INTELLIGENT RESCUE ROBOT

Category 1: Competition Field Format

Item 1: About the Competition Field

1.1 Consists of 3 stages: Line Following Stage, Ball Collection Stage and maze solving Stage. All three stages are in the same area and are continuous.
1.2 Stages are required to be accomplished in a SEQUANTIAL order and NO SKIPPING of stages are allowed.

1.3 Information about the Line Following Stage:

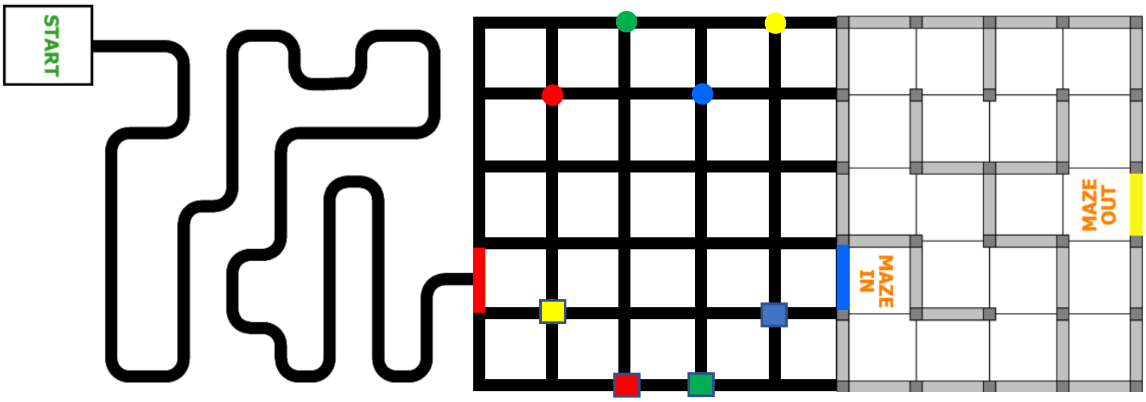
- 1.3.1 The Field is flat with black lines on a white or light-colored surface that can be clearly distinguished.
- 1.3.2 The path format is a continuous line with a width between 1 to 2.5 cm.
- 1.3.3 There may be intersections.
- 1.3.4 The competition path will be announced before the start of each round.
- 1.3.5 The robot must accurately detect both the normal path and intersections, and be able to move along the path and change routes automatically when encountering intersection conditions.

1.4 Information about the Ball Collection Stage:

- 1.4.1 The field is flat and white or light-coloured, with grid lines between 1 to 2.5 cm.
- 1.4.2 It may have inclined levels.
- 1.4.3 4 x colored ping-pong balls are placed randomly in any order at specific pickup points by the competitors themselves before each game.
- 1.4.4 4 x colored drop off stations are placed and FIXED on the DAY OF THE COMPETITION.

1.5 Information about the Maze Stage:

- 1.5.1 The field is flat and white or light-coloured, without any lines.
- 1.5.2 White or light-coloured walls not exceeding 20 cm in height are installed to define the path, with the path width being approximately 25cm to 35cm.
- 1.5.3 The competition path will be announced during the DAY OF THE COMPETITION.



Stage 1 : **Line following**

- Robot needs to follow the line fully.
- Actual map revealed on Games day.

Stage 2 : **Ball Collecting**

- Robots collect and deposit balls according to color.
- Pickup color order is randomly picked up by competitor.
- Pick up and drop locations are fixed and will be revealed on the Games day.
- PICK UP POSITIONS
- DROP OFF POSITIONS

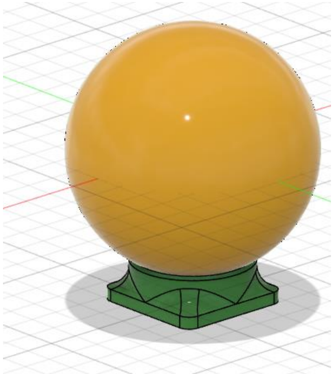
Stage 3 : **Maze Solving**

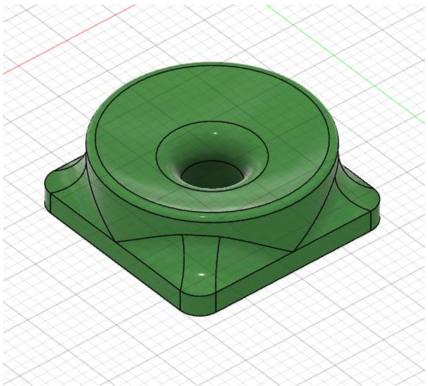
Robot needs to move out of the maze arena successfully.

