

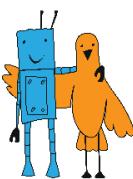
# РОБОФИНИСТ

## “JOURNEY” General requirements

*Version 2.0 dated July 20, 2017.*

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## 1. General provisions

### 1.1. Task description

The robot participating in Journey competitions should perform Line Follower, Labyrinth, and Kegelring tasks in sequence within one race.

### 1.2. Competition categories

Journey competitions are held in two categories: «elementary» and «junior»:

- «elementary» - the oldest team member is under the age of 13 on the day of the competition;
- «junior» - the youngest team member is 13 years old or older on the day of the competition.

In each category, the robot should pass through four sections performing some tasks.

*Table 1. Tasks for categories per each section*

No.	Category	
	Elementary	Junior
1	«Line Follower with Fixed Obstacle»	«Line Follower with Moving Obstacle»
2	Labyrinth	
3	«Line Follower with Slide»	«Line Follower with Inversion»
4	Kegelring	

### 1.3. Robot specifications

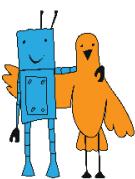
The maximum width of the robot is 25 cm, and the length is 25 cm. The robot height is not limited.

During the competitions, the size of the robot may change but should not go beyond the above mentioned dimension.

It is prohibited to use any adhesive devices on the robot body for skittles collecting.

Quantity of hardware components, controllers, sensors, motors and other devices is not limited.

### 1.4. Procedure of the competition



On the day of the competition, the Organizers may change slightly the arrangement of objects into the sections without changing the order of these sections.

Before the races start, all the participants hand over their robots to the area which is inaccessible for them (quarantine area). During the competitions, the participants may take robots only from the quarantine area and only at the referee's command. After the race the participant puts his/her robot back to the quarantine area.

The labyrinth section configuration changes after all the participants hand over their robots to the quarantine area. After Labyrinth section configuration is changed, the participants cannot hand over their robots to the quarantine area.

Each section has its own starting and finish areas.

Before the race starts the robot is set at the starting area of a section so that none of its parts extend over the limits of such area.

The participant starts his/her robot at the referee's command. Time is counted from this moment.

The robot must be autonomous. The robot cannot be controlled by the participant (or other participants) in any way. Otherwise, the race will be stopped, and the robot will be disqualified.

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

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.

The race is stopped in the following cases:

the time allocated for completing the task expired;

the robot was disqualified during the race in such case, the maximum time allocated for completing such task is registered.

The race is interrupted if the robot was disqualified according to the respective section rules. In this case, the participant manually sets the robot in the starting area of the next section. If disqualification occurred at the last section, the participant sets the robot in the starting area of this section. In these circumstances the time counting is not stopped.

## 1.5. Ineligibility conditions

In the following cases the robot will be disqualified:

the robot is non-autonomous (the human is in control of the robot);

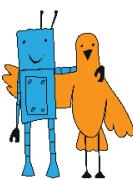
during the race the participant has touched the field or the robot;

while performing the Line Follower task the robot has not found the line within five seconds;

while performing the Line Follower or Kegelring task the robot has left the field (any fulcrum has touched the surface out of the field);

while performing the Line Follower task the robot has lost the line for more than five seconds. The obstacle avoidance within 10 seconds is not considered as the loss of the line;

the robot has not left the Labyrinth cell within 30 seconds.



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The line may be left only tangentially from the outside, provided that the length of the sector which the robot passes tangentially does not exceed three lengths of the robot body.

The robot is considered to be out of the field if any of its fulcrum has touched the surface out of the field.

The robot is considered to have left the line if none of its part is over the line.

## 1.6. Scoring

The robot scores points for completing tasks at sections.

If the robot was disqualified during the race, the robot does not score the points for completing the task at the section at which the race was stopped.

The sum of the points which the robot scores as it completes tasks is the final result. If the competitions are held in several attempts, the sum of the points which the robot scores as it completes tasks in each attempt is the final result of such attempt. The maximum result out of all the attempts is the final result of the robot.

