ROBOFINIST

Aquabots

RoboFinist competition rules

Version 1.3 dated February 10, 2025

1. General Provisions

One team plays one robot.

1.1. Task Description

The robot has to perform various exercises in a specified sequence. The robot has at least 2 attempts to perform each exercise and the best attempt counts.

1.2. Restrictions

A team must meet the following requirements, unless otherwise specified by the Organizing Committee of a particular Event:

- the number of participants in the team is 2 or less (the number of coaches/team managers is not limited)
- the oldest member of the team is 19 years old or less in the year of the competition.

2. Requirements for the Robot

The robot must meet the following requirements:

- length - not more than 600 mm;
- width - not more than 400 mm;
- height - not more than 400 mm;
- weight - not limited.

The robot must be autonomous for all exercises.

The robot must hold on water during all exercises.

3. Specifications of the field

The field is a parallelepiped-shaped pool filled with water.

Pool Specifications:

- width (along the frontal sides) - more than 2000 mm;
- length (along the longitudinal sides) - more than 4000 mm;
- depth - more than 300 mm;
- height of the board from the water level - more than 100 mm.

All participants must compete in identical sized pools.

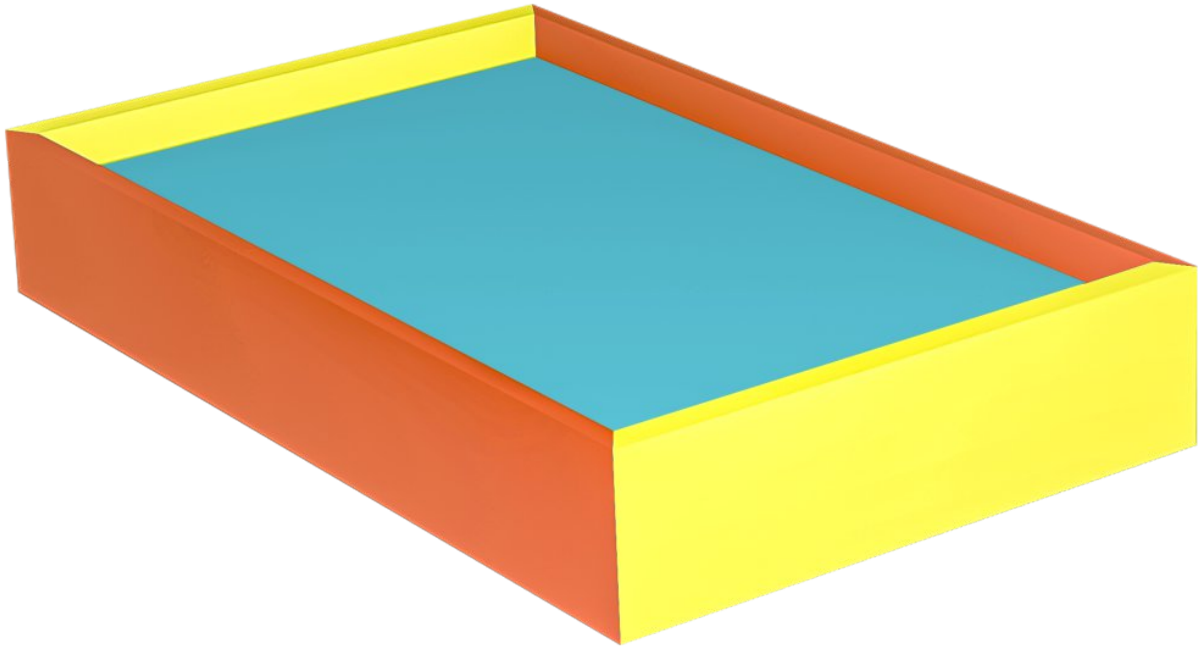


Figure 1. Schematic representation of the pool. Longitudinal sides are marked in red and frontal sides in yellow.

A buoy is a cylindrical or conical orange-colored float with an anchor. The base diameter is 50 mm and the height above the water level is at least 200 mm. It is placed in an upright position due to the at the lower end and the anchor.

4. Contest Procedure

The order of performance of each team is determined by drawing lots for all exercises before the start of the competition.

