Annex to the Regulation on the “RoboLand 2019” V International Festival of Robotics, Programming and Innovation Technologies

"RALLY"
ROBOTS CONTEST ORDER

Age of participants: from 9 years up to 21 years.
Team: 2 participants.
Robots: autonomous robots.
Equipment: any platform, any parts of the constructors, including those made by yourself.
Programming language: at the discretion of the team, without limitation.
Procedure for the conduct of competitions: qualification and double races.

1.1. Field
1.1.1. The field represents a closed polygon 3m x 3m, inside which a route is laid, for passage by the robot.
1.1.2. The polygon covering is a flooring carpet (color can change).
1.1.3. The color of the bordering polygon is white.
1.1.4. The width of the route shall not exceed 1 m.
1.1.5. The height of the sides is not less than 40 cm.
1.1.6. Slots are possible in the borders between the sides, a width not exceeding 7 cm.
1.1.7. On the road there may be special obstacles (see the ann. 1.2) - Stones - 2 pcs, Tunnel - 1 pc., Columns - 5 pcs., Boom - 1 pc., Swing - 1 pc., Stairs - 1 pc.
1.2. List of possible special obstacles on the field

1.2.1. Obstacle “Stones”: a platform that is a thin sheet material with a thickness not exceeding 5 mm, with attached to it pieces of broken stones, with sharp angles and differences in height. The average height of the stone layer is 50 mm. The length of the site along the route is 20 cm, the width of the corridor is 70 cm. The robot must overcome the obstacle.

1.2.2. Obstacle of the “Columns”: cylinders or parallelepipeds 24 cm in height, diameter (or diagonal) 7 cm. The purpose of the robot is to go round each obstacle (movement along a curve).

1.2.3. The tunnel obstruction: the length of the tunnel is 60 cm, the width is 100 cm. The entrance and exit from the tunnel is covered by mobile flexible black strips, 50 mm wide, with possible gaps of no more than 10 mm between them. The purpose of the robot is to enter and exit the tunnel without losing orientation.

1.2.4. The obstacle of the “Swing” is a mobile platform with a width of 40 cm, a length of 70 cm, the angle of ascent to which does not exceed 30 degrees. The center of gravity of the site is shifted to the side of arrival. When the route passes, the platform of the swing under the weight of the robot tilts to the opposite side, and when the congress returns to its original state.
1.2.5. Obstacle “Stairs” represents three stairs up and three stairs down, the lifting of the steps does not exceed 50 mm, the total height of the ladder above the level of the route is not more than 15 cm. The robot's goal is to overcome the obstacle.

1.2.6. Obstacle The "boom" is a narrow bridge located in front of the finish line. The width of the boom is 20 cm, the length is not less than 100 cm, the angle of arrival is not more than 30 degrees. The robot must overcome the obstacle. At the request of the participants, additional transverse lines with a width of 10 mm, a rise of not more than 5 mm, a distance between the bands of 10 cm can be glued to the boom.

1.2.7. According to the decision of the judges, one of the obstacles can be excluded from the course.

2. Requirements to the Robots
2.1. Basic Specifications
2.1.1. In the rally involved four-wheeled cars with rear (or front) drive and steering front wheels. Steering wheels should not be installed on the same axle. Robot move it entirely by turning the steering wheel.
2.1.2. At start the size of the robot should not exceed 40x40 cm.
2.1.3. The height of the robot should not exceed 40 cm.
2.1.4. During the movement, the dimensions of the robot must remain unchanged.
2.1.5. The weight of the robot should not exceed 10 kg.
2.1.6. The robot must be completely autonomous.
2.1.7. Robots without steering are not allowed to participate.

3. Game
3.1. Objective of the game
3.1.1. For the shortest time, moving during the race in the same direction along the route, the robot must achieve finish zone from the start zone.
3.1.2. The time for the task should not exceed 5 minutes. The time limit for the decision of the judges may be increased or decreased (but not less than 2 minutes).

3.2. Start
3.2.1. At start, the robot must be completely in the start area (green section).
3.2.2. The robot must be switched on or initialized manually at the beginning of the match by the referee's command, after which it is impossible to interfere with his work. It is forbidden to remote control or feed the robot any commands.
3.2.3. During the competition, participants are prohibited from touching the robot body or the polygon.

3.3. Finish
3.3.1. The task is completed by the command of the judge after the robot crosses the finish line (subject to the conditions of clause 3.1.1).
3.3.2. Upon the judge's decision, the attempt can be completed ahead of schedule.

3.4. Stop of the task performance
3.4.1. The execution of the task can be interrupted, and the time is stopped in the following cases:
3.4.1.1. If any member of the team touches the body of the robot.
3.4.1.2. If the number of penalty points has exceeded 5 (on the rules for calculating penalty points, see c. 3.5)
3.4.1.3. If the conditions of the finish are met (see c. 3.3).
3.4.1.4. If the rules of the competition are violated.
3.4.1.5. If the time allocated for the task has expired. The time is taken into account together with the penalty seconds.

3.5. Penalties
3.5.1. For each touch of the robot with its body, the edge of the route, the robot is credited with one penalty point.
3.5.2. In the case of movement of the robot in contact with the wall, one penalty point is awarded for each meter of such movement.
3.5.3. In the event that the robot did not perform the required element of movement, the robot is given a penalty seconds.

4. Rules for determining the winner
4.1.1. The competition is held in two stages:
  - First stage – qualification;
  - Second stage – pair races.

4.2. First stage
4.2.1. At the first stage, the possibility of performing the task by the robot is evaluated. The robot must cross the track in accordance with the regulations.
4.2.2. Before the second stage, robots that meet the conditions of the finish are allowed (see c. 3.3).

4.3. Second stage
4.3.1. At the second stage, robots start in pairs.
4.3.2. The location is determined in advance by means of a draw. Under the location here is understood, from which side of the robot the opponent will start the participant.
4.3.3. The robot wins, the total time of passing the distance, taking into account the penalty time, turned out to be the smallest at the moment of the arrival of both robots.
4.3.4. If after the lapse of the time allotted for the task, none of the robots reached the finish zone, then the robot, which is located closer to the finish zone, wins.
4.3.5. Depending on the total number of participants, the competitions are held according to the Olympic system or each competes with each.
4.3.6. The second stage of the competition can be excluded by the decision of the judges and agreement with the participants.
4.3.7. The decision of the judges is not discussed, no objections are expressed.
4.3.8. Appeal is submitted to the Organizing Committee before the end of this type of competition. In the absence of representatives of the Organizing Committee, an appeal is submitted to the judge of the competition.

**CONTEST ORDER FLEXIBILITY**

1. Flexibility of the rules may take place when the number of contestants changes, which may have little effect on the content of the order, but its basic concepts should be followed.
2. Contest organizers can make changes or exceptions to the order before the event, after which they are constant throughout the event.
3. Participants shall be informed about changes or cancellation of the contest order in advance (no later than 15 minutes) prior to the contest.
4. Adjusted rules shall remain unchanged during the contest.

**LIABILITY**

1. Teams and competitors are personally responsible for the operability and safety of the robots, as well as they are responsible in accordance with the legislation of the Republic of Kazakhstan for any accidents caused by the actions of team members or their robots.

2. The organizers are not liable in the case of an accident or an emergency caused by the actions of team members or their equipment.

**LINKS TO THE RESOURCES USED**

1. www.robofinist.ru
2. www.myROBOT.ru
3. robolymp.ru
4. www.rus-robots.ru