The time from the beginning of the race to the end of the race is the final time of the robot in each attempt provided that the race is not stopped due to the robot's disqualification. Otherwise, the maximum time allotted for the attempt is the final time of the robot. The final time of the attempt with the best final result is the final time of the robot.

The robot with the maximum final result is announced the best.

If the final results are equal, provided that the competitions were held in several attempts, the results of the remaining attempts of robots are compared in descending order.

If the points are equal in all the attempts, the final time of each attempt is compared (in such case attempts are arranged in the descending order of the final result). The result of the robot which spent the least time in its best attempt is announced the best.

If the final time is equal in each attempt, the weight of robots is compared. The robot with the least weight is announced the best.

## 2. Line follower

### 2.1. Field specifications

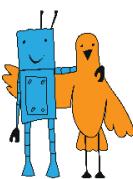
The field is a white rectangular field marked with a black line.

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 15 cm when measured from the center line.

The starting and finish areas are limited with the black line in the form of a square 20 mm thick.



## 2.2. Additional specifications

Line Follower sections have additional complications: «fixed obstacle», «slide», «moving obstacle» and «inversion». See a detailed description in the Journey Contest Rules for elementary and junior categories.

## 2.3. Procedure for completing task

During the race the robot is to pass from the starting area to the finish area along the line marked on the field.

The race time is counted from the moment the robot crosses the line which limits the starting area to the moment the robot crosses the line which limits the finish area.

The robot crosses the line when its foremost part touches or crosses the line.

The race time is registered with the electronic gate system or by the referee with the stopwatch depending on the availability of the equipment. In any case the registered time is considered final.

## 3. Labyrinth

### 3.1. Field specifications

The Labyrinth has the size of 150x150 cm and is divided into cells with the size of  $30 \pm 2$  cm (see Fig. 1).

The field surface is white.

Wall with height of 10 cm and a thickness of  $16 \pm 1$  mm can be installed between the cells. 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 extensions of the lines from neighboring Line Follower sections are in the starting and finish area. The line enters the cell max. by one half of the length of such cell.

The location of the walls changes just before the attempt.

The labyrinth walls are laid out so that only one path which does not cross itself is available between any two cells of such labyrinth

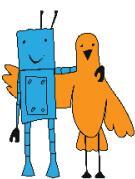
### 3.2. Procedure for completing task

The configuration of the walls changes after all participants have handed over their robots to the quarantine area or after the referee's decision.

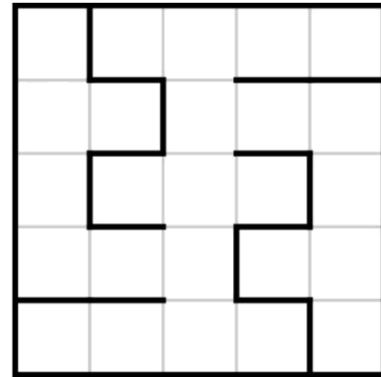
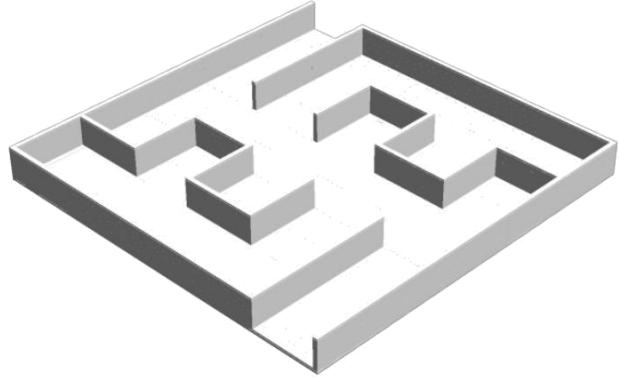
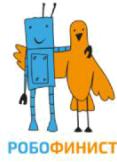
During the race the robot is to pass from the starting area to the finish area.

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

If the robot is not leaving the cell within 30 seconds it should be disqualified.



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*Fig. 1 Labyrinth field layout example*

## 4. Kegelring

### 4.1. Field specifications

The playground is a field with a ring which is a circle 1 m in diameter and limited along its perimeter with a line 50 mm thick (see [Fig. 2](#)).

