

# Rules RoboRAVE International Challenges

## 06.06.2026



Valid for all events in 2026; including the  
RoboRAVE Global in Osaka Japan

|                                                 |    |
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## Global Event Osaka Japan 2026

**"RoboRAVE World Championship Osaka, Japan 2026"**  
General rules of the event "discipline"

## Global Event Houston, Tx. USA 2027

**"RoboRAVE World Championship USA 2027"**  
General rules of the event "discipline"

## Goal

To hold the best possible event in peace and harmony with all guests, visitors, and our RoboRAVE International family.

General Guidelines:

General rules of respect and discipline within the venue:

- The consumption of alcoholic beverages is not permitted inside the event venue.
- All applicable laws and regulations in force at the event location must be observed.
- Anyone who destroys or damages the event infrastructure must compensate for the damage and, at the discretion of the Event Director or the committee, may be suspended or expelled from the event.

**Note:** Any situation not described in this reference manual will be evaluated and resolved by the Event Director or the acting Committee.

General Rules:

- Any issue to be addressed must be submitted in writing to the Director or the Organizing Committee, avoiding any misconduct toward track marshals, referees, or event judges.
- Any person who confronts, assaults, or harasses a track marshal, referee, or event judge may be warned, sanctioned, or removed from the event, as deemed appropriate by the Event Director or the Organizing Committee to ensure the proper development and continuity of the event.
- Everyone's behavior must be friendly and respectful at all times, in accordance with the core values of RoboRAVE International:
  - Have fun while learning
  - Sharing
  - Teamwork
  - Respect
  - Responsibility

Without further ado, we take this opportunity to express our recognition and highest consideration for all participants in this event.

Sincerely,  
**Organizing Committee**  
**RoboRAVE International Inc.**



## 1. a-MAZE-ing

### a-MAZE-ing Challenge Rules



#### Goal

Design, build, and program a robot that can follow an elevated wooden maze without falling off. Completing the maze before the time limit adds bonus points to the team's score.

#### Who Can Participate

Teams participating in this challenge are:

- Elementary School (ES)
- Middle School (MS)
- High School (HS) – occasionally

**Note:** If fewer than 5 teams are registered in any division, the Event Director has the option to combine divisions.

#### Requirements

**Robot:** Autonomous robot, any platform (Lego, Abilix, Vex, Makeblock, Arduino, ESP32, Etc.), with a maximum value of  $\leq$  USD \$1,500.

Must pass registration by performing basic operational movements required for this challenge.

Gyro sensors are prohibited.

#### Physical Check-in Procedure:

The robot must be able to move, without external sensors or remote control, as follows:

- Move forward any distance,
- Then make a turn in any direction of  $-45^\circ$  or more,
- Then move forward any distance.

The robot may not use any external sensors to help it follow the maze; however, wheel encoders are allowed.

Only robots with a minimum of two wheels and one caster (pivot or free) wheel are permitted.

- 1) The robot's volume must be  $\leq 65030 \text{ cm}^3$ . [Click Here for the Video!](#)

### General Rules

- The Event Director will establish the number of official runs allowed and how many of those official runs will count toward the aggregate score used to determine the top 8 teams that advance to the Finals at the Event.
- The robot has 2 minutes to complete the maze, with the clock counting down from 120 seconds.
- Teams may practice as much as needed, sharing the tracks with other teams that also need to practice.
- If the track is needed for an official run, practice teams must yield the track.

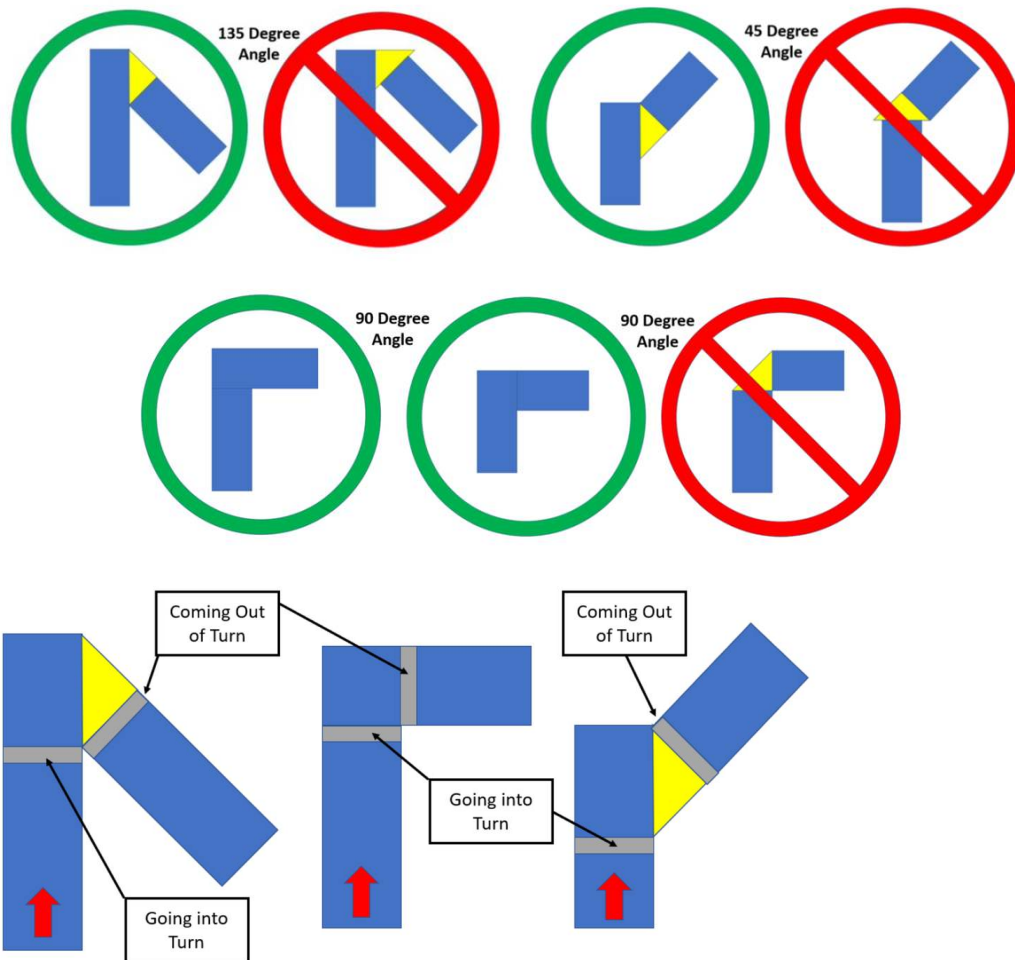
### Challenge-Specific Rules

- If the robot falls off the maze before reaching the finish line and there is still time remaining, return it to the starting line and attempt to complete the maze again.
- A robot is considered to have fallen off the maze when any of its wheels is COMPLETELY off or makes contact with the surface supporting the track.
- Gyro sensors are prohibited.

**Track:** All challenge dimensions are approximate.

### Physical Events:

- All a-MAZE-ing tracks will have a design as close as possible to the standard and will be built using particle board (or a similar locally sourced material) that is 24 cm wide and 2 cm high.
- Multiple lengths based on the division, with angled turns in any direction of  $-45^\circ$ ,  $-90^\circ$ , and  $-135^\circ$ .



Regardless of the method used to join the pieces, **every effort must be made** to ensure that the tracks are as smooth and free of irregularities as possible.

- **ES Division** has 4 straight sections and 3 angled turns, for a total of **500 possible points**.
- **MS Division** has 6 straight sections and 5 angled turns, for a total of **800 possible points**.

Depending on the Event space and the materials available, both divisions may run on the longer MS track. In that case, the **ES Division finish line** will be located somewhere between the **third and fourth angled turns** of the MS track.

#### Materials, Track Pattern, and Assembly Details:

- **Track material:** Particle board, low-density fiberboard, MDF, or plywood.
- **DESIGN for your event:** There is **NO fixed design** — your choice, as long as the **3 angled turns** are provided.
- **Angled turns:** The hypotenuse is placed against the straight leg from which the robot turns.

