Rescue B Rules (2010)

Last Updated: Wednesday 23th December 2009

TC Rescue 2010:

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Ashley Green – United Kingdom

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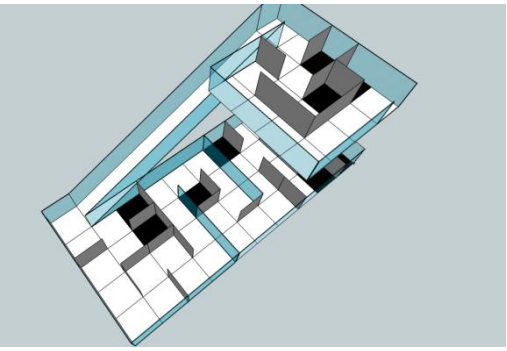
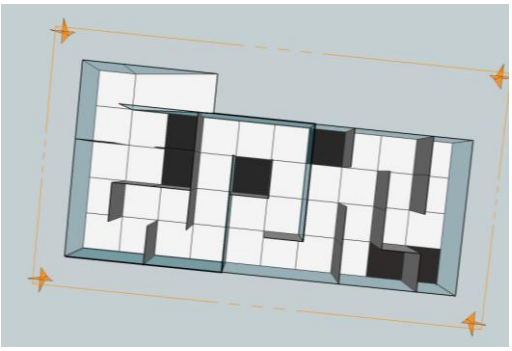
Changes from first release on green





1. Arena.

1.1. Description:

1.1.1. A robot must be able to solve the maze by itself, using the walls

1.1.2. The arena is modular. Each module can be thought of as a "room" in a building. Modules may be placed adjacent to each other (on the same level horizontally) or may be stacked vertically. Modules on the same level are connected by level hallways. Modules on different levels are connected by a sloping hallway or ramp. A ramp will not exceed an incline of 25 degrees from the horizontal, and must have walls at least 300 mm high.

1.2. Dimensions:

1.2.1. Each module is approximately 1200 mm by 1200 mm (47 inches by 47 inches) [could be 1200 mm by 900 mm (47 inches by 36 inches)], with walls that are approximately 300 mm (12 inches) high.

1.2.2. The walls should have a light colour (white or close to white) with a good Infrareds Reflection level.

1.2.3. Doorways between rooms are 300 mm wide.

1.3. Floor:

1.3.1. The floor of each room will be a light colour (white, or close to white). The floor may be either smooth or textured (like linoleum or carpet), and may have steps of up to 3 mm in height at joins between modules. There will be holes (about 5 mm diameter) in the floor, for fastening the walls.

1.3.2. Dead ends (cul-de-sacs) will have a floor with a dark colour (black, or close to black).

1.3.3. The arena should be placed so that the floors are level.

1.4. Path:

1.4.1. There will be a path, defined by 300 mm high walls, from the place where the robot starts to the bottom of the ramp. The robot must find this path.

1.4.2. The robot may utilize the walls to navigate but must not damage them (i.e. it can touch the walls but not push them out of place).

1.5. Debris:

1.5.1. Debris may be located anywhere in the maze (except on the ramp). Debris may take the form of obstacles to be avoided, speed bumps that should be driven over, or smaller objects that could be driven over or pushed aside.

1.5.2. Debris may consist of bricks, blocks, weights, speed bumps (made from 10 mm plastic pipe or wooden dowel painted white), or wooden sticks less than 3 mm in diameter (e.g. cocktail sticks or kebab skewers).

1.6. Victims:

1.6.1. Victims will be electrically heated sources of thermal infrared (TIR) radiation (wavelengths greater than about 3 microns).

1.6.2. Each victim will have a surface area greater than 25 sq cm.

1.6.3. Victims must be coated with paint or fabric to ensure a high thermal emissivity.

1.6.4. The surface temperature of victims must not exceed 45ºC (323 K).

1.6.5. The victims should be placed near the floor, on any wall.

2. Robot.

2.1. Size:

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

2.1.2. A robot must not have any sensor or other device that enables it to ‘see’ over the walls.

2.1.3. Robots will not have any other size restrictions, but they must not use their weight or force to move or destroy walls.

