

MAKE X

V1.0

ROBOTICS COMPETITION

RULES GUIDE MAKE X SPARK

2024.01

www.makex.cc





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MAKE X



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MAKE X



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 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 by encouraging all contestants to create unique high-tech works with their talent, and challenge themselves for continuous progress!

Teamwork: we advocate solidarity and friendship, encouraging all contestants to develop a sense of responsibility and enterprising spirit, and sincerely working 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 their knowledge and responsibility with society, and work hard to achieve their grand aspiration of changing the world and creating the future!

1.3 About MakeX Spark

MakeX Spark is an innovation competition program in the form of online or onsite events. Teams need to focus on the theme of each competition, carry out the projects through software programming and hardware construction, and the 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 the theme learning and practice in the competition, contestants are able to effectively improve their ability to communicate and express, thus gaining a joy of sharing.



2.3 Recommended Equipment

There is no fixed equipment kit for MakeX Spark, the details will be determined by the single competition. We recommend to use CyberPi Educational Competition Kit, mBot2, Halocode, laser machine and other equipment.



CyberPi Educational Competition Kit



Halocode



Desktop Smart Laser Machine

3. Competition Plan

3.1 Introduction

Each match has different sub-themes based on annual theme in MakeX Spark competition. The theme mainly comes from STEAM education at home and abroad, important international or national events, latest developments in science and technology, news reports and daily life, etc. Contestants are encouraged to participate in multiple matches to gain a full and thorough understanding of the competition. The theme of the project should be positive and closely related to the sub-theme of each match.



3.2 Schedule

The MakeX Spark competition for the 2024 season plans to hold multiple rounds of online or offline city matches, national competitions, global match, etc. Winning teams will have the opportunity to advance to the MakeX World Championship.

Each competition is independent with a different theme. Participants can choose to compete in one or multiple rounds within the same competition area, but simultaneous participation across different competition areas is not allowed. Please stay updated on the specific competition dates by regularly checking the MakeX official website's competition page.



3.3 Sub-theme Interpretation

The annual theme for the 2024 MakeX Spark competition is "Dream Home." Faced with increasingly severe environmental issues such as global warming, air pollution, ocean pollution, and soil contamination, the use of artificial intelligence technology to optimize the environment and create homesteads has become essential for the future development of human society. Brave young talents, armed with their acquired knowledge and utilizing various specialized components, will construct environmental governance systems. Their goal is to contribute to the optimization of the ecological environment and the creation of a better homestead.

Within this theme, each individual competition will have different sub-themes. Participants are required to create projects based on the specific sub-theme for each match. The content of the projects should be positive and proactive, closely related to the sub-theme of the specific round. Participants should avoid opportunistic or contrived storytelling. The confirmed sub-themes will be announced before the competition.

3.3.1 Theme One ——"Ocean Guardian"

On this blue planet we inhabit, the oceans cover more than 70% of the Earth's surface, containing about 97% of the Earth's water, often referred to as the "source of wind and rain." Oceans drive various global systems, making the Earth habitable for humans. Rainwater, drinking water, weather, climate, coastlines, various crops, and even the oxygen we breathe are fundamentally provided and regulated by the oceans. Properly managing this crucial global resource is vital for constructing a sustainable future. However, coastal waters are continuously deteriorating due to pollution, and issues like nuclear pollution adversely affect ecosystem functions and biodiversity.

Actions such as reducing marine litter and practicing sustainable fishing are crucial for the biodiversity of the oceans, and they play a vital role in the health of both humanity and the Earth. Participants are required to create creative projects around



the theme of "Ocean Guardian."

3.3.2 Theme Two ——"Clean Earth Action"

Soil is a finite resource, meaning that once it is damaged and degraded, it cannot be restored within a human's lifetime. Soil influences the food we eat, the water we drink, the air we breathe, our health, and the health of all life on Earth. Soil pollution can trigger chain reactions, affecting all forms of life it comes in contact with. Most pollutants are the result of human activities, which means we have a responsibility to make necessary changes to ensure reduced pollution and a safer future.