### Securing the track to the floor:

- Use **5 cm (2 in) wide tape**.
- Secure to the floor, up and over each segment joint.
- Attach both ends.
- The track surface must be **SMOOTH**.
  - **Not smooth? Do it again!**

### Scoring lines (the **FRONT primary wheels** must touch the line to score points):

- Draw lines across each segment:
  - ~20 cm from the end of each straight segment
  - ~10 cm into the angled turn
- Mark an area around each track that is **FOR PLAYERS ONLY**:
  - Tape a bright rectangle around the track area.

### Track layout: Two challenges

- **ES** uses the first **3 complete legs** plus crossing into the **4th leg**.
- **MS** uses the **entire track** with **9 angled turns**:
  - Include at least **one 45° angled turn** and **one (1) 135° angled turn** for the ES section.

### Double-check your completed track for:

- Tape smoothness
- No raised edges between boards

## Scoring

- Each completed straight section is worth **50 points**.
  - A straight section is considered completed when the **front wheels** make contact with the scoring line marked on the track.
- Each completed angled turn is worth **100 points**.
  - An angle is considered completed when the **front wheels** make contact with the scoring line marked on the track.

- **ES Division** has 4 straight sections and 3 angled turns for a total of **500 possible points**.
- **MS Division** has 6 straight sections and 5 angled turns for a total of **800 possible points**.

If the robot does not complete the maze before time runs out, the score awarded will be for the **most completed section** of the track.

If the robot completes the maze before time runs out, the score will be the **maximum score for its division**, plus **bonus points**:

- **1 point for each whole second remaining.**
  - (Example: if **3.14 s** remain, **3 bonus points** are awarded; if **12.94 s** remain, **12 bonus points** are awarded.)

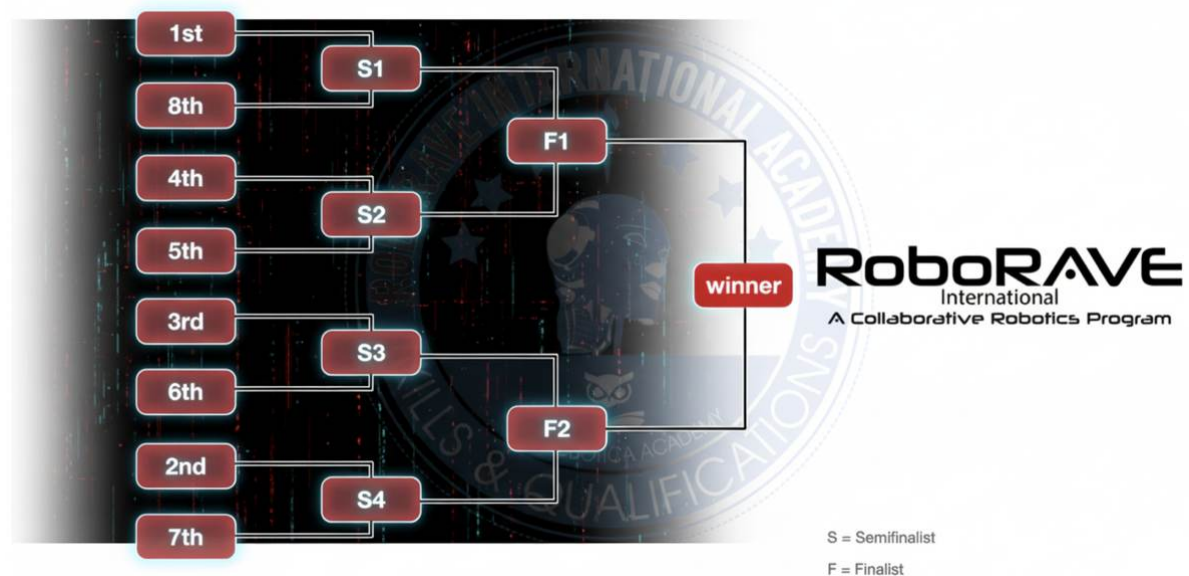
## Tournament Scoring

- The **top eight teams** in each division will advance to the **final stage** of the event.

Ties will be broken based on **PERFORMANCE-BASED CRITERIA** chosen by the Event Director. For example, using the **highest single-run score** among all tied teams.

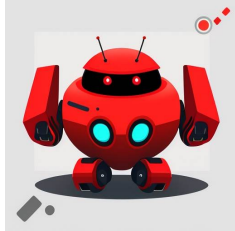
Teams that advance will be **seeded** into the tournament bracket according to their achieved score (see bracket below).

The **runners-up** are used to determine **3rd and 4th place** based on the results of the semifinals.



## 2. SumoBot (LEGO/VEX IQ & OPEN)

### SumoBot Challenge Rules



#### Goal

Design, build, and program an **autonomous robot** that can search for and push an opposing **Sumo robot** off an **elevated fighting ring**.

#### Divisions / Weight Classes:

Refer to the table below to decide which **division / weight class** you want to compete in.

| LEGO/VEX IQ | Open       | Open       |
|-------------|------------|------------|
| <b>1Kg</b>  | <b>1Kg</b> | <b>3Kg</b> |
| <b>ES</b>   | <b>ES</b>  | <b>**</b>  |
| <b>**</b>   | <b>MS</b>  | <b>MS</b>  |
| <b>**</b>   | <b>HS</b>  | <b>HS</b>  |
| <b>**</b>   | <b>UP</b>  | <b>UP</b>  |

**\*\* These categories may be added at the discretion of the Event Directors.**

**Note:** If fewer than 5 teams are registered in any division, the Event Director has the option to combine divisions.

## Requirements

Autonomous robot, any platform, with a cost of **USD \$1,500 or less**, and compliant with the following design restrictions, which will be verified during robot check-in:

#### [LEGO/VEX IQ] ES

**1 kg ES, MS/HS/UP ok to use LEGO VEX**

**3kg MS, HS/UP ok to use LEGO VEX**

- The robot's maximum size is **25 cm x 18 cm**, with **no height restriction**, measured with any articulated component in its **starting position**.
- Size and mass restrictions are **strictly enforced throughout the entire event** to ensure fair competition for all participants.
- Articulated or moving components are allowed as long as they comply with the design rules above; however, the **no intentional damage** rule applies. This means fins and sliding plates are okay, but deliberately destructive mechanisms (such as abrasive rotors, hammers, etc.) are **not allowed**. Sumo robots must not have sharp parts or any parts that may cause injury.
- **Competition ring (track/arena):** A **black (or white) circle** with a **100 cm diameter**, with a **5 cm white border**, on a board **13 to 20 mm thick**. The ring surface must be elevated **50 to 80 mm** above the floor. (*Measurements may vary slightly depending on locally available materials.*)

## General Rules

- Each robot will compete in a series of **round-robin matches**. The number of rounds/matches will be determined on competition day based on the available time and the number of robots in each category.
- A match ends once a team has won **two times** against its opponent. **3 points** are awarded for a win, **1 point** for a tie, and **0 points** for a loss.
- Team points will be tallied and displayed during the competition. The **top 8 teams** in each category will be selected for the final matches.
- Teams may practice on open rings, taking turns with other teams that need to practice.
- The loser is the robot that leaves the ring first, defined as **touching the surface** on which the competition ring is placed. The referee may call a tie after **60 seconds**, or may force a restart after **5 seconds of "robots locked"**, at their discretion.
- Robot handlers must not touch their robots unless instructed by the referee. **Three (3) minutes** are allotted per match; if there is no winner within this time, the match will be scored as a **tie**.
- **Conflict resolution:** During gameplay, the referee's decisions are final.

## Robot Activation Protocol

- Only **one (1) team member** may approach the arena to activate the robot.

## Starting Position Requirements

- Robots are placed on the **markers designated by the referee**.

- Team members confirm the area is clear and signal to the referees that they are ready.
- After mutual confirmation, the referees perform a countdown and the match begins.

