theme may be directly related to AI technologies. It is suggested that both the contestants and mentors understand and learn about the relevant technologies and their application. The theme may not be directly related to AI. It is suggested that contestants think from the perspectives of AI. We are also looking forward to more appropriate and innovative ideas and solutions from the teams.

Creativity Scope and Project Orientation

When determining the topic of the project, it is suggested that the team members collaborate with each other, exchange ideas, brainstorm, analyze problems, and work out the solutions together. The theme of the project should be closely related to the theme of the specific competition, to avoid opportunism or falling into redundant storylines. It is highly recommended that the content be positive, the theme and functions be clear, and the design and decoration be imaginative.

2.5   Procedure

2.5.1   Warming Up

Each team are encouraged to prepare well before officially participating in the competition. The following advices may help team lay solid foundations and outdo themselves during the real competition.
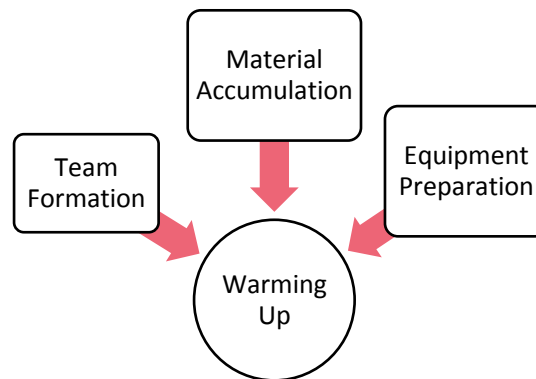
P01 Team Formation

Forming a team is the first step. Contestants can form teams on their own or with the help of the mentors. After the formation of a team, the contestants could do something together.

A.   Know each other

Get familiar with every team member by learning about their names, hometowns, interests, and strengths.

B.   Name the team

Give the team an impressive name.

C.   Design the image for the team

If possible, design the team badge, team flag, and uniform before the competitions.

D.   Divide the work

Each team is recommended to divide the work to maximize the engagement of each member. Teams may break down a single task into multiple steps so that everyone can play a part in it. Teams may also set up different roles from career development perspective, such as the

mechanical engineer, electrical engineer, R&D engineer, visual designer, product manager, and marketing manager. Additionally, everyone should get familiar with the work of the teammates for better collaboration. Recommended work division is as follow.

| Quantity of Team Members	Recommended Work Division
2 Persons per Team	Engineer; Designer
3 Persons per Team	Hardware Engineer; Software Engineer; Visual Designer
4 Persons per Team	Hardware Engineer; Software Engineer; Visual Designer; Marketing Manager

P02 Material Accumulation

Before taking part in the competition, it is very important to fully understand the theme and accumulate the relevant knowledge.

A. Prepare for the Content

For the accumulation, teams could collect and learn about the materials related to the annual theme. It may help contestants find inspiration for the upcoming competitions and lay a foundation for creative thinking. Contestants should take the initiative to correctly understand the themes, and firmly follow any creative ideas.

B. Build a demo

Learn how to use the equipment, practice for some creative usage scenarios, and try to build a simple demo project for testing.
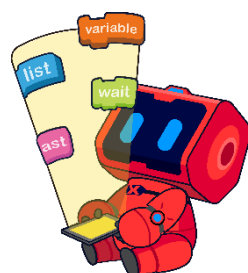
P03 Equipment Preparation

According to the requirements of each competition, teams can register and create teams with the assistance of the mentors. Teams should prepare materials on demand, including but not limited to mechanical parts, electronic components, tool kit, exhibition boards, wooden boards, paper boards, colour pens, crayons, markers, as well as other decorative materials and daily items.

2.5.2 Standard Procedure

The following is the standard procedure of the program. The actual quantity, timeline, and order of the procedures may subject to changes based on the actual conditions of the

competition.
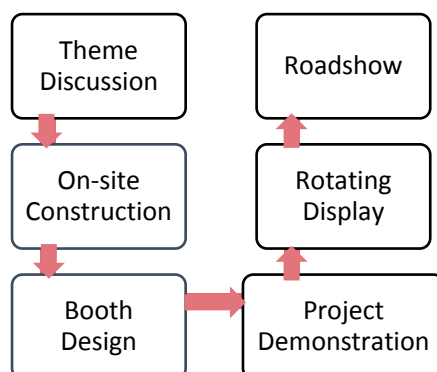
P04 Theme Discussion

A.   Understand the theme

The staff will officially announce the theme at the beginning of the competition. Every contestant should carefully read and understand the theme of the competition. At this stage, the staff may uniformly answer questions from the contestants.

