RoboCupJunior Rescue Maze Rules 2026

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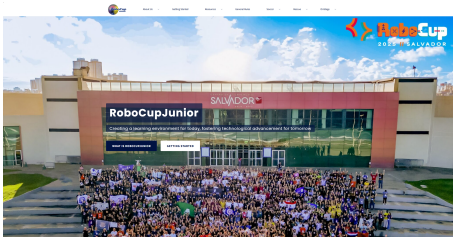
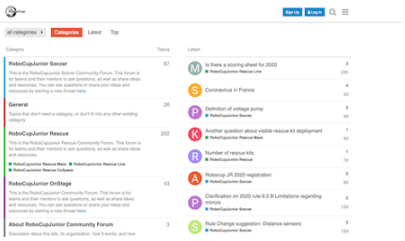
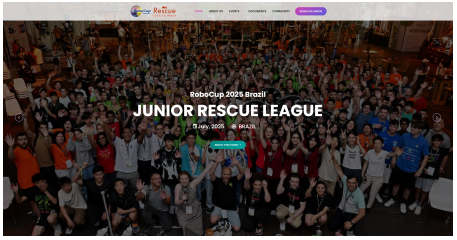
Official Resources

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

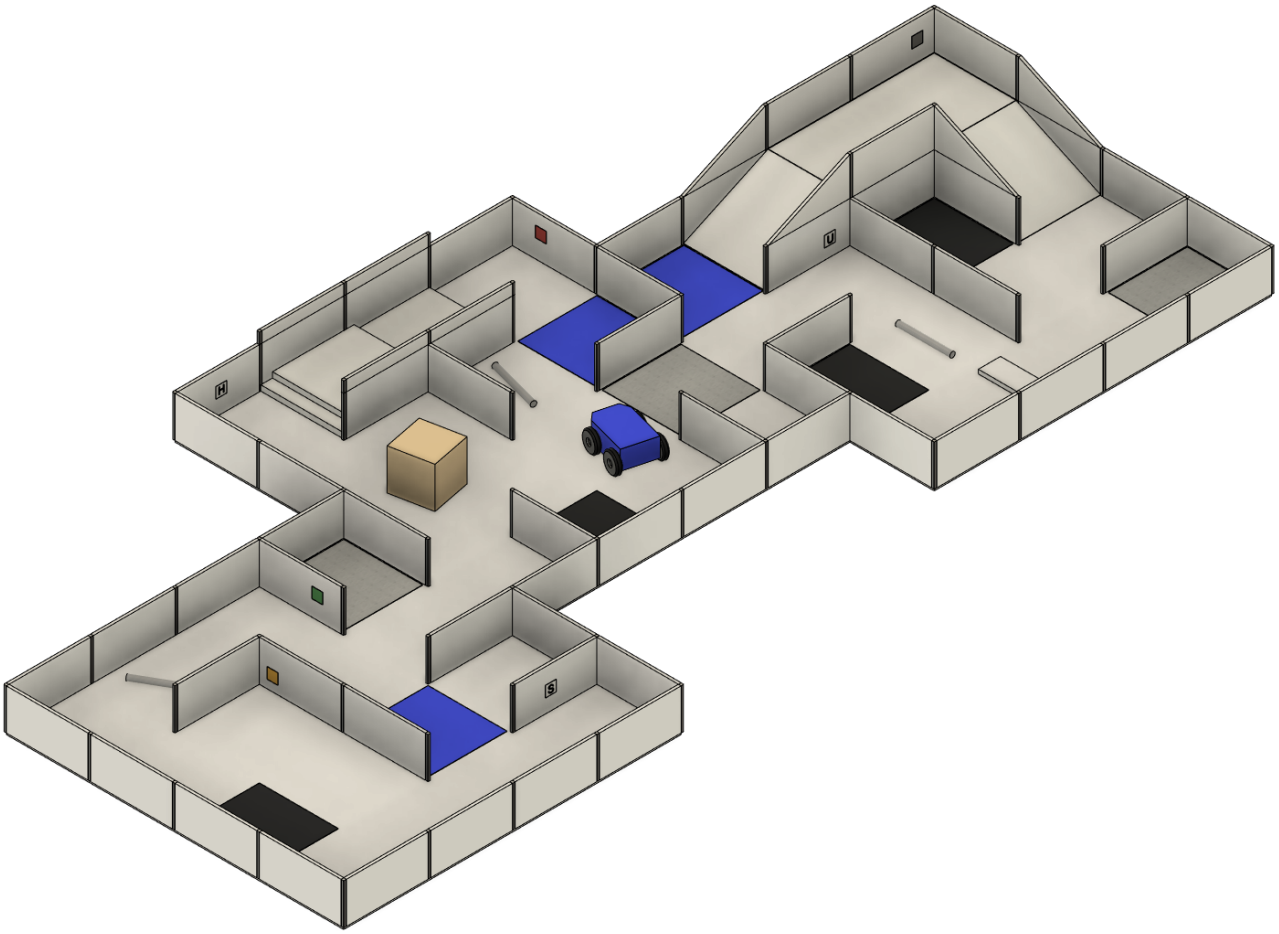
Corrections and clarifications to the rules may be posted on the forum before updating this rule file. It is the responsibility of the teams to review the forum to have a complete vision of these rules.

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 2026. 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.

Scenario

The land is too dangerous for humans to reach the victims. Your team has been given a difficult task. The robot must be able to carry out a rescue mission in a fully autonomous mode with no human assistance. The robot must be durable and intelligent enough to navigate treacherous terrain with hills, uneven land, and rubble without getting stuck. The robot must search for victims, dispense rescue kits, and signal the position of the victims so the humans can take over. Time and technical skills are essential! Come prepared to be the most successful rescue team.



Summary

The robot needs to search through a maze for victims. The maze can contain an area which is called "Dangerous Zone". This area is considered more challenging than the rest of the field. The robot is not supposed to find the fastest path through the labyrinth; instead, it should explore as much of the maze as possible. The robot will be awarded 5, 10, 15, or 30 points for each **cognitive target** [1] or letter victim detected, dependent on its location in the field. Suppose the robot can successfully deliver a rescue kit close to a victim. In that case, it will earn an additional 10 **or 30** points per **victim** [2]. The number of maximum extra points depends on the type of victim.

