

## "WRO GEN II FOOTBALL" CONTEST RULES

Version 1.1 dated April 04, 2015  
Based on the [robolymp.ru](http://robolymp.ru) version

### 1. Playing field and ball

#### 1.1. Field

1.1.1. Field schema is shown in the Figure 1. Playing field for competitions has the following dimensions – 122 cm x 183 cm. Along the perimeter of the field it is drawn the border – white line with width of 30 cm.

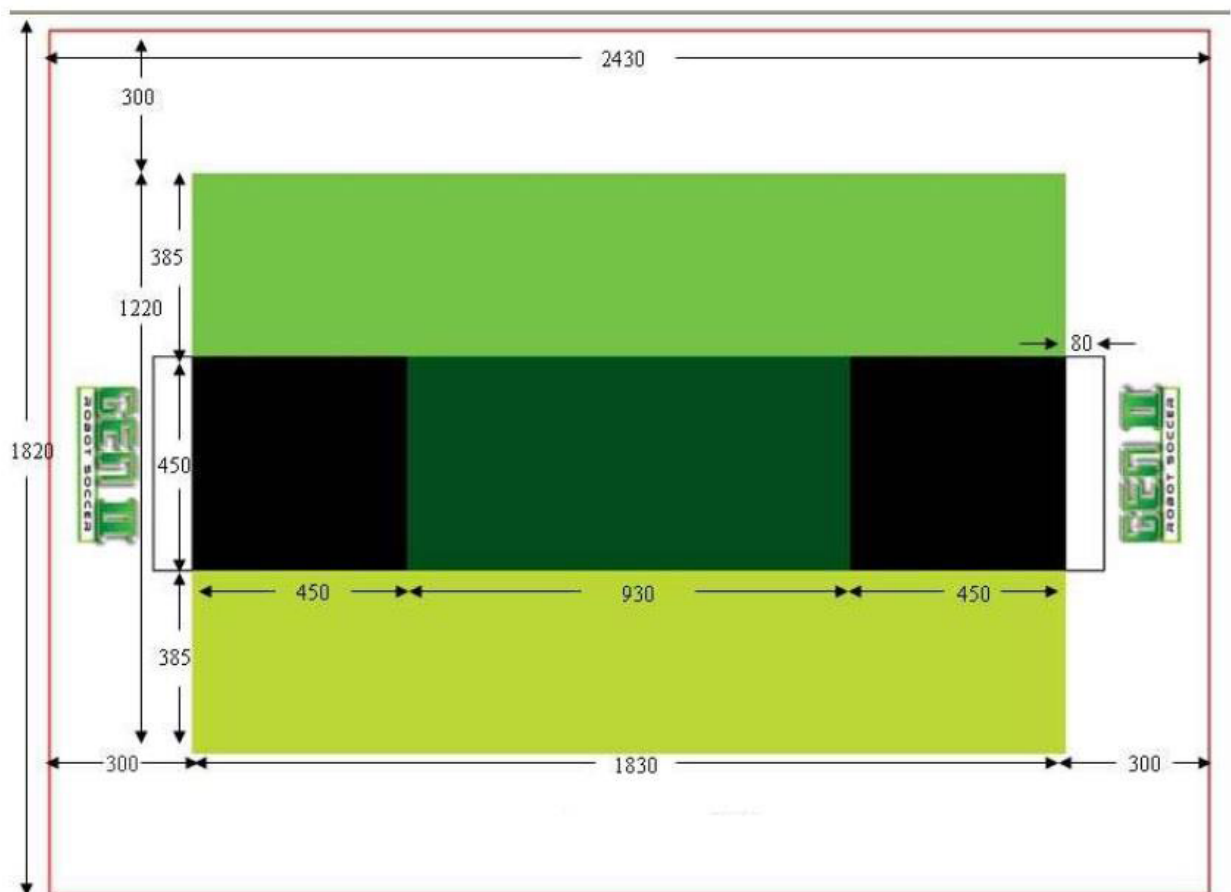


Fig. 1. Playing field

- 1.1.2. Playing field surface is a vinyl covering (with printed markings on it) which has a matte surface that prevents slip. It can be purchased on the Modern Teaching Aids.
- 1.1.3. The central part of the playing field shall be flat and horizontal. All white borders including borders on the field's ends shall be elevated towards to outer sides on 1 cm (tilt allows a ball to roll down from the top side point to the nearest end of the dark-green zone).