B.   Brainstorm

Every team should discuss about their understanding of the theme to ensure all team members are on the same page, gather creative ideas, and reach an agreement on the direction and content of the project. During brainstorming, everyone can contribute their expertise, skills, ideas, and suggestions to the project.

P05 On-site Construction
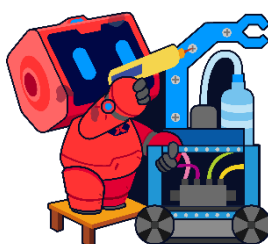
After the discussion, teams can make a plan for the construction, and reasonably divide the work among the team members. Teams must complete the hardware construction for their project independently within the time limit. The teams are also expected to bring blank exhibition boards, and design the board for their projects at this stage.

P06 Booth Design

After the end of the construction, teams need to design according to the situation of the booths. Teams can use some materials, including theme-related materials, team badges and flags, to decorate the booths. At this stage, each team is encouraged to show their team

culture in a variety of ways such as booth decoration and costumes.

P07 Project Demonstration

A.   Interact with the audience

In this part, teams can demonstrate their projects to the audience of the competition, both adults and children, and interact with them. In return, the audience can vote for the team as an encouragement.

B.   Communicate with other teams

Every team can vote for other teams, and it is highly recommended for the teams to exchange experience and souvenirs with each other. Let's make friends!
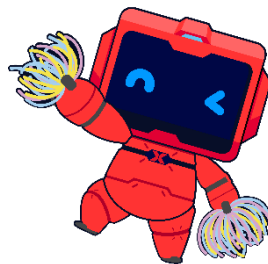
P08 Rotating Display

Teachers from the education or robotics competition industries will form a teacher judge panel. The judegs will split into groups and visit the booths of the teams in turn to ask them questions and score their projects. Teacher judge panel shall be no less than 6 judges for each competition. The specific number of judges will be determined according to the actual conditions of each competition.

In this process, teams need to take turns to introduce and demonstrate their projects to the teacher judge panel, answer the questions, fully display the work and share the harvest in the competition and the team culture.

P09 Roadshow

Experts from the education or robotics competition industries will form an expert judge panel, with 3 - 5 judges for each competition. The specific number of judges will be determined according to the actual conditions of each competition.

The order of roadshow is decided by drawing lots. Teams bring the projects to the stage in turn, and display within the specified time. The content of the roadshow may include the outcome of the project and the teamwork. There is no restriction on roadshow forms, and the teams can make PowerPoint presentations, tell stories, sing songs, or deliver performance. The teams should prepare the roadshow materials in advance, such as PPT, costumes, and props.

3. Assessment

3.1 Assessment

Based on the MakeX spirit: creativity, teamwork, fun and sharing, this program suggest that each participating team fully collaborate, study, and solve problems together. Inspired by swarm intelligence, teams turn the ideas into reality, and share their projects to everyone. We hope that all the teams really taste the fun of creativity, teamwork, and sharing.

The assessment of this competition will be based on several parts, including the project, the demonstration, and the team performance. Before the start of each competition, an official participant guide containing specific scoring dimensions will be issued. Each dimension will contain a series of sub-dimensions and assessment rules. The assessment is referred to as follows.

3.1.1 The project

A. Theme Application

★ The project should have a clear theme, that is, the central idea and main content of the project conform to the theme of the specific competition.

★ The ideas of the project are derived from the observation, understanding, and thinking of daily life, and may have some real-life application value in the future.

B. Innovative Thinking

★ Teams are encouraged to introduce new ideas and new things from all aspects; think beyond the box, and put forward creative or innovative ideas based on the thematic scenes of the project; use knowledge and materials to meet people's requirements and solve practical problems; and improve or create new things, methods, elements, paths, and environment to benefit the society.

★ In the thematic scenes of the project, the team makes rational assumptions of problems, and the source of ideas is reasonable and easy to understand.

