



A U S T R A L I A

RoboCup Junior Australia

Rescue Maze Rules 2026

Version 26.1 | Last Modified: 28 February 2026





RoboCup Junior Australia Executive Committee

President	Karen Binns (New South Wales)
Vice President	Graham Stock (Australian Capital Territory)
Treasurer	Evan Bailey (Victoria)
Minutes Secretary	Brenda Gahan (Queensland)
Secretary	Wilson Cheng (New South Wales)
Digital Platforms Executive	Zac McWilliam (Victoria)
Relations Executive	Margaux Edwards (Queensland)
International Representative	James Talkington (Queensland)

RoboCup Junior Australia Rescue Technical Committee

National Challenge Coordinator Tim Ronchi (Victoria) – tim.ronchi@robocupjunior.org.au

For State and Territory enquiries, contact information can be found on the RCJA Website:

[ACT](#) [NSW](#) [NT](#) [QLD](#) [SA](#) [TAS](#) [VIC](#) [WA](#)

Preface

Spirit

It is expected that all participants, students and mentors, will respect the aims and ideals of RoboCup Junior 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 event is competitive, fair and most importantly fun. “It is not whether you win or lose, but how much you learn that counts.”

Sharing

It is the overall desire of RoboCup Junior events, that any technological and curricular developments will be shared with other participants after the event. Any developments including new technology and software examples may be published on the RoboCup Junior website after the event, furthering the mission of RoboCup Junior as an educational initiative. Participants are strongly encouraged to ask questions of their fellow competitors to foster a culture of curiosity and exploration in the fields of science and technology.

Local Variations

These rules will be in use for the Australian National Championships for the titled year. State and Regional events may implement minor variations with respect to age groups, divisions and judging. These variations will be communicated to the participants through email and/or on their relevant website prior to the state or regional event.

General Rules

All RoboCup Junior challenges are governed by our General Rules, which cover rules that are consistent across all the challenges including team make-up, robot configuration and more. Please ensure you read the General Rules, which can be downloaded from the [Rescue Maze Challenge Page](#) on the RoboCup Junior Australia Website.

Notes/Advice vs. Rules

This document may include notes/advice to participants and mentors, plus rules that are firm. This has been done to remove ambiguity. There is a notation to indicate whether the content of this document is to be read as a note/advice or as a rule. Advice is noted in **green**. Rule changes for the new year are noted in **red**.



Change Log

Revision	Change(s) Made
26.0	<p>Initial release for the season. Key changes from 2025 include:</p> <ul style="list-style-type: none"> • Changed wording of challenge aspect from “Floating Walls” to “Floating Tiles” to improve clarity (see section 1.2.1). • Adjusted description of what can be done with a robot stuck in the maze from “restarted” to “moved” to reduce confusion (see section A/B/C1). • Clarified that walls must be opaque (see section A/B/C2.1.6). • Changed example manufacturing material from vinyl to melamine (see section A/B2.2.1). • Clarification that Start/Exit tile will be enclosed with walls on three sides (see section A/B2.2.2). • Clarification that teams need to expect some movement of black and silver tiles fixed to the floor (see section A/B2.2.2 and A/B2.2.3). • Changed definitions in path information to refer to “Linear Tiles” and “Floating Tiles” instead of “Linear Walls” and “Floating Walls” to improve clarity and scoring (see section A/B/C2.3.1). • Added note to consider black “no go” tiles as virtual walls when identifying tile type (see section A/B/C2.3.1). • Removal of duplicate rules on environmental conditions (see sections A/B/C2.5.4-7). • Removed requirement for victims to be 150mm away from nearest wall (see section A/B3.1.1). • Added rule that victims must be placed in the centre of a tile (see section A/B3.2.2). • Removed rule that victims will be placed more than 100mm apart (see section A/B3.2.4). • Added advice that lighting and magnetic conditions may vary between Playing Fields and practice area (see section A/B/C5.1.1). • Added clarification that non-team members cannot communicate with robot handler during a scoring run (see section A/B/C5.2.3). • Added clarification that a robot must be contained completely on a tile for it to count as having stopped on that tile (see section A/B/C5.4.4.3 and A/B/C6.5). • Clarification on lack of progress to be length of time not moving or number of repeat loops of movement (see section A/B/C5.5.1.1) • Change to rule on lack of progress that programs can now be reset but not changed (see section A/B/C5.5.2) • Advise added for students to consider implication to their stored variables of restarting program during lack of progress (see section A/B5.5.2, section A/B6.6 and section A/B6.7) • Note added that victim should not be counted more than once for each time the robot passes over it (see section A/B6.6) • Clarification to Open scoring based on new “Linear Tile” and “Floating Tile” definitions (see section C6.1) • Rule added limiting the number of robots teams are allowed to bring to the competition to ONE (1) only (see section 2.1.6) • Moved rule governing laser class to General Rules (see section 2.1.9) • Changes to submission requirements to validate work (see section 3)



Table of Contents

1	The Challenge.....	7
1.1	The Scenario.....	7
1.2	Event Divisions	7
A	Mighty Maisy Maze	8
A1	Introduction	8
A2	Playing Field	8
A2.1	Maze Description	8
A2.2	Floor	8
A2.3	Path	8
A2.4	Debris, Speed Bumps, Obstacles and Stairs.....	9
A2.5	Environmental Conditions	9
A3	Victims	9
A3.1	Definition	9
A3.2	Locations.....	9
A4	Rescue Kits.....	10
A5	Game Play.....	10
A5.1	Pre-round Practice	10
A5.2	Humans.....	10
A5.3	Start of Play.....	10
A5.4	Scoring Run	10
A5.5	Lack of Progress	11
A5.6	Restart	11
A6	Scoring	11
A7	Event Structure	12
B	Intermediate Maze.....	14
B1	Introduction	14
B2	Playing Field	14
B2.1	Maze Description	14
B2.2	Floor	14
B2.3	Path	14
B2.4	Debris, Speed Bumps, Obstacles and Stairs.....	15
B2.5	Environmental Conditions	15
B3	Victims	15



B3.1	Definition	15
B3.2	Locations.....	16
B.4	Rescue Kits.....	16
B.5	Game Play.....	16
B5.1	Pre-round Practice	16
B5.2	Humans.....	16
B5.3	Start of Play.....	16
B5.4	Scoring Run	17
B5.5	Lack of Progress	17
B5.6	Restart	18
B.6	Scoring.....	18
B.7	Event Structure	19
C	Open Maze.....	20
C1	Introduction	20
C2	Playing Field	20
C2.1	Maze Description	20
C2.2	Floor	21
C2.3	Path	21
C2.4	Debris, Speed Bumps, Obstacles and Stairs.....	21
C2.5	Environmental Conditions	22
C3	Victims	23
C3.1	Definition	23
C3.2	Locations.....	24
C4	Rescue Kits.....	25
C5	Game Play.....	25
C5.1	Pre-round Practice	25
C5.2	Humans.....	25
C5.3	Start of Play.....	26
C5.4	Scoring Run	26
C5.5	Lack of Progress	27
C5.6	Restart	27
C6	Scoring.....	27
C7	Event Structure	29
2	Robot.....	30



2.1	Robot Configuration.....	30
2.2	Robot Control.....	30
2.3	Inspection	31
2.4	Violations.....	31
3	Validation of Work	32
3.1	Electronic Submission.....	32
3.1.1	Annotated Code Submission.....	32
3.2.2	Digital Technical Poster Submission	32
3.3	Interviews	32
4	Teams	34
4.1	Definition.....	34



1 The Challenge

1.1 The Scenario

1.1.1 There has been an accident at a manufacturing plant. There are a number of victims still trapped within the plant, and it is too hazardous to send in human rescue teams. Your autonomous robot must be able to navigate through a treacherous building which may have obstacles, uneven floors and restricted areas to identify victims and leave rescue kits to aid harmed victims. Time and technical skills are essential! Come and prepare to be the most successful Rescue Maze Response Team.

1.2 Event Divisions

1.2.1 The Rescue Maze Challenge has three divisions: Mighty Maisy Maze, Intermediate Maze and Open Maze.

Mighty Maisy Maze was developed with the aim to create a very accessible entry point for students who are new to the Challenge.

Intermediate Maze increases the difficulty of the Challenge to be a transition level between Mighty Maisy Maze and Open Maze. This division can also be used by Open Maze teams that are significantly changing hardware and/or software platform.

Open Maze extends the Challenge with more complexity for more experienced students.

Subject to age limitations and other criteria, Open Division teams who perform well in the National Event may qualify for the annual RoboCup Junior International Event. Other international events may have other divisions/qualification requirements.

