

LEGO League Soccer

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INTRODUCTION

This is a draft rules for the LEGO soccer competition. As such, it does not contain detailed game rules for the full game, nor are all aspects of the competition reflected, especially the full game league. The final revision will be released some time in November. Please keep track of rule revisions and news at <https://stormingrobots.com/blog/category/lego-soccer/>.

1 ROBOT

1.1 Construction

1.1.1 The mass of a robot may not exceed 1.5kg (3.3lb).

1.1.2 The diameter of a robot may not exceed 23cm (9.0in), that is no two lateral points on the robot may measure more than 23cm.

1.1.3 The height of a robot may not exceed 23cm (9.0in).

1.1.4 Robots must be constructed with Lego parts or non-machined/manufactured parts (the use of 3D printing, CNC, etc. is not allowed). Allowed parts include but are not limited to cardboard, fishing line, adhesives, etc.

1.1.5 Robots must have a handle which allows the referee to easily lift a given robot. The handle must stand upright, and may exceed the maximum height of a robot. The handle may not have any sensors or motors attached.

1.2 Hardware Platform

1.2.1 Robots may be controlled only by a singular LEGO Mindstorms RCX, NXT, or EV3.

1.2.2 Robots may only use first party sensors or those on the attached approved list.

1.2.3 Robots may only use cameras on the attached approved list.

1.2.4 Sensors (including cameras) and motors may not be modified in any way from their stock condition except structurally, such as removing external casing.

1.2.5 Robots may only use first party motors.

1.3 Software Platform

1.3.1 Robots may be programmed using any IDE and firmware, including but not limited to NXT-G, the native EV3 language, ROBOLAB, ROBOTC, and ev3dev.

1.4 Control

1.4.1 Robots must be able to run in full autonomous mode, that is, without human interference (other than stopping and starting the program).

1.4.2 The use of wireless or manual control mechanisms, including but not limited to remote controls, wired controller, etc. is strictly forbidden.

1.4.3 Robots in the Full Game League may use wireless communications (which is in contradiction to Rule 1.4.2), but only when for communications between only their striker and goalie robot,

2 FIELD

2.1 Construction

2.1.1 The game field will measure 4ft by 8ft (1.2m by 2.4m).

2.1.2 The game field will be surrounded by a white wall measuring at least 15cm (5.9in) in height.

2.1.3 The flooring of the game field will mimic that of an actual soccer field, being green in color and possessing the appropriate markings for the penalty area, goal box area, midfield line, and center circle.

2.2 Goals

2.2.1 There will be two goals, with one colored blue and the other colored yellow.

2.2.2 Each goal will be positioned 1ft away from the two shorter walls, centered relative to the two longer wall, facing the center.

2.2.3 Each goal will be 50cm (19.7in).

2.2.4 The goals will not be affixed to the ground.

2.3 Ball

2.3.1 The ball will be 6.4cm (2.5in) in diameter, colored orange, and have a mass of approximately 60 grams

2.4 Tolerance Margin

2.4.1 All measurements regarding the field are subject to up to a 5% margin of error.

2.4.2 Note that the game field may not be perfectly flat due to assembly imperfections. Any bumps in the field will not exceed more than 3mm (0.1in).

3 GAME MODES

Introduction

In order to promote the participants of different levels of experience, the competition divided into 3 separate leagues, Free Kick League, Goalie League, and Soccer League. The hope is that newer teams can develop a robot that completes part of the full game so that they can not only participate, but also have a foundation for future years of participation.

3.1 Participation

3.1.1 Teams participating in the Soccer League cannot compete in Free Kick League or Goalie League.

3.2 General

3.2.1 All rules of the full game (Section 4) as well as other sections apply unless they are in direct contradiction to the specific rules below.

3.2.2 No wireless communication is allowed whatsoever. This overrides Rule . As there is only one robot at a time, there is no reason for active wireless communications in this division.

