RoboCupJunior Australia

Rescue Rules 2015

Primary Rescue

Secondary Rescue

Open Rescue

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Notes to Teams

The changes to this year RoboCupJunior Rescue Rules have been made to introduce new challenges and clarify a few rules. All changes are marked in red.

Introduction

Spirit

It is expected that all participants, students and mentors, will respect the aims and ideals of RoboCupJunior as set out in our mission statement. In turn, the volunteers, referees and officials will act within the spirit of the event to ensure the competition is competitive, fair and most importantly fun. “It is not whether you win or lose, but how much you learn that counts.”

Sharing

One of the goals of RoboCupJunior competitions is that technological and curricular developments will be shared between participants and educational institutions after the competition. Participants are required to provide their designs, documentation, photos and source code so that they can be shared. Any developments including technology, techniques and software may be published on the RoboCupJunior web site after the event, furthering the mission of RoboCupJunior as an educational initiative as well as progressing robotic capabilities and technologies for all. Participants are encouraged to ask questions of their fellow competitors to foster a culture of curiosity and exploration in the fields of science, technology and engineering.

Local Variations

State and Regional competitions may implement minor variations with respect to age groups, running of the rescue rounds or other rule modifications. These variations will be communicated to the participants through email and/or on their relevant website prior to the state or regional competition as well as on the day of the competition.

Age Limit

Students may participate in **ONE** of three divisions, Primary Rescue, Secondary Rescue or Open Rescue.

1. **Primary Rescue**: Open to students studying at a recognised primary study provider. **Note**: Team members can compete any number of times whilst they are enrolled at a recognised primary study provider.
2. **Secondary Rescue:** Open to all students studying at a recognised secondary study provider. **Note:** Team members are only eligible to compete for a total of two (2) years in this division after which they must participate in the Open Rescue division.
3. **Open Rescue**: Open to all students studying at a recognised secondary or primary study provider.

1 The Challenge

1.1 The Scenario

1.1.1 A terrible earthquake has hit the city and caused a large chemical storage unit to rupture spilling thousands of litres of toxic chemicals in the centre of the city. There is a person trapped in a sinking rescue capsule (the Victim) in the middle of the chemical spill. Rescue crews are having trouble entering the city with the amount of rubble around, and rescue from the air has also been ruled out due to the noxious gases rising from the toxic chemicals directly above the spill. It has been decided that the best form of rescue is the deployment of an autonomous robot that can navigate to the scene, rescue the Victim and exit the chemical spill.

The robot can be deployed at the start tile (**City Limits**) or air dropped to any tile that is at least two (2) tiles away from the chemical spill (**Drop Zone**).

1.1.2 **Primary Rescue**: The robot must navigate to the scene, find and rescue the Victim by pushing or dragging (control) the Victim out of the chemical spill.

1.1.3 **Secondary Rescue**: The robot must navigate to the chemical spill and rescue the Victim by controlling the Victim and then manoeuvring and leaving it outside of the chemical spill in an upright position. The robot must then save itself by exiting the chemical spill via the 'Spill Access Point'.

1.1.4 **Open Rescue**: The robot must navigate to the chemical spill and remove the correct rescue capsule from the chemical spill and place it in its original orientation safely on the evacuation platform for later collection by an aircrew. The robot must then save itself by exiting the chemical spill via the 'Spill Access Point'. The spill may contain one or more rescue capsules - uncontaminated rescue capsules with a Victim are silver and contaminated empty rescue capsules with no Victim are black. Rescuing the Victim will earn the team points for a successful control and rescue. Rescuing an empty rescue capsules will not earn the team points for control or rescue.

2 The Field

2.1 Tiles

2.1.1 The field will consist of 594mm x 594mm tiles, with differing patterns. The final selection of tiles and their arrangement will not be revealed until the day of the competition. Competition tiles may be mounted on a hard backing material of any thickness.

2.1.2. There will be a minimum of 4 tiles in a competition field.

2.1.3 There are different tile designs (see examples below). Tile size has been selected so that each tile can be manufactured from an A1 sheet of paper (594x841)
Note: The official RoboCupJunior Australia Rescue Field used in competitions can be obtained from Modern Teaching Aids, our Platinum Sponsor

