

RULEBOOK

IYRC CHINA 2025



INTERNATIONAL YOUTH ROBOT COMPETITION

IYRC CHINA 2025

2025 IYRC 国际青少年机器人与人工智能大赛暨IYRC青少年创新教育国际交流论坛

RULES AND REGULATIONS



Organized by:



Supported by:





2025 IYRC 国际青少年 AI 机器人大赛暨第十三届 IYRC 国际邀请展示活动

International Youth Robot Competition

INTERNATIONAL YOUTH ROBOT COMPETITION

IYRC CHINA 2025

20-21 DEC 2025 SHENZHEN, CHINA

IYRC International Youth Robot Competition

IYRA International Youth Robot Association



IYRC International Youth Robotics and Artificial Intelligence Competition (IYRC CHINA 2025) & IYRC International Youth Innovation Education Exchange Forum

The International Youth Robot Competition (IYRC), launched in August 2013, has grown into a leading global platform for youth innovation and technological exchange. By 2024, the competition has welcomed members from over 40 countries and regions—including China, Malaysia, South Korea, Russia, Israel, the United States, Indonesia, Singapore, Thailand, Vietnam, the Philippines, Laos, Myanmar, and Cambodia. Over the past decade, IYRC has become one of the most popular and influential international events for young people, inspiring their passion for robotics, programming, and artificial intelligence while fostering global collaboration in science and technology education.

The IYRC CHINA 2025 event is co-organized by the globally recognized NGO, the International Youth Robot Association (IYRA), together with My Robot Time (SZ) Co., Ltd. It features two major components: the IYRC Youth Artificial Intelligence Science Education Summit Forum and the IYRC International Youth Robot Competition.

Through these activities, IYRC not only provides young participants with opportunities to learn, compete, and grow, but also serves as a bridge for international cooperation, cultural exchange, and the advancement of global science and technology education.

IYRC CHINA 2025

RnR change log

Version	Details
1.0	- Identify the competition categories and competition type
1.1	- Add on competition- IYRC· Energy Exploration (Elementary, Middle & High School Group)
1.2	- Update game field size for green goal

Overall Competition

Competition	Robot Kits	Age Group
IYRC · Green Goal	MRT Series CodeSpark	Kinder (4 to 6 years old) Elementary school (7 to 12 years old)
IYRC · Bowling	MRT Series CodeSpark	Kinder (4 to 6 years old) Elementary school grade 1-3 (7 to 9 years old)
IYRC · SUMO	MRT Series CodeSpark	Elementary school grade (7 to 12 years old) Middle School (13 to 15 years old) High School (16 to 18 years old)
IYRC · Communication Master II	CodeSpark	Elementary school grade 1- 3 (7 to 9 years old)
IYRC · Wandering Planet II	MRT Series CodeSpark	Elementary school grade 4-6 (10 to 12 years old) Middle School (13 to 15 years old) High School (16 to 18 years old)
IntelliFusion MRT · AI City Guardians	CodeSpark AI Car	Elementary school grade (7 to 12 years old) Middle School (13 to 15 years old) High School (16 to 18 years old)
IYRC · Humanoid Boxing	Line Core M	Elementary school grade (7 to 12 years old) Middle and high school (13 to 18 years old)
IYRC · Creative Design	MRT Series CodeSpark	Kinder (4 to 6 years old) Elementary school grade (7 to 12 years old) Middle and high school (13 to 18 years old)
IYRC· Strait Crossing Challenge (Drone Competition)	Remote Control Drone	Elementary school grade (7 to 12 years old) Middle and high school (13 to 18 years old)
IYRC· Bio Lab Challenge		Elementary school grade (7 to 12 years old) Middle and high school (13 to 18 years old)
IYRC· Energy Exploration	MRT Series CodeSpark	Elementary School (7 to 12 years old) Middle and High School (13 to 18 years old)



Table of Content

IYRC · Green Goal	6
IYRC · Bowling	10
IYRC · Communication Master II	14
IYRC · Wandering Planet II	24
IYRC · Strait Crossing Challenge (Drone Competition)	34
IYRC · Creative Design	43
IYRC · SUMO	46
IYRC · Humanoid Boxing	50
IntelliFusion MRT · AI City Guardians	54
IYRC· Bio Lab Challenge	62
IYRC· Energy Exploration	68



IYRC · Green Goal

1. Scope of Participation

a. Competition Categories:

- i. Kinder (4 to 6 years old)
- ii. Elementary school (7 to 12 years old)

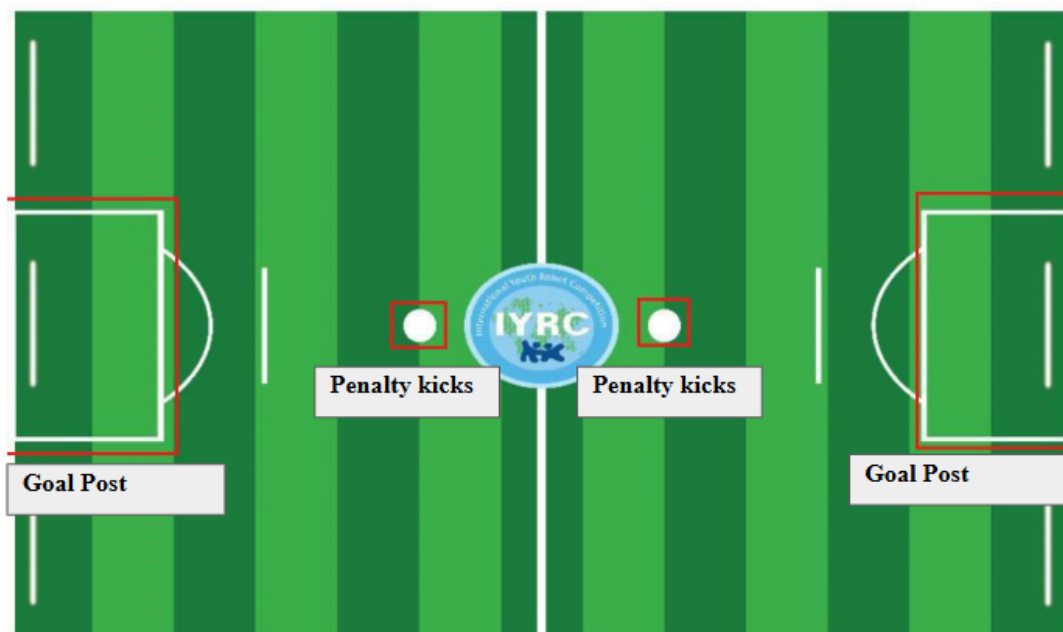
b. Number of Participants: Team (2 vs 2)

2. Competition Process

- a. **Competition Registration:** Participants should register for the competition following the guidelines and schedule provided by the organizing committee. Successfully registered participants will be granted the qualification to participate in the competition.

3. Competition Environment

- a. **Robotic Kits:** CodeSpark Series/ MRT series
- b. **Coding laptop:** Participants need to bring their own laptop as well as the universal travel adapter.
- c. **Prohibited devices :** USB Flash Drives, mobile phones, smartwatches, walkie-talkies etc.
- d. **Competition game field:**



- i. Game field size : 2750mm (L) X 1650mm (W)

4. Robot Requirements

- a. Each participant is allowed one remote control robot built using MRT series kits.
- b. **Mainboard:** Only 1 mainboard is allowed during the competition. The robot must use only the MRT series mainboard that can complete the competition.
- c. **Motors:** The robot is allowed to use a maximum of 2 DC motors.
- d. **Dimensions:** The maximum size of the robot must not exceed 25cm x 25cm x 25cm, including the expansion stage.
- e. **Remote control:** Robots are operated via Bluetooth remote controllers or RF. Participants are required to bring their own remote control.
- f. Robots must not intentionally damage the competition field.
- g. Robots must not cause danger to the field or surrounding environment.
- h. **Power Supply:** The fully charged voltage of each robot's battery must not exceed 9V.

5. Competition Task

A. Competition duration

- i. Each match lasts **3 minutes**.

B. Robot Building

- i. Pre-build and pre-programmed remote control soccer robot.

C. Starting of the Robot

- i. The match officially begins when the referee blows the whistle.

D. Match System:

- i. The competition follows an elimination system (Knockout mode)
- ii. Each team consists of 2 students and 2 robots, with each student controlling one robot.
- iii. Participants must keep a distance from the field and must not touch or damage it.

E. Fouls & Penalties:

- i. **First offense:** Yellow card warning.
- ii. **Two yellow cards:** Player is removed from the field and isolated for 1 minute before returning.
- iii. Removed robots may only rejoin the match with referee approval.

F. Tie-Breaks:

- i. If the match is tied after the 3-minute regulation time, an **extra 1-minute** period will be played, with the first team to score declared the winner.
- ii. If the tie remains, a **1-minute 1-on-1 penalty shootout** will be held, where the first to score wins.
- iii. If the score is still the same for both teams, the game proceeds to **sudden-death penalty kicks**, with teams alternating shots until a winner is determined.

G. Penalty kicks:

- i. The ball is placed at a fixed point (white dot).
- ii. The robot must start from behind the fixed point.
- iii. The robot cannot push the ball over the white line directly and can only touch the ball once.
- iv. Each robot has 15 seconds to complete the penalty kick.
- v. Both teams take penalty kicks from the same position.

H. Match Regulations:

- i. Robots may not trap the ball using their structure. If the ball becomes stuck, it will be repositioned by the referee.
- ii. Robots will be placed in a preparation area before matches and cannot be used by multiple participants simultaneously.
- iii. If a robot is damaged or parts fall off, repairs/reassembly are not allowed during the match.
- iv. Upon hearing any whistle from the referee, players must immediately stop operating the robot.
- v. If the ball becomes stuck during play, the referee will count down 5 seconds. If the ball still cannot be moved, it is considered a dead ball and the ball will be repositioned by the referee.
- vi. Robots may enter their own penalty box and goal area but cannot remain stationary for more than 6 seconds.
- vii. Robots may enter the opponent's penalty box and goal area but cannot stay for more than 6 seconds.

I. Scoring

- i. The participant with the highest score will be declared the winner.
- ii. In the knockout stage, scores of each match will not be recorded; the winner advances to the next round. In the event of a tie, an overtime match will be held.

J. Disqualification:

- iii. Touching the robot during a match.
- iv. Robot violating size restrictions.

6. Relevant Explanation

These rules are the basis for the implementation of refereeing work, and referees (judges) have the final authority to make decisions during the competition. Any matters not stated in the rules shall be decided by the referee team.

IYRC · Bowling

1. Scope of Participation

a. Competition Categories:

- i. Kinder (4 to 6 years old)
- ii. Elementary school grade 1-3 (7 to 9 years old)

b. Number of Participants: Individual

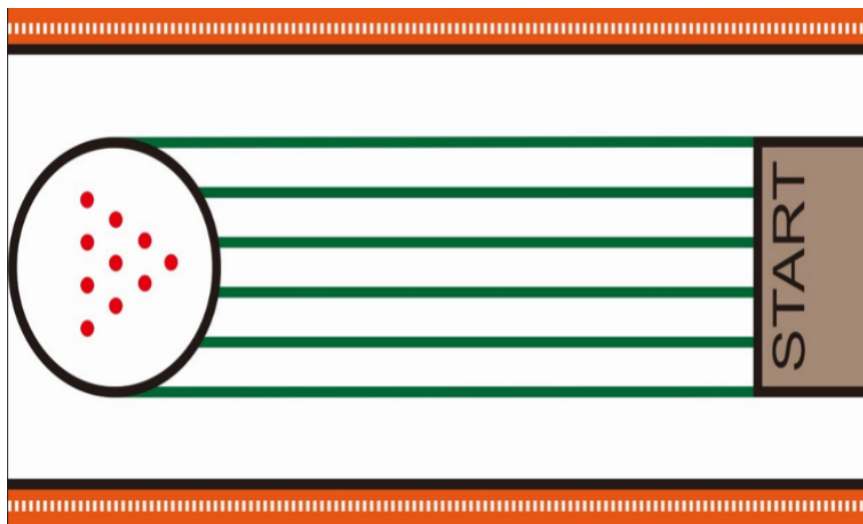
c. Instructor: 1 person (optional)

2. Competition Process

- a. **Competition Registration:** Participants should register for the competition following the guidelines and schedule provided by the organizing committee. Successfully registered participants will be granted the qualification to participate in the competition.

3. Competition Environment

- a. **Robotic Kits:** CodeSpark Series/MRT series
- b. **Coding:** Participants need to bring their own programming tools such as card reader and programming card.
- c. **Prohibited devices :** USB Flash Drives, mobile phones, smartwatches, walkie-talkies etc.
- d. **Competition game field:**



- i. Game field size : 244cm (L) X 122cm (W)
- ii. No boundary walls will be installed around the field.



- iii. The robot must be placed in the starting position (START) for every launch.
- iv. The red dot indicates the position of the bowling pins.

4. Robot Requirements

- a. Robots should preferably use **MRT card-swiping series products**.
- b. Each robot may use a maximum of 1 card-programming mainboard and 3 motors.
- c. Robots must not intentionally damage the competition field.
- d. Robots must not pose any danger to the field or surrounding environment.
- e. Robot dimensions must not exceed **35cm × 35cm × 35cm** during measurement. After the match begins, extended parts are allowed to exceed this limit.
- f. Participants need to bring their own programming card and card reader.
- g. Fully charged battery voltage **must not exceed 9V**.

5. Competition Task

A. Competition duration

- i. Each round lasts **3 minutes**.
- ii. Each participant has **three rounds with two attempts** per round.

B. Robot Building:

- i. Pre-build bowling robot. On-site program.

C. Starting of the Robot

- i. The match officially begins when the referee blows the whistle.

D. Match System:

- i. Before the first round begins, participants must complete on-site programming using a programming card and card reader under referee supervision.
- ii. Card programming must be completed within 5 minutes; failure to do so results in immediate match termination.
- iii. **Provided on-site:** Programming cards and card reader (participants are advised to bring their own).
- iv. The robot must always start from the designated starting position.

- v. If the robot crosses the starting line during a throw, it is considered a foul and the attempt is invalid
- vi. Any pins knocked down are removed before the next throw.
- vii. After the first round, the pins are reset for the second round, and so on.
- viii. Only one GOMA large gear may be used per throw.
- ix. During the match, participants are allowed to touch or hold their robot to prevent shaking during the throw.
- x. Each knocked-down pin is recorded as 1 point.
- xi. If all 10 pins are knocked down on the first throw of a round, they will be reset for the second throw.
- xii. If fewer than 10 pins are knocked down in the first throw, the remaining pins will be targeted in the second throw.
- xiii. Time spent resetting pins is not included in the 3-minute match duration.

E. Scoring:

- i. **Bowling Score:**
 - a. Each pin knocked down = **1 point**.
 - b. Maximum score per throw = **10 points**.
 - c. Maximum score for 3 rounds (6 throws) = **60 points**.
- ii. **Programming Score:**
 - a. On-site card programming = **10 points**.
- iii. **Total Score:**
 - a. Bowling score + programming score.
 - b. Highest total score wins.

F. Tie-Breaks:

- i. If tied, compare scores from the first throw of the first round — higher score ranks ahead.
- ii. If still tied, compare second throws, then continue in order until a winner is determined.

G. Disqualification:

- i. Intentionally damaging the competition field.
- ii. Violating size restrictions.
- iii. Using another participant's robot in the competition.

