



REGULATIONS OF THE ROBOT COMPETITION

"LABYRINTH. LEVEL 2"

Age of participants: Level 2: 13-16 years.

Team: 1-2 people.

Robots: autonomous robots.

Equipment used: no restrictions.

Programming language: no restrictions.

Description of the task: An autonomous robot, assembled by the competition participants themselves, must navigate the path from the starting area of the labyrinth, passing through colored sections in the minimum amount of time, and then return to the start/finish zone.

The labyrinth is divided into two equal parts, the configuration of the first half of the labyrinth and the location of the colored marks are chosen by lot and shown to the participants 60 minutes before the quarantine begins. The configuration of the second half of the labyrinth is unknown in advance and is chosen by the judge after the quarantine begins.

1. Requirements for the robot

1.1. The use of any parts, including those made by yourself, is permitted in the design of the robot.

1.2. The maximum size of the robot is 250×250×250 mm. During the attempt, the robot must not exceed the maximum allowed dimensions.

1.3. The robot must be autonomous.

1.4. The robot must be brought assembled on the day of the competition.

1.5. The robot's weight is not limited.

1.6. The robot body must not damage the surface of the competition area in any way, otherwise the team may be removed from the competition and disqualified.

2. Requirements for the landfill

2.1. The field consists of a base with sides, with internal dimensions of 1200×2400 mm.

2.2. The labyrinth is made up of 300×300 mm sections of two types: with a wall and without a wall. The entire structure of the labyrinth is made up of 16 mm thick white laminated chipboard.

2.3. The walls of the labyrinth are 150 mm high and 16 mm thick.

2.4. The characteristics of each section of the landfill are indicated in Appendix No. 1.

3. Procedure for holding the competition

3.1. The team is given 1 hour to draw up the program.

3.2. Before the start of the competition, all participants hand over their robots to an area inaccessible to them (quarantine). If during the inspection a violation in the robot's design is found, the judge gives 3 minutes to correct the violation.

3.3. If it is impossible to correct the robot, the team is not allowed to attempt.

3.4. During the competition, participants may take robots only from the quarantine zone and only at the command of the judge.

3.5. The maximum time to complete the task is 5 minutes.

3.6. The team starts the competition at the judge's signal. The robot must be completely located in the "Start/Finish" starting zone. After the judge's command, one of the operators starts the robot.

3.7. After the start of the attempt, the robot must visit colored zones No. 1 and 2 in the order indicated by the judge.

3.8. The location of color zone No. 3 is known in advance and it is guaranteed that there is a passage from it to the zone with an unknown configuration.

3.9. Next, the robot, guided by the sensor readings, must reach color mark No. 4 in the second half of the labyrinth with a previously unknown configuration.

3.10. After passing all the marks, the robot must return to the Start/Finish zone by any route.

3.11. The end of an attempt is recorded in one of the following cases:

3.11.1. The robot has completed the task completely and returned to the Start/Finish zone.

3.11.2. After 5 minutes from the start of the attempt.

3.11.3. The participant prematurely interrupted the attempt by saying the word "Stop".

3.11.4. The participant touched the robot.

3.11.5. If the robot is unable to continue the competition and/or the robot loses motor activity for 15 seconds (determined by the judge).

3.11.6. When the robot tries to get into another section through the wall.

3.12. The competition is held in two runs. Each team makes one attempt in two runs. After the first attempt, the team quarantines the robot until all participants have completed the test. 30 minutes are given to prepare for the second attempt.

4. Counting points and determining winners

4.1 The team with the highest number of points will be declared the winner.

4.2. The attempt with the maximum number of points is counted.

4.3. If the teams score the same number of points, the team that spends the least amount of time on completing the task is declared the winner.

4.4. Passing the colored section is counted if the robot's projection is completely in the section zone, the robot stops for 1 second and plays a sound signal.

