RoboCup Junior Australia

Soccer Rules 2025

Version 25.0 | Last Modified: 28 January 2025

RoboCup Junior Australia Executive Committee

President	Evan Bailey (Victoria)
Vice President	Karen Binns (New South Wales)
Minutes Secretary	Brenda Gahan (Queensland)
Treasurer	David Ebert (Victoria)
Secretary	Wilson Cheng (New South Wales)
Relations Executive	Margaux Edwards (Queensland)
Digital Platforms Executive	Zac McWilliam (Victoria)

Soccer State & Territory Contacts

National Challenge Coordinator Kris Choy (New South Wales) – kris.choy@robocupjunior.org.au

For State and Territory enquiries, contact information can be found on the RCJA Website:

ACT NSW NT QLD SA TAS VIC WA

Preface

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 event 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 events, that any technological and curricular developments will be shared with other participants after the event. 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 events 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 event.

General Rules

General Rules have been introduced. Multiple sections of these Challenge Rules have been relocated to the General Rules to ensure consistency across all Challenges. Please ensure you read the General Rules, which can be downloaded from the Soccer Challenge Page on the RoboCup Junior Australia Website.

Notes/Advice vs. Rules

This document may include notes/advice to participants 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. Advice is noted in green. Rule changes for the new year are noted in red.

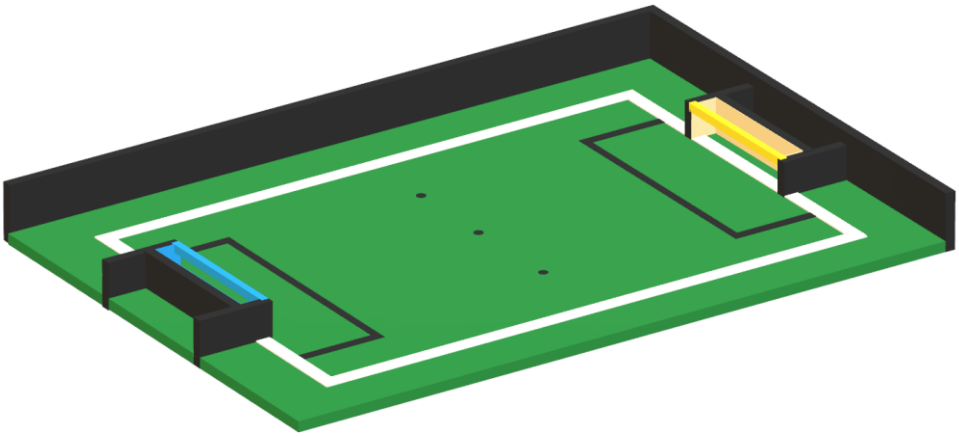
Change Log

Revision	Change(s) Made
25.0	Initial release for the season. Key changes from 2024 include: **Simple Simon** • There is now an external allowlist for allowed third party IR sensors (see section 4.5.1) **Standard League** • The maximum year limit has been removed for Standard League (see section 1.2). • There is now an external allowlist for allowed third party IR sensors (see section 4.5.1). • Any type of omniwheel (commercial or custom printed) can now be used. They must have a maximum diameter of 80mm (see section 4.5.5). **Open League** • Open League now uses a passive golf ball (see section 3.1.2) and robots have a maximum 15 mm ball capture zone (see section 4.1.1). **General changes** • Robots must now **freely rotate** within the cylinder. It is not sufficient to "fit" in the cylinder (see section 4.1.2). • The specifications of a handle have changed. It must be stable, noticeable and accessible, and must allow a robot to be picked up from 50 mm above the robot height (see section 4.5.6). • Removed 'in-goal' terminology, a defensive robot is in-goal if it is touching the goal's back wall. (see section 5.5.2). • The forcing rule now only applies in the goal penalty box (see section 5.6.1.3). • General Rules have been introduced. Multiple sections of these Challenge Rules have been relocated to the General Rules to ensure consistency across all Challenges. Please ensure you read the General Rules, which can be downloaded from the Soccer Challenge Page on the RoboCup Junior Australia Website.

Table of Contents

1 Preface

1.1 In Soccer, students are required to design, build and program robots to compete in a dynamic game of robot soccer against an opposing pair of robots. The robots are autonomously run during gameplay. They detect a ball and score goals on a green carpet playing field.



