REGULATIONS OF THE ROBOT COMPETITION
"ROBOGEOMETRY"

Age of participants:

– Level 1: 10-13 years;

– Level 2: 14-17 years (recommended for students in years 1-2 of study).

Team: 1-2 people.

Robots: autonomous robots.

Equipment used:

- Level 1: 10-13 years: LEGO Mindstorms EV 3 or NXT , LEGO SPIKE Prime ;

– Level 2: 14-17 years old : LEGO Mindstorms EV3 or NXT.

Programming language: no restrictions.

Description of the task: In this competition, teams must prepare an autonomous robot capable of drawing a given geometric figure in the shortest possible time using an attached marker. Each section of the figure is considered completed if the robot's marker connects the black dots. The order in which the dots are passed is determined by the head judge of the category and is presented on the day of the competition.

Changes in the 2025 regulation:

1.1. The controller and motors used to assemble the robots must be from the educational platforms of the LEGO Education series: NXT or EV3 (Appendix No. 1). For ***the Level 1 category: 10-13 years old*** LEGO is also allowed SPIKE Prime .

1.4.1. In the Level 1 category: 10-13 years, the use of a gyro sensor (LEGO EV3 45505) is permitted.

1. Requirements for the robot

1.1. The controller and motors used to assemble the robots must be from the educational platforms of the LEGO Education series: NXT or EV3 (Appendix No. 1). For ***the Level 1 category: 10-13 years old*** LEGO is also allowed SPIKE Prime .

1.2. Only 1 controller can be used in the robot design.

1.3. The number of motors used is no more than 3.

1.4. The use of sensors is prohibited, with the exception of the motor rotation sensor built into the servo drive and the touch sensor for starting the robot .

    1.4.1. In the Level 1 category: 10-13 years, the use of a gyro sensor (LEGO EV3 45505) is permitted.

1.5. Only original LEGO parts may be used to create the remaining parts or components of the robot.

1.6. The robot must be equipped with a marker for applying an image to a horizontal surface.

1.7. The maximum size of the robot is 250×250×250 mm. During the attempt, the robot must not exceed the maximum permissible dimensions.

1.8. The robot must be autonomous.

1.9. The robot must be brought assembled on the day of the competition.

1.10. The marker can be secured with rubber bands or LEGO pieces.

Note: A functioning water-based magnetic (whiteboard) marker must be attached to the robot body. Alcohol-based markers are not allowed in the competition. The marker attachment is at the discretion of the participants.

1.11. The program for passing the route is compiled on site on the day of the competition. It is prohibited to use blanks of program code, including your own blocks and libraries.

1.12. The robot's weight is not limited.

Note: The robot body must not damage the surface of the competition area in any way, otherwise the team may be removed from the competition and disqualified.

2. Requirements for the landfill

2.1. The banner, measuring 2400×1200 mm, is covered with glass and divided into 2 sections for parallel execution of the task by two teams.

2.2. The banner size may be slightly changed.

2.3. The banner contains black dots with circles drawn around them.

2.4. The diameter of the black dot is 40 mm, the diameter of the circle is 100 mm.

2.5. Sponge for marker board.

2.6. The pattern of the drawing and the dots to be connected are announced on the day of the competition, but not less than 1 hour before the start of the races.
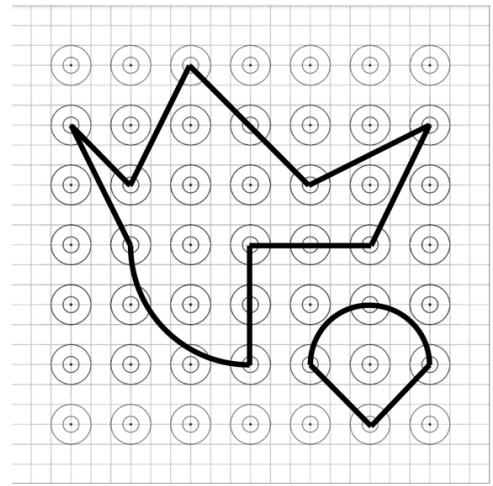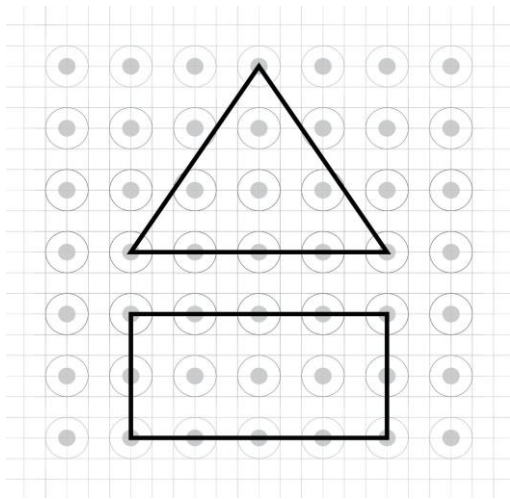
Fig. 1. **Example of a task on a game field** Fig. 2. **Example of a task on a game field**
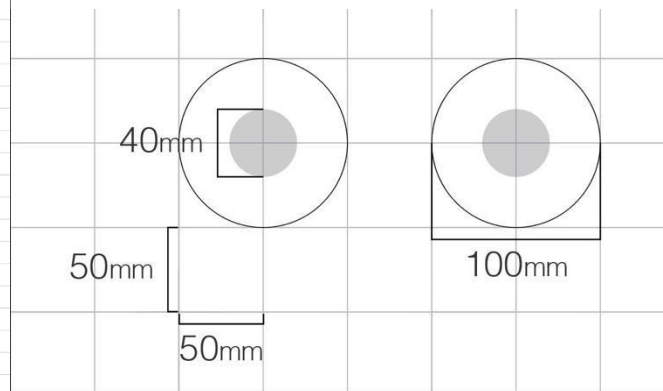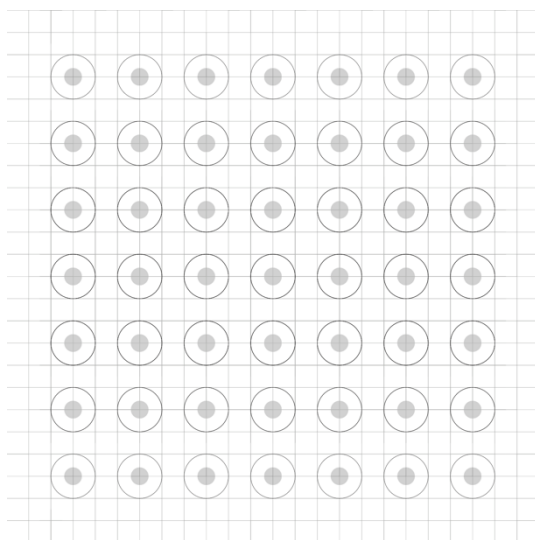**(Level 1: 10-13 years) (Level 2: 14-17 years)**