Healthy soil is precious and non-renewable, yet human destructive behavior continues to pose an increasing threat to it. Now, we must take action to protect the soil, starting with ourselves. Actions such as choosing sustainably produced food, properly recycling hazardous items like batteries, and more are within our reach. Participants are required to create creative projects around the theme of "Clean Earth Action."

3.3.3 Theme Three ——"All-Round Services"

The dream home is not just a place; it is a meticulously designed aspiration. In the dream home, humans and artificial intelligence are closely connected, collectively building a future filled with warmth and wisdom. Whether it's an intelligent home system that conserves energy or personalized lifestyle recommendations, artificial intelligence can provide us with more versatile services. All of this is aimed at making our lives easier and more enjoyable, turning our homes into the comfortable havens we dream of.

The dream home is the ideal place in everyone's heart, and all-encompassing service is the secret weapon to create it. Participants are required to create creative projects around the theme of "All-round Services."

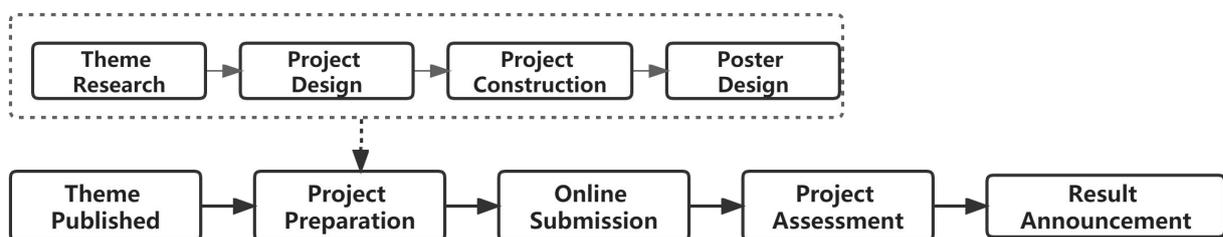
Mysterious Mission

Mysterious Mission: The mysterious mission will be announced at the scene in different competitions.



4. Procedure and Rules of Online Competition

4.1 Participation Procedure



The period of MakeX Spark online competition is two to four months, ranging from theme published, project preparation, online submission to project assessment and results announcement. Under the guidance of mentors, the contestants follow a step-by-step project-based learning process and then prepare and submit their projects.

Theme Published

The sub-theme of each competition will be published on the MakeX official website at least two or three months before the competition. Contestants should pay close attention to the MakeX Official website to approach the competition theme and relevant timeline.

Project Preparation

In the early stage of the competition, contestants can focus on the research of realistic problems, and put forward the general structure of the project. After confirming the project plan, project function and equipment list, the contestants are required to construct and program the project, as well as recording the process including the idea of coding, construction structure and exterior design. The contestants are also required to create a poster and submit it online. Please refer to

"4.2 Project Submission Rules of Online Competition" for the specification.

Online Submission

Online submission is usually valid for 10 days, and each team must turn to the submission web-page to publish projects, fill in the correct registration information and upload the poster before the deadline of submission.



Web-page and Submission Link of Previous Online Competition

Project Assessment

The judge panel of MakeX Spark Online Competition consists of judge, judge group leader, expert judge. Judges are responsible for the preliminary evaluation of all projects; Judge group leaders are for the re-evaluation of the project; The expert judges are for arbitration, dealing with the complaints that judges and judge group leaders cannot solve, and confirming the scoring results and awards.

Results Announcement

The awarding results will be announced on the competition web-page.

4.2 Project Submission Rules

4.2.1 Publishing Rules

R01. Each team can only publish one project to participate in a single match.

R02. Each team must publish original and non-adapted project.



R03. Each team must publish the project before the deadline of submission. Please do not publish your project in advance.

R04. The Name of the Project: The published project must include the official name of the project, which must be exactly the same as the name of project poster.

