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Battle Cube Single

League

Junior

Participation

1

Person

1

Robot

Construction

Pre-made

1. Game Description

Battle Cube single is a tournament which is control by premade robot and need an understanding of robot structure and good skill of programming robot are required. Skill aptitude Kit is allowed to use in the competition. After school kit is used only in final round but is doesn't related to qualification to international tournament.

2. Robot

2-1. Type of robot

2-1-1. only selected robot kit can be used.

(Communication component items must be involved in Kit Items.)

<2017 After school kit authorized by IROC>

Company name	Materials	
Robotis	Ollo	Level 1,2,3,4
	Dream	Level 1,2,3,4
	Smart(I)	Level 1,2,3
	Smart(II)	Level 1,2,3
Roborobo	School Kit	Level 1,2,3,4,5,6,7

2-1-2. no frame restriction applies if the flame selected robot kit.

(But, there is restriction on sensor, motor and board.)

2-1-3. combination of using selected robot kit are not allowed

(Product A 1~2 steps + Product B 3~4 steps (X))

But, it is able to use same product line.

(Product A 1~4 steps + Product A 1~4 steps (O))

2-1-4. Different types of the robot cannot be used in team during competition.

(Robot 1: Product A + Robot 2 : Product B(X))

2-1-5. It is not allowed to change the shape of frame

2-2. Construction

2-2-1. Pre-built

All robots must be pre-built before the competition and construction time is not given

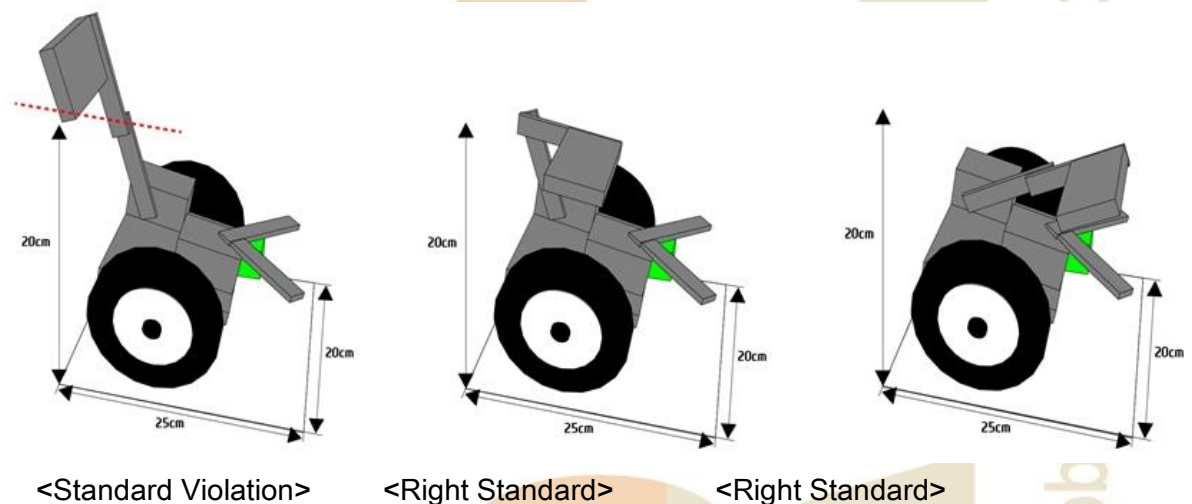
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in the playfield.

2-2-2. Size: Less than 25cm X 20cm X 20cm (L X W X H)

2-2-1-1. Size measurement

- 1) Official inspection: Size of robot will be measured by referee before match.
- 2) Way of Measuring: When the power of robot start to move will start to measure the equipment and participant cannot give any objection toward the judge.
- 3) If the robot exceeds the size, 1minute modification time will be given at the referees stands in front of playfield.
- 4) If the participant fails to modify the robot on time, he/she will be disqualified.



2-2-3. Weight: Except controller, weight of a robot is less than 1kg (including battery)

2-2-4. Sensor: No restriction

2-3. Power source

2-3-1. Robots should work with an independent electric power supply; it cannot use a combustible device.