- **30** [3] points for harmed letter victims
- 10 points for stable letter victims
- No additional points for an unharmed letter victim
- **30** [4] points for a **harmed cognitive target** [5]
- 10 points for a **stable cognitive target** [6]
- No additional points for a **unharmed cognitive target** [7]

If the robot is stuck in the maze, it can be restarted at the last visited checkpoint. A reflective floor indicates checkpoints, so the robot can save the position to a map (if it uses a map) in a non-volatile medium and restore it in case of a restart. The robot must also avoid areas with black floors.

If the robot can find its way back to the beginning of the maze after exploring the whole maze, it will receive an exit bonus. The robot will also earn a reliability bonus if the robot can exit the maze with a minimum number of restarts. Suppose the robot can find its way back to the beginning after exploring the maze. In that case, it will receive 10 bonus points per identified victim, **10 bonus points for every blue tile which was only visited once, 5 bonus points for each successful stair navigation and 5 bonus points for each successful ramp navigation** as an exit bonus.

The robot can earn additional points by navigating the following hazards:

- 10 points for going up or down a ramp
- 10 points for each visited checkpoint
- 5 points for passing through each tile with speed bumps
- 10 points for navigating a set of stairs

Changes from the 2025 RoboCupJunior Rescue Maze Rules

- Deleted "Terms and Definitions"
- Changed "colored" to "cognitive target"
- Changed "rescue kit" to "victim"
- Added "or 30"
- Changed "20" to "30"
- Changed "20" to "30"
- Changed "red-colored victim" to "harmed cognitive target"
- Changed "yellow-colored victim" to "stable cognitive target"
- Changed "green-colored victim" to "unharmed cognitive target"
- Added "10 bonus points for every blue tile which was only visited once, 5 bonus points for each successful stair navigation and 5 bonus points for each successful ramp navigation"
- Added "The definition of walls also include the support structure on the ends (e.g. item profiles, pillars, ...)."
- Changed "in dimension (±10% variation on the tile size) than a tile due to the nature of placing walls." to "due to the walls not being indefinitely thin. That leads that the pathway between two opposite walls is 28 cm wide."
- Deleted "for the robot are intended to be of the width of the tile and"
- Changed "colored victims" to "cognitive targets"
- Added "or cognitive targets with values that do not represent a health status."
- Changed "H" to "Φ"
- Changed "S" to "Ψ"
- Changed "U" to "Ω"
- Deleted "Colored victims are printed on or attached to a wall. Their size will be 16 cm² with no more than 6 cm in either dimension. Three colors are used: red, yellow, and green."
- Added "Cognitive targets have the shape of a circle. The outermost circle has a diameter of 5 cm, consisting of up to 5 concentric rings. The innermost circle has a diameter of 1 cm, and the diameter of each subsequent outer ring increases by 1 cm, resulting in rings with diameters of 1 cm, 2 cm, 3 cm, 4 cm, and 5 cm. The rings and the circle can have different colors. The color of the rings and the circle correspond to a numerical value:"
- Added "Black = -2"
- Added "Red = -1"
- Added "Yellow = 0"
- Added "Green = 1"

- Added "Blue = 2"
- Added "The health status of the victims at the cognitive target can be calculated by summing up the value of the 5 rings. Adjacent rings of the same color are not merged. The robot must always consider each of the 5 rings separately and sum the value for all 5 rings, regardless of whether colors repeat. Depending on the sum, the health status can be determined."
- Added "Harmed victim: sum = 2"
- Added "Stable victim: sum = 1"
- Added "Unharmed victim: sum = 0"
- Changed "12" to "8"
- Added "Robots are strictly prohibited from intentionally marking any part of the competition field."
- Changed "colored" to "letter"
- Changed "letter victims" to "cognitive targets"
- Changed "colored" to "letter"
- Changed "letter victims" to "cognitive targets"
- Changed "per successful rescue kit deployment." to "for one successful rescue kit deployment, while 30 points are awarded for two successful rescue kit deployments to the same victim."
- Changed "H" to "Φ"
- Changed "20" to "30"
- Changed "S" to "Ψ"
- Changed "U" to "Ω"
- Changed "Colored victims" to "Cognitive targets"
- Changed "Red" to "Harmed (2)"
- Changed "20" to "30"
- Changed "Yellow" to "Stable (1)"
- Changed "Green" to "Unharmed (0)"
- Added "Successful blue tile visits (SBV). 30 points are awarded for visiting a blue tile once. Partially successful blue tile visits - if the robot revisits the exact same blue tile, the score for a blue tile is reduced. For every subsequent time the robot visits that exact same tile, the total score awarded for that specific tile will be reduced by 10 points. The score of a single blue tile can not go below 0."
- Added ", successful blue tile visits (SBV)"
- Added "+ (SBV) × 10"
- Changed "10" to "15"
- Added "10 points for every successful blue tile visits (SBV), 5 points for every successful stair navigation (SSN) and 5 points for every successful ramp navigation (SRN)"
- Added "+ (SBV) × 10 + (SSN) × 5 + (SRN) × 5"
- Added "The robot brought to the competition must remain substantially the same robot for the Super

Team Competition."

- Added "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."

Contents

1. RoboCupJunior International 2026 General Rules

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 gameplay 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. 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. 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.

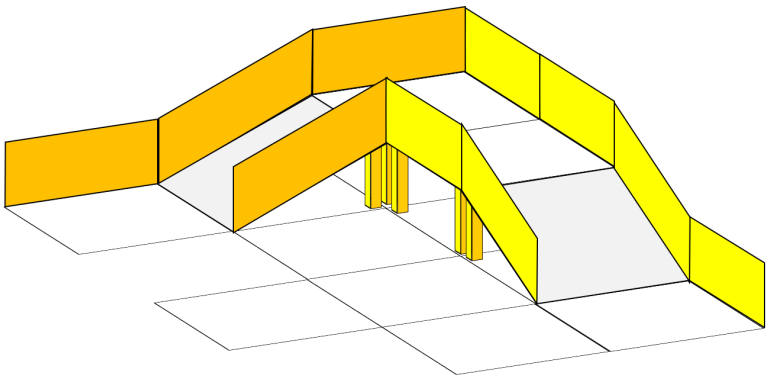
2.6. Sharing

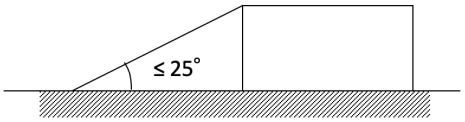
1. The spirit of world RoboCup competitions is that teams should share technological and curricular developments with other participants after the tournament. Sharing furthers the mission of RoboCupJunior as an educational initiative.
2. The RoboCupJunior Rescue Committee may publish developments on 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. Field

3.1. Description

1. The field layout will consist of a collection of tiles with a horizontal floor, a perimeter wall, ramps, and walls within the field.
2. All tiles are defined as a 30 cm x 30 cm space.
3. All walls used to create the maze are at least 15 cm high from any floor or the peaks of stairs, 30 cm in length, and are mounted on the edges of the tiles.
4. **The definition of walls also include the support structure on the ends (e.g. item profiles, pillars, ...).**
5. Tiles will be used as ramps. They will have an incline with a maximum of 25 degrees from the horizontal and are always straight.
6. Ramps must NOT have a drop-off immediately following a rise section, creating a peak-like structure, or vice versa.



