

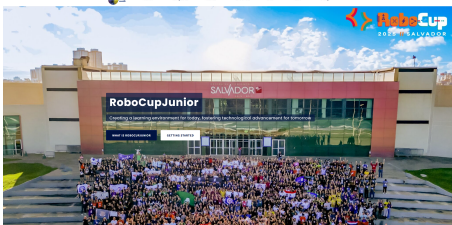
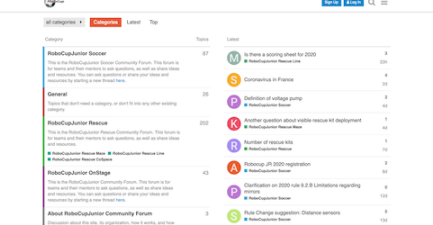
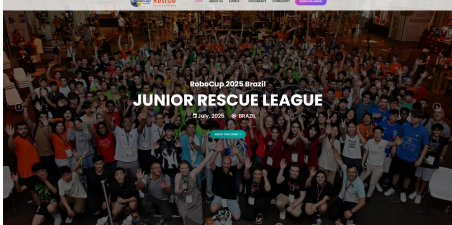
RoboCupJunior Rescue Maze

Rules 2027

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Co-Chair	Stefan Zauper	Austria
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Christian Häußler	Germany	Roberto Bonilla	USA
Margaux Edwards	Australia		
Tatiana Pazelli	Brazil		
Tom Linnemann	Germany		
William Plummer	Australia		

Official Resources

RoboCupJunior Official Website	RoboCupJunior Official Forum	RCJ Rescue Community Website
 https://junior.robocup.org	 https://junior.forum.robocup.org	 https://rescue.rcj.cloud



Corrections and clarifications to the rules may be posted on the forum before updating this rule file. It is the responsibility of the teams to review the forum to have a complete vision of these rules.

Before you read the rules



Please read through the [RoboCupJunior General Rules](#) before proceeding with these rules, as they are the premise for all rules. The English rules published by the RoboCupJunior Rescue Committee are the only official rules for RoboCupJunior Rescue Maze 2027. The translated versions each regional committee can publish are only referenced information for non-English speakers to understand the rules better. It is the responsibility of the teams to read and understand the official rules.

Intro

RoboCupJunior is one of the world's biggest robotics competition for youth, and with a rapidly evolving technological landscape, we feel that it is necessary to evolve the rules so that the competition can keep up and continue to be an engaging and rewarding experience for all involved.

Because of this we have decided to rewrite of the rules, this rewrite will not change anything from how the competition will be run but it is intended to make the rules easier to understand. Because almost everything is rewritten we have not marked what has changed in the rules. The only actual rule changes from the previous year are:

- Letter victims have been changed to smiley victims.
- A Tile is now 28cm × 28cm.
- Walls are now 12.5cm.
- Ramps may now be up to 30 degrees inside the Hazard Zone.
- Restrictions on the amount of rescue kits have been removed and the size of the kits have been increased to minimum 1.5cm per dimension and minimum volume of 3.375 cm³.
- The exit bonus now requires that the identification light stays on for 5 seconds instead of blinking.
- Exit bonus on the wrong tile can now trigger a misidentification and use of the identification light for anything other than victim identification and exit bonus now triggers misidentification.
- Dangerous Zone renamed to Hazard Zone.

Scenario

There has been a catastrophe. With first responders spread too thin, your team has been tasked with building a robot to help the victims of this catastrophe. Your robot must autonomously navigate the treacherous terrain to locate victims, to triage and deliver supplies to them, so that they can sustain themselves until human first responders can get there. Problem solving and technical skills will be essential. We are all relying on your team, good luck!

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1. RoboCupJunior International General Rules

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These rules apply to the international RoboCupJunior competition. However, regional, SuperRegional, and local tournaments may have variations or adaptations to these rules to suit their specific competition needs. It is important to check with the organizers of the tournaments you are participating in to confirm which exact rules will be in use.

If teams are unsure about any aspects of the General Rules or specific League Rules, they are encouraged to inquire via the official RoboCupJunior Forum for clarification: <https://junior.forum.robocup.org/>

For questions regarding any of the rules or RoboCupJunior in general, teams can also reach out to the RoboCupJunior community through the [official Discord Server](#).

1.1. Team Requirements

1.1.1. Team Size

Minimum Team Size: Teams must consist of at least 2 members.

Maximum Team Size:

- Soccer and Rescue Leagues: 4 members.
- OnStage League: 5 members.

Regional and SuperRegional competitions may define their own team sizes depending on their venue capacity and regional variations. Teams attending the International competition will only be able to have the maximum number of registered participants in the qualifying team.

Shared Members and Robots: No team member(s) or robot(s) may be shared between teams.

1.1.2. Team Supervision

Junior Mentor Requirement: Each Junior team must have at least one Junior Mentor registered and attending with the team.

Mentors and Parent/Chaperones are responsible for supervising their teams and maintain a duty of care/well being for their team members, as appropriate for their home region's regulations. Any concerns regarding team member welfare should be brought to the attention of the event organizers



immediately.

The Junior Mentor is expected to be present during all official competition events with their team. They must not interact in an imposing manner with teams, robots, judges, or the judging process. Any incident considered inappropriate will be handled by the event organizers and may lead to disciplinary actions.

1.1.3. Age Requirements

Junior Student Members: Must be between 14 and 19 years old as of July 1st of the competition year.

Junior Mentors and Parent/Chaperones: Must be 19 years or older as of July 1st of the competition year.

1.1.4. Team Members

Entry Leagues: RoboCupJunior Entry leagues and other "Primary" divisions (where minimum age may vary) are not run at the international competition but feature in many regions and SuperRegional tournaments.

Technical Roles: Every team member must have a defined technical role (mechanical/design, electrical/sensing, software etc.) and should be able to explain their role during technical judging.

