



RoboCup Singapore Open 2026 RCJ OnStage Rules (U19)

Summary

(Based on RCJ OnStage Rules 2026)

This summary is made based on RCJ OnStage Rules 2026 (https://robocup-junior.github.io/onstage-rules/main/onstage_rules.pdf)

Teams should make sure to review ALL the pages of these rules. Each team has a responsibility to verify the latest version of these documents prior to the competition, as changes may be made at any moment. Teams are encouraged to study all documents in detail.

Preface

RoboCupJunior OnStage invites teams to design, build and program creative and autonomous physical robots. The objective is to create either a live or streamed, robotic performance that uses a wide variety of technology to engage an audience. This includes a range of possible performances, such as dance, storytelling, theater, or art installations. The performance may involve music, but this is optional. The league is intended to be open-ended. Teams are encouraged to be creative, innovative, and entertaining, in both the design of the robots and in the design of the overall performance.

An OnStage performance should make use of innovative technologies or use technology in new innovative ways not previously developed in OnStage performances, while adding value to the performance. Innovation can be achieved with clear evidence of testing, research and development and can be an inspiration for future competitors.

An OnStage Performance must showcase the implementation and integration of robotic features in ways that visually enhance or add value and contribute to the theme or story being portrayed.

The OnStage performance will be judged in the following 3 areas.

1. Technical Demonstration Video (20%),
2. Technical Interview (30%),
3. OnStage Performance (50%).

Teams must present four of their robot(s) features:

1. those aspects that the team considers to be outstanding in system integration
2. electromechanical design,
3. interaction,
4. or software solutions implemented on their robot(s).

Teams should present the integration of the chosen features and how the features contribute to the progression of the performance.



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1. What is OnStage

RoboCupJunior OnStage is an invitation for teams to design, build, and program creative and autonomous physical robots with the goal of creating a live performance that uses a wide variety of technologies to engage an audience. The league is intended to be open-ended, allowing for performances such as dance, storytelling, theatre, or games.

Core Objectives and Innovation

The objective is to showcase the implementation and integration of four robotic features in ways that visually enhance the theme or story being told. Innovation is a key pillar of OnStage, and teams are expected to use technology in new, previously unexplored ways or provide clear evidence of research and development.

Judging and Scoring Components

A team's total score is a weighted combination of four main areas:

- **OnStage Performance (50%):** A live stage show (minimum 1:30 minutes) on a 5 x 4 meter stage where robots must perform autonomously.
- **Technical Interview (30%):** A live meeting where judges evaluate the team's understanding of their robotics, code, and design authenticity.
- **Technical Demonstration Video (20%):** It shows the functional robots without costumes to highlight their internal mechanisms.

2. Team Requirements

1. **Team Size:** Teams must have between 2 and 5 members.
2. **Age requirement:** At least one member in the team is 12 or above. All members are 19 or below.
3. **Roles:** Every member must have a defined technical role (e.g., software, mechanical, or electrical) and be able to explain it to judges.

3. Stage

1. **Dimensions:** The performance area is a 5 x 4 meter rectangle, with the 5-meter side facing the judges.
2. **Markings:** A black line (about 2cm width) marks the outside edge of the stage.
3. **Surface:** The floor is a flat, non-glossy white surface (typically painted MDF); teams should prepare for joints or irregularities of up to 5 mm.

4. Robot Requirements

4.1. Autonomy and Control:

- 4.1.1. Robots must perform autonomously throughout the entire routine.
- 4.1.2. Teams can use various devices as autonomous controllers, including laptops, tablets, and Raspberry Pis.
- 4.1.3. Robots may be started manually at the beginning using human contact, sensors, or remote control, but remote control is strictly prohibited once the performance begins.



- 4.1.4. Using touch-based sensors during the routine is considered unplanned human interaction and is treated as remote control.

4.2. Construction and Originality:

- 4.2.1. Teams are expected to build their own robots rather than following commercial kit instructions and are encouraged to design the robot's appearance themselves.
- 4.2.2. No robot may be shared between different teams.

4.3. Quantity and Physical Requirements:

- 4.3.1. A team may use any number and size of robots, though using more or larger robots does not automatically lead to higher scores.
- 4.3.2. Robots must be of a size and weight that team members can easily carry and lift onto the stage without assistance.
- 4.3.3. Robots must be started from within the performance area to be considered for judging.

4.4. Power and Electrical Safety:

- 4.4.1. Robots are prohibited from using mains electricity.
- 4.4.2. The maximum allowed voltage is 48V DC or 25V AC RMS, and this must be easily measurable during technical inspections.
- 4.4.3. Lithium batteries must be stored in safety bags, and all charging in competition areas must be supervised by the team.
- 4.4.4. Robot designs must feature safe wiring, secure batteries, and emergency stop functionality.