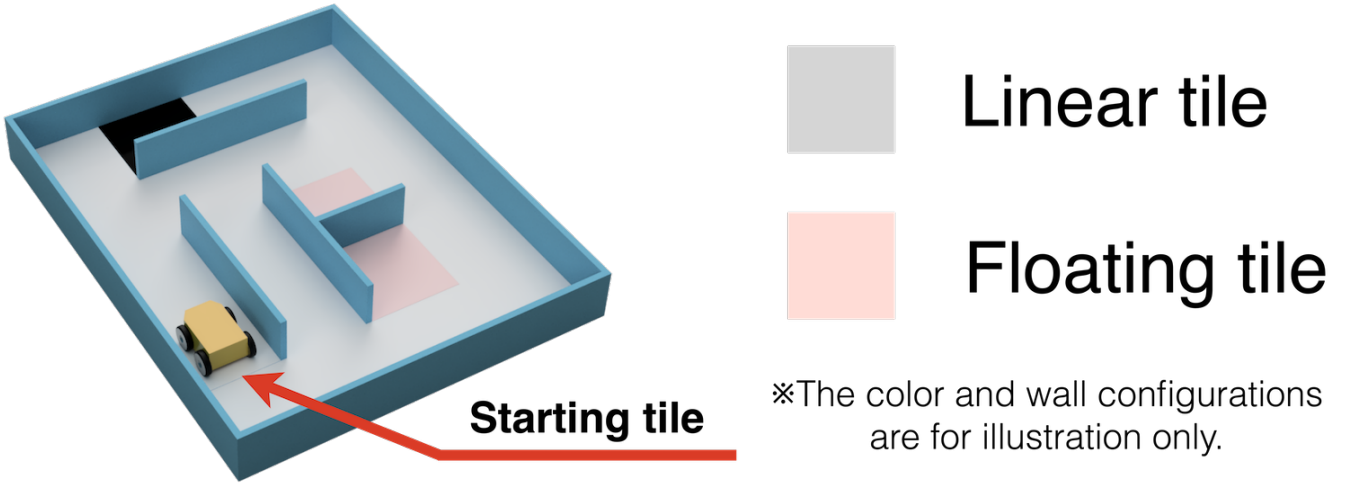


3.2. Floor

1. Floors may be either smooth or textured (like linoleum or carpet) and may have deviations of up to 3 mm in height between the tiles. There may be holes in the floor (approximately 5 mm in diameter) for fastening walls.
2. Colored tiles:
   a. There will be tiles of different colors on the floor of the maze. The meaning of each color is explained below.
   b. Colored tiles will be placed at the start of each game.
   c. The organizers will fix colored tiles to the floor, but teams should be prepared for slight movements of these tiles.
3. Black tiles in the field represent holes, which the robot must avoid.
4. Silver tiles in the field represent checkpoints.
5. Blue tiles:
   a. Blue tiles in the field represent puddles or other hard-to-traverse terrains.
   b. If a robot visits a blue tile, it has to stop for 5 consequent seconds before visiting another tile.
6. Red tiles in the field represent the entrance of the dangerous zone.
7. Robots must be designed to navigate under tiles that form bridges over other tiles. Tiles placed above other tiles will be supported by walls. The minimum height (space between the floor and the ceiling) will be 25 cm.

3.3. Path

1. Tiles that lead to the starting tile consistently following the leftmost or rightmost wall are called 'linear tiles'. The tiles that do NOT lead to the starting tile consistently following the leftmost or rightmost wall are called 'floating tiles'.
2. Black tiles will affect the determination of tile type (linear or floating) since they can be considered virtual walls.

