

# RoboCupJunior Soccer Rules 2009

These are the official rules for RoboCupJunior 2009. They are released by the RoboCupJunior Soccer Technical Committee for Soccer. These rules have priority over any translations.

## 1. TEAM

### 1.1 Regulations

A **team** consists of one or more members.

Each team must have a **captain**. The captain is the person responsible for communication with the referee. The team can replace its captain during the competition. The captain is not allowed to wear any yellow or blue clothes that can be seen by the robot (to avoid interference with the goal colour).

### 1.2 Violations

Teams that do not abide by the rules are not allowed to participate.

The referee can require the team captain to change clothes or to be replaced by another team member if interference with goal colour is suspected.

## 2. ROBOTS

### 2.1 Number of robots / substitution

Each team is allowed to have at most two robots. The substitution of robots within a team or with other teams is forbidden.

### 2.2 Dimensions

Robots will be measured in an upright position with all parts extended. A robot's dimensions must not exceed the following limits:

size / diameter	Ø 22 cm
height	22 cm
weight	2,5 kg
ball-capturing zone	3 cm

Ball-capturing zone is defined as any internal space created when a straight edge is placed on the protruding points of a robot. This means the ball must not enter the concave hull of a robot by more than 3 cm. Furthermore, it must be possible for another robot to take possession of the ball.

### 2.3 Color

Robots are not allowed to be coloured yellow or blue in order to avoid interference with the goal colours. Yellow or blue parts used in the construction of the robot must either be occluded by other parts from the perception by other robots or be taped with a neutral colour.

### 2.4 Control

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

## **2.5 Communication**

Robots are not allowed to use any kind of communication during gameplay.

## **2.6 Agility**

Robots must be constructed and programmed in a way that their movement is not limited to only one dimension (that means one axis). They must be able to move in all directions, for example by turning.

Robots must be constructed and programmed in a way that they do not enter the goal. Robots are allowed to use the cross-bar.

## **2.7 Additional regulations of the leagues**

A tournament may be organized in different leagues. Each league (e.g. the Open League) may have its own additional regulations, including regulations affecting the construction of robots. Such regulations will be passed by the RoboCupJunior Soccer Technical Committee and become a part of this rule.

## **2.8 Violations**

Robots that do not abide by the above specifications/regulations are not allowed to play. If violations are detected during a running game the team is disqualified for that game. If similar violations occur repeatedly, the team can be disqualified from the tournament.

# **3. FIELD**

## **3.1 Kinds of fields**

Two different kinds of fields, named VERSION A and VERSION B, may be used at a tournament.

## **3.2 Dimensions of the field**

VERSION A: The playing-field is 122 cm by 183 cm. The corners are flattened.

VERSION B: The playing-field is 122 cm by 183 cm. Around the field is an out-area of 30 cm width. Total dimensions of the field, including the out-area, are 182 cm by 243 cm.

## **3.3 Walls**

Walls are placed all around the field, including behind the goals and, if applicable, the out-area. The height of the walls is 14 cm. The walls are painted matte black.

## **3.4 Goals**

3.4.1 VERSION A: The width of each goal is 45 cm, centered on each of the shorter sides of the playing-field. The goal is 14 cm high. It has a cross-bar on top (to prevent robots from entering the goal). The interior of the goal including floor, walls and cross-bar are painted, one side yellow, the other side blue. The exterior is painted black.

3.4.2 VERSION B: The width of each goal is 60 cm, centered on each of the shorter sides of the playing-field. The goal is 10 cm high. It has a cross-bar on top (to prevent robots from entering the goal). The interior of the goal including floor, walls and cross-bar are painted, one side yellow, the other side blue. The exterior is painted black.

## **3.5 Floor**

The floor consists of green carpet on top of a hard surface.

### **3.6 Neutral sports**

There are five neutral spots defined in the field. One is in the center of the field. The other four are adjacent to each corner, located 45 cm along the long edge of the field, aligned with each goal post towards the middle of the field (from the goal post). The spots are marked black.

### **3.7 Center circle**

A center circle will be drawn on the field. It is 60 cm in diameter. It is marked black.

### **3.8 Penalty areas**

VERSION A: In front of each goal there is a 30 cm wide and 75 cm long penalty area.

VERSION B: In front of each goal there is a 30 cm wide and 90 cm long penalty area.