2-3-2. KIT including the battery case which had been approval can be used.

2-3-3. There are no limitations on type of battery or voltage level. However, usage of extra battery case is not allowed. Also, participant who added part to install extra battery will be disqualified.

2-4. Operation: No restriction.

2-5. Programming and control

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2-5-1. Both programmed robot and remote-controlled robot are allowed.

2-5-2. Robot is not allowed to work without remote-controlled by its competitor in preparation time.

2-5-3. Control communication specification

2-5-3-1. Zigbee /Bluetooth /2.4Ghz wireless, Smart phone are allowed, wired control is not allowed.

2-5-3-2. When communication system is interrupted then both team are disqualified the competition if changing channel is not working.

2-6. Spare robot

2-6-1. Robot preparation

Both main and spare robots should be confirmed by referee before match.

2-6-2. Spare robot use

Participant must get permission by the referee when switching the robot. (Time of switch might be different of progress in League and Tournament)

2-6-2-1. League: switch is allowed before the group matches start.

2-6-2-2. Tournament: switch is allowed before each match start.

2-7. unfaithful start

If the robot changes its size and shape compare to official inspection when the match starts, participant will be disqualified.

3. Competition Site

3-1. Site has to be used approval by IROC.

3-2. Structure

3-2-1. Size and arrangement: Two blocks with size 160cm x 120cm ($\pm 10\%$) are connected.

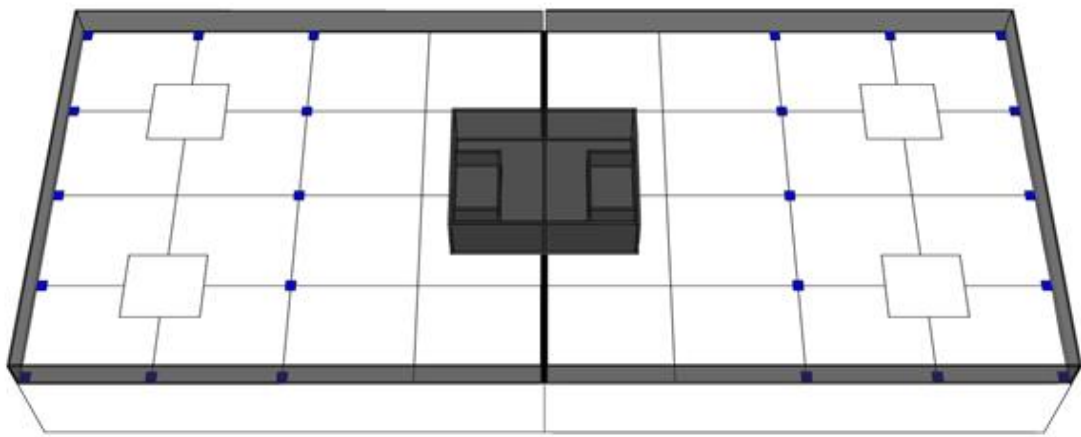
3-2-2. Less than 2° gradient ($\pm 10\%$) is possible to exist in site.

3-2-3. Less than 0.3cm ($\pm 10\%$) irregularity or crack is possible to exist in site.