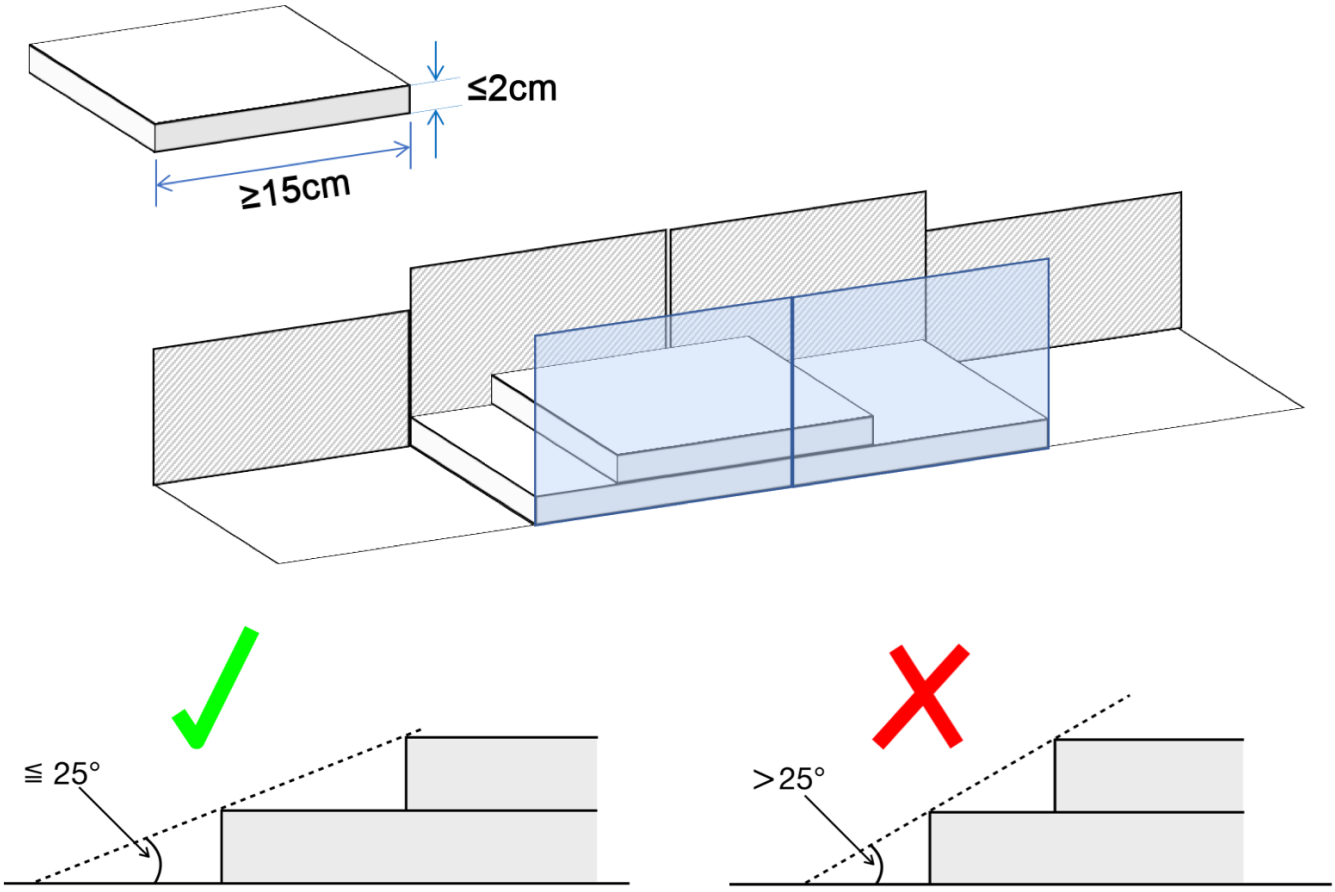


3. Teams must prepare for the pathways to be slightly smaller **due to the walls not being indefinitely thin. That leads that the pathway between two opposite walls is 28 cm wide.** [8]
4. Pathways [9] may open into foyers more expansive than the pathways.
5. One tile is the starting tile, where a robot should start and exit the run. It can be located anywhere in the field.
6. Walls may be removed, added, or changed just before a scoring run starts to prevent teams from pre-mapping the layout of the fields. Organizers will do their best not to change the maze's length or difficulty when introducing these changes.

3.4. Speed Bumps, Obstacles, and Stairs

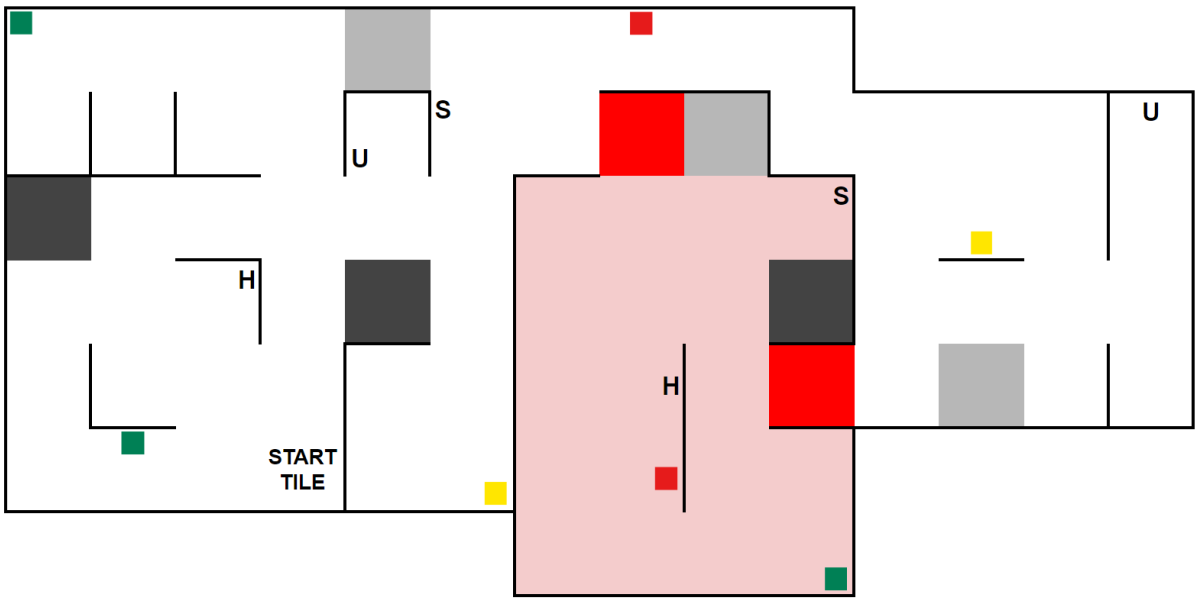
1. Speed bumps are fixed to the floor and have a maximum height of 1 cm.
2. Speed bumps are not allowed to be placed on ramps or stairs.
3. Obstacles:
    a. have a minimum height of 15 cm.
    b. may consist of any large, heavy items.
    c. may be fixed to the floor.
    d. may be any shape.
4. Organizers may place obstacle either:
    a. at least 20 cm from any wall OR
    b. touching any wall and at least 20 cm from the opposite edge of the tile and any other obstacles.
5. Obstacles that are moved or knocked over must remain where they are moved or fall and will not be reset during the scoring run.
6. The width of the stairs is the same as the path. The maximum height is 2 cm. The length of the top of the stairs is at least 15 cm.
7. The incline of stairs (i.e., the angle of a plate to the horizontal when placed on the stairs) will be less than 25 degrees outside the dangerous zone.