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

Before starting each attempt of each exercise, 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 Juge's command only. After the run the participant places his/her robot back to the Quarantine area.

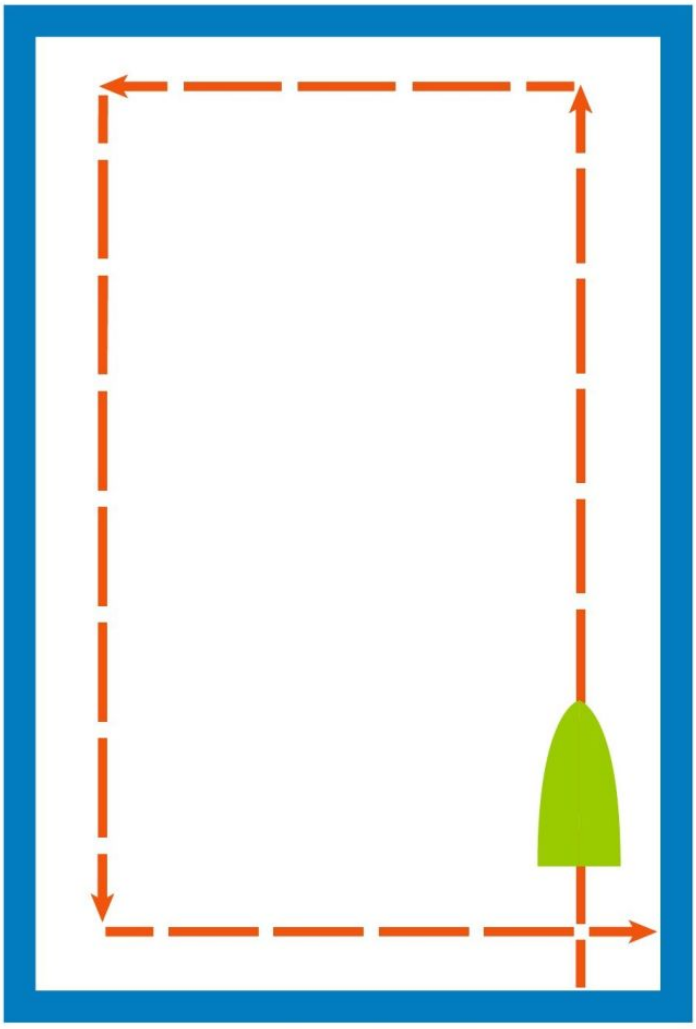
Robots are given 2 minutes max to complete each task.

The run time is counted from the moment the robot starts moving.

4.1. «Perimeter Traversal» Exercise

The robot must start moving from one side and in the shortest possible time do one lap along the sides of the pool, moving at a distance of no more than 300 mm from the board. The end of the exercise is recorded by the Judge at the moment when the robot touches the side along which the start was made.

The result of the attempt is the time taken to cover the distance.