3.3 Free Kick League

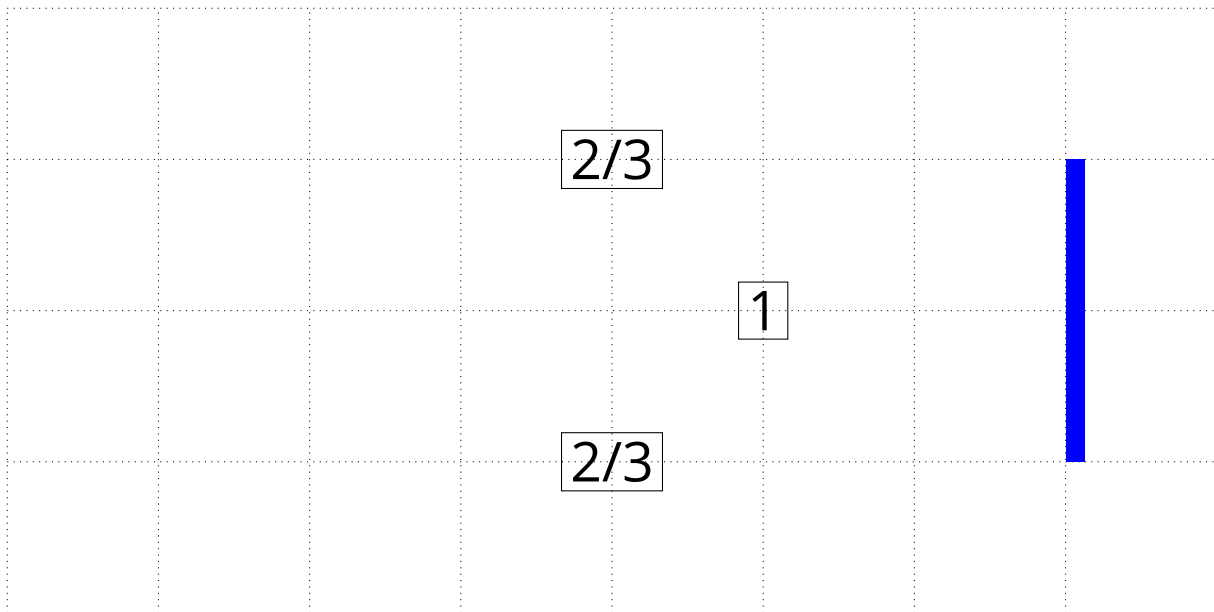
3.3.1 There will be 3 levels of differing difficulty (referred to as difficulty 1, 2 and 3).

3.3.2 For each level of difficulty, there will be two free kicks.

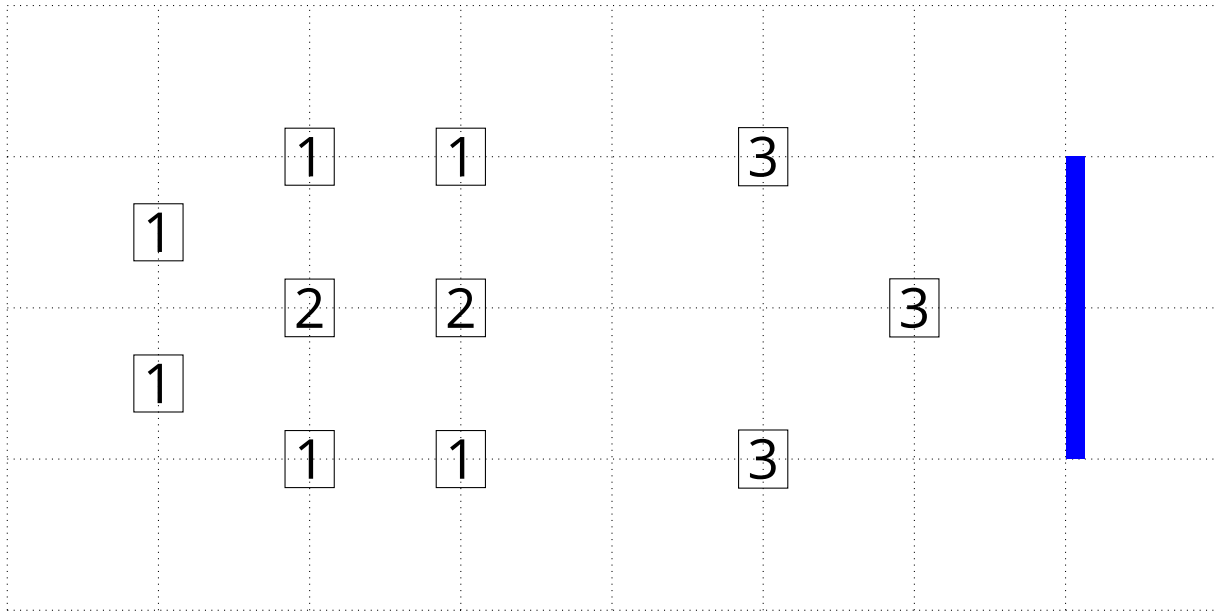
3.3.3 Each attempt at a free kick will be given at max 30 seconds.