6. Relevant Explanation

These rules are the basis for the implementation of refereeing work, and referees (judges) have the final authority to make decisions during the competition. Any matters not stated in the rules shall be decided by the referee team.

IYRC · Communication Master II

1. Scope of Participation

a. Competition Categories:

- i. Elementary school grade 1-3 (7 to 9 years old)

b. Number of Participants: Individual

c. Instructor: 1 person (optional)

2. Competition Theme

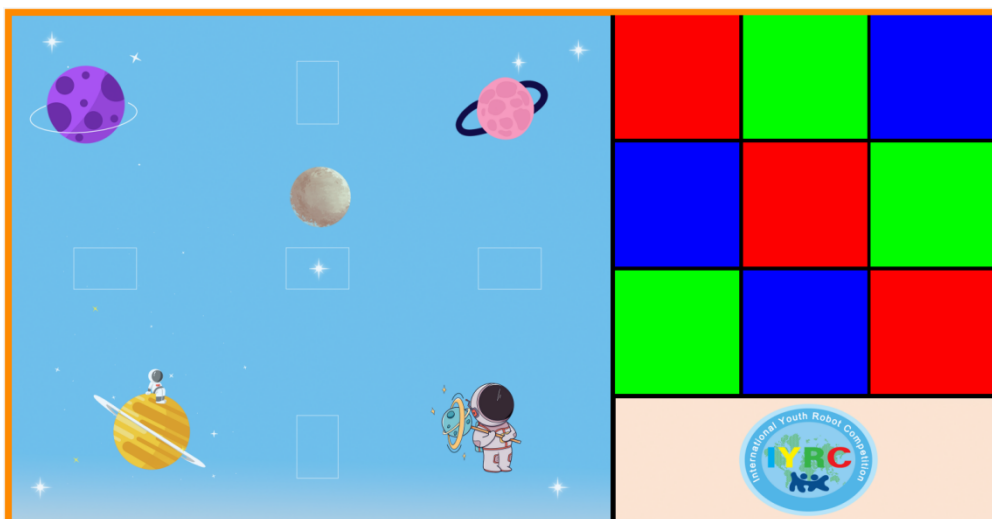
Communication Master II

3. Competition Process

- a. **Competition Registration:** Participants should register for the competition following the guidelines and schedule provided by the organizing committee. Successfully registered participants will be granted the qualification to participate in the competition.

4. Competition Environment

- a. **Robotic Kits:** CodeSpark series+ remote control
- b. **Coding:** Participants need to bring their own programming tools such as card reader and programming card.
- c. **Prohibited devices :** USB Flash Drives, mobile phones, smartwatches, walkie-talkies etc.
- d. **Competition game field:**



- i. The total field size is approximately **2300 mm (length) × 1200 mm (width) (±5%)**, divided into two sections.
- ii. The left side is the *manual remote-control zone*.



- iii. The left side contains five task points, each with one task prop.
- iv. The right side is the *card-based programming automation zone*.
- v. The right side contains nine grids in red, green, and blue. Each grid measures **285 mm × 285 mm**.
- vi. At the bottom-right corner, the starting area is marked with the IYRC logo, measuring **875 mm (length) × 285 mm (width)**.
- vii. Task blocks are made of EVA foam, each measuring **50 mm × 50 mm × 50 mm**, in three colors: red, green, and blue.

5. Robot Requirements

- a. Each participant may use one remote-controlled card-programming robot using CodeSpark Series.
- b. Robot dimensions must not exceed **220mm (length) × 220mm (width)** during measurement.
- c. **Mainboard:**
 - i. CodeSpark mainboard
 - ii. Equipped with a 1.5–2 inch screen.
 - iii. Built-in battery.
 - iv. TYPE-C input/output port.
 - v. Supports voice control and remote control.
 - vi. Compatible with external card reader and color sensor.
- d. Robots are limited to:
 - i. 1 card-programming mainboard
 - ii. 1 remote controller
 - iii. Mainboard capable of storing up to 3 programs.
 - iv. Maximum 2 motors.
- e. Robot battery voltage must **not exceed 9V**.

6. Competition Task

A. Competition info

The task consists of two parts: **manual remote control and card-based programming automation** (manual must be completed first, followed by automation).

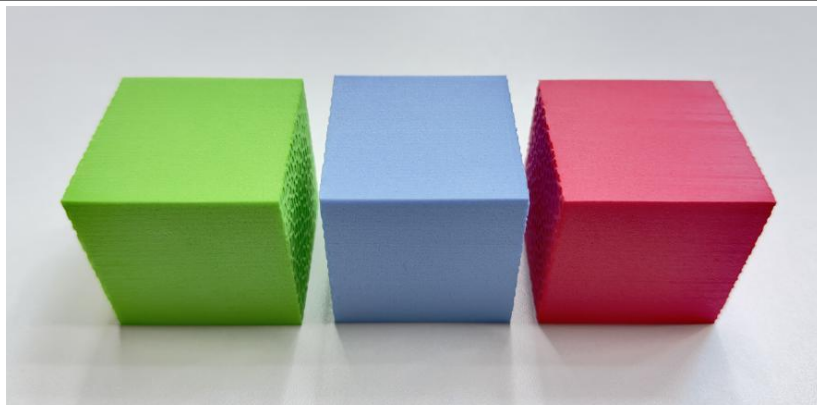
The robot is placed in the starting area. Participants must first use remote control to move the robot from the starting area to the remote-control zone, complete five designated tasks, and

bring back three differently colored blocks from the task props in the remote-control zone to the starting area.

(Note: If a block is completely removed from the field during the remote-control phase, it may not be returned to the field.)

After that, the robot switches to card-based programming automation mode. Using a color recognition sensor, the robot must identify the corresponding colored grids and deliver the three different colored blocks retrieved earlier into their matching grids (as shown in the diagram).

(Alternatively, this part may also be completed by remote control. But the participants will get less score if use remote control to complete the autonomous part)

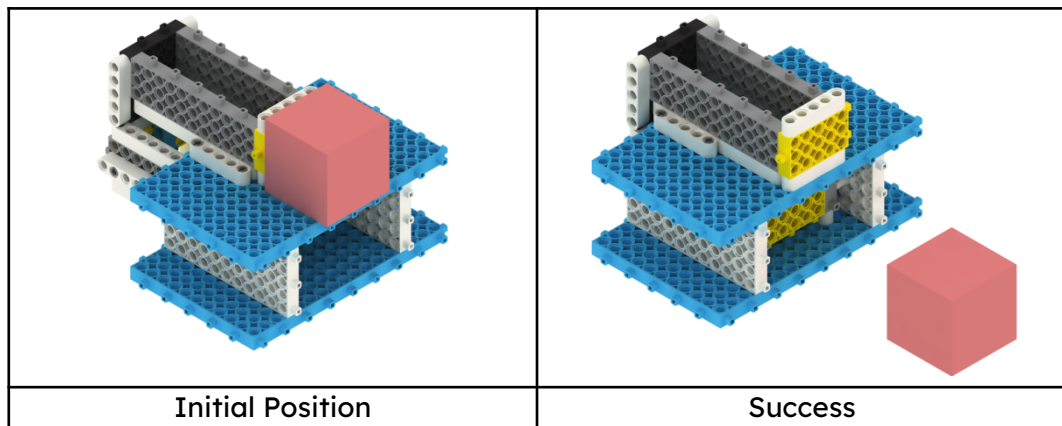


Three different colored blocks

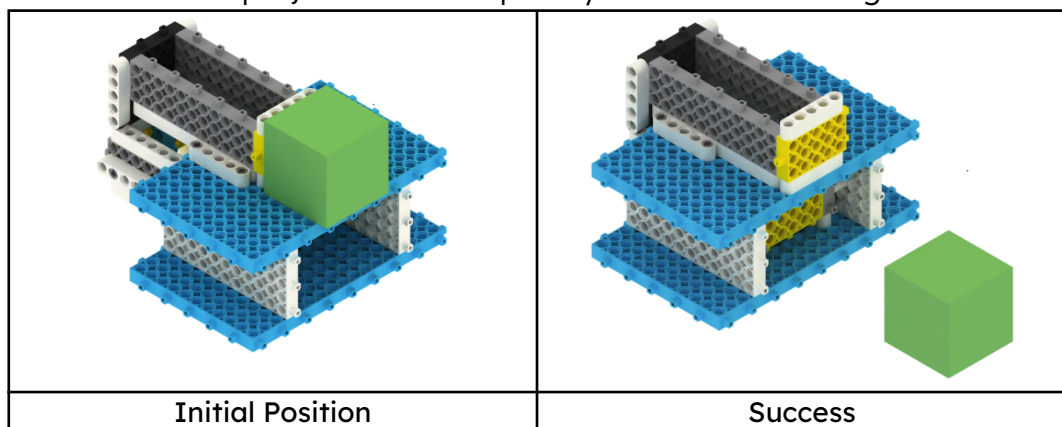
B. Task Decomposition

i. Manual Remote Control Phase

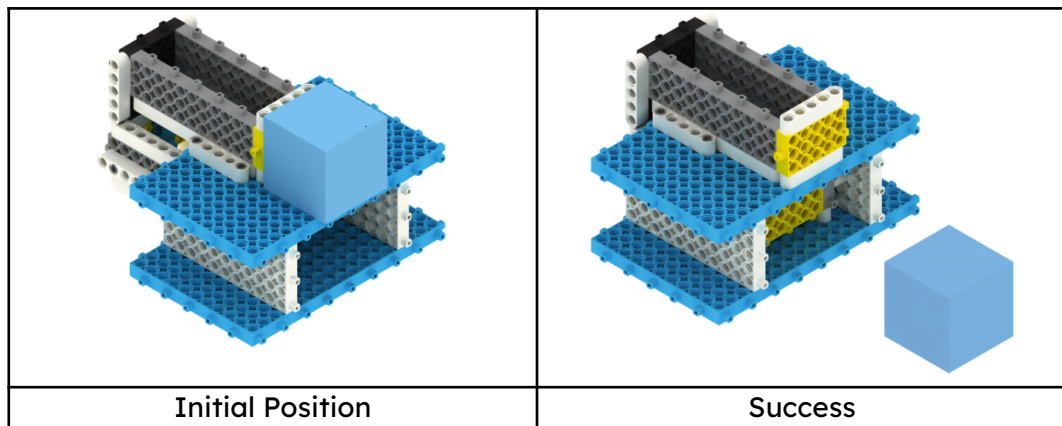
- a. **Start:** After activation, the participant must control the robot to leave the starting area (the robot's vertical projection must be completely outside the starting zone).
- b. **Task 1 – Red Block Collection:** The participant must control the robot to make the red block on the platform fall (e.g., by collision or other means), and then bring the block back to the starting area. The task is considered successful when the block's vertical projection is completely within the starting area.



- c. **Task 2 – Green Block Collection:** The participant must control the robot to make the green block on the platform fall (e.g., by collision or other means), and then bring the block back to the starting area. The task is considered successful when the block's vertical projection is completely within the starting area.

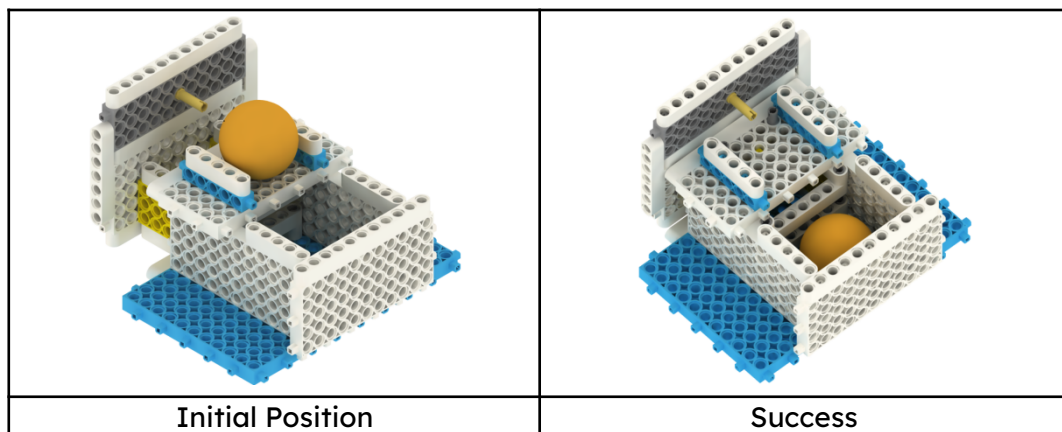


- d. **Task 3 – Blue Block Collection:** The participant must control the robot to make the blue block on the platform fall (e.g., by collision or other means), and then bring the block back to the starting area. The task is considered successful when the block's vertical projection is completely within the starting area.



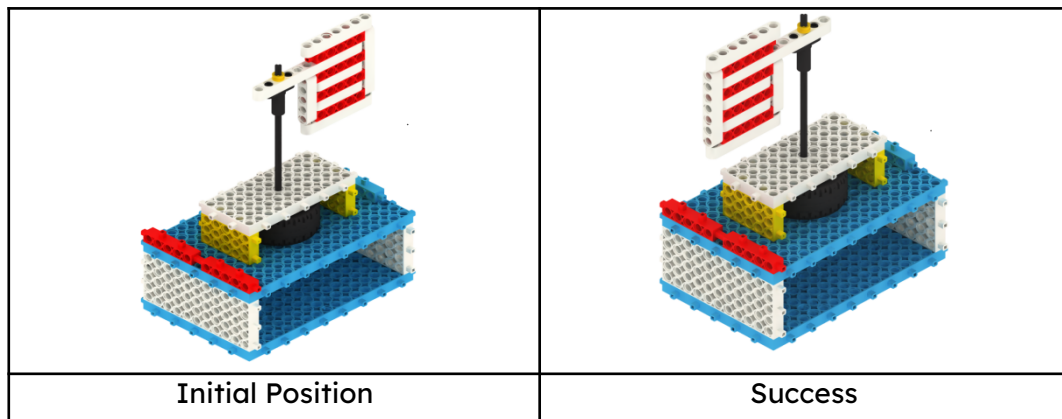
- e. **Task 4 – Signal Launch:** The participant must control the robot to make the ping pong ball on the platform fall (e.g., by collision or other means) into the designated box in front. The task is considered successful when the ping pong ball is completely within the box.

(The prop is placed in the leftmost white box of the remote-control zone.)



- f. **Task 5 – Radar Positioning:** The participant must control the robot to rotate the red-and-white striped radar on the vertical pole, moving it from above the blue 5-hole beam to above the two red 5-hole beams. The task is considered successful when the radar's vertical projection is positioned over the two red 5-hole beams.

(The prop is placed in the middle white box of the remote-control zone.)



ii. Card-Based Programming Automation Phase

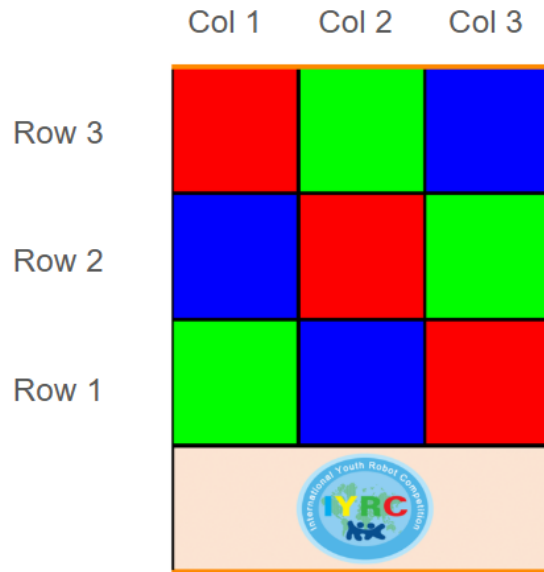
The participant must use card-based programming to make the robot automatically depart from the starting area. Using a color recognition sensor, the robot shall deliver the red, green, and blue blocks (retrieved from the remote-control zone) to the corresponding colored grids located in the row or column designated by the referee on site.