1.2 There are four Soccer leagues. All leagues are open to teams of any age (primary and secondary school age).

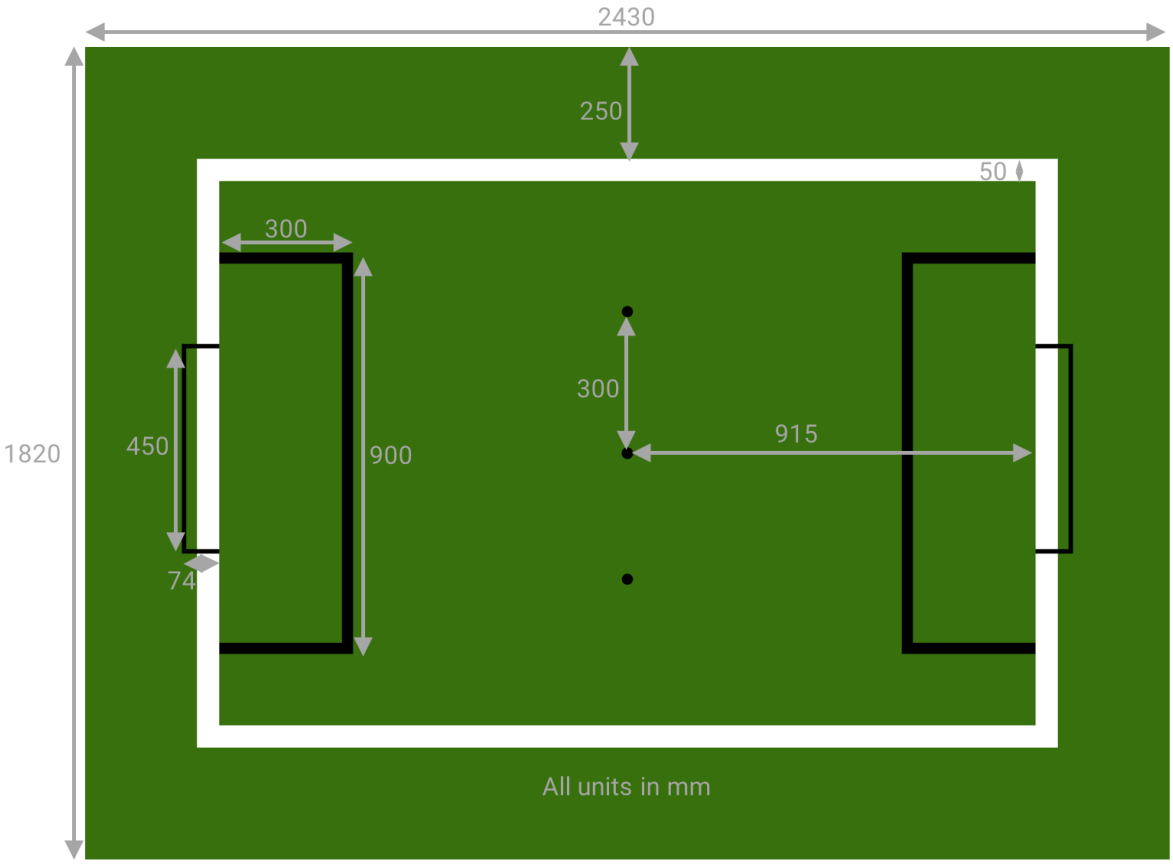
- **Simple Simon League** is a beginner league played using a ball that emits infrared signals. Robots may weigh up to 1.0 kg and are limited to LEGO parts and an IR sensor. Teams can only participate in Simple Simon for up to 2 years.
- **Standard League** is a league played using a ball that emits infrared signals. Robots may weigh up to 1.0 kg and are limited to LEGO parts and a list of other third party sensors. ~~Teams can only participate in Standard League for up to 2 years.~~
- **Lightweight League** is a mid-level league played using a ball that emits infrared signals. Robots may weigh up to 1.4 kg and are not limited in components used.
- **Open League** is a high-level league played using an orange coloured ball. Robots may weigh up to 2.5 kg.

1.3 Subject to age limitations and other criteria, teams who perform well in the National Event may qualify for the annual RoboCupJunior International Event:

- Lightweight League teams may qualify for RCJ Soccer Lightweight.
- Open League teams may qualify for RCJ Soccer Open.

Other international events may have other divisions/qualification requirements.

2 Playing Field



2.1 Floor

2.1.1 The field has 50 mm thick white lines 250 mm from the walls on every side, which form the border of the out area (exclusive of the white lines). The floor is green or charcoal coloured carpet with neutral points and penalty boxes marked with 25 mm thick black lines, as shown above.