Both VERSION A and VERSION B: The penalty areas are marked by a white line of at least 10 mm width.

### **3.9 Lighting and Magnetic Conditions**

The fields should be placed in a way that the influence by external infrared light is as low as possible and that the magnetic field of the earth is disturbed as little as possible. Perfect conditions cannot be guaranteed, however. Teams must come to tournaments being prepared to calibrate their robots based on the lighting and magnetic conditions at the venue.

## **4. BALL**

### **4.1 Ball specification**

4.1.1 A well-balanced electronic ball shall be used.

4.1.2 The ball will emit infra-red (IR) light.

### **4.2 Official suppliers**

Currently, there are two electronic balls that have been approved by the RoboCupJunior Soccer Technical Committee:

- IR Roboball MK2 made by Wiltronics
- RoboSoccer RCJ-04 ball made by EK Japan

The RoboCupJunior Soccer Technical Committee can approve new balls at any time.

### **4.3 Tournament balls**

Balls for the tournament must be made available by the organizers. Organizers are not responsible for providing balls for practice.

## **5. GAME PLAY**

### **5.1 Game procedure and length of a game**

The game will consist of two halves. The duration of each half is 10-minutes. There will be a 5-minute break in between the halves.

The game clock will run for the duration of the halves without stopping (except if or when the referee wants to consult an official). The game clock will be run by the referee or an assistant.

Teams are supposed to be at the table 5 minutes before their game starts. Teams can be penalized one goal per minute at the referee's discretion if they are late for the game start. If a team does not report within 5 minutes of the game start, it forfeits the game and the winning team is awarded a 5-0 win.

## **5.2 Pre-match meeting**

At the start of the first half of the game, the referee will toss a coin. The team mentioned first in the draw shall call the coin. The winner of the toss can choose either which end to kick to, or to kick off first. The loser of the toss will decide the other option. After the first half, teams will switch sides. The team not kicking off in the first half of the game will kick off to begin the second half of the game.

## **5.3 Kick-off**

Each half of the game begins with a kick-off. All robots must be located on their own side of the field. All robots must be halted. The ball is positioned by the referee in the center of the field.

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

The team not kicking off will now place their robots on the defensive end of the field. All robots on the team not kicking off must be at least 30cm away from the ball (that means outside the center circle).

The referee may adjust the placement of the robots.

On the referee's command (usually by whistle), all robots will be started immediately by each captain. Any robots that are started early will be removed by the referee from the field and treated as a damaged robot.

## **5.4 Human interference**

Except for the kick-off, human interference (e.g. touching the robots) during the game is not allowed unless explicitly permitted by the referee. Violators can be disqualified from the game.

## **5.5 Ball movement**

A robot cannot hold a ball. Holding a ball means taking full control of the ball by removing all of its degrees of freedom. Examples for ball holding include 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

The only exception to holding is the use of a rotating drum that imparts dynamic back spin on the ball to keep the ball on its surface. Such a device is called a dribbler.

Other players must be able to access the ball.

## **5.6 Scoring**

A goal is scored when the whole of the ball is inside the goal or if it strikes the back wall of the goal.

## **5.7 Goalie**

The robot moving first into the penalty area (at least with one part) on a team's defending side is designated as goalie until it completely leaves the penalty area.

## **5.8 Pushing**

Within the penalty area, the goalie has priority. Attacking robots are not supposed to push the goalie in any way. If the goalie has physical contact with the ball and is pushed by an attacking robot, the ball will be moved to the nearest unoccupied neutral spot. This includes the situation that the goalie has

physical contact with the ball and the attacking robot is pushing the ball. If a goal is scored as a result of this situation, it will be disallowed.

### **5.9 Lack of progress**

**Lack of progress** occurs if there is no progress in the gameplay for a reasonable period of time and the situation is not likely to change. Typical lack of progress situations are when the ball is stuck between robots or between the robot and the wall or no robot is able to detect the ball at its location. The referee will call "lack of progress" and will move the ball to the nearest unoccupied neutral spot. If this does not solve the lack of progress, the referee can move the ball to different neutral spots.