1.2. International Team Qualification Process

- To qualify for the International competition, each region's Regional Representative will complete the Slot Allocation Process at the start of the Competition year. Regional Representatives can be found at the [Official Website](#).
- After the region's local qualifying tournament, the Regional Representative will assign slots. Once confirmed by the RoboCupJunior organizers, the qualified teams will be invited to register through the official RoboCup Federation registration system.
- The qualification process differs depending on the size of each region, but slot allocation must strongly reflect results from regional competitions.
- If a region does not use or releases its allocated slots, Regional Representatives may request additional slots during a later stage of the allocation process.

1.3. Robot Requirements

1.3.1. Robot Communication

Permitted Communication: Communication between robots during competition rounds is allowed as long as it uses the 2.4GHz spectrum and its power output does not exceed 100 mW EIRP (Effective Isotropic Radiated Power) under any circumstances.

Responsibility: Teams are responsible for managing their robot communication. Teams must ensure

their wireless equipment and its use comply with host-country regulations. Spectrum availability is not guaranteed.

Component Communication: Communication between components of the same robot is permitted.

League Adaptability: Each league may modify the robot communication rules to ensure they meet their specific requirements.

1.3.2. Safety and Power Requirements

Electrical Power:

- Robots must not use mains electricity.
- Maximum allowed voltage: 48V DC or 25V AC RMS (Root Mean Square).
- Voltage must be easily measured during inspections, and measuring points must be covered for safety or designed with safety considerations in place.

Battery Safety:

- Lithium batteries must be stored in safety bags, and charging must be supervised by team members in competition areas.
- Teams must follow safety protocols, including battery fire handling and evacuation procedures.

Robot Safety Design:

- **Power Management:** Secure batteries, safe wiring, and emergency stop functionality.
- **Mechanical Safety:** No sharp edges, pinch points, or other hazards. Actuators must be appropriate for the robot's size and function.
- **Hazardous Behavior:** Teams must report potentially dangerous robot behaviors at least two weeks before a RoboCupJunior event.

1.4. Documentation and Sharing Requirements

1.4.1. RoboCupJunior Team Posters

Purpose: Posters are a tool for sharing robot designs and insights with judges, teams, and the public. Posters will be hung in public competition areas in the venue and digital copies or photographs will be shared by RoboCupJunior after the competition.

Size: Posters must be no larger than A1 size (60 x 84 cm).

Content: Posters should summarize design documents and present the robot's capabilities in an engaging format.

1.4.2. Technical Description Video (See League Documentation)

Content:

- **Robotic Demonstration:** Show fully functional robot systems to highlight technical aspects.
- **Design Process:** Explain design choices and team problem-solving approaches.
- **Presentation:** Clear and high-quality, explaining innovative or unusual techniques.
- **Innovation & Sustainability:** Highlight new technologies and sustainable practices.

Submission: Guidelines will specify video length and deadlines per league.

1.4.3. Sharing Team Resources

Sharing: Materials submitted by teams as part of the documentation submission will be shared on GitHub repositories for the leagues: <https://github.com/robocup-junior>

Credit: Teams must credit creators of external work and adhere to licensing rules. The focus should remain on personal growth and learning.

1.4.4. Plagiarism Guidelines

External Code Use: Teams are allowed to use external code but must credit the original creators.

Learning Priority: Teams should prioritize learning and not use complete solutions from others. Always pay attention to licensing rules.

1.4.5. Acceptable Uses of AI

Generative AI tools and technologies used to create content in a team's code and documentation (including but not limited to text, figures, images) must be disclosed. The AI system used must be identified and be accompanied by a brief explanation regarding the manner in which the AI system was used to generate the content. The use of AI systems for editing and grammar enhancement or translation to English is common practice and does not need to be specified.

1.4.6. Bill of Materials (BOM)

Submission: Teams must submit a BOM (Bill of Materials) listing major components and materials used.

Details: The BOM must include:

- Component name/description (e.g., part number).
- Supplier/source of the component (including PCBs/machined components).
- Status (new/reused).
- Kit or custom-built.
- Price.

Template: A standardized BOM template will be provided with the league documentation submissions for the international competition.

1.5. Spirit and Behavior

1.5.1. Behavior

All participants are expected to behave themselves and be considerate and polite especially but not only towards other participants, volunteers, referees and organizers of all Junior and Major Leagues as well as the host venue.

1.5.2. Code of Conduct

All organisers, volunteers, team members, mentors, supporters and visitors must abide by the RoboCup Federation Code of Conduct. Any instances where, a situation occurs that does not meet the code of conduct must be reported to a RoboCup Federation organisation member and will be investigated.

1.5.3. Mentoring and Onsite Assistance

Support from other teams, mentors, teachers, parents, sponsors, internet communities etc. is a core part of how teams learn and grow.

To ensure fair competition and maximize learning it is required that none of the support they receive does the work of competing for the team. A good indication is the team's ability to explain not only what their robots' components do but also how they do it.

1.5.4. Teams Onsite

- During the competition, only the official team members (maximum 4/5 depending on league) can represent the team at registration, setup-day, and have access to the competition areas for rounds and interviews.
- There must be at least 2 team members on-site, unless a team can present evidence of extenuating circumstances, including proof of travel for other team members. Teams where only one participant presents at the venue will be able to compete, but will not be eligible for finals or awards.
- It is the teams' responsibility to ensure that team member are present at the correct time and location for all scheduled activities.
- Teams are not allowed to communicate with or receive help virtually from external parties with the intention of impacting the team's performance during the competition areas. Virtually communicating includes but is not limited to extended phone calls, video calls, remote desktop control etc.
- Any team found to be in breach of these rules may be subject to disciplinary action.
- Teams are recommended to seek help from other teams, or organizers if they are struggling with any issues onsite.