2.1.4 The background colour of each tile is white.

2.1.5 The line on the tiles will have a width between 15mm and 20mm and be black in colour.

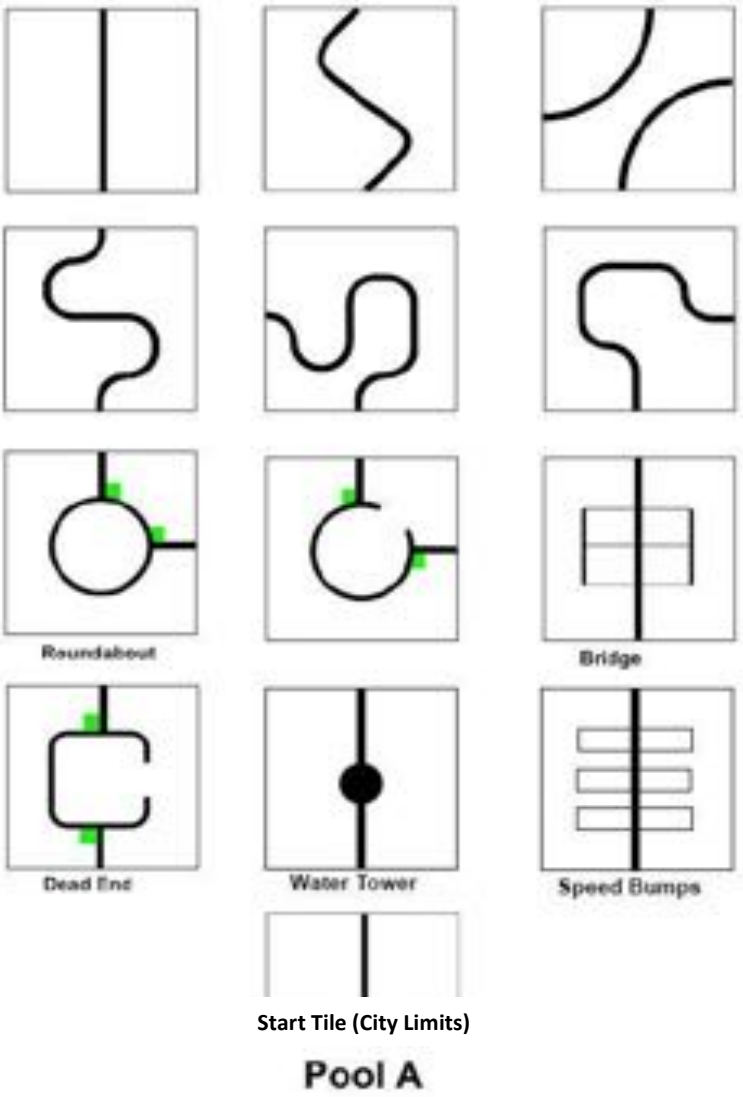
2.1.6 All lines meet the edge of the tile halfway along its length.

2.1.7 Intersections markers are green in colour, 40mm x 40mm in dimension and indicate the correct path to follow. The shade of green may vary and is not required to register as Lego Green on the EV3.

2.1.8 The organising committee will make every possible attempt to ensure there are no 'bumps' between tiles although there may be slight deviations in height of up to 3mm. Competitors must be prepared to deal with these slight imperfections in height.

2.1.9 **Primary and Secondary Rescue**: The tiles will be selected from Pool A only (see examples below), although competitors can expect tiles to be duplicated and/or omitted.

2.1.10 **Open Rescue**: The tiles and obstacles will be selected from both Pool A and Pool B, although competitors can expect tiles to be duplicated and/ or omitted.



See rule 2.1.1 to 2.1.24

Revealed at the competition

Pool A Challenge Tile

Revealed at the competition

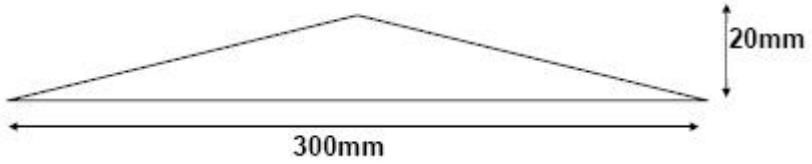
Pool B Challenge Tile

See rule 2.1.25

2.1.11 The 'City Limits' start tile consists of a lead in black line and does not count for any points. Robots are to start behind the join between the start tile and the first course tile.

2.1.12 The 'Drop Zone' tile: Teams have the option of nominating a Drop Zone starting point, anywhere on the course. The Drop Zone tile must be at least two (2) tiles away from the chemical spill and can be used to air drop the robot to it, upon start of a round or a restart.

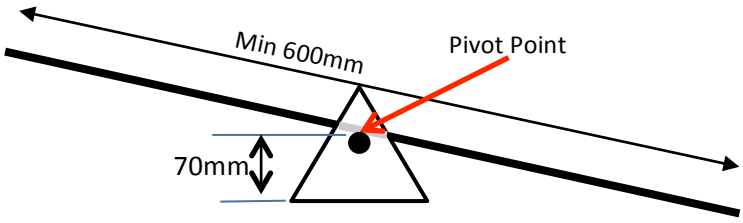
2.1.13 The "Bridge" tile will consist of a white raised section with the following dimensions with a black line across the middle of the bridge;



2.1.14 The "Speed Bumps" will consist of rectangular sections, 200mm x 30mm, white in colour, with a height of 5mm. A black line will run across the top surface of the speed bump.

2.1.15 The "Water Tower" will be a clear 1.25L PET soft drink bottle filled with water. The water tower will be clear with all external labels removed. Bottles without 'waists' e.g. Coke are preferred. When navigating the water tower, robots must regain following the line on the Water Tower tile (see rule 3.7.2). Should the line not be reacquired within the tile, the robot will have been deemed to have 'loss of line' and be required to restart. The water tower is not to be intentionally moved from its location.