The rules for each division are separated into their own sections with the chart below highlighting the differences:

Challenge Aspect	Mighty Maisy Maze	Intermediate Maze	Open Maze
Floor victims	X	X	
Wall victims			X
Rescue Kits for Harmed victims		X	X
Start/Finish using silver reflective tile	X	X	
Start/Finish using coloured tiles			X
Checkpoints at identified victims	X	X	
Checkpoints using silver reflective tiles			X
Maze: Allow use of A4 Reams for walls	X	X	
Maze: "No Go" black tiles	X	X	X
Maze: Floating Tiles		X	X
Maze: Debris		X	X
Maze: Speed Bumps		X	X
Maze: Obstacles			X
Maze: Stairs			X
Maze: Ramps			X
Maze: Multiple Levels			X
Maze: Tunnels			X
Exit Bonus	X	X	X
Count Bonus	X	X	



A Mighty Maisy Maze

A1 Introduction

The robot needs to search through a maze for colour-identifiable victims. i.e. the robot need not find the fastest path through the maze, instead it should explore as much as possible of the maze. The robot will score points for each victim found. The robot should avoid areas with a black floor. If the robot is stuck in the maze, it can be ~~restarted at~~ **moved to** any previous correctly identified victim. If the robot can find its way back to the start tile after exploring the maze it will receive an exit bonus (see section A6.5). Additional count bonuses will be awarded upon exit if the robot can report the number and type of victims that it has identified in the maze (victims might be identified more than once) once at least half the victims have been identified (see section A6.6).

A2 Playing Field

All measurements in the rules have a tolerance of 5%.

A2.1 Maze Description

A2.1.1 The maze will be on a single level and may consist of multiple distinct areas. Areas will have a horizontal floor and a perimeter wall. Walls can be constructed either using reams of A4 Paper laid on their long side or using the Open Maze walls.

A2.1.2 Areas may be joined together by doorways.

A2.1.3 Walls will be located approximately 290 mm (tolerance ± 15 mm) apart. There may be a 5 mm gap between wall sections.

A2.1.4 Doorways are approximately 290 mm (tolerance ± 15 mm) wide.

A2.1.5 Walls that make up the maze are at least 150 mm to a maximum of 300 mm high.

A2.1.6 The walls **will be opaque and** can be any colour.

A2.2 Floor

A2.2.1 Floors will be smooth (e.g. **melamine**) and may have up to 3 mm height difference at joints. There may be holes in the floor (about 5 mm diameter) for fastening walls. There may also be 5 mm gaps between floor tiles. Floors will be a light colour and must not be a similar colour to silver reflective tiles, black tiles or victims.

A2.2.2 The Start/Exit Tile will be marked by a silver reflective tile and enclosed with walls **on three sides**. The silver reflective tile will be fixed to the floor **but teams should be prepared for slight movements of these tiles**.

A2.2.3 Throughout the Playing Field, there may exist black tiles that represent "no go" spaces. The black tile will be fixed to the floor **but teams should be prepared for slight movements of these tiles**.

A2.3 Path

A2.3.1 ~~Tiles will lead to the entrance/exit. Walls that lead to the entrance/exit are called linear walls. The walls that do NOT lead to the entrance/exit are called "Floating Walls" and are not included in the Mighty Maisy Maze division.~~

Tiles that lead to the Start/Exit 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". "Floating Tiles" are not included in the Mighty Maisy division, and all tiles will lead to the Start/Exit tile.

Note: Black "no go" tiles will affect the determination of tile type since they can be considered virtual walls.

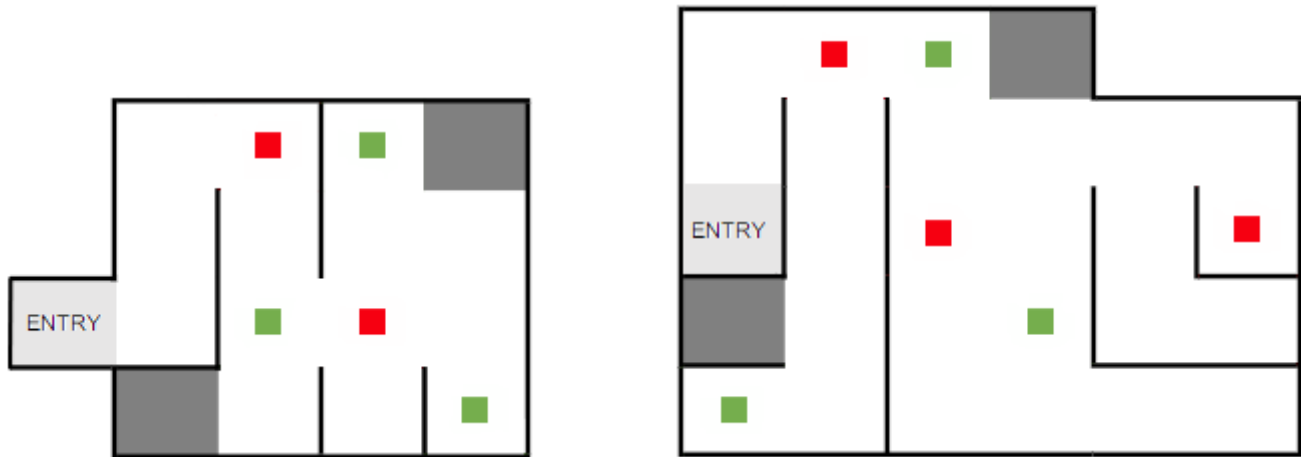


A2.3.2 Paths will be approximately 290 mm (tolerance ± 15 mm) wide but may open into foyers wider than the path.

A2.4 Debris, Speed Bumps, Obstacles and Stairs

A2.4.1 There are no Debris, Speed Bumps, Obstacles, Stairs or Ramps in the Mighty Maisy Maze division.

Example Courses:



A2.5 Environmental Conditions

A2.5.1 This event simulates a disaster area. There may be gaps and misalignments between wall panels, differences in flooring materials and heights. Teams should expect the environmental conditions at a tournament to be different from the conditions at their home practice field.

A2.5.2 Teams must come prepared to adjust their robots to the conditions at the venue.

A2.5.3 Lighting and magnetic conditions may vary within and between the Playing Fields at the venue.

~~A2.5.4 The arena may be affected by magnetic fields (e.g. generated by under floor wiring and metallic objects).~~

~~A2.5.5 Teams should prepare their robots to handle unexpected lighting interference. While the organizers and referees will try their best to minimize external lighting interference, it is not possible for them to foresee all unexpected interferences such as camera flash from spectators.~~

~~A2.5.6 The Organising Committee will try their best to fasten the walls onto the field floor so that the impact from regular robot's contact should not affect the robot. All measurements in the rules have a tolerance of 5%.~~

~~A2.5.7 Objects to be detected by the robot will be distinguishable from the environment by their colour.~~

A3 Victims

A3.1 Definition

A3.1.1 Victims are represented by red or green coloured 50 mm squares fixed to the floor ~~approximately 150 mm from the nearest wall (as measured to the centre of the square).~~

A3.1.2 Unharmed victims are depicted as green squares while Harmed victims are red squares.

A3.2 Locations

A3.2.1 There will be a minimum of four (4) victims in any round.

A3.2.2 Victims will be fixed to the centre of a tile.



A3.2.3 Victims can be located anywhere within the maze except on black tiles and Start/End tiles.

~~A3.2.4 Victims will be placed more than 100 mm apart as measured from the edge of each square.~~

A4 Rescue Kits

A4.1 There are no Rescue Kits in the Mighty Maisy Maze division.

A5 Game Play

A5.1 Pre-round Practice

A5.1.1 Where possible, competitors will have access to practice mazes for calibration, testing and tuning throughout the event.

Note: The lighting and magnetic conditions in the area of the practice mazes may vary from the competition mazes.

A5.1.2 Whenever there are dedicated independent arenas for event and practice, it is at the organizers' discretion if testing is allowed on the event arena.

A5.2 Humans

A5.2.1 Teams should designate one of its own team members as Robot Handler. Only this team member will be allowed access to the practice/event arenas, unless otherwise directed by a referee. Only the robot handler will be allowed to interact with the robot during a scoring run.

A5.2.2 The robot handler can move the robot only when told to do so by the referee.

A5.2.3 Other team members (and any spectators) within the vicinity of the rescue arena have to stand at least 1500 mm away from the arena while their robot is active, unless otherwise directed by the referee. **Non-team members are not allowed to communicate with the team during a round.**

A5.2.4 No one is allowed to touch the Playing Field intentionally during a scoring run.

A5.3 Start of Play

A5.3.1 A run begins at the scheduled starting time whether or not the team is present/ready.

A5.3.2 Once the scoring run has begun, the playing robot is not permitted to be taken from the event area for any reason.

A5.3.3 Each run lasts a maximum of 180 seconds and includes time for calibration. Time Limits for a round may be varied at the discretion of the Challenge Coordinator at the event.

A5.3.4 Calibration is defined as the taking of sensor readings and if necessary, modifying a robot's program to accommodate such sensor readings. Once the clock has started, a team may calibrate their robot at as many locations as desired on the arena, but the clock will continue to count down.

A5.3.5 Calibration time is not for pre-mapping the arena and/or the locations of the victims. Pre-mapping activities will result in immediate robot disqualification for the round.

A5.3.6 The maze will have one silver reflective Start/Exit tile.

A5.4 Scoring Run

A5.4.1 Modifying a robot during a run is prohibited, which includes remounting parts that have fallen off, unless a Restart is declared.



A5.4.2 All parts that the robot loses (intentionally or unintentionally) will be left in the arena until the run is over, unless a Restart is declared. Neither the team nor the judge are allowed to remove parts from the arena during a run.

