robotex International

LINE FOLLOWING RULES

COMPETITION COORDINATOR

Kaspar Laks
kaspar@robotex.ee

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1 Introduction

Line following is one of the most popular robotic competitions in the world. The task for line following robots is to drive through the track as fast as possible. Track consists of a black line on a white synthetic field.

2 Definition and Robot classes

In the Robotex National line following competition there are **represented autonomous robots in two different classes.**

- One operator and up to four assistants may be registered for each robot **(maximum of five team members in total).***The team may change the designated operator in accordance with the competition rules.*
- **The competitions take place in two categories:**
  - LEGO robots (LEGO® robots havea shorter track)
  - All robots
- **Robotex Lego Line Following competition takes place in three age groups:**
  - **OPEN** – At the competition day 19 y.o. and older.
  - **U19** - At the competition day up to 18 y.o. (including 18 y.o.) .
  - **U14** - At the competition day up to 13 y.o. (including 13 y.o.) .
- The age group of a team is determined **based on the age of the oldest team member.** You must register your team to a correct age category. If during the competition it
- turns out, that the team is registered to an incorrect age category, the robot of this team will be disqualified from the competition. **NB!** Teams who belong to the younger age group are allowed to compete in the older age group.
- The organizers reserve the right to check the age of the competitors during the competition. In case of violation the robot of the team, who violated the rules will be disqualified.

3 Technical Inspection and registration

The robot needs to pass technical inspection before the competition. The robot technical inspection is based on paragraphs “6.” and “8.”. During the inspection, it is checked whether the robot or the operator who is handling the robot meets the paragraphs requirements. **Only one team member with a robot** (the currently selected robot operator) **can come to the technical inspection. If necessary, they can have a translator or team**

instructor with them. The purpose of this is to guarantee a smooth course of the competition and technical inspection.

4 Lighting conditions

The lighting in the area needs to be as close to real sunlight as possible (Midday), with consistent color and stability. The field cannot have shadows while the attempt is running. Lighting is allowed to change between attempts, but it needs to be consistent for every field.

5 The Field

1. The field is made of white synthetic material with an area of 3 to 100 m2.
2. The track can either be open or closed.
3. The 15 mm wide line, or track, has been printed on the field with black ink. **The line or track width is 20 mm in LEGO class.**
4. The minimum turning radius of the line is 0.
5. The line is surrounded by 25 cm of free space on both sides, except on cross-sections.
6. The lines on the cross-section are perpendicular at least to the extent of 20 cm. On the cross-section the robot must follow the straight line (it cannot turn to the other line or it will lose its trial).
7. The start and finish lines are marked on the field separately, for a closed track the start and finish lines can be the same.

6 The Robot

1. The robot must be autonomous.
2. The maximum dimensions of the robot are 25 x 25 x 25 cm and mass 1 kg. NB! LEGO® robot measure box will be 25 x 25 x 25 cm with +2 mm tolerance.
3. The robot must always cover the line once it follows it, otherwise the race is considered to be failed.
4. The robot must not damage the field or endanger the spectators in any way.
5. It is forbidden to use higher voltage than 24 V in the robot.
6. The robot must have a remote from where the robot can be started or stopped. NB! The remote is not mandatory for LEGO® robots which can also be controlled with a start and stop button on the robot.

7. The body of the robot must entirely block the light beam of the time measuring system with a diameter of 3 mm at the height of 3 cm.

6.1 Additional requirements for LEGO robots

1. The robot must be exclusively constructed of the licensed parts of LEGO® original or HiTechnic®. There is an exception for wires used in the robot, wires must be the licenced parts of LEGO® original, HiTechnic® or Mindsensors. LEGO® RCX sensors, motors or other components are not allowed.
2. The robot must use only batteries or cells that are recommended by LEGO®.