Fig. 3. **Dimensions of the elements of the competition ground**

3. Procedure for holding the competition

3.1. At the beginning of the day, the team is given a task - a drawing that the robot must reproduce on the training ground.

3.2. The team is given 1 hour to draw up the program.

3.3. Before the start of the competition, all participants hand over their robots to an area inaccessible to them (quarantine). If during the inspection a violation in the robot's design is found, the judge gives 3 minutes to correct the violation.

3.4. If it is impossible to correct the robot, the team is not allowed to attempt.

3.5. During the competition, participants may take robots only from the quarantine zone and only at the command of the judge.

3.6. The maximum time to complete the task is 2 minutes.

3.7. During the attempt, the robot cannot change its size, except for changing the position of the marker.

3.8. The movement of the robots begins after the judge's command and the team member pressing the central button or touch sensor.

3.9. Before the start of the attempt, the robot is positioned so that the lowered marker is in the center of any circle; the team determines the direction independently.

3.10. After the start of the attempt, the robot must connect the dots in such a way as to form the figure indicated by the judge.

3.11. The points must be connected by a straight continuous line, thus forming segments.

3.12. The sequence of passing the points is not important. The end of the attempt is recorded either at the moment of connecting the last point or after 2 minutes.

3.13. The competition is held in two runs. Each team makes one attempt in two runs. After the first attempt, the team quarantines the robot until all participants have completed the test. 30 minutes are given to prepare for the second attempt.

4. Counting points and determining winners

4.1. The team that receives the most points will be declared the winner. The sum of the points from the two attempts is considered.

4.2. 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.

4.3. Accrual of points:

Criterion	Points
The robot's marker connected two black dots with a line segment (for each line segment, points are awarded once)	10
The robot's marker connected two circles or a circle and a black dot (for each segment, points are awarded 1 time)	5
The marker did not touch the circle	0
Missing lines outside the specified drawing (accrued 1 time per attempt)	10

5. Permissible simplifications when conducting selection stages

5.1. No restrictions on the overall dimensions of the robot.

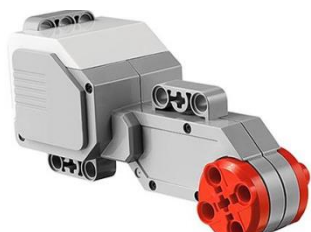5.2. The drawing on the field does not imply the removal of the marker.

Acceptable controllers and motors

1. Acceptable controllers

*Level 1: 10-13 years only allows LEGO SPIKE Prime.

2. Acceptable motors

*Level 1: 10-13 years only allows LEGO SPIKE Prime.

3. Acceptable sensors:

Recommendations for judges

1. Designate a dedicated assistant referee to monitor the use of routines during preparation for a try.

2. If it is not possible to make a polygon from glass and a banner, then it is permissible to use a marker board of the appropriate size. And it is necessary to make a template with circles of 40 and 100 mm for marking the field. Prepare a tape measure or a long ruler.

3. Apply the template with a permanent marker that does not wear off when the robot moves, while the participants use a water-based marker.

4. After the competition, clean the area with a board spray or paint over the drawing made with a permanent marker with alcohol. Then erase with a board sponge.

Recommendations for organizers

1. Each team is provided with a work space (table, 2 chairs).

2. The field is placed in a place accessible to spectators.

3. Team leaders are not allowed to participate in the competition.