## Movement rule after activation (manual start)

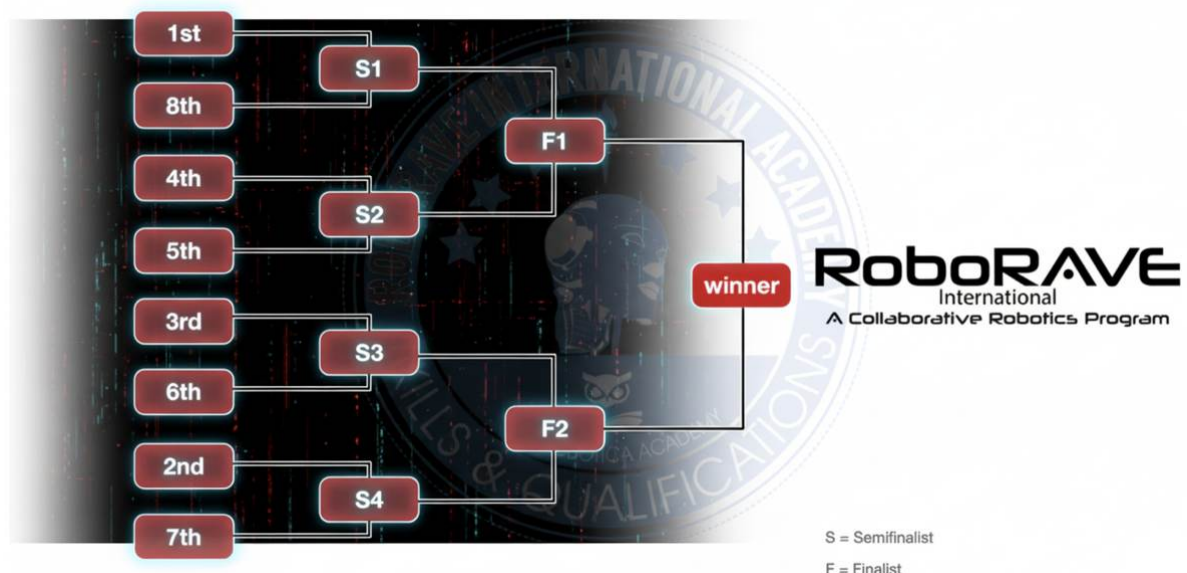
- Robots start back-to-back at the center, wait 3 seconds, go to the edge, touch the edge, then begin fighting.

## “Falling” Criteria

- **Partial contact with the floor = a fall** (the round ends).
- **Floating/suspended** (no contact with the floor) = the round continues.

## Tournament Scoring

- Typically, we organize tournaments for the **top 8 teams**. However, if there are more than 8 teams due to ties, the Event Director may expand the tournament to **12 or 16**, or may run a tiebreaker tournament to reach **8, 12, or 16 teams**.
- Teams that advance will be **seeded** into the tournament bracket according to their **overall score**. Below is an example of our typical **8-team tournament bracket**.
- The **runners-up** play for **3rd and 4th place** based on the results of the semifinals.



### 3. Line Following

#### Line Following Challenge Rules



##### Goal:

Design, build, and program a **line-following robot** that can (within **three minutes**) follow a **black line on a white background** to a tower and deliver at least **one (1) ball**, then return to its starting point. Then, in the remaining time, return to the tower (as many times as needed) to deliver an exact required number (**no more and no less**) of balls according to your team's division requirements.

#### Who Can Participate

Teams in this challenge compete in separate divisions:

| [LEGO/VEX IQ] ES | [Open] ES/MS, HS/UP |
|------------------|---------------------|
| <b>ES</b>        | <b>ES</b>           |
| <b>MS</b>        | <b>MS</b>           |
| <b>**</b>        | <b>HS</b>           |
| <b>**</b>        | <b>UP</b>           |

- Elementary School (ES)
- Middle School (MS)
- High School (HS)
- University / Professional (UP)

**Note:** If fewer than 5 teams are registered in any division, the Event Director has the option to combine divisions.

## Requirements

**Robot:** Autonomous robot, any platform, with a cost of **USD \$1,500 or less**, and compliant with the following design restrictions, which will be verified during **Check-In**.

*[LEGO/VEX IQ] ES*

*[Open] ES/MS, HS/UP*

- The robot must demonstrate that it is running a **line-following program** on a test track.
- The robot must demonstrate that it will **stop upon reaching the tower**; it does **not** have to demonstrate the ability to drop a ball or turn around.
- Multiple sensors and processors are allowed.
- The robot's volume must not exceed **65,030 cm<sup>3</sup>**. [Click Here for the Video!](#)

## General Rules

- The Event Director will establish the number of official runs allowed and how many of those runs will count toward the aggregate score used to determine the **top 8 teams** that will compete in the Tournament.
- The robot has **3 minutes** to complete the tasks.
- A **line-following program** must control the robot's movement at all times.
- Only players may operate and handle the robot during the run. Remember: *"Players play, coaches coach, parents cheer."*
- The tower may not be touched by any person during payload delivery.
- No person may remove balls from the tower during payload delivery.
- Touching the robot at any time requires it to be picked up and returned to the start.

## Challenge-Specific Rules

**Tower (dimensions are approximate and may vary slightly)**

All divisions use the same tower: **20 cm tall x 10 cm wide x 35 cm long**, with a **10 cm x 10 cm opening** on top and an **open back** to allow balls to roll through during delivery. The tower is secured to the track with a strip of **Velcro tape**.

If a track monitor sees a team touch or reach into the tower, the challenge will be stopped and the team will receive **only 400 points** for completing the challenge track, regardless of how many balls were delivered.

## Track

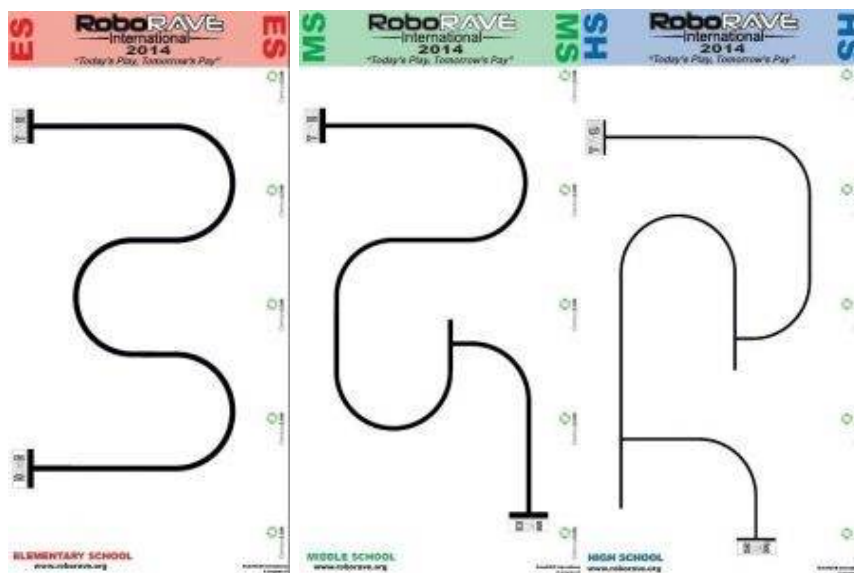
Tracks are typically printed on durable paper, PVC vinyl backing, or Trovicel; the **Line Following** challenge track is **3 mm** and measures **120 cm x 180 cm**.

- **Elementary Division:** No intersections, **1.25 cm** black line
- **Middle School Division:** One intersection, **1.25 cm** black line
- **High School & Big Kid Division:** Two intersections, **0.75 cm** black line

A new design is created each year.

- There will be a minimum of **20 cm of straight line** leading to the tower.
- The line will be no closer than **10 cm** to the edge of the track or to any other line.
- Printed ads or instructions may be placed anywhere on the track surface, but must be at least **10 cm** from any line.
- Curves may have different or changing radii, but no part of any curve may have a radius smaller than **15 cm**.

## Example Tracks / Fields



The tracks shown are an example. The design changes every year and is revealed on the first day of an event.

## Other Significant Items

- The challenge may be run in areas with **natural lighting**, which can change track lighting conditions. Teams must be prepared to design around this natural condition.
- Event Directors may use the **HS track** or create a more difficult challenge track for the **UP division**. In addition, the tower opening may be reduced in size for the UP division.

## Scoring

Overall score is a combination of points earned from:

- Running the track to the tower
- Delivering at least one ball
- Returning home
- Delivering the required number of balls

Each division will have a required number of balls to deliver. The numbers will be posted at the event. The division numbers must be chosen within these ranges:

- **Elementary School:** 75 to 125
- **Middle School:** 125 to 200
- **High School:** 200 to 250
- **University/Professional:** 100 to 350 (*keep in the lower range if the tower opening is reduced*)

Refer to the scoring matrix for your division below for details on the points awarded during your first trip to the tower and back.

### A Successful Run Is Defined As

The robot travels the track from home to the tower, drops at least **one (1) ball**, and travels the track back home. These balls are removed and **do not count** toward bonus runs.