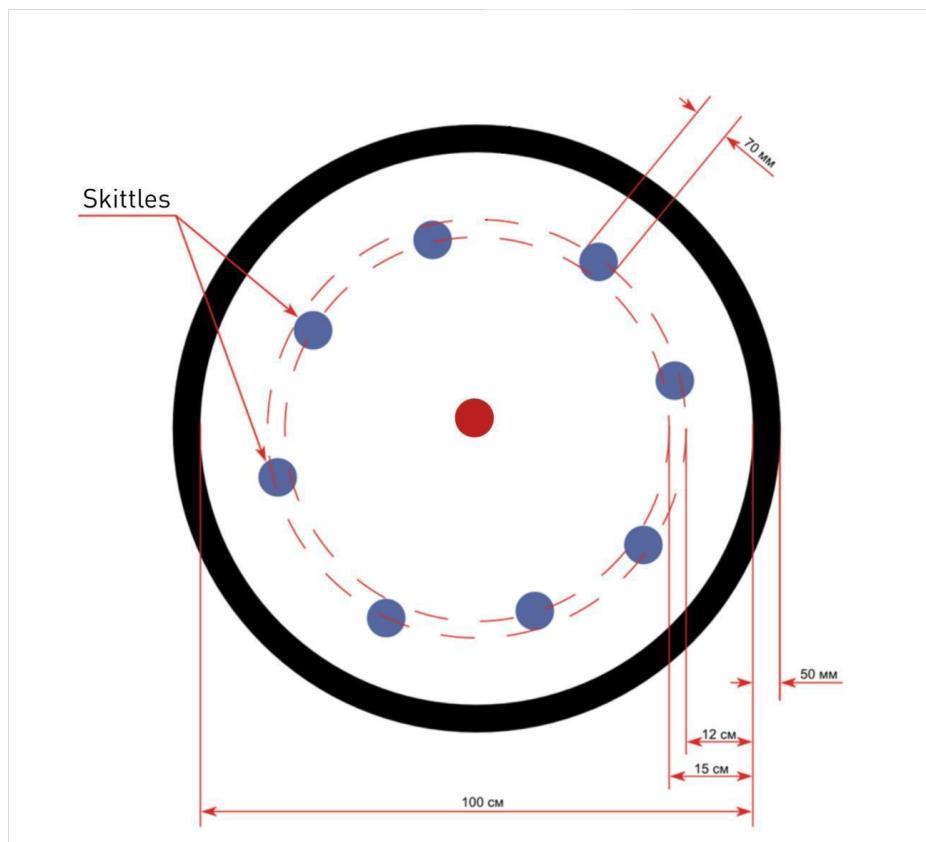
The field colour is white.

The limiting line is black.

Skittles are rigid cylinders which are 70 mm in diameter and 120 mm high and weigh max. 50 g.

Skittles have a mat one-tone surface.

Skittles can be empty standard soda cans (330 ml). An empty can should only be wrapped with a regular sheet of paper.



*Fig. 2. Marking Kegelring field*

#### 4.2. Procedure for completing task

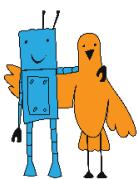
The following procedures are carried out before the race.

Eight skittles to be pushed outside the ring are placed in the ring (blue ones on [Fig. 2](#)). Skittles should evenly be spaced inside the circumference of the ring: max. two skittles should be in each fourth part of the ring. Skittles are put no closer than 12 cm and no further than 15 cm from the black limiting line.

The participant of the race can adjust the position of skittles as he/she thinks fit while meeting the requirements. The referee approves the final layout.

The skittle is considered outside the ring if none of its part is inside the ring at some point in time.

The robot is considered to have left the contest polygon when any supporting point of such robot touches the surface outside the polygon. The robot leaving the contest field should be disqualified.



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## 5. Revision History

Nº	Doc. No.	Date	Note	Previous version	Update version
1	2	3	4	5	6
1	1.1	04.11.1 6	Section changed	1.5	
2			Section changed	4.2.1.2.	
3	2.0	20.07.1 7	Entire text changed		
4					
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