2.1.2 The field should be placed so that it is flat and level. The out areas of the field may be either flat or inclined by raising the outside of the field by 10mm (the incline should allow the ball to roll from the top of the incline to the centre of the playing area).

2.1.3 **The field must be a carpet base.** The recommended carpet is 3 – 5 mm thick green or charcoal coloured carpet.

Advice: The Gen2 vinyl mat can be used as a practice mat.

2.1.4 The field may be placed on a wooden or plastic table or on the floor.

2.1.5 All dimensions of the field have a tolerance of 5%.

Note: While all efforts will be made to construct the fields precisely, robots should be designed to allow for this tolerance.

2.2 Walls

2.2.1 Matte black walls are placed all around the field, including behind the goals.

2.2.2 In Simple Simon, Standard and Lightweight Leagues, the walls are at least 100mm high above the playing field.

2.2.3 In Open League, the walls are at least 220mm high above the playing field.

2.3 Goals

2.3.1 The internal width of each goal is 450 mm.

2.3.2 The internal depth of each goal is 74 mm.

2.3.3 Each goal will have a crossbar 140 mm above the playing surface. The depth of the crossbar is a maximum of 20 mm to avoid covering the top of the goal.

2.3.4 The back and sides of one of the goal's interior, as well as the crossbar, are painted matte similar to CMYK cyan. The back and sides of the interior of the other goal, as well as the crossbar, are painted matte similar to CMYK yellow. The external sides of the goals are painted matte black.

2.3.5 The surface within the goal area is flat and level (horizontal).

2.3.6 The sidewalls of the goals extend to the end wall to prevent the ball from rolling behind the goals.

2.4 Neutral Points

2.4.1 There are two neutral points, as shown on the field diagram in section 2.1.

2.4.2 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.

2.5 Lighting and Magnetic Conditions

2.5.1 Teams must come prepared to calibrate their robots based on the lighting and magnetic conditions at the venue. It is recommended that teams design their robots to cope with variations in lighting and magnetic conditions, as these vary from venue to venue.

Note: At the Australian Open, all fields will be raised off the floor by at least 450 mm to minimise magnetic interference.

3 Ball

3.1 Specification

3.1.1 For **Simple Simon, Standard and Lightweight Leagues**, an **infrared ball** will be used. See Appendix A: Specification for Infrared Soccer Ball.

3.1.2 ~~For Open League, a passive orange ball will be used. See Appendix B: Specification for Passive Ball.~~
For **Open League**, **a passive orange golf ball** will be used. See Appendix B: Specification for Passive Golf Ball. We recommend purchasing the passive ball via the RCJA Store.

3.1.3 If the infrared ball has a **fast-flashing LED** (indicating low battery power) the batteries or the ball shall be replaced prior to the start of the game or at the earliest stoppage in play. Match timing shall be paused while the issue is rectified.

3.2 Ball Suppliers

3.2.1 The official infrared balls for all RCJA tournaments will be the Elekit RCJ-05 soccer ball available from Modern Teaching Aids.

Note: The older, dark-grey coloured infrared ball previously sold by HiTechnic is also acceptable.

3.2.2 A passive orange ball that suits the requirements set out in the Ball Specification document (see Rule 3.1.2) will be used for the Open League.

4 Robots

4.1 Dimensions

4.1.1 A robot's dimensions and characteristics must not exceed the following limits:

League	Rule	Simple Simon	Standard	Lightweight	Open
Diameter	4.1.2	220 mm	220 mm	220 mm	220 mm
Height		220 mm	220 mm	220 mm	220 mm
Weight		1.0 kg	1.0 kg	1.4 kg	2.5 kg
Ball capture zone	4.6	30 mm	30 mm	30 mm	~~30~~15 mm
Voltage	4.1.4	Limited to the rechargeable LEGO battery.		48V DC / 25V AC RMS	

4.1.2 A robot, as it will be positioned in gameplay, must ~~fit inside an upright 220mm diameter cylinder~~ rotate freely within an upright 220 mm diameter cylinder and pose little or no resistance to it.

4.1.3 While being inspected, each robot must be positioned as it will be in gameplay 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**.

Note: It is recommended to design your robot to a smaller size, such as 210 mm, to allow for tolerances.

4.1.4 In Lightweight and Open Leagues, no voltage on a robot should exceed 48 V DC or 25 V AC RMS at any point and at any time. This voltage refers to the maximum voltage, not the nominal voltage. This includes voltage pumps used for a kicker (see 4.8 for kicker limitations).