4.5. Mechanical Safety:

- 4.5.1. Robots must have no sharp edges, pinch points, or other hazards.
- 4.5.2. The use of projectiles, explosions, smoke, flames, water, or any other hazardous substances is strictly forbidden.
- 4.5.3. Flying robots (drones) must be secured inside a safety net or tied to a weight exceeding their lifting capacity to keep them within stage boundaries.

4.6. Communication and Localization:

- 4.6.1. Robot-to-robot communication is encouraged but must use the 2.4GHz spectrum with power output not exceeding 100 mW EIRP.
- 4.6.2. There must be no communication between off-stage and on-stage devices.
- 4.6.3. Any localization beacons or markers must be placed within the confines of the stage.

4.7. Interaction and Features:

- 4.7.1. Teams must showcase four distinct robotic features that are clearly visible to the judges.
- 4.7.2. Intelligent interaction is highly rewarded, such as robots responding to human gestures, proximity, or sound, as well as interaction between multiple robots.
- 4.7.3. All robot interactions, including the initial manual start, must be visible to the judges for the duration of the performance.



5. About 4 features to be presented

5.1. Selection Criteria

- 5.1.1. **Distinctiveness:** Each of the four selected features must be unique. Similar or overlapping features (e.g., two different types of simple movement) will be scored as a single feature by the judges.
- 5.1.2. **Visual Value:** The features must visually enhance or add value to the performance and contribute directly to the theme or story being told.
- 5.1.3. **Integration:** Higher marks are awarded when features are integrated into the performance to enhance its quality, rather than being shown as isolated technical demonstrations.
- 5.1.4. **Examples of Potential Features:** While not an exhaustive list, the rules highlight areas such as intelligent interaction with the environment, robot-to-human interaction (responding to gestures, sound, or proximity), and robot-to-robot communication.

5.2. Presentation and Documentation Requirements

- 5.2.1. **Visible During Performance:** All four chosen features must be clearly visible to the judges during the live OnStage performance.
- 5.2.2. **Technical Demonstration Video:** In the video, teams must outline the features they wish to be scored on and show them functioning without costumes so the internal mechanisms are visible.
- 5.2.3. **Technical Interview:** Teams must conduct a live demonstration for the judges, proving that all four chosen features are fully functional and explaining the technical implementation of each.

5.3. Judging Focus

- 5.3.1. The judges evaluate these features based on innovation, authenticity, and the team's understanding of the technologies used. Teams are encouraged to consult the supplementary article "How to Decide on Your OnStage Robotic Features" on the community website for further guidance on making their selection

6. Judging Components & Weighting

6.1. Judging Components

- 6.1.1. **OnStage Performance (50%):** A live stage show demonstrating the robots' design and technical aspects through a creative routine.
- 6.1.2. **Technical Interview (30%):** A 25-minute live meeting where judges evaluate the team's understanding of their robots, code, and design.
- 6.1.3. **Technical Demonstration Video (20%):** Showcases the robots' functional capabilities without costumes.

6.2. The "Four Robot Features" Requirement

- 6.2.1. Teams must choose four distinct robotic features to be the core of their judging.
- 6.2.2. These features must be clearly visible and described in the poster, video, and interview.



- 6.2.3. **Integration is key:** Judges award higher marks when these features are woven into the performance to enhance its quality rather than just being shown individually.

6.3. Evaluation Criteria

- 6.3.1. **Innovation and Authenticity:** Judges look for original ideas and the innovative use of technologies. Teams must prove they built their own robots and wrote their own code.
- 6.3.2. **Autonomy and Interaction:** High marks are given for intelligent interaction (robot-to-robot or robot-to-human) and for robots that dynamically respond to their environment.
- 6.3.3. **Deductions:** Points are deducted for restarts, unplanned human interactions (like touching a sensor to trigger a move), or violating safety and performance rules.

7. Technical Demonstration Video (20%)

7.1. About the Technical Demonstration Video

The video aims to showcase the capabilities of the robots, the **technical integration** of systems, and how the team's creations contribute to a performance.

- 7.1.1. All team members are encouraged to be actively involved in the video presentation.
- 7.1.2. The video file must be uploaded by the deadline set by the OnStage League Committee.

7.2. Technical Content:

- 7.2.1. Teams must demonstrate the four chosen robotic features they wish to be scored on.
- 7.2.2. Robots should be presented without their costumes so that the features and internal mechanisms are visible to the judges.
- 7.2.3. The video should highlight sensor systems, algorithms, mechanisms, and interactions, whether between robots or with humans.
- 7.2.4. Teams must explain their design process, including technical choices, problem-solving approaches, and how they overcame specific challenges.
- 7.2.5. It should also highlight innovation and sustainability practices used in the project.