- 1.1.4. The playing field shall be placed on the cover bedding. Recommended thickness of the used cover bedding is 3 mm. Tips for assembling fields for competitions or practicing are available at the [www.robocupjunior.org.au](http://www.robocupjunior.org.au) website.
- 1.1.5. The field can be placed on a wooden or plastic table or on the floor. You should check the electromagnetic environment, if the field is on the floor or on a table with metal legs.

## 1.2. Fencing walls

- 1.2.1. Matted black fencing walls are placed along perimeter of the field and behind the goals.
- 1.2.2. Fencing walls should be higher than the playing field at least at 8 cm.
- 1.2.3. Fencing walls can be manufactured from the various non-metallic materials, as they do not effect match.

## 1.3. Goals

- 1.3.1. Goals width is 45 cm.
- 1.3.2. Back and side walls of the goals should be painted from the inside in azure R color: 80 G:220 B:250. The floor inside the goals is white. Outer part of the goals shall be painted in matted black color.
- 1.3.3. Depth of the goals is 7.4 cm.
- 1.3.4. Goals should have black horizontal bar, installed at a height of 14 cm above the field surface.
- 1.3.5. The field surface inside the goals should be flat and horizontal.
- 1.3.6. Side walls of the goals should reach the field walls in order to avoid slotting a ball beyond the goals.

## 1.4. Illumination and magnetic fields

- 1.4.1. Teams shall be prepared to calibrate their robots according to the illumination and magnetic environment in the place of competitions. The organizers will try to maintain the minimum possible level of infrared radiation, as well as arrange the gaming field as far as possible from magnetic field emitters such as wiring and metal objects. Though sometimes it is not possible.
- 1.4.2. Teams are recommended to provide in the robot construction the possibility to act successfully under alternating illumination and magnetic field environment, since they can differ dependent on place of competitions.

## 2. Ball

### 2.1. Technical specification

- 2.1.1. It should be used in the game balanced electronic ball of 7.4 cm diameter.
- 2.1.2. Hitechnic (IRB 1005) infrared electronic ball in pulse mode -MODE D (pulsed) will be used in all tournaments. 2.2. Ball suppliers
- 2.1.3. Official ball for all tournaments will be Hitechnic Infrared Electronic Ball (IRB1005).

## 3. Robots

### 3.1. Dimensions

- 3.1.1. Robot dimensions shall be defined in the “standing posture” without any rest and with all its movable parts maximum prominent.
- 3.1.2. A robot in the “standing posture” should fit in a vertical cylinder with an internal diameter of 22 cm.
- 3.1.3. Height of a robot should be 22 cm min.
- 3.1.4. Weight of a robot should be 1 kg max.
- 3.1.5. If the robot is equipped with moving part that protrude in two directions this robot should be checked during an operation of this part. At that the robot shall not touch walls of the check cylinder.

### 3.2. Construction

- 3.2.1. Robots participating in Robot football should conform with the following requirements:
  - 3.2.1.1. Robots shall be built of only LEGO branded elements.
  - 3.2.1.2. Controller, motors and sensors that are used to build the robots should be of LEGO ® MINDSTORMS sets and HiTechnic brand (HiTechnic NXT IRSeeker V2 and HiTechnic NXT Compass sensors).
  - 3.2.1.3. WRO recommends to use LEGO MINDSTORMS educational courses, as LEGO distributors provide a wide range of services.
  - 3.2.1.4. It is prohibited to use modified LEGO elements.
  - 3.2.1.5. It is prohibited to use glue, adhesive tape, screws or any other materials for robots building.
  - 3.2.1.6. Tie wraps or adhesive tape can be used to fasten the wires.
  - 3.2.1.7. It is prohibited to use omni-wheels.
  - 3.2.1.8. Only LEGO ® MINDSTORMS™ EV3, ROBO LAB or LEGO ® MINDSTORM-STM NXT can be used as control programs.
  - 3.2.1.9. Any programming on the C base is prohibited. This paragraph is valid only for the international phase of the WRO. It is allowed to use any software at the Russian stage of Russian Robotic Olympiad 2015.
- 3.2.2. Robots shall be built within the time given to their building and debugging at the day of competition. All robot’s elements should be in the initial state (all elements separately) prior to the time of building and debugging. Robots can undergo changes during competitions. Robots shall be placed in a quarantine zone at night (between days of competitions) and may not leave the competition area until they have finished participating in competitions, unless otherwise stated by organizers of the Russian stage of Russian Robotic Olympiad 2015.
- 3.2.3. A handle should be put in robots construction in order for referees could easily take robots. Restrictions on the height of the robot do not apply to this handle. Handles can be made of non-LEGO brand elements.