A5.4.3 A “visited tile” means that more than half of the robot is inside the tile when looking down from above and shall be determined by the referee.

A5.4.4 The scoring run ends when:

A5.4.4.1 The time expires.

A5.4.4.2 The Robot Handler declares an end of their scoring run. The team will be awarded all points achieved up to the call for end of round.

A5.4.4.3 The robot returns to the start tile and gets the exit bonus. To collect points, the robot must stop on the start/exit tile **such that the entire robot is contained on the tile** and indicate in some way that it has completed the round. Exit indication should be distinct from the victim indication as detailed in section A6.2. The operator should be prepared to demonstrate the exit indication to the referee if required.

A5.4.4.4 A team member touches the arena or their robot without permission from a referee. If a team member is in breach of this rule the referee can declare a Restart where the robot is returned to the Start tile as per A5.6.1.

A5.5 Lack of Progress

A5.5.1 A Lack of Progress occurs when:

A5.5.1.1 The Robot Handler requests a Lack of Progress from the referee provided that the robot can genuinely not continue through either a ~~stoppage or recursive (looping) behaviour~~ **stoppage of three (3) or more seconds, or behaviour of three (3) or more loops.**

A5.5.1.2 A robot fails to retreat from a “visited” black tile. A robot is deemed to have entered the tile when more than half the robot is within the tile as determined by the referee. For a successful retreat, it needs to back up without turning inside the black tile (it has to move straight backwards inside of a black tile). (See definition of visited tile on rule A5.4.3.) If a robot is deemed to have visited the black tile, a Lack of Progress will be called as per rule A5.5.2.

A5.5.1.3 A robot or a team member damages the arena.

A5.5.2 If a Lack of Progress occurs the robot must be returned to any previously visited checkpoint (or the Start/Exit tile if the robot has not reached a checkpoint). The robot can be placed in any direction but must be wholly within the tile. The program can be paused ~~but not reset or changed~~ **or reset but not changed**. All points scored to that stage are still valid.

Note: teams should consider the implications of resetting their code on stored variables such as victim counts

A5.6 Restart

A5.6.1 After a Lack of Progress or when Rule A5.4.4.4 is breached, the Robot Handler may declare a **Restart**. After a Restart, the team can reset the power supply (turn the robot off and on), change programs, remount parts that have fallen off, and the maze will be returned to original condition by the referee.

Note: All points earned prior to a call of restart are invalid and will be reset.

Note: The round timer remains running.

A6 Scoring

A6.1 **Successful Victim Identification:** Robots are rewarded points for each Successful Victim Identification in the arena:

- 10 points per Unharmful victim.



- 25 points per Harmed victim.

A6.2 A robot can carry out the following action to successfully identify a victim by stopping for at least 1 second over the victim and clearly indicating by either visual indicator or sound.

Hint: Sounds can be hard to hear in a loud venue, so a visual indicator is recommended.

A6.3 **No duplicate rewards.** Each victim can only be identified and scored once.

A6.4 Once correctly identified, a victim can be used as a checkpoint for lack of progress.

A6.5 **Exit Bonus.** A successful exit bonus of 25 points will be awarded if the robot reaches and stops on the Start/Exit Tile **such that the entire robot is contained on the tile.**

A6.6 **Count Bonus.** Once at least 50% of the total victims in the maze (rounding down) have been identified, the robot will be awarded a further bonus of 25 points if it stops on the Start/Exit tile and clearly indicates the number of Unharmred victims the robot has found. A bonus of 25 points will be awarded if the number of Harmed victims the robot has found is clearly indicated. There is no penalty if victims are identified more than once.

Note: the victim should not be detected more than once per time that the sensor passes over it.

For example, if there are 2 Harmed victims, but the robot has successfully identified 3 (i.e. it has counted one victim twice) then the Harmed victim count should be 3. Teams are advised to consider how their counted variables may be affected if restarting the program in the event of a lack of progress.

A6.7 **Scoring Summary:**

State	Indicator	Points
Unharmred victim found	Stop for at least 1 second and give clear indication of victim identification	10 points per victim
Harmed victim found	Stop for at least 1 second and give clear indication of victim identification	25 points per victim
Exit Bonus	The robot will be awarded 25 points for reaching and stopping on the Start/Exit tile such that the entire robot is contained on the tile within Time Limit	25 points
Unharmred Victim Count Bonus	The robot will be awarded 25 points for a count of Unharmred victims the robot found	25 points
Harmed Victim Count Bonus	The robot will be awarded 25 points for a count of Harmed victims the robot found	25 points

A7 Event Structure

A7.1 The regular event will consist of as many preliminary rounds as possible with the team scores cumulative over the rounds. Placings at the end of the preliminary rounds will be awarded on the basis of the cumulative scores. In the event of a tied position the placings will be awarded based on the number of victims identified over the preliminary rounds. If still tied, the placings will be decided based on the lowest cumulative time over the preliminary rounds.

A7.2 The organisers may include Super Rounds for the final rounds of the event.

A7.3 The top 4 scoring teams in the preliminary rounds will be eligible to compete in the Super Rounds.



-
- A7.4 Placings at the end of the event will be awarded based solely on the cumulative scores of the Super Rounds. In the event of a tied position the placings will be awarded based on the number of victims identified over the Super Rounds. If still tied, the placings will be decided based on the lowest cumulative time over the Super Rounds. If still tied, the placings will then refer to the preliminary rounds results.
- A7.5 In the Super Rounds all teams compete at the same time, on separate independent courses.
- A7.6 The teams will select their initial course in the order that they have finished in the preliminary rounds.
- A7.7 After each Super Round, the competing teams will start the next round from the next course moving clockwise.
- A7.8 Courses for the Super Rounds must be independent but can have missing walls as long as there is a black tile to prevent robots from crossing into another course.



B Intermediate Maze

B1 Introduction

The robot needs to search through a maze for colour-identifiable victims. i.e. the robot need not find the fastest path through the maze, instead it should explore as much as possible of the maze. The robot will score points for each victim found. The robot should avoid areas with a black floor. If the robot is stuck in the maze, it can be ~~restarted at~~ **moved to** any previous correctly identified victim. If the robot can find its way back to the start tile after exploring the maze it will receive an exit bonus (see section B6.5). Additional count bonuses will be awarded upon exit if the robot can report the number and type of victims that it has identified in the maze (victims might be identified more than once) once at least half the victims have been identified (see section B6.6). If the robot can also deliver a Rescue Kit close to Harmed victims, it will earn additional points.

B2 Playing Field

All measurements in the rules have a tolerance of 5%.

B2.1 Maze Description

B2.1.1 The maze will be on a single level and may consist of multiple distinct areas. Areas will have a horizontal floor and a perimeter wall. Walls can be constructed either using reams of A4 Paper laid on their long side or using the Open Maze walls.

B2.1.2 Areas may be joined together by doorways.

B2.1.3 Walls will be located approximately 29 mm (tolerance ± 15 mm) apart. There may be a 5mm gap between wall sections.

B2.1.4 Doorways are approximately 290 mm (tolerance ± 15 mm) wide.

B2.1.5 Walls that make up the maze are at least 150 mm to a maximum of 300 mm high. There may be a 5 mm gap between wall sections.

B2.1.6 The walls **will be opaque and** can be any colour.

B2.2 Floor

B2.2.1 Floors should be smooth (e.g. **melamine**) and may have up to 3 mm height difference at joints. There may be holes in the floor (about 5 mm diameter) for fastening walls. There may also be 5mm gaps between floor tiles. Floors will be a light colour and must not be a similar colour to silver reflective tiles, black tiles or victims.

B2.2.2 The Start/Exit Tile will be marked by a silver reflective tile and enclosed with walls **on three sides**. The silver reflective tile will be fixed to the floor **but teams should be prepared for slight movements of these tiles**.

B2.2.3 Throughout the Playing Field, there may exist black tiles that represent "no go" spaces. The black tile will be fixed to the floor **but teams should be prepared for slight movements of these tiles**.

B2.3 Path

B2.3.1 ~~Walls will lead to the entrance/exit. Walls that lead to the entrance/exit are called linear walls. The walls that do NOT lead to the entrance/exit are called "Floating Walls".~~

Tiles that lead to the Start/Exit 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'.

Note: Black "no go" tiles will affect the determination of tile type since they can be considered virtual walls



B2.3.2 Paths will be approximately 290 mm (tolerance ± 15 mm) wide but may open into foyers wider than the path.

