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## Junior Soccer

### Soccer Rules (2008)

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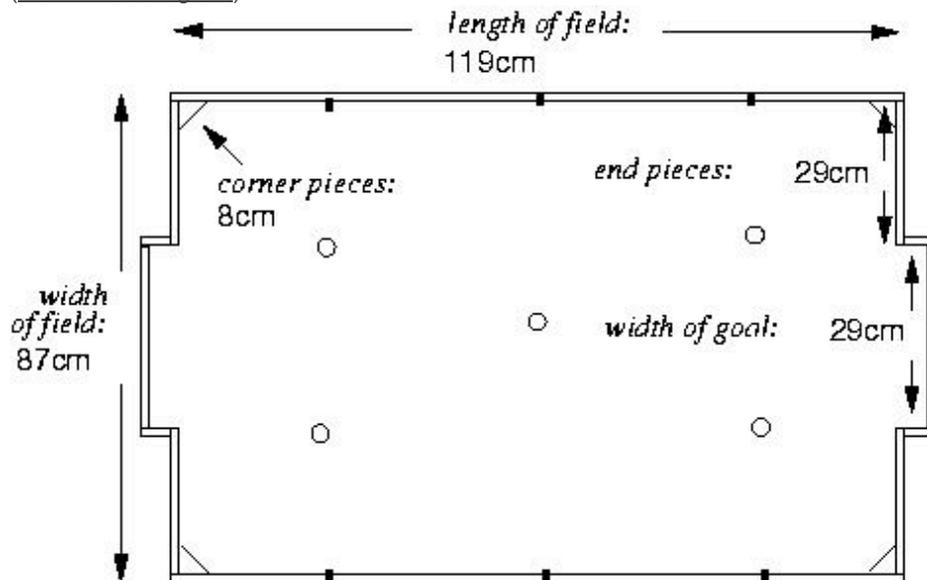
Last updated: Feb 11th 2008 by Sebastian Polly, Brian Thomas, Tairo Nomura, Sumon Azhar

Note: Changes from 2007 rules are highlighted in red.

### 1. Playing Field.

1.1.1. The playing field for the 1-on-1 League is 87 cm by 119 cm (oversize A0).

(1-on-1 field diagram)



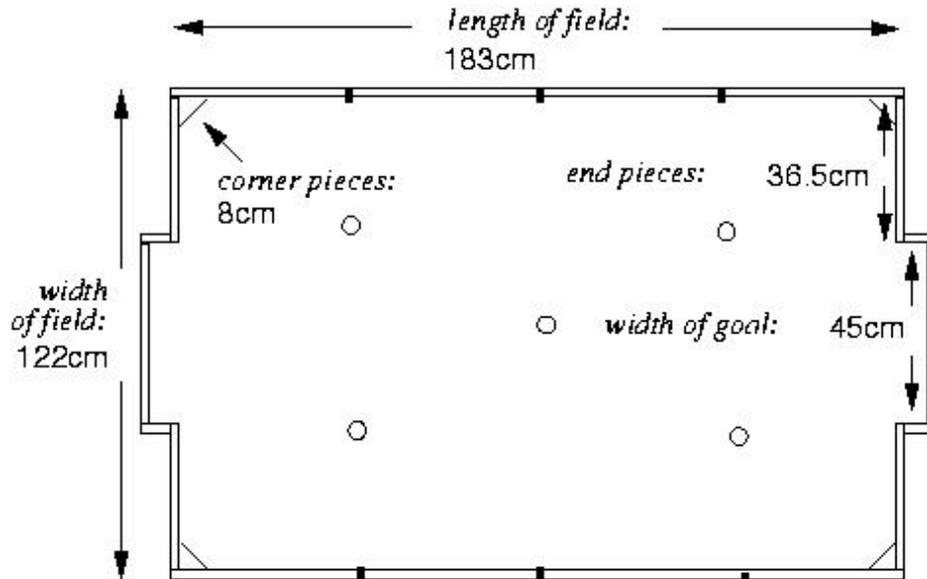
*height of walls:* 14cm  
walls are painted black  
goals are painted grey