## 3.3. Control

- 3.3.1. Robots shall be capable to operate autonomously.
- 3.3.2. Robots shall be started manually.
- 3.3.3. It is prohibited to use robot remote control systems.
- 3.3.4. Robots shall be capable to move in all directions.
- 3.3.5. It is allowed to use BlueTooth connection in order for robots to communicate data to each other but only in case it doesn't affect the other robots functionality.
- 3.3.6. Robots shall have the possibility to switch off their communication devices at a referee request.

## 3.4. Identification and colors

- 3.4.1. Competitors shall identify (mark, decorate) their robots in the way that their belonging to the same team is visible. It should not affect the match. Restrictions on the height also do not apply to robot decoration.
- 3.4.2. Colors of robots and light they emit should not effect on sensors of other robots.

## 3.5. Team

- 3.5.1. All teams should have two robots max. Any replacements or shared usage of robots by several teams during competitions is prohibited and would lead to the disqualification.

## 3.6. Ball capture zones and moving areas

- 3.6.1. Ball capture zones are any internal space on the playing field within the area limited by the straight edge applied to the robot prominent parts.
- 3.6.2. The ball may not penetrate in the capture zone more than for 2 cm.
- 3.6.3. Robot may not hold the ball.

Remark: Holding the ball means the full ball control using blocking of all ball's degrees of freedom. For example, if the robot press the ball to its body or cover it with any of its elements, making difficult the access to the ball for other robots. The robot is considered holding the ball, if the ball stops rotating when the robot dribbles the ball or if the ball doesn't bounce when hitting in the robot.

- 3.6.4. Robot is prohibited to hold the ball under itself, in other words, no part of the robot shall overlap the ball more than half of the ball diameter.

## 3.7. Goalkeepers

- 3.7.1. If your team uses goalkeeper, it is not enough for goalkeeper to move in only one direction. The goalkeeper shall be able to move in any direction on the field. It must be programmed on the movement in all directions.
- 3.7.2. The goalkeeper shall react at the ball by moving forward in order to tackle the ball before it gets into the goals. If necessary some parts of the robot-goalkeeper may move outside the scoring area it is ideal (45 cm from the goals). Remark: the goalkeeper shall not react at the ball by moving aside and then forward.
- 3.7.3. If the robot goalkeeper doesn't move forward towards the ball, it will be considered as Fault (Paragraph 4.7).

## 4. Matchmaking

### 4.1. Pre-settings

- 4.1.1. Organizers allow access to the playing field to set up and check the robots before competition start according to the schedule that will be published at the competition beginning.
- 4.1.2. Organizers will try to give at least 10 minutes to check the settings of the robots before each game.
- 4.1.3. At the same period the teams can advance a claim against competitors' robots.

### 4.2. Game duration

- 4.2.1. The match will consist of two 10 minutes periods. According to the Competition organizing committee the period duration in some cases can be decreased to 5 minutes.
- 4.2.2. It is provided 5 minutes break between periods.
- 4.2.3. The stop-watch will be switched on for the full game duration (two 10 minutes periods), without stopping the time (excluding time-outs, taken by the referee - see paragraph 4.6.10).
- 4.2.4. According to the referee decision the team can be penalized by one goal for one minute late attendance.
- 4.2.5. If the team will not be ready for the game in 5 minutes after its starting the team will be considered as loosed the game with the score of 0-5.
- 4.2.6. If goals difference in the match achieves 10, the match will be ended. The losing team may decide to continue the match, but the score will remain unchanged.

### 4.3. Game start

- 4.3.1. Before each match period the referee will spin a coin, and the first team in the list shall make a choice of heads or tails and announce it when the coin is still in the air
- 4.3.2. Lottery winner can choose when to have the first kickoff right: at the start of the first or the second period.
- 4.3.3. The team, that has not the first kickoff right in the first period, will do this in second period.

### 4.4. First kickoffs

- 4.4.1. Each period starts with the first kickoff.
- 4.4.2. All robots shall be on their half of the playing field.
- 4.4.3. Robots shall not be started.
- 4.4.4. The referee places the ball at the center of the playing field.
- 4.4.5. The team having the first kickoff right places its robots on the field first. At that robots shall not move.
- 4.4.6. Robots of the team that do not do the first kickoff, should be within the scoring area.