2.1.16 The "See Saw" may be introduced onto any straight section of the course that does not have a tunnel section above it.

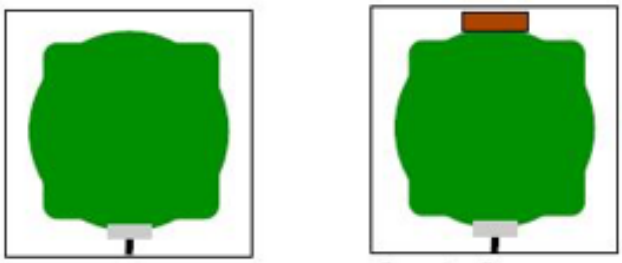


The "See Saw" will be constructed from 10mm plywood, MDF or similar. The pivot board is 600mm x (594 – 'Pivot support width' * 2) mm. The maximum height of the pivot point of the platform will be 70mm above the top surface of the field. Robots will need to be able to climb and descend both sides while following the line. The See-Saw competition surface will be of similar material to the Rescue Tiles i.e., white heavy duty Vinyl Banner Material with a standard width black line.

Suggested construction:

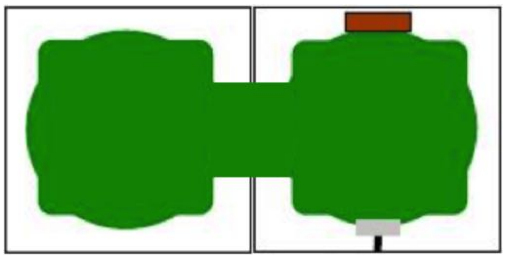
- Two supports made from 120mm equilateral triangles.
- A base piece 120mm x 594 joining the two supports together.
- 5mm holes approx. 70mm up from tile level of the base of the supports will be the pivot point for the “Sea Saw”. On the edge of the Pivot board drill a 3mm hole 295mm from one end on both sides. This will make the Pivot board heavy on one end so that it always tilts one way.
- Use a 50mm screw on each side to join the Pivot board to the Supports.

2.1.17 The Rescue Tile is a 594mm x 594mm white tile with the chemical spill indicated by a green area. At the point where the black line meets the green area, there will be a piece of smooth reflective aluminium (**Spill Access Point**) foil, 40mm x 15mm in dimension to indicate that the robot is entering the chemical spill.



2.1.18 **Open Rescue**: The Rescue Tile will have an evacuation platform, 70mm high, 200mm wide and 70mm deep located at the rear of the chemical spill. The platform will be painted a similar colour (orange) as the location rectangle on the Rescue Tile.

2.1.19 **Secondary and Open Rescue**: The Chemical Spill may be extended by joining the green areas of two or more chemical spill tiles to form a continuous chemical spill.



2.1.20 Competitors need to be aware that in some competitions, tiles may be mounted on thick (6mm to 12mm) backing or raised off the ground (up to 180-270mm) with the Elevation Blocks, which may make it difficult to get back on a tile should the robot come off. No provision will be made to assist robots that drive off a tile, from getting back on the tile.

2.1.21 Tiles may be elevated off the floor by elevator blocks placed in the corner of the tile. They may only be re-positioned to provide robot clearance by **an official**.

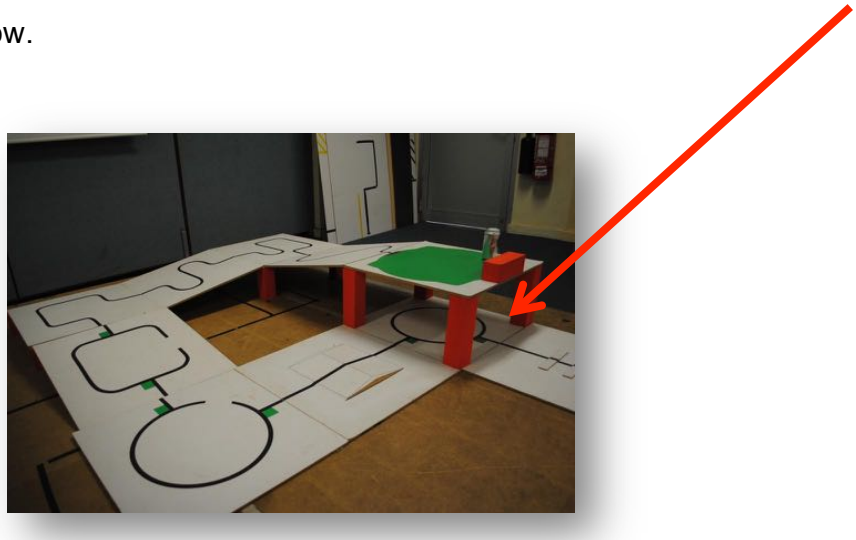
2.1.22 Tile elevations are:

- In Primary Rescue and Secondary Rescue 90mm and 180mm; and
- In Open Rescue 90mm, 180mm and 270mm,

Division	90mm	180mm	270mm
Primary Rescue	Yes	Yes	No
Secondary Rescue	Yes	Yes	No
Open Rescue	Yes	Yes	Yes

Tiles will be used as ramps to allow the robots to 'climb' up to and down from the elevated tile. Ramps can increase or decrease in elevation only 90mm at a time between tiles. Elevator blocks are to be made of 70 x 70 wood painted in a similar colour as the location rectangle on the Open Rescue finishing tile.

