# RULES OF ROBOTIC TOURNAMENT
## " XII Robotic Arena "
## LineFollower Enhanc3d

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## Section I

## General

### § 1

1. This document regulates rules of the tournament in category "LineFollower Enhanc3d".

## Section II

## Robot Specification

### § 2

1. Robots can't be pre-built, commercial construction.
2. Robots must fit on a standard A4-size paper.
3. Height of robots is not limited.
4. Weight of robots is not limited.
5. Communication with robots during matches is forbidden.
6. Disabling robots remotely is an exception from the point above.

### § 3

1. Robots must be fully autonomous.
2. Robots must be designed so that it can be run at the mark given by the judge.
3. Robots can be equipped with "EDF" (Electric Ducted Fan) or other active devices for better adhesion.

4. Robots functionality cannot be dependent on varying environment during tournament, such as lighting (from dusk to bright reflectors), smoke, loud music or laser effects. The show may be lit by regular lightbulbs, halogens, energy saving lightbulbs, fluorescent lamps, LEDs and other lightsources common in households. Organizers have no control over street lighting near windows of the building. During the show it will be forbidden to use camera flashes and other intense light.

## Section III

## Route Specification

### § 4

1. Route is mostly defined by black line (with width up to 2 cm) placed on a bright background.
2. The parts of the route can be defined by the line with witdh other than 2cm.
3. The parts of the route can be defined by the line in a different color.
4. The parts of the route can be placed on a background in a different color.
5. At the parts of the route can occur an intense source of light.
6. Surface with route can be built from a many connected components. Any set offs on the components' connection will be possibly eliminated.
7. The route may have vertically inclined fragments. The slope of fragments where the route is approximately a straight line is less than 45 degrees. Inclination of fragments with bends on the route is less than 30 degrees.
8. Changing the slope of the route can be continuous.
9. Changing the slope of the route can be stepwise.
10. The distance between two step changes in the slope of the route is greater than 300 mm.
11. At a distance of 210mm away from the line (smaller dimension of A4-size paper) can't be other line or the end of the route.
12. The route can be a closed loop.
13. The route can include right angle or crossroad.
14. The crossroads should be ride straight ahead.
15. The route can have breaks in line, bifurcations or any obstacles.
16. The route area is limited by a rectangle, which fully includes the route. The rectangle will be defined along with the selection of the exact route run.
17. The gates (for time measurement) have to be placed at two sides at least 170mm away from line.

## Section IV

## Competition

### § 5

1. Competition will be conducted in two stages:
   (a) Elimination phase,
   (b) Finals.
2. In elimination phase, each robot has a right to unlimited number of the rides.
3. Matches in elimination phase will be held based on the schedule given by the referee.
4. 6 best constructions from elimination phase will take part in finals.
5. Order of the rides in finals are inversely proportional to ranked place in the elimination phase.
6. The shape of finals' route is shown just before final phase.
7. In finals, each robot has a right to only 3 rides.
8. As a result of referee's decision, there can be only final stage. Therefore:
   (a) Each robot can take part in final stage (only after succesful registration process)
   (b) Matches in finals will be held based on the schedule given by the referee.
9. Each phase results announcement will occur after finishing the phase.

## Section V

## Winner Selection Rules

### § 6

1. Before start of the ride, the participants are placing the robots on the start line as instructed by the referee.
2. Robots are started on the mark of a judge.
3. The false start happens when robot exceed start line before mark of a judge
4. First false start restarts the ride.
5. Second false start makes ride as unfinished.
6. Leaving the route by the robot occurs, when the robot's contour gets away from route.
7. Each robot, after leaving the route, have to get back on the route by itself.
8. It is allowed to leave the route or to get back on the route in different point than the leaving point (only in a section with obstacles).
9. The referee decides, if the robot has passed an obstacle correctly.
10. If the robot gains the advantage by leaving the route, the ride is getting unfinished.
11. The referee decides, if the robot gained the advantage.
12. If the robot leaves the route area, the ride is getting unfinished.

### § 7

1. Time of overcome distance is the time counted from passing the start line to moment of passing the finish line.
2. Passing the start/finish line means that any component of the robot has passed it.
3. Time of overcome distance is measured by gate or by the referee with stopwatch (if the gate will crash).

4. The gate has at least 1 sensor, placed 1cm above the route's surface.

5. It is recognized that the robot has passed the finish line only if any of the sensors will notice it.

6. There is a 3 mins limit for passing the route.

7. If the ride is longer than 3 mins, it's getting unfinished.

## § 8

1. If the phase is taking place on 1 track, the shortest time of ride is taken into consideration in final classification of the phase.

2. If the phase is taking place on 2 tracks, the biggest amount of the points (obtained in duels of randomly selected pairs of robots) is taken into consideration in final classification of the phase.

3. If selection of 3 first places, based on the shortest times of the ride in phase with limited rides, won't be possible, the rules of the further competition are determined by the referees.

4. Final classification of the phase is determined on the rules defined in this paragraph.