- 4.4.7. On a referee signal all robots shall be immediately started by the members of the teams.
- 4.4.8. Robot that have the first kickoff should produce a distinctive kick at the ball so that it rolls over a distance of at least 5 cm from the robot or the robot should start being at a distance of 5 cm from the ball. Wrong first kickoff will cause the kickoff right move to another team.
- 4.4.9. Any robot, that has started the game before the referee signal, will be out for one minute.

## 4.5. Scoring

- 4.5.1. Goal will be scored if the ball entirely crosses the goal line. I.e. the ball shall hit the back goals wall. If a goal is scored, the referee whistles.
- 4.5.2. The penalty goal is scored if the ball sneaking into the goals gets into the robot from defensive team, and part of this robot was behind the line of the goals or inside it. Remark: it is recommended to construct robots so that the bar prevents its movement behind the goal line.
- 4.5.3. It shall be a ball kickoff after a goal is conceded. The kickoff is produced by a team conceded a goal.
- 4.5.4. Own goal will be scored in favor of the opponent team.

## 4.6. Blocking

- 4.6.1. Blocking is made in cases when the ball is sticked between between several robots for a long period of time and in the foreseeable nothing can change it, or if none of the robots can detect the ball for a long period of time.
- 4.6.2. Referee signals "Blocking" immediately, as soon as a robot begins to use more power to push the ball through the opponents block.
- 4.6.3. If the referee signals "Blocking", and as a result of the power pushing a goal is conceded, the goal is canceled.
- 4.6.4. Any stuck robots will be immediately returned to the scoring area of its team. Some part of the robot shall be within the scoring area.
- 4.6.5. Robots are allowed to be left movable.
- 4.6.6. The referee will put the ball on the top of the slope in the center of the long side of the field, where from the ball will roll toward the center of the field.
- 4.6.7. Robots can start moving only when the referee releases the ball on the field and whistles.
- 4.6.8. Robots that may not proceed to the game immediately will be declared fault.
- 4.6.9. Robots that started moving before the whistle, will be removed from the field for 1 minute and declared fault (see paragraph 4.7).
- 4.6.10. If the robot was damaged as a result of robots separation, the referee stops the game and game time count for the period up to 2 minutes, until the robot is repaired (see paragraph 4.9.4 "Referees Time Outs").
- 4.6.11. The referee may announce a time out ("Referees Time Out") to repair the playing field and also in the cases described in Paragraph 4.6.9 or 4.9.3, or if the referee is called to clarify the competition rules. If the game brake is expending, the referee can decide to stop the game time count.

## 4.7. Fault robots

- 4.7.1. If the robot is not able to move independently and/or do not respond to the ball, the referee declares that robot as fault.
- 4.7.2. If one robot stays in the goals more than 20 seconds or is stuck opposite the goals walls and «is not going to» return to the playing field, the referee declares that robot as fault. Remark: A small move in the opposite direction, set in a program, usually helps to free up the robot.
- 4.7.3. The referee or players (after referee permission) can remove the fault robot (or robots) from the playing field.
- 4.7.4. The fault robot shall stay outside the playing field for at least one minute or until the next goal is conceded.
- 4.7.5. The fault robot may be repaired and by authorization of the referee returned to the neutral zone that is nearest to the goals that it defends and provides no advantages for the returned robot, for example placing it opposite to the ball. Goalkeepers are allowed to be returned in any place in front of the goals.
- 4.7.6. The game continues during the removal, repair or return of the robot. Note that the referee may decide to stop the game if the robot was damaged in a collision with a robot from competitors team.
- 4.7.7. If the robot overturned “itself”, it will be considered as fault and removed from the field. If the robot is overturned after collision with other robot the referee can put it «on its feet» again and the robot will continue to play.

## 4.8. Multiple defense

- 4.8.1. Multiple defense means the situation when more than one robot of the defending team enter the scoring area and exert decisive effect on the game.
- 4.8.2. Robot, which is included in the multiple defense and makes the least contribution to the game, is placed at the center of the field. If one of these robots is the goalkeeper, the other robot will be moved to the center of the field.

## 4.9. Infraction

- 4.9.1. If the robot uses a device or an action by means of which regularly attacks robots that do not possess the ball, the referee fixes infraction. In that case the team captain shall remove this robot from the playing field minimum for one minute and clear the problem; after that the game will be resumed (according to the paragraph 4.7 “Fault robots”).
- 4.9.2. If the robot continues to foul it will be constantly removed from the field, the warning yellow sticker will be hung on it and the referee will record these fouls in the match report.
- 4.9.3. If the robot was damaged as a result of the foul, the referee stops the game and game time count for the period up to 2 minutes, until the robot is repaired (see paragraph 4.6.10 “Referees Time Outs”).
- 4.9.4. If the robot was removed from the game due to fouls in two matches, it will be disqualified for the whole competition.

