Football 4 x 4 robot

OPEN

GAME RULES

Section 1 Participants

Article 1

1.1 There are 4 members per team.

1.2 Every team may or may not have one teacher/mentor by each team.

1.3 Each participant can play in only one team.

1.4 A mentor/teacher may supervise multiple teams

Section 2 Competition field

Article 2 Competition field information

2.1 The competition field spans 2.4 x 4.8 meters in dimensions. The size is subject to possible modifications without prior notification, considering the available competition area, while preserving the general field shape. The field might incorporate connections with heights not exceeding 3 mm and is enclosed

by walls.

2.2 The ground color is green and there are white lines for the penalty area, penalty line, and center circle as shown in Figure 1.

2.3 There is a 10-centimeter-high boundary around the court to prevent the ball from flowing out of the field too easily.

2.4 There are 2 goals placed on each side of the field, measuring 80 cm. wide, 40 cm. high, and 30 cm. deep.

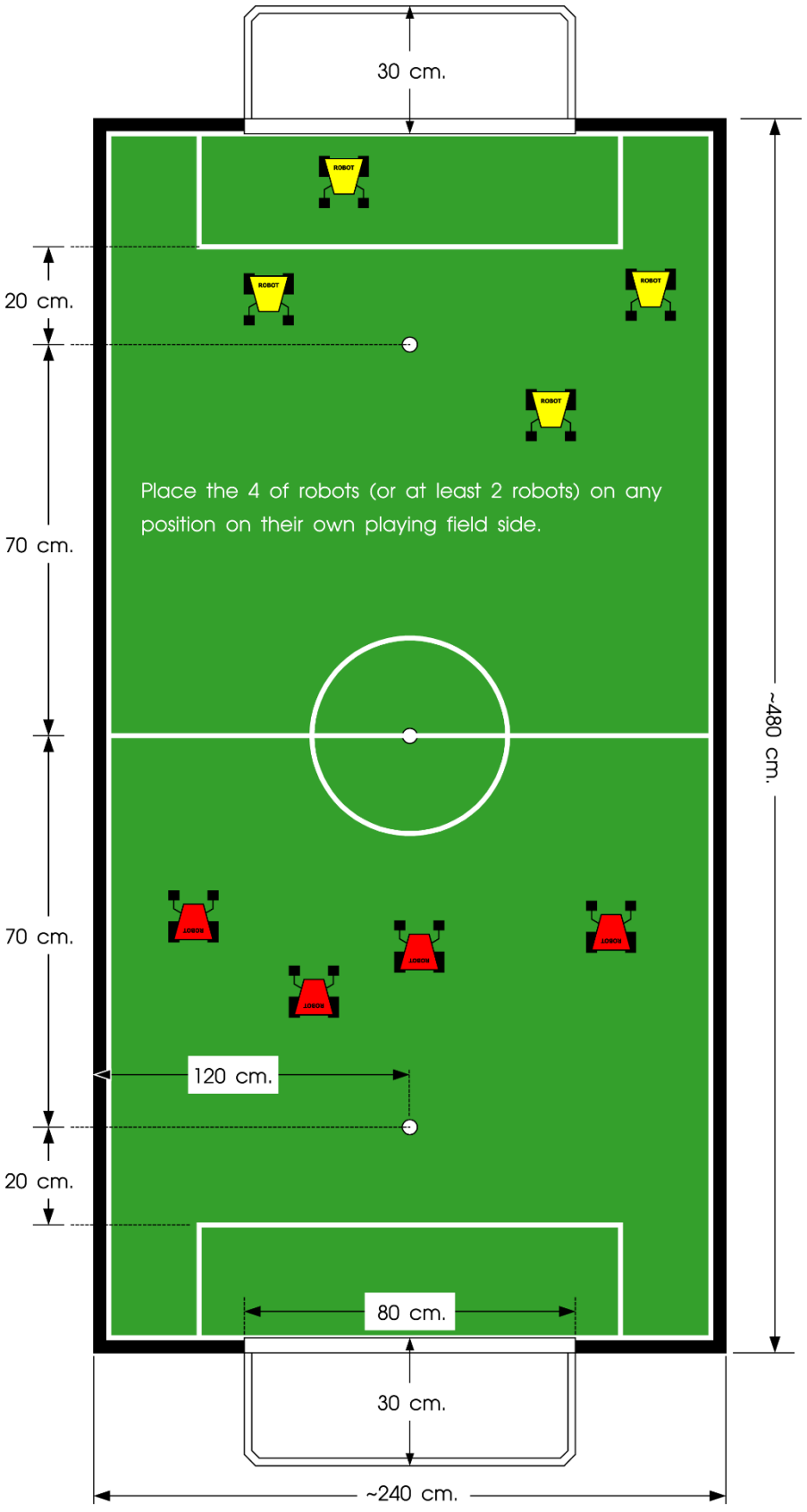

Figure 1 : The Football 4x4 robot competition field

Section 3 Robot requirements

Article 3 Technical features

3.1 The robot size must not exceed than 25 x 25 cm.

3.2 For microcontroller rules, the sole decision rests with the individual country representative or the committee in the absence of a country representative. Please contact your individual country representative/committee for more information.