R05. Project Introduction: The introduction of the project shall include the content of theme and the functions of project. The description should not exaggerate the actual functions and working mechanism of the project. The introduction of the whole project is generally 700 to 900 words, without exceeding 2000 words.

R06. Instruction: The steps should be clearly identified in the instructions, and there should be a sequential relationship between the steps. Avoid situations that readers cannot understand, perform or achieve the desired effect with the instructions. Do not mistake, miss, or skip steps.

R07. Project Program: The uploaded program should have clear notes on the implementation of each function. The notes should be as straight forward as possible to help the judges understand the logic of the program.

R08. Project Videos: The video content shall include oral introduction by the contestant and functional demonstration of the project, ideas for creating the project (find question- solve question) and project construction and programming. The videos support MP4 and MOV formats, with single storage no more than 200M. The shooting lighting should be clear and bright to avoid blurry video. There is no limited display form for the video, but it needs to be easily understood.

R09. Project Picture: The photos support GIF, JPG, PNG format, and the size of a single one should not exceed 10M. Uploading at least three photos, and choose one photo as the cover of the project when publishing the project. Photos should be clearly visible with no ambiguity in the main displaying subject. Take photos from several angles to fully present the structure and design of the project.

R10. Check the uploaded materials initiatively after the submission just in case anything goes wrong. Contestants may fail to get a score of the corresponding dimension if there is no corresponding information in the submitted materials.

Smart Trolley

发布于: 2021-05-25 更新于: 2021-05-25 0 266

举报



witawadeekusmp21



作品介绍:

My robots are built for delivering food, water, and medicine for patients or people infected with Covid-19 to act as the helpers of doctors and nurses to avoid contact with patients and can also kill the germs coronavirus by UV light applications can red commands with barcodes to run the motor, such as move forward move backward turn left and turn right when encountering an obstacle in front It. will stop moving and once the obstacle has passed, the robot can operate as before and can operate as before and can also execute commands and when there is a power cuts off an abnormal temperature, it can signal a warning light.

操作说明:

1. Using CyperPi remote control with SmartPhone.
2. There are three Halocode and 2 mBot to make it possible and get the job done.

- The First Halocode control main to control, Broadcast Lan between Halocode and CyperPi.
- The Second Halocode control Humiture sensor, MQ2 Gas













Previous Project Sample-Smart Trolley

4.2.2 Poster Specifications

S01. The poster must be created by the contestants themselves and drawn manually. Paper and digital versions are both accepted. Contestants are encouraged to give full play to their imagination and artistic creativity to display their project embedded with pictures and texts in a vivid and concise way.

S02. Format Requirements: The name of the poster must be the same as the submitted project when submitting the poster. The poster is preferably submitted in PDF format. If failing to transfer the poster into PDF, the contestant is suggested to take HD pictures and upload with up to 3 pictures and size no more than 30M in total.

The size of single poster should not exceed 297mm*420mm (standard A3 paper size). Paper or other environment-friendly display board materials can be used, with clear content for easy reading.

S03. Content Recommendation: The content of poster should include the basic information of the project, including but not limited to the name of the project, the author, main functions and inspirations of the project. The poster can also display problem discovery – problem solving process, preferably with manuscripts such as the design drafts, structure and the logical of programming. Please list the main hardware materials on the poster. If a large number of non-quantifiable material such as paper shell or metal beam is used, just fill in the name of the material without marking the quantity. For example: CyberPi x1, Paper shell several, ultrasonic sensor x1.



Project Poster Sample

5. Procedure and Rules of Onsite Competition

5.1 Participation Procedure



The period of MakeX Spark onsite competition is usually two to three days, ranging from theme announcement, project construction, display board design to onsite assessment and results announcement. According to the competition theme announced on the spot, participating teams must carry out teamwork with ideas and creativity and complete the project construction, programming, display board design, etc. in a limited time, while joining in the onsite assessment and presentation. The specific process and duration of a single competition will depend on actual situation.