### Bonus Ball Runs

After completing all elements above, you may perform Bonus Ball Runs:

A Bonus Ball Run is when the robot travels the track from home to the tower and delivers the exact required number of balls for your division. During bonus ball runs, the robot does **not** have to travel from the tower back home.

## Bonus Ball Delivery Scoring

- If the number of balls delivered is **less** than the required number, that number is your bonus ball score.
- If the number of balls delivered is **greater** than the required number, the extra balls will be **subtracted** from the required number, resulting in your ball count score.

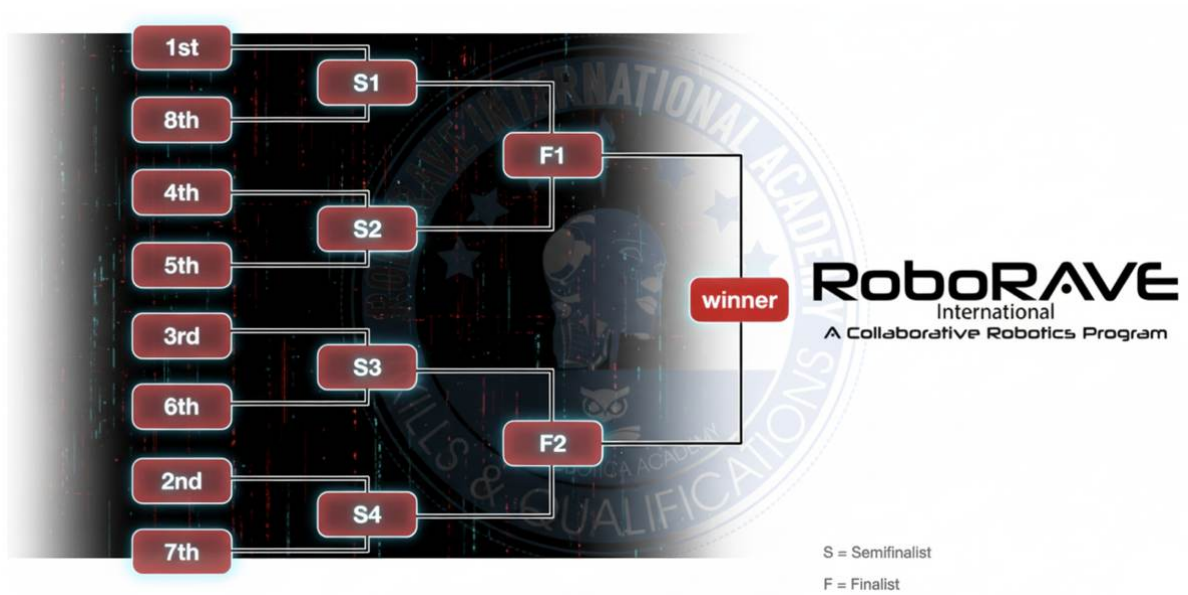
### Scoring Matrix:

|              | Leaves Home | Turns at 1 <sup>st</sup> "T" | Turns at 2 <sup>nd</sup> "T" | Stops at Tower | Delivers a Ball |
|--------------|-------------|------------------------------|------------------------------|----------------|-----------------|
| <b>ES</b>    | 50          | N/A                          | N/A                          | 100            | 100             |
| <b>MS</b>    | 25          | 25                           | N/A                          | 100            | 100             |
| <b>HS/UP</b> | 25          | 25                           | 25                           | 50             | 100             |

|              | Starts Back Home | Turns at 1 <sup>st</sup> "T" | Turns at 2 <sup>nd</sup> "T" | Returns Home | Total |
|--------------|------------------|------------------------------|------------------------------|--------------|-------|
| <b>ES</b>    | 50               | N/A                          | N/A                          | 100          | 400   |
| <b>MS</b>    | 25               | 25                           | N/A                          | 100          | 400   |
| <b>HS/UP</b> | 25               | 25                           | 25                           | 100          | 400   |

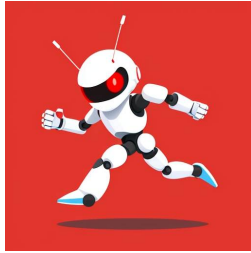
## Tournament Scoring

- The **top eight teams** in each division will compete in the **final tournament**.
- Teams that advance will be **seeded** into the tournament bracket according to their **total score** (see bracket below).
- The **runners-up** play for **3rd and 4th place** based on the results of the semifinals.



## 4. FastBot

### FastBot Challenge Rules



#### Goal:

Design, build, and program a **line-following robot** that can follow a **black line on a white background** around a **closed-loop race track** for a specified number of laps, according to the requirements of your team's division. **Middle School and higher divisions may include intersections.**

## Who Can Participate

Teams competing in this challenge participate in the following divisions:

- Elementary School (ES)
- Middle School (MS)
- High School (HS)
- University / Professional (UP)

**Note:** If fewer than 5 teams are registered in any division, the Event Director has the option to combine divisions.

## Requirements

**Robot:** Autonomous robot, any platform, valued at  $\leq$  **USD \$1,500**, and compliant with the following design restrictions, which will be verified during **Check-In**.

#### Registration / Check-In:

- An **IR sensor must be coded and used** to track the line throughout the entire challenge (**REQUIRED**).
- The robot must demonstrate that it is running **line-following code** on a test track.
- The robot's volume must be  $\leq$  **65,030 cm<sup>3</sup>** [Click Here for the Video!](#)

- The robot **must have and use IR sensors** to track the line throughout the challenge.

## General Rules

- The Event Director will establish the **number of official runs allowed** and how many of those runs will count toward the **aggregate score** used to determine the **top 8 teams** that will compete in the tournament.
- Divisions may compete on the **same track** with an increasing number of required laps, **or** on **different tracks** with increasing difficulty based on track design (e.g., line width, number of intersections, etc.).
- The score for each run is the **elapsed time in seconds and hundredths of a second** (e.g., **3.52 seconds**).
- The robot has **3.00 minutes** to complete the run. Any robot that exceeds three minutes will be assigned a **maximum time score of 180 seconds** for that run, with **zero (0) bonus seconds** awarded.
- A **line-following program using an infrared (IR) sensor** must control the robot's movement **at all times (REQUIRED)**.
- **Only players** may operate and handle the robot during the challenge. Remember: *"Players play, coaches coach, parents cheer."*
- **Touching the robot at any time** ends the run and results in the **maximum time score (180 seconds)**.

## Challenge-Specific Rules

### Track:

- Tracks are typically printed on **durable paper** or **PVC vinyl backing**.
- The **FastBot (robot racing) challenge field** measures approximately **115 cm x 150 cm**.

### Elementary School Division:

- No intersections
- Black line **1.25 cm** wide

### Middle School Division:

- Up to **one intersection**
- Black line **1.25 cm** wide

### High School Division:

- Up to **two intersections**
- Black line **0.75 cm** wide

### University / Professional Division:

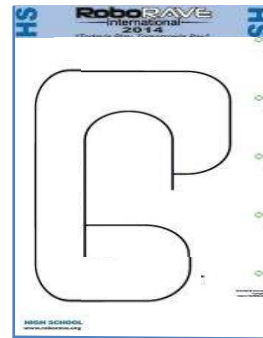
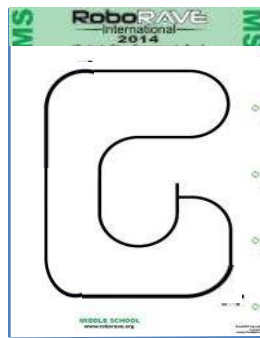
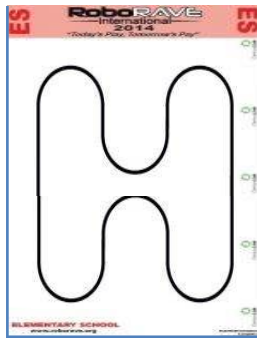
- **Two or more intersections** of different styles
- Black line **0.75 cm wide or thinner**
- Line may be **solid, dashed, broken, or a different color**

### Alternative Options:

- Use the **HS track** with a **higher lap requirement, or**
- Create an **ADVANCED track** with higher-difficulty elements, which may include:
  - Dashed or broken lines
  - Multiple colors
  - Circular turns
  - Variable line widths
  - Variable line ink saturation
- The line will be **no closer than 10 cm** to the edge of the track or to any other line.
- Advertisements or printed instructions may be placed anywhere on the track surface but must be at least **10 cm away from any line**.
- Curves may have **different or changing radii** on any division track.
- The **UP lane** is the same as the **HS lane**, **BUT** it may include a greater variety of intersections, colors, and line types (dotted, dashed, thick lines).