3.3 No limit of number of motors for movement and ball mechanism.

3.4 The brushless motors and fan that helping the movement are prohibited (used as suction)

3.5 The weight of each robot must not exceed 1 kg.

3.6 The robot used in the competition must move on the floor without any restrictions on movement patterns.

3.7 During the competition, the robot must remain in its original configuration and cannot be disassembled or extended.

3.8 The robot used in the competition can be either an autonomous or remote-controlled mobile robot, and there are no restrictions on the format of the remote control.

3.9 Participants must be prepared for possible interference with radio waves or infrared light from the remote-control during training and competition.

3.10 No limit on the source of mechanical parts and accessories. It can be hand-made, formed from 3D printer, or modified from toy.

3.11 Fixing screws and nuts or any fixation device in the robot must be securely firmly. If during the competition, any piece dropped or break onto the competition field, the referees will not remove it and will be allowed to continue the competition. Referees cannot be held responsible for consequences during removal of a loose piece from the competition field.

3.12 No limit for the computer properties used to program the robot.

3.13 Participants must securely install batteries and ensure they are protected from potential damage caused by robot collisions.

3.14 The robot should be capable of moving the ball. For example, there should be a mechanism for flicking, kicking, tapping, shoot the ball while the robot is not moving.

3.13 The use or installation of blades or similar tools in the robot is strictly prohibited.

3.14 Attaching a sheet of material or scoop that is beveled in the shape of a sumo robot on the robot body is not allowed.

3.15 Do not use any device that can shoot, throw, or release parts from the robot towards the opponent.

3.16 No parts of the robot should be designed to grab, hold, or grip the ball during the competition.

3.17 The robot should be sturdy and robust since collisions with the wall may occur at any time.

Article 4 Prohibition of creating the robot

Parts or equipment that can, in any way damage the competition field is prohibited.

Section 4 Mission

The Participants control the robots to direct the ball into the opponent's goal, similar to a human football match. The team that scores more goals at the end of the competition time will be declared the winner.

Article 5 The competition time

Total time is 6 minutes divided into 2 halves of 3 minutes each.

Article 6 Goal scoring

6.1 Unofficial goal or score counting takes place continuously throughout the match. When the ball enters the goal correctly once, one goal is scored.

6.2 The official goal or score counting takes place at the end of the match time.

6.3 For a goal to be considered valid, the ball must completely cross the goal line into the interior of the goal, regardless of whether the ball is in possession of either side's robot.

6.4 The team that scores more goals or points at the end of the competition time will be declared the winner, earning 3 points.

6.5 In the case of equal goals scored at the end of the time, it will be considered a draw, and each team will receive 1 point.

Article 7 Ball information

7.1 Balls used in the games may be made of rubber, cloth, or synthetic fiber. They should be soft and not bounce excessively. During the game, only one ball will be used. If the ball goes out of bounds, it may be replaced at any time to ensure the competition proceeds continuously.

7.2 The ball used in the competition must not be more than 15 cm in diameter and not more than 200 g. in weight.

7.3 The ball can be of any pattern or color. Referees cannot endorse any impact on the engineering or performance of the competitor's robot.

Section 5 Competition format

Article 8 Competition pattern

8.1 The competition system in the first round is divided into groups. There are 4 teams maximum in each group. The winning team in each match will receive 3 points. In case of a tie, each team will receive 1 point, and the losing team will not accumulate any points.

8.2 The first round will qualify the 1st and 2nd place teams to the knock out stage.

8.3 From the second round until the final, it is a knock-out stage. The pairings will be decided by drawing lots before the competition. The robot team that scores more points will advance to the final round, and the losing team will be eliminated.

8.4 From the second round onwards, if the match results in a draw, 3 penalty shoot-outs will be taken for each team. The team that scores the most points in the penalty shoot-outs wins. If the score is still tied, the result will be decided by sudden dead

shoot-out for each team. The team that scores more penalty shoot-outs wins.

8.5 According to 8.4, if there is still a draw, the finalists will be determined by weighing the total weight of each team's four robots. The team with the smaller total weight will be declared the winner.