4.5. The finish is counted if the robot's projection is completely in the finish zone and the robot stops on its own.

4.6. Accrual of points:

Criterion	Points
<i>When moving from the Start/Finish zone to mark No. 3</i>	
The robot visited the colored section according to the numbers assigned during the draw (for each section)	10
The robot visited the colored section without observing the ordinal numbers assigned during the draw (for each section)	5
<i>When moving after mark No. 3 to the Start/Finish zone</i>	
The robot visited color section #4 according to the correct sequence determined by the draw	20
The robot visited color section #4 without following the sequence determined by the draw	10
The robot returned to the Start/Finish zone	20

5. Permissible simplifications when conducting selection stages

No restrictions on the overall dimensions of the robot.

Landfill characteristics

1. An example of the placement of marks in a maze.

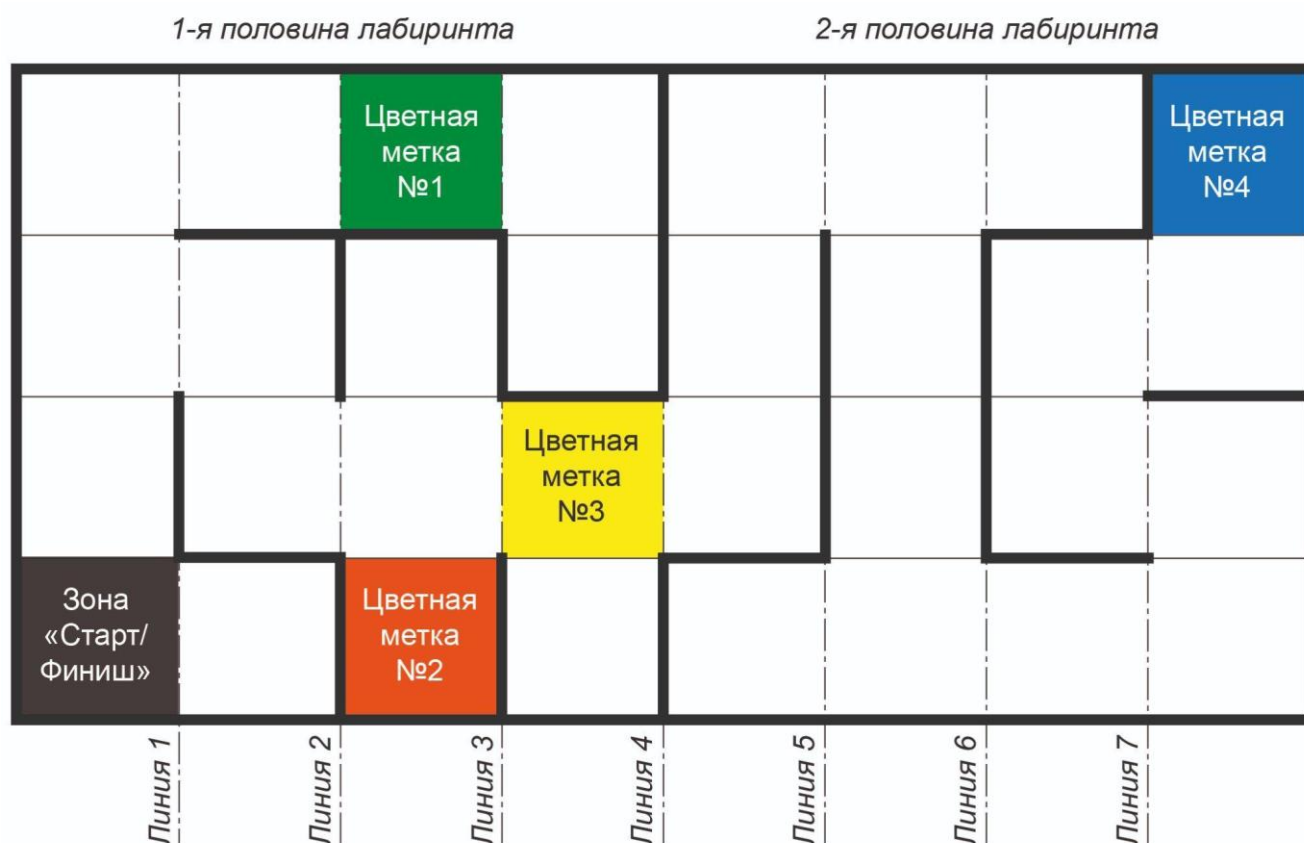


Fig. 1. Polygon configuration

2. Dimensions of the landfill.

No	Name	Material	Color	Size	Quantity
1.	Field base	Chipboard	White	2440×1220 mm	1 pc.
2.	Field side, long	Chipboard	White	2440×150×16 mm	2 pcs.
3.	Field side, short	Chipboard	White	1188×150×16 mm	2 pcs.
4.	Section with wall	Chipboard	White	300×300×150 mm Thickness – 16 mm	22 pcs.
5.	Section without wall	Chipboard	White	300×300 Thickness – 16 mm	8 pcs.
6.	Section "Base Camp"	Chipboard, self-adhesive film	White, green	300×300×150 mm Thickness – 16 mm	1 pc.
7.	End section	Chipboard, self-adhesive film	White, red	300×300×150 mm Thickness – 16 mm	1 pc.