Theme Announcement

The theme of a single match in MakeX Spark onsite competition is usually announced on the spot, and the theme content is projected to be formulated based on the annual theme of "Dream Home". After announcing the theme, the contestants should carefully read and understand the theme content, brainstorm and exchange ideas with teammates, and determine the name of project and the action plan.



Previous Onsite Competition- Theme Discussion

Project Construction



Before the project construction, teams must cooperate efficiently to ensure that each contestant engages in the preparation deeply. Teams are also encouraged to allocate their work based on different tasks in terms of career development, such as engineers, software engineers, designers and so on. Please refer to "**5.2 Creation Rules of Onsite Competition**" for the specifications.



Previous Onsite Competition-Project Construction

Display Board Design

The contestants are required to design a display board based on the competition theme and individual project. The contestants are encouraged to prepare and decorate their display board with clothes, badges and other design elements, so as to fully display the team culture. Please refer to "**5.2 Onsite Creation Rules**" for the specifications.



Previous Onsite Competition-Display Board Design



Onsite Assessment

The judge panel will consist of invited excellent judges and experts from education sector or robotics competition sector. The number of judges is generally 3-5. Onsite assessment will be conducted in the form of rotating assessment and road show. The drawing of lots will determine the sequence of the team roadshow before the competition starts. Before the project construction, each team should assign one member to the roadshow stage area to draw the lots. The assessment time for each team is 10 minutes. In this process, the contestants will be required to introduce and demonstrate their projects and answer questions from the judges, while displaying the team's culture and expressing their own thoughts. The number of judges and the judging process will depend on actual situation of single competition. The assessment process is arranged as follows.

Content	Duration
Enter the stage: Team should bring their project, display board and all necessities enter the stage area. <i>Depending on the actual conditions, contestants may be require to conduct their presentation on their spot in the pits area.</i>	1 minute
Equipment debugging: the team needs to debug the project to the best display state within this time. If the team need to use the PC to display the relevant content, the team need to prepare your own laptop.	1 minute
Presentation time: the team shall introduce and demonstrate their projects, as well as displaying the team's culture and expressing their own thoughts.	5 minutes
Q&A: The team are required to answer the question from the judges, and might be required to display the project's programming	2 minute



Scoring time: The judges will score the team's presentation, performance, and the content of their project and display board. The team will then sign to confirm their scores and leave the presentation area in an orderly manner, carrying their relevant items.	1 minute
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If the team completes their roadshows within 10 minutes, they can end the roadshow in advance and leave the stage in an orderly manner; if the 10-minute roadshow time runs out, the judges will take the initiative to issue the "end of the roadshow" command and the team need to stop the roadshow immediately and leave the stage in an orderly manner with all the belongings.

Results Announcement

The awarding results will be announced onsite or online.

5.2 Onsite Creation Rules

1. Before the formal competition, contestants are advised to collect related information and prepare materials. Besides, they can search and learn the contents related to the annual theme, prepare project ideas, the materials including mechanic parts, electronic components, blank KT board, kits, wooden boards, cardboard, colored pens, crayons, marker pens, any decorative materials, and recycling materials in advance.
2. The contestants are required to bring their own laptops and install mBlock in advance.
3. There is no access to network in competition venue, therefore, please prepare your own Wi-Fi equipment if have any network demand for debugging your project.
4. Usually, the organizers may provide some tools such as laser cutting machine, basswood board, corrugated paper, printing paper, painting brush, children's scissors, screwdriver, etc. Whether these tools are available will depend on actual situation and shall be used safely under the guidance of staff.



5. Before the start of the competition, the staff will inspect the equipment and tools carried by the participating teams. All equipment must be spare parts that have not been assembled, and complete projects or semi-finished projects are forbidden. If the equipment is exception to the rules, it must be disassembled on site, and the competition cannot be started until you finish it.