3.3.4 There will be only 1 goal, colored blue.

3.3.5 The initial ball position will be determined by a dice roll under the following schema, where the placement of a number (1, 2, or 3) represents a possible placement of the robot for the given difficulty level.



3.3.6 The initial robot position will be determined by a dice roll under the following schema, where the placement of a number (1, 2, or 3) represents a possible placement of the robot for the given difficulty level.



3.3.7 The starting direction will be decided upon by the referee. The method of deciding the direction will be unbiased and uniform across all teams' attempts.

3.3.8 Scoring The Free Kick League score will be the number of successful free kicks weighted by the difficulty (1 point for difficulty 1, 2 for difficulty 2, etc).

3.3.9 In the case of a tie, the team with the lowest combined time will win.

3.4 Goalie League

3.4.1 There will be 3 levels of differing difficulty (referred to as difficulty 1, 2 and 3).

3.4.2 For each level of difficulty, there will be two blocking attempts.

3.4.3 The speed of the ball is determined by the difficulty level - the higher the difficulty, the higher the speed. 1 - .25 m/s; 2 - .5 m/s; 3 - 1 m/s

3.4.4 The ball speeds mentioned in Rule 3.4.3 are subject to a $\pm 10\%$ margin of error

3.4.5 For each attempt, the ball will be rolled from a random location 100cm away from the wall corresponding to the goal.

3.4.6 Both goals will be present.

3.4.7 At the start of each attempt, players may place the robot down at any position within a penalty box.

3.4.8 The robot will defend the goal associated with the penalty box it's placed in.

3.4.9 Scoring The Goalie League score will be the number of successful blocks weighted by the difficulty (1 point for difficulty 1, 2 for difficulty 2, etc).

3.5 Full Game League

3.5.1 See Section 4

4 FULL GAME

TBD

For those not participating in the Free Kick or Goalie league (see Section 3), there will be a full soccer game competition. Each team will have one striker and one goalie robot on the field. Teams will compete by trying to dribble and kick the ball into the opponent's goal. The exact rules are to be determined and will come out with the full release of the rules.

5 TECHNICAL INTERVIEW

Introduction

There will be a technical interview that involves the answering of questions in front of a panel of judges and engineering journal/documentation submission. Details will come with the full release of the rules.

6 CODE OF CONDUCT

6.1 Individual Work

6.1.1 All work must be done by the competing team members.

6.1.2 Work from departed team members and mentors are not allowed.

6.1.3 Teams may not be given technical assistance by mentors at the venue of the competition.

6.1.4 All hardware and software design must be of the team members' own making. Competitors may not use another party's robot design or code (excluding device drivers and such).

6.1.5 Any teams found to have gotten outside help, whether it is displayed in the technical interview or otherwise, may be subject to penalty or disqualification.

6.2 Behavior

6.2.1 Competitors are expected to act with courtesy and sportsmanship at all times, with the mindset of learning, not winning.

6.2.2 Disrespectful behavior against other teams, spectators, judges, or staff will not be tolerated.

6.2.3 Actions that impact the operation of opposing robots are strictly prohibited.

6.2.4 Competitors are expected to respect all the rules of the competition fully. If a rule is unclear, competitors must contact the organizers for clarification or else it will be at the organizer's discretion whether or not a rule is violated.

6.2.5 Design features or actions that obviously and intentionally circumvent the spirit of the competition are not allowed, even if not explicitly stated in the rules.

6.2.6 Failure to behave in an appropriate manner may yield a penalty or disqualification.

A COMMITTEES

Technical Committee

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B ALLOWED HARDWARE DEVICES

B.1 Sensors

B.1.1 TBD

B.2 Cameras

B.2.1 TBD