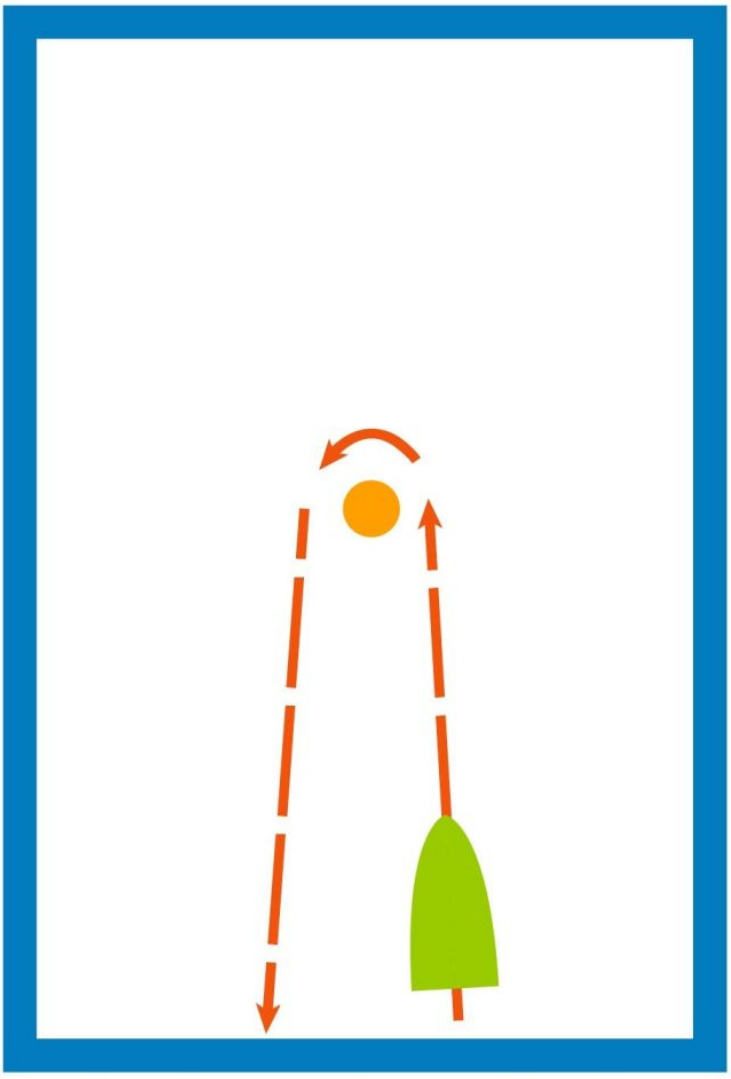
Penalty seconds are awarded for the following violations:

- touching the board – 5 penalty seconds, excluding touching for finishing;
- movement in contact with the board – 5 penalty seconds per each meter.

4.2. «Loop» Exercise

Before the start of each attempt, a buoy is placed on the longitudinal axis of the pool at a distance of at least 1000 mm from the front boards. All participants must place their robots in the Quarantine area before the buoy is installed.

The robot must start moving from the frontal board designated by the Judge as the starting board, reach the buoy in the shortest possible time, round it and return to the starting frontal board. The end of the exercise is recorded by the Judge at the moment the robot touches the starting board when having floated the pool in the opposite direction.



The result of the attempt is the time taken to cover the distance.

Penalty seconds are awarded for the following violations:

- touching the longitudinal board – 5 penalty seconds;
- movement in contact with the board – 5 penalty seconds per each meter;

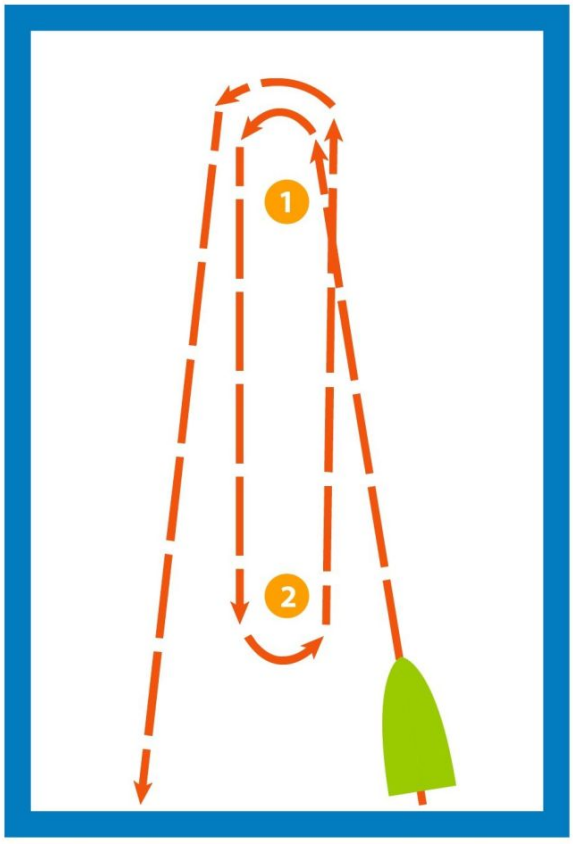
- touching the buoy - 10 penalty seconds.

4.3. «2 Loops» Exercise

The robot must:

1. start moving from the frontal board designated by the Judge as the starting board;
2. reach the buoy #1 near the opposite front board and round it;
3. reach the buoy #2 near the starting board and round it;
4. reach the buoy #1 near the opposite front board and round it;
5. return to the starting front board.