6. The size of display board is a KT board of wide 800 mm * height 1800 mm that provide by MakeX or our local organizers. If there is no KT board, it can be replaced by other materials. The contents of the display board should include basic information such as the title of the project, the name of the contestant, the function of the project, etc. It can introduce your inspiration, record the creation process, and be accompanied by manuscript drawings such as the design drafts, structure and codes,etc. Please list the main hardware materials on the poster. If a large number of non-quantifiable material such as paper shell or metal beam is used, just fill in the name of the material without marking the quantity. For example: CyberPi x1, Paper shell several, ultrasonic sensor x1.

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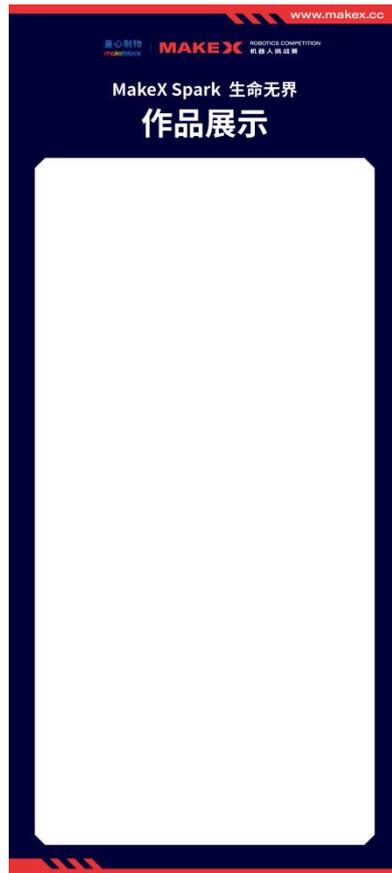


Fig. Project Display Board(600mm*800mm)

7. During the competition, projects or equipment shall not be taken away from the competition area. When entering the competition area, contestants are not allowed to bring complete project or semi-finished project. If above circumstance occurs for the first time, the team will be cautioned. If serious offense occurs, the team will be disqualified.
8. During the competition, no one other than the contestants, including but not limited to parents or mentors, shall enter the competition area by any means or act as a substitute or mentor. If above circumstance occurs for the first time, the team will be cautioned. If serious offense occurs, the team will be disqualified.
9. All cheating is prohibited in the competition. Contestants shall report to staff in advance if they carry mobile phones, phone watches and other electronic communication devices. Contestants are not allowed to use electronic communication devices (except laptops) without permission. If it is found that



communication devices are used by contestants to communicate with the person outside the competition area during the competition, contestants will be cautioned.

10. During the competition, contestants should not leave the competition area and should keep silence while creating projects. No food or drinks are allowed in the competition area.

11. After the construction, contestants should take the initiative to clean up their own construction area and keep a clean environment.

6. Assessment

6.1 Grades

After assessment of MakeX Spark, the teams and their projects will be assessed in five dimensions, including innovative thinking, design ability, electronic technology, programming ability, and communication skill. Each dimension consists of 1 or 2 sub-dimensions. In this competition, the score result of each dimension and sub-dimension will be closely related to the contestants' performance and their projects. Please refer to **Appendix 1: Assessment Criteria Details**.

1. **Innovative Thinking:** It includes 2 sub-dimensions of innovation and theme research, and the score range of each sub-dimension is 0-5;
2. **Design Ability:** It includes 2 sub-dimensions of structural application and exterior design, and the score range of each sub-dimension is 0-5;
3. **Electronic Technology:** It includes 1 dimension of electronic technology, which scores 0-5;
4. **Programming Ability:** It includes 1 dimension of programming ability, which scores 0-5;

5. **Communication Skill:** It includes 2 sub-dimensions of oral expression and process presentation, and the score range of each sub-dimension is 0-5;



Fig. 6.1 Radar Chart of Capability Assessment Report

All the contestants who obey the competition rules can get a STEAM Assessment Report (Scores for each dimension in the report will be specified to one decimal places). The competition encourages original ideas. Contestants are encouraged to think independently and incorporate insights, experiences, and thoughts into their projects. It is believed that each contestant may have a different understanding of the theme, and we wish to see distinct elaborate designs, rather than copies of the same products.