### **5.10 Out (in VERSION B only)**

The ball is considered as **out** if the whole of the ball is out of the playing area. If a ball is out, the referee will reposition the ball on a neutral spot. The captain of the team whose robots did not touch the ball last can choose between the two neutral spots on the half of the field where the ball went out. If one of these neutral spots is occupied by a robot, the captain can also choose to reposition the ball to the center of the field. The decision of the captain must be made immediately by pointing on a neutral spot. If the captain does not decide immediately, the referee will choose a neutral spot instead.

### **5.11 Damaged robots**

If a robot is damaged, it has to be taken off the field and must be fixed before it can play again. A damaged robot must remain off the field for at least one minute.

A robot is damaged especially when:

- it does not respond to the ball
- it continually moves into the goal
- it turns over on its own accord
- it is stuck to a wall or a corner and cannot free itself continually

After a robot has been fixed it will be placed on the unoccupied neutral spot nearest to where it has been taken off, and not directly aiming towards to the ball. A robot can only be returned to the field if the damage has been repaired.

Only the referee decides whether a robot is damaged. A robot can only be taken off or returned with the referee's permission.

### **5.12 Multiple defense**

Multiple defense occurs if more than one robot from the defending team enters its penalty area and substantially affects the game. The robot not being the goalie will be moved to the nearest unoccupied neutral spot.

### **5.13 Interruption of Game**

In principle, a game will not be stopped.

The referee can stop the game if there is a situation on or around the field which the referee wants to discuss with an official of the tournament.

When the referee has stopped the game, all robots must be stopped and remain on the field untouched. The referee may decide whether the game will be continued/resumed from the situation in which the game was stopped or by a kick-off.

## **6. CODE OF CONDUCT**

### **6.1 Fair Play**

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 consideration to other participants.

Robots are not allowed to cause deliberate interference with or damage to other robots during normal game play.

Robots are not allowed to cause damage to the field or the ball during normal game play.

Humans are not allowed to cause deliberate interference with robots or damage to the field or the ball.

### **6.2 Behavior**

All participants are expected to behave themselves. All movement and behavior is to be of a subdued nature within the tournament venue.

### **6.3 Help**

Mentors (teachers, parents, chaperones and other adult team-members) are not allowed in the student work area unless it is explicitly allowed. Only participating students are allowed to be inside the work area.

Mentors must not touch, build, repair or program any robots.

The substitution of robots during the competition within the team or with other teams is forbidden.

### **6.4 Sharing**

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

### **6.5 Spirit**

It is expected that all participants, students, mentors and parents alike, will respect the RoboCupJunior mission. ***It is not whether you win or lose, but how much you learn that counts!***

### **6.6 Violations / Disqualification**

Teams who violate the code of conduct can be disqualified from the tournament. It is also possible to disqualify and exclude from further participation in the tournament only a single person or a single robot.

In less severe cases of violations of the code of conduct, a team will be given a warning by showing it a yellow card. In severe or repeated cases of violations of the code of conduct a team can be disqualified immediately without a warning by showing it the red card.

## **7. CONFLICT RESOLUTION**

### **7.1 Referee and referee assistant**

All decisions during the game are made by the referee or the referee assistant, who are in charge of the table, the field, and the persons and objects surrounding it. During game play, the referees' decisions are final.

Any argument with a referee or the assistant can result in a warning. If the argument continues or another argument occurs, this may result in immediate disqualification from the game.

At the conclusion of the game, the referee 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.

### **7.2 Rule clarification**

Rule clarification may be made by members of the RoboCupJunior Soccer Technical Committee, if necessary even during a tournament.