B2.4 Debris, Speed Bumps, Obstacles and Stairs

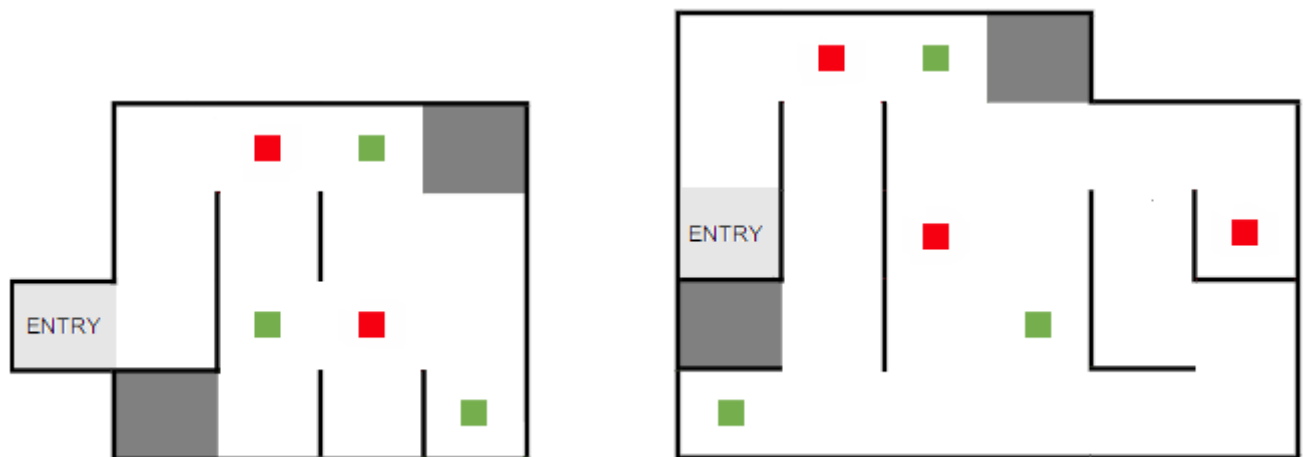
B2.4.1 **Speed Bumps** are fixed to the floor, have a maximum height of 5 mm and will be no closer than 50 mm apart.

B2.4.2 **Debris** will not be fixed on the floor and will have a maximum height of 5 mm. Debris can be placed anywhere on the tile and must be a contrasting colour to the victims, the start tiles, black tiles.

Hint: Make sure that your robot can negotiate speed bumps and has sufficient ground clearance.

B2.4.3 There are no Obstacles, Stairs or Ramps in the Intermediate Maze division.

Example Courses:



B2.5 Environmental Conditions

B2.5.1 This event simulates a disaster area. There may be gaps and misalignments between wall panels, differences in flooring materials and heights. Teams should expect the environmental conditions at a tournament to be different from the conditions at their home practice field.

B2.5.2 Teams must come prepared to adjust their robots to the conditions at the venue.

B2.5.3 Lighting and magnetic conditions may vary within and between Playing Fields at the venue.

~~B2.5.4 The arena may be affected by magnetic fields (e.g. generated by under floor wiring and metallic objects).~~

~~B2.5.5 Teams should prepare their robots to handle unexpected lighting interference. While the organizers and referees will try their best to minimize external lighting interference, it is not possible for them to foresee all unexpected interferences such as camera flash from spectators.~~

~~B2.5.6 The Organizing Committee will try their best to fasten the walls onto the field floor so that the impact from regular robot's contact should not affect the robot. All measurements in the rules have a tolerance of 5%.~~

~~B2.5.7 Objects to be detected by the robot will be distinguishable from the environment by their colour.~~

B3 Victims

B3.1 Definition

~~B3.1.1 Victims are represented by red or green coloured 50 mm squares fixed to the floor approximately 150 mm from the nearest wall (as measured to the centre of the square).~~



B3.1.2 Unharmful victims are depicted as green squares while Harmful victims are red squares.

B3.2 Locations

B3.2.1 There will be a minimum of four (4) victims in any round.

B3.2.2 Victims will be fixed to the centre of a tile.

B3.2.3 Victims can be located anywhere within the maze except on black tiles and Start/End tiles.

~~B3.2.4 Victims will be placed more than 100 mm apart as measured from the edge of each square.~~

B.4 Rescue Kits

B4.1 A Rescue Kit represents a basic health package distributed to a harmed victim caught in a natural disaster. It symbolises tools or devices used in the rescue process, such as GPS Transponders or even something as simple as food, water or light source providers.

B4.2 Each Rescue Kit must have a minimum volume of 500 mm³ (e.g. 8 mm x 8 mm x 8 mm).

B4.3 Each team can only carry a maximum number of 12 of those kits.

B4.4 Each team is responsible for the whole Rescue Kit system (the maximum of 12 kits), including bringing the rescue kits to the event. The Robot Handler is responsible for loading their own Rescue Kits on their robots and cleaning the field with the referee's/judges' authorization after the game is called to end.

B.5 Game Play

B5.1 Pre-round Practice

B5.1.1 Where possible, competitors will have access to practice arenas for calibration, testing and tuning throughout the event.

Note: The lighting and magnetic conditions in the area of the practice mazes may vary from the competition mazes.

B5.1.2 Whenever there are dedicated independent arenas for event and practice, it is at the organizers' discretion if testing is allowed on the event arena.

B5.2 Humans

B5.2.1 Teams should designate one of its own team members as Robot Handler. Only this team member will be allowed access to the practice/event arenas, unless otherwise directed by a referee. Only the robot handler will be allowed to interact with the robot during a scoring run.

B5.2.2 The robot handler can move the robot only when told to do so by the referee.

B5.2.3 Other team members (and any spectators) within the vicinity of the rescue arena have to stand at least 1500 mm away from the arena while their robot is active, unless otherwise directed by the referee. **Non-team members are not allowed to communicate with the team during a round.**

B5.2.4 No one is allowed to touch the Playing Fields intentionally during a scoring run.

B5.3 Start of Play

B5.3.1 A run begins at the scheduled starting time whether or not the team is present/ready.

B5.3.2 Once the scoring run has begun, the playing robot is not permitted to be taken from the event area for any reason.



B5.3.3 Each run lasts a maximum of 240 seconds and includes time for calibration. Time Limits for a round may be varied at the discretion of the Challenge Coordinator at the event.

B5.3.4 Calibration is defined as the taking of sensor readings and if necessary, modifying a robot's program to accommodate such sensor readings. Once the clock has started, a team may calibrate their robot at as many locations as desired on the arena, but the clock will continue to count down.

B5.3.5 Calibration time is not for pre-mapping the arena and/or the locations of the victims. Pre-mapping activities will result in immediate robot disqualification for the round.

B5.3.6 The maze will have one silver reflective start tile.

B5.4 Scoring Run

B5.4.1 Modifying a robot during a run is prohibited, which includes remounting parts that have fallen off, unless a Restart is declared.

B5.4.2 All parts that the robot loses intentionally or unintentionally will be left in the arena until the run is over, unless a Restart is declared. Neither the team nor the judge are allowed to remove parts from the arena during a run.

B5.4.3 A "visited tile" means that more than half of the robot is inside the tile when looking down from above and shall be determined by the referee.

B5.4.4 The scoring run ends when:

B5.4.4.1 The time expires.

B5.4.4.2 The Robot Handler declares an end of their scoring run. The team will be awarded all points achieved up to the call for end of round.

B5.4.4.3 The robot returns to the start tile and gets the exit bonus. To collect points, the robot must stop on the start/exit tile **such that the entire robot is contained on the tile** and indicate in some way that it has completed the round. Exit indication should be distinct from the victim indication as detailed in section B6.2. The operator should be prepared to demonstrate the exit indication to the referee if required.

B5.4.4.4 A team member touches the arena or their robot without permission from a referee. If a team member is in breach of this rule the referee can declare a Restart where the robot is returned to the Start tile as per B5.6.1.

B5.5 Lack of Progress

B5.5.1 A Lack of Progress occurs when:

B5.5.1.1 The Robot Handler requests a Lack of Progress from the referee provided that the robot can genuinely not continue through either a ~~stoppage or recursive (looping) behaviour~~ **stoppage of three (3) or more seconds, or behaviour of three (3) or more loops.**

B5.5.1.2 A robot fails to retreat from a "visited" black tile. A robot is deemed to have entered the tile when more than half the robot is within the tile as determined by the referee. For a successful retreat, it needs to back up without turning inside the black tile (it has to move straight backwards inside of a black tile). (See definition of visited tile on rule B5.4.3.) If a robot is deemed to have visited the black tile, a Lack of Progress will be called as per rule B5.5.2.

B5.5.1.3 A robot or a team member damages the arena.

B5.5.2 If a Lack of Progress occurs the robot must be returned to any previously visited checkpoint (or the Start tile if the robot has not reached a checkpoint). The robot can be placed in any direction but must be wholly within the tile. The program can be paused ~~but not reset or changed~~ **or reset but not changed**. All points scored to that stage are still valid, but debris will not be reset.



Note: teams should consider the implications of resetting their code on stored variables such as victim counts

B5.6 Restart

B5.6.1 After a Lack of Progress or when Rule B5.4.4 is breached, the Robot Handler may declare a **Restart**. After a Restart, the team can reset the power supply (turn the robot off and on), change programs, remount parts that have fallen off, and the maze will be returned to original condition by the referee.

Note: All points earned prior to a call of restart are invalid and will be reset.

Note: The round timer remains running.

B.6 Scoring

B6.1 **Successful Victim Identification:** Robots are rewarded points for each Successful Victim Identification in the arena:

- 10 points per Unharmd victim.
- 25 points per Harmed victim, with an additional 10 points for a successful rescue kit deployment.

B6.2 A robot can carry out the following action to successfully identify a victim by stopping for at least 1 second over the victim and clearly indicating by either visual indicator or sound.

Hint: Sounds can be hard to hear in a loud venue, so a visual indicator is recommended.

