



JRC 2018 RoboJunior - Football Rules  
Preliminary (Nov. 06, 2017)



**Junior Robotics Competition 2018 RoboJunior  
Football Rules**

In the JRC 2018 RoboJunior Football event, two teams, each composed of two to four students, compete; using two of their own built and programmed robots. Once the team captain presses the start button, these robots must move independently without further communication or interaction with any human. They must be programmed to recognize the ball, move towards it, push it, kick it, or move it to the opponent's goal. The ball used is a well-balanced infrared (IR) electronic ball set to pulse mode (example: HiTechnic Infrared Electronic Ball -IRB 1005 or similar).

The Robots are required to have full autonomy. Students competing in the event must do all the construction and programming of their robots without any help or interference from their teachers or mentors. During the Football competition, no teacher, mentor or visitor is allowed to touch the robots or help in programming. If a team requires assistance in anything, the chief judge or one of the designated officials may be consulted.

The Judges will apply all the rules fairly and without prejudice. All the decisions made by the Football Judge during the games are final. Any argument with the Judge or the assistant judges will result in a warning (yellow card). If the argument continues or another occurs, this will result in immediate disqualification from the game (red card). At the conclusion of the game, the judge will ask the captains to sign the score sheet. By signing the score sheet the captains accept the final score on behalf of the entire team.

This event should be an enjoyable experience for the students. It is designed to encourage the students to learn from each other and to work as a team.

## **1. PREQUALIFICATION.**

- 1.1.** Each team, in the presence of the Football Judge, must qualify each of their competing robots. The Robot's weight must be less than 1.2 kg and the maximum size (diameter) of each robot must not exceed 25.0 centimeters when measured with all parts fully extended. Cables don't count but must be bundled up in a neat and compact fashion.
- 1.2.** Each team must demonstrate, to the satisfaction of the Judge, that their two robots are able to recognize and follow the Infrared Electronic Ball in pulse mode. **Failure to accomplish that will automatically disqualify the robot(s) in question from competing.**
- 1.3.** All team members will be interviewed by the Chief Judge to ensure that **all team members** have adequate knowledge of the construction and programming of the robots. The interview may be carried out at any time during the two-day competition.

## **2. THE RULES.**

- A) A team must designate a captain for each game. The captain is the only person allowed to manually start the robots and touch them, during the game, when instructed by the judge. All team members who are competing in the game are allowed to be around the field, however, no member is allowed to lean on or touch the field.
- B) A team can have a maximum of two robots playing in a game. If a robot gets damaged during the game, the captain must remove it and pass it to other team members to fix the problem. When the robot is fixed and ready to return, the judge will instruct the captain



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when and where to place the robot. Each returned robot must be returned to the nearest unoccupied neutral spot from where it was removed, and not facing the ball in play.

- C) The ball used is a well-balanced infrared (IR) electronic ball set to pulse mode (for example: HiTechnic Infrared Electronic Ball- IRB 1005 or similar). Bring your own balls for practice, but remember to take them with you at the end of the competition. The Football Judge will supply the balls for the competition.
- D) The Football field is about 180 cm x 240 cm made of a plywood floor covered with a green synthetic carpet. The walls along the four sides of the field are about 15 cm high. The inside of the walls are painted black. Although there is a white rectangle marked inside the field about 30 cm from the walls, the actual playing area includes the part between the white line and the walls. There is no penalty for the robots if they go beyond the white lines.
- E) There are two goals, centered on each of the shorter sides of the field. The goal is approximately 60 cm wide, 10 cm high and 7 cm deep. The neutral spots, centre circle, and penalty areas are all marked on the field with black marker.

**3. "THE BEAUTIFUL GAME".**

- A) A game consists of two halves with a half time break. The duration of each half and of the break will be indicated on the games' schedules which are distributed on the first day of the competition. Time is kept by the Football judges or their assistants.
- B) A team should be ready to start according to their scheduled time. If a team is late by more than 5 minutes, it automatically forfeits the game and the winning team gets the 2 points, however the score (goals) is recorded as 0-0.
- C) The Judge can make changes to the schedule of the games, at any time, if necessary. Rule (B) above will not apply if the Judge decides to reschedule teams. All teams will be given adequate notice of the changes.
- D) At the start, the choice of the side is determined by a toss of a coin. The teams switch sides after half time. Each half of the game begins with a kickoff. All robots must be located on their own side of the field and must be stopped. The ball is placed by the Judge in the center of the field.

The team kicking off should place their robots on the field first. Robots cannot be placed nor remain behind the goal line or in the outer area. The team not kicking off will then place their robots on the defensive end of the field. All robots on the team not kicking off must be outside the center circle. Robots cannot be repositioned once they have been placed, however the Judge may adjust the placement of the robots if deemed necessary. On the Judge's command (usually the blow of a whistle), the team captains will start their own robots.