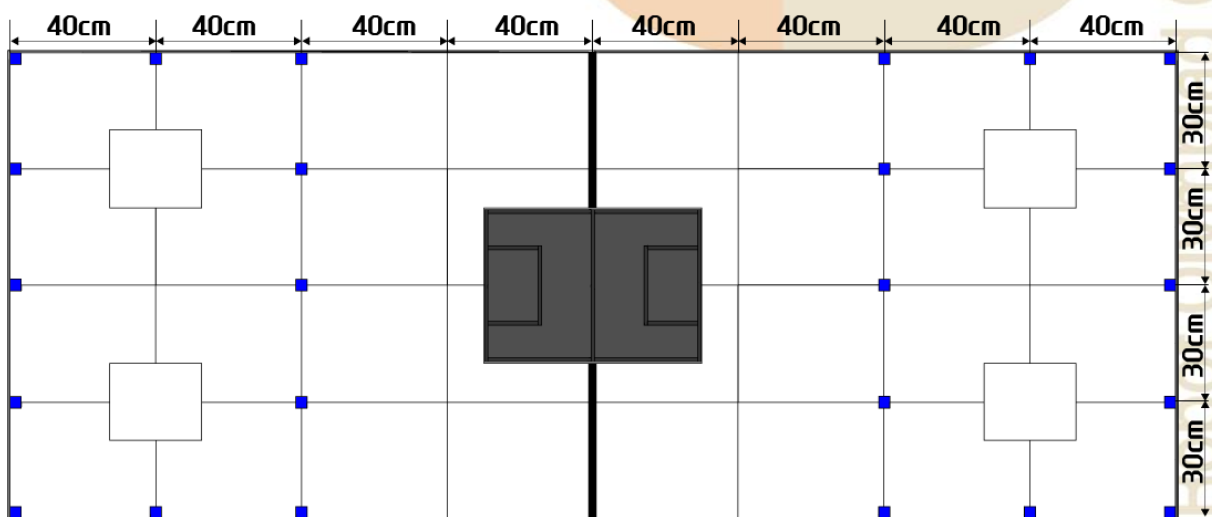
3-2-4. Transparent acrylic wall height 10cm ($\pm 10\%$) for prevent robot from falling is installed around the playfield.



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<<Picture 1. Example of Site>>



<<Picture 2. Size of Site>>

3-3. Site Field

3-3-1. field

3-3-1-1. Floor is made of glossy coated PET. Color is white, and sheet may be added for IROC logo or advertisement

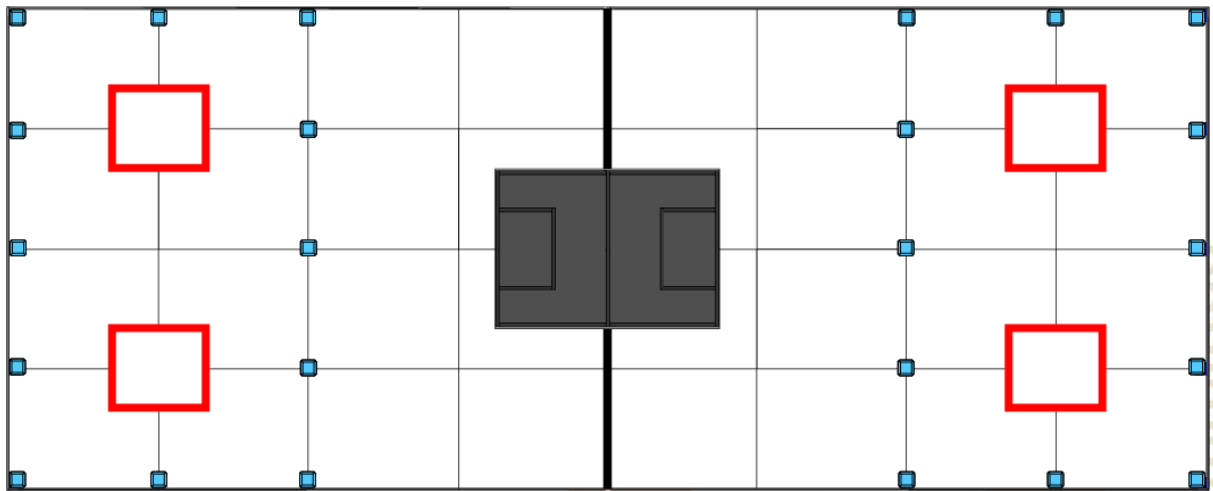
3-3-1-2. Site floor is joined by sheet paper or type.

3-3-1-3. Line: Black line with 2cm ($\pm 10\%$) wide

3-3-2. Starting point

Each robot is able to start from one of the red circle (below the picture) that participants can choose where to start.