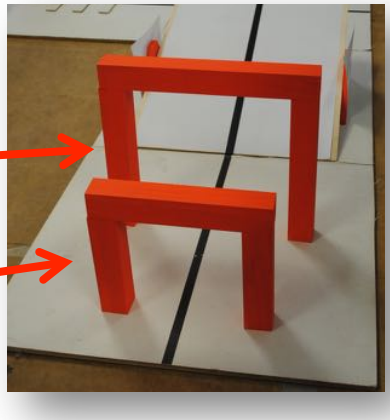
Note: Courses may now incorporate 'Tunnels'. Robots, therefore, must be designed so that they can navigate along any tile that may be placed on the base of the 'Tunnel'. See example below.



2.1.23 Robots must be able to navigate through a 'Doorway' that may be placed on any straight section of the field. The doorway will be placed so that the two uprights are approximately equidistant from the line. It will be free standing and will **not** be mounted or taped directly to the tile. If a doorway is present on the course the robot must have passed through it before the score for the round will be recorded.

2.1.24 The "**Doorway**". The doorway will:

- Consist of three (3) pieces of solid wood 41mm x 41mm.
- Have all pieces **fixed together**.
- Be painted a similar colour (orange) as the location rectangle on the Open Rescue finishing tile.
- Be 270mm wide and 270mm high for Open Rescue
- Be 180mm wide and 180mm high for **Primary Rescue and Secondary Rescue**



The doorway may be placed on a straight section of the line.

2.1.25. **Drop Zone Puck**:- The Drop Zone Puck will be a suitable size and colour so as to be easily identified by the robot handler. The puck will not interfere with the robot's path on the field.

2.1.26 The Challenge Tile:

- will be explained to the teams during the competition briefing
- may be added to pool A and/or B at the official's discretion
- must be available in practice areas before the first round of the competition.
- may be introduced from round 4 through to the finals.
- may take the form of a physical or logical challenge – e.g. colour detection, decision making, additional objects, etc.

2.2 Victim

2.2.1 **Primary, Secondary and Open Rescue:** A rescue capsule **WITH** a Victim inside will be represented by a standard 375ml aluminium can, standing upright, wrapped in aluminium foil or aluminium foil tape. This capsule will be referred to as the Victim.

2.2.2 **Open Rescue:** A rescue capsule contaminated by the chemical spill **WITHOUT** a Victim inside will be represented by a standard 375ml aluminium can, standing upright, painted matt black or wrapped with matt black tape or paper. This capsule will be referred to as an empty capsule.

2.2.3. The can will contain material such as rice bringing the weight of the rescue capsule to 100gms. A liquid must not be used to add weight to the can.

2.3 Lighting

2.3.1 Teams must come prepared to calibrate their robots based on the lighting conditions available at the venue. Teams are expected to have tested their robots under a variety of different lighting conditions and light sources.

2.3.2 The organising committee will make a reasonable effort to keep ambient light to a low level with infra-red (IR) sources from incandescent lights and natural lighting minimised.

2.3.3. Teams must also be prepared for other forms of light interference such as from electronic devices and should take steps to shield their robot's sensors.

3 Robots

3.1 Robot Control

3.1.1 Robots must be controlled autonomously.

3.1.2 Robots must be started/restarted manually by the robot handler.

3.1.3 The use of remote control of any kind is forbidden.

3.2 Construction

3.2.1 Any robot kit or building materials may be used, as long as the robot fits the specifications documented in these rules and as long as the design and construction are primarily and substantially the original work of the student(s).

3.2.2 Robots should be well engineered and constructed. The robot should not fall apart during the game. If the robot has substantially failed mechanically, fallen apart (refer to 4.5.9) or is unable to complete the challenge, the robot will be deemed damaged and the robot handler will be instructed to remove the robot from the field and the round will finish.

3.2.3 Commercial robot kits may be used but must be substantially modified by the students.

3.2.4 A team will not be able to compete with a robot identical to another team's robot.

3.2.5 A team will not be able to compete with a robot that is identical to another team's robot from previous years.

3.2.6 Teams may be scrutinised to establish the ownership of the robot design.

3.3 Robot Configuration

3.3.1 Robot must be able to pass through the **Doorway** without moving it from its original position. The robot must do this autonomously during the game.

3.3.2 Robots that knock over the Doorway or move it from the original tile, must restart the course and attempt the doorway again.