7.3. Format and Duration:

- 7.3.1. The video has a maximum length of 6 minutes; any content beyond this limit will be cut for judging purposes.
- 7.3.2. The presentation must be in English, including any voice-overs and on-screen text.
- 7.3.3. English subtitles or transcripts are strongly recommended for clarity.
- 7.3.4. Video editing is allowed and encouraged to ensure the demonstration is technically engaging and informative.

8. Technical Interview (30%)

8.1. About the Technical Interview

The Technical Interview is a live, in-person evaluation where judges assess a team's understanding of their robotic systems and the authenticity of their work.

- 8.1.1. **Scoring and Weighting:** The interview accounts for 30% of the total score.



- 8.1.2. **Duration and Setting:** The meeting lasts up to 25 minutes and takes place in a separate room at the venue.
- 8.1.3. **Judging Panel:** It is conducted by at least two judges who have also reviewed the team's technical poster and demonstration video.
- 8.1.4. **Language:** The interview is conducted in English. Translators can be organized if requested in advance, but no extra time will be provided for translated interviews.
- 8.1.5. **Mentor Role:** Mentors are not allowed in the interview room, except to assist with carrying heavy equipment in or out.
- 8.1.6. **Follow-up:** Judges may request a second technical interview if they deem it necessary.

8.2. Core Requirements:

- 8.2.1. **Live Demonstration:** Teams must perform a live demonstration proving that all four chosen robotic features are fully functional.
- 8.2.2. **Technical Explanations:** Every team member must have a defined technical role and be prepared to explain their specific involvement in the robot's design, construction, and programming.
- 8.2.3. **Documentation:** Teams must bring copies of all work for judges to review, including programs, CAD/CAM designs, PCB designs, and wiring diagrams.
- 8.2.4. **Software:** Code must be documented with comments explaining the purpose of functions and methods. Teams must also clarify any use of third-party code, libraries, or AI.

9. Stage Performance (50%)

An OnStage Performance is a live stage show where teams use creative and autonomous physical robots to engage an audience through mediums such as dance, storytelling, theatre, or games. It accounts for 40% of the total score and focuses on the implementation and integration of innovative technologies.

Core Objectives

- 1. **Creative Technology:** Teams must design, build, and program robots to create an entertaining routine that showcases their technical achievements.
- 2. **The Four Features:** The performance must showcase four distinct robotic features that visually enhance the theme or story. These features must be clearly visible to the judges during the routine.
- 3. **Innovation:** High marks are awarded for using technology in new or unexplored ways and for intelligent interaction between robots, humans, or the environment.

9.1. Routine

- 9.1.1. **Opportunities:** Teams typically have up to two opportunities to perform for the judges.
- 9.1.2. **Routine Duration:** The performance itself must be at least 1:30 minutes long.
- 9.1.3. **Total Stage Time:** Teams have a seven-minute time limit on stage, which includes setup, introduction, the routine (and any restarts), and clearing the stage.



- 9.1.4. **Timing:** An official starts the timer when the team is called; it only stops when the stage is completely clear of all remnants.
- 9.1.5. **Introduction and Signals:** Teams are encouraged to introduce their robot features during setup. They must signal the start with a "3-2-1" countdown and clearly indicate the end of the show (e.g., by thanking the audience).

9.2. Restarts

- 9.2.1. **Allowance:** Teams may restart their routine at the judges' discretion, with no limit on the number of restarts within the seven-minute stage time.
- 9.2.2. **Procedure:** A restart must be verbally signaled by a team member on stage and begins with a clear "3-2-1" countdown without the team having to re-enter the stage.
- 9.2.3. **Scoring:** While score and deductions are reset to zero upon a restart request, restart penalty marks are applied to the final score at the end of the performance.

9.3. Music and Multimedia Presentations

- 9.3.1. **Optional Media:** Teams may use music, video, or animations to complement their show.
- 9.3.2. **Originality:** All visual or multimedia content must be created by the team members themselves.
- 9.3.3. **Technical Setup:** A projector and screen (with HDMI and 3.5mm AUX cables) are provided, though the exact size and height of the screen are not guaranteed.
- 9.3.4. **Interaction:** Interaction between the robots and the visual display is highly encouraged.
- 9.3.5. **Submission:** Music or video files should be on a clearly labeled memory stick (MP3/MP4 format) and given to a technician before the session starts.

9.4. Stage

- 9.4.1. **Calibration:** Teams must be ready to calibrate robots for specific venue conditions, such as lighting, metal staging affecting compasses, and floor stability.