B6.3 **No duplicate rewards.** Each victim can only be identified and scored once. Points for a successful rescue kit deployment can only be scored once.

B6.4 Once correctly identified a victim can be used as a checkpoint for lack of progress.

B6.5 **Exit Bonus.** A successful exit bonus of 25 points will be awarded if the robot reaches and stops on the Start/Exit Tile **such that the entire robot is contained on the tile**.

B6.6 **Count Bonus.** Once at least half of the total victims in the maze (rounding down) have been identified, the robot will be awarded a further bonus of 25 points if it stops on the Start/Exit tile and clearly indicates the number of Unharmd victims the robot has found. A bonus of 25 points will be awarded if the number of Harmed victims the robot has found is clearly indicated. There is no penalty if victims are identified more than once.

Note: the victim should not be detected more than once per time that the sensor passes over it.

For example, if there are 2 Harmed victims, but the robot has successfully identified 3 (i.e. it has counted one victim twice) then the Harmed victim count should be 3. Teams are advised to consider how their counted variables may be affected if restarting the program in the event of a lack of progress.

B6.7 **Scoring Summary:**

State	Indicator	Points
Unharmd victim found	Stop for at least 1 second and give clear indication of victim identification	10 points per victim
Harmed victim found	Stop for at least 1 second and give clear indication of victim identification	25 points per victim
Exit Bonus	The robot will be awarded 25 points for reaching and stopping on the Start/Exit tile such that the entire robot is contained on the tile within Time Limit	25 points
Unharmd Victim Count Bonus	The robot will be awarded 25 points for a count of Unharmd victims the robot found	25 points



Harmed Victim Count Bonus	The robot will be awarded 25 points for a count of Harmed victims the robot found	25 points
Rescue Kit deployed for Harmed victims	Drop one rescue kit on the tile of an identified Harmed victim	10 points per victim

B6.8 **Successful rescue kit deployment.** Robot should drop a rescue kit on the tile where an identified Harmed victim is. The deployment point and the rescue kit need to be wholly on the tile of the victim. The robot is awarded points (see table) per successful rescue kit deployment.

B.7 Event Structure

- B7.1 The regular event will consist of as many preliminary rounds as possible with the team scores cumulative over the rounds. Placings at the end of the preliminary rounds will be awarded on the basis of the cumulative scores. In the event of a tied position the placings will be awarded based on the number of victims identified over the preliminary rounds. If still tied, the placings will be decided based on the lowest cumulative time over the preliminary rounds.
- B7.2 The organisers may include Super Rounds for the final rounds of the event.
- B7.3 The top 4 scoring teams in the preliminary rounds will be eligible to compete in the Super Rounds.
- B7.4 Placings at the end of the event will be awarded based solely on the cumulative scores of the Super Rounds. In the event of a tied position the placings will be awarded based on the number of victims identified over the Super Rounds. If still tied, the placings will be decided based on the lowest cumulative time over the Super Rounds. If still tied, the placings will then refer to the preliminary rounds results.
- B7.5 In the Super Rounds all teams compete at the same time, on separate independent courses.
- B7.6 The teams will select their initial starting tile course in the order that they have finished in the preliminary rounds.
- B7.7 After each Super Round, the competing teams will start the next round from the next start tile course moving clockwise.
- B7.8 Courses for the Super Rounds must be independent but can have missing walls as long as there is a black tile to prevent robots from crossing into another course.



C Open Maze

C1 Introduction

The robot needs to search through a maze for colour and/or visually identifiable victims. i.e. the robot need not find the fastest path through the maze, instead it should explore as much of the maze as possible. The robot will score points for each victim found. The robot should avoid areas with a black floor. If the robot is stuck in the maze, it can be ~~restarted at~~ **moved to** the last visited checkpoint. The checkpoints are indicated with silver reflective tile so the robot can save its map (if it uses a map) to a non-volatile medium and restore it in case of a restart, optimising the robot's search. If the robot can find its way back to its start tile after exploring a large proportion of the maze it will receive an exit bonus (as defined in C6.7). If the robot can also deliver a Rescue Kit close to alive victims, it will earn additional points.

C2 Playing Field

All measurements in the rules have a tolerance of 5%.

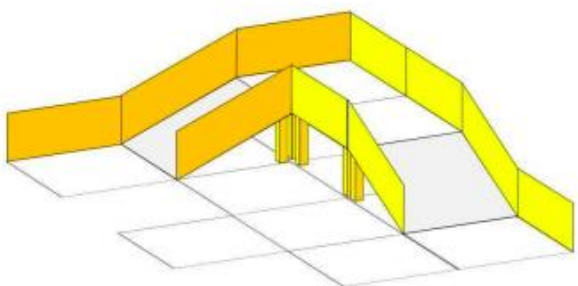
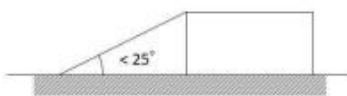
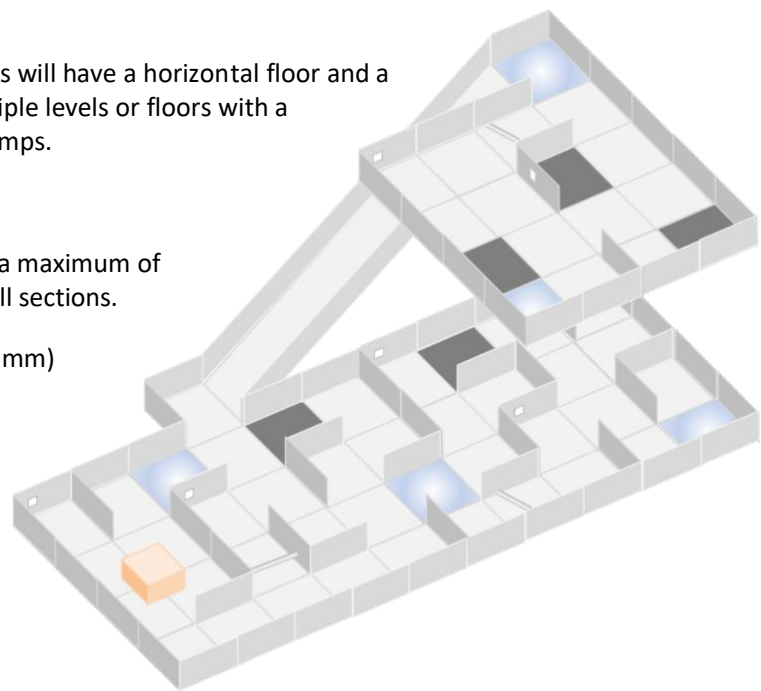
C2.1 Maze Description

C2.1.1 The maze may consist of multiple distinct areas. Areas will have a horizontal floor and a perimeter wall. Mazes may be constructed with multiple levels or floors with a height of 400-600 mm Which will be accessible via ramps.

C2.1.2 Areas may be joined together by doorways or ramps.

C2.1.3 Walls that make up the maze are at least 150 mm to a maximum of 300 mm high. There may be a 5 mm gap between wall sections.

C2.1.4 Doorways are approximately 290 mm (tolerance ± 15 mm) wide.



C2.1.5 Ramps will be at least 290 mm (tolerance ± 15 mm) wide and have an incline with a maximum of 25 degrees from horizontal surface. The ramp is always straight.

C2.1.6 The walls **will be opaque and** can be any colour.



C2.2 Floor

- C2.2.1 Floors may be either smooth or textured (like linoleum or carpet) and may have up to 3 mm height difference at joints. There may be holes in the floor (about 5 mm diameter) for fastening walls. There may also be 5mm gaps between floor tiles. Floors must not be a similar colour to start tiles, silver reflective tiles or black tiles.
- C2.2.3 There may also exist silver reflective tiles that represent Checkpoints. Silver reflective tiles may not be completely fixed on the floor.
- C2.2.4 Throughout the arena, there may exist black tiles that represent “no go” spaces. Black tiles may not be completely fixed on the floor.
- C2.2.5 The floors for start tiles can be coloured red, green, blue or yellow and will be against an external wall. The entry will be enclosed with a wall.

C2.3 Path

- C2.3.1 ~~Walls may or may not lead to the entrance/exit. Walls that lead to the entrance/exit are called linear walls. The walls that do NOT lead to the entrance/exit are called "Floating Walls".~~

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'.

Black “no go” tiles will affect the determination of tile type (linear or floating) since they can be considered virtual walls.

- C2.3.2 Paths will be at least 290 mm (tolerance ± 15 mm) wide but may open into foyers wider than the path.
- C2.3.3 There may be multiple entries with coloured floors that are randomly selected prior to the start of the run.
- C2.3.4 Paths may form passages/tunnels passing under upper floors.

C2.4 Debris, Speed Bumps, Obstacles and Stairs

- C2.4.1 **Speed Bumps** are fixed to the floor, have a maximum height of 20 mm and will be no closer than 50 mm apart.
- C2.4.2 **Debris** will not be fixed on the floor, and will have a maximum height of 10 mm. Debris can be placed anywhere on the tile and must be a contrasting colour to the start tiles, black or silver reflective tiles.

Hint: Make sure that your robot can negotiate obstacles and has sufficient ground clearance.

