



RoboCup Junior Australia

# Soccer ev3sim Rules 2021

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## Code of Conduct

### Spirit

It is expected that all participants, students and mentors, will respect the aims and ideals of RoboCup Junior as set out in our mission statement. In turn, the volunteers, referees and officials will act within the spirit of the event to ensure the competition is competitive, fair and most importantly, fun. "It is not whether you win or lose, but how much you learn that counts."

### Sharing

It is the overall desire of RoboCup Junior competitions that any technological and curricular developments will be shared with other participants after the competition. Any developments including new technology and software examples, may be published on the RoboCup Junior website after the event, furthering the mission of RoboCup Junior as an educational initiative. Participants are strongly encouraged to ask questions of their fellow competitors to foster a culture of curiosity and exploration in the fields of science and technology.

### Local Variations

These rules will be in use for the Australian National Championships for the titled year. State and Regional competitions may implement minor variations with respect to age groups, divisions and judging. These variations will be communicated to the participants through email and/or on their relevant website prior to the state or regional competition.

### Notes/Advice vs. Rules

This document includes notes/advice to the competitors and mentors, plus rules that are firm. This has been done to remove ambiguity. There is a notation to indicate whether the content of this document is to be read as a note/advice or as a rule. **Notes/advice appear in green.**



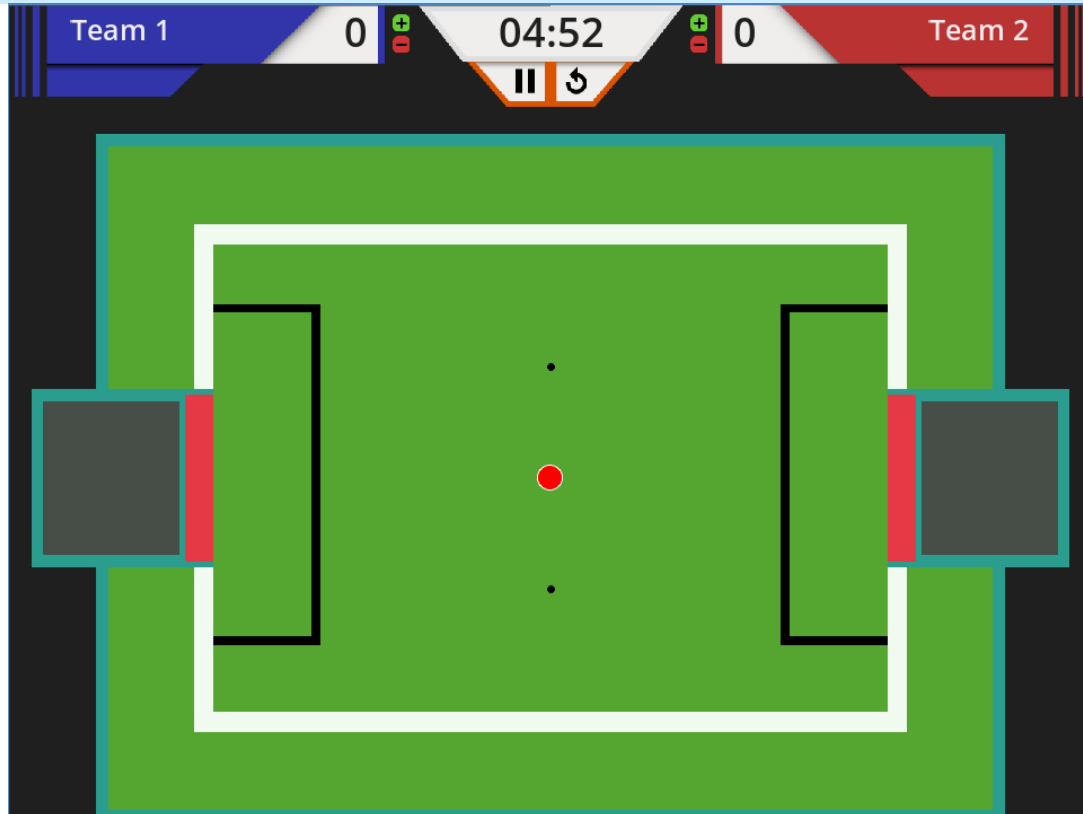
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## 1 Playing Field

**In summary:** The playing field in SoccerSim is very similar to a real life competition. Measurements are made in pixels and degrees.



### 1.1 Simulation platform

- 1.1.1 The field is a scaled down replica of the Official RCJA Soccer field.
- 1.1.2 An orange ball is situated within the simulation.
- 1.1.3 There are two neutral points, as shown on the field diagram.
- 1.1.4 A neutral point is also designated in the middle of the field. This is only used for starting games and placing the ball after multiple calls of lack of progress, or if all other neutral points are occupied.