3.3.3 **Primary Rescue** robots must NOT increase in size, extend or use a device intended to sweep the Victim. Robots must demonstrate a search algorithm to 'find' and control the Victim as specified in section 1.1 - The Scenario.

3.3.4 **Secondary Rescue** and **Open Rescue** division robots must have a functioning and demonstrable mechanism with the potential to control AND rescue the Victim as specified in section 1.1 - The Scenario.

3.4 Inspection

3.4.1 The robot will be examined by a panel of referees before/during or after the tournament to ensure that the robot adheres to the rules of the tournament.

3.4.2 It is the responsibility of teams to have their robot re-inspected if their robot is modified at any time during the tournament.

3.5 Students

3.5.1 Team member(s) will be interviewed and asked to explain the operation of their robot in order to verify that the construction and the programming of the robot is their own work. Logbooks or design diaries must be provided. (see section 7)

3.5.2 Team member(s) will be asked questions about their preparation efforts, and they may be requested to answer surveys and participate in videotaped interviews for research purposes.

3.6 Violations

3.6.1 Any violations of the inspection rules will prevent the robot from competing in a round until modifications are effected.

3.6.2 Modifications must be made within the time schedule of the tournament. Game play will not be delayed due to late teams.

3.6.3 If a robot fails to meet all specifications (including modifications) the robot will be disqualified from that round (but not the tournament).

3.6.4 If there is mentor assistance or it is determined that the work on the robot is not substantially the original work of the team members, the team will be disqualified from the challenge.

3.7 Convex Hull Rule

3.7.1 **Robot Convex Hull:** For the purpose of determining whether a robot has left the chemical spill the convex hull of the robot will be used. This measure is done by stretching an imaginary rubber band around the extremities of the robot, and using the enclosed space as a silhouette.

3.7.2 **Sensor Convex Hull:** For the purpose of determining whether a robot has lost the line or reacquired the line on a tile, the convex hull of the sensors will be used. This measure is done by stretching an imaginary rubber band around the extremities of the sensor(s) used to follow the line, and using the enclosed space as a silhouette.

4 Game Play

Games will be organised into rounds, then a finals series.

4.1 Pre-game Set-up

4.1.1 Organisers will make a reasonable effort to provide the teams' access to the competition area prior to the start of the competition.

4.1.2 Organisers will make a reasonable effort to allow at least 10 minutes of setup time before each round. Participants should be aware, however, that situations may arise where these conditions cannot be met; and so participants should arrive prepared to cope under conditions that are less than ideal.

4.2 Game Zone

4.2.1 An area around the game fields will be designated as the "game zone" by the officials.

4.2.2 Only officials, referees, timekeepers and robot handlers (see 4.4.1) may enter the Game Zone.

4.3 Length of a Game

Division	Game Length (sec)	Calibration Window
Primary Rescue	120	Prior to the game clock starting
Secondary Rescue	150	Prior to the game clock starting

Open Rescue	240	After starting the game clock

4.3.1 **Primary Rescue**: A time limit of **120** seconds will be imposed. Teams have a **120** second window to complete the course set for that round. A team may calibrate their robots before the timer is started.

4.3.2 **Secondary Rescue**: A time limit of **150** seconds will be imposed. Teams have a **150** second window to complete the course set for that round. A team may calibrate their robots before the timer is started.

4.3.3 **Open Rescue**: A time limit of **240** seconds will be imposed. Teams have a **240** second window to calibrate their robots and complete the course set for that round.

4.3.4 Organisers will ensure that the competition field design will be of adequate length for this time limit.

4.4 Pre Game

4.4.1 One team member is elected as the robot handler. Only the robot handler is permitted to enter the game zone and handle the robot during the round. All other team members must remain outside the game zone unless authorised by the Referee.

4.4.2 The robot handler is the only team member that may direct the referee during a round.

4.4.3 The referee will ask the robot handler if they would like to nominate a Drop Zone. If the robot handler elects a Drop Zone the tile will have an orange disk placed in one of the corners. Once the game timer has started the Drop Zone cannot be changed.

Note: the 'Drop Zone' tile can be different for each round.

4.4.4 The referee will ask the robot handler if they are happy with the course. After positive acknowledgement the round begins.

4.5 Game Play

4.5.1 The Robot Handler is the only team member permitted to communicate with the officials and referees during the Game.

4.5.2 The referee will ask the robot handler if they are ready to start. The robot handler must indicate to the Referee when they wish to commence the Rescue run.

4.5.3 The robot must start from either the City Limits or from the nominated Drop Zone. Where possible the entire robot must be behind the join between the start tile and the next course tile towards the chemical spill. The Referee will check for correct placement.

4.5.4 The referee will indicate to the robot handler that they may proceed and start the program on the robot. At this point the round begins and the referee starts the game timer for the round.

4.5.5 Robots must move towards the chemical spill from any starting point (City Limits, Drop Zone).

4.5.6 **Primary and Secondary** - Calibration of the robot is not included in the game timing of a round.

4.5.7 **Open** - Calibration of the robot is permitted only once the timing of the round has begun.