- C2.4.3 **Obstacles** have a minimum height of 150 mm, may consist of any large, heavy items and can be any shape, including rectangular, pyramidal, spherical or cylindrical. Obstacles can be coloured or clear. Obstacles are not fixed to the floor so may be moved by the robot during play.



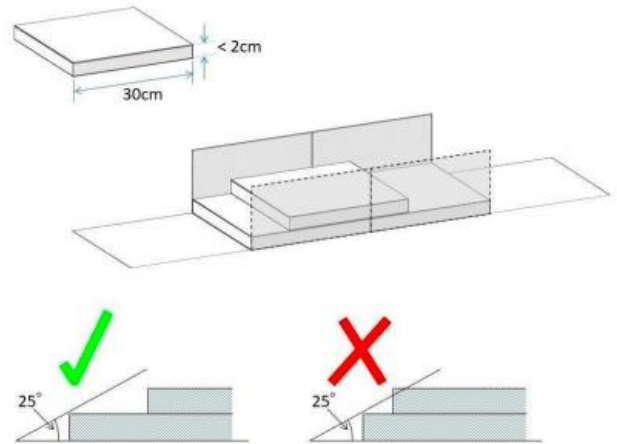
C2.4.4 Obstacles will not prevent a robot from discovering routes in the maze. An Obstacle may be placed in any location where at least 200 mm is left between the obstacle and a wall.

C2.4.5 Obstacles that are moved or knocked over will remain where they are moved to/fall and will not be reset during the scoring run.

C2.4.6 Stairs will be the full width of the passageway (300 mm less thickness of walls) and the individual maximum height is 20 mm.

C2.4.7 The incline of stairs (i.e.: the incline of a plate to the horizontal when placed on the stairs) will be less than 25 degrees.

C2.4.8 Stairs will be placed between walls.



C2.5 Environmental Conditions

C2.5.1 This event simulates a disaster area. There may be gaps and misalignments between wall panels, differences in flooring materials and heights. Teams should expect the environmental conditions at a tournament to be different from the conditions at their home practice field.

C2.5.2 Teams must come prepared to adjust their robots to the conditions at the venue.

C2.5.3 Lighting and magnetic conditions may vary along within and between Playing Fields at the venue.

~~C2.5.4 The arena may be affected by magnetic fields (e.g. generated by under floor wiring and metallic objects).~~

~~C2.5.5 Teams should prepare their robots to handle unexpected lighting interference. While the organizers and referees will try their best to minimize external lighting interference, it is not possible for them to foresee all unexpected interferences such as camera flash from spectators.~~

~~C2.5.6 The Organizing Committee will try their best to fasten the walls onto the field floor so that the impact from regular robot's contact should not affect the robot. All measurements in the rules have a tolerance of 5%.~~

~~C2.5.7 Objects to be detected by the robot will be distinguishable from the environment by their colour and/or symbol.~~



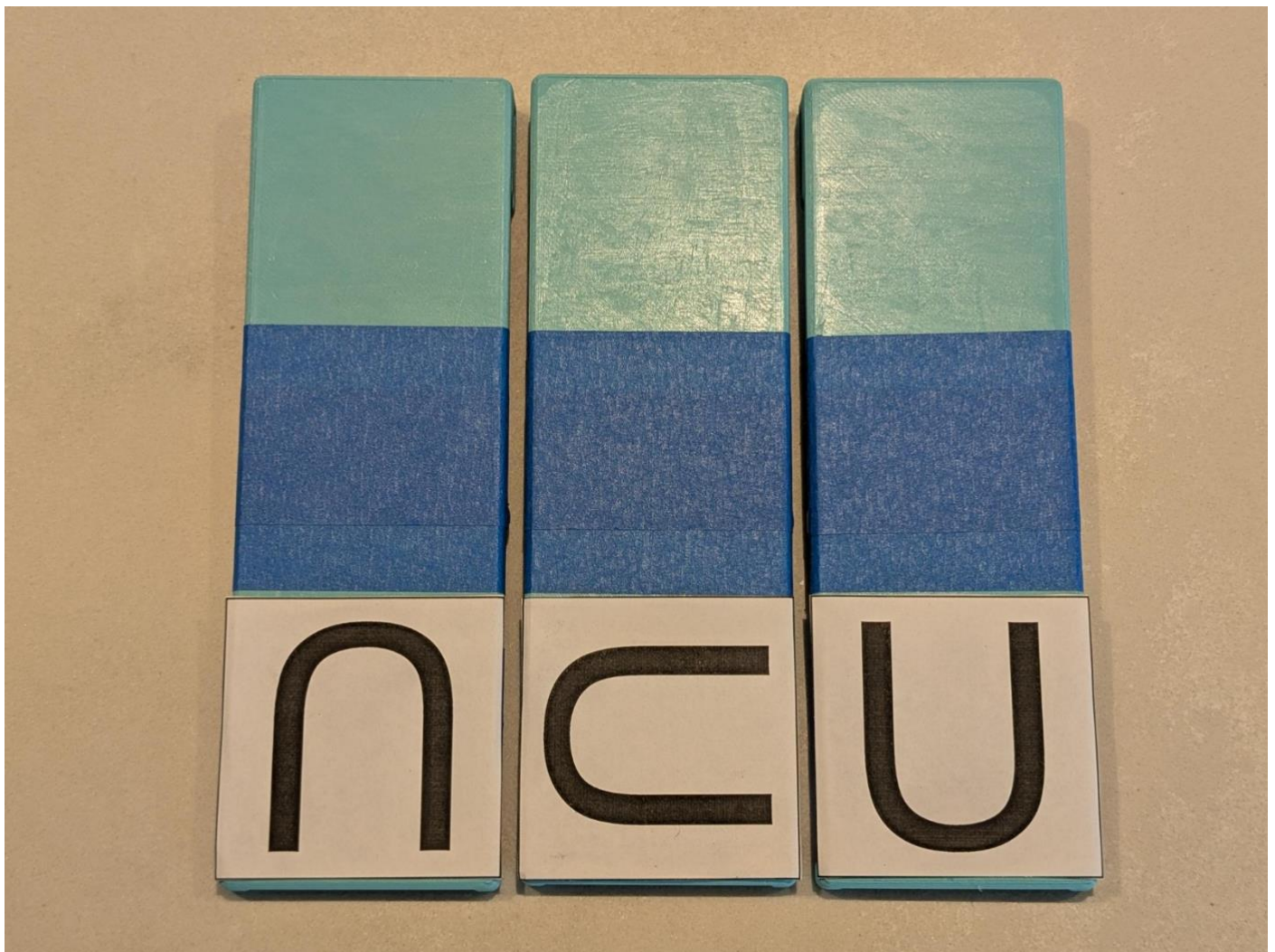
C3 Victims

C3.1 Definition

C3.1.1 There are two types of victims that may be used: Unharmred and Harmed. Victims can be identified by looking for coloured or reflective tape, or by looking for letter symbols.

The inclusion of letter symbols helps prepare teams and robots for the International Rescue Maze rules.

C3.1.2 Unharmred Victims will be located on walls, near the floor of the arena (centred approximately 70 mm above the floor). The victim will be an uppercase letter “U” (for Unharmred) on a white background. It will be printed in black using a sans serif typeface (such as ‘Arial’ 160 point) with a height of 40 mm. The letter can be rotated. They will also be wearing work clothing simulated by blue coloured tape (e.g. 3M painter’s blue masking tape) fixed to them. The tape will be centred approximately 130 mm above the floor and have an area of approximately 2500 mm² (for example: 50 mm x 50 mm).





C3.1.3 Harmed Victims will be located on walls, near the floor of the arena (centred approximately 70 mm above the floor). The victim will be an uppercase letter “H” (for Harmed) on a white background. It will be printed in black using a sans serif typeface (such as ‘Arial’ 160 point) with a height of 40 mm. The letter can be rotated. They will also have “locator beacons” simulated by reflective tape (e.g. Aluminium foil tape) fixed to them. The tape will be centred approximately 130 mm above the floor and have an area of approximately 2500 mm² (for example: 50 mm x 50 mm).



C3.1.4 Victims identified as Harmed need medical assistance and require a Rescue Kit dropped.

C3.1.5 Victims identified as Unharmred do not need a Rescue Kit. There will be no points awarded for dropping a Rescue Kit.

Advice: It is recommended that teams using Lego robots be aware that if they are using the standard Lego software they may be restricted in their choice of sensors and that the standard Lego sensors, while usable, may not be very effective. We would recommend that the teams consider using some of the text-based programming alternatives in combination with robot vision to identify victims.

C3.2 Locations

C3.2.1 There will be a minimum of four (4) victims in any round.

C3.2.2 Victims can be located anywhere within the maze except for on black tiles, Start/End tiles or on tiles with obstacles. Victims may be located on ramps and stairs.



C4 Rescue Kits

- C4.1 A Rescue Kit represents a basic health package distributed to a Harmed Victim caught in a natural disaster. It symbolizes tools or devices used in the rescue process, such as GPS Transponders or even something as simple as food, water or light source providers.
- C4.2 Each Rescue Kit must have a minimum volume of 500 mm³ (e.g. 8 mm x 8 mm x 8 mm).
- C4.3 Each team can only carry a maximum number of 12 of those kits.
- C4.4 Each team is responsible for the whole Rescue Kit system (the maximum of 12 kits), including bringing the rescue kits to the event. The Robot Handler is responsible for loading their own Rescue Kits on their robots and cleaning the field with the referee's/judges' authorization after the game is called to end.

