



REGULATIONS OF THE ROBOT COMPETITION

"ASSEMBLE A ROBOT. LEVEL 2"

Age of participants: Level 2: 9-12 years.

Team: 1-2 people.

Robots: autonomous robots.

Equipment used: LEGO Mindstorms EV3.

Programming language: no restrictions.

Description of the task: Participants receive tasks in real time, complete them within the allotted time and demonstrate the results to the judges.

1. Requirements for the robot

1.1 To participate in the competition, you must use your own parts and LEGO Mindstorms EV3 controller.

1.2. The robot is assembled on the day of the competition. The program is written on the day of the competition.

1.3. Before the start of the competition, the robot assembly kit must be completely disassembled.

1.4. The use of any instructions is prohibited.

2. Requirements for participants

2.1. To successfully pass the tests, participants must have competencies in the fields of mechanics and programming.

2.2. Necessary competencies in the field of mechanics:

- Creation of an elementary design from a robotic construction kit;
- Ability to create a rigid structure;
- Ability to fix sensors in any plane;
- Construction of stationary and/or mobile structures.

2.3. Necessary competencies in the field of programming:

- Creating a program using algorithmic structures: cycles, branches.
- Control of servomotor with feedback;
- Color determination;
- Determination of distance;
- Convert degrees to centimeters and vice versa;
- Working with buttons on the block;

- Working with a distance sensor;
- Relay regulator;
- Basic mathematical operations;
- Using variables.

3. Procedure for holding the competition

3.1. All participants are invited to the competition area at the same time and, upon the judge's signal, begin performing the task. Participants of one team work with one set.

3.2. The round lasts 3 hours. You can submit the task at any time, but the first attempt must be submitted no later than 2 hours after the start of the round. The time of submission of the task is recorded by the judge.

3.3. The participant must inform the judge of the completion of the task by raising his hand and stating his readiness to submit the task. At this point, the time spent on completing the round is recorded and no changes are allowed.

3.4. Example of a task.

3.4.1. Participants are asked to write a game " Guess the Color ". To do this, it is necessary to design a device that will read the color of a " card " assembled from 3 colored 1x3 beams (see Appendix 1). The participant turns away from the robot. The judge places the card in the reader and then removes it. The robot must change the color of the backlight. The participant, looking at the robot, must name the color of the card that the judge placed in the reader. Then, after pressing the button, the robot must display the correct name of the color on the screen.

Card color	Backlight color
Red	Red
Green	Green (non-flickering)
Yellow	Orange
Blue	Green flashing
Card missing	Does not blink or light up, backlight is off

3.4.2. Accrual of points.

Criterion	Points
The model is assembled correctly (the structure is rigid, there is a zone for placing a card, the sensor(s) are fixed)	10

The backlight does not light if the card is missing.	10
No additional human intervention is required after the card is placed (the robot autonomously determines the presence of the card)	10
After placing the card, the backlight changes color	10×3
The participant correctly identified the color of the card by looking at the backlight	10×3
The name of the color is displayed on the screen (if incorrect, the coefficient is 0.5)	10×3
The program is cyclical and repeats 3 or more times.	10

4. Determining the winner

The team that scores the most points is considered the winner. If the points are equal, the time it took to complete the task is taken into account. The team that scores the most points and spends the least amount of time is declared the winner.

5. Organizational recommendations

Assign a separate person who will record the time of the end of the attempt, but not evaluate their performance. He should also ensure that work on the task is not carried out after the time is recorded.

Example of a color card

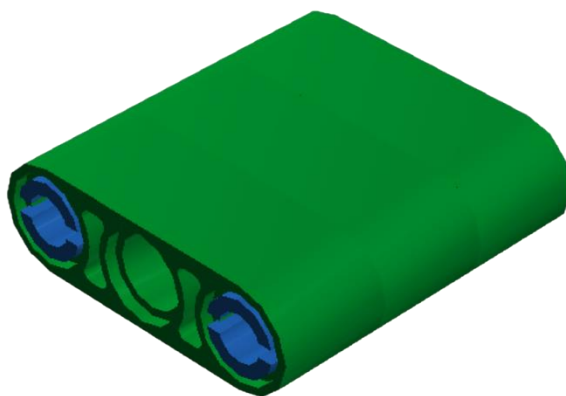


Fig. 1. Example of a color card