8. Stairs may be used to change the level of the floor, similar to a ramp.
9. Stairs will be placed between walls.



3.5. Dangerous Zone

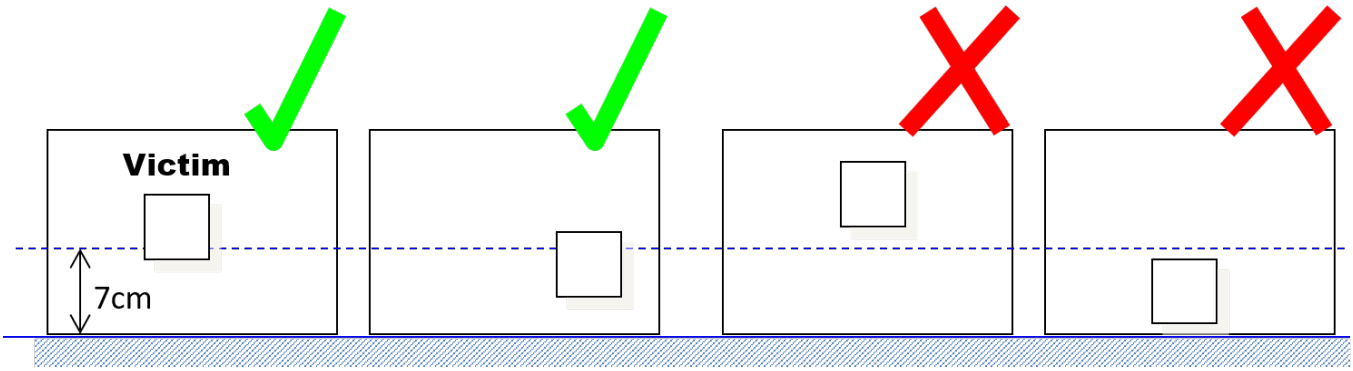
1. The Dangerous Zone is an area considered more challenging than the rest of the field.
2. The Dangerous Zone is marked by a red tile at the entrance and completly surrounded by walls.
3. The Dangerous Zone does not block the path for completing the entire map. Therefore, the rest of the field can be completed without entering the Dangerous Zone.
4. Speed bumps are allowed to be placed on ramps inside the dangerous zone.
5. The debris is not fixed to the floor and has a maximum height of 1 cm inside the dangerous zone.
6. The incline of stairs (i.e., the angle of a plate to the horizontal when placed on the stairs) will be less than 30 degrees inside the dangerous zone.
7. Speed bumps are fixed to the floor and have a maximum height of 2 cm inside the dangerous zone.
8. The start tile will not be inside the Dangerous Zone.



The tiles inside the dangerous zone won't be red (except for the entrance), this is just for illustration purposes.

3.6. Victims

1. There are two types of victims: letter victims and **cognitive targets** [10].
2. Victims are located near the floor of the field (located about 7 cm above the floor, see the figure below).



3. Organizers will never locate victims on walls facing black/silver/blue/red tiles, tiles with obstacles/speedbumps/stairs, and ramps.
4. There may be objects that resemble victims in appearance but are not victims. This includes but is not limited to letters, symbols or colors other than the ones described on this section **or cognitive targets with values that do not represent a health status.** Such objects should not be identified as victims by robots.
5. Letter victims are uppercase letters printed on or attached to the wall. They are printed in black, using a sans serif typeface such as 'Arial'. They can be rotated, and their height will be 4 cm. The letters represent the health status of the victim.
    a. Harmed victim: **Φ** [11]

b. Stable victim: **Ψ** [12]

c. Unharmed victim: **Ω** [13]

6. [14] **Cognitive targets have the shape of a circle. The outermost circle has a diameter of 5 cm, consisting of up to 5 concentric rings. The innermost circle has a diameter of 1 cm, and the diameter of each subsequent outer ring increases by 1 cm, resulting in rings with diameters of 1 cm, 2 cm, 3 cm, 4 cm, and 5 cm. The rings and the circle can have different colors. The color of the rings and the circle correspond to a numerical value:**

   a. **Black = -2**

   b. **Red = -1**

   c. **Yellow = 0**

   d. **Green = 1**

   e. **Blue = 2**

7. **The health status of the victims at the cognitive target can be calculated by summing up the value of the 5 rings. Adjacent rings of the same color are not merged. The robot must always consider each of the 5 rings separately and sum the value for all 5 rings, regardless of whether colors repeat. Depending on the sum, the health status can be determined.**

   a. **Harmed victim: sum = 2**

   b. **Stable victim: sum = 1**

   c. **Unharmed victim: sum = 0**

Example of a cognitive targets. The numbers are from the center outwards.

3.7. Rescue Kits

1. A rescue kit represents an essential health package distributed to a victim caught in a natural disaster. It symbolizes tools, medical supplies, or devices used in the rescue process, such as GPS transponders or even something as simple as a light source.
2. Because we need to ensure that a rescue kit reaches the victim, it has to stay near the victim after the deployment. For example, it cannot roll away from or bounce away from the victim.
3. Each rescue kit must have a minimum size of 1 cm in each dimension and have a minimum volume of 1 cm^3 after deployment.
4. A robot can only carry a maximum number of **8** [15] rescue kits.
5. Each team is responsible for its rescue kit system, including bringing the rescue kits to the competition. The team captain is responsible for loading the rescue kits onto their robot and collecting it from the field with the referee's authorization after the end of the run.
6. Deployment of the rescue kit must be very clear to the referee.

3.8. Environmental Conditions

1. The environmental conditions at a tournament may differ from those at home practice fields. Teams must come prepared to adjust their robots to the conditions at the venue.
2. Lighting and magnetic conditions may vary in the rescue field.
3. The field may be affected by magnetic fields (e.g., under-floor wiring and metallic objects). Teams should prepare their robots to handle such interference.
4. The field may be affected by unexpected lighting interference (e.g., camera flash from spectators). Teams should prepare their robots to handle such interference.
5. The RoboCupJunior Rescue Committee will try its best to fasten the walls onto the field floor so that the impact from contact should not affect the robot.
6. All measurements in the rules have a tolerance of ±10%.
7. Objects detected by the robot will be distinguishable from the environment by their color or shape.

4. Robots

4.1. [1] Control

1. Robots must be controlled autonomously. Using a remote control, manual control, or passing information (by external sensors, cables, wirelessly, etc.) to the robot is not allowed.
2. Robots must be started manually by the team captain.
3. Any pre-mapped type of dead reckoning (movements preprogrammed based on known locations or placement of features in the field) is prohibited.
4. A robot must not damage any part of the field in any way.