4.5.8 Modifying a robot, once a round has begun, is prohibited. This includes remounting parts that have fallen off or changing the program.

4.5.9 Any parts that have fallen off during a timed game, intentionally or otherwise, are to be left in the game zone and cannot be removed by the robot handler until the run is over.

4.6 Restarts

4.6.1 A robot must restart if:

- The robot ceases to follow the line,
- the robot is touched by a human,
- the robot moves off the field.
- the robot exits the chemical spill tile (convex hull rule) in a direction other than via the 'Spill Access Point' or exits without attempting to rescuing the Victim.

4.6.2 The robot handler may restart the robot due to malfunction as deemed necessary by the robot handler.

4.6.3 Robots that have completed a Rescue but have not gained a full score have the option to restart the course again, at either of the start points, facing towards the chemical spill, to obtain any uncollected points.

4.6.4 The robot must be positioned at either the 'City Limits' or 'Drop Zone' start tiles facing the chemical spill, and checked by the referee.

4.6.5 The game clock will continue running during all restarts.

4.6.6 There is no limit to the number of restarts within a game.

4.6.7 Points not gained in one run can be gained in subsequent runs after restarts adding to the accumulated points until all tiles have been successfully completed.

4.6.8 A reliability score will be calculated for the robot at the end of each round. The reliability score will be subtracted from the **overall score** for the round and added to the **overall time** (as seconds) for the round

- The reliability score is calculated by multiplying the number of restarts by 5.
- The maximum deductible reliability score is 20 points.
- If a robot required no restarts there will be no points deducted.

4.6.9 The rescue capsule will not be moved or reset to the initial position or orientation after a restart. The rescue capsule must stay in the position and orientation the robot left it in.

4.7 Following the Line

4.7.1 The robot must follow the line completely to enter the chemical spill.

4.7.2 Where there are multiple paths, the robot may take any path.

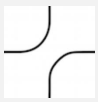
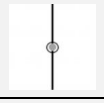
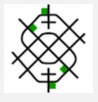
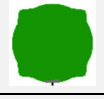
4.7.3 Where the line is discontinuous, and there is no continuous path through the tile, the robot may search for the recommencement of the line, but must not completely leave the tile before re-finding the line. In this case some part of the tile must be under the robot's convex hull (see rule 3.7.1).

4.7.4 The referee will use the "convex hull" (see rule 3.7.1) of the robot for the purpose of determining if a robot has left the line or left the tile.

4.7.5 Some portion of the continuous line segment must be under the robot's convex hull.

4.7.6 Once the robot has entered the chemical spill tile it is no longer required to "follow the line". It may enter the chemical spill in any direction in its efforts to rescue the Victim.

4.8 Scoring

	Name	Total Score upon completion
	Straight	10
	S Bend	10
	Cross Curves	10
	Hairpin Bends	10
	Big Bend	10
	Corner	10
	Square Dead End	14 (10 points for tile completion + 2 points for each direction marker)
	Roundabout	14 (10 points for tile completion + 2 points for each direction marker)
	Round Dead End	14 (10 points for tile completion + 2 points for each direction marker)
	Bridge	15
	Speed Bumps	15
	See Saw	15
	Water Tower	20
	Grid Lock	18 (10 points for tile completion + 2 points for each direction marker)
	Chemical Spill	50
	Open Chemical Spill	100

4.8.1 Teams will be awarded 10 points for each line follow tile (tiles that are line following only) that their robot successfully negotiates. Eg, robots reaching the 4th tile would have successfully negotiated 3 tiles and be awarded 30 points.

4.8.2 Teams will gain an extra 2 points for each intersection marker they correctly follow. Eg, if a robot correctly follows both shortcut markers on the roundabout, it will be awarded 14 points for the tile, 10 points for completing the line follow of the tile and 4 points for correctly following the shortcut markers.

4.8.3 Teams will be awarded a total of 20 points for successfully navigating the **Water Tower** tile. The robot must reacquire the line on the water tower tile.

4.8.4 Teams will be awarded 15 points for successfully traversing the **Speed Bumps** tile.

4.8.5 Teams will be awarded 15 points for successfully traversing the **See Saw** tile.

4.8.6 Teams will be awarded 15 points for successfully traversing the **Bridge** tile.

4.8.7 For **Primary Rescue**, teams will be awarded 50 points for successfully rescuing the Victim. The Victim is considered rescued when it is completely outside the chemical spill.

4.8.8 For **Secondary Rescue,** teams will be awarded 25 points for successfully gaining control of the Victim and then 25 points for manoeuvring (Rescue) it outside of the Chemical Spill. Control of the Victim means that the robot could move in any direction and the Victim would move, as one, with the robot. (eg: By lifting or containing, the Victim so that the Victim will move with the robot no matter which direction the robot were to move (forward, backwards or rotating in either direction.)