3. The internal size of the polygon is a field of 1200x2400 mm, limited by sides.

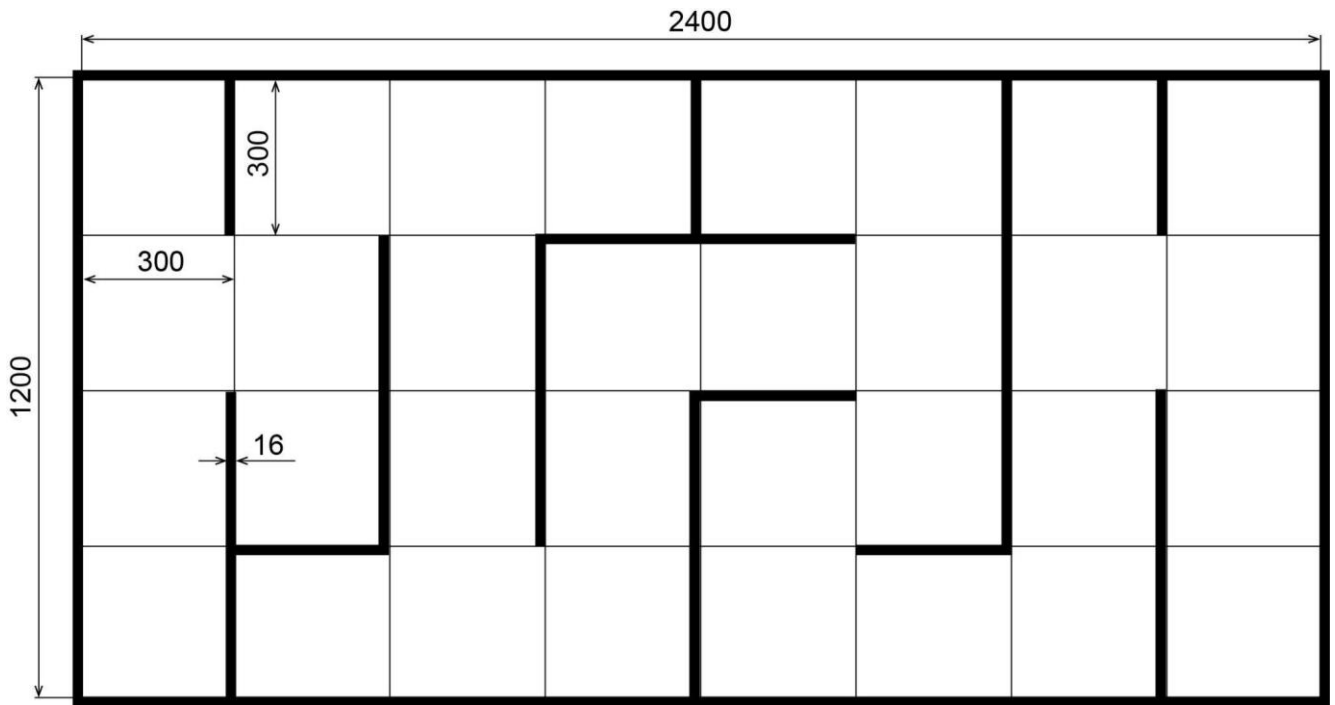


Fig. 2. Internal dimensions of the polygon

4. The labyrinth trajectory is made up of double and single sections with dimensions of 300 × 300 × 150 mm and 300 × 300 mm, respectively.

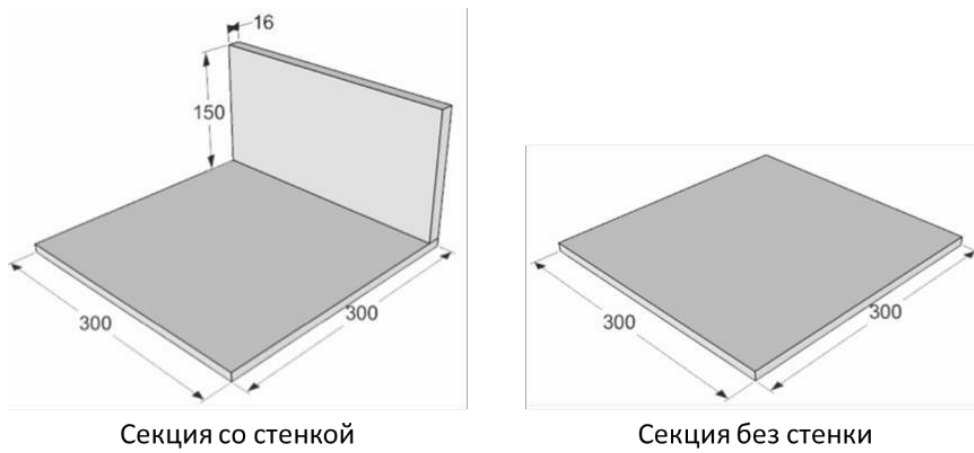


Fig. 3. Double and single sections

5. The starting and finishing area (“Base Camp”) is marked in black.

Appendix No. 2

Recommendations for judges

1. The configuration of the first half of the polygon and the location of the color marks are determined on the day of the event and remain unchanged throughout the day; the configuration of the second half of the polygon becomes known after the robot is quarantined and changes before the start of the race.