2.2. Control:

2.2.1. Robots must be controlled autonomously.

2.2.2. Robots must be started manually by humans.

2.2.3. Robots should be able to be easily stopped/paused by humans, in order to avoid damage to the maze.

2.2.4. The use of a remote control to manually control the robot is not allowed.

2.2.5. Bluetooth Class 2 communication between robots in the same arena is permitted, but *not* between multiple processors on the same robot.

2.2.6. No other form of radio communication is allowed. Robots that have any other form of radio communication on board (whether or not it is used during the competition) will be immediately disqualified.

2.3. Construction:

2.3.1. Any robot kit or building blocks (either available on the market or built from raw hardware) may be used, as long as the robot complies with the above constraints, and its design and construction are primarily and substantially the original work of the students (see section 2.5. below).

2.3.2. Any commercially produced robot kit that is specifically marketed as a 'maze solver' or 'rescue robot' is likely to be disqualified unless significant modifications have been made to both its mechanical design and software. If there is any doubt as to the acceptability of a particular commercial product, participants must obtain approval from the International RoboCupJunior Rescue Technical Committee several months prior to any competition. Organizers will treat all inquiries with the utmost privacy, and will not release details to any third parties.

2.4. Team:

2.4.1. In each round, a single robot is deployed which must perform its tasks autonomously. (In certain international competitions, this rule can be modified such that two or more robots are deployed together and have to cooperate in fulfilling the task. Check the bylaws for the competition.)

2.5. Inspection:

2.5.1. The robots will be examined by a panel of referees before the start of the tournament and at other times during the competition to ensure that they comply with all of the constraints described above.

2.5.2. It is the responsibility of teams to have their robots re-inspected if modifications are made to them at any time during the tournament.

2.5.3. Students will be asked to explain the operation of their robot, in order to verify that the construction and programming of the robot are their own work.

2.5.4. Students will be asked questions about their preparation efforts, and may be requested to answer surveys and participate in video-taped interviews for research purposes.

2.6. Violations:

2.6.1. Any violations of the inspection rules will prevent that robot competing until modifications are effected.
2.6.2. Modifications must be made within the time schedule of the tournament and teams must not delay tournament play while making modifications.
2.6.3. If a robot fails to comply with all constraints (even with modification), it will be disqualified from that round (but not from the tournament).
2.6.4. If there is excessive mentor assistance, or the work on the robots is not substantially original work by the students, then the team will be disqualified from the tournament.

3. Play.

3.1. Pre-round setup:

3.1.1. Where possible, competitors will have access to practice arenas for calibration, testing and tuning throughout the competition.
3.1.2. Organizers will make every effort to allow 2 minutes of setup time on the competition arenas for each team before each of their rounds.
Hint: Participants should be aware that situations may arise where these conditions cannot be met, so they should arrive prepared to cope with conditions that are less than ideal.

3.2. Length of round:

3.2.1. Robots will be given a maximum time of 8 minutes to complete the course. The time for each round will be kept by the referee.

3.3. Start of play:

3.3.1. To begin, the robot is placed at its starting location in the first room, as indicated by the referee.
3.3.2. Teams that are late for their starting time will forfeit the round. Start times will be posted prominently around the venue.

3.4. Humans:

3.4.1. In general, movement of robots by humans is not acceptable.
3.4.2. Humans can move robots only when told to do so by the referee.

3.4.3. Before the start of each round, teams should designate one human who will act as "captain", and be allowed to move the robot, based on the stated rules and as directed by the referee.
3.4.4. Other team members (and any spectators) within the vicinity of the rescue arena are to stand at least 150 cm (approximately 60 inches) away from the arena while their robot is active, unless otherwise directed by the referee.

3.5. Scoring:

3.5.1. Robots are rewarded 20 points for each “victim” that they identify in the arena. To identify a victim, a robot must flash a lamp on and off for two seconds while it is within 100 mm of that victim.
3.5.2. Robots are rewarded 10 points for each room (group of 4 by 4 squares) that they cross.
3.5.3. Robots are rewarded 20 points for successfully negotiating a ramp without any assistance on the first attempt, but only 10 points for successfully negotiating it on the second or third attempt.
3.5.4. Robots are penalized 5 points for making false victim identification.
3.5.5. Robots are penalized 10 points for being over a black square for longer than 5 seconds.
3.5.6. Robots are penalized 20 points for each lack of progress (see section 3.6).
3.5.7. Ties in scoring will be resolved on the basis of the time taken by each robot to complete the course.