4.8.9 For **Open Rescue**, teams will be awarded 50 points for successfully gaining full control of the Victim. Full Control is defined as having lifted the Victim to a height that will allow the Victim to be placed on the platform and maintain the lift while the robot is moving. 50 points will be awarded for successfully rescuing the Victim - placing and releasing the Victim on the evacuation platform, maintaining the Victim's upright orientation.

4.8.10. **Secondary** and **Open** Rescue Teams will be awarded an additional 10 points for fully exiting the Chemical Spill via the 'Spill Access Point' (Convex Hull Rule). The robot must reacquire the line and begin to line follow **after** successfully rescuing the Victim OR attempting to rescue the Victim before the points are awarded.

4.8.11 If the robot fails to rescue the Victim in the allocated time, it will be given a time score of 120, 150 or 240 seconds depending on the division.

4.8.12 A robot must have achieved a full score for the round before the round clock is stopped. Only when the maximum possible points for the round are achieved will a time less than designated round time be awarded.

4.8.13 No points are awarded for control or rescue of an empty rescue capsule. There is no penalty for rescuing an empty rescue capsule.

4.8.14 All preliminary round points awarded will be normalised to a score out of 100.

4.8.15 After the preliminary rounds have been run, teams will be ranked according to their overall Score for their best rounds minus their worst round.

4.8.16 Should two or more teams have the same Overall Score, further ranking will be performed by finding the sum of the time taken to rescue the Victim in the scoring rounds. The team with the lowest time will be ranked higher.

4.9 Playoff Rounds

4.9.1 There may be multiple playoff rounds, depending on the time constraints of the tournament. *Note*: National competitions will aim to host 5 rounds, or more, as time permits.

4.9.2 Each team will play one game per round.

4.9.3 Officials at the competition will determine the order and nature of how each round will be conducted. All teams must consult with the officials at the start of the competition to be informed on how the playoff rounds will be run.

4.9.6 The Victim will be located in a new position in the chemical spill for each round. It will be in the same position for every team in that round.

4.10 Final

4.10.1 There will be maximum of three (3) teams in a final head to head playoff. The 3 teams will be determined by selecting the top 3 teams from the play off rounds.

4.10.2 The first, second and third placed teams will be determined by a Head to Head Finals process called the Trophy Rounds

4.10.3 **Trophy Rounds**:- The 3 teams will compete Head-to-Head (H2H) to determine the podium placing's. Three different field layouts will be used in the H2H Trophy Round. The three finalists will rotate through and attempt each of the courses. The team with the highest cumulative score will be judged the winner. If scores are tied then the lower cumulative time will determine the winner. Second and third placings are also determined by the combined scores and if necessary times.

5. Conflict Resolution

5.1 Referee

5.1.1 During game play, the referee's decisions are final.

5.2 Officials

5.2.1 Rule clarification, but no handling of protests, may be made by a committee of three officials.

5.2.2 The three officials will be designated prior to the tournament.

5.2.3 An official must declare any relationship with any of the teams entered in the tournament and shall not referee any team they have a relationship with.

5.3 Special Circumstances

5.3.1 Specific modifications to the rules to allow for special circumstances, such as unforeseen problems and / or capabilities of a team's robots, may be agreed to at the time of the tournament, provided a majority of the contestants agree.

6 Code of Conduct

6.1 Fair Play

6.1.1 Robots that cause interference with other robots or damage to the field or the Victim will be disqualified.

6.1.2 Humans that cause deliberate interference with robots or damage to the field or the Victim will be disqualified.

6.1.3 It is expected that the aim of all teams is to play a fair and clean game of robot rescue.

6.2 Behaviour

6.2.1 All movement and behaviour is to be of a subdued nature within the tournament venue.

6.2.2 Participants and/or mentors who breach the rules, misbehave or repeatedly fail to follow an official's instructions may be asked to leave the venue and risk their team being disqualified from the tournament.

6.2.3 These rules will be enforced at the discretion of the officials, organising committee or local law enforcement authorities.

6.3 Mentors

6.3.1 Mentors, Teachers and adults are not allowed in the student work area.

6.3.2 Mentors are not to repair/modify robots or be involved in programming of student's robots.

6.3.3 Mentor interference with robots, students or official decisions will result in a warning in the first instance. If this reoccurs, the team will risk being disqualified.

7 Documentation

7.1 Log Books

7.1.1 Any team that has original (custom) construction of robots or sensors (not freely or commercially available to all competitors) must supply full documentary proof that the developments were wholly the work of the students. This should be in the form of a logbook showing all stages of design, development, testing and construction.

7.1.2 All teams must maintain a logbook detailing the design, development and construction of the robot and its programs.

7.1.3 Failure to produce documentary proof may result in the robot or sensor not being allowed to be used in the tournament.

7.1.4 Two (2) weeks prior to a State or National competition, each team must electronically submit their Log Book to the competition registration web site.