### For physical events:

- The challenge may take place in areas with **natural lighting** on the tracks, which can change lighting conditions. Teams must be prepared to **design for and adapt to natural lighting variations**.

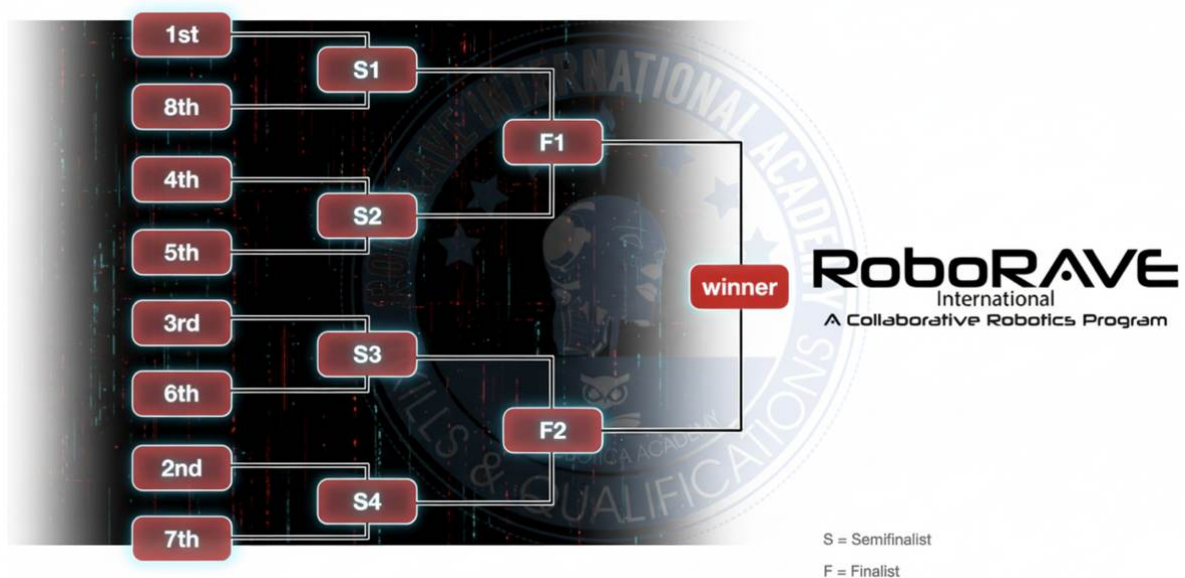


## Scoring

- The score for each run is determined by measuring the **elapsed time from start to finish in seconds and hundredths of a second (000.00)**.
- A **maximum score of 180.00 (full 3 minutes in seconds)** will be recorded for any run that does **not finish within the three-minute (3.00 min) limit**.
- A **maximum score of 180.00 (full 3 minutes in seconds)** will also be recorded if **any team member touches the robot** during the challenge.

## Tournament Scoring

- The **top eight teams** in each division will compete in the **final tournament**.
- Teams that advance will be **seeded** into the tournament bracket according to their **total score** (see bracket below).
- The **Runner-Up** is used to determine **3rd place** based on the results of the semifinals.



## 5. Alpine Bot Challenge

### Alpine Bot Challenge Rules



#### Goal

Design, build, and program a robot that can climb a steep ramp, get up onto the top of the table (flat surface), and place a flag in the target zone. Completing the challenge before the time limit ends adds bonus points to your score.

## Who Can Play

Teams in this challenge compete in separate divisions:

- Elementary School (ES)
- Middle School (MS)
- High School (HS)
- University / Professional (UP)

**Note:** If fewer than 5 teams are registered in any division, the Event Director has the option to combine divisions.

## Requirements

Autonomous robot, any platform, with a cost of **USD \$1,500 or less**, and compliant with the following design restrictions, which will be verified during **Check-In** or on the track.

### Check-In

**SAFETY is the #1 PRIORITY.** If, during operation, someone raises a concern and the judge and/or challenge coordinators confirm it, the robot will be stopped, inspected regarding the stated concern, and modified to address it as raised. This evaluation will be performed by judges and/or the challenge coordinator(s). If the robot is deemed safe, it will be allowed to continue. If it is not safe, a reasonable amount of time will be provided to achieve compliance. If the robot cannot be made safe, it will be removed from the challenge. The final decision rests with the challenge coordinator(s) to allow, require modifications to, or remove the robot.

**No**

- Flying robots
- Secondary robots

## Yes

- Multiple sensors and processors are allowed, within the cost limit
- Must climb the ramp
- May use the edge of the ramp
- May drive up the ramp

The robot's volume must not exceed **65,030 cm<sup>3</sup>** in its starting configuration. [Click Here for the Video!](#)

It is also mandatory that the robot must fit within a maximum dimension of 60 cm on any side.

## General Gameplay and Scoring Rules

- The Event Director will establish the number of official runs allowed and how many official runs will count toward the aggregate score used to determine the **top 8 teams** that will compete in the tournament.
- Refer to the scoring matrix below for point values for each part of the challenge.
- The robot has **2 minutes** to complete the challenge, with the clock counting down from **120 seconds**.
- Teams may practice as needed, taking turns with other teams that need to practice. If the track is needed for an official scored run, practice teams must yield the track. Once the tournament period has begun, practice is no longer allowed.
- **ES teams** will start their robot on the floor in front of the ramp, or on the ramp at the bottom. **MS, HS, and UP divisions** must start on the floor at any distance behind the start line, which will be located **30 cm** from the base of the ramp.
- Touching the robot at any time requires it to return to its original starting position **with the clock still running**.
- Each completed section of the ramp is worth points. A section is considered complete when any part of the robot's chassis crosses the scoring-zone line that defines the end of the current section and the beginning of the next section.
- If your robot is **100% on top of the table**, you earn **100 points**. The robot must have all supporting components (wheels, tracks, skids, etc.) on the table to be considered fully on the table.

- A team member will tell the Challenge Monitor (judge) when to stop the clock at the conclusion of the run. (**CAUTION: DO NOT TOUCH THE ROBOT UNTIL THE MONITOR INSTRUCTS YOU TO, OR YOU MAY LOSE YOUR FLAG POINTS AND YOUR TIME BONUS.**)
- The center of the flag (the pole) determines which scoring zone the flag is in. If any part of the robot touches any part of the flag system (flag, holder, pole), a **50% penalty** will be applied to the flag points assessed.
- If the robot successfully places the flag (**the flag must be standing upright on its base**), a time bonus equal to **1 point per whole second remaining** will be added to the overall score.

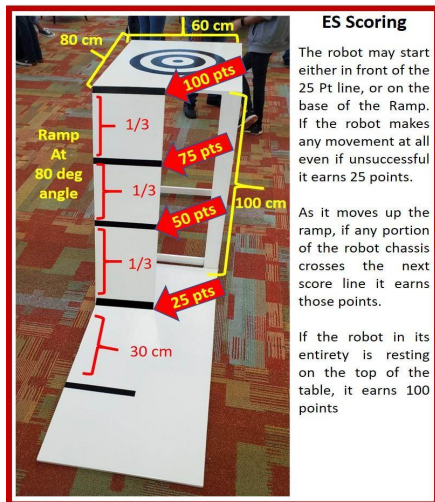
## Challenge Track Specifications

- Event Directors are free to use locally available materials to build challenge tracks, but must make every effort to match the provided RRI design as closely as possible.
- The **Alpine Bot** challenge track measures **60 cm x 80 cm**. Thickness may vary between **12 mm and 25 mm**.
- The table surface will be **1 meter above the floor surface**.
- It is recommended that the table and ramp material be made from **particle board**.
- **Ramp surface(s):** At least one smooth, flat surface must be provided for scoring the challenge, although other surface variations are allowed to provide multiple skill levels (at the discretion of event management).
- **ES Division:** The robot may start on the floor or on the initial part of the ramp. (See diagram below.)
- **MS, HS, and UP Divisions:** The robot starts behind the line **30 cm** from the base of the ramp. (See diagram below.)
- There will be **four black lines (2 mm wide)** drawn perpendicular across the ramp at: the beginning, one-third of the way up, two-thirds of the way up, and at the top of the ramp.
- There is a centered target on the top of the table consisting of **three black rings**. (See diagram below.)

