



Soccer Simulation Mini RULES

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Soccer Rules | Simulation Mini

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1. Competition

The Soccer Simulation Mini category features a maximum of 16 teams (with only 1 team per registered entry for the competition) and takes place over 3 days. Due to current circumstances, the FIRASim software is used, which simulates all the characteristics of a VSSS match, from physical aspects to category rules. In addition to this simulator, Referee is used to monitor and control game situations. Therefore, the competition is held in two stages.

1.1. Presentation

The goal is to promote team development, allowing them to verify the performance of their work.

1.2. Modality

During this stage, there is only one group containing all competitors. In a round-robin format, where a win earns 3 points, a draw earns 1 point, and a loss earns no points. The top three in the table are crowned champions, respectively: gold, silver, and bronze. In case of a tie in points, the goal difference is considered, and if the tie remains, the team with the fewer goals conceded wins.

1.3. Required Resources

The following resources are required for the development of the client code: FIRASim (Simulator), VSS-Referee (Referee), and Docker (to run on competition servers).

2. Field and Ball

2.1. Field Specifications

The field has markings as seen in Figure 1. The center circle has a radius of 25cm. The arc, which is part of the goal area, is 20cm along the goal line and 5cm in the perpendicular direction. The central lines (center and edges of the goal area and the midfield circle) must have a thickness of 3mm.

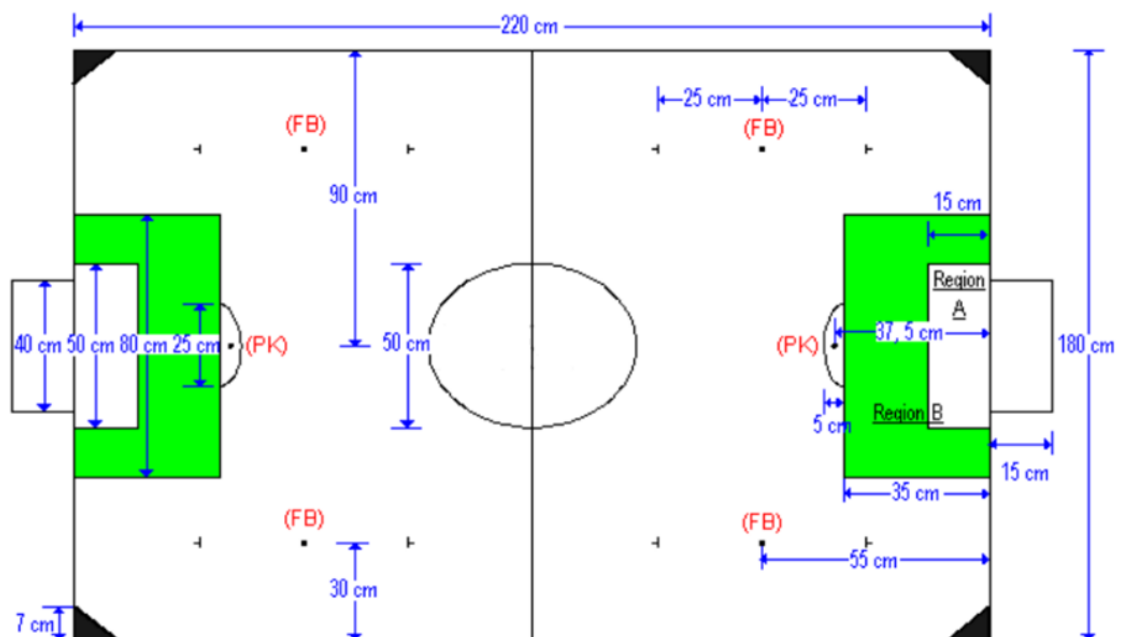


Figure 1: Field Measurements

FB - Ball position on free kick;
TK - Ball position on free throw;
PK - Ball position on penalty kick;
All lines are 3mm thick;
Robot positions (white circles) in the free ball situation;
Side lines - 2.5cm thick, top is black, and sides are white.

2.2. Goal

The goal area comprises the area of a rectangle (measuring 80cm x 35cm, in front of the goal) and an arc associated with the center of the line (25cm next to the goal line and 5cm in the perpendicular direction). Within this area, it will comprise a smaller area, Region A or goal area (50cm x 15cm in size). There must also be a line exactly at the entrance to the goal, 40 cm wide.