2. The refereeing staff prepares 3 configuration options for the second half of the training ground.
3. On the day of the competition, one of the prepared options is randomly selected.
4. The configuration of the second half of the polygon must comply with Appendix No. 3.

Appendix No. 3

Labyrinth Configuration Criteria

1. Between any two cells there is a route, and it is unique. The criterion for the uniqueness of the route between any two cells can be the absence of cycles in the labyrinth.
2. The number of cells that are not limited by walls on any side does not exceed three.
3. Inside any square of four cells there is at least one wall (see Fig. 4).

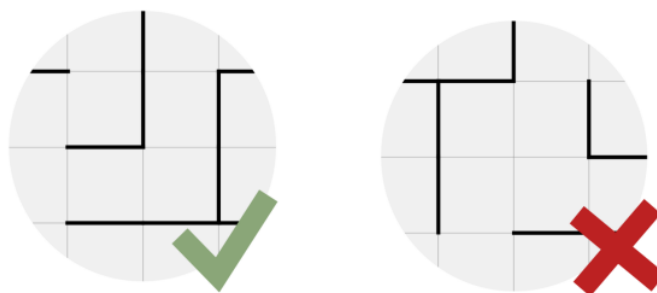


Fig. 4. Features of the arrangement of the polygon walls

Note: When developing the regulations, materials from robofinist.ru were used