5. Robots may utilize various maze navigation algorithms.

4.2. Construction

1. Any robot kit or building blocks, either available on the market or built from raw hardware, may be used as long as the design and construction of the robot are primarily and substantially the students' original work.
2. Robots like drones or hovercrafts are prohibited in the challenge due to safety reasons.
3. Teams are not permitted to use commercially produced robot kits or sensor components specifically designed or marketed to complete any single primary task of RoboCupJunior Rescue. Robots that do not comply will face immediate disqualification from the tournament. If there is any doubt, teams should consult the RoboCupJunior Rescue Committee before the competition.
4. Only lasers from classes 1 and 2 are allowed for the safety of participants and spectators. The organizers will check this during the inspection. Teams using lasers must have the datasheet of the laser and submit them before the competition and be able to show them during the competition.
5. Robots may incur damage by falling off the field, making contact with another robot, or contacting field elements. The RoboCupJunior Rescue Committee cannot anticipate all potential situations where damage to the robot may occur. Teams should ensure that all active elements on a robot are adequately protected with resistant materials. For example, teams must protect electrical circuits from all human contact and direct contact with other robots and field elements.
6. When batteries are transported, moved, or charged, it is strongly recommended that safety bags be used. Reasonable efforts should be made to ensure that robots avoid short circuits and chemical or air leaks.
7. **Robots must be equipped with a handle that is to be used to pick them up during the scoring run.**
8. **Robots must be equipped with a single physical binary switch/button (with exception of buttons that are a part of commercial controller), clearly visible to the referee, for starting the robot at the beginning of the run and when a lack of progress occurs. The procedure performed after a LoP occurs can only include this button and at most one more switch for cutting the power. Teams have to notify the referee about their LoP procedure before each scoring run, and only this procedure is allowed to be performed after a LoP.**
9. The height of a robot must not exceed 25 cm.
10. Robots may not have sensors or devices that enable them to 'see' over the walls.
11. The robot must be equipped with one specific LED or display that is dedicated only for identifying victims. The LED or display must be clearly visible to the referee.
12. **Robots are strictly prohibited from intentionally marking any part of the competition field.**

4.3. Team

1. Each team must have only one robot in the field.
2. Each team must comply with the RoboCupJunior General Rules regarding the number of members

and each member's age.

3. Each team member must explain their work and have a specific technical role.
4. A student can be registered on only one team across all RoboCupJunior leagues/sub-leagues.
5. A team can only participate in one league/sub-league across all RoboCupJunior leagues/sub-leagues.
6. Mentors/parents are not allowed to be with the students during the competition. The students will have to govern themselves (without a mentor's supervision or assistance) during the long stretch of hours at the competition.

4.4. Inspection

1. A panel of referees will scrutinize the robots before the start of the tournament and at other times during the competition to ensure that they meet the constraints described in these rules.
2. Using a robot similar to another team's robot from a previous year or the current year is illegal.
3. The team's responsibility is to have their robot re-inspected if modified at any time during the tournament.
4. Students will be asked to explain their robot's operation to verify that its construction and programming are their own work.
5. Students will be asked about their preparation efforts. The RoboCupJunior Rescue Committee may request them to answer surveys and participate in videotaped interviews for research purposes.
6. All teams must complete a web form before the competition to allow referees to prepare better for the interviews. The RoboCupJunior Rescue Committee will provide instructions on submitting the form to the teams at least 4 weeks before the competition.
7. All teams have to submit their source code before the competition. The organizers will not share the source code with other teams without the team's permission. The organizers will request permission at the registration.

4.5. Violations

1. Any violations of the inspection rules will prevent the offending robot from competing until modifications are made, and the robot passes inspection.
2. Teams must make modifications within the schedule of the tournament, and teams cannot delay tournament play while making modifications.
3. Suppose a robot fails to meet all specifications (even with modifications). In that case, it will be disqualified from that game (but not from the tournament).
4. No mentor assistance is allowed during the competition. (See Section 2, "Code of Conduct")
5. 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 referees, officials, or RoboCupJunior Rescue Committee.

5. Play

5.1. Pre-game Practice

1. When possible, teams will have access to practice fields for calibration and testing throughout the competition.
2. Whenever there are dedicated independent fields for competition and practice, it is at the organizers' discretion if testing is allowed on the competition fields.

5.2. Humans

1. Teams should designate one of their members as 'captain' and another as 'co-captain'. Only these two team members will be allowed access to the competition fields unless directed by a referee. Only the captain can interact with the robot during a scoring run.
2. The captain can move the robot only when they are told to do so by a referee.
3. Other team members (and any spectators) within the vicinity of the competition field must stand at least 150 cm away from the field unless directed by a referee.
4. No one is allowed to touch the fields intentionally during a scoring run.
5. All pre-mapping activities will immediately disqualify the robot for the round. Pre-mapping is the act of humans providing the robot with information about the field (e.g., location of walls, location of black/silver/blue/red tiles, location type of victims, etc.) before the game.

5.3. Start of Game

1. Each team has a maximum of 8 minutes for a game. The game includes the time for calibration and the scoring run.
2. Calibration is defined as taking sensor readings and modifying a robot’s program to accommodate such sensor readings. Calibration does not count as pre-mapping.
3. The scoring run is defined as the time when the robot is moving autonomously to navigate the field, and the referee will record the scores.
4. A game begins at the scheduled starting time, whether or not the team is present or ready. Start times will be posted around the venue.
5. Once the game has begun, the robot is not permitted to leave the competition area.
6. Teams may calibrate their robot in as many locations as desired on the field, but the clock will continue to run. Robots are not permitted to move on their own while calibrating.
7. Before a scoring run begins, the referee will roll a standard 6-sided dice or another method of randomization set by the organizers to determine the location of the black, blue, red and silver tiles. Organizers will not reveal the position of the black, blue, red and silver tiles to the team until they are ready to start a scoring run. Referees will ensure the combination of black tile placements in a field layout is 'solvable' before a robot begins a scoring run.

8. Before a scoring run begins, the referee can change any walls of the field (see Section 3.3, “Path”).
9. Once a team is ready to start a scoring run, the team must notify the referee. To start a scoring run, the robot is placed on the start tile of the course, as indicated by the referee. Once a scoring run has begun, no more calibration is permitted, including changing code/code selection.
10. Teams may choose not to calibrate the robot and immediately start the scoring run instead.
11. Once the robot starts moving as the scoring run begins, a referee will place the black, blue, red and silver tiles.

5.4. Scoring Run

1. Modifying the robot during a scoring run is prohibited, which includes remounting parts that have fallen off.
2. Any parts the robot loses intentionally or unintentionally will be left on the field until the game ends. Team members and referees cannot move or remove elements from the field during a scoring run.
3. Teams cannot give their robot any information about the field. A robot is supposed to recognize the field elements by itself.
4. A 'visited tile' means that more than half of the robot is inside the tile when looking from above.

