Rescue Line - Technical Challenge

RoboCupJunior Rescue Committee

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Scenery

An earthquake struck right in the city center. Aftershocks are expected, and action is needed as quickly as possible. There are both dead and living victims in the rescue zone. The road is clear, but due to the earthquake, the intersections and all signs are reversed. Therefore, when a left turn is indicated, the rescue team must turn right, following the other signs until reaching the area where the victims are located. To exit the evacuation zone, the machinery has built a ramp, and beyond this, the safe zone will be located. Remember, our priority is to rescue the living victims in the rescue zone.
Help us save them, time is running out.

Technical Challenge field must contain:

- 1 live victim + up to 2 dead victims
- 3 or more intersections

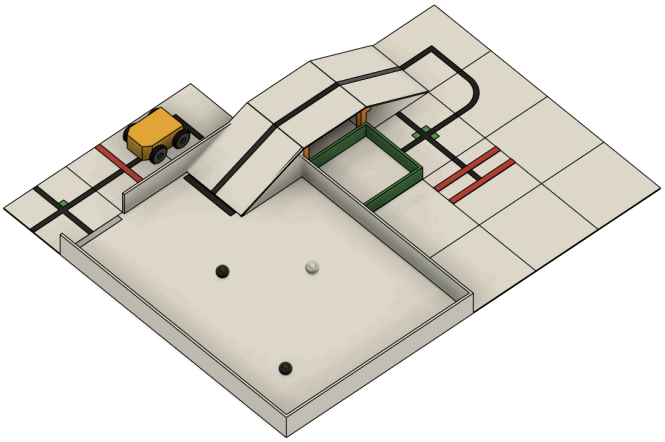


Fig.1 - Example of a Technical Challenge field with 3 intersections and 3 victims.

The robot starts from the starting tile and will follow the line until it enters the evacuation zone. In the evacuation zone, there may be up to 3 victims: two dead victims and one live victim. The robot must find the live victim, pick them up, transport them, and find the exit to the rescue zone. It will then follow the line to the safe evacuation zone, place the victim there, and follow the line to the goal tile.

Travel as far as you can within the time limit!

Teams should be called to the competition area without previously knowing their assigned competition field.

Play

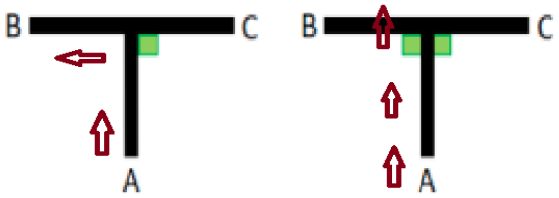
The aim of the technical challenge is to provide opportunities to the teams to show their ability to quickly modify the behaviour of their robots. During this technical challenge the rules used are the bases rules RoboCupJunior Rescue Line Rules 2025, and in this document will detail the modifications. If something isn't included or described in this document, it's understood that the original ruleset will be followed.

The rules are detailed below.

Line Following Zone
The robot will start on the starting tile and navigate to the evacuation zone.
After exiting the evacuation zone, it must follow the line to transport the victims to the safe evacuation and reach the end of the course.
Along the way, it will encounter speed bumps, but these won't count toward your score.
It won't encounter any obstacles. It will also encounter gaps; their score is indicated

below; as well as intersections and dead ends, whose definitions are contrary to those of the 2025 Rescue Line Rules, explained as follows:

- When the robot encounters a dead end, it must continue forward.
- When the robot encounters a green marker on the right, it must turn left, and vice versa—when the robot encounters a green block on the left, it must turn right (see IMAGE).
- The goal tile will be indicated by two parallel red lines measuring 25mm x 300mm, spaced 80mm apart. During line following, the robot may encounter red lines measuring 25mm x 300mm that do NOT indicate the end of the course and are NOT worth points.



Evacuation Zone and Safe Evacuation

In the evacuation zone, up to three victims may be found: 2 dead victims and 1 live victim. These victims must be transported to the safe evacuation area, marked in green. Picking up dead victims does not add or subtract points.

The evacuation zone will have:

1. The black line will end at the entrance of the evacuation zone.
2. The black line will begin again at the exit of the evacuation zone.
3. The evacuation zone is 120 cm by 90 cm with walls around the four sides at least 10 cm high and colored white.
4. At the entrance to the evacuation zone, there is a 25 mm × 250 mm strip of reflective silver tape on the floor.
5. To exit the evacuation zone there will be a ramp within the same evacuation zone located in one of the corners with a strip of black tape measuring 25 mm × 250 mm on the floor.

THERE IS ONLY ONE SAFE EVACUATION FOR THE VICTIMS, the safe evacuation will be located outside of the evacuation zone and that it can be found following the regular line path.

Start of Game

a. Each team has a maximum of **8 minutes** for a game. The game includes the time for calibration and the scoring run.

b. Robots will start behind the joint of the start tile.

Lack of Progress

A lack of progress occurs when:

a. Team captain declares a lack of progress.
b. The robot loses the black line without regaining it by the next tile in the sequence.
c. The robot reaches a line that is not in the intended sequence.
d. The robot fails at navigating hazards in the field.
e. The robot does not behave as expected by this Technical Challenge when identifying the presence of an obstacle**.**

If a lack of progress occurs, the robot must be positioned on the start tile facing the path towards the goal tile and checked by the referee.

Scoring

The score on this occasion will be evaluate as follows:

a. Each intersection and/or dead ends, **20 points.**
b. For reacquiring the line after a tile with one or more gaps, **10 points.**
c. Pick up the live victim, **45 points.**
    i. "Pick up" is defined as maintaining a victim in a lifted position, completely off the ground, continuously for more than 5 seconds.
d. Exits the evacuation zone (reach 2nd tile after the rescue zone.), **15 points.**
e. Successful ramp navigation, **40 points per ramp.**
f. Place the live victim in the safe evacuation, **30 points.**
g. Exis bonus: The robot stops for 5 seconds at the goal tile, **50 points.**
h. Each LoP adds a penalty of **-5 points** to the Exit bonus as **(#Exit bonus - 5*#LoP)** (min. **0** points)
i. If the robot stops in the wrong red line for over 5 seconds (exit signal), it will be penalized with **-5 points.**

End of Game

The game ends when:

a. The robot reaches the goal tile and completely stops for 5 seconds.
b. The **8 minutes** of allowed game time expires.
c. Team captain calls the end of the game.