*greyscale on floor:*  
perfect greyscale from white to black

*neutral spots:*  
5 virtual circles: 1 in the center of the field,  
4 located a goal width along the long edge, aligned with each goal post

1.1.2 The playing field for the 2-on-2 League is 122 cm by 183 cm.

(2-on-2 field diagram)



**height of walls:** 14cm  
 walls are painted black  
 goals are painted grey

**greyscale on floor:**  
 15cm band of white along width of one end  
 15cm band of black along width of other end  
 perfect greyscale from white to black in between

**neutral spots:**  
 5 virtual circles: 1 in the center of the field,  
 4 located a goal width along the long edge, aligned with each goal post

1.1.3. As shown in the diagrams, each corner is a triangle of 8cm on each of the sides parallel to the walls.

## 1.2. Floor.

1.2.1. The floor of the playing field is covered with a printed, matte greyscale. See your national web site for local suppliers.

1.2.2. The playing field should be placed so that it is flat and level. The field may be placed on a table or on the floor.

*Hint: It is recommended that teams design their robots to cope with slight imperfections up to 3mm on the surface.*

## 1.3. Walls.

1.3.1. Walls are placed all around the field, including behind the goals.

1.3.2. The walls are 14 cm high.

1.3.3. The walls are painted matte black.

## 1.4. Goals.

1.4.1. The width of each goal for the 1-on-1 League is 29 cm, centered on the shorter end of the field.

1.4.2. The width of each goal is 45 cm, centered on the shorter end of the field.

1.4.3. The back, sides and floor of the goal (inside the field) are painted matte grey: 75% matte white and 25% matte black.

## 1.5. Neutral Spots.

1.5.1. There are five (5) neutral spots defined in the field.

1.5.2. One (1) is in the center of the field.

1.5.3. Four (4) are adjacent to each corner, located a goal width along the long edge of the field, aligned with each goal post; i.e., for the 1-on-1 League, 29cm towards the middle of the field from each goal post (see drawing in 1.1.1); for the 2-on-2 League, 45cm towards the middle of the field from each goal post (see drawing in 1.1.2).

1.5.4. The neutral spots are positions on the field where the referee can place robots or the ball in case play is interrupted (see Interruption of Game Play).

1.5.5. The spots are marked by a small blue cross on the floor of the field.

1.5.6. The ball is to be placed on the goal neutral spots if an interruption occurs while it is in the goal area. The ball is placed in the central neutral spot if an interruption occurs while it is in the Centre Area. See the diagram in 1.1.1 or 1.1.2

## 1.6. Lighting and Magnetic Conditions

1.6.1. Teams must come prepared to calibrate their robots based on the lighting and magnetic conditions at the venue. Every effort will be made by organizers to keep light levels as low as possible and locate soccer fields away from magnetic fields such as under floor wiring and metallic objects. However sometimes this cannot be avoided.

*Hint: It is recommended that teams design their robots to cope with variations in lighting and magnetic conditions, as these vary from venue to venue.*

## 2. Robots.

### 2.1. Dimensions.

2.1.1. Robots will be measured in an upright position and with all parts fully extended.

2.1.2 For the 1-on-1 League the robot must fit inside an upright 18cm diameter cylinder.

2.1.3. For the 2-on-2 League, the upright robot must fit inside an upright 22cm diameter cylinder.

2.1.4. The robot height must be 22cm or less.

2.1.5. The robot's total weight must not exceed the following limits:

secondary 2on2:	2.5 kg
secondary 1on1:	2.0 kg
primary 2on2 or 1on1:	1.5 kg

### 2.2. Control.

- 2.2.1. Robots must be controlled autonomously.
- 2.2.2. Robots must be started manually by humans.
- 2.2.3. The use of remote control any kind is not allowed.

### **2.3. Marking/Coloring.**

- 2.3.1. Competitors are required to mark or decorate their robots to identify them as belonging to the same team.
- 2.3.2. Colors of robots and/or light transmitters must not interfere with the light sensors readings of other robots.

### **2.4. Team.**

- 2.4.1. For the 1-on-1 League, a team shall consist of one and only one (1) robot.
- 2.4.2. For the 2-on-2 League, a team shall consist of no more than two (2) robots.