After each delivery, when the robot returns to the starting area, it must touch the boundary of the starting box before the participant is allowed to touch the robot.

The match ends when the robot has finished delivering all the blocks and has completely returned to the starting area.

A block is considered successfully delivered when its vertical projection is completely within the target grid. Scoring is based on the final position of the blocks at the end of the task.

The grid area consists of three rows and three columns (as shown in the diagram).



Grid Area

Programming Card:

The programming cards include motion type cards, condition type cards, and color category cards. Participants must program the main controller correctly by swiping the appropriate cards according to the competition requirements in order to achieve the event objectives.



C. Competition duration

Category	On-site programming and debugging duration	Specified task duration	Specified task count
Elementary School	60 minutes	120 seconds	1 time
1. On-site programming and debugging duration: During this time, all teams will collectively engage in programming and debugging. 2. Specified task duration: The robot must complete all tasks within the specified time. If not all tasks are completed within the allotted time, the score will be based on the tasks that were successfully completed.			

D. Robot Building:

- i. Pre-build robot. On-site program

E. On-Site Mission:

- i. The placement of the task props will be announced by the on-site referee.
- ii. The robot will get different scores depending on which grid the blocks are delivered to.
- iii. The designated row or column for block delivery will be announced by the referee on site.

F. Starting of the Robot

- i. Before starting, the robot must remain stationary within the designated starting area, and its entire projection must not exceed the boundary of the starting box.
- ii. Once the robot has been started, participants are not allowed to touch it until the end of the match (except when the robot is still inside the starting box).
- iii. The robot must operate continuously within the time limit set for the task, with no pauses allowed.
- iv. If any part of the robot becomes detached during the task, participants may request the referee to retrieve the detached piece, provided it does not affect the robot's normal operation.
- v. During the competition, participants may not replace the robot, nor make any hardware or software modifications to it.

G. Ending of the Robot

- i. Completing all tasks within the specified time.
- ii. End of the specified time.
- iii. The participant touches any part of the robot during its movement.
- iv. The robot completely leaves the competition field.

H. Scoring:

Task	Score
Robot departs from the starting area	10 points
Red block falls from the platform	10 points
Green block falls from the platform.	10 points
Blue block falls from the platform.	10 points
Red block is brought back to the starting area.	10 points
Green block is brought back to the starting area.	10 points
Blue block is brought back to the starting area	10 points
Signal launch (ping pong ball dropped into the designated box).	20 points
Radar positioning (rotate radar to the correct location).	20 points
(Auto/Remote) Deliver the red block to the red grid.	Autonomous: 20 points Remote control: 5 points
(Auto/Remote) Deliver the green block to the green grid	Autonomous: 20 points Remote control: 5 points
(Auto/Remote) Deliver the blue block to the blue grid.	Autonomous: 20 points Remote control: 5 points
The robot completely returns to the starting area (the entire robot body within the starting box).	10 points

I. Winning:

- i. If only part of the tasks are completed within the specified time limit, scoring will be based on the tasks actually completed.

- ii. Participants with higher scores will be ranked higher. If scores are the same, the participant with the shorter completion time will be ranked higher.
- iii. If both the score and completion time are identical, the participants will be awarded the same ranking.

J. Disqualification:

- i. A participant deliberately damages the competition field.
- ii. A participant refuses to follow the instructions of the referee (or judges).
- iii. A participant is the subject of a complaint that is verified and upheld.
- iv. The robot does not comply with the size requirements.

7. Evaluation criteria

These rules are the basis for the implementation of refereeing work, and referees (judges) have the final authority to make decisions during the competition. Any matters not stated in the rules shall be decided by the referee team.

IYRC · Wandering Planet II

1. Scope of Participation

a. Competition Categories :

- i. Elementary school grade 4-6 (10 to 12 years old)
- ii. Middle School (13 to 15 years old)
- iii. High School (16 to 18 years old)

b. Number of Participants : Individual

c. Competition Type: Task completion

2. Competition Theme

Wandering Planet II

3. Competition Process

Competition Registration: Participants should register for the competition following the guidelines and schedule provided by the organizing committee. Successfully registered participants will be granted the qualification to participate in the competition.

4. Competition Environment

- a. **Robotic Kits:** MRT Series /CodeSpark Series
- b. **Programming System:** Blockbased programming.
- c. **Coding laptop:** Participants need to bring their own laptop as well as the universal travel adapter.
- d. **Prohibited devices** : USB Flash Drives, mobile phones, smartwatches, walkie-talkies etc.
- e. **Competition game field:**



- i. The total size of the field is **2300 mm × 1200 mm (±5%)**.
- ii. The trajectory line is black with a width of 24 mm.
- iii. The square marked with the IYRC logo is the base area, measuring **250 mm × 250 mm**.
- iv. In the diagram, the 11 dashed squares indicate the placement points for task props.

5. Robot Requirements

- a. Each participant needs to have one programmable robot.
- b. Participants can use either MRT series or CodeSpark series to complete the competition.
- c. At starting, the robot's dimensions must not exceed **250 mm (length) × 250 mm (width) × 250 mm (height)**. The robot is allowed to expand to any size after the competition starts.
- d. **Mainboard:** Use a programmable mainboard capable of completing the competition tasks, supporting either a four-way or five-way integrated line-tracking board or Bluetooth remote control (for specific category only).
- e. **Line-Tracking Device:** The robot should use one four-way or five-way integrated line-tracking board or maximum 5 IR sensors. The robot's main frame should be constructed using 6 sided building blocks.
- f. **Motor:** The robot can use up to four motors (maximum)
- g. **Battery Power:** The robot's battery voltage must not exceed 9V.

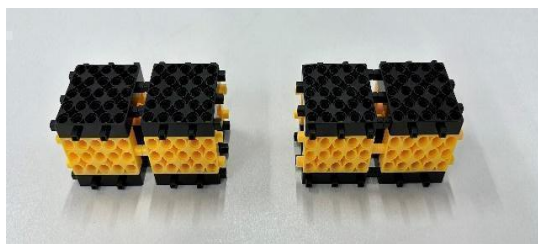
6. Competition Task

A. Task overview

- i. **Elementary School Group:** Tasks are divided into manual remote control and automatic sections (manual first, then automatic).
- ii. **Middle and High School Groups:** All tasks must be completed automatically.
- iii. **Task Points:** There are task points numbered 1 to 7, with corresponding task props labeled ① to ⑦.
- iv. **Elementary School Group:**
 - a. **Manual Part:** Participants use the remote control to move the robot from the base to transport 4 energy blocks from either 2 of the task points: 8, 9, 10, and 11 (will be announced on the spot) to task points 6 and 7 (energy blocks must touch the black line in their vertical projection). Each task point should have 2 energy blocks placed.
 - b. **Automatic Part:** After completing the manual tasks, the robot returns to the base and switches to automatic mode (the robot's body must be at least half within the base area). The robot must complete tasks ①, ②, ③, ④, and ⑤. Task ① has a fixed position, while tasks ② and ③, and tasks ④ and ⑤ may switch places.
- v. **Middle and High School Groups:** All tasks must be completed automatically. The referee will announce the placement positions for tasks ①, ②, ③, ④, and ⑤ before the competition. Tasks ⑥ and ⑦ may switch places.

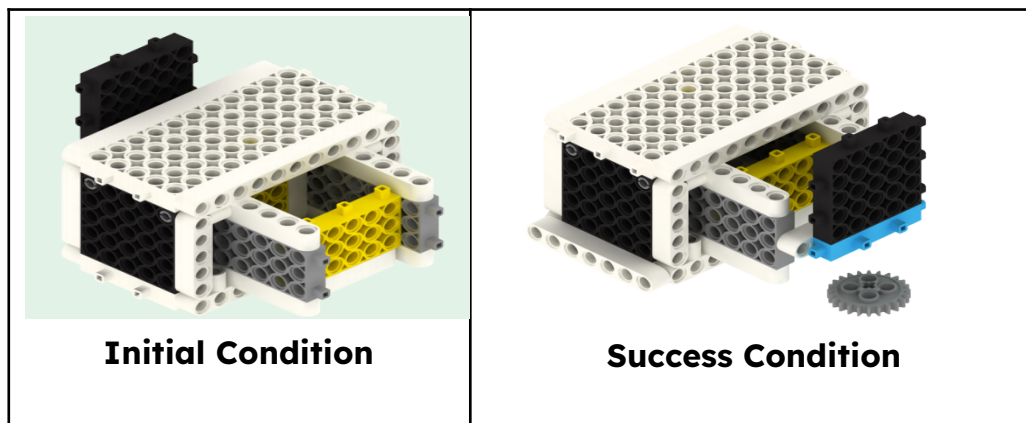
B. Task decomposition

- i. **Elementary School Group: Manual Part** (transport 4 energy blocks)

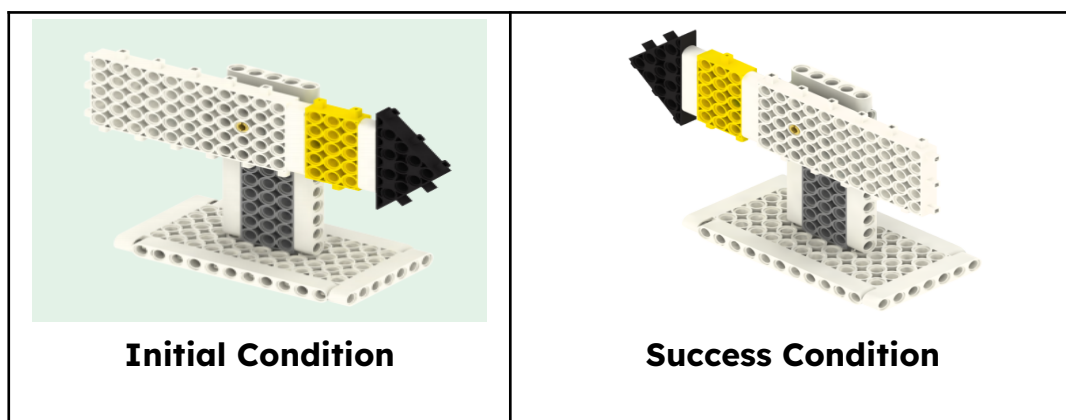


ii. Automatic part

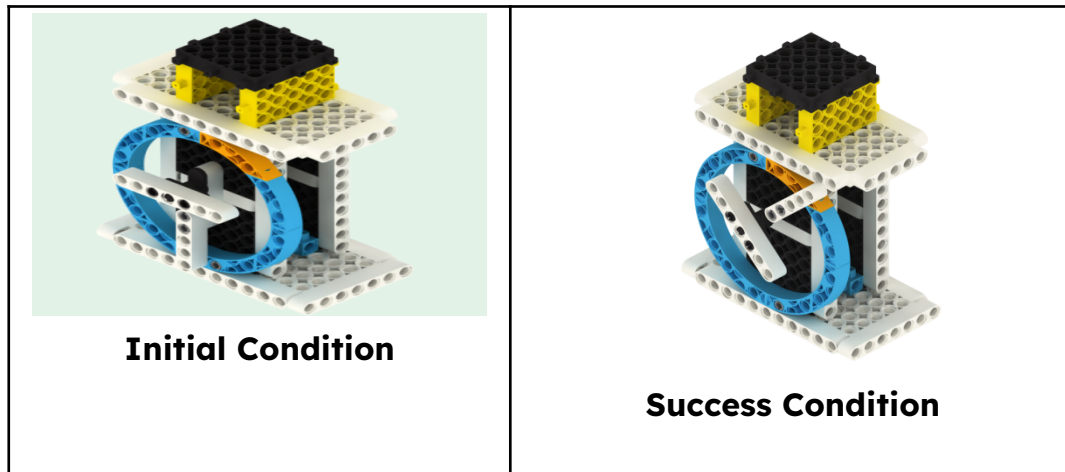
- a. **Start:** After the robot is activated, it must automatically exit the starting area (the robot must completely move out of the starting area based on its vertical projection).
- b. **Task ① Energy Extraction:** The robot must successfully remove the task module placed in the middle of the slide rail by pulling the slide rail away from the model's base (the task module must not be in contact with the base). The relevant diagram is as follows:



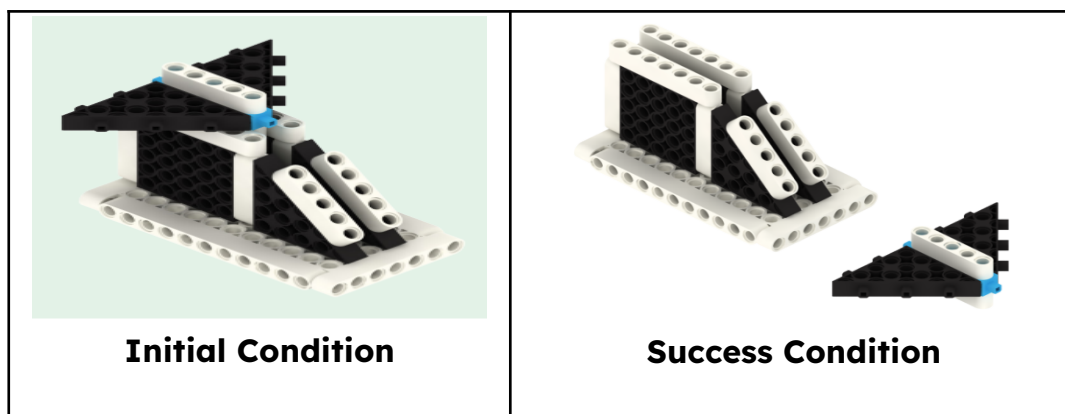
- c. **Task ② Coordinate Guidance:** The robot must rotate the horizontal rod so that the black arrow on the rod moves from facing the right to facing the left. Success is achieved when the black arrow completely crosses over the vertical rod. The relevant diagram is as follows:



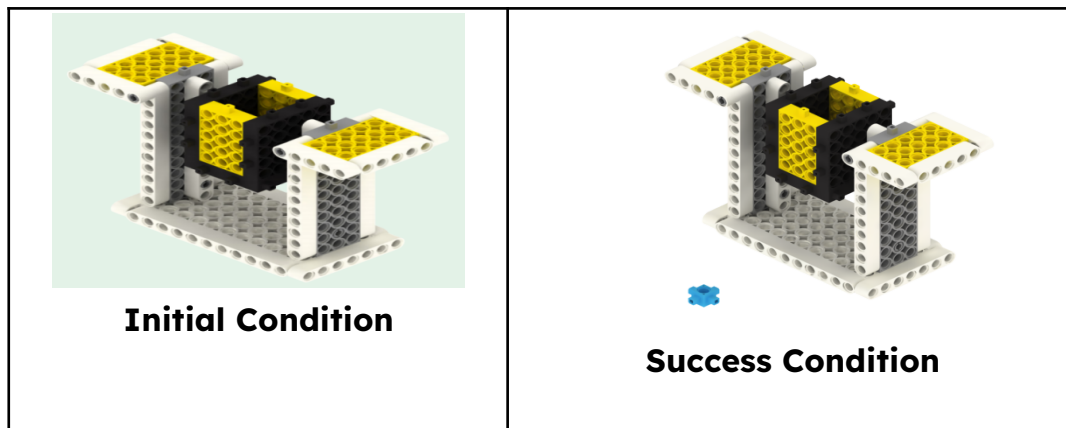
- d. **Task ③ Energy Detection:** The robot must rotate the handle to turn the white pointer on the model. Success is achieved when the white pointer stops in the orange section of the circle (the final state should have the white pointer in contact with the orange section). The relevant diagram is as follows:



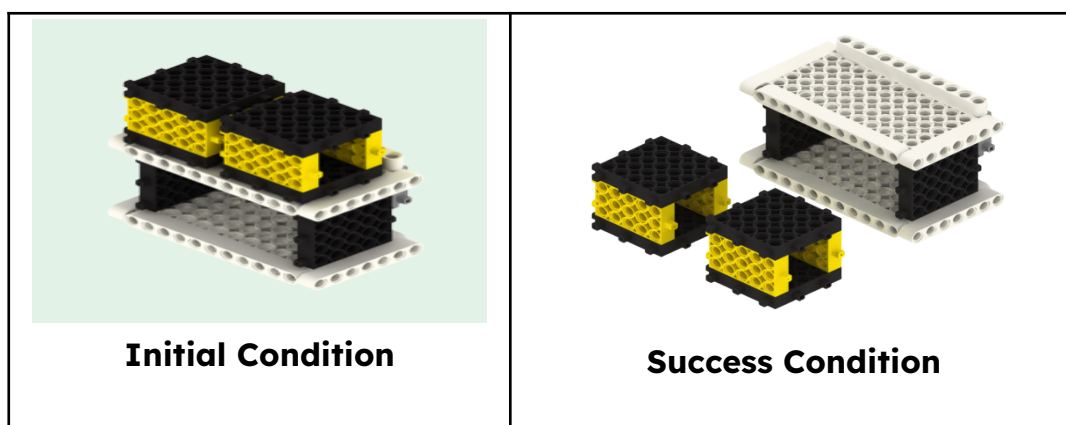
- e. **Task ④ Launch the Spaceship:** The robot must maneuver to detach the airplane model from the slide rail platform. Success is achieved when the entire projection of the model is completely off the slide rail. The relevant diagram is as follows:



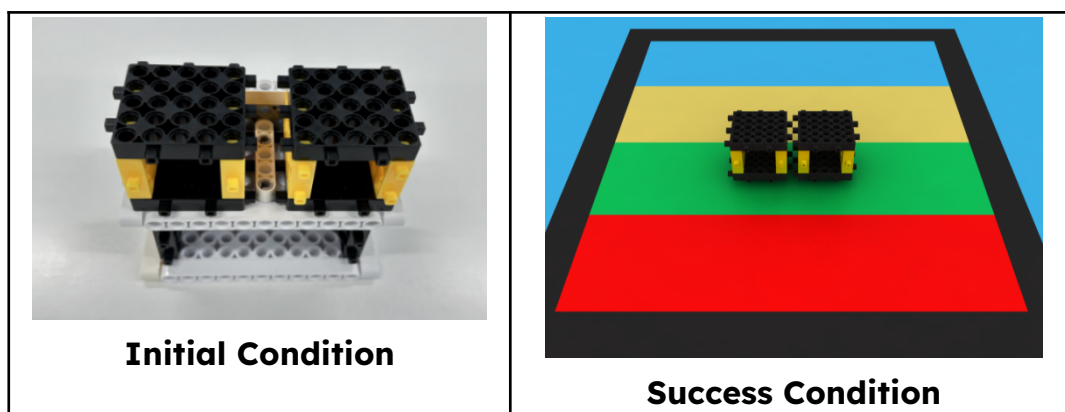
- f. **Task ⑤ Ore Screening:** The robot must manipulate the model to rotate the gravity chamber in the center, causing the ore inside the chamber to fall out. Success is achieved when the ore is completely removed from the gravity chamber. The relevant diagram is as follows:



- g. **Task ⑥ Energy Collection:** The robot must push or maneuver to make the two touching energy blocks fall off the platform. Success is achieved when the energy blocks are no longer in contact with the platform surface. The relevant diagram is as follows:



- h. **Task ⑦ Energy Transport:** The robot must transport two energy blocks, which are spaced one hole apart on the platform, back to the base. Success is achieved when the vertical projection of the energy blocks is completely within the base area. The relevant diagram is as follows:



- i. **Return to Base:** The robot must autonomously return to the base and be in a state where no further tasks are required. Success is achieved when at least half of the robot's body is in contact with the base area.

C. Task Announcement

- i. **Elementary School Group Manual Remote Control Part:** The placement positions of task props will be announced by the referee on-site.
- ii. **Elementary School Group Automatic Part:** Some task props may switch places, and the updated positions will be announced on-site.
- iii. **Middle and High School Groups Automatic Part:** The placement positions of task props will be announced by the referee on-site.

D. Duration

Group	On-site programming duration	Specified task duration	Specified task chance
Elementary School Group	60 min	120s /time	2
Middle School Group	60 min	120s /time	2
High School Group	60 min	120s /time	2
On-Site Programming and Debugging Duration: During this time, all teams in each group will perform programming and debugging simultaneously. Task Duration: The robot must complete all tasks within the specified time. If not all tasks are completed within the time limit,			

scores will be based on the completed tasks.

3. **Competition Runs:** Each robot will compete in two consecutive runs. The better score of the two will be considered the final result.

7. Robot operation and ending

A. Robot operation

- i. **Robot Start and Operation:** Before the robot is started, it must remain stationary and its overall projection must not exceed the base's boundary box.
- ii. For the manual part, the robot started using a remote control. Participants need to be ready with their own remote control.
- iii. For the automatic part, the robot can be started by pressing a button or using a sensor.
- iv. Once started, the robot must operate autonomously, and participants must not touch the robot from start to finish (except for the elementary school group when switching from remote to automatic mode at the base).
- v. The robot will complete two consecutive runs.
- vi. No pauses are allowed during the specified task time.
- vii. If any part of the robot falls off during the specified task time and does not affect its normal operation, participants may request the referee's assistance to retrieve the fallen part.
- viii. The robot cannot be replaced during the competition.
- ix. The referee will determine the placement of task props on-site.

B. Ending

1. Complete all tasks within the specified time.
2. The time allocated is over.
3. The robot overturns or flips during movement.
4. Participants touch any part of the robot during the competition.
5. The robot's vertical projection completely moves away from the black line.

8. Scoring

A. Scoring explanation

Evaluation Criteria	Score
Starting (The robot's vertical projection must be completely outside the starting area.)	10 points
Energy Extraction	20 points
Coordinate Guidance	20 points
Energy Detection	20 points
Launch the Spaceship	20 points
Ore Screening	30 points
Elementary School Group Task: Energy Transport (4 items)	10 points / per item
Middle and High School Groups Task: Energy Collection (2 items)	10 points / per item
Middle and High School Groups Task: Energy Transport (2 items)	20 points/ per item
Return to Base (The robot is considered within the base if at least half of its body is in contact with the base area.)	20 points

B. Scoring calculation

- If only part of the tasks are completed within the specified time, scores will be based on the completed tasks.
- The higher score from the two competition runs will be considered the final result. Higher scores rank higher; if scores are the same, the shorter time ranks higher. If scores and times are still the same, the total score from both rounds will determine the ranking.
- Each score = Points for completed tasks by the robot.
- If both the score and completion time are the same, the result will be considered a tie.

C. Disqualify

- Participants who are more than 10 minutes late.
- Participants who intentionally damage the competition area.
- Participants who do not follow the instructions of the referee

(or judges).

4. Participants who score zero in the competition.
5. Participants who are subject to valid complaints.
6. Participants competing in multiple events.
7. Using a remote control to operate the robot during the automatic section.
8. Robots that do not meet the size requirements.

9. Relevant Explanation

These rules serve as the basis for referee operations. During the competition, judges have the final decision-making authority. Any matters not explicitly covered by the rules will be determined by the judging panel through discussion.



IYRC · Strait Crossing Challenge (Drone Competition)

1. Scope of Participation

a. Competition Categories :

- i. Elementary school grade (7 to 12 years old)
- ii. Middle and high school (13 to 18 years old)

b. Number of Participants : Individual

c. Competition Type: Task completion

2. Competition Theme

Drone Mission

3. Competition Process

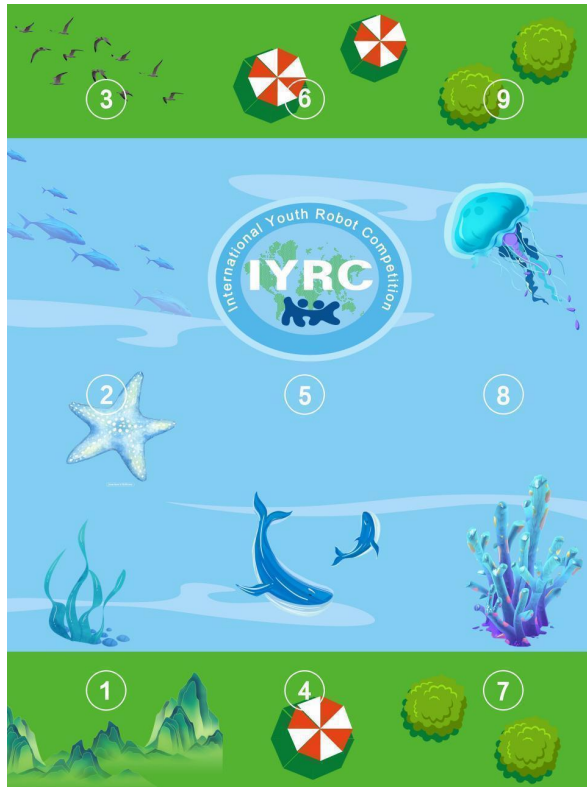
Competition Registration : Participants should register for the competition following the guidelines and schedule provided by the organizing committee. Successfully registered participants will be granted the qualification to participate in the competition.

4. Competition Environment

a. Control system : Remote Control Operation

b. Prohibited devices : USB Flash Drives, mobile phones, smartwatches, walkie-talkies etc.

c. Competition game field:



- i. The total size of the game field is **300cm (W) x 400cm (L) ($\pm 5\%$)**, the positions of task points on the spot will have task props randomly placed.
- ii. There is a circular area marked with an 'H' symbol, serving as both the take-off and landing point (the standing point for participants after the drone takes off) outside of the game field
- iii. The drone competition venue is indoors, with efforts made to maintain a wind-free and magnetically undisturbed environment.

5. Robot Requirements

- a. Each participant needs to have one remote-controlled drone.
 - i. The drone has dimensions of **200 mm x 200 mm x 180 mm**, with a wheelbase of 118 mm, and is equipped with a **protective cover (no matter if it is spherical or what)**.
 - ii. **Controller:** Remote controller operating at a frequency of 2.4GHz.
 - iii. **Weight:** The drone's empty weight must be within 80 g, and the total take-off weight must be within 100 g.
 - iv. **Battery Voltage and Capacity:** Up to 7.5 V and within 500 mAh.

6. Competition Task

A. Task overview

- i. **Elementary School** : The drone starts from the take-off point, completes tasks at 5 designated points and returns to the landing point.
- ii. **Middle and High School** : The drone starts from the take-off point, completes tasks at 8 designated points and returns to the landing point.

All tasks are scored only once, multiple completions of the same task are counted as a single score.

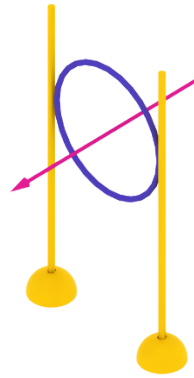
B. Task decomposition

Drone takeoff: The drone completes takeoff and vertical projection fully leaving the takeoff point is considered successful.

- i. **Task 1 Crossing mountains and ridges** : The drone completes one circle around the horizontal bar to be considered successful. A related diagram is provided below:



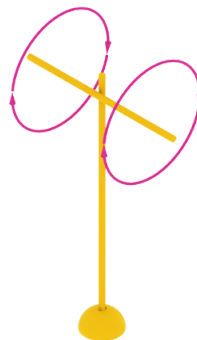
- ii. **Task 2 Crossing the strait:** The drone passing through the ring is considered successful. A related diagram is shown below:



- iii. **Task 3 Fixed-point cruising:** The drone completes one circle around the vertical pole to be considered successful (the flight altitude must not exceed the height of the vertical pole). A related diagram is shown below:



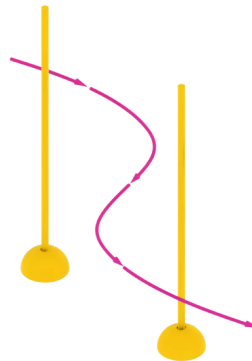
- iv. **Task 4 Dual challenge:** The drone completes one circle around each of the horizontal bars at both ends to be considered successful. A related diagram is shown below:



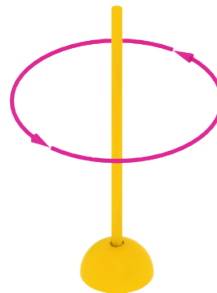
- v. **Task 5 Rapid ascent:** The drone passing through the ring from bottom to top is considered successful. A related diagram is shown below:



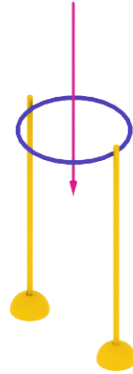
- vi. **Task 6 S-shaped maneuvering:** The drone successfully navigates around two vertical poles spaced 30 cm apart in an S-shaped pattern. A related diagram is shown below:



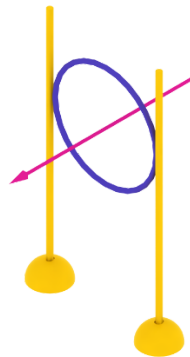
- vii. **Task 7 Low-altitude flight:** The drone completes one circle around the pole (the flight altitude must not exceed the height of the pole) to be considered successful. A related diagram is shown below:



- viii. **Task 8 Rapid descent:** The drone passing through the ring from top to bottom is considered successful. A related diagram is shown below:



- ix. **Task 9 Safe return:** The drone passing through the ring is considered successful. A related diagram is shown below:



Drone landing: The drone must come to a complete stop and its vertical projection must be entirely within the landing zone to be considered successful.

If the drone touches any competition task props while completing a task, that task will not earn any points.

C. Task Announcement:

- i. Types of tasks.
- ii. Placement position, orientation, and height of the tasks.

D. Time and Frequency

Category	On-site flight testing duration	Specified task duration	Specified task chance
Elementary School	5 Minutes	180sec/time	2 times
Middle and High School	5 Minutes	180sec/time	2 times

1. **On-site testing duration:** During this time, all teams in each category will collectively engage in programming and testing.
2. **Specified task duration:** The drone must complete all tasks within the specified time. If not all tasks are completed within the allotted time, scoring will be based on the tasks successfully completed.
3. The participant will have two chances and the better score will be considered as the final result.