## 2 Robots

**In summary:** There is a minimum and maximum size for your robot. Robots must be autonomous and should only be edited using the bot editor. Robots that have modified physics will be disqualified. Robot programs written in Python should use a minimal set of libraries.

### 2.1 Robot Types

- 2.1.1 The robot can be customised using the bot editor.
- 2.1.2 The robot must have a minimum rectangle base plate of 6 by 6, or a minimum circular or polygon base plate radius of 7. The robot must fit within the circular background. The robot cannot have any floating components. Sensors must be fully within a robot object (e.g. within a rectangle, circle or polygon).
- 2.1.3 The robot must have default mass, restitution and friction. Modifying the base physics of a robot is not allowed.

### 2.2 Control

- 2.2.1 Robots must be controlled autonomously.
- 2.2.2 The robot must only use the devices 'Ultrasonic', 'Colour', 'Infrared', 'Compass', 'Large Motor' and 'Medium Motor'.
- 2.2.3 Robot programs written in Python should only use a minimal set of libraries necessary for the control of the robot. For example, math and time can be used. Importing libraries such as (but not limited to) threading, subprocess or requests is not necessary for typical control of a robot, and is not allowed.

### 2.3 Team Structure

- 2.3.1 All teams shall consist of no more than two (2) robots.

### 2.4 Goalies

- 2.4.1 If a goalie is used, it cannot limit its movement to a single direction on the field. It must be programmed to move in all directions.
- 2.4.2 The goalie must respond to the ball in an attempt to intercept the ball ahead of the goal.

**Note:** There is no restriction to how the goalie responds. The goalie can respond by moving sideways or forwards.

- 2.4.3 Failure to respond to the ball with a movement will result in the robot being classified as "Damaged." (Section 4.7)

## 3 Game Play

**In summary:** 5 minute halves, no kick offs. Teams score goals when more than half the ball enters the red goal area. When the ball is stuck or not moving, or is out of the white boundary, it can be moved to a neutral point by a referee. Round Robin, 3 points for a win, 1 point for a tie, 0 for a loss. Quarter-/semi-/finals follow.

If a robot is stuck and does not move for a long period of time, it may be deemed damaged. Damaged robots are out of the field for 30 seconds.



### 3.1 Pre-game setup

- 3.1.1 You can only provide one program for each robot. Organisers will not switch between programs during the competition.
- 3.1.2 You must designate a kick off robot which will be placed further forward when your team is kicking off.

### 3.2 Length of Game

- 3.2.1 The game will consist of two 5-minute halves. Some competitions may choose to run 10-minute halves at the discretion of the tournament organising committee.
- 3.2.2 There will be a 5-minute break in between the halves.
- 3.2.3 The game clock will run for the duration of the game (typically two 5 minute halves). The time stops after each goal and resumes after kickoff, as well as during a Referee's Timeout as noted in section 4.9.4.
- 3.2.4 Teams with no submissions will forfeit the game and the winning team awarded a 5-0 score line.

### 3.3 Start of Game

- 3.3.1 At the start of the first half of the game, the referee will toss a coin and will randomly decide the team kicking off.
- 3.3.2 The team not kicking off in the first half of the game will kick off to begin the second half.

### 3.4 Kick-Offs

- 3.4.1 There are no kick-offs in ev3sim.
- 3.4.2 All robots will be automatically located on their defensive side of the field.
- 3.4.3 The ball is positioned automatically in the centre of the field.
- 3.4.4 All robots will be started immediately when the referee starts the round.

### 3.5 Scoring

- 3.5.1 A goal is scored when **more than half of the ball enters the red goal area**.
- 3.5.2 "Own goals" will be treated as a goal to the opposition. -

### 3.6 Lack of Progress

- 3.6.1 This occurs if the ball is stuck between multiple robots ("forcing" situation) for a reasonable amount of time and has no chance of being freed or if no robot has any chance of locating the ball in a reasonable amount of time.
- 3.6.2 The referee will call "Lack of Progress" when a robot is using greater power to "force" the ball past the opposition. If a referee is slow to remove the ball and a goal is scored as a direct result of a robot "forcing" the ball through, the goal will be disallowed and the ball placed on the nearest neutral point.
- 3.6.3 In the case of Lack of Progress, the ball will first be moved to the nearest neutral point. If this occurs again, the ball will be moved to the centre of the field.
- 3.6.4 When Lack of Progress is called, any stuck robots will be freed by the referee. Stuck robots should not be moved at any other time.