7 The Competition

1. The robots compete in driving through the track in one direction.
2. An optical time measuring system measures the start and finish times at the start- and finish lines.
3. Time measuring lasts from start to finish. Robot has passed the line if it breaks the light beam of the time measuring system at the height of 3 cm.
4. The competition consists of qualifications and finals.
5. **In qualification rounds each team may do as many attempts as they wish in the time given** (usually 2-4h, depending on the time schedule and number of competitors), however the priority is given to teams with less tries.
6. 5 fastest competitors will get to compete in the finals.
7. Each robot has 3 minutes in the finals. Teams can do as many rounds in that time as possible.
8. First 3 places are determined by who is the fastest in the finals.
9. Robots must start the trial when the referee gives the signal.
10. Maximum lap time is 2 minutes. If the robot exceeds this time, it will lose the current attempt.
11. The robot is allowed to drive off the track for a maximum of 3 seconds, however the robot has to continue following the line in the correct direction.

7.1 Delay of the competition

When competitions start to delay, organizers have the authority to act in accordance with rules to minimize the delays and bring the competition back on schedule. The competition will continue as smoothly as possible, eliminating any rematches or any moments that could cause delays, and instead using a less time-consuming judging system based on rules. Any objections will not be accepted during the delay, and competition will not be

delayed to resolve the objections. If the robot cannot be found in the designated area, the attempt is considered a failure.

8 Organizing

1. The competition and testing fields are made of same materials.
2. The robot must be registered before the competition. The registration process includes technical inspection of the robot, marking the robot with a number sticker and testing of the remote start and stop function (not necessary for LEGO® robots).
3. Technical inspection must be completed by the time specified by the organisers.
4. All questions and problems that may arise during the competition, are solved by the referee.
5. The decisions of the referees are not subject to appeals. Complaints must be submitted during or immediately after the match. If no settlement is reached with the referee, claims must be submitted immediately to the Robotex Head referee. Any later complaints will not be accepted. In case of any conflicts or disputes, the final word will be said by the referees and/or the organisers. **NB! Rude behaviour is not tolerated and the team who does not respect the referees / head referees decisions can be disqualified by the head referee and/or event organisers.**

8.1 Lighting and infrared noise

The arena has at parts uneven lighting and infrared noise, which may disrupt the work of sensors during the competition. For this reason, the organizers recommend using covers or blinds for sensors, testing the sensors under intense lighting conditions or even under direct sunlight to imitate the lighting conditions of the competition arena.

8.2 Winners one-year break

Winners of 1st place cannot compete in the same category next year– they must take a one-year break from that category. At least 50% of the team must consist of non-winners. If the winners' team has three members, next year they should have at least one new member who was not previously on this team to compete in the same category again instead of taking a year off from it. This rule is aimed at bringing new people, giving
everyone a fair chance and encouraging recurring winners to try new competitions they usually do not participate in and to educate and engage new beginners in the field of robotics. *

***The rule complies only with Robotex International standards and is used for Robotex National competition.**

9 Changes and cancellations in the rules

Changes and cancellations made to the rules are adopted by the main organiser of the competition, according to the regulations of the regulatory committee of the competition.