### **2.5. Construction.**

- 2.5.1. Any robot kit or building block, either commercial or from raw hardware may be used, as long as the robot fits the above specifications and as long as the design and construction are primarily and substantially the original work of the student(s) (see section 4.3).
- 2.5.2. Robot pieces may be permanently attached with glue, screws, etc.

### **2.6. Ball Capturing Zones.**

- 2.6.1. Ball Capturing Zones are defined as any internal space created when a straight edge is placed on the protruding points of a robot.
- 2.6.2. The ball cannot penetrate the Ball Capturing Zone by more than 2cm.

### **2.7. Goalies (2-on-2)**

- 2.7.1. If a goalie is used in 2-on-2, it cannot limit its movement to a single direction on the field. It must be programmed to move in all directions.
- 2.7.2. The goalie must respond to the ball in a forward direction in an attempt to intercept the ball ahead of the goal. If required, its movement should be able to take some part of the robot past the Neutral Spots (45 cm from goal).  
The goalie cannot respond sideways and then with a forward movement.
- 2.7.3. Failure to respond to the ball with forward movement down the field will result in the robot being classified as "Damaged." (Section 5.10)

### **2.8. Kickers and Robot Power**

- 2.8.1. If a robot damages a ball or the field, or two colliding robots damage a ball, they will be removed from play and treated as damaged robots.  
If the referee considers one robot to be significantly more aggressive than the other in a collision that breaks the ball , they can choose to remove one robot from play.
- 2.8.2. Adjustments must be made to the robot/s to prevent this from recurring. **A yellow warning sticker will be placed on the robot/s and the referee will record the infringement on the score card.**

2.8.3. If a robot infringes again during the tournament, **it can be disqualified from the tournament.**

*If a robot has the power to damage an officially accepted RoboCupJunior Soccer ball(See 3.2.1 and 3.2.2), it is a strong indication that the robot has been built with excessive power and the intention to damage other robots. The robot has not been built with the ideals of RoboCupJunior and fair competition in mind, so the tournament committee has every right to remove that robot from the competition.*

### **3. Ball.**

#### **3.1. Specification.**

3.1.1. A well-balanced electronic ball shall be used.

3.1.2. The ball will transmit infra-red (IR) light.

3.1.3 The ball will be checked for any damage by the referee before each half of the game is started.

#### **3.2. Suppliers.**

There are two electronic balls that have been approved by the RoboCupJunior Technical Committee. Both are similar in performance and either can be used at RoboCupJunior tournaments.

3.2.1. IR Roboball MK2 made by Wiltronics (order on-line from:  
<http://www.wiltronics.com.au/catalogue/shop.php?cid=339>).

3.2.2. RoboSoccer RCJ-04 ball made by EK Japan (email: [info@elekit.co.jp](mailto:info@elekit.co.jp))

*The official ball for Suzhou 2008 will be the either of the approved balls. Teams should note that the Roboball ball has a thinner casing than the Elekit ball and robot power should be controlled otherwise there is a risk of disqualification according to Rule 2.8*

### **4. Inspection.**

#### **4.1. Schedule.**

4.1.1. The robots will be examined by a panel of referees before the start of the tournament to ensure that the robots meet the constraints described above.

4.1.2. It is the responsibility of teams to have their robots re-inspected if their robots are modified at any time during the tournament.

#### **4.2. Robot configuration.**

4.2.1. While being inspected, each robot must be upright and at its maximum size; i.e., anything that protrudes from the robot must be fully extended. If a robot has a moving part that extends in two directions, it will need to be inspected with this part operating. The robot must be able to operate without touching the measuring cylinder.

#### **4.3. Students.**

4.3.1. Students will be asked to explain the operation of their robots in order to verify that the construction and the programming of the robot is their own work.

4.3.2. Students will be asked questions about their preparation efforts, and they will be requested to answer surveys and participate in video-taped interviews for research purposes.

4.3.3. Commercial kits may be used but **must be substantially modified** by the students.

4.3.4. Proof must be supplied that robots are constructed and programmed by the students.

4.3.5. Any team that has original construction of robots or sensors (not commercially available ) must supply full documentary proof that the developments were wholly the work of the students according to Section 4.3.1. This will be in the form of a log book describing all stages of design, development and construction.

