



REGULATIONS OF THE ROBOT COMPETITION

"KEGELRING - QUADRO×2"

Age of participants: 10-14 years.

Team: 1-2 people.

Robots: autonomous robots.

Equipment used: no restrictions.

Programming language: no restrictions.

Task Description: In this competition, teams must prepare robots that can autonomously recognize and push pins out of the ring in the shortest amount of time.

1. Requirements for robots

1.1. The dimensions (width × length) of the robot are 200×200 mm, the height is not regulated, the design of the robot must remain unchanged during the competition.

1.2. The robot's weight is not limited.

1.3. The robot body must not contain special devices for capturing or tipping over the pin - manipulators, pneumatic elements, acoustics, vibration, etc., the robot works only with its body.

1.4. The tires and other components of the robot that come into contact with the ring must not be able to lift and hold an A4 sheet of 80 g/m² paper for more than 2 seconds.

1.5. The robot must be completely autonomous.

2. Requirements for the landfill

2.1. The pins are 120 mm high, 70 mm in diameter and weigh no more than 50 grams.

2.2. The ring is a white circle with a diameter of 1500 mm. The line limiting the circle is black and 50 mm wide.

2.3. There are 16 yellow marks in the circle for setting pins, with a diameter of 70 mm.

3. Procedure for holding the competition

3.1. The robot's task is to push all the white pins located in the ring out of its boundaries in the shortest time possible. At the same time, the black pins must remain within the ring.

3.2. After the start signal, team members are not allowed to touch their robot, the ring or the pins. Any remote participation or third-party interference in the robot's operation is prohibited, including

remote control from a PC or other means. If such actions are detected, the team is disqualified and removed from the competition.

3.3. When installing the robot, it is placed in the center of the ring in the direction of the arrow.

3.4 All robots are located in the same position.

3.5. Rules for placing pins:

3.5.1. Numbered pins (16 pcs.) are placed on the ring, after which eight of them are removed by lot. Of the remaining pins, four are replaced with black ones, also by lot.

3.5.2. The pins are placed in the same way for all participants during one attempt, and the drawing of pins is carried out anew for each attempt.

3.6. The object of the competition is to push the two white pins in the inner circle and the two white pins in the outer circle (along the black line) out of the ring. The black pins must not leave the inner ring.

3.7. The maximum attempt time is 5 minutes.

3.8. The outer circle pins are placed at a distance of 8-10 cm from the edge of the circle line, the inner circle pins – 40-42 cm from the edge of the line. Before the start signal, the robot operator is allowed to independently adjust the pins in accordance with the requirements with the permission of the competition judge.

3.9 A pin is considered to be ejected if no part of it is inside the white circle delimited by the line. The orientation of the pin does not matter.

3.10. When rolling a pin back into the circle after being pushed out, the referee removes the pin from the ring.

3.11. End of the race:

3.11.1. The race time stops as soon as the robot pushes all white pins out of the ring.

3.11.2. If the robot does not change its position relative to the polygon within 10 seconds, the judge has the right to stop the attempt and count the number of pins pushed out as a result.

3.11.3. During the attempt, the operator may stop the run by saying STOP and stopping the robot. After that, the judge counts the number of pins pushed out for the score.

3.11.4. The robot has completely left the ring, including the black line that limits the ring.

4. Counting points and determining winners

4.1. Accrual of points:

4.1.1. For each white pin pushed out of the ring, the team receives 10 points.

4.1.2. For each black pin not pushed out, the team receives 10 points.

4.2. Each team is given at least two attempts (the specific number of attempts may be changed by the judges' decision).

4.3. The attempt with the maximum number of points is counted.

4.4 The team with the highest number of points will be declared the winner.

4.5. If the teams score the same number of points, the team that spends the least amount of time on completing the task is declared the winner.

4.6. In case of equality of points and time spent, the next most effective attempt is taken into account.

5. Permissible simplifications when conducting selection stages

5.1. The robot is allowed to go beyond the ring line for no more than 3 seconds for each exit, otherwise the attempt is considered lost.

Example of a game polygon

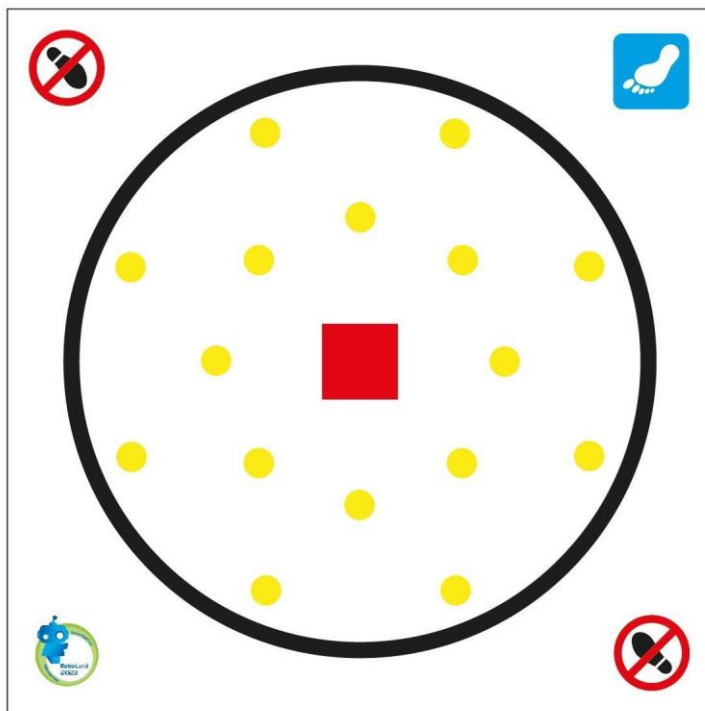


Fig. 1. Sample of a game polygon

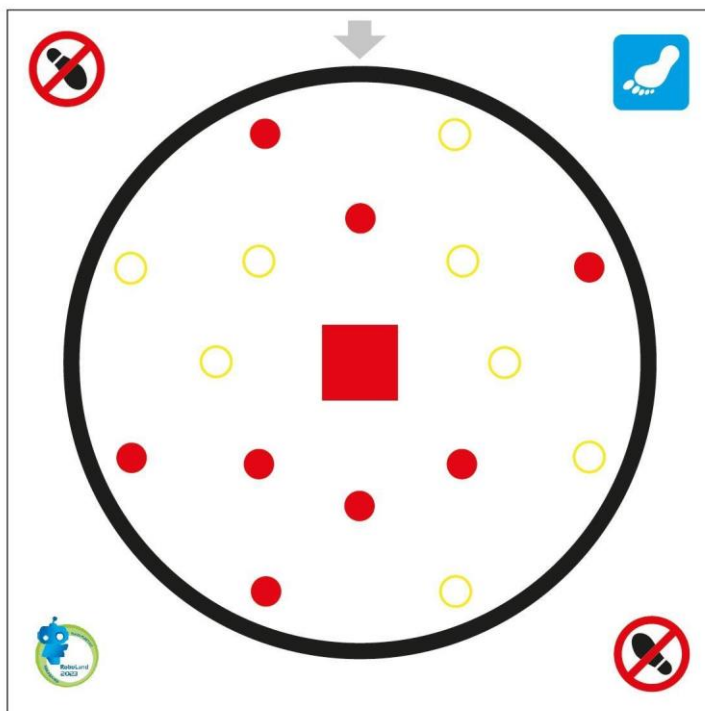


Fig. 2. Example of a possible landfill configuration