### 3.7 Damaged Robots

- 3.7.1 If a robot does not respond to the ball, it will be deemed damaged by the referee.
- 3.7.2 If a single robot remains in the goal area for longer than 20 seconds, or is stuck against walls or goals, and shows no indication of returning to the playing area, it will be deemed damaged by the referee.
- Advice: A small reverse command in a program will usually free a stuck robot.*
- 3.7.3 A damaged robot must remain off the field for at least thirty seconds (or one minute if ten minute halves) or until a goal is scored.
- 3.7.4 A damaged robot will be automatically returned to the field. It will be placed on an unoccupied corner of the penalty box on the robot's defending side that does not advantage the robot, e.g. facing the ball.
- 3.7.5 Play will continue when a robot is damaged.
- 3.7.6 There is no restriction if a robot enters the out area (i.e. fully enters the area between the walls and white line). It will NOT be deemed to be damaged.

### 3.8 Ball Out of Play

- 3.8.1 A ball is considered out of play if it leaves the playing area. The playing area is defined as the inner green area bounded but not including the white lines.
- 3.8.2 After a ball is considered out of play, it will be moved to the nearest neutral point in 1 second (set by the 'ball reset delay').

### 3.9 Interruption of Game Play

- 3.9.1 The situations listed in sections 3.6 - 3.8 may cause play to be interrupted, usually resulting in the movement of the ball to the nearest neutral point while play is allowed to continue.
- 3.9.2 Play may also be stopped by the referee.
- 3.9.3 After a stoppage in play, play will resume on the referee's command and all robots will start simultaneously.
- 3.9.4 A referee may call "Referee's Timeout" for program repair or other situation. The referee can elect to stop the match clock if the stoppage is lengthy.

### 3.10 Multiple Defence and Fouls

- 3.10.1 There are no multiple defence rules in SoccerSim.
- 3.10.2 Robots that cause deliberate interference, attempt to break out of the simulation platform or use exploits or bugs to other robots during normal game play will be disqualified.

### 3.11 Free Kicks, Penalty Kicks and Offside

- 3.11.1 There are no free kicks, penalty kicks or offside rules.

### 3.12 Selections For Finals

- 3.12.1 During Round Robin play, teams will be allocated three points for a win, one point for a tie and 0 points for a loss.





3.12.2 Teams will be ranked on the following criteria (in order): Points scored, Goals scored, Goal difference

### 3.13 Tied Games

3.13.1 In the event of a tie at full time during a non-finals game, the tied score will be recorded.

3.13.2 In the event of a tie at full time during a finals game, the following procedure will be followed:

- Game play will not be stopped or interrupted.
- The game will continue as “golden goal”. As soon as a goal is scored, the game will end.
- If after five minutes, no additional goal has been scored, then only one robot from each team will be allowed on the field. The robot assigned as the kick off robot will be allowed on the field, and then “golden goal” gameplay will continue. The robot chosen to be removed from the field is not allowed back on the field for the remainder of the game.
- If after an additional five minutes, no team has scored a golden goal, the team who is ranked higher in the seeding will be considered to have won the game.

## 4 Inspection

**In summary:** You are expected to know how your robot programs work. Excessive assistance by mentors may result your team being disqualified.

### 4.1 Scrutineering

4.1.1 All robot programs will be examined by a panel of referees after receiving all submissions.

### 4.2 Robot Construction

4.2.1 Programming of robots must be performed exclusively by the competitors.

4.2.2 Competitors may be interviewed to explain the operation of their robots in order to verify that the construction and the programming of the robot is their own work.

4.2.3 Competitors may be asked questions about their preparation efforts, and they may be requested to answer surveys and participate in recorded interviews for research purposes.

4.2.4 Proof of a full understanding of the program must be shown.

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





## 5 Code of Conduct

**In summary:** Don't try to break out of the simulation platform or cause interference in any other way. Teams that cause deliberate interference will be disqualified.

### 5.1 Fair Play

5.1.1 Robots that cause deliberate interference to other robots during normal game play will be disqualified (see section 4.10.2).

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

### 5.2 Sharing

5.2.1 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.

5.2.2 Any developments may be published on the RoboCup Junior Australia website after the event.

5.2.3 This furthers the mission of RoboCup Junior Australia as an educational initiative.

5.2.4 Teams are encouraged to publish footage of highlights on YouTube and social media, tagging "RoboCup Junior Australia Soccer" or its social media pages. Prizes may be awarded for the best clips at the discretion of the tournament organisers.

### 5.3 Spirit

5.3.1 It is expected that all participants, competitors and mentors alike, will respect the RoboCup Junior Australia mission.

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

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