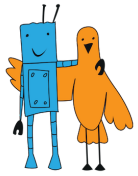
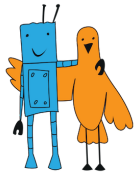


ROBOFINIST

«JOURNEY» GENERAL CONTEST RULES

*Version **3.0** dated August 1, 2019*



1. General Provisions

1.1. Task Description

Within one run, the robot must complete the tasks of the “Line Follower”, “Labyrinth” and “Kegelring” in the sequence established by the Contest Rules of the corresponding competition category.

1.2. Contest Categories

“Journey” is held in two age categories:

- “junior“ - the oldest team member is 12 years old or under in the year of the competition
- “high“ - no age limit

In each category, the robot has to get through four sections with different tasks (see Table 1).

Table 1. Tasks for categories per each section

№	Category	
	Junior	High
1	Line Follower with Fixed Obstacle	Line Follower with Moving Obstacle
2	Labyrinth	
3	Line Follower with Slide	Line Follower with Inversion
4	Kegelring	

2. Requirements for the Robot

The robot must meet the following requirements:

- width - not more than 250 mm;
- length - not more than 250 mm;
- height - not limited;
- weight - not more than 1 kg.

The robot must be absolutely autonomous; remote control in any form is prohibited. The program run by the robot must be written by the participant only.

The robot's dimensions may vary during the competition, but must not exceed the maximum allowable parameters.

It is forbidden to use any adhesive gadgets to collect skittles.

3. Specifications of the Field

The "Journey" field consists of 4 consecutively placed fields (see Table 1) depending on the selected category.

3.1. Line Follower

The field is a flat rectangular white surface with a black line on it.

- the line is 30 mm wide;
- the line curvature radius is over 130 mm at any point of such line;
- the minimum distance at which the line should approach the end of the competitive field must be at least 150 mm (when measured from the line axis).

The starting\finish areas are marked with a black line of at least 10 mm thick in the form of a square with a side of 300 mm.

The starting area of the first field is green.

The "Line Follower" field has additional elements such as "fixed obstacle", "slide", "moving obstacle" and "inversion". Detailed description of additional elements is given in the Contest Rules of the corresponding categories.

3.2. Labyrinth

The Labyrinth field is a square of 1500x1500 mm and is conditionally divided into cells with the size of 300±20 mm (see Fig. 1).

The field surface is white.

Walls with height of 10 cm and a thickness of 16 ± 1 mm will be installed between the cells by the Judge. Walls are also set around the whole perimeter of the labyrinth except for the cells with the starting and finish areas. Gaps and overhangs with the size of max. 5 mm are allowed between the walls.

The Labyrinth is configured according to the following rules:

- there is the only way to reach any cell of the Labyrinth from any other cell of the Labyrinth;
- the length of the Labyrinth routes according to the “right-hand” or “left-hand” rules is at least twice as long as the shortest route;
- the lengths of the “right-hand” and “left-hand” routes are equal.

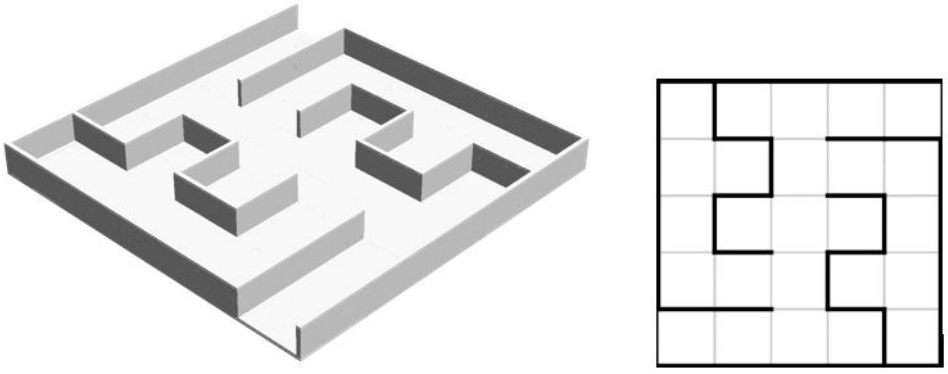


Figure 1. Labyrinth field layout example

The starting area of the field is the first cell of the labyrinth in the direction of travel. The field finish area is the starting area of the next field.

3.3. Kegelring

The field is a square of 1500x1500 mm with a ring which is a circle with a diameter of 1000 mm located in the middle. There is a black line 50 mm thick around the perimeter of the ring, which is not part of the ring.

The field surface is white.

Skittles are rigid cylinders with a diameter of 70±3mm, height of 120±5 mm and weight of 30±10 g.

Skittles can be empty standard soda cans (330 ml) wrapped in paper.

The general view of the field and the layout of the skittles are shown in Fig. 2.