6.2 Awards

To truly guide the contestants to experience and reap the fruits 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 contestants. The types of the award may be updated during the season. The award list is as follows:

Young All-Rounder—In each competition, teams that rank top three will win the "Young All-Rounder" award (Those teams who won the "Young All-Round" prize won't be able to win another special award)

Young Innovator—The project is creative and very attractive with clear positioning.



Contestants show their unique theme exploration and innovation ability in the competition. Those who perform well in the dimension of "Innovative Thinking" will have the opportunity to win the "Young Innovator " award.

Young Designer—Contestants present the potential to become future designers with excellent design and aesthetic capabilities. Those who perform well in the dimension of "Design Ability" will have the opportunity to win the "Young Designer" award.

Young Engineer—Contestants show the potential to become future engineers with excellent capabilities of electronic technology and programming. Those who perform well in the two dimensions of "Electronic Technology" and "Programming Ability" will have the opportunity to win the "Young Engineer" award.

Best Demonstration—Contestants show excellent communication skills in the competition. Those who perform well in the dimension of "Communication Skill" will have the opportunity to win the "Best Demonstration" award.

In each competition, if the teams' total scores (i.e. the sum of all dimension scores) are the same, then the teams will be ranked according to their sub-dimension scores in the order of Innovative Thinking, Design Ability, Electronic Technology and Programming Ability, and Communication Skill;

Example: When the total scores of two teams are the same, then

- (1) Compare the scores of the teams in the "Innovative Thinking" dimension, the team with the higher score in this dimension will be ranked higher;
- (2) If the scores of "Innovative Thinking" are the same, then compare the scores of the teams in the "Design Ability" dimension, and the team with the higher score in this dimension will be ranked higher.
- (3) If the score of "Innovative Thinking" are the same, then the "Design Ability" score will be compared with the team's score, and the one with the higher score in this dimension will be ranked higher.
- (4) By analogy with this method, until we selected the winner.



- (5) If the score of every dimension is the same, the expert judges will re-assess the projects and give the score.

In the selection of special awards, if the teams has the same score in one dimension, then compare the teams' total score, and the one with the higher total score will be ranked higher; if the total score is the same, then compare the scores of the other sub-dimensions until the ranking is determined, and the order of the sub-dimensions will be as follows: Innovative Thinking, Design Ability, Electronic Technology and Programming Ability, and Communication Skill;

Example: When selecting the "Young Innovator" award, firstly compare the scores of the team's "Innovative Thinking" dimension; if the scores of this dimension are the same, then

- (1) Compare the team's total score: the team with the higher total score will rank higher;
- (2) If the total is the same, then we will compare the team's "Design Ability" dimension score, the team with the higher score in this dimension will rank higher;
- (3) By analogy with this method, until we selected the winner.
- (4) If the score of every dimension is the same, the expert judges will re-assess the projects and give the score.

On the premise of complying with the rules, awards are given according to the corresponding dimension ranking in the sequence of Young Innovator, Young Designer, Young Engineer, Best Demonstration. The quota for each special award is 15%. Each team can only obtain one special award.

Each contestant can obtain a certificate of participation by submitting a written application to the committee.

In addition, the competition specially sets up the following awards for schools or educational organizations that actively arrange students to participate in MakeX Spark: Excellent Mentor and Excellent Organization. The awards will be



comprehensively issued based on the number of participating teams and the number of awarding projects guided by the same mentor or organization.

7. Safety Rules

1. Contestants must follow the instructions of mentors or staff in the preparation process of the competition. Do not carry out dangerous operations without authorization.
2. Pay attention to safety when assembling various parts and using various tools (such as screwdrivers, sharp knives and other dangerous materials) in the construction process, and use them under the guidance of mentors or staff.
3. The use of hazardous materials such as contaminated and unstable chemicals is prohibited.
4. The use of high-power equipment and dangerous materials that may cause personal injury is prohibited.
5. The judging panel has the right to disqualify the teams based on the safety problems of the projects.