2.3. Ball

The ball used in the simulator must be configured and defined as orange, with approximately 42.7mm in diameter and 46g in weight (similar to a golf ball), to avoid vision problems between teams.

3. Players

3.1. Complete System

A match must be played by 2 (two) teams, each consisting of a maximum of 5 (five) robots. One of the robots can be the goalkeeper. Only one computer per team can be used, especially dedicated to visual processing and position recognition.

3.2. Robots

3.2.1. Size

The size of each robot is already defined by the software. The upper part of the robots can be blue or yellow, to be defined by the organizers (or between the teams themselves before the match starts) and identify different teams.

3.2.2. Positioning and Equipment

A robot inside their own goal area (Rule 2.3) must be considered as a "goalkeeper." The role of goalkeeper can be dynamically exchanged during the match, so a robot inside their own area is always considered as a goalkeeper.

4. Technical Time-Out

A time-out can be requested by a representative of the team at any time during the game, but it is only available when appropriate. Each team is entitled to 1 technical time-out per match, each with a maximum duration of 5 minutes, including sending, compiling, and starting time on the server.

5. Information Transmission

The human members of a team can transmit certain commands from the "host" computer only with the referee's authorization or when the game is not in progress. Signal transmissions, such as signals to stop any of the robots or signals for restarting, are not permitted without the referee's permission. Direct control of the robots through keyboards or joysticks is not allowed under any circumstances. While the game is in progress, the "host" computer can send any information autonomously. Any non-autonomous information can only be communicated when the game is not in progress.

6. Game Duration

Each match will have 2 equal periods, each with 5 minutes, with a half-time break of 5 minutes. This interval time may or may not occur depending on the teams' need to make any changes in their strategy.

7. Game Start

Before the game begins, the color of the team is decided either by a table or by consensus between the teams.

8. Scoring Method

8.1. Winner

A goal shall be scored when the ball completely passes over the goal line. The winner of a game is determined by the number of goals scored (goal difference).

8.2. Tiebreaker

In the case of a tie after the second half, and if the rules of the competition do not permit a tie at this point in the game, the winner is decided in the overtime scheme. After a 5-minute break (if necessary), the game is continued for two periods of 3 minutes each. If the tie persists after the overtime, the winner is decided on penalties. Each team will have 3 penalty kicks, and if the tie persists, additional penalty kicks will be taken one by one until the winner is decided. The goalkeeper may leave the area after the referee's signal. Other penalty kick information is described in Rule 13. A penalty kick is completed when one of the following situations occurs:

- The goalkeeper catches the ball with any of the equipment (if any) in the goal area;
- The ball goes out of the goal area;
- After 10 seconds counted from the referee's whistle.

8.3. Walkover (WO)

If a team does not show up on the field or does not have robots in playing condition, it is called a WO. In this case, the opposing team would receive the win and a goal difference of 10. The team that declares WO receives a score of 0 and a negative goal difference according to the final score of the game.

Note 1: If both teams declare WO, both receive a score of 0. If this happens in a knockout competition, both teams are disqualified.

9. Fouls

9.1. Personal Fouls

It is called handling, announced by the referee, when a robot other than the goalkeeper holds the ball or when the goalkeeper leaves their goal area. The ball is considered held when it is joined to a robot's body in such a way that no other robot can move it. The responsible team is penalized with a free kick or a penalty kick, depending on where the infraction occurred. When a goalkeeper has possession of the ball without contesting it, they must kick it out of their goal area within a maximum of 5 seconds. If they fail to do so, they are penalized with a penalty kick given to the opposing team. If an attacker contests the ball with the goalkeeper during this time, the countdown is restarted. However, if the attacker blocks the goalkeeper, it is considered a goal kick. The direct messaging of a human operator to the robot is only allowed with the referee's authorization. If the messaging is discovered at any other time, the game is immediately stopped for analysis, and the penalty can range from a penalty kick for the opposing team to the disqualification of the team that committed the infraction.