7. Drone operation and ending

A. Drone operation

- i. **The drone's startup and operation method:** Before takeoff from the starting point, the drone must remain stationary and its projection must not overlap or exceed the starting point's boundary. The drone should be started using remote control operation. After the drone is started, participants are not allowed to touch the drone until the end of the competition
- ii. Once the drone takes off, the participant must enter the standing point and must not leave the standing point circle for the duration of the competition.
- iii. The drone completes two consecutive competitions.
- iv. No pauses are allowed within the specified duration for task completion.
- v. Within the specified duration for task completion, if a participating drone experiences a structural detachment, the participant may request the judge's assistance in retrieving the detached part, without affecting the drone's

normal flight.

- vi. During the competition, drones cannot be replaced or modified.
- vii. The judges will announce the tasks and their positions, orientations, and heights on-site.

B. Ending

- i. Complete all tasks within the specified duration.
- ii. Finishing of time allocated.
- iii. When competition is going, participants touch any part of the drone.
- iv. The drone flew away from the field for more than 5 seconds without returning.
- v. The participants completely leave the standing point circle.
- vi. The drone landed at any location.

8. Scoring

A) Scoring explanation

Evaluation Criteria	Score
Take off	10 points
Task 1 Crossing mountains and ridges	20 points
Task 2 Crossing the strait	20 points
Task 3 Fixed-point cruising	20 points
Task 4 Dual challenge	20 points
Task 5 Rapid ascent	20 points
Task 6 S-shaped maneuvering	20 points
Task 7 Low-altitude flight	20 points
Task 8 Rapid descent	20 points
Task 9 Safe return	20 points
Landing (entire drone is stopped completely within the starting area)	10 points
After landing, for every second finished early before the allocated time	+1 point will be awarded per second (time less than one second will not be counted).

B) Scoring calculation

- i. Scoring is based on the designated tasks completed within the specified task duration.
- ii. The final score will take the higher score of the two competitions. Participants with higher scores rank higher and in case of ties, the participants that complete the mission using the shortest time will win the game.
- iii. If the scores and completion times are the same, it will result in a tie for the ranking.

C) Disqualification

- i. Participants late for more than 10 minutes.
- ii. Participants deliberately damage the competition venue.
- iii. A participant does not follow the instructions of the referee (judge).
- iv. The participant score is zero.
- v. Complaints were filed against participants and were established.
- vi. The drone does not meet the size requirements.

9. Relevant Explanation

These rules serve as the basis for referee operations. During the competition, judges have the final decision-making authority. Any matters not explicitly covered by the rules will be determined by the judging panel through discussion.

IYRC · Creative Design

1. Scope of participation

a. **Competition Categories :**

- i. Kinder (4 to 6 years old)
- ii. Elementary school grade (7 to 12 years old)
- iii. Middle and high school (13 to 18 years old)

b. **Number of Participants** : 3 person maximum in 1 group

c. **Competition Type** : Creative design work display and explanation

2. Competition Process

Competition Registration : Participants should register for the competition following the guidelines and schedule provided by the organizing committee. Successfully registered participants will be granted the qualification to participate in the competition.

3. Competition Theme

< Innovating the Cities of Tomorrow >

Based on: *Sustainable Development Goals 11: Sustainable Cities & Communities*

Participants are strongly recommended to study what the themes above mean at <https://sdgs.un.org/goals>.

4. Competition Environment

Only MRT series products are to be used to build the robot. There is no limitation to the amount of blocks used to build the robot. You are allowed to cross use the parts from the above-mentioned systems for the robots.

Other materials can be used to further enhance the model/robot such as camera, paper cups, rings, sticks, bottles, 3D printed models, drone, future board, etc (keeping in mind that the main component needs to be products from MRT series). However, must at least have one MRT mainboard and perform some function.

5. Competition Rules

- a. Entries must be relevant to the chosen theme.
- b. Design directions may include technological innovation, healthcare, architecture, smart transportation, future cities, and smart communities.
- c. Presentation of the physical form of the work and text introduction (cardboard will be provided on site).
- d. The maximum size of the work cannot exceed 80cm(W) x 80cm(L) x 80cm(H).
- e. The works are presented in physical form and displayed on site in a dynamic form.

6. Scoring

The evaluation is divided into three groups: Kinder (4 to 6 years old), Elementary school grade (7 to 12 years old) and Middle and high school (13 to 18 years old) and rankings are made according to the results of the evaluation.

a. Innovation and Creation (20 points):

The theme of the work is clear, the creativity is unique, and the form of expression is novel. Participants need to explain the source of innovation, the innovation process and the means of realization.

b. Design (20 points):

The design of the work should showcase highlights such as 'dynamic' and 'innovative', adhering to principles of aesthetic form. Each element in the design should have appropriate proportions, a layout is reasonable, and the materials used have practical significance and fully express the theme.

c. Rationally of the proposal (20 points):

The proposals presented in the work are rational, with clear logical relationships, correct arguments and evidence, feasibility, and suitable application scenarios.

d. Work expression (20 points):

The explanation (defense) of the work should be clear, articulate, fluent, coherent, concise, focused, and organized.

e. Procedural technology(20 points):

Reasonable and correct use of hardware, software, experimental techniques, stable and smooth operation. The work should demonstrate the use of natural science knowledge, presenting effects involving sound, light, electricity, etc.

7. Evaluation Criteria

The design of work must adhere to accurate scientific principles, be innovative in creativity, feature unique structures, maintain wholesome content, and must not contain any content that conflicts with national laws.

8. Showcase protocol

- a. Team self-introduction (including names, school and category/group).
- b. Description of the production process and highlights of the project, including each team member's role in the project.
- c. Presentation of the demonstration effect of the project.

9. Relevant Explanation

These rules serve as the basis for the implementation of judging work. During the competition, judges have the final decision-making authority. Any matters not specified in the rules shall be determined by the judging panel.

IYRC · SUMO

1. Scope of Participation

A. Competition Categories :

- i. Elementary school grade (7 to 12 years old)
- ii. Middle School (13 to 15 years old)
- iii. High School (16 to 18 years old)

B. Number of Participants : Individual

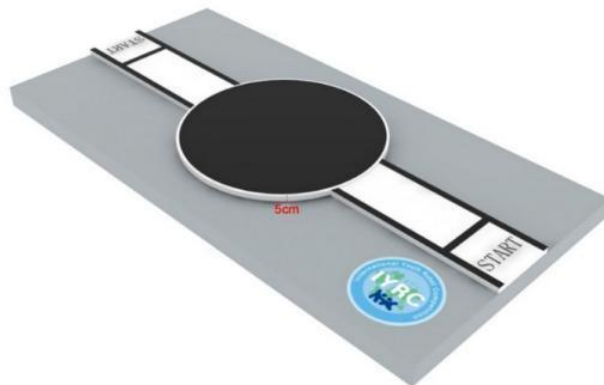
C. Competition Type: Task completion

2. Competition Process

Competition Registration : Participants should register for the competition following the guidelines and schedule provided by the organizing committee. Successfully registered participants will be granted the qualification to participate in the competition.

3. Competition Environment

- a. **Robotic kits:** CodeSpark Series/ MRT Series
- b. **Control system :** Remote Control Operation. Participants are encouraged to prepare their own remote control.
- c. **Prohibited devices :** USB Flash Drives, mobile phones, smartwatches, walkie-talkies etc.
- d. **Competition game field:**



- i. The total size of the field is 244 cm × 122 cm (±10%).

4. Robot Requirements

- i. Robots must be built using **MRT or CodeSpark series** products. There is no limit to the number of modules used, and participants are allowed to combine parts from the above series.
- ii. Each robot may use a maximum of **2 DC motors, 2 servo motors, and 1 main board** during the competition. Other electronic accessories are not restricted.
- iii. When measured, the robot must not exceed **20 cm × 20 cm × 20 cm**. However, after the match begins, it is allowed to expand beyond this size limit.
- iv. A robot built is not allowed to modify its mechanical parts (painting/folding/sharpening) and electronic parts. The block structure of any product is not allowed to be deformed. The player would be IMMEDIATELY disqualified if found guilty.
- v. Robots must not deliberately damage the competition field.
- vi. For safety reasons, robots must not use batteries exceeding **9V DC**, and the use of VAC (AC power) is strictly prohibited.
- vii. Robots must not pose any danger to the field or the surrounding environment.
- viii. Robots must ensure that their sensors are protected from external interference.
- ix. The remote-control receiver of the robot must also be protected from external interference.
- x. The robot's total weight, including the battery, must not exceed **700 g**.

5. Competition Task

A. Task overview

- i. Before the match begins, robots must be placed behind the starting black line, remaining stationary
- ii. During the match, when the referee's whistle is blown, participants must immediately stop operating their robots.
- iii. At the first whistle, both robots must pass through the channel and reach the black arena waiting area. At the second whistle, the battle begins.
- iv. If a robot falls off the channel before reaching the black arena, the participant loses that round.
- v. If a robot fails to reach the black arena within 10 seconds,

- the participant loses that round.
- vi. Within 1 minute, the participant who first pushes the opponent's robot out of the black arena wins. If both robots fall out of the arena simultaneously, the round ends in a draw.
 - vii. If more than half of a robot's body leaves the arena, or if the robot is unable to return to the competition area, the opponent is declared the winner. (Whether the push occurs within the channel will be determined by the chief referee.)

B. Time and Frequency

Category	Total task duration	Specified task duration	Specified task chance
Elementary School	3 Minutes	60sec/time	3 times
Middle and High School	3 Minutes	60sec/time	3 times

6. Scoring

- i. **Draw:** If both robots remain operating within the arena when time ends, or if both fall out of the arena simultaneously, the round is considered a draw. (Each side scores 1 point.)
- ii. **Win:** A participant wins by pushing the opponent's robot out of the arena, or if the opponent's robot cannot return to the arena within 10 seconds. (Winner scores 2 points.)
- iii. **Loss:** A participant loses if more than half of their robot is pushed out of the arena by the opponent, or if the robot is unable to return to the arena to continue the match. (Loser scores 0 points.)
- iv. **Total Score:** After 3 rounds, the participant with the highest total score is the overall winner. If scores are tied, both robots will be placed back-to-back for a final tie-breaking PK round to determine the winner.

7. Fouls and Disqualification:

A. Fouls:

- i. Touching the robot during the match.
- ii. Remaining stationary for more than 5 seconds.
- iii. Accumulating 2 fouls in a round will result in the match ending, and the opponent will be declared the winner.

B. Disqualification:

- i. A participant deliberately damages the competition field.
- ii. A participant refuses to follow the referee's instructions.
- iii. Participants late for more than 10 minutes.

8. Relevant Explanation

These rules serve as the basis for referee operations. During the competition, judges have the final decision-making authority. Any matters not explicitly covered by the rules will be determined by the judging panel through discussion.

IYRC · Humanoid Boxing

1. Scope of Participation

A. Competition Categories :

- i. Elementary school grade (7 to 12 years old)
- ii. Middle and high school (13 to 18 years old)

B. Number of Participants : Individual

C. Competition Type: Task completion

2. Competition Process

Competition Registration : Participants should register for the competition following the guidelines and schedule provided by the organizing committee. Successfully registered participants will be granted the qualification to participate in the competition.

3. Competition Environment

- a. **Robotic kits:** LINE CORE M
- b. **Control system :** Remote Control Operation
- c. **Competition game field:**



- i. The total size of the field is 100 cm × 100 cm (±10%).

4. Robot Requirements

- i. Robots must use the **LINE CORE M Humanoid Robot Kit**.
- ii. Robots must not deliberately damage the competition field.
- iii. Robots are not allowed to replace electronic components.
- iv. Robots must not deliberately damage the competition field or obstacles.
- v. Robots must not pose any danger to the competition field or surrounding environment.
- vi. Robots must ensure that their sensors are protected from any external interference.
- vii. Robots must ensure that their remote-control receivers are protected from any external interference.
- viii. Robots may be pre-assembled and pre-programmed.
- ix. The robot's **battery specifications**, as well as the arm and leg lengths, must strictly follow the official Line Core M manual.
- x. The robot's appearance may be customized in terms of color or accessories.
- xi. The robot's movements may be freely programmed.
- xii. Participants must use their own robots and are not allowed to use another participant's robot in the competition.
- xiii. Participants must prepare their own control device (Android smartphone or tablet). During the competition, the device must be set to flight mode.

5. Competition Task

A. Task overview

- i. The match officially begins at the sound of the referee's whistle.
- ii. While operating the robot, participants must keep a safe distance from the competition field and must not touch or damage the field.
- iii. All participating teams will compete in a round-robin, knockout, or a combined format depending on the number of registrations.
- iv. Robots may use their hands, legs, or body to knock down the opponent.
- v. If a robot knocks down the opponent and then falls, or falls down by itself, the opponent will be awarded **10 points**.
- vi. If any part of the robot's body other than its feet (e.g.,

knees, chest, or back) touches the ground, the opponent will be awarded **10 points** (except in cases of continuous motion).

- vii. There is no pause or rest time during the match (e.g., if a robot falls and cannot get up, or loses control, the match continues).
- viii. After the opponent's robot is knocked down, the attacking robot must step back to a designated distance under the referee's instruction and wait until the opponent stands up again.
- ix. If a robot falls or loses control, the referee will start a 10-second count. If the robot cannot return to normal operation within this time, the referee will declare the participant's loss.
- x. At the sound of the referee's whistle, both robots must attempt to engage the opponent. Failure to attempt engagement will be considered a foul. Once the match begins, both robots must attempt offensive actions. Participants may adopt any tactics or strategies as long as they are not against the rules.
- xi. If a robot stops attacking for 10 seconds, it will receive a yellow card warning. After 2 yellow cards, the opponent will be awarded 10 points.

B. Time and Frequency

Category	Total task duration
Elementary School	5 Minutes
Middle and High School	5 Minutes

6. Scoring

A) Scoring explanation

Condition	Score
A robot knocks down the opponent's robot	10 points
Both robots fall down simultaneously	10 points

Any part of a robot's body other than its feet (e.g., knees, chest, back) touches the ground, opponents will get marks	Opponent: +10 points
A robot ceases attacking for 10 seconds → 1 yellow card; upon receiving 2 yellow cards	Opponent: +10 points
Disqualification	No Score
1. After the opponent's robot is knocked down, the attacking robot must follow the referee's instruction to retreat to the designated distance and wait until the opponent stands up again. 2. If a robot falls or loses control, the referee will start a 10-second countdown. If the robot cannot return to normal operation within this time, the referee will declare that participant's loss.	

7. Ending and Disqualification:

A. Ending:

- i. Times up
- ii. The robot cannot function
- iii. During the competition, if a participant touches any part of the robot.

B. Disqualification:

- i. The team arrives more than 5 minutes late.
- ii. A participant deliberately damages the competition field.
- iii. A participant refuses to follow the referee's instructions.

8. Relevant Explanation

These rules serve as the basis for referee operations. During the competition, judges have the final decision-making authority. Any matters not explicitly covered by the rules will be determined by the judging panel through discussion.

IntelliFusion MRT · AI City Guardians

1. Scope of Participation

a. Competition Categories :

- i. Elementary school grade 4-6 (10 to 12 years old)
- ii. Middle School (13 to 15 years old)
- iii. High School (16 to 18 years old)

b. Number of Participants : 1-3 ppl/ team

c. Competition Type: Task completion

d. Instructor: Each team may have up to two instructors.