8. Statement

MakeX Robotics Competition Committee reserves the final interpretation right of 2024 MakeX Spark Dream Home Rules Guide.

8.1 Rules Explanations

In order to ensure a fair competition and high-quality competition experience,



MakeX Robotics Competition Committee has the right to update and complement this Rules Guide regularly, and then issue and implement the latest version before the competition.

During the competition, all matters not stated in the Rules Guide shall be decided by the judging panel.

This Rules Guide is the basis for assessment, and the judging panel has the final right of adjudication during the competition.

8.2 Disclaimer

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

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

(2) During the competition, the contestants should ensure that all the actions such as constructing, testing and demonstration will not do harm to other contestants, audiences, equipment and venues.

(3) In the process of construction and competition, if any action that may violate the national laws, regulations or safety 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 Robotics Competition Committee will not be responsible for any injury or loss of property by improper use.



8.3 Copyright Declaration

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

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Appendix 1. Assessment Criteria Details

Assessment Dimension 1: Innovative Thinking		
Sub-dimension	Grade	Assessment Criteria
Innovation	5	The project solution is very unique and innovative, no other simulated projects or products on the market, reflects unique creativity.
	4	The project solution is relatively innovative, combined with functions from other projects or products on the market, has some improvements, reflects certain creativity.
	3	The project solution is innovative, improve the single function from other projects or products on the market, reflects certain creativity.
	2	The project solution is common, repeating the functions of other projects or products on the market, but no improvement.
	1	The project solution is ordinary, only repeating single function of other projects or products on the market.
	0	The project solution does not have any personal creativity, highly similar to other projects or products.
Theme Research	5	The target user and orientation of the project is clear; Reflect the collection of information from 3 or more typical sources; The project is related to the theme.
	4	The target user and orientation of the project is clear; Reflect the collection of information from 1-2 typical sources, such as experts, related industries or



		organizations; The project is related to the theme.
	3	The target user and orientation of the project is blur; Reflect the collection of information from 3 or more typical or ordinary sources; The project is related to the theme.
	2	The target user and the orientation of the project is blur; Reflect the collection of information from 1-2 typical or ordinary sources, such as internet search, media news, daily life observation; The project is related to the theme.
	1	The target user and the orientation of the project is blur; The core of the project is barely related to the theme.
	0	The project has nothing to do with the theme.



Assessment Dimension 2: Design Ability		
Sub-dimension	Grade	Assessment Criteria
Structure Application	5	Design and construct at least 3 kinds of simple or difficult mechanical structures. Combine various structures reasonably.
	4	Design and construct 1-2 kind/s of difficult mechanical structures, such as robot claws and robot arms, etc.
	3	Design and construct 1-2 kind/s of relatively difficult mechanical structures, such as the combination of crank, connecting rod and parallelogram structure, etc.
	2	Design and construct 1-2 kind/s of simple mechanical structures, such as pulleys, gear sets, belt drives and chain drives, etc.
	1	Use the simplest building block bricks for stacking without any



		other mechanical connection or any mechanical transmission method.
	0	The project has no structure with only electronic parts connected. Or the structures have nothing to do with the function of the project. Or the structure cannot work at all.
Exterior Design	5	Use various art or other environmentally-friendly processing materials; Use materials of both 3D printing and laser cutting; The project and poster are attractive in design, and the project is equipped with an interactive device.
	4	Use various art materials or environmentally-friendly processing materials; Use one of 3D printing or laser cutting to design; The overall project and poster are very beautiful.
	3	Use 3 or more kinds of art materials or other art processing materials to design the project exterior; The project and poster are relatively beautiful.
	2	Use 1-2 kind/s of art materials or other art processing materials to design the project exterior; The project and poster are ordinary.
	1	Use ready-made products or tools for decoration; The project is simple without poster.
	0	The project has no exterior design with only mechanical structure and electronic parts connected. Or the designed exterior has nothing to do with the theme of the project.