9.2. Offensive Fouls

A team attacking with more than one robot in the opponent's goal area is penalized with a goal kick, which can be taken by any player from the opposing team (as long as no other positioning rule is violated). A robot is considered in the goal area if any part of it is inside the area.

Note 1: The second robot in the goal area must actually participate in the play for the fault to be considered. That is, a fault is marked in the case of the 2nd player:

- Preventing or hindering the goalkeeper's movement;
- Touching the ball at any time.

Note 2: If the second player is contesting the ball and is pushed into the area, the team is not penalized with the fault.

Blocking the opposing team's goalkeeper in their respective area results in a free kick, taken by the goalkeeper's team.

9.3. Defense Fouls

A team defending with more than one robot in the goal area is penalized with a penalty kick, except if the attacking team scores a goal. If the ball is not in the goal area, there are no penalties for teams with more than one robot in their goal area. It is allowed to push the goalkeeper robot in the goal area if the ball is between the goalkeeper and the robot that is pushing. A robot is considered in the goal area if more than 50% of it is inside the area, with the confirmation of the referee.

Note: Note 1: The second robot in the goal area must actually participate in the play for the fault to be considered. That is, a penalty is marked in the case of the 2nd player:

- Preventing or hindering the attacker's movement;
- Touching the ball at any time.

Note 2: If the second player is contesting the ball and is pushed into the area, the team is not penalized with the penalty.

10. False Start

A false start is considered when the robot starts a play before the referee's signal, and it can occur at any moment of a dead ball. There are cases where one team has possession of the ball, here now defined as the attacking team, and a team without possession, defined in this item as the defending team. Only in the case of a "free" ball, there is no team with possession. In all cases, the first time the infraction occurs, the team receives a warning, the players are repositioned, and the game is restarted. For the case of recurrence, the penalty is according to the team that commits the infraction and the type of kick:

10.1. Game Start and Restart (Kick Off)

- Attacking Team: first, possession of the ball is switched, and in a new recurrence, a free kick is awarded;
- Defending Team: first, the team is positioned at the edge of its area, and in a new recurrence, a free kick is awarded.

10.2. Penalty

- Attacking Team: a free ball is awarded, and the team loses the penalty kick;
- Defending Team: the goalkeeper is cautioned with a yellow card, and in a new recurrence, he is excluded from the game. He is not replaced and is kept out for 30 seconds of running play or until the opponent scores a goal.

10.3. Free Kick

- Attacking Team: possession of the ball is switched, and the attacking team must position itself completely in its defensive field;
- Defending Team: a penalty kick is awarded to the other team.

10.4. Free Ball

- A free kick is awarded to the other team.

Note: If the referee perceives that a team deliberately abuses false starts, the punishment will be more severe, reaching the declaration of defeat of the team by W.O.

11. Game Interruptions

The game is interrupted, and the robots are repositioned when:

- A robot falls in a way that blocks the goal;
- A goal or a foul is marked;
- The referee orders a free kick, penalty kick, goal kick, or free ball.

The robots must be automatically repositioned. If there is a collision due to both teams choosing the same position, an agreement must be reached so that one or both teams can reposition themselves.

12. Free Kick

For cases defined as fouls, a free kick is awarded. The ball is positioned at the relevant position for the free kick (CL) on the field. The robot that will kick must be positioned behind the ball. The team with possession of the ball can position its robots freely on its side of the field. Then,

the team without possession can position itself in contact with the goal area or on either side of the goal. If it is not positioned correctly, the team is cautioned. If it recurs, a penalty kick is awarded in favor of the team with possession of the ball. With the referee's whistle, all robots can move freely again.

Position of the ball and robots in the free kick:

1. Robot receiving the ball behind the ball;
2. Defending robots in contact with the goal area on either side of the goal;
3. The defending team must position its first robots first.