1.5.5. Violations

Teams, Team Mentors/Supporters or Team Members that repeatedly conduct themselves in an unacceptable way or in violation to the General or League Rules may be disqualified from the tournament and asked to leave the venue.

2. Code of Conduct

2.1. Spirit

1. It is expected that all participants (students and mentors alike) respect the aims and ideals of RoboCupJunior as set out in our mission statement.
2. The volunteers, referees, and officials will act within the event's spirit to ensure the competition is competitive, fair, and, most importantly, fun.
3. **It is not whether you win or lose but how much you learn that counts!**

2.2. Fair Play

1. Robots that cause deliberate or repeated damage to the field will be disqualified.
2. Humans who cause deliberate interference with robots or damage the field will be disqualified.
3. It is expected that all teams aim to participate fairly.

2.3. Behavior

1. Each team is responsible for verifying the latest version of the rules on the RoboCupJunior Official website and additional clarifications/corrections on the official forum made by the RoboCupJunior Rescue Committee before the competition.
2. Participants should be mindful of other people and their robots when moving around the tournament venue.
3. Participants are not allowed to enter setup areas of other leagues or teams unless explicitly invited to do so by team members.
4. Teams will be responsible for checking updated information (schedules, meetings, announcements, etc.) during the event. The RoboCupJunior Rescue Committee will provide updated information on notice boards in the venue, the local competition website, or the RoboCupJunior website if possible.
5. Participants and their companions who misbehave may be asked to leave the venue and risk being disqualified from the tournament.
6. Referees, officials, tournament organizers, and local law enforcement authorities will enforce these rules equally to all participants.
7. Teams are expected to be at the venue early on the setup day as important activities will occur. These activities include but are not limited to registration, participation raffle, interviews, captains, and mentor's meetings, among others.

2.4. Mentors

1. Non-team members (mentors, teachers, parents and other family, chaperones, translators, and other adult team members) are not allowed in the student work area.
2. Mentors are not permitted to be involved in building, repairing, or programming their team's robots before and during the competition.
3. In the first instance, mentor interference with robots or referee decisions will result in a warning. If this behavior recurs, the team could face a possible elimination from the tournament.
4. Robots have to be the work of the students. Any robot that appears identical to another robot may be prompted for re-inspection.

2.5. Ethics and Integrity

1. Fraud and misconduct are not condoned. Fraudulent acts may include the following:
 - a. Mentors working on the software or hardware of student's robot(s) during the competition.
 - b. More experienced/advanced groups of students may provide advice but should not do the work for other groups. Otherwise, the team risks being disqualified.
2. RoboCupJunior reserves the right to revoke an award if fraudulent behavior is proven after the award ceremony occurs.
3. Suppose it is evident that a mentor intentionally violates the code of conduct and modifies and works on the student's robot(s) during the competition. In that case, the mentor will be banned from future participation in RoboCupJunior competitions.
4. Teams that violate the code of conduct can be disqualified from the tournament. Disqualifying a single team member from further participation in the tournament is also possible.
5. Referees, officials, tournament organizers, and local law enforcement authorities will give a team a warning in less severe cases of violations of the code of conduct. A team can be disqualified immediately without warning for severe or repeated violations of the code of conduct.

2.6. Sharing

1. The spirit of world RoboCup competitions is that teams should share technological and curricular developments with other participants after the tournament. Sharing furthers the mission of RoboCupJunior as an educational initiative.
2. The RoboCupJunior Rescue Committee may publish developments on the RoboCupJunior website after the event.
3. Participants are strongly encouraged to ask questions to their fellow competitors to foster a culture of curiosity and exploration in the fields of science and technology.

3. Glossary

Assistant Field Judge

Judge who helps the field judge with rules decisions and keeps track of the scoring.

Black Tile

A tile that is of a singular black color that the robot is not allowed to visit.

Blue Tile

A tile that is of a singular blue color that the robot has to stop on for 5 seconds before visiting another tile.

Calibration

The part of the game where the designated team members are allowed to get values from their robots and change settings on the robot to adapt it to the fields unique conditions.

Checkpoint

The tile that the robot is returned to when a lack of progress occurs.

Cognitive Victim

The Victim is identified by 5 concentric circles.

Color Tile

Any tile with an associated color i.e. black tile, blue tile, red tile, silver tile.

Competition Area

The field and the area around the field where only functionaries and the designated team members are allowed to be.

Debris

Small objects not fixed to the floor, examples of debris are toothpicks, rice, ...

Designated Team Members

Team members who are allowed inside the competition area and are responsible for the robot during the game.

Extra Scoring

Additional score given to the team after a game is concluded.

Field Judge

Judge who ensures that the rules are followed during the game.

Field

The area consisting of a horizontal floor with floating and linear tiles, a perimeter wall, internal walls and field elements.

Floating Tile

Tiles that cannot be reached by only following the right or left wall.

Functionary

People helping with the running of the competition, i.e. judge, organizing committee, security guards, ...

Game

The calibration and scoring run.

Game Time

The time the team has to do calibration and the scoring run.

Hazard Zone

An area of the field enclosed by walls that has a red tile at the entrances, field elements within the hazard zone may be harder to traverse than outside it.

Identification Light

The light used by the robot to show to the field judge and assistant field judge that it has identified a

victim or that it is scoring the exit bonus.

Lack of Progress (LoP)

When the robot either does something disallowed or is stuck and is moved back to the last visited checkpoint.

Linear Tile

Tiles that led back the starting tile by either following the left or right wall.

Red Tile

A tile that is of a singular red color that marks a entrance to the hazard zone.

Scored

Something is considered scored when the **Scoring Condition:** is fulfilled.

Scoring Run

The part of the game where the robot is not allowed to be modified and it runs autonomously to gain score.

Silver Tile

A tile that is of a singular silver color that marks a checkpoint.