2. Competition Theme

In today's fast-paced era of technological advancement, artificial intelligence has become deeply embedded in urban life, playing a vital role in areas such as smart traffic management and city security monitoring. The IntelliFusion MRT · AI City Guardians Competition is created to offer young people a platform to explore AI applications in urban settings. It seeks to ignite their passion for innovation, strengthen their programming skills, foster interdisciplinary thinking, and enhance their ability to tackle real-world challenges, ultimately nurturing the next generation of innovators in the field of technology.

3. Competition Process

Competition Registration: Participants should register for the competition following the guidelines and schedule provided by the organizing committee. Successfully registered participants will be granted the qualification to participate in the competition.

4. Competition Environment

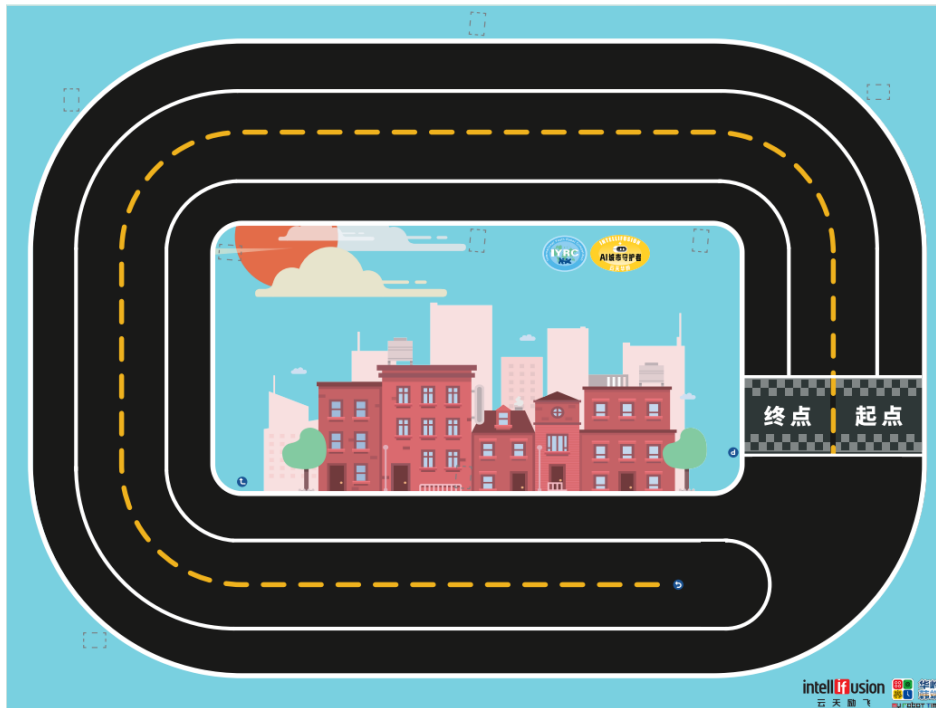
a. Robotic Kits: CodeSpark AI car series

b. Programming System: Integrates locally collected data, cloud-imported data, and advanced graphical programming software, combined with AGI technology, to provide a more intelligent and efficient programming experience.

c. Coding laptop: Participants must bring their own competition laptop equipped with AI-related functions. The laptop must be fully charged before the match (portable charging devices may be

prepared) to ensure full utilization of AI technology during programming and competition.

- d. **Prohibited devices** : USB Flash Drives, mobile phones, smartwatches, walkie-talkies etc.
- e. **Competition game field:**



- i. The total size of the field is **3200 mm × 2400 mm (±5%)**.
- ii. The driving track consists of black and white road markings for the AI car to follow. A yellow dashed line divides the track into an outer lane and an inner lane, with a white guide line in between. Each lane is **300 mm wide** (outer loop = outer lane; inner loop = inner lane). Both edges of the track are marked with solid white lines.
- iii. The start and finish areas each measure **300 mm × 300 mm**.
- iv. The robot must be placed within the starting area, and its overall projection must not exceed the front boundary of the starting area marking.
- v. The field includes road signs, event markers, and random markers placed within the track.

5. Robot Requirements

- a. Each participant may use one AI car that has passed the inspection and verification process.
- b. The AI car must fit within **280 mm (length) × 250 mm (width) ×**

250 mm (height).

- c. **Controller:** The AI car must use an AI programming series mainboard that supports a high-resolution AI vision module camera, capable of accurately capturing fine image details and operating stably under complex lighting conditions. This provides reliable visual perception for data collection and analysis during the competition.
- d. Each AI car may use up to 4 motors, 1 AI vision module, 1 dual-line tracking module, and 1 mainboard. The operating voltage must not exceed 9V. The main body of the car must be built using asymmetrical hexahedral blocks.

6. Competition Task

A. Task overview

i. Elementary School Division:

The AI car, powered by advanced artificial intelligence technology, starts its journey from the outer lane of the starting area, following the white guide line. With its strong AI vision recognition capabilities, it must accurately detect 3 road signs, 2 event markers, and 1 random marker. Using AI deep learning, it must precisely interpret specific markers. Upon detecting a U-turn marker, the AI car must intelligently plan its path, smoothly transitioning from the outer lane to the inner lane, and finally reach the finish area successfully.

ii. Middle School Division:

The AI car begins from the outer lane of the starting area, following the white guide line. With advanced AI vision recognition, it must accurately detect 2 road signs, 3 event markers, and 2 random markers. Leveraging AI deep learning, it must correctly identify specific markers. Upon encountering a U-turn marker, the AI car must smartly plan its route to transition from the outer lane to the inner lane, and complete the journey at the finish area.

iii. High School Division:

The AI car starts from the outer lane of the starting area, following the white guide line. With its advanced AI visual recognition system, it must accurately detect 3 road signs, 4 event markers, and 2 random markers. Through AI deep

learning, it must precisely interpret designated markers. When a U-turn marker is identified, the AI car must utilize AI path planning to transition smoothly from the outer lane to the inner lane, ultimately arriving at the finish area.

iv. **Task Variables:**

The specific event markers to be used and their placement will be announced on site.

v. **Random Markers:**

Random markers will be distributed on site, along with the announcement of their placement and the corresponding tasks.

B. Marker Description

- i. **Road Markers:** Right turn, U-turn, and stop signs. (These markers are placed in fixed positions; see example diagram.)
- ii. **Event Markers:** Flame, fighting, blocked traffic sign, exposed garbage, etc. (These markers are placed within the gray dashed boxes; see example diagram.)
- iii. **Random Markers:** Provided on site. Participants must collect data and complete the corresponding task during the competition. (These markers are placed within the gray dashed boxes; see example diagram.)
- iv. **Task Marker Interpretation:** Participants must correctly interpret the designated markers to complete the required tasks.

Detect the right-turn sign, announce “Right turn ahead,” and display white light on the mainboard. Turn off the light after passing the sign.	
Detect the U-turn sign, announce “U-turn ahead,” and display white light on the mainboard screen. Turn off the light after passing the sign.	

Detect the parking sign, announce “Destination ahead,” and stop in the finish area.	
Detect an obstructed traffic sign, announce “Obstructed sign detected ahead,” and display green light on the mainboard screen. Turn off the light after passing the sign.	
Detect the exposed trash sign, announce “Exposed trash detected ahead,” and display blue light on the mainboard screen. Turn off the light after passing the sign.	
Detect the fighting sign, announce “Stop fighting immediately,” and display a red light on the mainboard screen. Turn off the light after passing the sign.	
Detect the flame/fire sign, announce “ Flame detected ahead,” and display red light on the mainboard screen. Turn off the light after passing the sign.	
On-site, detect randomly placed signs, correctly announce them via voice, and execute the corresponding task commands.	?

C. Duration

Group	On-site programming duration	Specified task duration	Specified task chance
Elementary School Group	70 min	90s /time	1
Middle School Group	70 min	90s /time	1
High School Group	70 min	90s /time	1

1. **On-Site Programming Time:** Each division will have a unified programming session of 70 minutes. During this time, participants may perform field testing and program adjustments.
2. **Match Duration:** Each match lasts 90 seconds. Any AI car that does not finish within the specified time will be forcibly stopped and the match will be ended.

7. Robot operation and ending

A. Robot operation

- i. Before the AI car starts in the starting area, it must remain stationary, and the frontmost part of its moving mechanism must not extend beyond the starting line. The start can be triggered by “pressing a button” or “sending a signal to a sensor.” After starting, the robot must operate autonomously; any detected manual remote control of the robot will result in immediate disqualification.
- ii. Each participant has 1 minute to enter the competition area for preparation. After finishing the preparation, the participant must signal the referee to start the competition.
- iii. No pauses are allowed during the allotted task time.
- iv. During the allotted task time, if any structural parts of the robot fall off without affecting its normal operation, participants may request the referee’s assistance to retrieve the fallen parts.
- v. Robots cannot be replaced during the competition, and no modifications to the robot’s hardware or software are allowed.
- vi. Participants may only take their robots after the referee signals the end of the competition.

B. Ending

- i. Completed the competition within the allotted time.
- ii. Did not complete the competition within the allotted time.
- iii. The AI car completely leaves the competition area during movement.
- iv. The AI car suddenly stops or cannot move forward for more than 5 seconds during movement.
- v. The AI car departs from the driving white line for more than

5 seconds during movement.

- vi. The AI car flips over or tips sideways during movement.
- vii. The participant touches any part of the robot during its movement.
- viii. The participant deliberately damages the competition field.

8. Scoring

A. Scoring explanation

Task	Score
The robot starts from the starting area, with its entire projection leaving the starting zone.	10 points
Detect the right-turn sign, announce “Right turn ahead,” and display white light on the mainboard screen. Turn off the light after passing the sign.	10 points
Detect the U-turn sign, announce “U-turn ahead,” and display white light on the mainboard screen. Turn off the light after passing the sign.	10 points
Detect the parking sign, announce “Destination ahead,” and stop in the finish area. The robot is considered stopped if any part of its structure is in contact with the finish area while stationary.	10 points
Detect the obstructed traffic sign, announce “Obstructed traffic sign detected ahead,” and display green light on the mainboard screen. Turn off the light after passing the sign.	10 points
Detect the exposed trash sign, announce “Exposed trash detected ahead,” and display blue light on the mainboard screen. Turn off the light after passing the sign.	10 points
Detect the fighting sign, announce “Stop fighting immediately,” and display red light on the mainboard screen. Turn off the light after passing the sign.	10 points
Detect the flame/fire sign, announce “Open flame detected ahead,” and display red light on the mainboard screen. Turn off the light after passing the sign.	10 points
On-site, detect randomly placed signs and correctly execute the corresponding task commands.	10 points
If the robot makes an error after recognizing a sign, such as incorrect voice announcement or incorrect action execution, it will be considered a fault.	-10 points per error

B. Scoring calculation

- i. If only part of the tasks are completed within the allotted time, the score will be calculated based on the tasks actually completed.
- ii. Participants with higher scores will be ranked higher; if scores are the same, the participant who took less time will be ranked higher.
- iii. If both the score and completion time are the same, the participants will be considered to share the same rank.

C. Disqualify

- i. Participants deliberately damage the competition field.
- ii. Participants refuse to follow the instructions of referees (judges).
- iii. Participants are reported for misconduct and the complaint is verified.
- iv. Participants take part in multiple competition categories.
- v. Robots are operated by remote control during the autonomous section of the competition.
- vi. Robots do not meet the size requirements.

9. Relevant Explanation

These rules serve as the basis for referee operations. During the competition, judges have the final decision-making authority. Any matters not explicitly covered by the rules will be determined by the judging panel through discussion.

IYRC· Bio Lab Challenge

1. Competition Background

General Secretary Xi Jinping emphasized during the third collective study session of the 20th CPC Politburo in 2023:

"We must strengthen national science popularization capabilities, implement actions to improve the scientific literacy of all citizens, disseminate scientific knowledge and showcase technological achievements through both online and offline channels, and cultivate a social atmosphere that loves and respects science. Upholding the spirit of 'Two Bombs, One Satellite,' the manned space program, and the lunar exploration program, we should enhance science education in the context of the 'double reduction' policy, inspire young people's curiosity, imagination, and desire to explore, and nurture a generation of youth with the potential to become scientists who are willing to dedicate themselves to scientific research."

This guidance forms the foundation for high-quality development of science popularization and scientific literacy in the new stage of development.

The IYRC Artificial Intelligence Literacy Science & Innovation Competition aims to enhance students' AI literacy through **science literacy education + practical activities**. By applying different sensors, the competition stimulates students' interest in AI perception modules, evaluates their ability to make decisions, execute programming tasks, and assemble functional systems. Using domestically produced chips, students experience a fully China-made approach—from manufacturing to innovation—gradually building cultural and national confidence.

2. Competition Overview

China's first Mars exploration mission was launched in 2016 to achieve orbiting, landing, and rover exploration of Mars. The Tianwen-1 spacecraft successfully launched on July 23, 2020, aboard the Long March 5 rocket from Wenchang, Hainan. On February 10, 2021, it completed Mars capture, becoming China's first artificial Mars satellite.

On February 24, the probe entered Mars orbit for about three months of orbital exploration, laying the groundwork for a successful landing. The Tianwen-1 landing made China the second country to successfully land on Mars. In the near future, humans are preparing for an interplanetary mission—“Mars colonization.”

(A) Competition Theme

Wandering Planet: Mars Colonization – Explore Everything, Create the Universe!

Students act as young scientists on the Martian surface to conduct life science experiments. Tasks include studying life signs and geological features to investigate the existence of life and future colonization conditions. Students will use microscopes, life science experimental kits, and other instruments to search for microbes, organic matter, and other potential life signs. Data from these tasks will support future space exploration and life-support system research.

Through these experiments, students deepen their understanding of life sciences, improve scientific literacy and practical skills, and contribute to humanity’s exploration of Mars and other planetary life signs. Careful sampling, observation, and analysis are required, along with use of experimental kits to detect organic molecules and other bio-signatures.

(B) Competition Content and Requirements

(1) Competition Content- Science Popularization Videos

- i. *“How Much Do You Know About Interstellar Exploration?”*
(AI tool usage)
 - Students propose meaningful questions about interstellar travel to an AI tool and organize the AI responses into a clear, logical summary.
- ii. *“Human Survival Plan”* (Science experiment operations)
 - Students select 1 topic from 8 preliminary experiment topics to record a video (max 5 minutes, MP4, ≤200 MB), showing experimental procedures and explaining principles.

Preliminary Experiment Topics – “Human Survival Plan” (Same for elementary and middle school groups)

- i. Color Code: Safe testing of food coloring
- ii. Acid-Base Magic: Natural anthocyanins
- iii. Vitamin C Exploration: Discovering vitamin C-rich fruits
- iv. Energy Tracking: Starch in food
- v. Perfect Food: Protein in food
- vi. Sweet Trap: Sugar content comparison
- vii. Freshness Test: Old vs. new eggs
- viii. Moisture Detection: Detect water-injected pork

(2) Competition Experiments

- i. Competitions include **intelligent science experiments and life** science experiments.
- ii. Sensors and development boards are not restricted (Arduino allowed).
- iii. Complete 2 randomly drawn tasks within the time limit using the experimental detection kits.