Standard PING PONG Dimensions and Weight

PICK UP POSITIONS

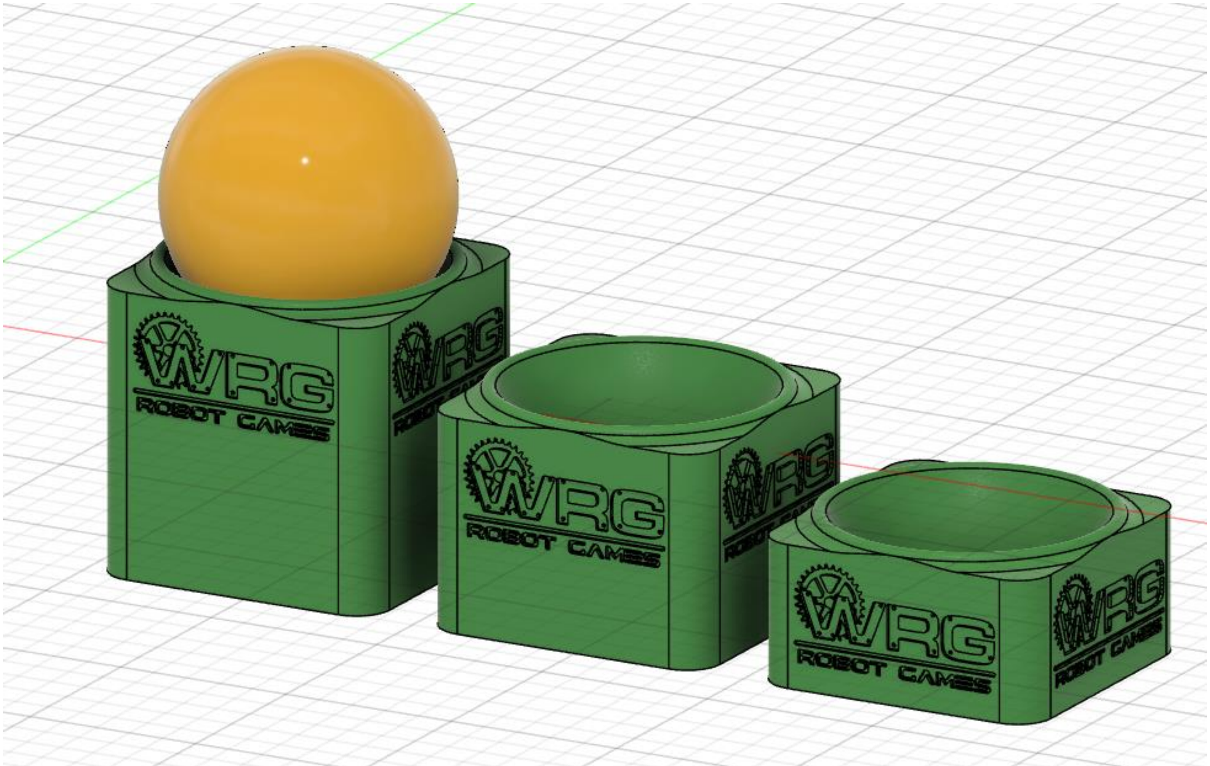
- PING PONG BALLS will be placed on approx. 7mm high platforms.
- Please see STL for own printing.





DROP OFF POSITIONS

- PING PONG BALLS will need to be deposited at the respective drop off stations which vary from 20mm to 50mm high platforms.
- Please see STL for own printing.