## 4.10. People participation

- 4.10.1. Moving robots by people during the game is not acceptable.

- 4.10.2. People may move robots only in case of referee permission.
- 4.10.3. Before game start the teams shall assign captain who will be allowed to place, remove and rearrange robots during the games in accordance with the rules and directions of the referee.
- 4.10.4. Other team members can start one robot, but after that they are not allowed to be within the playing field. They shall not approach to the playing field for one meter max. as long as the ball is in the game except the cases specified by the referee.

## 5. Contention resolution

### 5.1. Referee

- 5.1.1. During the game the referee makes the final decision. Any disagreement with the referee decision is penalized with the warning yellow card. If after that the conflict is not resolved the referee shows a red card that results for the team in losing the game.
- 5.1.2. If the teams captains agree with the game result, they sign the match report as the game is completed.
- 5.1.3. Any protests after the game are accepted only if the game result is supposed to be incorrect or cause doubts. No protests are accepted after the match report is signed.

### 5.2. Clarification of the rules

- 5.2.1. Rules can be clarified by referee committee members.
- 5.2.2. If it is necessary to clarify the rules the referee shall immediately stop the game, take a time out (see paragraph 4.6.10), stop the game time count and affirm a decision before game resuming.

### 5.3. Exceptional circumstances

- 5.3.1. Special corrections may be made in competitions rules during competitions and under agreement of counter parties in exceptional circumstances such as unforeseen situations and/or robots technical difficulties.

## 6. Checks

### 6.1. Technical checks

- 6.1.1. All robots will be checked by the referee committee at each competition day start to ensure that all robots comply with the requirements specified in Section 3.
- 6.1.2. The teams are obliged to provide their robots for recheck if their robots construction has been changed during the competition. The changes also include damages or conversions of robots during the game. Any team caught to use during the game a robot that does not comply with the rules of competition will be scored a loose.
- 6.1.3. Any violation found during checks prohibits robot to participate in competitions until the violation is fixed.



- 6.1.4. Changes shall be made within the specified period of time and the teams shall not delay the game.

## 6.2. Design of a robot

- 6.2.1. Design and programming of robots shall be performed only by the participants.
- 6.2.2. Participants will have an interview where they explain their robots operation, to ensure that they built and programmed robots themselves.
- 6.2.3. Participants will be asked the questions concerning how they carried out the preparatory works. It will be a questionnaire and recording the video interview that are necessary for research purposes.
- 6.2.4. It is necessary to provide the evidences of full understanding of the presented program.
- 6.2.5. It is suggested the competition organizers will conduct this test interviews before final games beginning.
- 6.2.6. If it is found that a participant had significant assistance of the teachers during robot building or that a robot development was carried out mostly not by participants the team will be disqualified from competitions.

## 7. Code of behavior

### 7.1. Fair play

- 7.1.1. Robots, that during the game intentionally and repeatedly cause the damages to other robots, will be disqualified (see paragraph 4.11 “Rules violation”).
- 7.1.2. Robots that damage the field or the ball during the game will be disqualified (see paragraph 3.8).
- 7.1.3. People that intentionally effect on any robots or damages the playing field or the ball will be asked to leave the building, where competitions are held.
- 7.1.4. It is suggested that the aim of all teams is fair “robotics football” play.

### 7.2. Competitors behavior

- 7.2.1. The behavior of the competitors must match the type of competition.
- 7.2.2. Competitors shall not enter set up sites of other leagues or teams excluding the cases when they are directly invited.
- 7.2.3. Competitors that behave improperly may be asked to leave the place of competition and they risk to be disqualified.
- 7.2.4. These measures are applied with the agreement of referees, competition organizers, supervisors and local authority representatives.

### 7.3. Mentors

- 7.3.1. Mentors (teachers, parents, accompanying persons and other adults) are not allowed to enter competition area.
- 7.3.2. Mentors have no right to participate in robot repair or programming carried out by the participants. It is prohibited to carry away robots and computers from competition area during the days of competitions.

7.3.3. Intervention by mentors in the work of the robot can lead to penalty by referees' decision with the warning yellow card. In case of these fouls repeating it will be shown a red card and the rule - breaker will be asked to leave the place of competitions.

## 8. History of rules modifications

### 8.1. Version 1.1

8.1.1. The version is created at April 30, 2015 on the basis of the rules of the ro-bolymp.ru site