10 Appendix 1. The dimensions for the track and robot

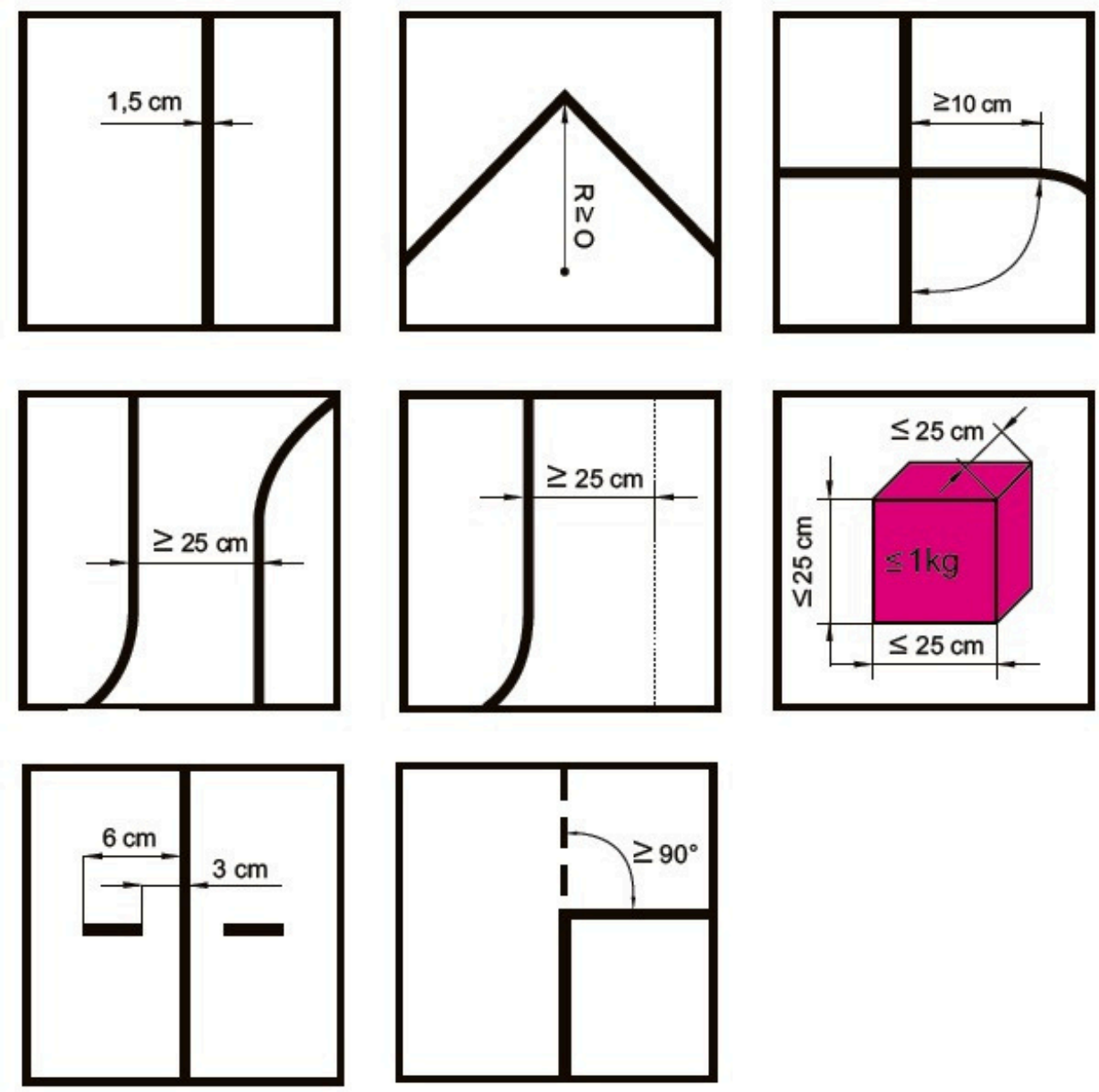

Figure 1: Thedimensions of the track and robot.

11 Revision history

1. 06.09.2023 Removed previous rule change history before 2018.
2. 06.09.2023 Paragraph 5. Allowed unlimited qualification rounds.
3. 06.09.2023 Paragraph 5. Allowed leaving the track for a maximum of 3 seconds if the robot is able to continue following the line in the correct direction afterwards.
4. 06.09.2023 Paragraph 5. Limited maximum number of contestants for LEGO® Line following.
5. 06.09.2023 Paragraph 6. Specified organizing rules.
6. 29.09.2025 Paragraph 5. clause 14. Specified new age groups for LEGO® Line following.
7. 29.09.2025 Paragraph 6. clause 6. Added winners-one-year break rule.
8. 08.02.2026 Removed previous rule change history before 2023.
9. 08.02.2026 Paragraphs 2. , 3. , 4. , 7. , 7.1. , 8. , 8.2. , 8.1. were updated.