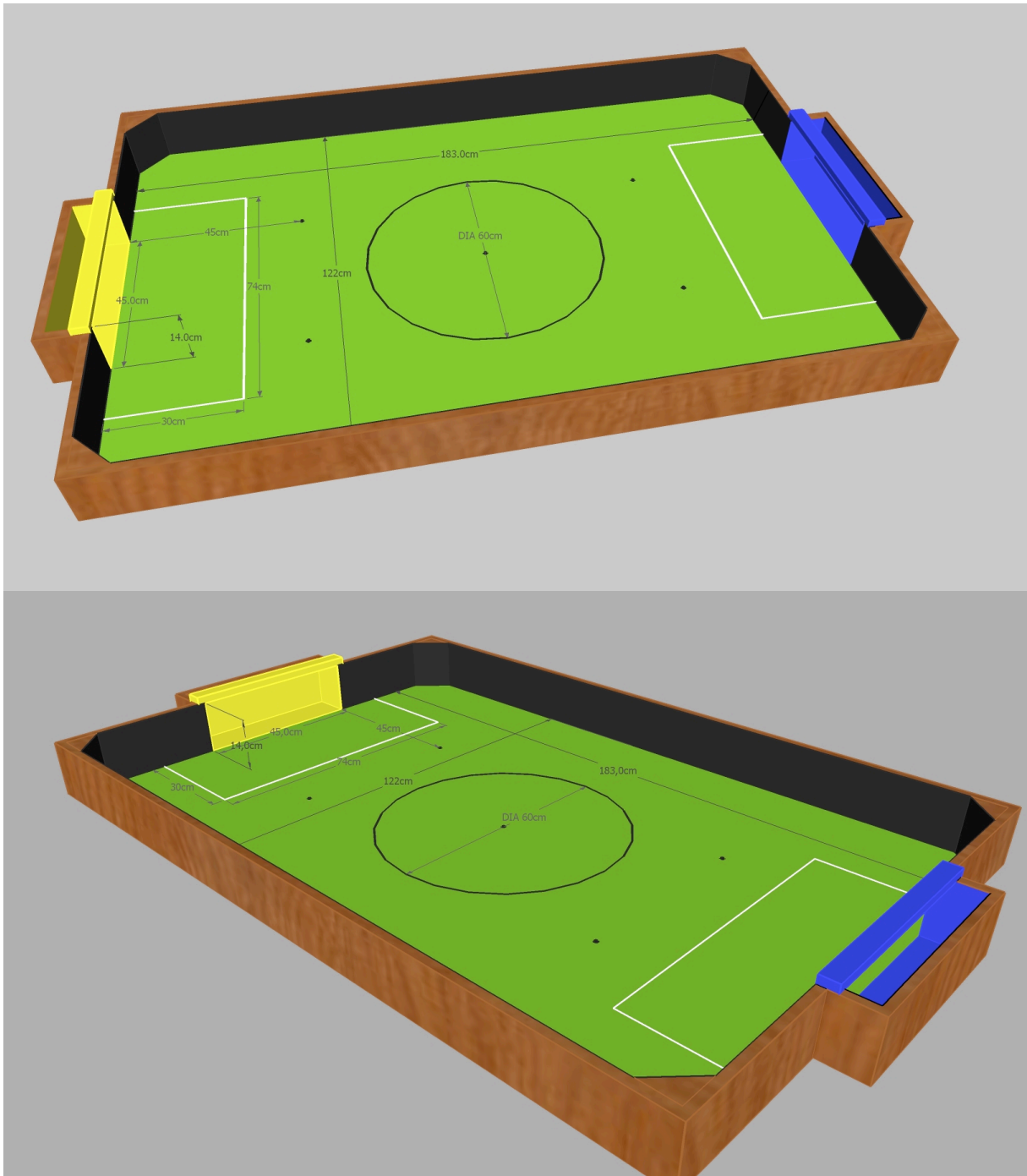
### **7.3 Rule modification**

If special circumstances, such as unforeseen problems or capabilities of a robot, occur, rules may be modified by members of the RoboCupJunior Soccer Technical Committee, if necessary even during a tournament.