C5 Game Play

C5.1 Pre-round Practice

- C5.1.1 Where possible, competitors will have access to practice arenas for calibration, testing and tuning throughout the event.

Note: The lighting and magnetic conditions in the area of the practice mazes may vary from the competition mazes.

- C5.1.2 Whenever there are dedicated independent arenas for event and practice, it is at the organizers' discretion if testing is allowed on the event arena.

C5.2 Humans

- C5.2.1 Teams should designate one of its own team members as Robot Handler. Only this team member will be allowed access to the practice/event arenas, unless otherwise directed by a referee. Only the robot handler will be allowed to interact with the robot during a scoring run.
- C5.2.2 The robot handler can move the robot only when told to do so by the referee.
- C5.2.3 Other team members (and any spectators) within the vicinity of the rescue arena have to stand at least 1500 mm away from the arena while their robot is active, unless otherwise directed by the referee. **Non-team members are not allowed to communicate with the team during a round.**
- C5.2.4 No one is allowed to touch the Playing Fields intentionally during a scoring run.



C5.3 Start of Play

- C5.3.1 A run begins at the scheduled starting time whether or not the team is present/ready.
- C5.3.2 Once the scoring run has begun, the playing robot is not permitted to be taken from the event area for any reason.
- C5.3.3 Each run lasts a maximum of 240 seconds and includes time for calibration. Time Limits for a round may be varied at the discretion of the Challenge Coordinator at the event.
- C5.3.4 Calibration is defined as the taking of sensor readings and if necessary, modifying a robot's program to accommodate such sensor readings. Once the clock has started, a team may calibrate their robot at as many locations as desired on the arena, but the clock will continue to count down.
- C5.3.5 Calibration time is not for pre-mapping the arena and/or the locations of the victims. Pre-mapping activities will result in immediate robot disqualification for the round.
- C5.3.6 The maze will have a minimum of 2, and up to 4 possible entries. Calibration for the colour of the entry tile will be included within the Run Time. Entries may be on either the ground or upper levels and will be against an external wall. The entry will be enclosed with a wall.
- C5.3.7 The start tile for each run will be randomly determined just prior to the commencement of the timed period. Black tiles and Checkpoints may also be relocated at this time.
- C5.3.8 Once initial calibration has been completed, no more calibration is permitted (this includes changing of code/code selection) without penalty as per section C5.6.1.

C5.4 Scoring Run

- C5.4.1 Modifying a robot during a run is prohibited, which includes remounting parts that have fallen off, unless a Restart is declared.
- C5.4.2 All parts that the robot loses intentionally or unintentionally will be left in the arena until the run is over, unless a Restart is declared. Neither the team nor the judge are allowed to remove parts from the arena during a run.
- C5.4.3 A "visited tile" means that more than half of the robot is inside the tile when looking down from above and shall be determined by the referee.
- C5.4.4 The scoring run ends when:
 - C5.4.4.1 The time expires.
 - C5.4.4.2 The Robot Handler declares an end of their scoring run. The team will be awarded all points achieved up to the call for end of round.
 - C5.4.4.3 The robot returns to the start tile and gets the exit bonus. To collect points, the robot must stop on the start/exit tile **such that the entire robot is contained on the tile** and indicate in some way that it has completed the round. Exit indication should be distinct from the victim indication as detailed in section C6.2. The operator should be prepared to demonstrate the exit indication to the referee if required.
 - C5.4.4.4 A team member touches the arena or their robot without permission from a referee. If a team member is in breach of this rule the referee can declare a Restart where the robot is returned to the Start tile as per C5.6.1.



C5.5 Lack of Progress

C5.5.1 A Lack of Progress occurs when:

C5.5.1.1 The Robot Handler requests a Lack of Progress from the referee provided that the robot can genuinely not continue through either a ~~stoppage or recursive (looping) behaviour~~ **stoppage of three (3) or more seconds, or behaviour of three (3) or more loops.**

C5.5.1.2 A robot fails to retreat from a “visited” black tile. A robot is deemed to have entered the tile when more than half the robot is within the tile as determined by the referee. For a successful retreat, it needs to back up without turning inside the black tile (it has to move straight backwards inside of a black tile). (See definition of visited tile on rule C5.4.3.) If a robot is deemed to have visited the black tile it must return to the last visited checkpoint (or the start tile if never reached a checkpoint). All points scored to that stage are still valid, but obstacles and debris will not be reset.

C5.5.1.3 A robot or a team member damages the arena.

C5.5.2 If a Lack of Progress occurs the robot must be returned to the last visited checkpoint (or the Start tile if the robot has not reached a checkpoint). The robot can be placed in any direction but must be wholly within the tile. The program can be paused ~~but not reset or changed~~ **or reset but not changed.**

C5.6 Restart

C5.6.1 After a Lack of Progress or when Rule C5.4.4.4 is breached, the Robot Handler may declare a **Restart**. After a Restart, the team can reset the power supply (turn the robot off and on), change programs, remount parts that have fallen off, and the maze will be returned to original condition by the referee.

Note: All points earned prior to a call of restart are invalid and will be reset.

Note: The round timer remains running.

C6 Scoring

C6.1 **Successful Victim Identification.** Robots are rewarded points for each Successful Victim Identification in the arena:

- 10 points per “victim” located on a “Linear Tile”
- 25 points per “victim” located on a “Floating Tile”

C6.2 The method used to indicate the discovery of the victim must be clearly observable in the course of play. The indicator method used must be conveyed to the referee before commencing the course. The robot must carry out one or more of the following actions to successfully identify a victim:

C6.2.1 Stop for 5 seconds wholly on the same tile as the victim and clearly indicate for the full 5 seconds, or

C6.2.2 Stop wholly on the same tile and play a Sound, or

Hint: Sounds can be hard to hear in a loud venue, so a visual indicator is recommended.

C6.2.3 Stop wholly on the same tile and provide a visual notification, such as a flashing light or colour change.

Note: Visual indicators must be placed in a clearly observable area.

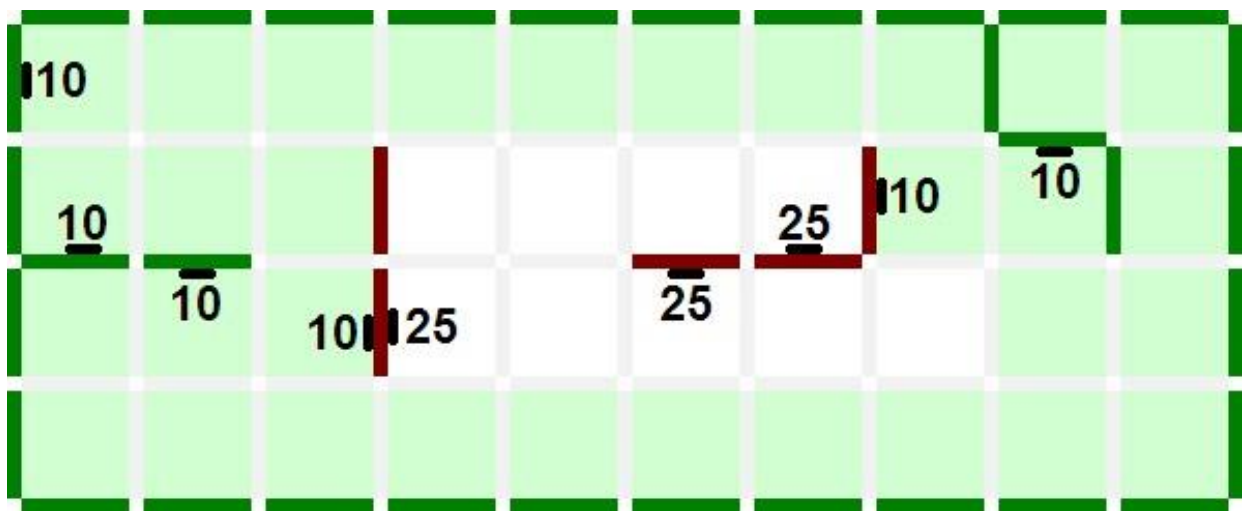
C6.3 **Successful rescue kit deployment.** Robot should drop a rescue kit on the tile where an identified Harmed victim is. The deployment point and the rescue kit need to be wholly on the tile of the victim. The robot is awarded points (see table) per successful rescue kit deployment.



C6.4 **No duplicate rewards.** For example, if a robot successfully crosses a tile with a checkpoint multiple times, only one successful checkpoint bonus will be rewarded per tile. The same result applies to all other scoring rules.

C6.5 **Scoring Table for Victim Identification:**

State	Indicator	Points Linear Tile	Points Floating Tile	Each Rescue Kit deployed for Harmed victims
Victim Found	Clear indication of victim identification	10 points	25 points	10 points



Note: In the above diagram, red/brown lines mean floating walls while the green ones represent linear walls. Some of the victims on the floating walls are worth 10p, because the 10p victims are located in a tile near a linear wall. The colours on the diagram are just for illustrative purposes.