Smiley Victim

The victim is identified by a smiley face.

Speed Bump

Small objects fixed to the floor, examples of speed bumps are wooden dowels, aluminium profiles, ...

Starting Tile

The tile the robot starts and ends the run on, is designated by the field judge.

Successfully Visits

A robot has successfully visited a tile if after visiting the tile it can continue visiting other tiles, i.e if a

robots flips over onto another tile and can't continue it has **not** successfully visited that tile.

Tile

A square part of the field floor. The tile's area is the navigable space by the robot.

Victim

Represents a person in different needs of help.

Victim Identification Area

The area within which the robot can help the victim.

Visited Tile

A tile is considered visited when looking from above more than half of the robots area is within that tile.

Wall

The wall inside and enclosing the field, that creates the maze that the robot navigates during the scoring run. The walls also include the structure supporting it, e.g. pillars, aluminium profiles, ...

4. Field

4.1. Layout

1. All measurements in the field section has a tolerance of $\pm 10\%$.
2. The tiles shall be of equal size, and be 28cm $\times$ 28cm.
3. Walls shall be at least 12.5cm high measured from the field floor and shall be the length of the tile and be mounted on the edges of the tile.
4. The minimum height between the floor and any ceiling shall be 25 cm.
5. The field floor shall be made up of a whole multiple of tiles, the tiles may have deviations of up to 3mm in height and gaps of up to 3mm. There may be holes in the floor for fastening walls.
6. The placement of walls, field elements and tiles may be modified during the round by the field judge before the start of a scoring run as long as the scoring and difficulty is the same during the round.
7. Environmental conditions may vary across fields, the field and rounds. The conditions includes but is not limited to lighting, magnetic field, ...
8. The competition area is the field and 150 cm around the field where only functionaries and designated team members are allowed within. The field judge may include other people access to the competition area.

4.2. Hazard Zone

1. There may be a hazard zone on the field, it shall be enclosed and any entrance shall be marked with a red tile.
2. The hazard zone may not prevent the robot from exploring the field outside the hazard zone, and the start point may not be inside the hazard zone.
3. Inside the hazard zone the hazard variant of the rules may be used, i.e the modification marked with **Hazard Variant:** .

4.3. Colored Tiles

1. A colored tile shall be the same size as any other tile, and shall be fixed to the floor.

4.3.1. Blue Tile

1. After visiting a blue tile a robot needs to stop and stay still for 5 consecutive seconds before it is allowed to visit another tile. If this is not done it shall be considered a lack of progress.
2. **Scoring Condition:** Shall be considered scored when the robot makes a successful visit of another tile after visiting the blue tile.

4.3.2. Black Tile

1. A visit of a black tile shall be considered a lack of progress.
2. For consideration of linear/floating tiles black tiles shall be considered a wall.

4.3.3. Silver Tile

1. The last visited silver tile shall be considered the current checkpoint.

4.4. Field Elements

4.4.1. Speed Bump:

1. Speed bumps shall be fixed to the floor.
2. Speed bumps shall have a maximum height of 1 cm, measured from the floor.
3. Speed bumps shall not be placed on any ramp or stair.
4. **Hazard Variant:** Maximum height of 2cm and allowed to be placed on ramps.
5. **Scoring Condition:** Shall be considered scored when the robot after visiting a tile containing a speed bump successfully visits a tile without the speed bump on it.

4.4.2. Obstacles

1. Obstacles shall have a minimum height of 15 cm.
2. Obstacles may be fixed to the floor.
3. Obstacles shall be at least 20 cm from any wall or touching any wall and at least 20 cm from the opposite edge of the tile and any other obstacle.

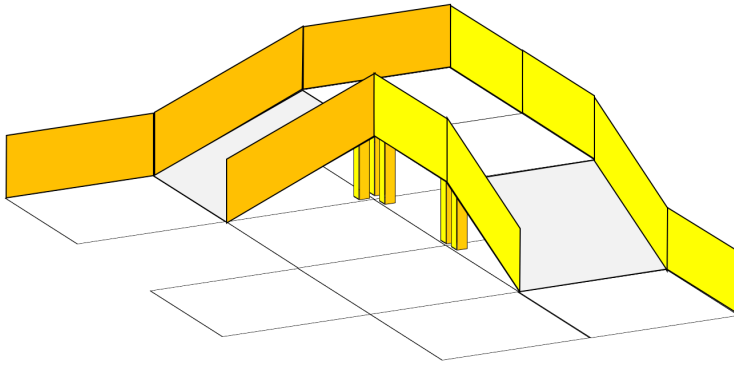
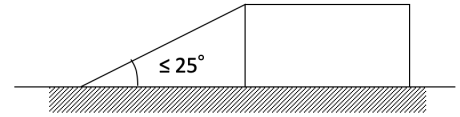
4.4.3. Debris

1. Debris may only be placed inside the hazard zone.
2. Debris shall not be fixed to the floor.
3. Debris shall have a maximum height of 1 cm, measured from the floor.