★ The solutions to problems are unique, innovative, and appealing, and carry some imagination and characteristics.

C. Technical Application

★ Technical application refer to the technical solutions used by teams to implement their ideas including both hardware and software technologies.

★ The mechanical structure of the project is complete and stable, and operates properly.

★ The project uses diversified electronic parts that accurately and properly implement the

desired functions.

D. Exterior Design

★ The exterior design of the project comprises the appearance design and interaction design. It covers the external shape, structural form, colour collocation, decoration, and interaction devices etc.

★ The mechanical structure of the project is well-designed and well-balanced.

★ The project contains specific scene decoration that matches the theme.

★ The project contains interaction devices which can interact with the audience, and attracts people to have a try.

★ The design of the project is artistic and visually appealing.

In addition, the competition requires original thoughts. Contestants are encouraged to think independently and incorporate insights, experiences and thoughts into the projects. It is believed that each contestant may have a different understanding about the theme, and we hope to see hundreds and thousands of different ideas, rather than copies of the same products.

3.1.2   The demonstration

A. Standardization

★ The team has complete project and exhibition board.

★ The size of the project and exhibition board conforms to the requirements.

B. Content

★ The demonstration reflects the basic information of the project, including the name, theme, inspiration, and functions etc.

★ The demonstration reflects the journey of the team, including the team formation, the material accumulation, and the construction process.

★ The demonstration covers the ideas and thinking process of the team, as well as the goals and gains in the competition.

C. Style

★ In project demonstration, the team demonstrates with a distinctive style, attracting many people to take the initiative to learn about the project and interact with the team.

★ In roadshow, the team presents their project in a unique way, and manages to present the theme, functions, and other key information of the project in a limited time.

D. Function Implementation

★ The functions demonstrated match the function description and operate completely and smoothly.

E. Expressiveness

★ The expression of the team is fluent and coherent, and the demonstration content is well prepared.

★ The team answer questions accurately and fluently, communicating with the judges naturally.

3.1.3   The team performance

A. Collaboration

★ The division of work is clear and the tasks are evenly distributed. The demonstration can reflect the role of each team member.

★ Contestants know both their own tasks and tasks of other team members.

★ Contestants are familiar with the details of the project; and can explain it fluently, operate it skillfully, and even can improve it when necessary.

B. Spirituality

★ Contestants are confident in the teams, responsible for the tasks, and trust other team members.

★ The team culture can be displayed during the competition, including but not limited to the uniform, badge, and decorations.

★ Members of the team actively communicate and exchange experience with other teams, and are willing to make friends with other contestants.

3.2   Awards

To truly guide the contestants to experience and harvest from MakeX spirit: creativity, teamwork, fun and sharing, a series of awards will be set up to show recognition and encouragement for the outstanding abilities and performance of the teams. We hope that every team can respect individual development, give full play to subjective initiative, and show the team's strengths and characteristics. The award list may be updated during the season and the awards may be as follows.

☺ **Best Creativity Award**—The team presents the most creative ideas and demonstrates innovative solutions. The team shows unique innovation ability in the competition.

☺ **Best Demonstration Award**—The team demonstrates diversified and novel content. The functions work smoothly and the elaboration is fluent.

☺ **Young Engineer**—The project has a stable structure and operates properly with some

mechanical and programming techniques. The team shows the style of future engineer.

☺ **Young Designer**—The exterior design of the project is visually appealing. The decoration of the scenes are artistic and vivid. The team shows the style of future designer.

☺ **Sharing Award**—The team has received a relatively large amount of encouragement, valuable support, and suggestions during project demonstration.

☺ **Teamwork Award**—The team has a proper division of work in the entire competition process, and the team members perform well.

☺ **Spirit Award**— The team can fully display the team culture, and can communicate with other teams in a friendly manner.

MakeX Spark will select a number of teams to enter 2020 MakeX World Championship according to the category and quantity of awards received by them.