C6.6 **Successful Checkpoint Negotiation.** A robot is awarded 10 points for each visited checkpoint. Refer to C5.4.3 for definition of visited tile.

C6.7 **Successful Exit Bonus.** A successful exit bonus is awarded when a robot successfully finishes a round **by stopping** on the start tile **such that the entire robot is contained on the tile** (see rule C5.4.4.3) and has visited at least 50% (round down) of the checkpoints. The points awarded will be 10 points per victim successfully identified.

C6.8 Table for Checkpoint and Exit Bonus:

Action Completed	Score
Checkpoint	10
Exit Bonus	10 x n (identified victims)



C7 Event Structure

- C7.1 The regular event will consist of as many preliminary rounds as possible with the team scores cumulative over the rounds. Placings at the end of the preliminary rounds will be awarded on the basis of the cumulative scores. In the event of a tied position the placings will be awarded based on the number of victims identified over the preliminary rounds. If still tied, the placings will be decided based on the lowest cumulative time over the preliminary rounds.
- C7.2 The organisers may include Super Rounds for the final rounds of the event.
- C7.3 The top 4 scoring teams in the preliminary rounds will be eligible to compete in the Super Rounds.
- C7.4 Placings at the end of the event will be awarded based solely on the cumulative scores of the Super Rounds. In the event of a tied position the placings will be awarded based on the number of victims identified over the Super Rounds. If still tied, the placings will be decided based on the lowest cumulative time over the Super Rounds. If still tied, the placings will then refer to the preliminary rounds results.
- C7.5 In the Super Rounds all teams compete at the same time.
- C7.6 The teams will select their initial starting tile in the order that they have finished in the preliminary rounds.
- C7.7 After each Super Round, the competing teams will start the next round from the next start tile moving clockwise.
- C7.8 Scoring in the Super Rounds is identical to the preliminary round with the exception that if a team is the first to correctly identify and leave a rescue kit for a particular victim, they “claim” that victim and no other team can score points for that victim. Claimed victims will be identified by coloured tags or stickers.



2 Robot

2.1 Robot Configuration

There are some robot configuration rules that are consistent across all Challenges. Please ensure you read the [General Rules](#), which can be downloaded from the [Rescue Maze Challenge Page](#) on the RoboCup Junior Australia Website, for robot configuration requirements.

2.1.1 The height of a robot must not exceed 300 mm.

Care should be taken in robot design to ensure that it is of a manageable size to negotiate its way successfully through the maze and past obstacles.

2.1.2 Robots may not have any sensor or devices that enable it to 'see' over the walls.

2.1.3 Any robot kit or building blocks, either available on the market or built from raw hardware and materials, may be used, as long as the design and construction are primarily and substantially the original work of the students.

2.1.4 Any commercially produced robot kits or sensors components that are specifically marketed to complete any single major task of RoboCup Junior Australia Rescue Maze will be disqualified. If there is any doubt, teams should consult the Technical Committee (TC).

2.1.5 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 or is unable to complete the challenge, the robot will be deemed damaged, and the Robot Handler will be asked to remove the robot from the field. The Robot Handler may choose to restart according to sections A5.6.1, B5.6.1, C5.6.1, otherwise the round is deemed to have ended.

2.1.6 Each team is permitted to compete with one (1) robot only for the duration of the competition. The same robot must be used for all runs and rounds of the event.

Teams may make repairs, adjustments, and incremental improvements to their robot during the competition, provided the robot continues to comply with all competition rules and requirements.

Replacing the robot with a different robot during the competition is not permitted. Significant modifications or major rebuilds that substantially alter the robot's structure, drive system, or overall design must be approved by the judges or Organising Committee before the robot is permitted to compete again.

2.1.7 A team will not be able to compete with a robot substantially the same as another team's robot.

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

~~2.1.9 For the safety of participants and spectators, only lasers of class 1 and 2 are allowed. This will be checked during inspection.~~

2.2 Robot Control

2.2.1 Robots cannot be started from a secondary device, such as a laptop, tablet, or mobile phone. Robots must have their program downloaded to them and be able to be started/restarted manually by the Robot Handler.

2.2.2 Robots must be autonomous in operation. If the robot has the capability for remote or any other wireless control (such as by Bluetooth, Wi-Fi or another form of wireless communication), the team must prove that they have disabled the capability for third party operation in some way. This could be by software, hardware or degree of human interaction. Robots that do not comply may face immediate disqualification from the event. Distributed control is allowed but must operate without human interaction after the robot has started the round.

2.2.3 Pre-mapping and/or any type of dead reckoning (i.e., configuring the robot's program based on predefined locations, tiles, obstacles, location of victim, number of victims etc. before game play) is prohibited.



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

2.3 Inspection

2.3.1 Teams may be scrutinised to establish the ownership of robot design and programming.

2.3.2 The robot will be inspected by a panel of referees before/during or after the event to ensure that the robot adheres to all relevant rules.

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

2.4 Violations

2.4.1 Any violations of the inspection rules will prevent the robot from competing in a round until modifications have been made to the robot to ensure compliance.

2.4.2 Modifications must be made within the time schedule of the events. Rounds will not be delayed due to late teams.

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

2.4.4 If it is determined that the work on the robot is not substantially the original work of the team members or the construction or programming of the robot be deemed not that of the team, the team will be referred to officials. Should the Rescue Coordinator (or other relevant person) on the advice of the officials then uphold the view of the scrutiniser, the team may be disqualified from the event.



3 Validation of Work

3.1 Electronic Submission

Each team is expected to submit two (2) digital elements prior to competition based on dates provided by the organisers:

- a. Annotated Code
- b. Digital Poster

3.1.1 Annotated Code Submission

3.1.1.1 Teams must submit a copy of the most recent version of their competition code. The code must be clearly annotated with comments that explain the purpose and function of key sections of the program, including (where applicable) sensor use, decision-making logic, and actuator control.

Note: Teams are permitted to continue updating their code after the digital submission deadline, but must maintain an up-to-date version of their annotated code. Students may be asked to show this updated code to judges upon request.

3.1.1.2 The submitted code must accurately reflect the robot used in competition.

3.1.1.3 Teams who fail to submit their annotated code will not be permitted to compete.

NOTE: This can be submitted as a power point, screen shots with annotations, doc, etc..

3.2.2 Digital Technical Poster Submission

3.2.2.1 Each team must submit one (1) poster that communicates their team and robot design if the team wishes to be considered for special awards.

Note: this poster may be shared publicly. Teams must not include any information that can't be publicly shared (e.g. student personal information other than first name, photos that would allow personal identification, etc.).

3.2.2.2 The poster must be A3 size and must include all of the following information:

- 1 Team name
- 2 Team member first names and roles
- 3 One interesting/innovative feature of the robot's design or engineering
- 4 A challenge encountered during development and how it was overcome
- 5 What the team has learned through participation in the competition

3.2.2.3 The poster must be clear, well-presented, and suitable for display. Teams may generate the poster using any software they chose (PowerPoint, Canva, Paint, etc.) or make a physical poster and submit a photo/scan of the poster. The poster must be the team's own original work.

3.2.2.4 Teams who fail to submit a poster will not be eligible for special awards.

Note: Teams are encouraged to bring a physical copy of their poster to display at the competition, however this is not mandatory.

3.3 Interviews

3.3.1 Teams may be required to attend a technical interview to explain the operation of their robot to verify that the design, construction and programming of the robot is the students' work. There are no set questions. If



interviews are being conducted, either a schedule will be released, or teams will be advised to go for an interview throughout the event well in advance of the Head-to-Head Round.

- 3.3.2 **The format, timing, and selection of teams for interview will be determined by the Organising Committee. Teams will be required to bring an up-to-date version of their annotated code to any requested interviews.**
- 3.3.3 Interviews are not scored and do not contribute to overall team score.
- 3.3.4 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.



4 Teams

There are some Team rules that are consistent across all Challenges. Please ensure you read the General Rules, which can be downloaded from the [Rescue Maze Challenge Page](#) on the RoboCup Junior Australia Website, for division rules that are consistent across all Challenges.

4.1 Definition

- 4.1.1 The eligibility requirements for each Rescue Maze Challenge Division are (Students should be guided to a higher division by their mentor as capability increases):
- 4.1.1.1 **Mighty Maisy Maze:** This is open to students who are new to Rescue. Teams will only be allowed to enter this division where all students have less than two years' experience participating in Rescue Maze (if all Team Members are in Year 8 or below), or have not participated in Rescue Maze in a prior year (if any Team Member is in Year 9 or above).
 - 4.1.1.2 **Intermediate Maze:** Open to students at an age that would typically be studying at a recognised primary or secondary provider. This is open to all students with less than two years' experience in Intermediate Maze or students attempting a new challenge such as creating a robot based on an Arduino or Raspberry Pi controller programmed with a text-based coding language.
 - 4.1.1.3 **Open Maze:** Open to all students at an age that would typically be studying at a recognised primary or secondary provider.
- 4.1.3 For each round, one team member is to be nominated 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, Official or other relevant person.
- 4.1.4 The Robot Handler is the only team member permitted to communicate directly with the Referees, and Officials.