4.4.4. Ramps

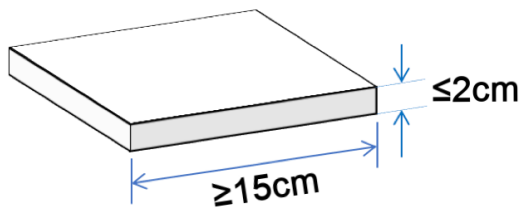
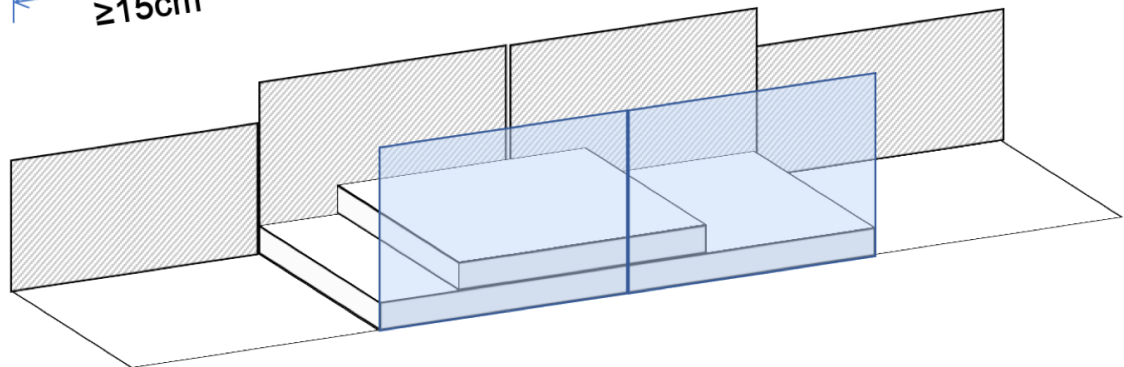
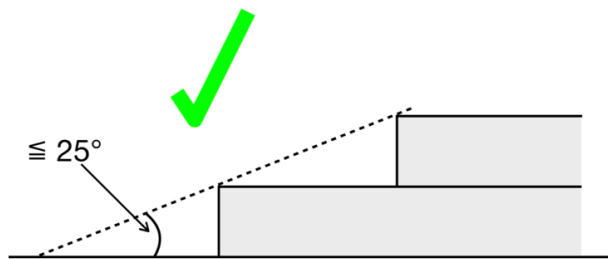
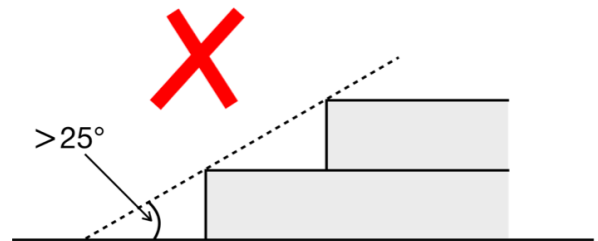
1. Ramps shall have a maximum incline of 25 degrees from the horizon.
2. Ramps may not be placed next to each other so that it creates a peak like structure.
3. Ramps shall end with a horizontal tile.
4. **Hazard Variant:** Maximum incline of 30 degrees.
5. **Scoring Condition:** Shall be considered scored when the robot after visiting a ramp tile successfully visits a horizontal tile, the horizontal tile must be a tile that the robot did not begin its navigation

from.



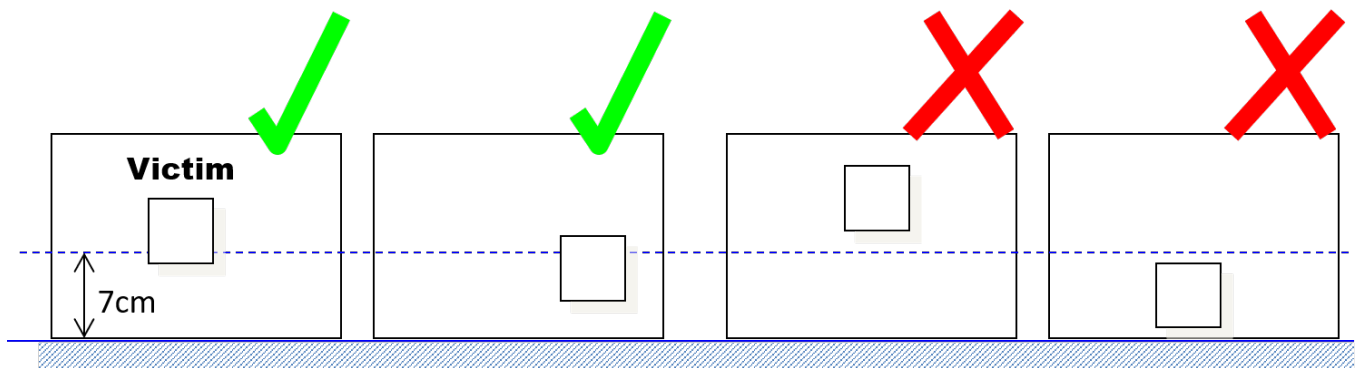
4.4.5. Stairs

1. The width of the stairs shall be the same as the tiles.
2. Each step of the stair shall have a maximum height of 2 cm.
3. If a stair has a peak like structure the top step shall have a length of at least 15 cm but less than the length of a tile.
4. Stairs shall end with a horizontal tile.
5. Stairs shall have a maximum incline of 25 degrees between each step.
6. **Hazard Variant:** Maximum incline of 30 degrees.
7. **Scoring Condition:** Shall be considered scored when the robot after visiting a stair tile successfully visits a horizontal tile, the horizontal tile must be a tile that the robot did not begin its navigation from.



4.4.6. Victims

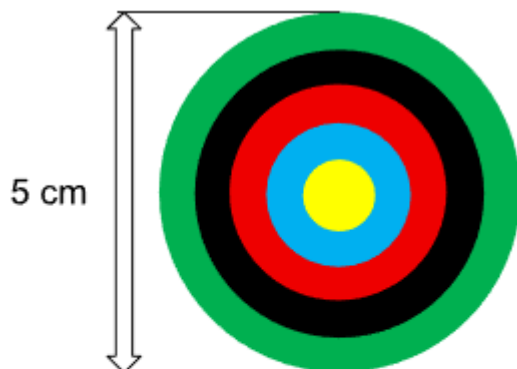
1. The victim shall be placed on a wall not facing a color tile/obstacle/speed bump/stair and/or ramp. Any part of the victim must be 7 cm from the floor.