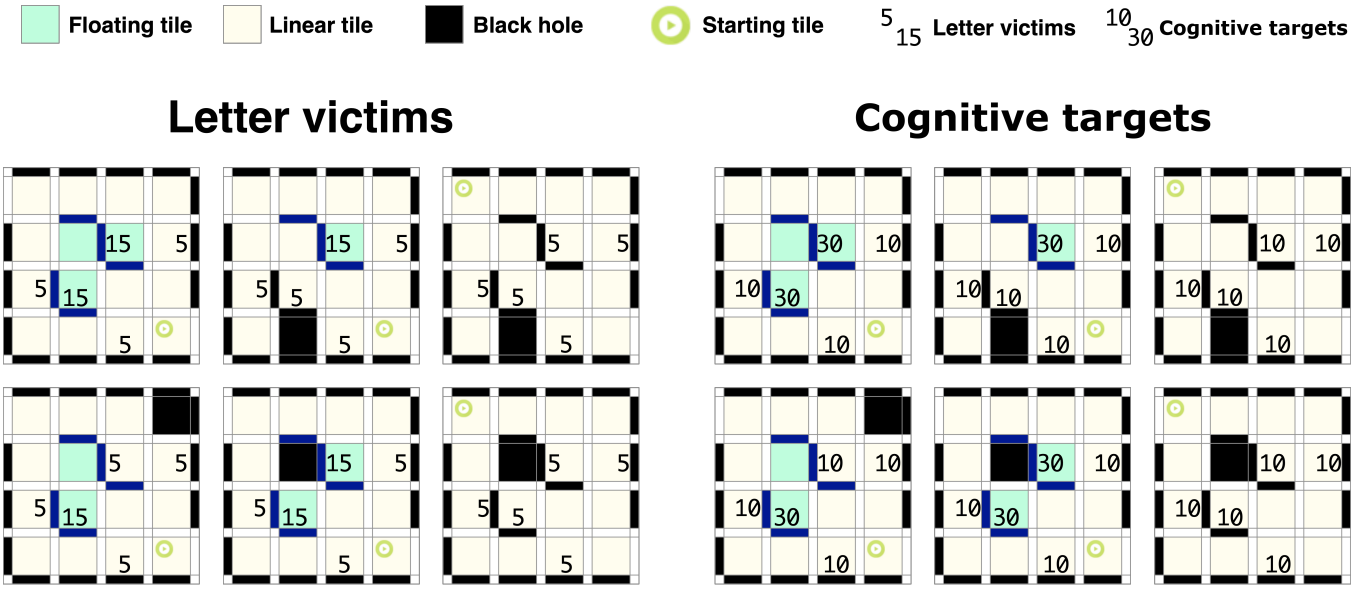
5.5. Lack of Progress

1. A lack of progress occurs when:
   a. the team captain declares a lack of progress.
   b. a robot visited the black tile. See the definition of visited tile on Section 5.4, “Scoring Run”.
   c. a robot visits another tile without stopping for 5 consequent seconds after visiting a blue tile. See the definition of visited tile on Section 5.4, “Scoring Run”.
   d. a robot damages the field.
   e. a team member touches the field or their robot without permission from a referee.
2. In the event of a lack of progress, the robot must return to the last visited checkpoint (or the start tile if it never reached a checkpoint). The robot can be installed in any direction. For the definition of the visited tile (see Section 5.4, “Scoring Run”).
3. After a lack of progress, only the LoP procedure explained to the referee before the run start is allowed to be performed (see Section 4.2, “Construction”).

5.6. Scoring

1. To successfully identify a victim, the robot must stop within 15 cm of a victim and blink with the specific LED or Display (see Section 4.2, “Construction”) that is cleary visible to the referee for the full 5 seconds while stationary. The blink interval (ON: 500ms, OFF: 500ms) must be followed to successfully identify a victim.
2. Points are rewarded for each Successful Victim Identification in the field.

a. For victims located on a linear tile.
   i. For **letter** [16] victims: 5 points
   ii. For **cognitive targets** [17]: 10 points
b. On floating tiles
   i. For **letter** [18] victims: 15 points
   ii. For **cognitive targets** [19]: 30 points



The color in the figure is for illustration only. Some tiles change between floating or linear depending on the adjacent black tiles. The field designer must remember this rule when deciding on the location of the black tiles. They can be changed during the run via a dice roll to keep the maximum score consistent.

3. A robot must deploy a rescue kit entirely within 15 cm of the victim to successfully deploy a rescue kit. The deployment point is determined by the location of the rescue kit when the robot moves entirely out of the 15 cm boundary of the victim.
4. No points will be awarded for delivering a rescue kit to a victim that wasn't successfully identified first.
5. 10 points are awarded **for one successful rescue kit deployment, while 30 points are awarded for two successful rescue kit deployments to the same victim.** [20] The robot can score the following amount of rescue kits points:
   a. Letter victims:
      i. Harmed (**Φ** [21]): two rescue kits per victim. (Maximum points for rescue kit deployment per victim: **30** [22] points.)
      ii. Stable (**Ψ** [23]): one rescue kit per victim. (Maximum points for rescue kit deployment per victim: 10 points.)
      iii. Unharmed (**Ω** [24]): zero rescue kit per victim.
   b. **Cognitive targets** [25]:

i. **Harmed (2)** [26]: two rescue kits per victim. (Maximum points for rescue kit deployment per victim: **30** [27] points.)

ii. **Stable (1)** [28]: one rescue kit per victim. (Maximum points for rescue kit deployment per victim: 10 points.)

iii. **Unharmed (0)** [29]: zero rescue kits per victim.

6. **Successful blue tile visits (SBV). 30 points are awarded for visiting a blue tile once. Partially successful blue tile visits - if the robot revisits the exact same blue tile, the score for a blue tile is reduced. For every subsequent time the robot visits that exact same tile, the total score awarded for that specific tile will be reduced by 10 points. The score of a single blue tile can not go below 0.**

7. The Reliability Bonus is a non negative number and consists of the number of successful victim identifications (SVI), successful rescue kit deployments (SRD)**, successful blue tile visits (SBV)** and a deduction for the total number of Lack of Progresses (LoP) as such:

```
(RELIABILITY BONUS) = (SVI) x 10 + (SRD) x 10 + (SBV) x 10 - (LoP) x 15 [30]
```

8. Successful Speed Bump Crossing. For each tile with speed bumps passed, a robot is awarded 5 points.

9. Successful Up or Down Ramp Navigation. A robot is awarded 10 points for successfully navigating up or down a ramp (i.e., the robot can score a maximum of 10 points per ramp). The robot has successfully navigated through the ramp when it moves from the bottom to the top tile (or vice-versa) and is entirely within the horizontal tile without toppling over.

10. Successful Up or Down Stair Navigation. A robot is awarded 10 points for successfully navigating up or down the stairs (i.e., the robot can score a maximum of 10 points per stair (up or down)). Successful navigation means the robot moves from the bottom to the top of the stairs (or vice-versa) and is entirely within the horizontal tile without toppling over.