Buoy rounding must be done on the left side of the robot.
The end of the exercise is recorded by the Judge at the moment the robot touches the starting board when having floated the pool in the opposite direction after the task has been completed.



The result of the attempt is the time taken to cover the distance.

Penalty seconds are awarded for the following violations:

- touching the longitudinal board – 5 penalty seconds, excluding touching for finishing;
- movement in contact with the board – 5 penalty seconds per each meter;

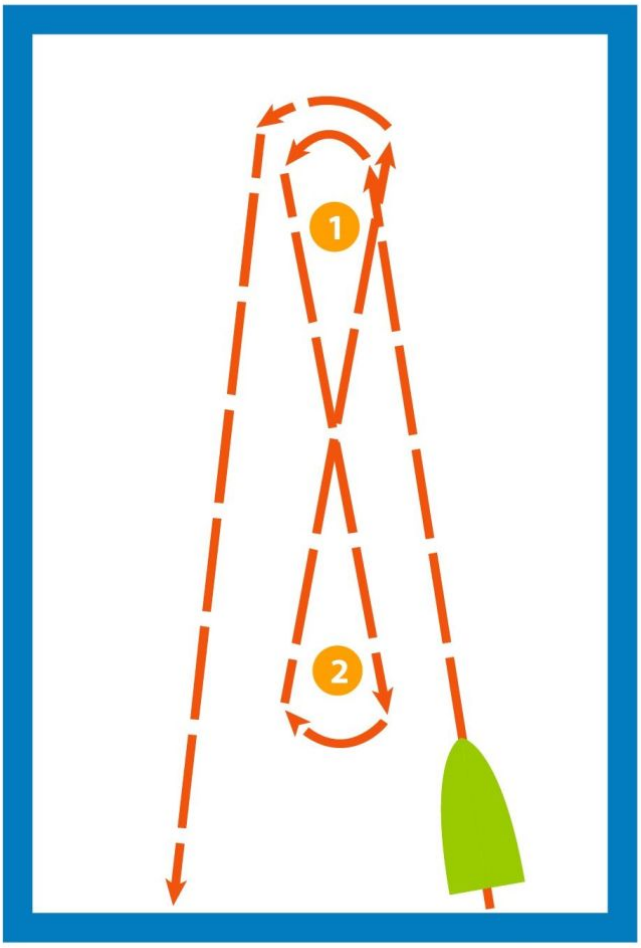
- touching the buoy - 10 penalty seconds.

4.4. «Eight» Exercise

Before the start of each attempt, 2 buoys are placed on the longitudinal axis of the pool at a distance of at least 1000 mm from the front boards and from each other. All participants must place their robots in the Quarantine area before the buoys are installed.

The robot must:

1. start moving from the frontal board designated by the Judge as the starting board;
2. reach the buoy #1 near the opposite front board and round it;
3. reach the buoy #2 near the starting board and round it;
4. reach the buoy #1 near the opposite front board and round it;
5. return to the starting front board.



Buoy rounding must be done alternately on different sides of the robot.

Penalty seconds are awarded for the following violations:

- touching the longitudinal board – 5 penalty seconds, excluding touching for finishing;
- movement in contact with the board – 5 penalty seconds per each meter;

- touching the buoy - 10 penalty seconds.

5. Disqualification

The attempt is disqualified if:

- the robot was not placed in the Quarantine area before the start of the attempt;
- the robot is not autonomous (the robot is under an external control);
- participant touched the robot or the pool during the run;
- the robot has not complete the task in a specified time;
- the buoy was submerged by the robot.

6. Scoring

If the robot did not show the result countable by the Judges (disqualification) in all attempts, the result of the exercise is equal to the maximum allowable exercise time.

The team's time in each exercise is multiplied by the difficulty multiplier of the exercise (the more difficult the exercise is, the lower the multiplier is). K1 = 2; K2 = 2; K3 = 1; K4 = 1.

The final team result is the weighted sum of the results of each exercise:

Total result = K1 * (first exercise time) + K2 * (second exercise time) + K3 * (third exercise time) + K4 * (fourth exercise time).

7. Procedure for Determining the Winner

The team with the lowest total result is declared the winner.