2. The victim shall be represented in one of two way, either by a smiley victim and/or a cognitive victim. They shall be printed on or attached to the wall, the victim may not protrude more than 3mm from the wall. The victim can be in 1 of 3 states, harmed/stable/unharmed.
3. Smiley victims shall be represented by a smiley face emoji, the victim shall be of a distinguishable color from the wall. The victim may be rotated and their diameter shall be 4 cm.
 - a. The Harmed state is represented by a sad face.
 - b. The Stable state is represented by a neutral face.
 - c. The Unharmed state is represented by a happy face.

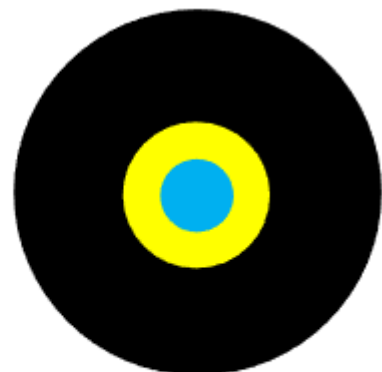


4. Cognitive victims shall be represented by a circle of 5 concentric rings where the innermost circle has a diameter of 1 cm and where each subsequent ring having a diameter of 1 more cm. Each circle may have a different color of the one before it where each color represents a different numerical value, black=-2, red=-1, yellow=0, green=1, blue=2. A value is then calculated by the sum of the 5 rings.
- The Harmed state is represented by the value 2.
 - The Stable state is represented by the value 1.
 - The Unharmed state is represented by the value 0.



Yellow, Blue, Red, Black,
Green

$0+2-1-2+1 = 0 \rightarrow$ Unharmed



Blue, Yellow, Black, Black,
Black

$2+0-2-2-2 = -4 \rightarrow$ fake target

5. The victims identification area is a half circle with a radius of 15cm in front of the victim.
6. There may be objects and/or symbols on/in the field that resemble victims in appearance but that are not victims.
7. **Scoring Condition:** Shall be considered scored when the robot while within the victims identification area uses its identification light to blink for 5 seconds, with a interval of 500ms on 500ms off, while remaining stationary.

5. Robot

5.1. Control

1. After start by a designated team member the robot must run autonomously.
2. The robot may not use any kind of pre-mapping, including but not limited to placement of walls, features, ...

5.2. Construction

1. The robots design and construction shall be primarily and substantially the teams original work.
2. The robot may not hover or fly.
3. Robot kits and/or components specifically designed and/or marketed to complete any single primary task of RoboCupJunior Rescue may not be used.
4. Only lasers of class 1 and 2 are allowed, teams using lasers must have the data-sheet for the laser available and provide them to the competition if/when asked to.
5. The robot must be equipped with a handle that is to be used to pick it up during the scoring run.
6. Robots may not have any sensors or devices that enable them to "see" over walls.
7. The robot must be equipped with an identification light that is easily visible to the field judge.
8. Robots may not intentionally mark or damage the field.

5.3. Rescue Kits

1. Rescue kits may be carried and deployed by the robot.
2. A rescue kit shall have a minimum size of 1.5 cm in each dimension and a minimum volume of 3.375 cm³ after deployment, and shall be provided by the competing team.
3. **Scoring Condition:** Shall be considered scored when after the robot has entirely left the victims identification area, the rescue kit has stopped moving the kit is entirely within the victims identification area and the victim is identified.

5.4. Team

1. Each team may only have one robot on the field.
2. Each team member must be able to explain their work and have a specific technical role.

5.5. Inspection

1. The robot shall be inspected by at least 2 judges before the first game, to make sure that the rules are followed.

2. Use of a robot similar to another team's robot is not allowed.
3. The team is responsible that the robot is re-inspected if they have done any substantial changes from the last inspection.
4. All teams must submit their source code to the competition organizers before the competition, as well as any substantial changes to their source code. The source code shall not be shared by the organizers unless permission is given by the team.
5. A team that has not passed inspection may not compete, if the robot has not passed inspection when it is their turn that round is forfeited.

6. The Game

6.1. Before the Game

1. Before each game the team shall designate 1 or 2 members to be designated team members.
2. Before each game the designated team members shall explain their lack of progress procedure to the field judge, show their identification light and inform the field judge if they want to calibrate their robot.
3. When the designated team members are ready, or the allotted start time for the round has passed, the field judge shall countdown and start the timer thereby starting the game, after this the robot and/or designated team members are not allowed to leave the competition area before the end of game.
4. Before the start of the scoring run calibration of the robot may be done, calibration may be skipped by the team. After a scoring run has started no more calibration is allowed, this includes any changes to code or code selection.

6.2. Calibration

1. The robot may not move on its own during calibration.
2. Designated team members may place and move the robot anywhere within the competition area.
3. During calibration designated team members may take sensor readings and modify the corresponding values in the robot's program.

6.3. Scoring Run

1. To start the scoring run a designated team member shall inform the field judge, then start the robot on the starting tile as indicated by the field judge.
2. The robot may start in any direction on the start tile.
3. If the team does not calibrate the robot, it may start on the start tile with the field judge countdown.
4. Any moved field element or part lost by the robot may not be reset until after the scoring run.

6.4. Lack of Progress

1. When a lack of progress is called the lack of progress procedure shall be performed by a designated team member and the robot shall then be restarted from the last visited checkpoint. The robot may restart in any direction.
2. If the robot has not visited any checkpoints, the start tile shall be the tile the robot restarts from.
3. The lack of progress procedure shall be consistent, simple and easy to follow by the field judge.
4. During a lack of progress only the demonstrated LoP procedure is allowed to be used without any modification, including but not limited to changing settings, removing specific debris, ...
5. A lack of progress is when:
 - a. A designated team member declares a lack of progress.
 - b. A designated team member touches the field or their robot without permission from a field judge.
 - c. A field judge declares a lack of progress.