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<<Picture 3 place of starting point>>

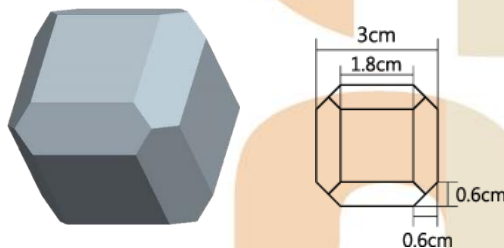
3-4. Site Attachments

3-4-1. Target

3-4-1-1. shape: polyhedron cube.

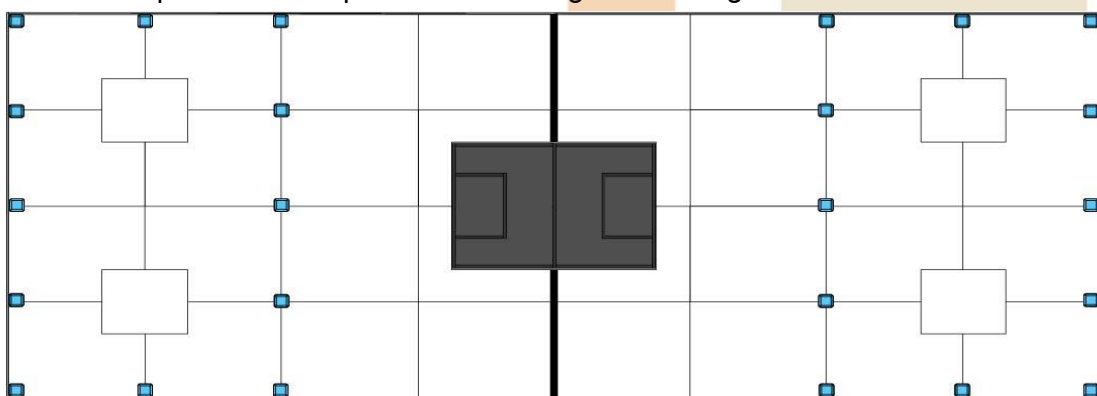
3-4-1-2. weight: less than 20g ($\pm 10\%$)

3-4-1-3. Size: 3cm x 3cm x 3cm (W x L x H, $\pm 10\%$)



<<Picture 4. shape and standard of cube >>

3-4-1-4. Arrangement: cube will be placed by referee and assistant referee below the picture. Participant cannot change the arrangement.