11. Successful Checkpoint Navigation. A robot is awarded 10 points for each visited checkpoint. Refer to Section 5.4, “Scoring Run” for definition of visited tile.

12. Successful Exit Bonus. A robot is awarded 10 points for each victim successfully identified (SVI), **10 points for every successful blue tile visits (SBV), 5 points for every successful stair navigation (SSN) and 5 points for every successful ramp navigation (SRN)**. The 'exit bonus' condition is satisfied when the robot returns to the starting tile. On the starting tile, the robot has to blink (ON: 1s, OFF: 1s) with the same LED or display that is used to identify a victim (see Section 4.2, “Construction”) for at least 10 seconds.

```
(SUCCESSFUL EXIT BONUS) = (SVI) x 10 + (SBV) x 10 + (SSN) x 5 + (SRN) x 5
```

13. No duplicate rewards. For example, suppose a robot successfully crosses a tile with speed bumps multiple times. In that case, only one successful speed bump crossing will be rewarded per tile. The same result applies to all other scoring rules.

14. Misidentification. If a robot identifies a victim but is outside the 15 cm radius of any victim, 5 points will be deducted. This scenario doesn’t apply to delivering the incorrect number of rescue kits to

victims. The total points will never go below zero points.

5.7. End of Game

1. A team may elect to stop the game early at any time. In this case, the team captain must indicate the team's desire to terminate the game to the referee. The team will be awarded all points earned up to the call for the end of the game. The referee will stop the time at the end of the game, which will be recorded as the game time.
2. The game ends when:
   a. the 8 minutes of allowed game time expires
   b. the team captain calls the end of the game
   c. the robot returns to the start tile and is awarded the exit bonus

6. 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 organiser for details.

6.1. 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:

```
(NORMALIZED FIELD SCORE) = (FIELD SCORE) / (BEST FIELD SCORE)
```

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

```
(MEAN OF NORMALIZED FIELD SCORES) = (SUM OF NORMALIZED FIELD SCORES EXCLUDING OMITTED
ROUNDS) / (NUMBER OF ROUNDS - NUMBER OF OMITTED ROUNDS)
```

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

```
(NORMALIZED RUBRICS SCORE) =
   0.6 x (TDP SCORE) / (BEST TDP SCORE)
 + 0.2 x (VIDEO SCORE) / (BEST VIDEO SCORE)
```

```
 + 0.2 x (POSTER SCORE) / (BEST POSTER SCORE)
```

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:

```
(NORMALIZED TECHNICAL CHALLENGE SCORE) = (TECHNICAL CHALLENGE SCORE) / (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:

```
(TOTAL SCORE) =
   0.6 x (MEAN OF NORMALIZED FIELD SCORES)
 + 0.2 x (NORMALIZED RUBRICS SCORE)
 + 0.2 x (NORMALIZED TECHNICAL CHALLENGE SCORE)
```

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

6.2. Technical Challenge

The Technical Challenge is an additional part of the competition where each teams' ability to quickly modify the bahaviour 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 behaviour. 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.

6.3. SuperTeam Challenge

The SuperTeam Challenge takes place independantly of the main competition and won’t influence the team’s individual score. It has its own award and is focussed 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.**

7. Open Technical Evaluation

7.1. 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.

7.2. 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

7.3. 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 competiiton 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.

7.4. 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.

8. Conflict Resolution

8.1. Referee and Referee Assistant

1. All decisions during gameplay are made by the referee or the referee assistant, who are in charge of the field, persons, and objects surrounding them.

2. During gameplay, the decisions made by the referee or the referee assistant are final.
3. After gameplay, the referee will ask the captain to sign the score sheet. Captains will be given a maximum of 1 minute to review the score sheet and sign it. By signing the score sheet, the captain accepts the final score on behalf of the entire team. In case of further clarification, the team captain should write their comments on the score sheet and sign it.

8.2. Rule Clarification

1. If any rule clarification is needed, please contact the International RoboCupJunior Rescue Committee through the RoboCupJunior Forum.
2. If necessary, even during a tournament, a rule clarification may be made by members of the International RoboCupJunior Rescue Committee.

8.3. Special Circumstances

1. If particular circumstances, such as unforeseen problems or capabilities of a robot occurs, rules may be modified by the RoboCupJunior Rescue Committee Chair in conjunction with available committee members, even during a tournament.
2. Suppose team captains/mentors do not attend the team meetings to discuss problems, and the resulting rule modifications described at 1.. In that case, the organizers will understand that they agreed and were aware of the changes.

[1] In previous version this said "Terms and Definitions"

[1] Changed from "colored" to "cognitive target"

[2] Changed from "rescue kit" to "victim"

[3] Changed from "20" to "30"

[4] Changed from "20" to "30"

[5] Changed from "red-colored victim" to "harmed cognitive target"

[6] Changed from "yellow-colored victim" to "stable cognitive target"

[7] Changed from "green-colored victim" to "unharmed cognitive target"

[8] Changed from "in dimension (±10% variation on the tile size) than a tile due to the nature of placing walls." to "due to the walls not being indefinitely thin. That leads that the pathway between two opposite walls is 28 cm wide."

[9] In previous version this said "for the robot are intended to be of the width of the tile and"

[10] Changed from "colored victims" to "cognitive targets"

[11] Changed from "H" to "Φ"

[12] Changed from "S" to "Ψ"

[13] Changed from "U" to "Ω"

[14] In previous version this said "Colored victims are printed on or attached to a wall. Their size will be 16 cm² with no more than 6 cm in either dimension. Three colors are used: red, yellow, and green."

[15] Changed from "12" to "8"

[16] Changed from "colored" to "letter"

[17] Changed from "letter victims" to "cognitive targets"

[18] Changed from "colored" to "letter"

[19] Changed from "letter victims" to "cognitive targets"

[20] Changed from "per successful rescue kit deployment." to "for one successful rescue kit deployment, while 30 points are awarded for two successful rescue kit deployments to the same victim."

[21] Changed from "H" to "Φ"

[22] Changed from "20" to "30"

[23] Changed from "S" to "Ψ"

[24] Changed from "U" to "Ω"

[25] Changed from "Colored victims" to "Cognitive targets"

[26] Changed from "Red" to "Harmed (2)"

[27] Changed from "20" to "30"

[28] Changed from "Yellow" to "Stable (1)"

[29] Changed from "Green" to "Unharmed (0)"

[30] Changed from "10" to "15"