4.2 Control

4.2.1 Robots must be controlled autonomously.

4.2.2 Robots must be able to be started manually. Robots cannot be started from a secondary device, such as a laptop, tablet, or mobile phone. Robots must have their program downloaded to them and be able to started/restart manually by the Robot Handler.

4.2.3 The use of remote control of any kind is not allowed.

4.2.4 Robots must be able to drive in all directions.

4.2.5 Communication between robots is acceptable as long as it does not interfere with the performance of other robots, is not detectable outside the venue and complies with local regulations regarding frequency use and safety.

Advice: Teams should perform checks on messages sent between robots. For example, you can prepend a unique string to their message, and check that the string exists, to reduce the possibility of receiving interfering messages from other teams.

4.2.6 Robots must have the ability to have their communication disabled at the request of the referee.

4.3 Marking/Colouring

4.3.1 Competitors must mark or decorate their robots to identify them as belonging to the same team. These must not influence gameplay and will not be considered in the height restrictions.

4.3.2 Colours of robots and/or light transmitters must not interfere with the sensor readings of other robots.

Advice: Lightweight and Open, avoid having cyan, yellow, or orange visible on the outside of the robot as it may interfere with other robots if they are using cameras.

4.4 Number of Robots

4.4.1 All teams shall consist of no more than two (2) robots. **Any substitution of extra robots during a tournament is forbidden, and disqualification will result. Teams cannot enter the competition venue with more than two constructed robots.**

4.5 Construction

4.5.1 A robot must be constructed with the following parts:

<table>
<tr><th>League</th><th>Rule</th><th colspan="2">Simple Simon</th><th>Standard</th><th>Lightweight</th><th>Open</th></tr>
<tr><td>Construction</td><td>4.5.2</td><td colspan="2">Unmodified LEGO-branded pieces, motors and sensors.</td><td colspan="2" rowspan="5">Any material or building block, either commercial or from raw hardware, as long as the robot fits the specifications, and the design and construction are primarily and substantially the original work of the competitors.

A single robot can use any number of cameras. All commercial lenses and cameras are permitted.</td></tr>
<tr><td>Third party IR sensors</td><td>4.5.3</td><td colspan="2">Allowed if on the allowed list</td></tr>
<tr><td><s>Aftermarket</s> Gyro and compass sensors</td><td>4.5.4</td><td>Not allowed</td><td>Allowed</td></tr>
<tr><td><s>Commercial and LEGO</s> Any omni-wheels</td><td>4.5.5</td><td>Not allowed</td><td>Allowed with max 80 mm diameter</td></tr>
<tr><td>Other materials</td><td>4.5.6</td><td colspan="2">Note: NO other building materials can be used, including glue, tape, screws, etc.</td></tr>
</table>

Note: Lightweight and Open robots are allowed to use any number of cameras.

4.5.2 For **Simple Simon and Standard Leagues**, all parts used in the robot construction (other than allowed exceptions) must be strictly LEGO-brand pieces, motors, and sensors.

4.5.3 For **Simple Simon and Standard Leagues**, only sensors on the official list at https://www.robocupjunior.org.au/soccer/sensors/ are allowed ~~the following aftermarket IR sensors are allowed: Tris10, HiTechnic IR and IR Seeker Sensor for LEGO Education SPIKE Prime (available from MTA), Mindsensors~~.

4.5.4 For **Simple Simon League only**, built-in or external compass sensors or gyro sensors are not permitted to be used.

4.5.5 For **Standard League only**, any non-LEGO omniwheels can be used. The wheels must have a maximum diameter of 80 mm.

4.5.5 Cable ties or tape may be used as a handle or to secure wires, but must not be part of robot construction

4.5.6 All robots must have a stable and easily noticeable handle to hold and to lift them. The handle must be easily accessible and allow the robot to be picked up from at least 50 mm above the highest structure of the robot. The dimensions of the handle may exceed the robot height limitation, but the part of the handle that exceeds this limit cannot be used to mount components of the robot ~~A robot must have a handle for referees to pick them up easily. The handle is not included in height measurements~~.

Cable ties make a strong lightweight handle.

4.6 Ball Capturing Zones and Movement

4.6.1 Ball Capturing Zones are defined as any internal space created when a straight edge is placed on the protruding points of a robot.

4.6.2 The ball cannot penetrate the Ball Capturing Zone by more than the limit specified in rule 4.1.1 ~~**30mm**~~.

4.6.3 A robot cannot "hold" a ball. Holding a ball means taking 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.

4.6.4 The ball cannot be held underneath a robot.

4.6.5 In **Simple Simon and Standard Leagues**, the use of a dribbler is not allowed. A dribbler is as a rotating drum or wheel that imparts dynamic backspin on the ball to keep the ball on its surface.