Assessment Dimension 3: Electronic Technology

Sub-dimension	Grade	Assessment Criteria
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Electronic Technology	5	Use electronic modules that enable vision sensing, voice recognition or techniques with same difficulty in combination with various input and output modules; Electronic modules are connected correctly and achieve the functions of the project.
	4	Use wireless communications technologies such as Wi-Fi and Bluetooth in combination with various input and output modules; Electronic modules are connected correctly and achieve the functions of the project.
	3	Use servo, LED panel, speaker or other electronic output modules in combination with various sensors; Electronic modules are connected correctly and achieve the functions of the project.
	2	Use 3 or more kinds of sensors. Electronic modules are connected correctly and achieve the functions of the project.
	1	Only use 1-2 kind/s of sensors. Electronic modules are connected correctly and achieve the functions of the project.
	0	No electronic module, or use the techniques listed above but no function is achieved, or the functions are irrelative to the theme of each match.

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Assessment Dimension 4: Programming Ability		
Sub-dimension	Grade	Assessment Criteria
Programming Ability	5	Use block-based programming languages combining various program structures and algorithms, adopt AI algorithm to achieve voice and image recognition or functions with same difficulty. Or use text-based programming languages like Arduino C and Python to realize PID control, voice and image recognition or functions with same difficulty;
	4	Use block-based programming languages combining various program structures and algorithms, realize PID control in the program or functions with same difficulty.
	3	Use block-based programming languages, choose data structure and algorithm logically, comprehensively use “event”, “variable” and “function” in the program.
	2	Use block-based programming languages, include 3 kinds of programming structures: “order”, “loop”, “select”. Use 1-2 type/s of blocks from "event", “variable” and “function” in the program.
	1	Use block-based programming languages, include 0-2 kind/s of programming structures from “order”, “loop”, “select”. No block from "event", “variable” and “function” in the program.
	0	No program provided, or the program is completely irrelative to the project.



Assessment Dimension 5: Communication Skill		
Sub-dimension	Grade	Assessment Criteria
Oral Expression	5	Fluent and well-organized expression, rich vocabulary, clear pronunciation, accurate use of words and idioms to describe the project, including all required information.
	4	Fluent expression, lack of organization, rich vocabulary, clear pronunciation, can accurately describe the project, lack of some required information.
	3	Fluent expression, lack of organization, moderate vocabulary, clear pronunciation, lack of some required information, with a lot of irrelevant information.
	2	Some pauses, limited vocabulary, clear pronunciation, lack of required information.
	1	Multiple pauses, poor vocabulary, slurred pronunciation, and no required information.
	0	No oral expression in the video.
Process Presentation	5	Present a complete problem-solving process, including problem definition, problem analysis, generation of possible solutions, selection and testing of solutions, analysis and evaluation of results.
	4	Shows the key steps in the problem-solving process, including problem definition, solution testing and results analysis.
	3	Shows the whole problem-solving process, but some



		steps are irrelevant to the final project. Lack interpretable logic.
	2	Shows 3 steps of the problem-solving process, but not all the key steps (problem definition, solution testing, results analysis). Lacks interpretable logic.
	1	Only shows 1-2 steps of the solving problem process. Lack of thinking process. Making people confused about why the problem exists, what problems have been solved, and how the final project solves the problem, etc.
	0	The problem-solving process is completely absent, or the presentation is completely unrelated to the project.

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Appendix 2. Competition Resources

Join MakeX Spark Online Competition Skype Group:

<https://join.skype.com/X5KZg8YXsnXp>



*Note: Please sign in with a Skype account before you click the **Join Link** above. Otherwise, if you select **Join as guest without account**, your guest conversation will only last for 24 hours.

MakeX Official Website: <https://www.makex.cc/en>

MakeX Official Email: makex_overseas@makeblock.com

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Edited By Makex Robotics Competition Committee

RULES GUIDE

MAKEEX SPARK

Official Website:
www.makex.cc/en

Email:
makex_overseasa@makeblock.com

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