### **7.4 Regulatory statutes**

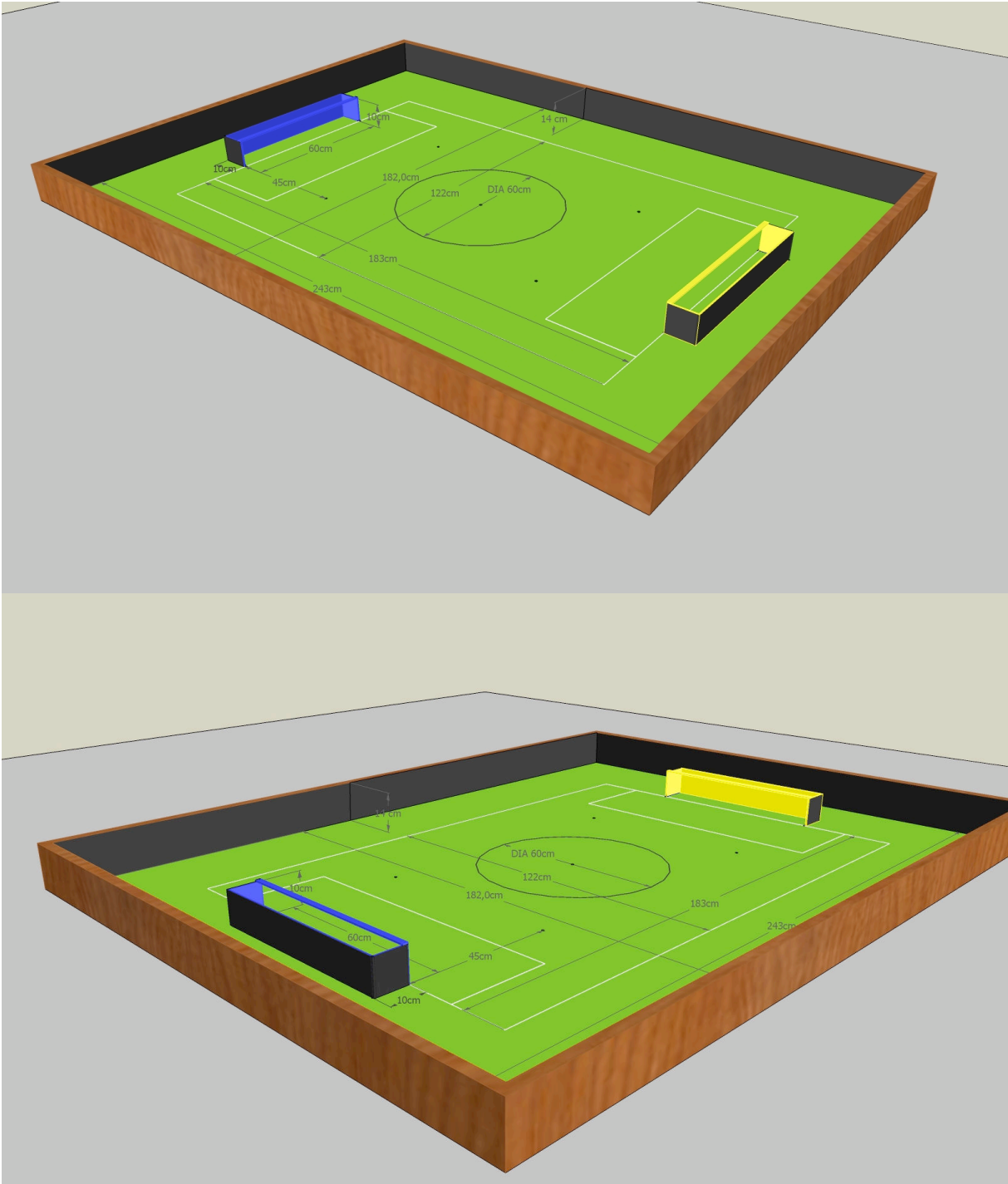
Each RoboCupJunior competition may have its own regulatory statutes to define the procedure of the tournament (for example, the inspection of robots, interviews, schedules, game modes, etc.). Regulatory statutes become a part of this rule.

**VERSION A**





**VERSION B**



# **Open League Regulations 2009**

## **1. Preamble**

According to Rule 2.8 of the RoboCupJunior Soccer Rules, each league has its own additional regulations. They become a part of the rules.

## **2. Regulations**

### **2.1 Construction**

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

For the construction of the robots any robot kit or building block may be used as long as the design and construction are primarily and substantially the original work of the team. This means that commercial kits may be used but must be substantially modified by the team. It is neither allowed to mainly follow a construction manual, nor to just change insignificant parts.

Robots must be constructed in a way that they can be started by the captain without the help of another person.

### **2.2 Programming**

Robots must be programmed exclusively by student members of the team. Mentors, teachers, parents or companies may not be involved in the 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 presets) or substantial parts of such programs are not allowed.

It is not allowed to use sample programs, not even if they are modified.

### **2.3 Burden of proof**

Proof must be supplied by each team that their robots match these regulations, for example by a detailed documentation or log book. Teams may be interviewed about their robots and the development process at any time during a tournament.

### **2.4 Violations**

Robots that do not match the above regulations are not allowed to play. If violations are detected during a running game, the team is disqualified for that game. If similar violations occur repeatedly, the team can be disqualified from the tournament.