Theme – “Human Oasis Plan”

Elementary	Middle School
CO ₂ Planet	Mars Oxygen Production Plan
Mars Soil Exploration	Soil Remediation Plan
Mars Water Resources	Mars Planting Base
Temperature-Dependent Life	Mars Planting Program
Mars Fruit Harvest	Mars Animal Breeding Plan

Competition Tools

Students must bring their own experimental detection kits.

- i. Prohibited devices: USB drives, mobile phones, smartwatches, or other communication devices.

(3) Competition Rule

- Competitors draw a track containing 2 operational experiments.
- Start the timer at the beginning and complete experiments using the detection kits.
- Stop the timer, raise hand, and signal the referee for inspection, scoring, and recording.

(4) Competition Duration

Group	Time
Elementary	30 min
Middle School	30 min

- i. Complete all tasks within the specified time.
- ii. Stop experiments when time ends.

(C) Participation Format

- i. Two groups: Elementary and Middle School.
- ii. Each team: 1 student, up to 1 instructor

3. Scoring Criteria

(1) Preliminary Round

Indicator	Description	Score
Logic & Scientific Accuracy of AI Questions	Questions must be meaningful; AI responses logically organized, scientifically accurate, citing correct sources.	30

Experiment Design Accuracy	Each step follows correct scientific procedures, proper use of reagents and equipment.	10
Experimental Safety	Proper safety measures followed (PPE, handling hazardous materials, avoiding contamination).	10
Principle Explanation Logic & Accuracy	Clear explanation of purpose, principle, steps, and possible results.	40
Video Quality	Meets format and content requirements, accurate, complete, and correct length.	10

(2) Semi-Final / Provincial Round

Indicator	Description	Score
Experiment Design	Design feasible and reasonable experimental procedures.	20
Experiment Skills	Properly operate equipment, follow steps, adapt to issues.	40
Intelligent Detection Skills	Correctly operate detection tools, adapt to real conditions.	40
Experiment Results	Scientific and feasible design, producing correct results and accurate data.	160
Operation Time	Complete within the time limit: <12 min = 40 pts, 12-15 min = 30 pts, 15-30 min = 20 pts, >30 min = 0 pts.	40

4. Score Calculation

- i. If only part of the tasks are completed, scores are based on tasks actually completed.
- ii. Higher scores rank higher; if tied, higher life science experiment score wins; if still tied, shorter completion time wins.
- iii. If scores and time are identical, participants share the same rank.

5. Disqualification

- i. Arriving more than 10 minutes late.
- ii. Deliberately disturbing the competition.
- iii. Not following referee instructions.
- iv. Score of zero.
- v. Valid complaints upheld against participants.

6. Relevant Explanation

These rules serve as the basis for referee operations. During the competition, judges have the final decision-making authority. Any matters not explicitly covered by the rules will be determined by the judging panel through discussion.

IYRC· Energy Exploration

1. Scope of Participation

a. Competition Categories :

- i. Elementary School (7 to 12 years old)
- ii. Middle and High School (13 to 18 years old)

b. Number of Participants : Grouping (2 people in a team)

c. Competition Type: Task completion

2. Competition Theme

Energy Exploration

3. Competition Process

Competition Registration: Participants should register for the competition following the guidelines and schedule provided by the organizing committee. Successfully registered participants will be granted the qualification to participate in the competition.

4. Competition Structure

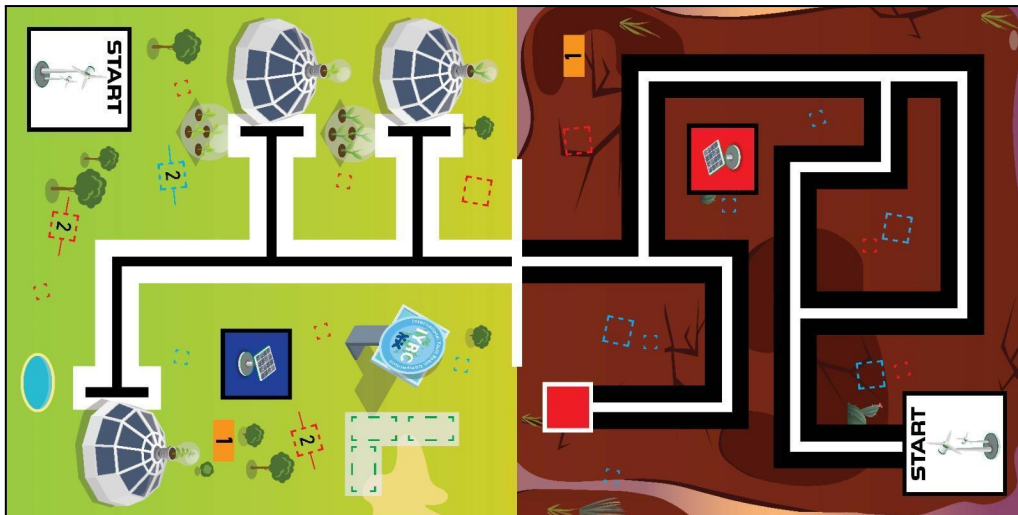
The competition is conducted in teams of two participants.

- **Elementary Group:** Both team members use remote control to exchange the blocks and push them to the designated location.
- **Middle and High School Groups:** One participant uses remote control to place the energy blocks on stations of different heights, while the other operates a line-tracing robot to activate the gate and stop at the designated station.

5. Elementary School (7 -12 years old)

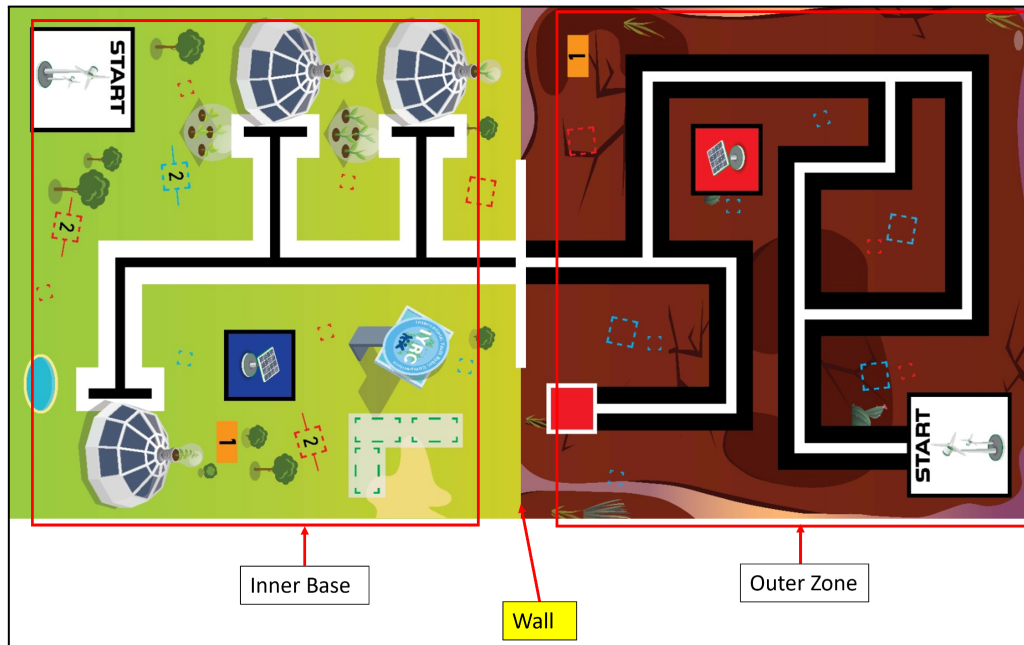
i. Competition Environment

1. **Robotic Kits:** MRT Series /CodeSpark Series
2. **Programming System:** Remote control robot , prebuild and pre program
3. **Coding laptop:** Participants need to bring their own laptop as well as the universal travel adapter.
4. **Prohibited devices :** USB Flash Drives, mobile phones, smartwatches, walkie-talkies etc.
5. **Competition game field:**

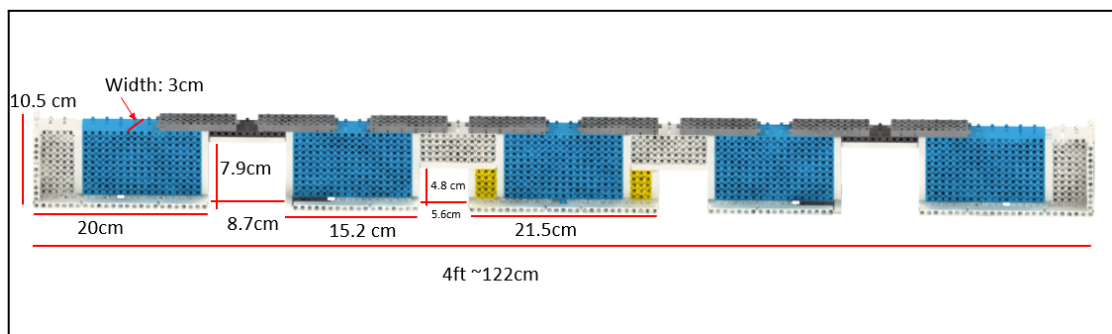


- i. The total size of the field is **2440mm (L) X 1220mm (W) ($\pm 5\%$)**.
- ii. There will be 2 zones: Outer Zone and Inner Base.
- iii. The robot needed to be positioned in the Starting Area of each zone and cannot exceed the outer black border before the starting of the competition.
- iv. The red and blue color dotted square is the initial position of the color energy blocks.
- v. Initial position of the energy blocks (3d printed):
 - a. **Outer Zone**
 - i. Big Red Energy Block (6x6x6 cm) : 1
 - ii. Big Blue Energy Block (6x6x6 cm) : 3
 - iii. Small Red Energy Block (3x3x3 cm) : 2
 - iv. Small Blue Energy Block (3x3x3 cm) : 4
 - b. **Inner Base**
 - i. Big Red Energy Block (6x6x6 cm) : 3
 - ii. Big Blue Energy Block (6x6x6 cm) : 1
 - iii. Small Red Energy Block (3x3x3 cm) : 4
 - iv. Small Blue Energy Block (3x3x3 cm) : 2
- vi. The orange box labeled 1 is the final stopping position of the robot.
- vii. The blue/red box, with solid color and solar power logo is the location of the Solar power plant. (**Final Destination of Small Energy Block**)
- viii. The starting box, marked with the Wind Turbine logo, has dimensions of 25 cm $\times$ 25 cm. (**Final Destination of Big Energy Block**)

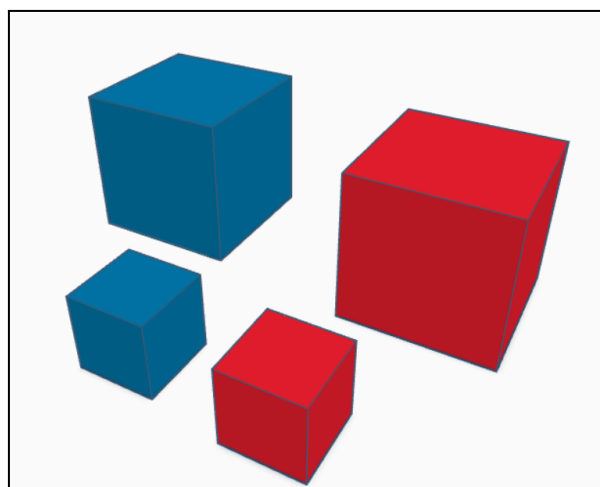
- ix. There will be a wall with 2 different size square hole that separate the inner base and outer zone.



The wall and the hole position



Dimension of the middle wall and hole



The 6x6x6cm cube (red and blue) and 3x3x3cm cube (red and blue)

ii. Robot Requirements

1. Each participant needs to have one remote control robot.
2. The initial size of the robot at the starting box shall not exceed 20cm (H) x 20cm (W) x 20cm (L).
3. Robots are ALLOWED to expand to any size after the game starts.
4. Each robot (in whole or in part) must be built using either the MRT Series or the CodeSpark Series kits. Only one series may be selected per robot, and mixing components from both series is not allowed.
5. The robot must not have any foreign parts (including rubber band, black tapes and scotch tapes).
6. Only allowed to use maximum up to 4 numbers of DC motors, 1 MRT Series or CodeSpark mainboard. There are no restrictions on using additional MRT/Code Spark series sensors if needed.
7. The robot needs to be able to control using a remote control. Participants need to prepare their own remote control and receiver.
8. The remote control receiver must be positioned where it can effectively detect signals from the remote control.
9. Robots shall not damage any part of the field or obstacles deliberately.
10. Total battery voltage cannot exceed 9V.
11. VAC (Volt of Alternating Current) power supplies are strictly prohibited for safety reasons.
12. If the players did not fulfill any of the requirements above, the player would be IMMEDIATELY disqualified.

iii. Competition Task

1. **Two players**, with one robot positioned at the Outer Zone and the other at the Base of their own gamefield.
2. Participants can switch on the robot first. Once the whistle is blown, the timer and game will start

simultaneously. Participants then only can control the robot.

3. The remote-controlled robots must be placed in the starting box (the box with a wind turbine) at both locations before the game begins.
4. During the game, the participant who remotely controls the robot shall keep distance with the game field area without touching, destroying or disturbing the game field.
5. During the game, participants cannot touch their robots or any of the items on the game field using their hands.
6. There will be a wall with different sizes of hole to separate the Outer Zone and Inner Base.
7. There will be two color (red and blue) blocks with two different sizes scattered at the Outer Zone and Inner Base. **The Outer Zone needs RED energy blocks and the Inner Base needs Blue energy blocks.**
8. The small energy block measures 3×3×3 cm, while the big energy block measures 6×6×6 cm. Both are 3D-printed using PLA material.
9. The blocks may only be **transferred through the holes in the wall**. Participants must align and position the energy blocks with the correct hole and push them into the next zone. However, it is not required that small blocks pass through the small holes or large blocks through the large holes.
10. Summary of the mission:
 - i. Exchange the color blocks with the team by using the hole on the wall.
 - ii. After exchange, push all the Big Blocks to Wind Turbines Station (Starting box) and Small Blocks to Solar Stations (Blue/Red box at each zone).
 - iii. The robot needs to stop at the orange box labeled 1 as each side. (Any part of the robot, not include wire, touch the oren box consider as success)
11. The timer will only stop when both of the robots stop at the ending box.

12. If the teammate did not come for the competition, the teacher **MUST** inform the organiser and can replace with any participants.
13. If a player who has played for two teams faces each other during a match, the helper will return to his/her original team, and another player which was eliminated in the starting round will replace.
14. If during the competition, the robot/robots cannot function or be controlled, participants can request referee help to restart the robot again. However, during this time, the timer will not stop.
15. Referee will only help to turn on and off the robot if:
 - i. The robot suddenly turned off.
 - ii. The robot cannot be controlled by remote control.

iv. Duration

Group	Specified task duration	Specified task chance
Elementary School Group	5 minutes /time	1

v. Scoring

1. The winner will be determined based on task completion and time taken.
2. If time runs out, the score will be determined based on the progress of mission completion, measured by the current mission score.
 - i. Successfully transfer the color blocks to the destination location. Big Blocks for Wind Turbines (Starting box) and Small Blocks for Solar Stations. The block must be fully inside the station (inside the inner border) .
 - ii. Every successful block, no matter big or small will count **20 points**.
3. If there are two teams with the same score and same duration, both teams will have the same rank.