4.6.6 In **Lightweight and Open Leagues**, a dribbler is allowed and is the only exception to rule 4.6.3. The dribbler must comply with rules 4.6.2 and 4.6.4. A robot using a dribbler must release the ball in order to score a goal.

4.7 ~~Batteries and~~ Kickers (Lightweight and Open Leagues Only)

In 2025 the General Rules have been introduced. Parts of this section of these Challenge Rules has been relocated to the General Rules to ensure consistency across all Challenges. Please ensure you read the General Rules, which can be downloaded from the Soccer Challenge Page on the RoboCup Junior Australia Website.

~~4.7.1 Due to safety reasons, Lithium-based batteries can only be used in conjunction with commercially produced, dedicated balanced Lithium-based battery chargers and fireproof charging bags. These batteries can explode due to incorrect charging and discharging (check manufacturer's recommendations), or if they are damaged.~~

~~4.7.2 Protection circuits for Lithium-based batteries are strongly encouraged. The use of swollen, damaged or otherwise dangerous batteries is not allowed.~~

~~4.7.3 At any event venue all teams charging lithium-based batteries (including LiPo (Lithium Polymer) and Li-ion (Lithium-Ion) batteries) must charge their batteries at the lower of either:~~

~~4.7.3.1 the manufacturer's recommended charging rate (if available)~~

~~4.7.3.2 a maximum charging rate of 1C~~

~~The charging rate equivalent of 1C for a given battery can be identified through its capacity. For example, a 1500mAh (1.5Ah) LiPo battery would have a 1C of 1500mA (1.5A), where as a 2200mAh (2.2Ah) LiPo battery would have a 1C of 2200mA (2.2A).~~

~~If the manufacturer's recommendations are not available, teams should charge lithium-based batteries at a rate within the range of 0.5C to 1C.~~

4.7.3 A robot's kicker cannot exceed a certain power. Kicker power is measured by means of an on-field test. All robot kickers will be tested with the tournament ball used in the division they participate in. The test is performed by placing the robot inside the left corner of a goal and performing a kick into the opposing goal. The power test is passed if the ball bounces off the opposite goal and the ball does not leave the penalty area of the opposing goal after bouncing back.

4.7.4 Robots that exceed the limitations must decrease the power of, or disable, the kicker.

Teams should build in the ability to adjust the power of a robot's kicker during the competition.

4.7.5 Kicker power is subject to compliance check at any time during the competition, such as during scrutineering, before a half, or when a game is about to be restarted after a goal.

5 Game Play

5.1 Pre-game setup

5.1.1 Organisers 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 Organisers will make every effort to allow at least 5 minutes of setup time before each game.

5.1.3 This time is also for teams to express any concerns about the legality of opposing robots.

5.2 Length of Game

5.2.1 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.

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 (typically two 5-minute halves), without stopping, except as noted in Referee's Timeout in section 5.9.4.

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

5.2.5 If a team does not report within 10 minutes of the scheduled game time, they will forfeit the game, and the winning team awarded a 10-0 score line. The 10 minutes includes any break times.

5.2.6 A game will end when there is a goal difference of 10 goals. The losing team may elect to continue playing, but the recorded score (10 goal difference) will not change.

5.2.7 Teams may elect to end a game early; however, they will forfeit the game, and the winning team awarded a 10-0 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.

5.4 Kick-Offs

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

5.4.2 All robots must be located on their defensive side of the field. Robots must not be ~~running~~ moving.

5.4.3 The ball is positioned by the referee in the centre of the field.

5.4.4 The team kicking off places their robots on the field first. Robots cannot be moved once they have been placed.

5.4.5 All robots on the team not kicking off must have some part of the robot in the penalty box.

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

5.4.7 The robot kicking off must make a clear strike of the ball and it must roll clear of the robot by at least 50 mm or the robot must start at least 50 mm from the ball. An illegal kick off will result in the opposing team being granted the kick off.

5.4.8 Any robots that are started before the referee's command will be treated as damaged.

5.5 Scoring

5.5.1 A goal is scored when the ball strikes the back wall of the goal. The referee will announce the goal.

5.5.2 A goal will be awarded if a ball deemed to be traveling into the goal strikes a defensive robot that is touching the back wall of the goal ~~A goal will be awarded if a ball deemed to be traveling into the goal strikes a defensive robot that has some part of it over the goal line and in the "in goal" area~~.