<<Picture 5. Placement of cube>>

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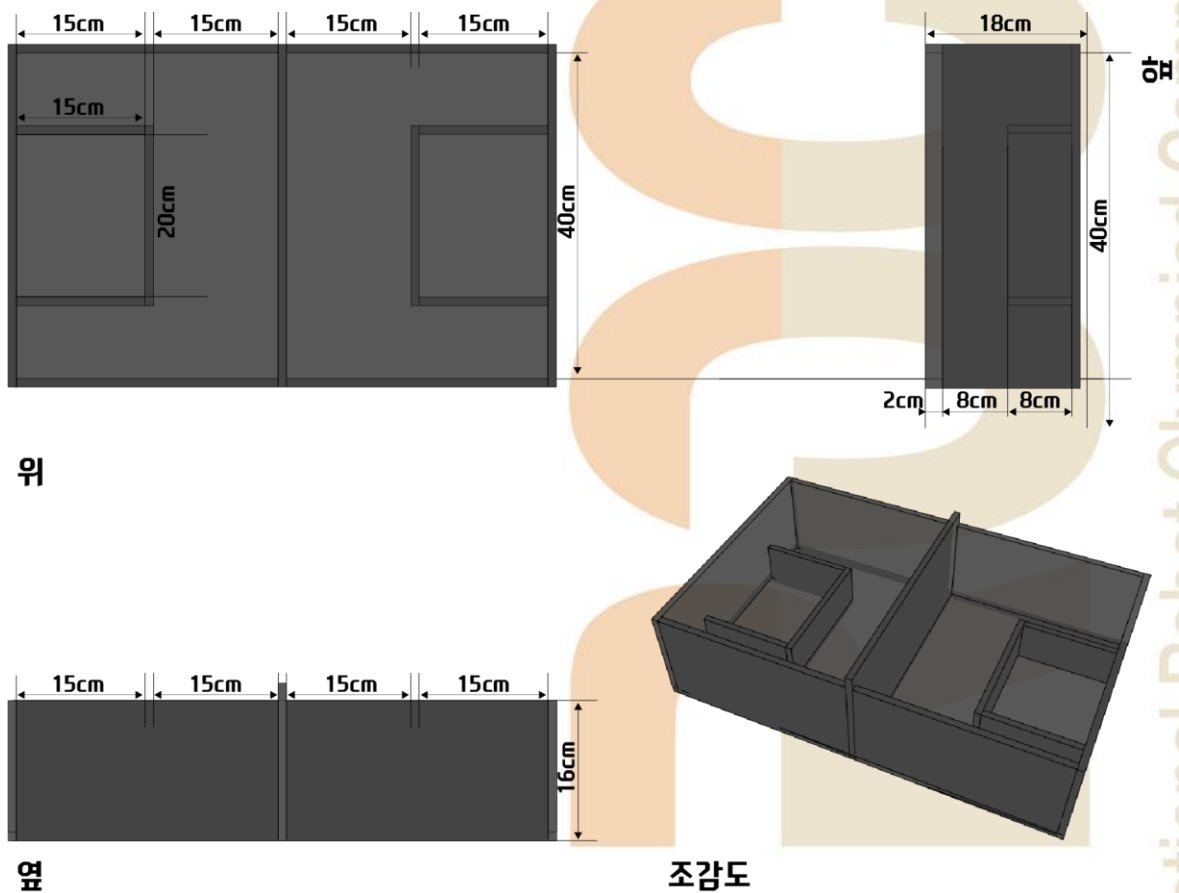
3-4-2. Destination

3-4-2-1. Shape: basket.

3-4-2-2. Size

- 1) Centre of basket: Less than 18cm (H, $\pm 10\%$)
- 2) Above basket: 16cm(H, $\pm 10\%$)
- 3) Below basket: 8cm(H, $\pm 10\%$)

3-4-2-3. Placement: basket is placed the center of site of competition.



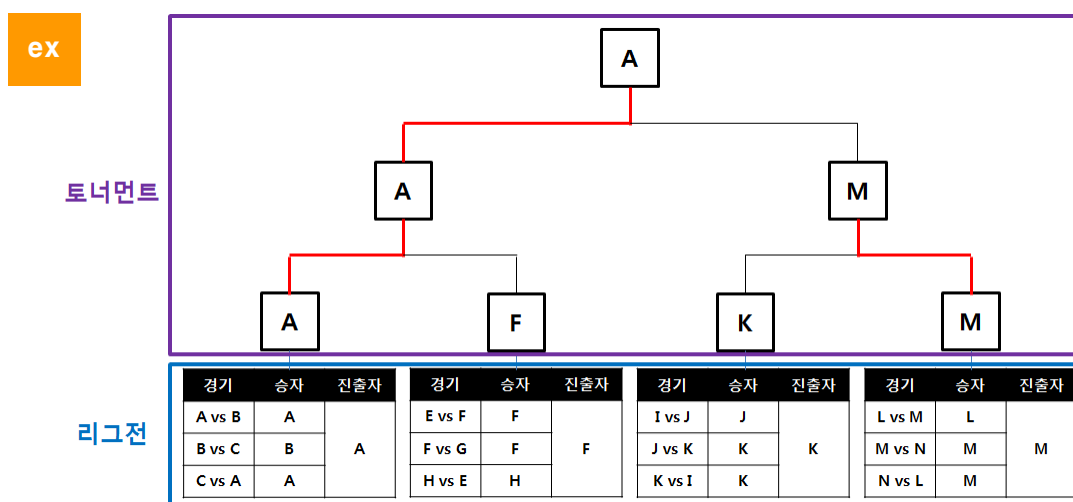
Picture 6 <<Basket standard>>-Bird eye view

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4. Competition

4-1. Match method

There are two stages: the league stage followed by the tournament.