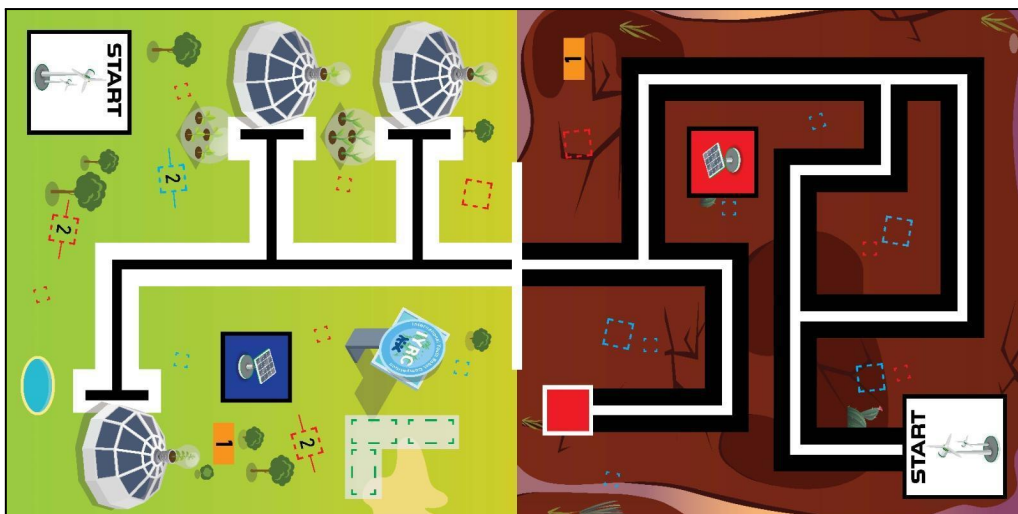
vi. Disqualify

1. Participants who are more than 10 minutes late.
2. Participants who intentionally damage the competition area.
3. Participants who do not follow the instructions of the referee (or judges).
4. Robots that do not meet the size requirements.
5. If the team did not present at the game field 2 minutes upon their turn.
6. Participants touch the robot, including fixing fallen or broken parts from the robot during the competition.
7. Participants touch the items on the game field during the game.

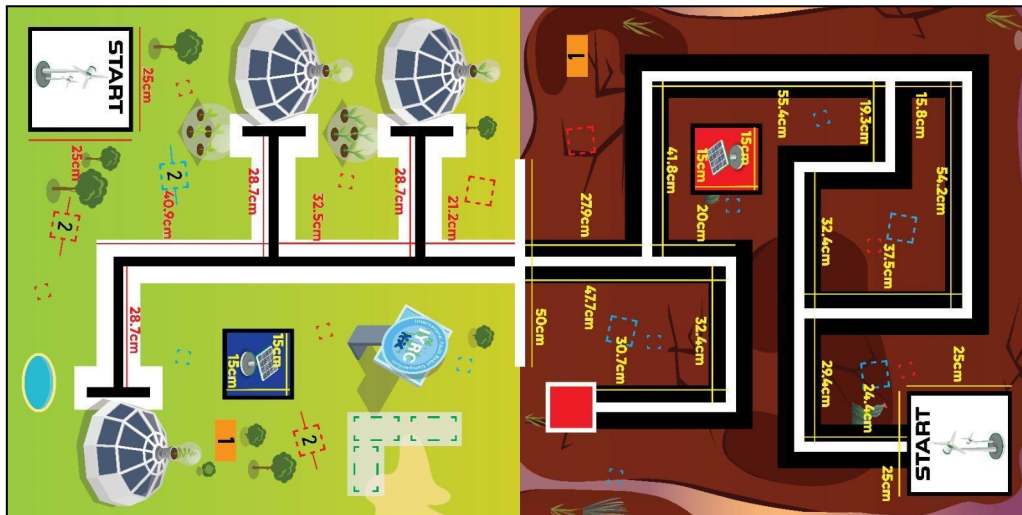
6. Middle and High School (13-18 years old)

i. Competition Environment

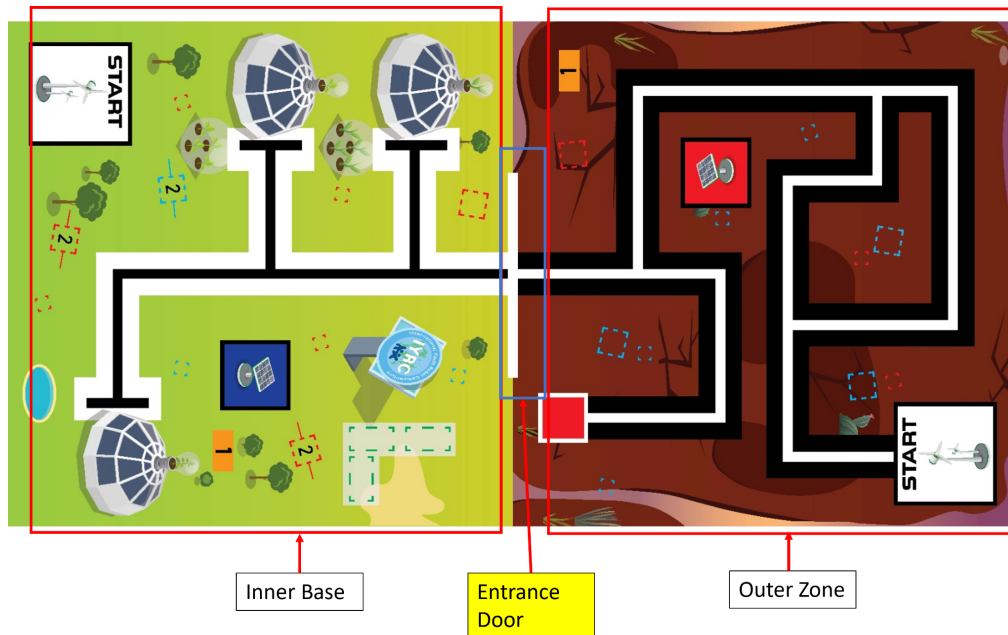
1. **Robotic Kits:** MRT Series /CodeSpark Series
2. **Programming System:** Remote control robot(pre build, pre programmed), line tracing robot (pre build, on-site programming, Block or python)
3. **Coding laptop:** Participants need to bring their own laptop as well as the universal travel adapter.
4. **Prohibited devices :** USB Flash Drives, mobile phones, smartwatches, walkie-talkies etc.
5. **Competition game field:**



- i. The dimension of the game field is 2440mm (L) X 1220mm (W) ($\pm 5\%$).
- ii. The line tracing track is black and white and has a width of 2 cm.
- iii. The starting box, marked with the Wind Turbine logo, has dimensions of 25 cm $\times$ 25 cm.
- iv. The entrance door is located in the middle of the game field, with a long white color line.
- v. **Checkpoints No 2** at the Inner Base are the position of the energy block for the remote control mission.
- vi. The Red box with the white border is the location for the Power Key Checkpoints.
- vii. The white boxes, with the green dotted line located at the Inner Base are the positions of the stations that need to restore the energy.



Game field with dimensions (With +- 0.5cm tolerance)



The position of the zones and the entrance door

ii. Robot Requirements

1. The initial size of the both robots at the starting box shall not exceed **25cm (H) x 25cm (W) x 25cm (L)**.
2. Both Robots are **ALLOWED to expand** to any size after the game starts.
3. Only **MRT Series or CodeSpark series robot kits** and parts are to be used to build the robot. There is no limitation to the number of blocks used to build the robot.
4. The two robots can use different series and blocks to build, for example: Line trace using MRT UNO series and remote control using CodeSpark Series.
5. The robot needs to be able to control using a remote control. Participants need to prepare their own remote control and receiver.
6. Only allowed to use maximum up to 4 DC motors, 5 IR sensors or 1 tracer board and 1 mainboard.
7. The usage of other MRT UNO / CodeSpark series sensors such as servo motors, color sensors and so on are allowed, with no limitation amount, based on requirement.
8. Robots shall not damage any part of the field or obstacles deliberately.
9. Total battery voltage cannot exceed 9V.

10. VAC (Volt of Alternating Current) power supplies are strictly prohibited for safety reasons.

iii. Overall competition Task

1. Team members in each group must be between **13 and 18 years old**. There is no requirement for members of the same age to be paired together.
2. Participants will be quarantined and given maximum 1 hour to program, modify or test their robot. Tables and seats will be prepared for those participants who wish to modify programming on the spot.
3. Since this is a grouping competition, the team members will sit together and tune the robot.
4. No more programming or modification of the robot is allowed once the time is up.
5. Some missions will be announced on the spot, during the testing session.
6. Upon being called, participants should place their robot completely in the starting box. Participants are allowed to start (switch on) the robot using single switch operation and the timer will start once the robot moves after the whistle has been blown as a sign of the start of the match.
7. The robot must always stay in the start box (Box with wind turbine) before the game starts.
8. The robot must always be able to perform line tracing, follow the black line track or white line track. The robot must not deviate from the black line and white line for more than 2 seconds
9. When starting, both of the robots need to start simultaneously.
10. During the game, participants are NOT ALLOWED to touch or hold the robot.
11. Each match is stipulated for one round with 2 attempts. However, the game may end before the 5 minutes if:
 - All the tasks have been completed and both of the robots successfully return and stop at the ending position.
 - Disqualification of participants.

- When the referee judges that continuation of the match is impossible. (eg. Robot did not move/stuck for more than 10 seconds)
- Two attempts had been used up.
- The robot is stuck at a certain mission and cannot function.

iv. Line Tracing Mission

1. **There are two zones:** Outer Zone and Inner Base. In the Outer Zone, the line tracing track is white with a black border. In the Inner Base, the line tracing track is black with a white border.
2. The entrance door from the outer zone to the inner base is closed at the beginning of the match.
3. Robots need to be able to follow the line in each zone to complete the mission.
4. The robot needs to be fully placed in the starting box (box with the wind turbine) before the game starts.
5. Participants can turn on the robot first and when the referee announces the starting of the match, participants can activate the robot by using a single button press.
6. The robot needs to follow the line to activate one Power Key Checkpoints, which are located in the red box with white border.
7. The Power Key Checkpoints consist of a tower equipped with one IR sensor and one LED. Besides, it also connects to the gate.
8. The height of the **IR sensor is 2 cm** from the ground.
9. When the robot touches the IR sensor, the LED will light up and the door will be open.
10. Before the door opens, robots are not allowed to touch/hit the door directly. Else, the robot will be directly taken out and the line tracing mission will be ended. However, the remote control mission still can proceed.
11. The line-tracing robot must continue following the line to the Inner Base and stop at one of the three stations.

12. **The Ending station will be announced on the spot, during the 1 hour testing time.**
13. When the robot fully stops at the Ending station (50 % and above), then the mission is complete for the line tracing robot.



Powerkey Checkpoint



When Powerkey is activated

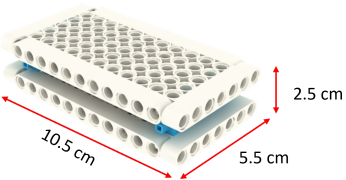
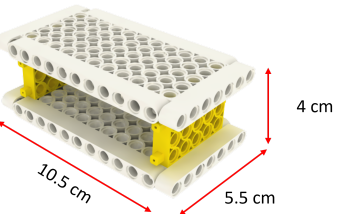
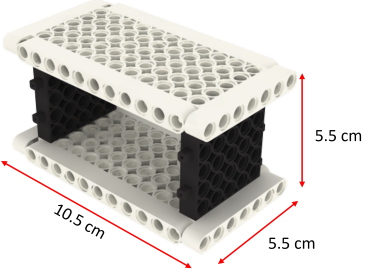
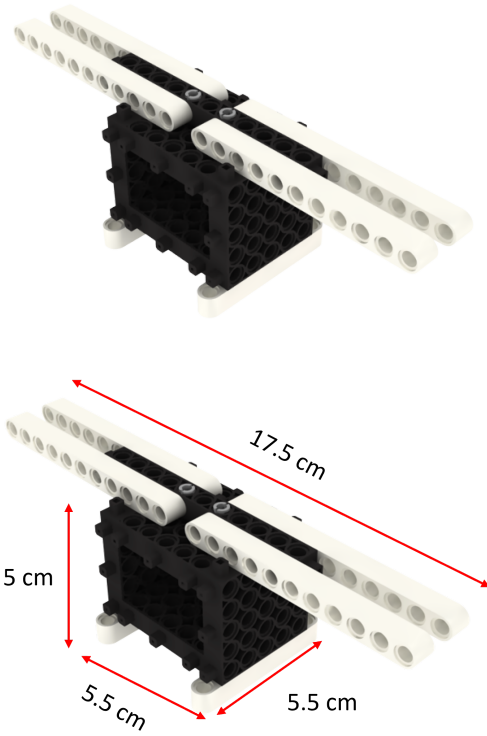


Gate at the closing state

v. Remote Control mission

1. The remote control robot will only stay in the **Inner Base.**
2. The robot needs to be fully placed in the starting box (box with the wind turbine) before the game starts.
3. Participants can turn on the robot first and when the referee announces the starting of the match, participants can activate the robot by using the remote control.
4. When the referee announces the start of the match, the remote-controlled robot begins its missions simultaneously with the line-tracing robot.

5. The remote control robot needs to restore three energy blocks located at Checkpoint No.2 to the different height stations located in the white box.
6. The energy block must be placed on the station, regardless of placement method or orientation.
7. **The position of the station will be only announced on the spot.**
8. One station is only allowed one energy block.
9. Then the robot needs to be stopped in the starting box (50% and above) to indicate the completion of the mission.

		
Station 1	Station 2	Station 3
		
Energy Block at the Checkpoint 2 that need to be transfer		

vi. Duration

Group	On-site programming duration	Specified task duration	Specified task chance
Middle and High School Group	60 min	5 minutes /time	2
1. On-Site Programming and Debugging Duration: During this time, all teams in each group will perform programming and debugging simultaneously. 2. Task Duration: The robot must complete all tasks within the specified time. If not all tasks are completed within the time limit, scores will be based on the completed tasks. 3. Competition Runs: Each robot will compete in two consecutive runs. The better score of the two will be considered the final result.			

vii. Scoring

1. The score for the team is based on two parts, Line tracing and Remote control.

Task	Score
Line tracing: Able to activate the Power Key Checkpoints:	10 marks
Line tracing: Open the gate	10 marks
Line tracing: Stop at the correct station (Announce on the spot)	20 marks
Remote control: Successfully restore energy blocks, one station one energy block	20 marks each
Remote control:	20 marks

Successfully stop in the starting box (50% of the robot need to be inside the box)	
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2. If the robot gets stuck at a certain mission and cannot move during the game, the score will be based on the missions already completed.
3. The winner is based on mission completion and time taken.
4. Each team has two attempts, and only the higher score of the attempt will be recorded as the final result.
5. The result will be focused on task completion then followed by timing.
6. If more than one group achieves the same score, the ranking will be determined based on the time taken to achieve their highest score.
7. If both the score and time (from the highest-scoring attempt) are still the same, both of the teams will have the same rank.

viii. Disqualify

1. The line tracing robot is not following the track.
2. The line tracing robot deviated from the track for more than 2 seconds.
3. Not show up for 10 minutes upon calling.

7. Relevant Explanation

These rules serve as the basis for referee operations. During the competition, judges have the final decision-making authority. Any matters not explicitly covered by the rules will be determined by the judging panel through discussion.