



Rescue Sim - Technical Challenge

RoboCupJunior Rescue Committee

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Triangle Area

Scenario

In the Rescue Sim maze, an old pirate robot has buried treasure. The location is completely secret, but we obtained a map with three marked points that define a triangle where the treasure is known to be buried. We need to calculate the cost of searching this entire area, and to do so, we need to know its area.

The robot must detect the colored tiles that indicate the three points of the triangle: red, green, and blue. Each vertex of the triangle is the center of one of these tiles.

Geometric hint: Given three points (x_1, y_1) , (x_2, y_2) , and (x_3, y_3) , the area of the triangle whose vertices are these points is

$$\frac{1}{2} |x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)|$$



In addition, the robot must continue to perform some of its usual tasks. In this case, you must continue to detect cognitive targets. Luckily, there are no victim signs, victim fakes, checkpoints, swamps, or holes.

Field

- The map consists of only area 2. **And the starting tile is located in that area!**
- There are only cognitive targets and no checkpoints, swamps, holes, victim signs or victim fakes.
- Three colored tiles are placed somewhere in the maze:
 - Red tile
 - Green tile
 - Blue tile
- Each colored tile appears only once on the map.
- The center of the tile represents the coordinate used for calculations.

Play

Start of Game

The robot still starts on the starting tile but somewhere in the map.

Rules

- The robot must explore the maze and detect the three colored tiles.
- For each colored tile the robot should determine the position of the center of the tile.
- Using these three positions the robot must calculate the area of the triangle formed by the three tile centers.
- At the end of the run the robot must print the calculated area to the console.
- No additional console output is allowed apart from the message defined below.
- The robot must detect the cognitive targets.
- Game time is 6 minutes.

Console Output

At the end of the run, the robot must print:

AREA <value>

Example:



AREA 0.094

Scoring

The reported triangle area will be compared to the real area manually by the referee.

- Triangle area correct (<5% error): 300 points
- Triangle area correct (<10% error): 200 points
- Triangle area correct (<20% error): 100 points
- Otherwise: 0 points

Additionally, the robot will be awarded points normally for all CT identified BUT:

- **The values of the ring colors change: Black: -3, Red: 2, Yellow: 1, Green:-1, Blue: 0**
- **After sending the message to the supervisor, it must celebrate by spinning around three times or more.**

All valid CTs that are correctly detected and reported award 50 points. Valid CTs that are detected but incorrectly reported award 25 points. In both cases, performing the dance awards an additional 10 points. A misidentification results in a 5-point deduction.

Lack of Progress (LoP)

The rules for a lack of progress are the same as in the normal rules.

If a LoP occurs, the robot will be reset to its starting position.

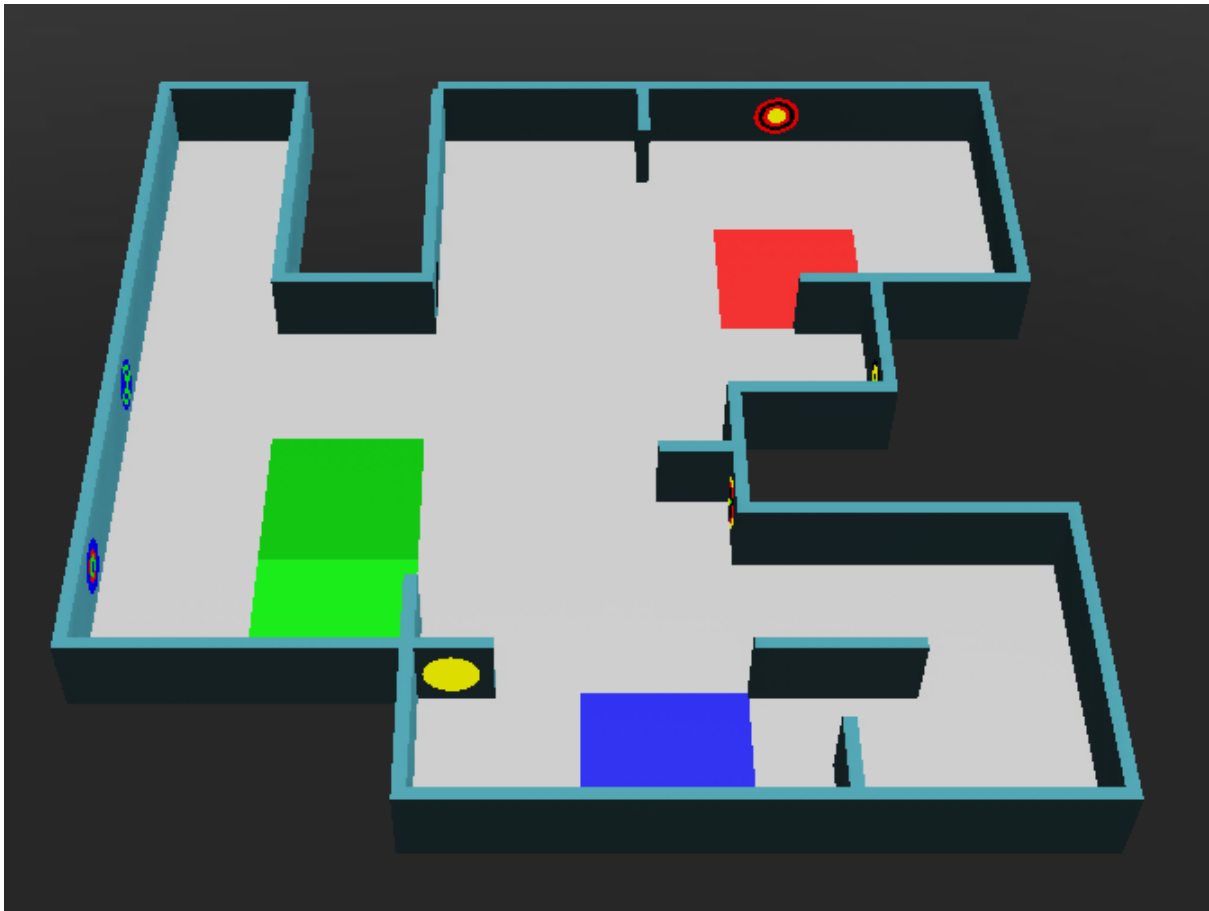
A 5-point deduction will be applied according to 5.6.7 (LoP)

End of Game

The game ends when:

- The robot prints the area message and sends an exit message.
- The allowed game time expires.
- The team captain calls the end of the game.

Example



- Red tile: 0.12 -0.24
- Green tile: -0.24 0.12
- Blue tile: 0 0.24

Area: 0.0648