<Above is the tournament and below is league>

4-2. League (qualifying round)

4-2-1. Group draws: All participators are in groups in three by draw.

4-2-2. Winning point and qualify tournament: The participant with highest Points proceeds to tournament. (Win: 3 points, Draw: 1 point, Lose: 0 point).

4-3. Tournament (main match)

4-3-1. Counterpart will be decided by group draws.

(Ex: group A 1st : group C 1st , group B 1st : group D 1st)

4-3-2. Draw is not accepted and extra time is given until winner is decided.

4-4. Robot Modification

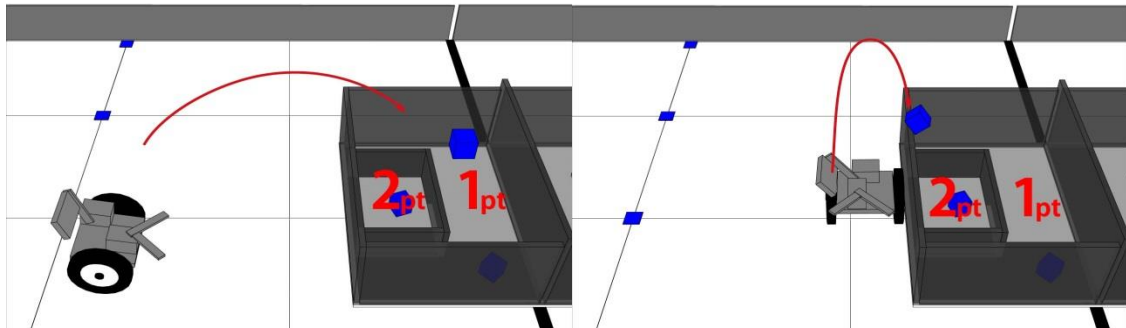
All teams are given a modification time after each match finished by referee's decisions.

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5. Match

5-1. Perform the mission

Participants control their robot to put cubes in the basket launching at the designated area.



picture 7. << Example of game method>>

5-2. match duration

If the mission is not completed within 2 minute from starting point then match is finished and compare level of completing mission.

5-3. Direction decision: It is determined through draw or other fair method before match.

5-3-1. League / Tournament

Direction is decided through draw or flipping a coin, rock paper and scissors other fair methods. And winner has a right to choose the direction.

5-4. Start and Restart

5-4-1. Start: It starts by referees signal. If it starts before the signal then restart is required as illegal work.

5-4-2. Restart: There are two chances to restart. If it does not work following referees signal then it is disqualified.

5-5. transporting cube and shooting

5-5-1. Participants can't transport or shoot more than 4 cubes at once.

(3 cubes are allowed.)

5-5-2. If you put the cube in the opponent basket than opponent gets a point.

(Point will be counted after match)

5-5-3. Shooting area: shooting is allowed in the shadow area of the below picture.

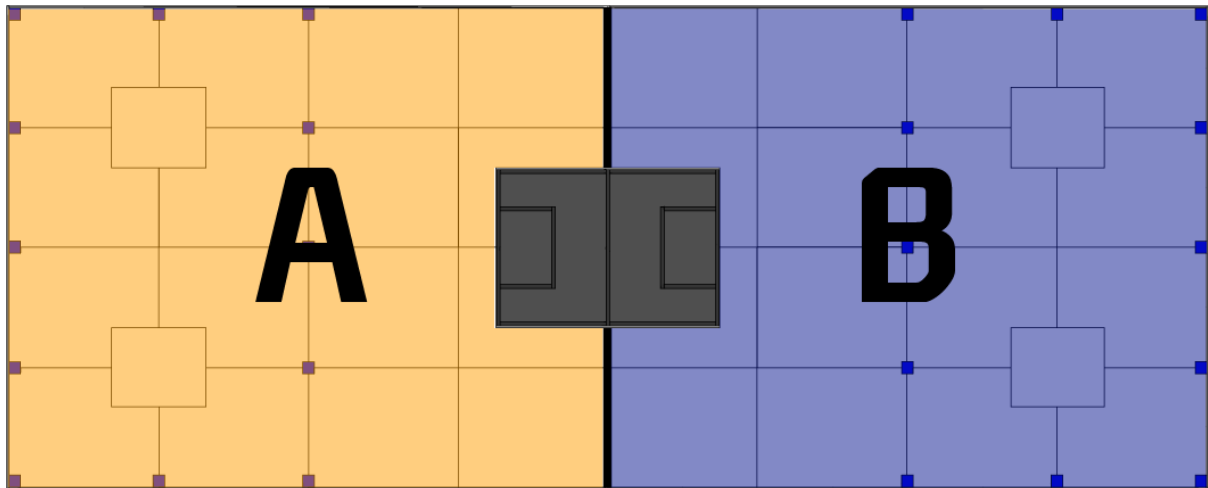
5-5-4. Same shooting in area: Shooting is allowed in same area.