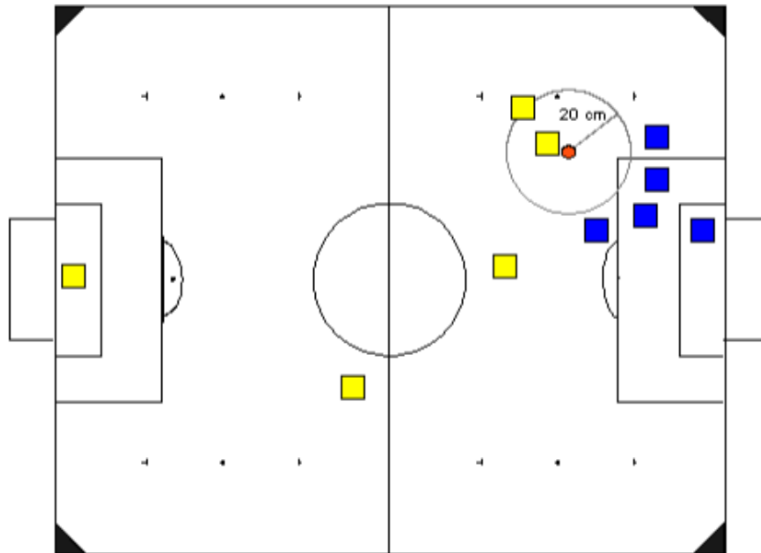


Figure 2: Free Kick Positioning.

13. Penalty Kick

For all cases defined as a penalty (Rules 9, 10, 12) during the game, the ball is positioned in the relevant position for the penalty kick (PK) on the field. The robot taking the penalty is placed behind the ball. During the kick, one side of the goalkeeper must be entirely in contact with the goal line. The goalkeeper can be oriented in any direction. Other robots must be positioned freely within the other half of the field, but the team defending the penalty must be the last to position themselves. With the referee's signal, the game restarts normally (all robots can move freely). The robot taking the penalty can dribble the ball or kick it.

In the case of a penalty shootout after extra time, only one player from each team is placed in the arena, with the others off the field. Teams are allowed to use any of their players in the shootout, without the need to use different robots for attack and defense. The other aspects of the shootout follow the rules described above.

Ball and robot positioning during a penalty kick:

1. Robot kicking the ball towards the goal;
2. Defending goalkeeper must be in contact with the goal line;
3. All other robots from both teams must be in the other half of the field;
4. The defending team must position their robots first.

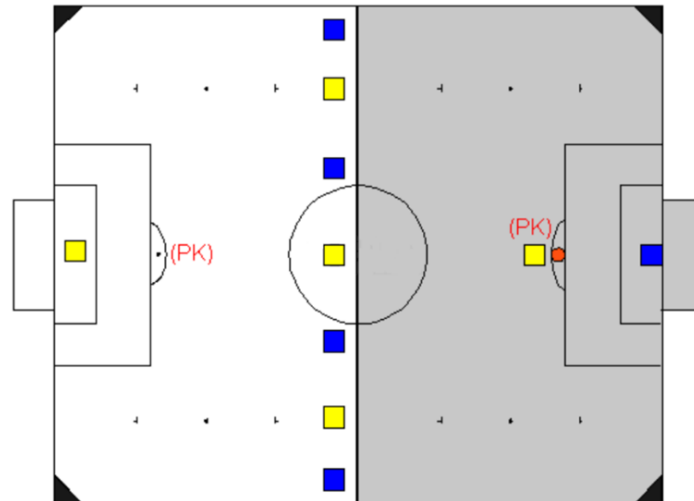


Figure 3: Penalty Kick Positioning.

14. Goal Kick

A goal kick is declared under the following situations:

- When an attacking robot pushes the goalkeeper within the goalkeeper's area without disputing the ball;
- Attacking with more than 1 robot inside the opponent's goal area;
- When the goalkeeper picks up the ball with their equipment (if they have any);
- When a deadlock occurs in the goal area for at least 5 seconds, in which the goalkeeper and an actively playing robot are disputing the ball.

Only the goalkeeper is allowed to remain within the goal area, and the ball can be placed anywhere within the area. Other robots from the team must be positioned outside the goal area. Any player can take the goal kick, respecting Rule 9. The team with possession of the ball must position their robots first. The game must restart after the referee's whistle.

Ball and robot positioning during a goal kick:

1. Only the goalkeeper stays within the goal area;
2. The ball can be placed anywhere within the goal area;
3. The defending team must position their robots first.