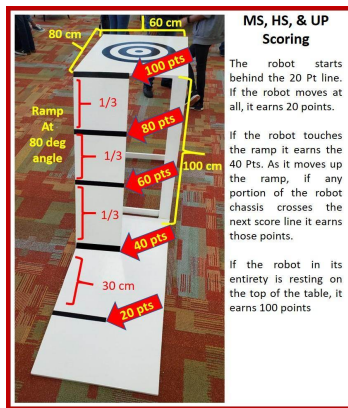
## Scoring Diagrams

Event Directors are free to use locally available materials in the construction of challenge tracks, but must make every effort to match the provided RRI design as closely as possible.

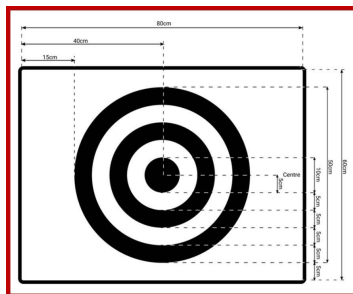
## Example Tracks: ES Division



## MS, HS, UP Divisions

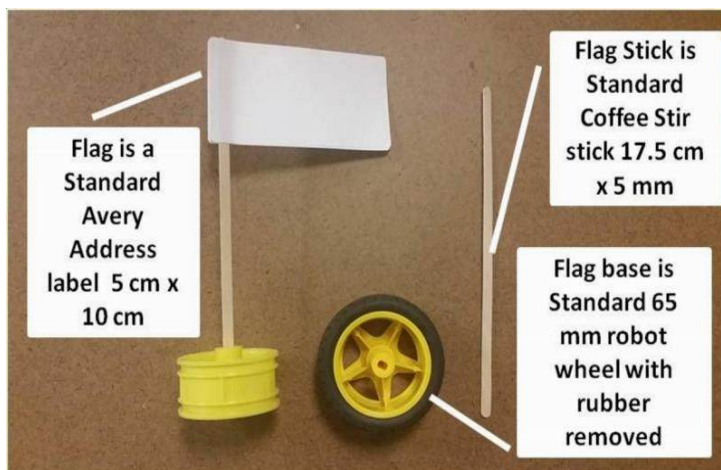


## Bullseye Diagram



## Flag Diagram:

There is a small flag with a **round base measuring 50 mm in diameter** that will be provided for the challenge (see diagram below).

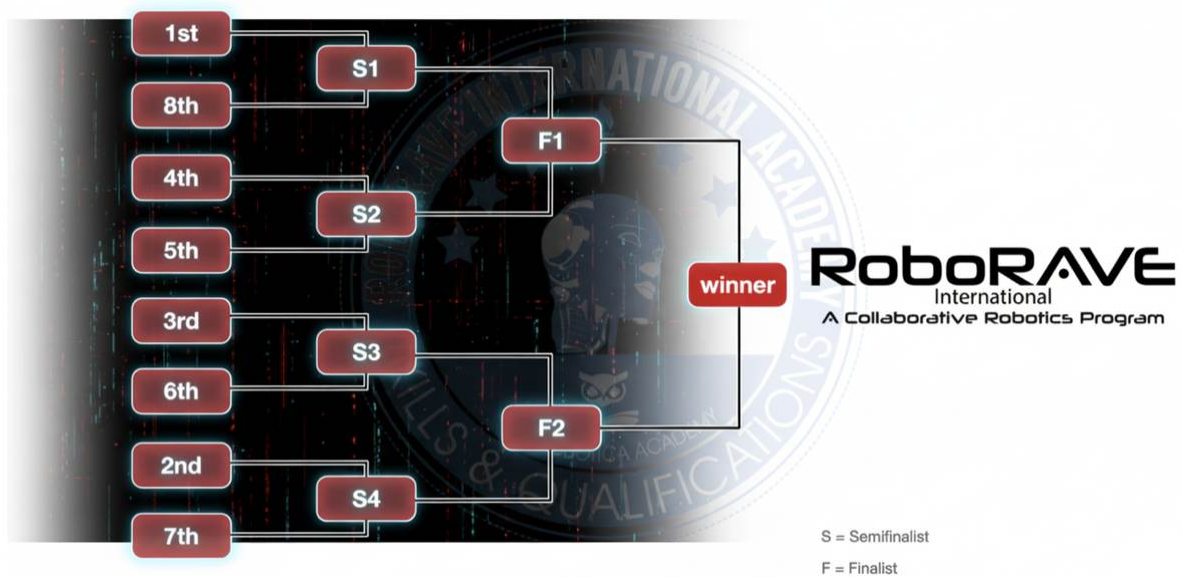


**Scoring Matrix:** Maximum possible points = **300 + time bonus**

| Start Line & Ramp | MS Start | ES Start Base of Ramp | One-third | Two-thirds | Top of Ramp |
|-------------------|----------|-----------------------|-----------|------------|-------------|
| ES                | X        | 0/25                  | 50        | 75         | 100         |
| MS/HS/UP          | 0/20     | 40                    | 60        | 80         | 100         |

| Table Top & Flag pts | Table top | Bulls Eye | Inner white | Inner Black | Outer White | Outer Black |
|----------------------|-----------|-----------|-------------|-------------|-------------|-------------|
| ES                   | 100       | 100*      | 80*         | 60*         | 40*         | 20*         |
| MS/HS/UP             | 100       | 100*      | 80*         | 60*         | 40*         | 20*         |

- **50% penalty** if any part of the **flagpole or flag base** touches the robot.



## 6. Entrepreneurial

### Entrepreneurial Innovation Challenge



#### Official Rules – Global Standard 2026

##### 1. PURPOSE OF THE CHALLENGE

The Entrepreneurial Innovation Challenge aims to evaluate and recognize teams that design, develop, and present a **functional robotic product** with real-world innovation, technical quality, and commercial potential.

Projects will be evaluated exclusively by a **panel of four (4) international judges** to ensure fairness, transparency, and professional standards.

This challenge measures:

- True innovation
- Technical functionality
- Social or market impact
- Business viability
- Quality of execution

##### 2. DIVISIONS

- **ES / MS** (Elementary & Middle School)
- **HS / UP** (High School & University / Professional)

If fewer than five (5) teams register in a division:

- The Event Director may merge divisions, or
- Declare the division as exhibition-only.

### 3. PROJECT REQUIREMENTS

Each team must present:

1. A robotic system incorporating a clear **Input–Process–Output logic**.
2. A product that is **autonomous and/or remotely controlled**.
3. A prototype with a total cost not exceeding **USD \$3,000**.
4. A live demonstration of the product in working condition.
5. Supporting materials:
  - One-page executive marketing flyer
  - Business Model Canvas
  - Promotional video (mandatory for HS/UP; optional for ES/MS)
  - Team visual identity and branding

### 4. JUDGING PANEL

All projects will be evaluated by a panel of **four (4) judges**, ideally composed of:

- One technical robotics expert
- One innovation or entrepreneurship expert
- One STEM academic representative
- One industry or sponsor representative

Each judge evaluates independently.

### 5. SCORING SYSTEM (100 POINTS TOTAL)

Each judge scores based on the following criteria:

#### 1) Innovation – 25 points

- Is the concept original?
- Does it offer a novel approach?
- Is it meaningfully differentiated?

#### 2) Technical Functionality – 20 points

- Does the product work reliably?
- Is the system logic clear?
- Is engineering execution sound?

### **3) Impact & Relevance – 20 points**

- Does it solve a real-world problem?
- Does it create social, environmental, or economic value?

### **4) Business Model – 15 points**

- Is the target market clearly defined?
- Is it commercially viable?
- Is pricing or value proposition realistic?

### **5) Presentation & Communication – 10 points**

- Clarity of explanation
- Professionalism
- Ability to answer technical questions

### **6) Scalability & Intellectual Property Potential – 10 points**

- Growth potential
- Patent or registration feasibility
- International adaptability

## **6. EVALUATION PROCESS**

### **Phase 1 – Stand Evaluation**

Judges visit each team's booth (15 minutes per team).