8.6 The losing teams in the quarterfinals will receive the **3rd runner-up** award, with a total of 4 teams.

8.7 The losing teams in the semifinals will receive the **2nd runner-up** award, totaling 2 teams.

8.8 In the final tournament, the winning team will be declared the **Champion**, and the losing team will receive the **1st runner-up** award.

Section 6 Start, stop, continue, and end of the competition

Article 9 Start of the competition

9.1 Before the game start, the referee place the ball on the middle of the field.

9.2 Participants are expected to choose a side and indicate their starting kick-off. The referee may utilize a coin toss method to establish which team will have the first turn.

9.3 Offensive robots (the team that starts first) shall be placed near at least one ball, while the rest must be in their own court at any location. As for the defensive robot, it must be placed outside the center circle at any position in their own side.

9.4 Participants turn on all the robots. They must test whether they can operate or control the robot remotely and then move the robot back at least 30 cm. behind the goal. The robots should wait for the signal to kick-off.

9.5 Upon receiving the kick-off signal from the referee, the offensive team must maneuver their robots to kick the ball. Once the ball has been displaced from the center of the field, all other robots on the field must commence movement without delay.

9.6 Participants must use a remote control to operate the robot only within the CONTROL AREA. For every infringement of the rules, the referee will award the opponent one penalty shoot.

Article 10 The format of the competition, stopping and continuing

10.1 When the referee signals the kick-off, the participants should control the robot to gain possession of the ball and attempt to maneuver it into the opponent's goal area to the best of their ability.

10.2 The robot's possession or dribbling of the ball must not involve holding, picking up, carrying, or gripping the ball by the robot itself. If using robot parts to occupy a ball, it must not occupy more than 50% of the ball's total size.

10.3 Should the ball exit the side of competition field, the referee will place the ball as quickly as possible on the spot where it went out of the field. The team that did not make the last contact with the ball will be executing kick the ball from the location where the ball left the field. The competition time will continue.

10.4 In the case that the ball exits behind the goal, if the team that last touched the ball is the defensice team, the offensive robot team are required to perform a kick from the corner of the field where the ball exited or called "a corner kick". If the offensive team was the last to touch the ball, the offensive robots must retreat to the line behind the penalty mark of their own side, allowing the defensive robot team to play the ball out of the goal box.

10.5 Upon the ball entering the goal, the offensive robot team earns 1 goal score. Subsequently, the defensive robot team will position the ball at the center of the field and await the referee's signal to resume play.

10.6 If any participant touches the robot during the competition, the referee will order that robot to be taken out of the game immediately.

10.7 When the robot encounters a problem and cannot continue to perform the task, the robot must be taken out of the field for repairs. Downloading the code is not allowed and the competition time still continues.

10.8 All robots of both parties must be in motion at all times. If any robot does not move, it must be removed from the field immediately. It can return to the field again when fixed, but the participants must notify the referee first.

Article 11 Finishing the game

The competition will end when:

11.1 Both teams of robots are completely damaged to the point of being unable to compete before the end of the competition.

11.2 The end of the game time is reached.

11.3 Both teams are ordered to stop playing.

11.4 At the end of the competition, the referee will immediately record the result of the match.

Section 7 Fouls

Article 12

Those any competitors do the action following the Article 4, 13 and 14 will be ordered to fouls.

Article 13

The participants who act insulting, abusing an opponent, whether verbally or physically, or lets the robot make noises, express messages, or act in a disrespectful manner, will be disqualify.

Article 14

If the participant does any of the following, it will also be considered a violation of the rules:

14.1 Do any act that interferes with the opponent's robot.

14.2 Take any action that causes the competition to be stopped without justifiable reason.

Section 8 Punishment

Article 15

Those the participants do the action following the Article 12 will be ordered to stop the competition. If a team repeatedly makes mistakes, the team will be disqualified.

Section 9 Damages and accidents in the competition

Article 16 Request to stop the competition

The referee will make the final decision.

Article 17 Repairing the robot

17.1 Participants can repair and modify the robot program at any time after obtaining permission from the referee.

17.2 Participants can repair the robot at any time during the competition while the timer continues.

17.3 It is strictly forbidden to change the robot body and any competitor during the repair of the robot.

17.4 The repair or improvement of the robot must be carried out in the designated area only.

17.5 Repairs must be conducted at the designated repair area using light tools only. Heavy tools such as bench drills and cutting machines are not allowed.

17.6 After being repaired, the robot can return to the field again by informing the referee.

Section 10: Robot Identification

Article 18

Naming or any identifiers must be obvious and easy to see all the time during the competition.