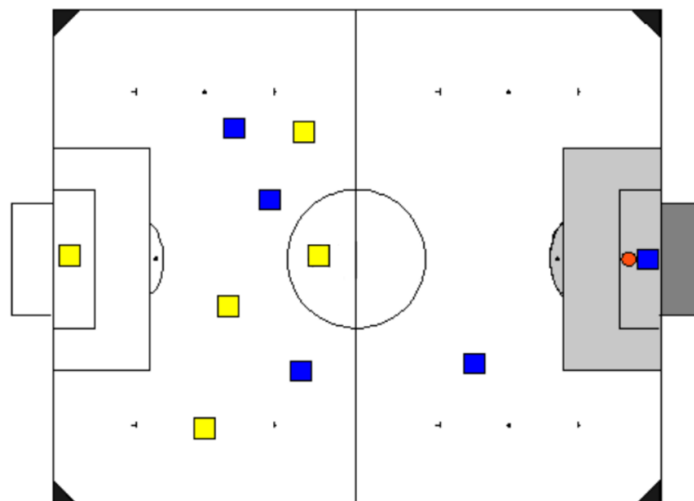


Figure 4: Goal Kick Positioning.

15. Free Ball

The referee declares a free ball when a stalemate occurs for 5 seconds outside of either of the two goal areas. In this case, only some robots may be relocated. When a free ball is declared, the robots must stop, and the ball is positioned by the referee in the relevant free ball (FB) spot on the field, respecting the quadrant of the field where the stalemate occurred. All robots that are less than 20cm away from the free ball mark must be moved to the nearest quadrant of their own field. After that, one (or none) robot from each team may position themselves at the relevant free ball spot (gray circle) closest to their own goal. The other robots (from both teams) can be repositioned as desired or following the standard positioning provided by the referee. The game must restart when the referee signals, and then all robots can move freely.

Position of the ball and robots in a free ball:

1. One robot per team, 20cm away from the ball on each side (horizontal direction);
2. Other robots from both teams stay outside the quadrant where the ball will be launched;
3. The defending team must position their robots first.

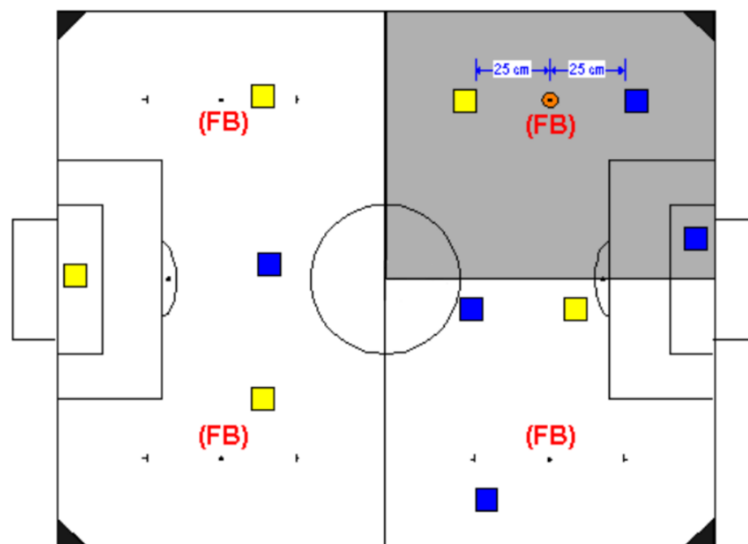


Figure 5: Free Ball Positioning.

16. Omitted Cases

Omitted cases are evaluated by a panel of judges according to the rules described here. For the smooth running of the competition, an additional booklet may be attached with changes or extra rules, provided that it is previously notified to the captains and judges and agreed upon in the captains' meeting. This meeting takes place at the beginning of the competition, together with the team drawing. The presence of the captains (or a representative from the team) is not mandatory, but no team can complain about any decision made in this meeting.

17. Special Rules

Due to problems generated by the pandemic, new rules are necessary for the competition to run correctly. Therefore, they are listed below:

- The judges responsible for the games are the responsibility of the event organizing team.
- Access to the servers is made through a key provided individually to each team. Therefore, it is the participating team's responsibility to ensure that access is made

conscientiously. During the games, only one member of the teams involved in the match is allowed access.

- If the improper presence is proven, the team is penalized with a loss of 3 points and a decrease in goal difference by 2. Recurrence disqualifies the team.