7.2 Logbook Criteria

It is recommended that teams use the following headings as a guide in the development of their Logbook. **Note**: these criteria are mapped to the **Australian National Technologies Curriculum**

- **Problem Definition**:
  - Define and decompose the problem

- **Planning**:-

- Identify a number of possible solutions to meet the requirements and constraints
- Identify the roles of the team and the order of tasks

- **Solution Design**:
  - Design the user experience of a digital system
  - Design Algorithms and validate them.
- **Implementation**:
  - Implement modular programs, applying selected algorithms and data structures
- **Evaluation**:
  - Critically evaluate the developed solution.
- **Student Collaboration**:
  - Create innovative solutions for sharing your ideas and information.
  - Plan and manage projects using an interactive and collaborative approach

7.3 Interviews

7.3.1 Teams may be required to attend an interview on the competition day. This will be used to check that the design, construction and programming of the robot is that of the students'. If interviews are being conducted, either a schedule will be released, or teams will be advised to go for an interview throughout the competition prior to the finals.

7.3.2 Teams must bring a running laptop to their interview with their program open and be able to talk through the logic of the program with the interviewer. Screenshots of the program are unacceptable.

7.3.3 There are no set questions and interviews are not scored and do not contribute to team overall score.

7.3.4 Should the interviewer believe that the construction and programming of the robot is not that of the team, the team will be referred to the officials. Should the officials uphold the view of the interviewer, the team may be disqualified from the competition.

8 Awards

8.1 Logbook

8.1.1 A number of awards may be given out to teams that demonstrate innovation in one or more areas as indicated in the teams Logbook.

8.2 Competition

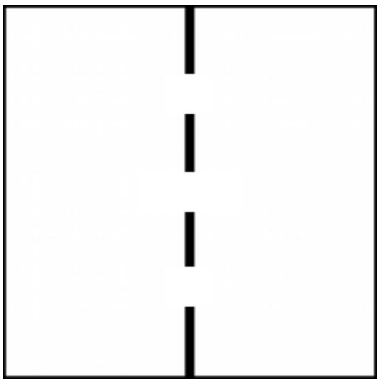
8.2.1 Teams will compete in a competition over a number of rounds and culminate in a final head to head round where the top three teams will be awarded first, second and third place as a result of them demonstrating the best solutions to the challenges according to the competition rules.

8.3 Encouragement and Innovation

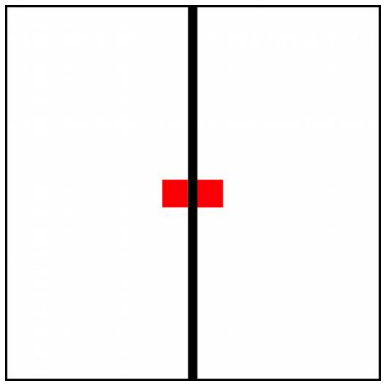
8.3.1 An encouragement award may be given out to a team that has demonstrated the true spirit and sharing of the RoboCupJunior philosophy.

8.3.2 An Innovation award may be given out to a team that has demonstrated innovative design with their robot.

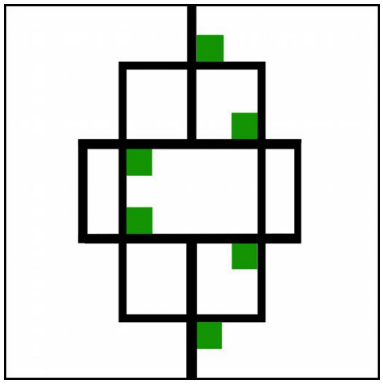
9 Coming soon (not in 2015)



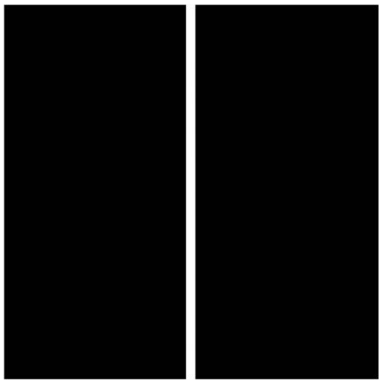
Broken Road



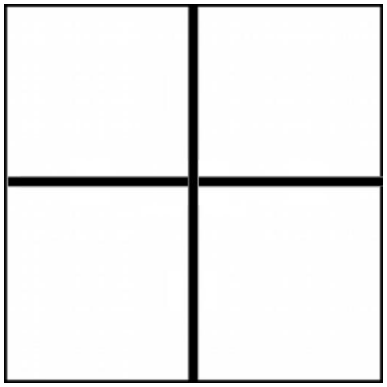
Stop Lights



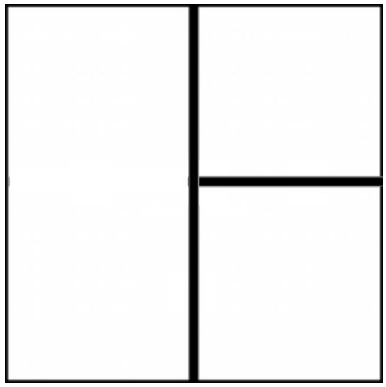
Ratrace



Tunnel



Cross Roads



T Intersection