Robots should be built in a manner that the crossbar prevents them from going inside the goal.

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

5.5.4 "Own goals" will be treated as a goal to the opposition.

5.6 Lack of Progress

5.6.1 The referee will call “Lack of Progress” in the following situations:

5.6.1.1 It will be called if no robot has any chance of locating the ball in a reasonable amount of time.

5.6.1.2 It will be called if the ball is stuck between multiple robots for a reasonable amount of time.

5.6.1.3 It will be called ~~immediately~~ when a robot is using greater power to “force” the ball past ~~the opposition~~ an opposition robot that is in its penalty box. 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.

5.6.2 When “Lack of Progress” is called, 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.

5.6.3 When Lack of Progress is called, any stuck robots will be freed using minimal movement by the referee or team captains at the request of the referee. Stuck robots should not be moved at any other time.

5.7 Damaged Robots

5.7.1 The referee will deem a robot as “damaged” in the following situations:

5.7.1.1 If a robot does not respond to the ball, it will be deemed damaged.

5.7.1.2 If a 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.

Advice: A small reverse command in a program will usually free a stuck robot.

5.7.1.3 If a robot turns over and is unable to move, it will be deemed damaged. This will not apply if the referee has deemed that the robot is tipped over after a collision with an opposition robot; it can be righted by the referee and continue playing.

5.7.1.4 If a robot damages a ball or the field, it will be deemed damaged.

5.7.1.5 If two colliding robots damage a ball, both robots will be deemed damaged.

5.7.1.6 **In Lightweight and Open Leagues**, if the whole of a robot enters the out area (i.e. fully enters the area between the walls and white line), it will be deemed damaged. Robots must attempt to stay on the playing field at all times. This will not apply if the referee has deemed that the robot has been pushed out by another robot or that the robot has made an attempt to stay on the field of play. If the robot has been pushed out by another robot, the referee may have to slightly push the robot back onto the field at their discretion.

5.7.2 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.

5.7.3 Damaged robot removal process:

5.7.3.1 **In Simple Simon League**, a team member may remove a damaged robot from the field at any time. They must inform the referee when they do so.

5.7.3.2 **In Standard, Lightweight and Open League**, a team member may only request the removal of a damaged robot if the robot is not significantly involved with gameplay (i.e. not near or approaching the ball). They can only remove the robot after the referee gives approval.

5.7.4 A damaged robot must be repaired and may be returned with the referee's permission 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.

Note: Alternatively, the referee may instruct the team to place the robot on a neutral point if the penalty box is fully occupied, or to avoid a multiple defence situation. Goalies may be returned to the area in front of the goal without advantaging the robot, e.g. facing the ball.

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

5.7.6 When a ball or the field is damaged, a yellow warning sticker will be placed on the robot and the referee will record the infringement on the scorecard. In the event of two colliding robots damaging a ball, if the referee considers one robot to be significantly more aggressive than the other, they can choose to remove that robot from play.

5.7.7 Adjustments must be made to the robot(s) to prevent damage to the ball or field from recurring.

5.7.8 If a robot damages the ball or field again during the tournament, it will be disqualified from the tournament.

Note: If a robot has the power to damage an officially accepted RoboCup Junior Soccer ball (see section 2.2.1), it is a strong indication that the robot has been built with excessive power and the intention to damage other robots. Therefore, the robot has not been built with the ideals of RoboCup Junior Australia and fair competition in mind, so the tournament committee has every right to remove that robot from the competition.

5.8 Goalies

5.8.1 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.

5.8.2 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 outside of the penalty box (300mm from the goal).

Note: The goalie cannot respond sideways, followed by a forward movement.

5.8.3 Failure to respond to the ball with a forward movement down the field will result in the robot being classified as "damaged" (see rule 5.7).

5.9 Ball Out of Play

5.9.1

Lightweight and Open League	A ball is considered out of play if it leaves the playing area.

Standard League	• If inclines are not used, a ball is considered out of play if it strikes any wall (including sides of the goals). • If inclines are used, a ball is considered out of play if it strikes the back wall or sides of goals.
Simple Simon League	• A ball is considered out of play if it strikes the wall behind either goal.

5.9.2 After a ball is considered out of play, it will be moved to the nearest neutral point.

5.10 Interruption of Game Play

5.10.1 The situations listed in sections 5.6 - 5.9 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.

5.10.2 Play may also be stopped by the referee, but the game clock is not stopped, unless at the discretion of the referee. All robots must be stopped immediately and **restarted from their penalty box**.