4.3.6. It is expected that all teams should attend a short verification interview prior to all events.

#### **4.4. Violations.**

4.4.1. Any violations of the inspection rules will prevent that robot competing until modifications are effected.

4.4.2. However, modifications must be made within the time schedule of the tournament and teams must not delay game play while making modifications.

4.4.3. If a robot fails to meet all specifications (even with modification), the robot will be disqualified for that game (but not the tournament).

4.4.4. If there is excessive mentor assistance or the work on the robots is not substantially original work by the students, then the team will be disqualified from the tournament.

### **5. Game Play.**

#### **5.1. Pre-game setup.**

5.1.1. Organizers will provide access to the competition area for calibration and testing prior to the competition and according to a schedule that will be made available at the start of the event

5.1.2. Organizers will make every effort to allow at least 10 minutes of setup time before each game.

#### **5.2. Length of Game.**

5.2.1. The game will consist of two 10-minute halves.

5.2.2. There will be a 5-minute break in between the halves.

5.2.3. The game clock will run for the duration of the game (two 10-minutes halves), without stopping (except as noted in Damaged Robots).

5.2.4. The game will run on a central time clock.

5.2.5. Teams can be penalized one goal per minute at the referee's discretion if they are late.

5.2.6. If a team does not report within 5 minutes of the game start, it will forfeit the game and the winning team awarded a 5-0 score line.

#### **5.3. Start of Game.**

5.3.1. At the start of the first half of the game, the referee will toss a coin and the team first mentioned in the draw shall call the coin while it is in the air.

5.3.2. The winner of the toss can choose either (a) which end to kick to, or (b) to kick off first.

5.3.3. The loser of the toss will decide the other option.

5.3.4. The team not kicking off in the first half of the game will kick off to begin the second half of the game.

#### **5.4. Kick-Offs.**

5.4.1. Each half of the game begins with a kick-off.

5.4.2. All robots must be in located on their own side of the field.

5.4.3. All robots must not be running.

5.4.4. The ball is positioned by the referee in the center of the field.

5.4.5. The team kicking off places their robots on the field first. Robots cannot be placed nor remain behind the goal line. **Robots cannot be moved once they have been placed.**

5.4.6. The team not kicking off will place their robots on the defensive end of the field.

5.4.7. All robots on the team not kicking off must be at least 30cm away from the ball.

5.4.8. The referee may adjust the placement of the robots.

5.4.9. On the referee's command, all robots will be started immediately by human team members.

5.4.10. Any robots that are started before the referee will be removed from the field and treated as a damaged robot. (See 5.10.5)

#### **5.5. Humans.**

5.5.1. In general, movement of robots by humans is not acceptable.

5.5.2. Humans can only move robots at the instruction of the referee.

5.5.3. Before the start of each match, teams should designate one human who will act as "Captain", and be allowed to start, place, remove and replace robots during the game, based on the stated rules and as directed by the referee.

5.5.4. Other team members within the vicinity of the playing field are to remain at least one metre from the field while the ball is in play, unless otherwise directed by the referee.

#### **5.6. Ball Movement.**

5.6.1. A robot cannot "hold" a ball.

Hint: Holding a ball means taking a full control of the ball by removing all of its degrees of freedom. For example, this would mean fixing a ball to the robot's body, surrounding a ball using the robot's body to prevent access by others, encircling the ball or somehow trapping the ball with any part of the robot's body. If a ball stops rolling while a robot is moving, or a ball does not rebound when rolled into a robot, it is a good indication that the ball is trapped.

5.6.2. The ball cannot be held underneath a robot.

5.6.3. The ball must be visible at all times.

5.6.4. Other players must be able to access the ball.

5.6.5 The only exception to rule 5.6.1 is the use of a rotating drum that imparts dynamic back spin on the ball to keep the ball on its surface. This is called a "dribbler".

5.6.6. A dribbler must comply with Rule 2.7 Ball Capturing Zones; i.e., the ball cannot penetrate under the dribbler for more than 2cm. The 2cm is measured from the contact point of the dribbler on the ball.

