robotex International

LINE FOLLOWING RULES

COMPETITION COORDINATOR

Sander Laas
Sander.laas@robotex.ee

Contents

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 Robot classes

In the Robotex International line following competition there are represented only autonomous robots in two different classes: LEGO robots and other.

3 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 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.

4 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.

4.1 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®.

5 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 queue will be either drawn by lots or determined according to the order of registration.
5. The competition queue and time will be announced via email to the competitors once registration to the competition has ended.
6. The competitors have 2 rounds, 1 attempt for each round.
7. 5 fastest competitors will get to compete in the finals.
8. Each robot has 3 minutes in the finals. Teams can do so many rounds in that time as possible.
9. First 3 places are determined by who is the fastest in the finals.
10. Robots must start the trial when the referee gives the signal.
11. Maximum lap time is 2 minutes. If the robot exceeds this time, it will lose the current attempt.
12. It is forbidden for the robot to drive off the track; if this happens, the robot will fail the current attempt.
13. One team can register up to 5 members.
14. The competitions take place in two categories: LEGO and other robots (LEGO robots have a shorter track)

6 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 final decision regarding any appeals is made by the referee and/or the organizers. All complaints must be reported to the referee during the match or right after the ending of the match. Complaints filed later will not be accepted. The final decision regarding any disputes or inconsistencies, is always made by the referee.
6. The best lighting conditions cannot be set for each robot separately. Lighting conditions will be set at the beginning of the competition day based on competitors' feedback and will stay the same throughout the competition (may vary occasionally during breaks or award ceremonies for show lighting).

7 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.

8 Appendix 1. The dimensions for the track and robot

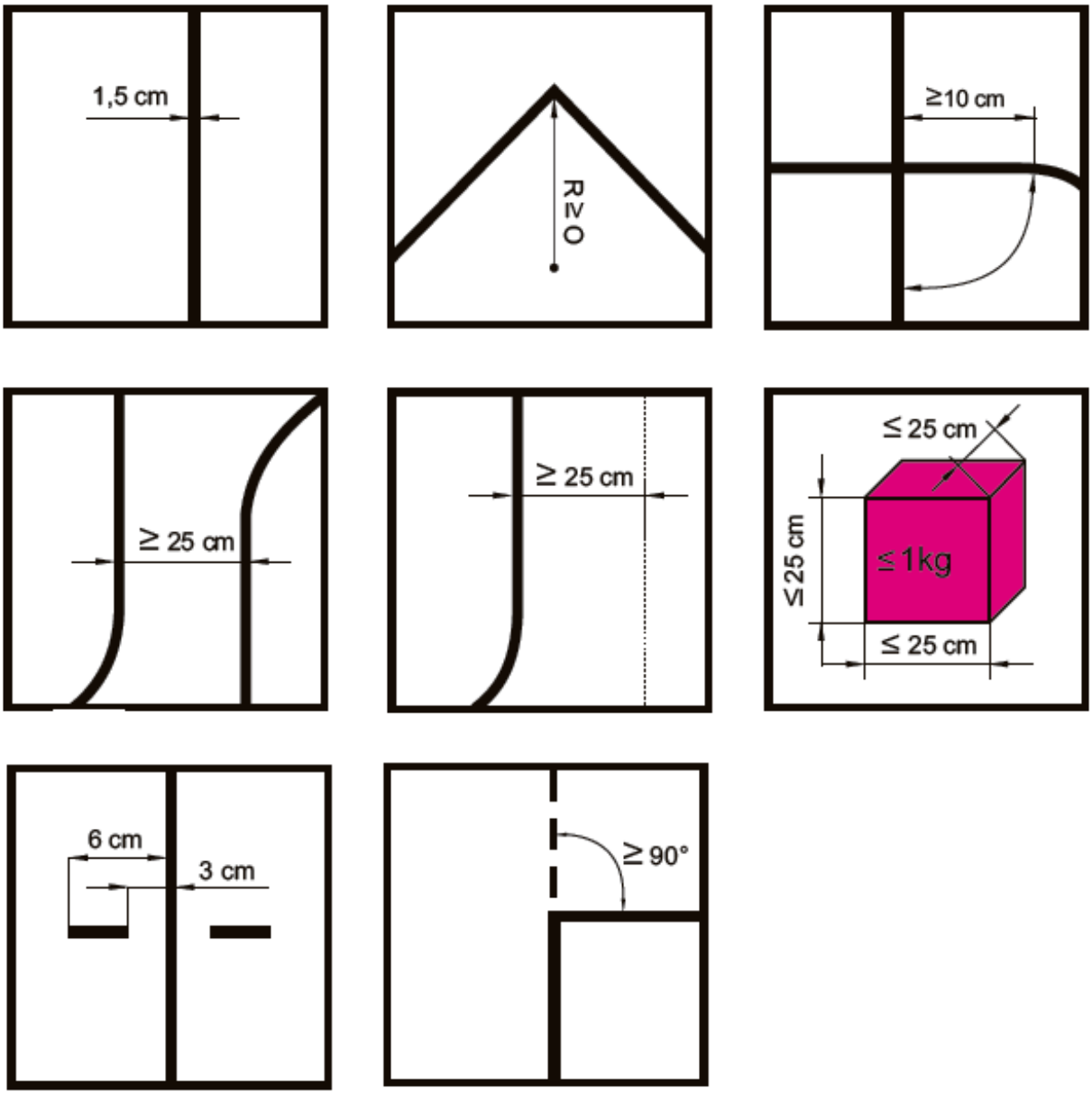

Figure 1: The dimensions of the track and robot.

9 Revision history

1. Clause 4 in paragraph 4 was amended on 21 April 2016. Robots do not have to compete in the same round in the qualifications.
2. Clause 7 in paragraph 4 was amended on 21 April 2016. Robots do not have to complete both tracks in the qualifications.
3. Clause 11 in paragraph 5 was amended on 28 May 2017. Condition was added about the start of robots.
4. Clause 13 in paragraph 5 was amended on 28 May 2017. Specification regarding the situation in which neither robot finishes the track in prescribed time was added.
5. Clause 15 in paragraph 5 was amended on 28 May 2017. Specification regarding the situation in which both robots drive off the track was added.
6. Clause 5 in paragraph 6 was amended on 28 May 2017. Specification was added about complaints.
7. Clause 11 in paragraph 5 was amended on 03 July 2017. Specification about the consequences, if the 3 second rule is not met.
8. Clause 1 in paragraph 4 was amended on 13 October 2017. Added a clarification about wires that are allowed in Lego line following robots.
9. 03.04.2018 Clause 1 in paragraph 3. Changed the maximum size of the competition field.
10. 03.04.2018 Clause 2 in paragraph 3. Mirrored track removed. Added a specification that the track can either be open or closed.
11. 03.04.2018 Clause 3 in paragraph 3. Specified how the track is made.
12. 03.04.2018 Clause 7 in paragraph 3. Specified that the start and finish line can be the same in a closed track.
13. 03.04.2018 Paragraph 4 clause 6. Remote is mandatory for other robots except LEGO®.
14. 03.04.2018 Clause 4.1 in paragraph 4. LEGO® RCX components are no longer allowed.
15. 03.04.2018 Paragraph 5. Specified the competition format.
16. 25.03.2019 Paragraph 3 clause 3. LEGO class line width has been added.
17. 25.03.2019 Paragraph 5 clause 7 and 8. The finals system has been changed.
18. 18.01.2022 Paragraph 6 clause 6. Lighting conditions defined.