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5-6. Position

5-6-1. each position is divided into two area (below the picture)



Picture 8. <<Division of area>>

5-6-2. Move opponent area: Robot is allowed to move in own area. If it moves to opponent area, then rules has to be followed.

5-6-2-1. 1st move: Match continues. The robot is moved near starting point and count 10. During the counts, robot should not operate, if it moves, then another count 10.

5-6-2-2. Collision with opponent's robot after moving: Disqualified regardless of number of movement.

5-7. robot stop and fall

5-7-1. Robot stop

If robot stops or walks certain area during the game, then referee makes count 10. If robot does not work after counting, then robot stop is made by referee and the robot is taken out of the game. Continue the match with remain robots.

5-7-2. Robot fall

If the robot has fallen out of the board during the game, that robot is out and continue the match with remain robots.

5-8. Penalty

5-8-1. When penalty situation occurs, referee will blow the whistle to pause the game.

Participants are now allowed to move the robots without referee's permission.

5-8-2. Match will start by referee's whistle.

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5-8-3. If the participant touch the robot without referee's permission, he/she will be penalized.

5-8-4. When penalty applies, 1 point will be deducted.

5-9. Guide line

5-9-1. There will be lines around the field and all participants are not allowed to move inside the line. If a participant's both feet are in the line, he/she will be penalized.

5-9-2. If the participant is penalized due to guide line, match continues without 10 counts.

5-10. Called Game

5-10-1. If cube is not in your area, then match ends and count the points at the match end.

5-10-2. decision of a called game can made when last cube falls to the field.

5-11. Disqualification

5-11-1. Robot touch

During matches, participants and their robots are immediately disqualified and removed from match when participants touch robot without referee's authorization.

5-11-2. Penalty

If the participant gets 3 penalties, despite of the result, he/she will be disqualified and total score will be not be added to point to league matches.

5-11-3. A violation of the number of cube rules

If participants transport or shoot the more than 4 cubes, referee will declare a disqualification of the team regardless of the result. Total point of that match will not be reflected in final ranking of league. (3 cubes are allowed.)

6. Evaluation

6-1. Ranking decision

6-1-1. Putting the cubes in the basket below basket 2pt, above basket 1pt.

6-1-2. Gain more points by putting cube in the basket in 2 minutes is the winner.

6-2. Tie-Breaker

6-2-1. League

6-2-1-1. If both team gain same winning point in the league below formula will be

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served.

Cube goal differences > total point > less penalty wins

6-2-2. Tournament

6-2-2-1. Extra time: if referee is unable to decide winner of match after 2 minutes match, there will be an extra time for them.

6-2-2-2. Rematch is conducted during 1 minute (a goal to win method)

6-2-2-3. It is unable to decide winner of match after rematch.

- 1) Each team has free throw 3 times by turns
- 2) Free throw is conducted while cube is placed on the shooting robot.
- 3) Free throw is allowed in the shooting area.

6-2-2-4. Undecided after free throw

- 1) If both team score same points by free throw, two more chance will be given.
- 2) If both teams fail to score, then both are disqualified.

International Robot Olympiad Committee