5.10.3 After a stoppage in play, play will resume on the referee's command and all robots will start simultaneously.

5.10.4 A referee may call “Referee’s Timeout” for field repair, situations such as in section 5.7.1.3 or 5.12.3, or if the tournament referee is called for rule clarification. The referee can elect to stop the match clock if the stoppage is lengthy.

5.11 Multiple Defence

5.11.1 **Multiple Defence occurs if more than one robot from the defending side enters the penalty area, takes up a defensive position and substantially affects the game.**

5.11.2 For a "Multiple Defence", the robot having the least influence on play is moved to the centre of field. In the case where a goalie is involved, the other player will be moved.

5.12 Fouls

5.12.1 If a robot utilises a device or an action which continuously attacks or charges a robot not in possession of the ball, the referee will call "Foul!". The robot will be deemed damaged.

5.12.2 If the robot continues to foul, it will be permanently removed from the game, a yellow warning sticker will be placed on the robot/s and the referee will record the infringement on the scorecard.

5.12.3 If a robot is damaged by a foul, the referee will stop the game and stop the clock for up to 2 minutes while repairs are made. (See Referee’s Timeout section 5.10.4)

5.12.4 If a robot is removed from two games for “fouling”, it will be disqualified from the tournament.

5.13 Free Kicks, Penalty Kicks and Offside

5.13.1 There are no free kicks, penalty kicks or offside rules.

5.14 Humans

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

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

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

5.14.4 Other team members may start one robot, but after this, they are not allowed within the vicinity of the playing field. They are to remain more than one metre from the field while the ball is in play, unless otherwise directed by the referee.

5.14.5 If requested, team members starting the robots must be able to cover up any cyan, yellow, or orange on their person or equipment that interferes with the sensors of the other team's robots (see also: section 4.3.2).

5.15 Selections for Finals

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

5.15.2 Teams will be ranked on the following criteria:

- Total points
- Total goals scored
- Goal difference

5.16 Finals

5.16.1 At the National Events, final play offs for 1st, 2nd, 3rd and 4th place will be conducted.

5.17 Tied Games

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

5.17.2 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. Any team with two robots on the field must pick one robot to be taken off the field, 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.

6 Conflict Resolution

6.1 Referee

6.1.1 **During game play, the referee's decisions are final.** Any argument with a referee's 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, or if a game result is in doubt. After signing the score sheet, no protests can be lodged.

6.2 Rule clarification

6.2.1 Rule clarification may be made by members of the RoboCup Junior Australia Technical Committee.

6.2.2 If a rule clarification is needed, the referee should stop the game immediately, call referee's timeout (Section 5.10.4), stop the clock and confirm the ruling before continuing with the game.

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 Inspection

7.1 Scrutineering

7.1.1 All robots will be examined by a panel of referees before the start of each day of the tournament to ensure that the robots meet all constraints described in section 4.

7.1.2 **It is the responsibility of teams to have their robots re-inspected if their robots have been modified at any time during the tournament.** This also includes damage or changes during game play. Any team that is deemed to have an illegal robot following a game, will forfeit that game.

7.1.3 Any violations of the inspection rules will prevent that robot from competing until modifications are made.

7.1.4 Modifications must be made within the time schedule of the tournament and teams must not delay game play while making modifications.

7.1.5 The inspection may include, but is not limited to, checking the size, weight, ball capture zone depth, maximum voltage, and kicker power of each robot.

7.2 Team Interviews

7.2.1 All teams will interview by a panel selected by the Technical Committee over the course of the competition, preferably completed on the first day of competition, should the event span multiple days. This is to ensure that the robots meet all constraints as described in section 7.3.

7.2.2 It is expected that tournament organisers will conduct verification interviews prior to the finals of all events.

7.2.3 Photos of the team's robots will be taken during the interview process and will be added to Official RCJA Soccer Robot Database, to ensure robots are not handed down from Team to Team. If robots are not substantially the original work of the Team Members, then the Team will be disqualified from the tournament.

7.2.3 Teams are to submit an electronic journal, logbook or technical description paper of their journey with designing, programming, and testing of the robots as described in section 7.4.

7.3 Robot Construction

7.3.1 Construction and programming of robots has to be performed exclusively by the competitors.

7.3.2 Competitors will 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.

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

7.3.4 Commercial kits may be used but must be substantially modified by the competitors.

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

7.3.6 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. In addition, referees may request Technical Committee support during the competition if there are concerns re excessive mentoring may have occurred.