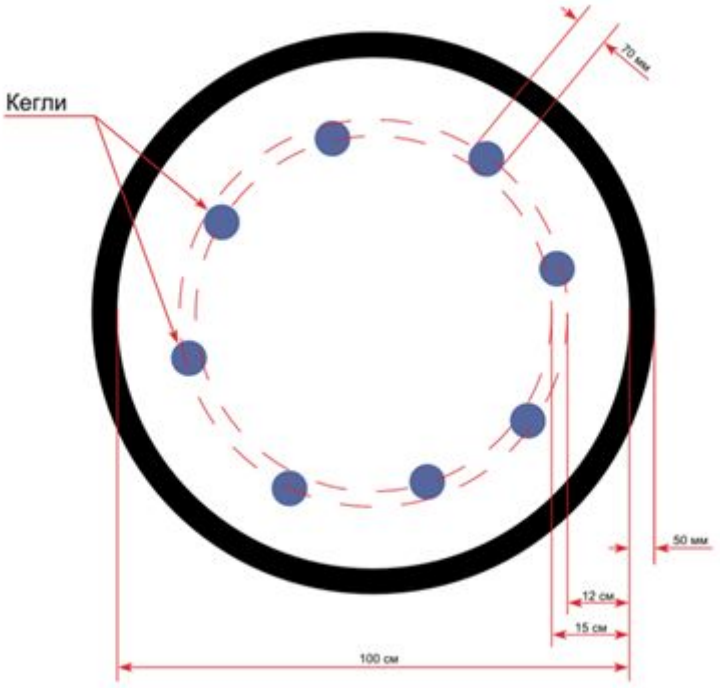


Figure 2. Kegelring field

4. Contest procedure

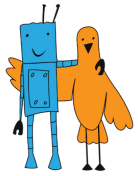
On the day of the competition, the Organizers may change the design of the field or the arrangement of elements without changing the order of the sections.

The number of attempts is determined by the Organizers on the day of the competition.

The relevant Contest Rules specify the maximum allowable time of the run for each category of the competitions.

Before the attempt starts, all the participants place their robots to the Quarantine area. During the competitions, the participants may take robots from the Quarantine area only and at the referee's command only. After the run the participant places his/her robot back to the Quarantine area.

Before each attempt, the configuration of the Labyrinth will be changed. All participants must place the robots in the Quarantine before the changing of the Labyrinth configuration starts.



Before the run starts, the robot is placed at the starting area of the first field so that none of its parts extend beyond the limits of such area.

The participant launches his/her robot at the referee's command. Time is counted from the moment the projection of the robot crosses the limit of the starting area.

The robot must be autonomous. The robot cannot be controlled by the participant in any way.

The robot starts to perform a section task when it crosses the line which limits the starting area of such section.

The robot finishes performing a section task when it crosses the line which limits the finish area of such section unless otherwise provided by the section task.

If the task of a certain section is not completed, the run is interrupted and the participant, with the permission of the referee, manually places the robot in the starting area of the next section or in the starting area of the same section. The time is not stopped and the field is restored to its original state. Half of the points will be awarded for the rerun. The number of reruns is unlimited.

At any time of the run the participant may verbally inform the Judge of the failure to complete the section task by saying: "Stop!", interrupt the run and start the task of the next section or repeat the task of the previous section.

The time of the run is recorded by the "start-finish" electronic system or by the Judge using the stopwatch. The recorded time is considered final.

The run is stopped in the following cases:

- the robot has fully completed the task;
- the time allotted for the run is over;
- the robot was disqualified.

4.1. Line Follower

The section task: the robot is to pass along the line marked on the field from the starting area to the finish area.

The robot is considered to have failed the task if:

- the robot has lost the line:
  - the projection of the robot is not above the line for more than 5 seconds;
  - the robot leaves the line not tangentially from the outside;
  - the robot detours an obstacle for more than 10 seconds.

- any robot's point of support has touched the surface outside the field.

4.2. Labyrinth

The section task: the robot is to pass through the Labyrinth from the starting area to the finish area.

The configuration of the walls changes after all participants have placed their robots to the Quarantine area or as decided by the Judge.

Just before each attempt, the configuration of the Labyrinth walls will be changed.

The robot is considered to have reached the cell if any of its points of support touched the surface of the cell.

The robot is considered to have failed to complete the section task if the robot has not left the cell within 30 seconds.

4.3. Kegelring

The section task: the robot needs to push the skittles out of the ring. Does not count as a section task failure if not all skittles are pushed out.

Before the run, the participant places the skittles on the corresponding marks by him/herself.

The skittles are considered to be pushed out of the ring if no part or a part of its projection is in the ring.

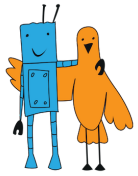
The robot is considered to have failed to complete the task if the robot has left the field. Points for the skittles pushed out are not reduced to zero.

In case of rerun, the points collected in the previous run will be reduced to zero.

5. Disqualification

The attempt is disqualified if:

- the robot was not placed in the Quarantine area before the changing of the Labyrinth configuration;
- robot is not autonomous (human is in control of the robot);
- participant touched the robot or the field during the run without the permission of the referee.



6. Scoring

The robot scores points for completing each section task. The number of points to be awarded is determined by the Contest Rules of the corresponding competition category.

Half of the points will be awarded for the section task rerun (see section 4).

In case of failure to complete the section task, points for this section are not awarded.

If an attempt is disqualified, no points will be awarded for the entire run.

The sum of the points that the robot scores for completing the sections' tasks and the time from the start to the end of the rrun is the final result.

The final result of the attempt is the sum of the points received for completing the tasks of the training grounds, and the time elapsed from the start of the race to the end of the race.

In case of interruption of the run, the time of the attempt is equal to the maximum allotted time of the run as defined by the Contest Rules of the corresponding competition category.

The attempt with the highest score is counted. If the points are equal, an attempt with the minimum run time is counted.

7. Procedure for Determining the Winner

The winner is the team with the highest score.

If the points are equal, the participant with the minimum run time gets the advantage.