### **Phase 2 – Formal Pitch Session**

- 5-minute structured presentation
- 5-minute Q&A session

### **Phase 3 – Closed Deliberation**

Judges review scores and deliberate privately.  
Final rankings are determined by total average score.

## **7. TIE-BREAKER PROCEDURE**

In case of a tie:

1. Highest score in Innovation
2. Highest score in Technical Functionality
3. Final deliberation vote by the judging panel

## **8. AWARDS**

- 1st Place
- 2nd Place
- 3rd Place
- Special Award – Innovation Excellence
- Special Award – Social Impact

### **Grand Prize Includes:**

- Determined by the venue or director responsible for the event
- Accreditation to compete at:
  - RoboRAVE World Championship – Osaka, Japan 2026  
OR
  - RoboRAVE World Championship – Houston, Texas 2027
- Advisory support for intellectual property registration (IMPI equivalent guidance)

## **9. PROHIBITED ACTIONS**

- No public voting will determine official winners.
- No external unregistered assistance during presentation.
- Projects must be primarily developed by registered team members.

Violation may result in disqualification.

## **7. SoccerBot (Autonomous)**

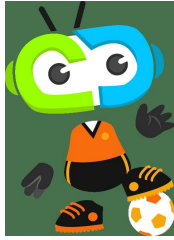
### **Challenge Rules**

**Japanese rules apply; please check the official RoboRAVE Osaka website.**

**<https://roborave-osaka.org/challenges/>**

## 8. SoccerBot RC (Remote Control)

### SoccerBot Radio-Controlled Challenge Rules



#### Goal

Design, build, and program **two radio-controlled robots** with the objective of playing “SOCCER.”

#### Divisions / Weight Classes:

Refer to the following table to decide which **division / weight class** you wish to compete in:

|               |
|---------------|
| <b>800 gr</b> |
| <b>ES</b>     |
| <b>MS</b>     |
| <b>HS</b>     |
| <b>**</b>     |

**\*\* These categories may be added at the discretion of the Event Directors.**

**Note:** If fewer than 5 teams are registered in any division, the Event Director has the option to combine divisions.

## Requirements

Two **radio-controlled robots**, any platform, with a cost of **USD \$500 or less**, and compliant with the following design restrictions, which will be verified during robot check-in:

- **Maximum dimensions:** 15 x 15 x 15 cm. **No tolerance will be allowed.**
- Size and mass restrictions are **strictly enforced throughout the entire event** to ensure fair competition for all participants.
- Parts of the robot that may come into contact with opposing robots must be **strong enough not to break easily**.

- The use of **shooting, grabbing, kicking, clamping mechanisms, sticky materials, solenoids, or any system that pushes or holds the ball** is prohibited. The robot may deploy components **once the match has started**.
- Robots must be **battery powered**. External power via cables is not permitted.
- Each robot may enclose the ball by a **maximum of 30% of the ball's total volume**, with the remaining **70% exposed outside the robot**.
  - Diameter: **42.67 mm** (1.680 inches).
  - Weight: **45.93 grams** (1.620 ounces).
  - To ensure fair play, **exact measurements and weight checks** will be performed. Any robot that does not meet the specifications **will not be allowed to compete**.
- It is **strictly prohibited** to glue, adhere, or use suction or adhesive mechanisms to keep the ball attached to the robot.
- Robots must be **clearly marked** with the **team name and a number**. Robots **may not be shared** between teams.

## General Rules

The following actions are considered **violations of fair play** and will be sanctioned by the judges with a **goal awarded to the opposing team**:

- Taking more than **30 seconds** to restart the match after a stoppage.
- Doing or saying anything that compromises the integrity of the competition or the organization. In this case, the offending team will be **disqualified**.
- Deliberately controlling the opposing team's robots. In this case, the offending team will be **disqualified**.
- Deliberate interference with robots by a team not currently competing or by a spectator. In this case, the team that benefits from the action will be **disqualified**.
- Use of **flammable devices**. In this case, the offending team will be **disqualified**.
- Deliberately causing damage to the field or the event setup. In this case, the offending team will be **disqualified**.
- Insulting the referee or members of the opposing team. In this case, the offending team will be **disqualified**.

## Group assignment or general table

- Group Assignment
- Groups will be determined by a draw or alphabetically, depending on the number of participants.
- Each group will consist of four (4) teams.
- Each match will have a maximum duration of three (3) minutes.
- A round-robin format will be used within each group.
- Alternatively, the event director may conduct a random draw to determine the number of matches, based on the schedule and the number of participants; this decision will be communicated to the teams on the first day of the event.
- The top teams will advance to the next round, followed by single-elimination matches.

## Game Duration

- Each match lasts a **maximum of three (3) minutes**, divided into **two halves of one and a half minutes (90 seconds) each**.
- At the end of the first half, teams **switch sides**, with a maximum of **30 seconds** to do so.
- There is **no extra time, time-outs, or stoppage time**.
- Game time stops when the ball leaves the field and restarts when the ball is back in play.

## Game Play

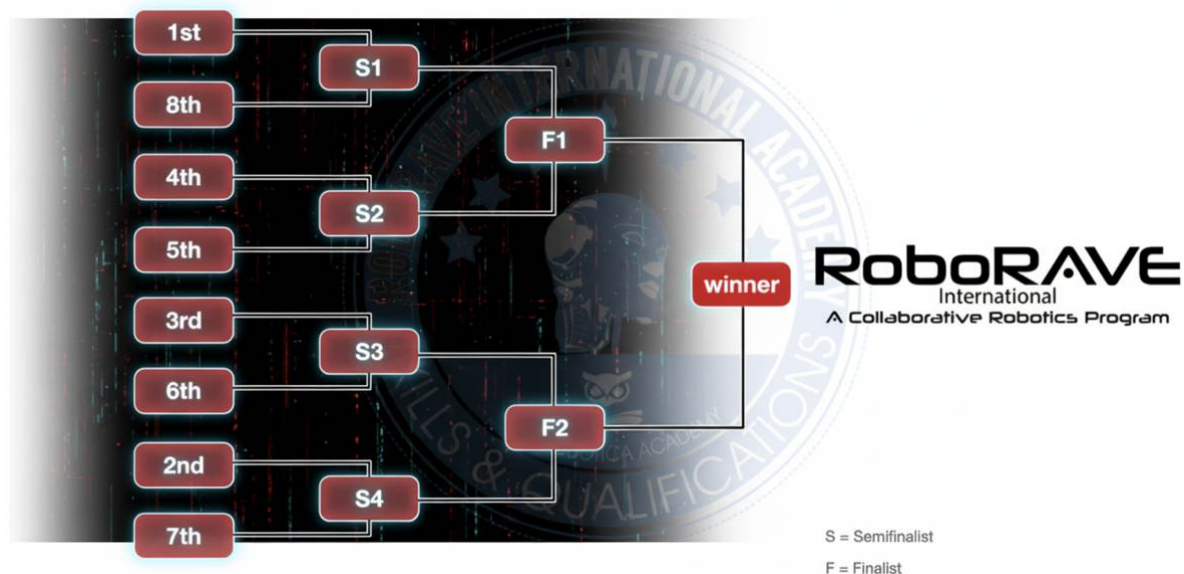
### Points Allocation

- **Three (3) points** to the winning team for scoring more goals.
- **Three (3) points** if the opposing team cannot continue competing due to damage or battery depletion, even if that team was leading.
- **Three (3) points** if the opposing team does not appear in the play area (**win by walkover**), and **three goals** are awarded to the winner.
- **One (1) point** for a scoreless draw or a draw with equal goals.

- **Zero (0) points** if both teams are unable to continue competing (the match must have been in progress).
- **Zero (0) points** for the losing team.
- **Zero (0) points** if neither team appears for the match.

**NOTE:**

- If there is a tie in the final standings during the group stage or general table, the winner will be determined by **the highest number of goals scored**.
- If the tie persists, the winner will be decided by a **coin toss**.
- If there is a tie during the **single-elimination stage**, play will resume and be decided by a **golden goal**.



**Field / Track:**

The tracks are typically printed on **durable paper**, **PVC vinyl backing (Canvas)**, or **3 mm Trovicel (120 cm x 180 cm)**.