6.5. Misidentification

1. A misidentification is when a robot uses its identification light but does not score a victim identification or the exit bonus.
2. Identifying the same victim multiple times shall not be considered a misidentification.

6.6. End of Game

1. When end of game is called the timer shall be stopped and the run time shall be recorded.
2. End of game is called when:
 - a. 8 minutes of game time has elapsed.
 - b. A designated team member declares end of game.
 - c. The robot successfully scores the exit bonus.
 - d. A field judge declares end of game.

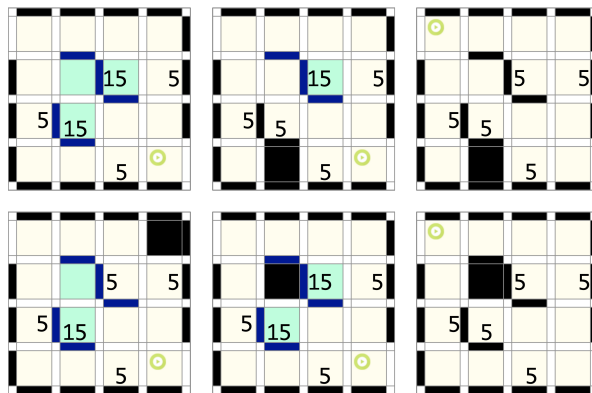
6.7. Scoring during the Scoring Run

1. For each victim identification:
 - a. Victim on linear tile:
 - i. Smiley victim: 5 points.
 - ii. Cognitive victim: 10 points.
 - b. Victim on floating tile:
 - i. Smiley victim: 15 points.

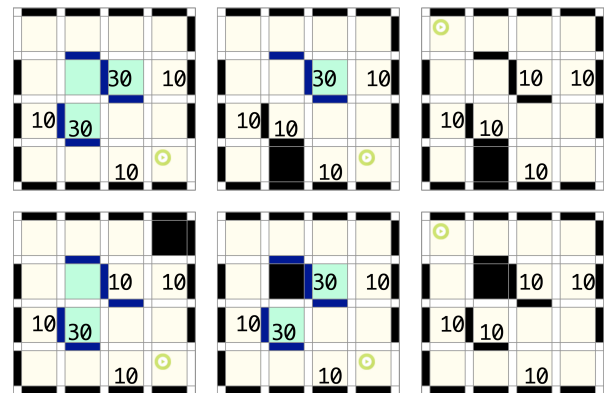
ii. Cognitive victim: 30 points

Floating tile
 Linear tile
 Black tile
 Starting tile
 $\frac{5}{15}$ Smiley victims
 $\frac{10}{30}$ Cognitive victims

Smiley victims



Cognitive victims



2. For each scored rescue kit:
 - a. Victim is harmed: 10 points for 1 scored rescue kit, 30 points for 2 scored rescue kits, max 30 points.
 - b. Victim is stable: 10 points for 1 scored rescue kit, max 10 points.
3. For each scored blue tile: 30 points, successive visit of a scored blue tile shall decrease the score by 10 points down to a minimum of 0 points.
4. For each scored speed bump tile: 5 points.
5. For each scored ramp: 10 points.
6. For each scored stair: 10 points.
7. For each scored checkpoint: 10 points.
8. For each misidentification: -5 points.
9. Each individual element on the field may only be scored once, the score may never be less than 0.

6.8. Extra Scoring

1. A reliability bonus is given, this is calculated from (but never less than 0):
 - a. For each successful victim identification, 10 points.
 - b. For each scored rescue kit, 10 points.
 - c. For each scored blue tile, 10 points.
 - d. For each lack of progress, -15 points.
2. The exit bonus is scored when the robot stays stationary on the start tile for 5 seconds with its identification light turned on. The exit bonus is calculated from:
 - a. For each successful victim identification: 10 points.
 - b. For each scored blue tile: 10 points.

- c. For each scored stair: 5 points.
- d. For each scored ramp: 5 points.

7. Competition

This chapter outlines the structure of an international RoboCupJunior Rescue competition. The competition format and the inclusion of elements like rubrics based scoring, Technical Challenges and the SuperTeam Challenge may vary in local, regional and super-regional competitions. Please refer to the respective organizer for details.

7.1. Rounds & Scoring

1. The competition will consist of multiple rounds of which the worst one or more will be omitted from the final score. The worst round is defined by the lowest normalized field score of the team.
2. The field score for every round will be normalized with the score of the best team of that round:

$$(\text{NORMALIZED FIELD SCORE}) = (\text{FIELD SCORE}) / (\text{BEST FIELD SCORE})$$

3. The normalized field scores will be used to calculate the mean. The worst round(s) will not be considered here:

$$(\text{MEAN OF NORMALIZED FIELD SCORES}) = (\text{SUM OF NORMALIZED FIELD SCORES EXCLUDING OMITTED ROUNDS}) / (\text{NUMBER OF ROUNDS} - \text{NUMBER OF OMITTED ROUNDS})$$

4. The normalized rubrics score is made up of a sum of normalized scores for the individual rubrics as follows:

$$\begin{aligned} (\text{NORMALIZED RUBRICS SCORE}) = & \\ & 0.6 \times (\text{TDP SCORE}) / (\text{BEST TDP SCORE}) \\ & + 0.2 \times (\text{VIDEO SCORE}) / (\text{BEST VIDEO SCORE}) \\ & + 0.2 \times (\text{POSTER SCORE}) / (\text{BEST POSTER SCORE}) \end{aligned}$$

5. The Rubrics for TDP, Video and Poster will be available on the RoboCupJunior website and the RCJ Rescue Community website.
6. The score from the Technical Challenge will be normalized with the score of the best team:

$$(\text{NORMALIZED TECHNICAL CHALLENGE SCORE}) = (\text{TECHNICAL CHALLENGE SCORE}) / (\text{BEST TECHNICAL CHALLENGE SCORE})$$

7. The final score is made up of a weighted sum of normalized scores from the field score, the rubrics and the Technical Challenge as such:

$$\begin{aligned} \text{(TOTAL SCORE)} &= \\ &0.6 \times \text{(MEAN OF NORMALIZED FIELD SCORES)} \\ &+ 0.2 \times \text{(NORMALIZED RUBRICS SCORE)} \\ &+ 0.2 \times \text{(NORMALIZED TECHNICAL CHALLENGE SCORE)} \end{aligned}$$

8. Ties in scoring will be resolved based on the mean of normalized field scores.

7.2. Technical Challenge

The Technical Challenge is an additional part of the competition where each team's ability to quickly modify the behavior of their robot will be tested. It consists of one or more mini-tasks with only a limited timespan to solve.