Category 2: Robot Specifications

Item 2: Technical Specifications

2.1 The size of the robot must not exceed **25 x 25 cm in width and length**, with no height restriction. It must fit into a 25 x 25 cm box provided by the judges before the competition run.
2.2 The robot used in the competition **must move along the line using wheels**
2.3 The robot **CANNOT** separate or expand in size during the competition.
2.4 There are no restrictions on the source and number of mechanical parts and accessories.
2.5 They can be self-made, formed using a 3D printer, or modified from toys.
2.6 Screws, nuts, or any fastening devices in the robot must be securely tightened. If any parts fall off, break, or detach during the competition, the judges will remove them ONLY AFTER the round is over. These parts are not to deliberately assist the robot in any of the task in anyway whatsoever. The judges are not responsible for any impact resulting from removing the detached parts from the field.

Item 3: Prohibited Actions in Robot Construction

Robots must not use any parts or equipment that, when installed or not installed, cause damage to the competition field under any circumstances.

Category 4: Competition Format

Item 4: Competition Arrangement

4.1 Each team will have at least 3 opportunities to run, with the best 2 scores being combined for ranking purposes.

4.2 In the 3 rounds of competition, according to the schedule announced on the competition day, competitors must bring their robots together during the allocated period. Only Registered competitors with their robots are allowed to run.

4.3 The competition procedure is as follows:

- 4.3.1 Competitors bring their robots to the table in front of the competition field.
- 4.3.2 Judges will check Competitors ID details, check size and weight of the robot.
- 4.3.3 Participants will then draw one by one the 4 colored ping-pong balls from a concealed container, and place them in order one by one on the pickup locations in stage 2.
- 4.3.4 Competitors place their robots on the start of the field at stage 1.
- 4.3.5 No programming adjustments are allowed using development tools or programming devices, including computers, smartphones, tablets, or similar or substitute devices.
- 4.3.6 **No physical MODIFICATIONS** are allowed to the robot.
- 4.3.7 Competitors can compete at any time within the specified allocation period.

4.4 The ranking system is based on the best 2 combined scores.

- 4.4.1 If scores are tied, the secondary scores from the next best round will be considered.
- 4.4.2 The team with the higher secondary scores from the specified criteria will rank higher.
- 4.4.3 Teams ranking 13th to 20th (up to 8 teams) will receive the third runner-up prize.
- 4.4.4 Teams ranking 9th to 12th (up to 4 teams) will receive the second runner-up prize.
- 4.4.5 Teams ranking 5th to 8th (up to 4 teams) will receive the first runner-up prize.
- 4.4.6 Teams ranking 2nd to 4th (up to 3 teams) will receive the gold medal.
- 4.4.7 The team ranking THE overall 1st will receive the Championship Trophy.
- **4.4.8 The above teams ranking from 4.4.3 to 4.4.6 is subjective and may increase on the actual GAMES day on request by any WRG COMMITTEE member.**

Category 5: Starting, Stopping, and Continuing the Line Following Stage

Item 5: Starting the Line Following Stage

5.1 When the judge gives the signal, competitors must come to the field, place the robot at the starting point, facing in any direction, ensuring no part of the robot crosses the starting line.
5.2 The judge gives the signal to start the competition and starts the timer.
5.3 Competitors switch on the robot by pressing the switch once (not counting the power switch). The total competition time for the three stages is 3 minutes.

Item 6: Objectives of the Line Following Stage

6.1 In this stage, the robot **must follow the line** to the exit of this stage and proceed to the next stage.
6.2 If the competitor TOUCHES the robot after the competition timer starts, its considered as a rule violation. The robot must restart at the starting point.
6.3 There is no limit to the number of retries at the starting point.
6.4 If the robot successfully completes this stage, it will earn 50 points, this is determined by its full entry into the maze stage.
6.5 Each retry does not result in a score deduction but will be recorded for ranking purposes in the event of a tie.

Item 7: Stopping and Continuing the Line Following Stage

7.1 If the robot moves off the line, competitors may wait for the robot to return without touching it, and the competition timer continues to run.
7.2 If competitors touch the robot, they must restart at the starting point of the line following stage or quit.