This program aims to stimulate the contestants' curiosity and desire to explore the world with imagination and creativity. It not only guides contestants to pay attention to practical problems and helps them carry out interdisciplinary study, but also improve their understanding and thinking in the professional field. The program hopes to cultivate the following seven abilities of the contestants.
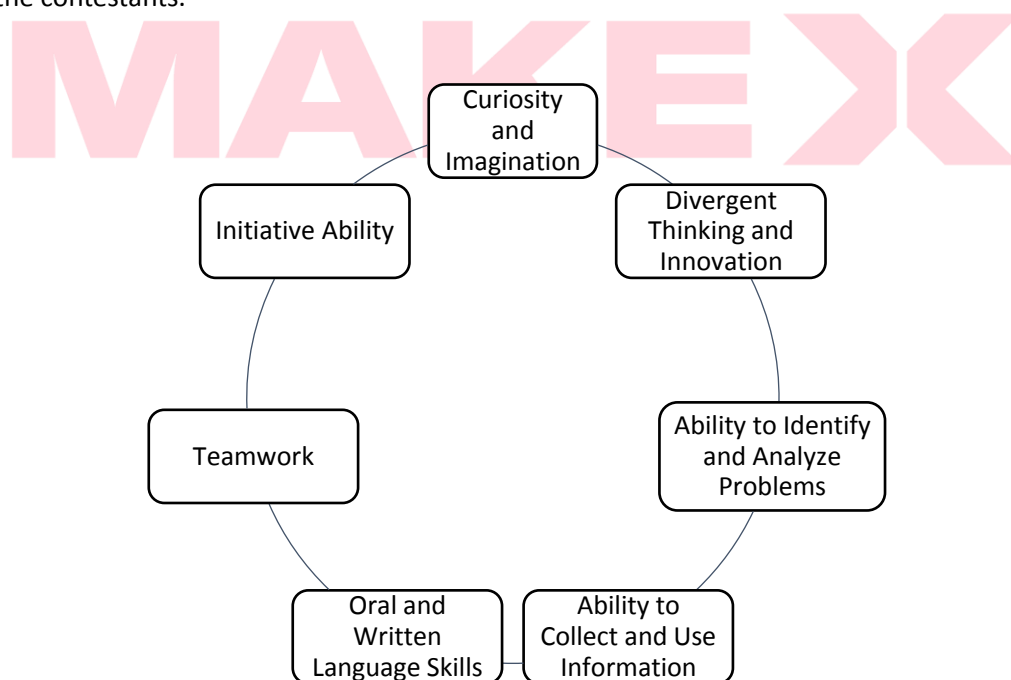

4.   Specifications

4.1   Project Specifications

S01. The program is a creative construction competition, which requires teams to program the

hardware. The main body of the project is hardware.

S02. The complete project (including all main parts and decorative parts and other materials of the project) size shall not exceed the maximum size of 800 mm (L) × 450 mm (W) × 600 mm (H). In other words, during the entire competition process, the vertical projection of the project shall not fall beyond the 800 mm (L) × 450 mm (W) square area, and the vertical height shall not exceed 600 mm (H), as shown in the following figure.
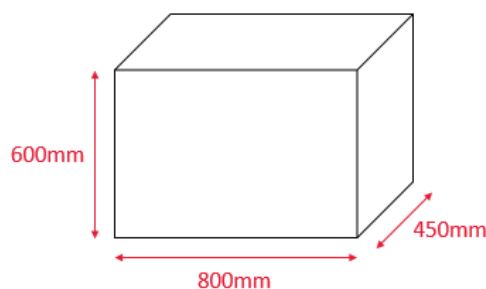
S03. The maximum size of the exhibition board shall not exceed 800 mm (W) × 600 mm (H). It is recommended that contestants use some brackets to support the board. The maximum size and suggested content layout of the exhibition board are shown in the following figure.
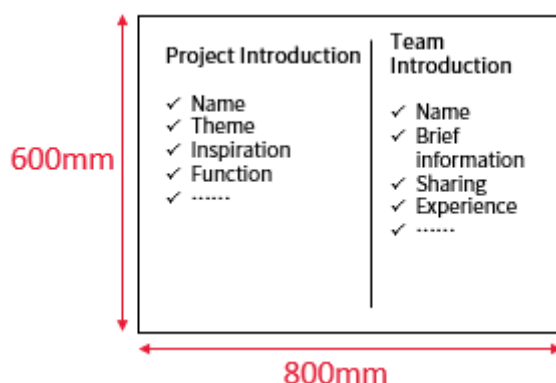
4.2   Content Specifications

4.2.1   Project Name

S04. Exactness—The project name is in line with the content, and the wording is grammatically correct.