1. The Technical Challenge will take place after the scoring runs have ended.
2. The rules of the individual parts of the Technical Challenge will not be announced before the competition. The teams will only have limited time to prepare for the Challenge.
3. The timeframe for the completion of these tasks will be announced alongside the rules and scoring at a team meeting after the scoring runs.
4. The rules will require the teams to reprogram their robot to change its behavior. There will be no hardware changes required compared to the main scoring runs.
5. The time given will correspond to the difficulty level of the tasks.
6. Any external contact during the Technical Challenge is prohibited; non-team members are not allowed to take place on the competition area or to help the competitors remotely.

7.3. SuperTeam Challenge

The SuperTeam Challenge takes place independently of the main competition and won't influence the team's individual score. It has its own award and is focused on the cooperation between the teams.

1. Each SuperTeam will consist of at least two teams. Teams coming from regions that share a native language will not be part of the same SuperTeam.
2. The rules of the SuperTeam Challenge will be announced at the competition and require the teams of each SuperTeam to work together.
3. The SuperTeam Challenge will require substantial software changes and may require minor hardware adjustments.



It is highly recommended that teams bring some kind of communication hardware or think about a communication mechanism for this challenge.

4. The robot brought to the competition must remain substantially the same robot for the Super Team Competition.
5. Modifications should maintain the robot's original functional concept, mechanical layout, and

overall design approach. Changes that effectively create a second, entirely different robot are not allowed.

8. Open Technical Evaluation

8.1. Description

1. The organizers will evaluate your technical innovation during a dedicated time frame. All teams need to prepare for an open display during this time frame.
2. Judges will circulate and interact with the teams. The Open Technical Evaluation is intended to be a casual conversation with a question-and-answer atmosphere.
3. The Open Technical Evaluation's main objective is to emphasize the innovation's ingenuity. Innovative may mean technical advances compared to existing knowledge or an out-of-the-ordinary, simple but clever solution to existing tasks.

8.2. Evaluation Aspects

1. A standardized rubric system will be used, focusing on:
 - creativity
 - cleverness
 - simplicity
 - functionality
2. Your 'work' can include (but is not limited to) one of the following aspects:
 - creation of your own sensor instead of a pre-built sensor
 - creation of a 'sensor module' which is comprised of various electronics resulting in a self-contained module to provide a specific functionality
 - creation of a mechanical invention that is functional but out of the ordinary
 - creation of a new software algorithm for a solution

8.3. Documents

1. Teams must provide documents that explain their work. Each invention must be supported by concise but clear documentation. The documents must show precise steps towards the creation of the invention.
2. The deadline for delivering the documents is scheduled for 3 weeks before the first day of the competition through an online form.
3. Documents must include one Technical Description Paper (TDP), one Poster and one Video. Teams should be prepared to explain their work.
4. All teams must submit their TDP before the competition. The TDP is a public document that will be

shared with the community. The competition organizer will ask the team to fill out the web form or ask to submit a PDF file. All teams must strictly follow the guidance on the web form or, in the case of PDF submissions, strictly follow the template provided. If a team does not follow this guidance / template (including but not limited to the different sections, fonts, sizes and lengths) the score for the document will be 0 and is not going to be evaluated. A template for the TDP and rubrics are available on the [RoboCupJunior Rescue Community Website](#).

5. All teams must submit a Poster file before the competition and bring a physical Poster to the competition venue. The Poster is a public document that will be shared with the community during the Poster Presentation session at the competition venue. The poster should include but is not limited to: the name of the team, country, league, robot description, robot capabilities, controller, the programming language used, sensors included, method of construction, time used for development, cost of materials, and awards won by the team in its country, etc. A guide for the poster format and rubrics are available on the [RoboCupJunior Rescue Community Website](#).
6. All teams must create and submit a Video before the competition. The Video should be short and showcasing the work of the team. These videos will be presented during the competition and should summarize the key aspects of the team's project, design process, and innovations. A guide for the video format and rubrics are available on the [RoboCupJunior Rescue Community Website](#).

8.4. Sharing

1. Teams are encouraged to review others' posters, TDPs and presentations.
2. Teams awarded certificates must post their documents and presentation online when the RoboCupJunior Rescue Committee asks.

9. Judging

1. During each game there shall be two judges in the competition area who are responsible for the field, persons and objects surrounding it.
2. During the game, decisions made by the field judge or assistant field judge are final.
3. If a rule is broken the field judge may call a lack of progress or end of game, depending on the severity.
4. After the game a designated team member shall review the games score-sheet and if they agree sign it. If the designated team member does not agree with the scoring they shall not sign and write a comment on why not. In the case of a disagreement with the score-sheet the competitions organizing committee shall investigate and decide on a resolution.
5. The competitions organizing committee shall only overrule a field judges decision if it is a clear and obvious mistake.
6. The competitions organizing committee may at any time release rules updates and/or rules clarifications. In this event they shall make this clear to competing teams.
7. Any rule violations may be penalized by disqualification from the tournament or the game or result in a loss of points at the discretion of the judges, officials, or competitions organizing committee.