9.5. Robots

- 9.5.1. **Autonomy:** Robots must perform autonomously using on-board controllers like laptops, tablets, or Raspberry Pi devices.
- 9.5.2. **Originality:** Teams should construct their own robots rather than following commercial kit instructions and must pay attention to copyright if using famous characters.
- 9.5.3. **Quantity:** Teams can use any number or size of robots, but using more or larger robots does not automatically grant higher points.
- 9.5.4. **Judging Eligibility:** Robots must be started from within the performance area to be considered for judging.

9.6. Communication and Localization

- 9.6.1. **Inter-Robot Communication:** Communication between robots (IR, Bluetooth, ZigBee, RFID) is encouraged.
- 9.6.2. **Strict Boundaries:** There must be no communication between off-stage and on-stage devices.



- 9.6.3. **Localization:** Any beacons or markers used for robot navigation must be placed within the stage confines.

9.7. Props

- 9.7.1. **Optional Use:** Props are optional, but interactive props (those that use sensors or communication to interact with robots) are welcomed.
- 9.7.2. **Placement:** All props must remain inside the performance area.
- 9.7.3. **Focus:** Props that are not integral to the routine are discouraged to ensure the focus remains on the robots.

9.8. Robot Autonomy and Interaction

- 9.8.1. **Manual Starts:** Robots may be started manually (contact, sensor, or remote) only at the beginning of the routine, and this start must be visible to judges.
- 9.8.2. **Prohibited Remote Control:** Once the performance starts, remote control is forbidden, including the use of apps, keyboards, or buttons.
- 9.8.3. **Interaction Rewards:** High marks are given for intelligent interaction with the environment or humans (responding to gestures, sound, or proximity) and for interactions between multiple robots.

9.9. Humans on Stage

- 9.9.1. **Professionalism:** Team members may perform alongside their robots but must remain professional and not block the judges' view of the robot features.
- 9.9.2. **Acting Guidelines:** Humans should follow basic acting principles, such as not standing with their backs to the audience.

9.10. Deductions

- 9.10.1. **Restarts:** Each restart results in a deduction according to the scoresheet.
- 9.10.2. **Unplanned Interaction:** Using a touch-based sensor during the routine is considered remote control (unplanned interaction) and leads to deductions.
- 9.10.3. **Boundaries:** Movements outside the area are not scored but do not cause deductions; however, robots started outside the area are not judged at all.
- 9.10.4. **Rule Violations:** At the judges' discretion, any performance that violates the rules may not be scored.

10. Code of Conduct

10.1. Spirit

- 10.1.1. It is expected that all participants, students, and mentors, will respect the RoboCupJunior mission. In addition, participants should keep in mind the values and goals of RoboCupJunior.
- 10.1.2. It is not whether you win or lose, but how much you learn that counts. Choosing not to take this opportunity to collaborate with students and mentors from all over the world means missing out on a lifelong learning experience. Remember this is a unique moment!



10.2. Fair play

- 10.2.1. It is expected that the aim of all teams is to participate in a fair and clean competition.
- 10.2.2. Humans that may cause deliberate interference with robots, robots' performance and/or damage to the stage will be subject to disciplinary action. This will be decided by the OnStage Committee and RoboCupJunior Officials.
- 10.2.3. Remember, helping those in need and demonstrating friendship and cooperation is the spirit of RoboCupJunior, as well as helping make the world a better place.
- 10.2.4. Participants are encouraged to help each other.

10.3. Behavior

- 10.3.1. All behavior is to be of a subdued nature while at the competition. It is expected that every participant behaves in a respectful manner towards each other.
- 10.3.2. Participants are not to enter set-up areas of other leagues or other teams unless expressly invited to do so by other team members. Participants who misbehave may have disciplinary action taken against them.

10.4. RoboCupJunior Officials

- 10.4.1. The officials will act within the spirit of the event. The RoboCupJunior officials shall not have a close relationship with any of the teams in the league they judge.

10.5. Mentors

- 10.5.1. Each team is required to have a mentor to assist with the communication between the team and facilitate learning. The mentor receives communication from the committee leading up to and during the competition via their specified E-Mail-Address.
- 10.5.2. Mentors (defined as teachers, parents, chaperones, translators, or any other non-team member) are not allowed in the student work area except to assist in carrying equipment in or out of the area on the arrival and departure days.
- 10.5.3. If a problem is encountered that is beyond the team's capabilities and is clearly beyond the reasonable ability level of a student to repair, mentors may request assistance from the OnStage Committee, including supervised support to conduct repairs.
- 10.5.4. Mentors are not allowed to set up equipment on stage, as this should be the responsibility of team members. Teams should design all robots and any additional equipment to be carried by team members only.