## 5.7. Scoring.

5.7.1. A goal is scored when the whole of the ball crosses the goal line. This coincides with the ball striking the back wall of the goal.

5.7.2. The ball must be free rolling to score a goal otherwise it will be deemed "pushed" by the referee and disallowed. In the event of a pushed goal, play will be stopped with the referee's whistle. The referee will explain the decision. The goal will not be allowed. The ball is replaced on the nearest available neutral spot and play is continued as for an "Interruption of Game Play"(5.8.2)

The robot must make a visible effort to kick or release the ball otherwise a goal will be deemed a "push". If no attempt is made to release the ball and it momentarily rolls free while in the control of a robot travelling towards goal, it will still be deemed a pushed goal.

5.7.3. The only exception to this is when a robot makes first contact, or a collision occurs with another robot with the ball less than 15cm in front of the goal.

5.7.4. The referee will blow the whistle when a goal is scored.

5.7.5. After a goal is scored, a kick-off will occur. The non-scoring team will be awarded the ball.

**5.7.6. A penalty goal will be awarded if a ball deemed to be travelling into the goal strikes a robot that has some part of it over the goal line and in the "in goal" area.**

5.7.7. "Own goals" will be treated as a goal to the opposition, even if the ball is "pushed" into the goal.

## 5.8. Interruption of Game Play.

5.8.1. The situations listed in sections 5.9-5.12 may cause play to be interrupted, usually resulting in the movement of the ball to a neutral position while play is allowed to continue.

5.8.2. Play may also be stopped by the referee blowing a whistle, but the game clock is not stopped, all at the discretion of the referee. All robots must be stopped immediately and returned to their position when the whistle was blown. The ball will be placed on the nearest Neutral Spot.

5.8.3. After a stoppage in play, play will resume on the referee's command and all robots are started simultaneously.

## 5.9. Lack of Progress.

5.9.1. This occurs if the ball is stuck between multiple robots("forcing" situation) or between robot(s) and the wall, consequently the ball is deemed by the referee to have no chance of being freed.

The referee can call "Lack of Progress" at any time and will call "Lack of Progress" immediately when a "forcing" situation arises. If a referee is slow to remove the ball and a goal is scored as a direct result of a robot using greater power to force the ball past the opposition, the goal will be disallowed and the ball placed on the nearest neutral spot.

5.9.2. Lack of Progress also occurs if the ball has not been touched by any robot for at least 20 seconds and it appears that no robots are likely to hit the ball.

5.9.3. In the case of Lack of Progress, the ball will be moved to the nearest unoccupied neutral zone according to section 1.5 (Neutral Zones).

5.9.4. When Lack of Progress is called, robots will be freed using minimal movement by the referee.

5.9.5. When Lack of Progress is called, any robots sitting behind the goal line will be moved forward out of the in goal area.

## **5.10. Damaged Robots.**

5.10.1. If a robot does not move for a period of at least 20 seconds and/or it does not respond to the ball, it will be deemed damaged by the referee.

5.10.2. If a robot continually returns to the area within the goals, it will be deemed damaged by the referee.

5.10.3. The referee or players may remove damaged robot(s) from the field.

5.10.4. A damaged robot must remain off the field for at least one minute

5.10.5. A damaged robot may be returned with the referee's permission to the neutral spot that is closest to the position on the field from where the robot was removed and does not advantage that robot.

5.10.6. Goalies may be returned to the area in front of the goal.

**5.10.7. Play may continue during removal, repair and replacement. Note that the referee may choose to interrupt play if robot damage occurred because of a collision with an opposition robot.**

5.10.8. If a robot turns over on its own accord, it will be treated as a damaged robot and removed. If the robot is tipped over after a collision with another robot, it can be righted by the referee and continue playing.

## **5.11. Multiple Defense(2-on-2 only) .**

5.11.1. Multiple Defense occurs if more than one robot from the defending side enters the region near the goal and substantially affects the game.

5.11.2. For a "Multiple Defense", the robot having the least influence on play is moved to the nearest neutral spot. In the case where a goalie is involved, the other player will be moved.