7.4 Journal/Logbook/Technical Description Paper

7.4.1 All teams must maintain a design journal/logbook/technical description paper or design diary detailing the robot's design, development and construction and programs as part of the learning experience. The journal/logbook/technical description paper can be a written document, PowerPoint presentation, website, blog, etc. Journals/Logbooks/Technical Description Papers or Design Diaries are not scored and do not contribute to the team's overall score but will be used to determine ownership of designs.

7.4.2 Construction of components (not freely or commercially available to all competitors) must be accompanied by full documentary proof that the developments were wholly the students' work. This should be in the form of technical documentation showing all stages of design, development, testing and construction.

7.4.3 Failure to produce documentary proof of students' work may result in the robot or custom component not being allowed to compete in the tournament.

7.4.4 Teams who fail to submit a journal, logbook or technical description paper may not be eligible for special awards.

A Technical Description Paper template is available to download from the RCJA Soccer Challenge Web Page.

~~8 Fair Play~~

In 2025 the General Rules have been introduced. Parts of this section of these Challenge Rules has been relocated to the General Rules to ensure consistency across all Challenges. Please ensure you read the General Rules, which can be downloaded from the Soccer Challenge Page on the RoboCup Junior Australia Website.

Appendix A: Specification for Infrared Soccer Ball

A.1 Ball suppliers

A.1.1 The official infrared balls for all RCJA tournaments will be the Elekit RCJ-05 soccer ball available from Modern Teaching Aids.

Note: The older, dark-grey coloured infrared ball previously sold by HiTechnic, or approved open-source alternatives, as they come available, is also acceptable.

A.1.2 The ball will be used in a pulsed and stepped-waveform mode - the Elekit RCJ-05 ball will be operated in MODE A (pulsed).

A.2 IR light

A.2.1 The ball shall emit infrared (IR) light of wavelengths in the range 920 nm – 960 nm, pulsed at a square-wave carrier frequency of 40 kHz. The ball should have enough ultra-bright, wide angle LEDs to minimise unevenness of the IR output.

A.3 Diameter

A.3.1 The diameter of the ball is required to be 74 mm. A well-balanced ball shall be used.

A.4 Durability

A.4.1 The ball must be able to resist normal game play. As an indication of its durability, it should be able to survive, undamaged, a free-fall from 1500 mm onto a hardwood table or floor.

A.5 Modulation

A.5.1 The 40 kHz carrier output of the ball shall be modulated with a trapezoidal (stepped) waveform of frequency 1.2 kHz. Each 833 microsecond cycle of the modulation waveform shall comprise 8 carrier pulses at full intensity, followed (in turn) by 4 carrier pulses at 1/4 of full intensity, four pulses at 1/16 of full intensity and four pulses at 1/64 of full intensity, followed by a space (i.e. zero intensity) of about 346 microseconds. The peak current level in the LEDs shall be within the range of 45 to 55 mA. The radiant intensity of each LED shall be more than 20 mW/sr.

A.6 Battery Life

A.6.1 If the ball has an embedded rechargeable battery, when new and fully charged it should last for more than 3 hours of continuous use before the brightness of the LEDs drops to 90% of the initial value. If the ball uses replaceable batteries; a set of new high-quality alkaline batteries should last for more than 8 hours of continuous use before the brightness of the LEDs drops to 90% of the initial value.

A.7 Colouration

A.7.1 The ball shall be neutral in colour. In particular, it must not have any green, blue or yellow colouration (to avoid confusion with the colours of the field and goals).

A.8 Weight

A.8.1 The ball shall have a total mass (including all batteries and parts necessary for use in game play) of between 0.13 kg and 0.15 kg.

Appendix B: Specification for Passive Golf Ball

B.1 Diameter

B.1.1 The diameter of the ball is required to be 42 ± 1 mm.

B.2 Durability

B.2.1 The ball must be able to resist normal gameplay. As an indication of its durability, it should be able to survive, undamaged, a free-fall from 1.5 meters onto a hardwood table or floor.

B.3 Colouration

B.3.1 The ball shall be of orange colour. Any colour that a human would deem to be orange and is substantially different from the other colours used on the field is acceptable.

B.4 Surface

B.4.1 Engravings and printed labels on the ball's surface are tolerated. Teams must be prepared to play with balls as supplied by tournament organizers.

B.5 Weight

B.5.1 The mass of the ball should be 46 ± 3 grams.

The Soccer Ball Specifications is primarily the work of the RoboCup Junior Soccer Technical Committee and has been used with permission by RoboCup Junior Australia.