3.6. Lack of Progress:

3.6.1. Lack of progress occurs if a robot is stuck or stopped at the same place for longer than 10 seconds.
3.6.2. If a robot loses the line or fails to appropriately negotiate a piece of debris, it must be returned to the start of the room (and in the process incur a 20-point penalty). If during the third attempt at a room there is a lack of progress, the team captain can choose to move the robot to the end of the room to continue onwards.
3.6.3. A team may elect to stop the round early if the lack of progress is caused by a faulty robot. The team will be awarded all points achieved thus far.

4. Conflict resolution.

4.1. Referee:

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

4.2. Rule clarification:

4.2.1. Rule clarification may be made by members of the International RoboCupJunior Rescue Technical Committee.

4.3. Special circumstances:

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

5. Documentation.

5.1. Reporting:

5.1.1. Each team must bring an electronic presentation (e.g., in PowerPoint, PDF or Flash format) and a poster (approximately A3 size) documenting the design, construction and programming of their robot.

5.1.2. Presentations and posters are to be shown to the judges during the scheduled interview, before being put up for viewing by other teams and the visiting members of the public.

5.1.3. The presentation should provide information about the team and how they prepared for RoboCupJunior. Areas that could be covered include:

5.1.3.1. Team name;

5.1.3.2. Division (primary or secondary);

5.1.3.3. Team members' names and (perhaps) a picture of the team members;

5.1.3.4. Team's country and location within country;

5.1.3.5. Team's school and district;

5.1.3.6. Pictures of the robot under development;

5.1.3.7. Information about the robot, including schematics, mechanical drawings and samples of code;

5.1.3.8. Any interesting or unusual features of the robot;

5.1.3.9. What the team hopes to achieve in robotics.

5.1.4. Judges will review the presentation and discuss the contents with team members.

5.1.5. Competitors are requested to provide digital versions of their presentation and poster.

5.1.6. Prizes may be awarded to teams with outstanding presentations.

5.2. Sharing:

5.2.1. Teams are encouraged to view one another's posters and presentations.

6. Code of Conduct.

6.1. Fair Play:

6.1.1. Robots that cause deliberate or repeated damage to the arena will be disqualified.
6.1.2. Humans that cause deliberate interference with robots or damage to the arena will be disqualified.
6.1.3. It is expected that the aim of all teams is to participate fairly.

6.2. Behaviour:

6.2.1. Participants should be mindful of other people and their robots when moving around the tournament venue.
6.2.2. Participants are not to enter setup areas of other leagues or other teams, unless expressly invited to do so by team members.
6.2.3. Participants who misbehave may be asked to leave the building and risk being disqualified from the tournament.
6.2.4. These rules will be enforced at the discretion of the referees, officials, tournament organizers and local law enforcement authorities.

6.3. Mentors:

6.3.1. Mentors (teachers, parents, chaperones and other adult team members) are not allowed in the student work area.
6.3.2. Sufficient seating will be supplied for mentors to remain in a supervisory capacity around the student work area.
6.3.3. Mentors are not to repair robots or be involved in programming of students' robots.
6.3.4. Mentor interference with robots or referee decisions will result in a warning in the first instance. If this recurs, the team will risk being disqualified.

6.4. Sharing:

6.4.1. An understanding that has been a part of world RoboCup competitions is that any technological and curricular developments should be shared with other participants after the tournament.
6.4.2. Any developments may be published on the RoboCupJunior website after the event.
6.4.3. This furthers the mission of RoboCupJunior as an educational initiative.

6.5. Spirit:

6.5.1. It is expected that all participants (students and mentors alike) will respect the RoboCupJunior mission.
6.5.2. The referees and officials will act within the spirit of the event.
6.5.3. It is not whether you win or lose, but how much you learn that counts!