## **5.12. Fouls.**

5.12.1. If a robot utilizes a device or an action which continuously attacks or charges a robot not in possession of the ball, the referee will call "Foul". The team captain must then remove the robot from the playing field for at least one minute and correct the problem; play will continue (as in 5.10 "Damaged Robots").

5.12.2. If the robot continues to Foul, it will be permanently removed from the game.

5.12.3 If a robot is damaged by a foul, the referee will stop the game and stop the clock while repairs are made.

**5.12.4 If a robot is removed from two games for "fouling" it can be disqualified from the tournament as with 2.8.2 and 2.8.3.**

## **5.13. Free Kicks**

There are no free kicks.

#### **5.14. Penalty Kicks.**

There are no penalty kicks.

#### **5.15. Offside.**

There are no offside rules.

#### **5.16. Timeouts.**

There are no timeouts in the game.

#### **5.17. Substitution.**

Substitution of robots at any time during a tournament is strictly forbidden. Any team or teams that knowingly substitute robots will be disqualified from the tournament.

### **6. Conflict Resolution.**

#### **6.1. Referee.**

6.1.1. During game play, the referee's decisions are final. Any argument with a referees decision will result in a Yellow Warning Card. If argument continues, the referee will give a Red Card resulting in immediate forfeit of the game.

6.1.2. If Team Captains are satisfied with the result of a game, they are to sign the score sheet at the conclusion of game play.

6.1.3. Any protest after the game should only be if the scoring is believed to be incorrect.

#### **6.2. Rule clarification.**

6.2.1. Rule clarification may be made by members of the RoboCupJunior International Technical Committee.

#### **6.3. Special Circumstances.**

6.3.1 Specific modifications to the rules to allow for special circumstances, such as unforeseen problems and/or capabilities of a team's robots, may be agreed to at the time of the tournament, provided a majority of the contestants agree.

### **7. Code of Conduct.**

#### **7.1. Fair Play.**

7.1.1. Robots that cause deliberate interference and repeated damage to structurally sound robots during normal game play can be disqualified (See Rule 5.12).

7.1.2. Robots that cause damage to the field or the ball during normal game play can be disqualified(see Rule 2.8).

7.1.3. Humans that cause deliberate interference with robots or damage to the field or the ball can be disqualified.

7.1.4. It is expected that the aim of all teams is to play a fair and clean game of robot soccer.

*It is expected that all robots will be built with Rule7.1 in mind.*

*If robots are built to the upper limits of power and weight, they must anticipate the possibility of damaging other robots. Officially endorsed RoboCupJunior balls have been tested for robustness and are not damaged in normal RoboCupJunior game play.*

## **7.2. Behavior.**

7.2.1. All movement and behavior is to be of a subdued nature within the tournament venue.

7.2.2. Competitors are not to enter setup areas of other leagues or other teams, unless expressly invited to do so by team members.

7.2.3. Participants who misbehave may be asked to leave the building and risk being disqualified from the tournament.

7.2.4. These rules will be enforced at the discretion of the referees, officials, conference organizers and local law enforcement authorities.

## **7.3. Mentors.**

7.3.1. Mentors (teachers, parents, chaperones and other adult team-members) are not allowed in the student work area.

7.3.2. Sufficient seating will be supplied for Mentors to remain in a supervisory capacity around the student work area.

7.3.3. Mentors are not to repair robots or be involved in programming of student robots.

7.3.4. Mentor interference with robots or referee decisions will result in a yellow card warning in the first instance. If this reoccurs, a red card will be awarded and the mentor will be asked to leave the venue.

## **7.4. Sharing.**

7.4.1. An understanding that has been a part of world RoboCup Competitions is that any technological and curricular developments should be shared with other participants after the competition.

7.4.2. Any developments may be published on the RoboCupJunior web site after the event.

7.4.3. This furthers the mission of RoboCupJunior as an educational initiative.

## **7.5. Spirit.**

7.5.1. It is expected that all participants, Students and Mentors alike, will respect the RoboCupJunior mission.

7.5.2. The referees and officials will act within the spirit of the event.

7.5.3. ***It is not whether you win or lose, but how much you learn that counts!***

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