**Dimensions:**

The **SoccerBot (radio-controlled soccer) challenge field** measures **1.20 m x 1.80 m**, and the **goals** measure **0.50 m**.



## 9. MiddleBot

### MiddleBot Challenge (MS & HS)

#### 2026 MiddleBot Rules

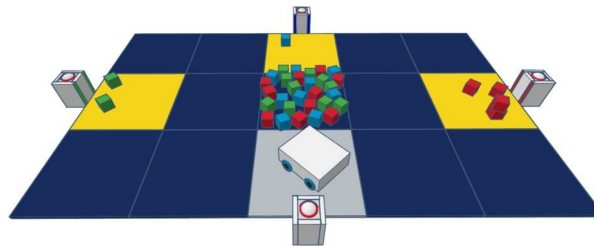
### I. Purpose

Waste sorting and resource recycling are extremely important because they effectively reduce the amount of waste, lower pollution, and allow reusable materials to be reintroduced into use, preventing valuable resources from being wasted. Through proper sorting, plastics, metals, glass, and paper can all be reprocessed into new products. This not only saves energy but also reduces environmental damage.

When more people value and practice recycling, the burden of urban waste management can be significantly reduced, along with the amount of incineration and landfill disposal. These seemingly simple actions, when accumulated, allow the Earth more time to recover, resulting in a cleaner environment and sustainable resource circulation.

### II. Competition Field Layout

- **Red scoring block**  
Length × Width × Height: approximately 7 cm × 7 cm × 7 cm
- **Blue scoring block**  
Length × Width × Height: approximately 7 cm × 7 cm × 7 cm
- **Green scoring block**  
Length × Width × Height: approximately 7 cm × 7 cm × 7 cm
- **Field dimensions**
  - Width: 240 cm
  - Length: 180 cm
  - Signal light pole turning radius: 60 cm

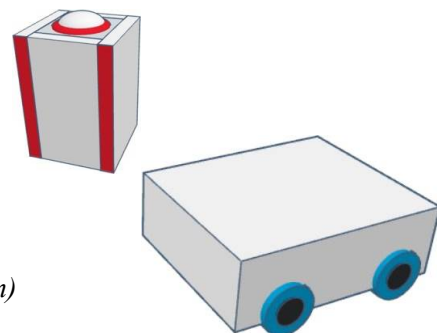


### III. Competition Rules

1. Robots and programs may be fully assembled and prepared in advance.
2. Each match lasts **2–5 minutes**.
3. A challenge-based system is used. Each team may attempt **5 runs**, and the **top 3 scores** will be recorded as the final result.
4. At the start of the match, a random number of blocks will be placed in the center of the field. The colors are **red, green, and blue**, and the quantity of each color will be **equal**.
5. The **gray mat** is the starting area. The robot must start from this area.
6. The match begins when the contestant uses the robot to press the **signal light pole button** behind the starting area. Once pressed, the countdown timer starts and the match officially begins.
7. The timer operates in **countdown mode**.
8. After the match begins, the robot must press the remaining **signal light poles** on the field. The light color will randomly change among **red, green, and blue**. Each time the button is pressed, the light color will change. The contestant must adjust the signal light poles so that all **three colors (red, green, blue)** appear.
9. The robot must move the colored blocks from the center of the field into the **yellow mats**.
10. The color of the blocks placed on each yellow mat must **match the color of the adjacent signal light pole**.
  - For example, if the LED of the signal light pole next to a yellow mat is **red**, then **only red blocks** should be placed on that mat.
11. Blocks placed on the yellow mats may be laid **flat or stacked**, but the scoring method differs.
12. A match ends in one of the following ways:
  - When the **countdown timer reaches zero**.
  - When time remains on the countdown timer and the robot returns to the starting area and presses the **signal light pole button** to pause the timer.

#### Signal Light Pole Specifications

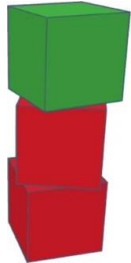
- Length × Width × Height: **12 cm × 12 cm × 20 cm**
- A **button** is located on the top.
- The **front red area** indicates the signal display.



#### Example Robot

- Length × Width × Height: *(as shown in the illustration)*

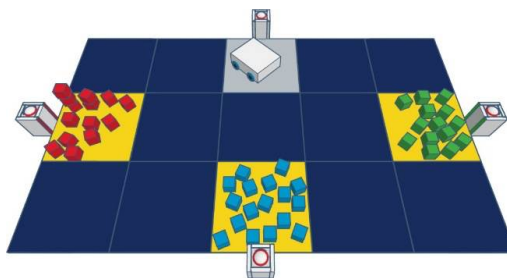
## IV. Scoring System



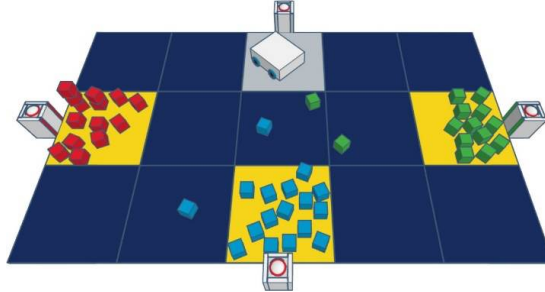
1. Each correctly placed colored block on the corresponding yellow mat scores **base points per block**.
2. If blocks are **stacked** on the correct mat:
  - Each additional stacked layer increases the score.
  - The score is calculated based on the **number of stacked layers × base score × multiplier**.
  - The higher the stack, the higher the scoring multiplier.
  - **Example scenarios:**
    - If red blocks are stacked but the top block color does not match the signal light color:
      - If the signal light is **red**, the score is calculated using the number of **red layers**.
      - If the signal light is **green**, the score is calculated using the number of **green layers**.
3. If time remains on the timer and the contestant uses the robot to press the signal light pole button to stop the timer, the **remaining seconds are added to the score**.
4. If there are still blocks left in the center of the field or if blocks placed on yellow mats **do not match the signal light color**, then even if the robot stops the timer early, the **remaining time will NOT be added** to the score.
5. When the countdown timer reaches zero, scoring is based only on the number of blocks on yellow mats that **match the signal light colors**.
6. At the end of the match (after the timer stops), if the robot **touches the starting area mat with any ground-contact point**, an **additional bonus score** is awarded for that round.

## VI. Example Scenarios

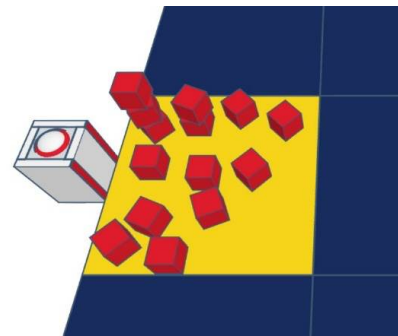
- If **all colored blocks** are placed in the correct positions (matching the signal light colors), they are scored according to the rules.
- If time remains on the timer, the remaining time is added to the score.
- If the robot returns to the starting area at the end, an additional bonus is awarded.



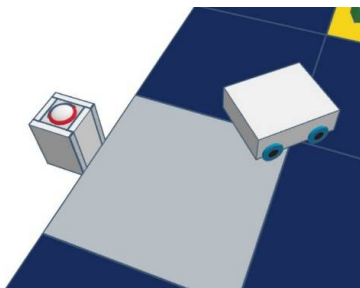
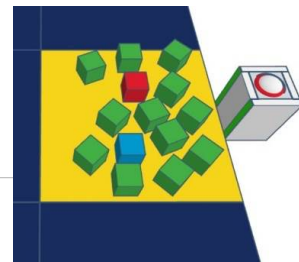
- If some blocks are not placed correctly:
  - Only the blocks correctly placed on yellow mats are scored.
  - Blocks not placed correctly are **not counted**.
  - Remaining time is **not added** to the score.
  - Returning to the starting area still grants the **bonus score**.



- Stacking examples:
  - Unstacked blocks: **9 blocks** → score =  $9 \times$  **base score**
  - One stack of **2 blocks** → score =  $(2 \times \text{base score}) \times 2$
  - One stack of **3 blocks** → score =  $(3 \times \text{base score}) \times 3$



- If the signal light pole is **green**:
  - The correct number of green blocks is **12**.
  - Total score =  $12 \times$  **base score**.



“Robot touching the starting area” means that **any single ground-contact point** of the robot touches the starting mat, as illustrated in the example images.