Item 8: Completing the Line Following Stage

8.1 The robot reaches the endpoint, which is the exit of the line following stage, and must enter the next maze stage. The judge will record the results of this stage to be used in the overall decision.
8.2 Competitors may voluntarily end the competition, and the judge will record the time as 3 minutes.
8.3 The 3-minute time limit is reached.

Category 9: Starting, Stopping, and Continuing the Ball Collection Stage

Item 9: Starting the Ball Collection Stage

The competition will continue from Category 5. When the robot passes the Line following stage, it will immediately enter the ball collection stage. The entrance to the ball collection stage will be marked with colored tape to inform the robot.

Item 10: Objectives of the Ball Collection Stage

10.1 The robot must collect and deposit as many of the 4 colored ping-pong balls as possible to their matching color deposit stations.
10.2 The robot is allowed to use the grid lines on the floor.
10.3 The robot is NOT allowed to reposition pickup / deposit stations.
10.4 For every successful pick and deposit, 20 points will be earned.
10.5 Competitors can choose pick less than the 4 balls and exit the stage
10.6 Competitors can also choose to skip this whole stage and proceed to stage 3, however, the robot must enter stage 3 on its own.
10.7 If the competitor TOUCHES the robot, it is considered as a rule violation and the Robot will need to restart at the Starting position of this STAGE or quit.
10.8 Each retry does not result in a score deduction but will be recorded for ranking purposes in the event of a tie.
10.9 In the event any colored ball falls drops onto the STAGE floor due to the robots involvement in anyway, the balls WILL NOT BE RECOVERED by the judge and the game continues.
10.10 The exit will be marked with a colored tape on the ground.
10.11 If the robot exits this stage on its own, it will earn 10 points.

Category 11: Starting, Stopping, and Continuing the Maze Stage

Item 11: Starting the Maze Stage

The competition will continue from Category 10. When the robot passes the Ball Collection stage, it will immediately enter the maze stage. The entrance to the maze stage will be marked with a colored tape to inform the robot.

11.1 The robot must navigate through the maze to find the exit.

11.2 The robot can touch or bump into the walls and move along them but must not damage the walls or the competition field. This includes causing cracks, breaks, holes, sparks, fires, or leaving any liquid residues. If any of these occur, the competition will be immediately stopped, and the team will be disqualified from the round. If it happens again, the competitor will be expelled from the competition.

11.3 The exit will be marked with a colored tape on the ground.

11.4 If the robot exits the maze by crossing the exit line completely, it will earn 70 points.

11.5 If the robot cannot continue in the maze, such as getting stuck against a wall or corner or moving repetitively without progress, the competitor can request to restart this stage or quit.

11.6 The restart can be from outside or just inside the maze entrance, and no points will be deducted for re-entering. The competition timer will continue running.

11.7 If the competitor touches the robot after the competition has started, it will be considered a rule violation. The robot must be restarted from the maze stage's starting point, or the competitor can choose to quit. The competition timer will continue running.

11.8 Each retirement does not result in a score deduction but will be recorded for ranking purposes in the event of a tie.

Item 12: Completing the Maze Stage

12.1 The robot reaches the end point, which is the exit of the maze stage.

12.2 Competitors may voluntarily end the competition, and the judge will record the time as 3 minutes.

12.3 The 3-minute time limit is reached.

Category 13: Scoring

Item 13: Competition Points

The competition has 3 stages to complete within 3 minutes, with each stage scored as follows:

13.1 Line following stage :

13.1.1 Completing this stage earns 50 points.

13.2 Ball collection stage :

13.2.1 Each successful Pick and Drop ball : 20 points

13.2.2 Exit this Stage : 10 points

13.3 Maze Stage :

13.3.1 Completing this stage earns 60 points

13.4 BONUS POINTS :

13.4.1 Successfully completes all 3 stages without ANY retires : 100 points

13.5 Total possible game score : 300

Section 14: Damage and Accidents in Competition

14.1 Request to Stop Competition

14.1.1 Competitors may request to stop the competition; the committee will record a time of 3 minutes.

14.2 Time for Robot Repair

14.2.1 Competitors are allowed to repair their robots throughout the competition; timing will continue during repairs.