- E) Except for the kickoff, it is not permitted for the captain or any other team member to touch the robots during the game. When a robot is damaged, the judge will instruct the team captain to remove it from the field and pass it to other team members for repair. The captain must wait for instructions from the judge to place the repaired robot back on the field on an unoccupied neutral spot, nearest to where it had been taken off, and not directly aiming towards the ball. When a robot flips over, or two robots get entangled or stuck together, the judge is the only person allowed to remove the robots



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from their position and place them back on the field close to where they were taken from and not facing the ball in play.

- F) If both robots from the same team are deemed damaged during the game, the clock continues and the remaining team gets one initial goal and rests while waiting for the opponent's return to play. The remaining team will also get one additional goal for each minute the opponent's robots remain damaged. After five minutes of absence, the team with no functional robots forfeits the game. However, these rules only apply when neither of the two robots from the same team was damaged as the result of play interference from the opposing team.
- G) A robot must not take hold of the ball by fixing a ball to its body or carry it around. The ball must not stop rolling while a robot is moving and must rebound when rolled into a robot. If this occurs, the judge will ask the captain to remove the offending robot and modify it before returning it to the field. The judge will place the ball in the centre point and the game continues.
- H) A goal is scored when the ball strikes or touches the interior back wall of a goal, or when it is completely inside a goal area. After a goal, the game will be restarted with a kickoff from the team who was scored against. Before a kickoff, all damaged robots are allowed to return to the playing field immediately if they are ready and fully functional.
- I) The judge can call "lack of progress" when the ball is stuck between robots; when there is no change in ball position; or when the ball is beyond detection or reach of all robots on the field. After calling "lack of progress" out loud, the judge will move the ball to an unoccupied neutral spot.
- J) The Football Judge can stop the game if the ball malfunctions and a replacement is not readily available, or if there is a situation where the Judge needs to confer with an official of the Competition. If this occurs, all robots must be stopped and remain on the field untouched. The Judge may decide whether the game will be resumed from the point at which the game was stopped, or by a kickoff.

#### 4. CODE OF CONDUCT.

- A) All participants are expected to play a fair and clean game. Robots are not allowed to deliberately interfere with or cause damage to other robots, or cause damage to the field or to the ball during the game.
- B) Humans are also not allowed to cause deliberate interference with robots or damage to the field or the ball. All participants are expected to treat each other with respect and to adhere to the rules and regulations of the competition.
- C) A team has the right to challenge the qualification of the opponent's robots if the robot's size, weight, or construction does not respect the regulations. The challenge must be voiced to the Judge by the game's team captain only and before the start of a game. If the Judge determines that the challenge is frivolous or unfounded, he or she may dismiss it. A team who repeatedly presents frivolous or unfounded challenges may risk disqualification.

#### 5. ADDITIONAL REQUIREMENTS.

- A) **Teacher-In-Charge and Mentors:**



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The teacher-in-charge and mentors (chaperons, parents, or any member from the public) are not allowed to assist in the construction or programming of the robots. For safety reasons, only the teacher-in-charge and the officially registered chaperon(s) are allowed to stay at the students work areas. These teachers and chaperons must refrain from touching the robots or giving any verbal directions to repair or re-program any robot. Violators may risk the disqualification of their team.

**B) Robot Construction:**

Robots must be constructed exclusively by the student members of a team. Mentors, teachers, parents or companies may not be involved in the design, construction, and assembly of robots.

For the construction of a robot, any robot kit or building block may be used as long as the design and construction are primarily and substantially the original work of a team. This means that commercial kits may be used but must be substantially modified by the team. It is not allowed to mainly follow a construction manual, or to just change unimportant parts.

Indications for violations are the use of commercial kits that can basically only be assembled in one way, or that robots from different teams, built from the same commercial kit, all basically function or look similar.

**C) Robot Programming:**

Robots must be programmed exclusively by student members of the team. Mentors, teachers, parents or companies must not be involved in the design, assembly, programming and debugging of robots.

For the programming of the robots, any programming language, interface or integrated development environment (IDE) may be used. The use of programs that come together with a commercial kit (especially sample programs or pre-sets) or substantial parts of such programs are not allowed. It is not allowed to use sample programs, not even if they are modified.

**D) Robot Inspection and Team Member Interviews:**

Robots must be inspected and certified every day before the first game is played. The Football Judge may request other inspections if necessary. The routine inspections include verification of size, weight, and construction.

The Competition Coordinator or the Football Chief Judge may arrange to interview all team members during the event. The teams must bring both robots and their computer code to the interview. They will be interviewed about the construction and programming of their robots and the development process.

An interviewer may ask the team for a demonstration. The interviewer may also ask the team to write a simple program during the interview to verify that the team is able to program its robot.

Failing the interview may disqualify the team from maintaining (if applicable) their first, second or third place. It is acceptable that different team members have varied skills in programming and/or construction.



## APPENDIX

### Required for the Football event:

Available in Montreal at different retailers and through ordering on line  
Brault & Bouthillier, RobotShop, HiTechnic (USA), etc

- HiTechnic Infrared Ball ([IRB1005](#))
- HiTechnic IRSeeker V2 ([NSK1042](#)) to locate and provide the direction to the IRBall
- HiTechnic Compass Sensor ([NMC1034](#)) to determine the orientation of the playing field and the heading to the goal