S05. Refining—The project name should be concise and leave for imagination.

S06. Vividness—The project name creates some images which can help people quickly

understand the message that the project is trying to deliver.

4.2.2   Project Description

S07. Clear logic—The project description is impressive, has clear logic, and allows others to easily find the key points.

S08. Conciseness—The project is briefly described on the exhibition board.

S09. Facticity—The description should not exaggerate the actual functions and working mechanism of the project.

4.2.3   Hardware Usage

S10. It is suggested that the teams list the details of the hardware usage on the exhibition boards. If a large number of unquantifiable materials such as paper shells and metal beams are used, just fill in the name of the material, without marking the quantity. Example: mCore main control ×1, several cardboard models, ultrasonic sensor ×1.

S11. The environment of the arena may change, and the teams need to adjust the relevant hardware according to the environment.

5.   Competition Rules

5.1   Safety Rules

R01. The use of hazardous materials such as contaminated and unstable chemicals is prohibited.

R02. The use of high power equipment and dangerous materials that may cause personal injury is prohibited.

5.2   On-site Rules

R03. Before the official start of each competition, the staff will check the equipment and materials brought by the teams. The teams can only bring parts, instead of finished or semi-finished projects, to the arena. Equipment and materials that do not meet this requirement must be disassembled before the team can participate in the competition.

R04. During the competition, the projects, equipment, and materials shall not be taken away from the arena. No team is allowed to bring finished or semi-finished projects or components into the arena. Teams that violate this rule will be warned or even be disqualified from the competition.

R05. During the construction, persons other than the contestants, including but not limited to

the parents and mentors of the contestants, are not allowed to enter the arena by any means or provide any forms of help or guidance to the contestants. Teams that violate this rule will be warned and even be disqualified from the competition.

R06. All forms of cheating is prohibited in the competition. Teams that violate this rule will be warned and even be disqualified from the competition.

R07. If network is not provided in the arena, contestants can bring their own Wi-Fi equipment (if required) to perform commissioning during the construction. No communication devices (including but not limited to mobile phones and watch phones) are allowed to use in the arena. If any contestants need to use these devices in special circumstances, contestants may apply to the staff.

R08. If a communication device is brought into the arena, it must be placed at a fixed position in the construction area, and the contestants are not allowed to touch the device during the match. Without permission, the contestants are not allowed to use any instant messaging software or web pages. Teams that violate this rule will be warned and even be disqualified from the competition.

R09. After the construction, the teams should clean up their own construction areas.

R10. Do not frequently enter and exit the arena. Keep the arena quiet.

R11. Do not bring any food or drinks, except for bottled water into the arena.

5.3   Rules Explanations

1. To ensure fair and high-quality competition experience, MakeX Robotics Competition Committee has the right to update this guide regularly, and to publish and implement necessary changes before the competition.

2. During the competition, all matters that are not specified herein shall be determined by the referee team.

3. The rules guide is the basis for the work of the judges and referees, who shall have the final decision during the competition.

6.   Rules Guide Statement

MakeX Robotics Competition Committee reserves the final interpretation right of MakeX Robotics Competition – 2020 Rules Guide for Future Home.

7.   Disclaimer

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

Contestants shall take adequate safety precautions when constructing the projects, and all parts used for construction shall be purchased from legal manufacturers.

During the competition, the teams should ensure that all the actions such as constructing, testing and demonstration will not do harm to team members 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., should be used in accordance with the instructions. Shenzhen Makeblock Co., Ltd. and MakeX Committee will not be responsible for any injury or loss of property by improper use.

8.   Copyright Declaration

Shenzhen Hulu Maker Co., Ltd. reserves the copyright of this Rules Guide. Without the written consent or authorization 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.

Appendix 1: Competition Resources

MakeX Official Website: http://www.makex.io

Any Feedback & Question Please Sent to:

makex_overseas@makeblock.com

Additional Information:

http://www.makex.io/information/download/

MAKEX

MakeX Robotics Competition Committee

RULES GUIDE

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