IRO2016
Indonesian Robotic Olympiad

Regular Category

Elementary School

Game description, rules, and scoring

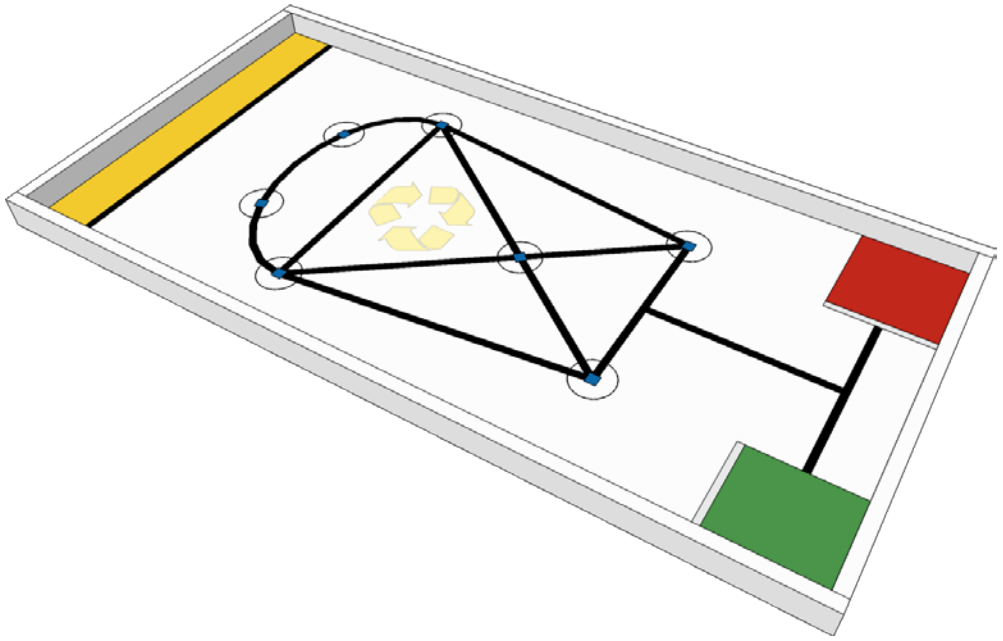
CLEAN ROAD TO SCHOOL

Updated 11 March 2016

1. Challenge

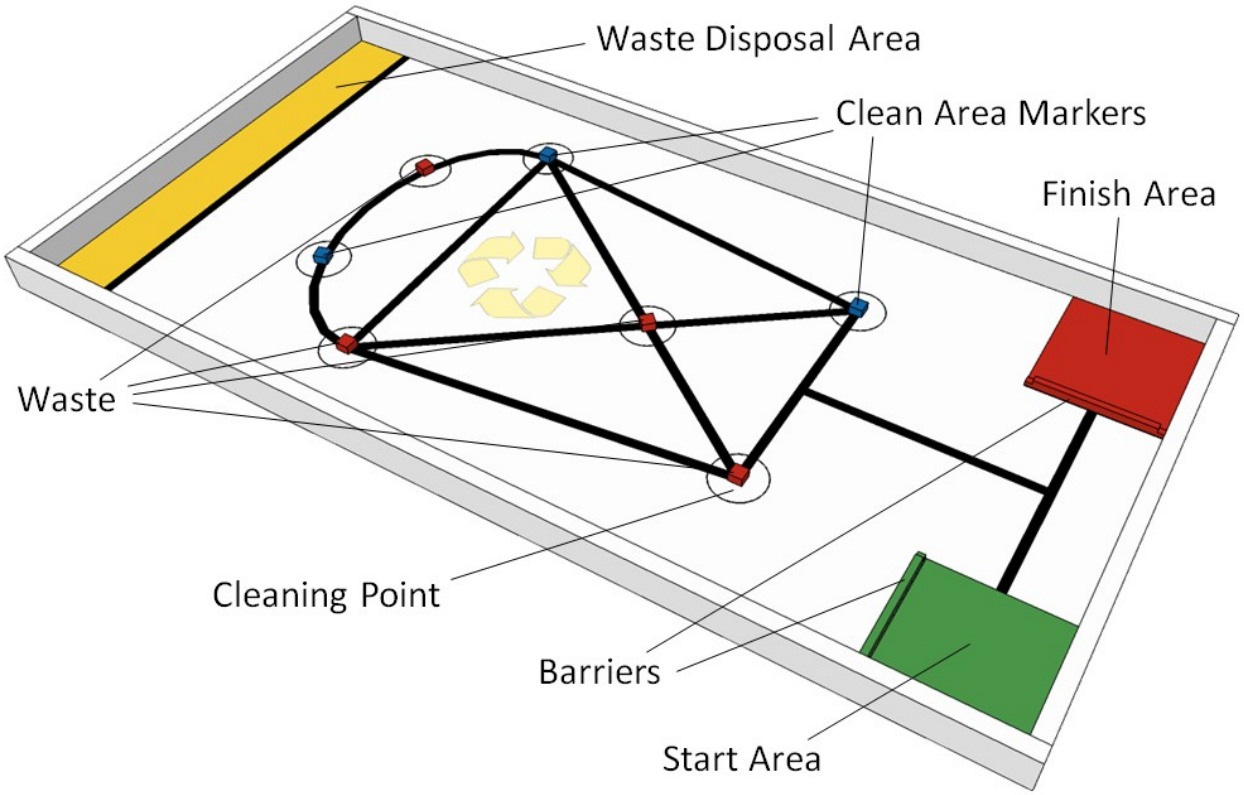
1.1. Overview

The challenge is to make a robot that helps you keep your road to school tidy – starting in your bedroom. Your daily routine begins with making your bed and goes all the way to cleaning the school's playground. There are 7 cleaning points on the journey, some of them containing "Waste/Trash". The 7 points relates to the your journey and they are my-bed (1), my-room (2), my-house (3), my-street (4), my-bus (5), my-school (6) and my-playground (7).



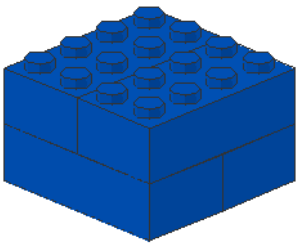
1.2. Description

The mission of the robot is to remove the Waste/Trash represented by red color LEGO blocks from the cleaning points represented by circles, dispose the red blocks in the waste disposal area and mark these cleaning points as "clean" by placing "clean area markers" represented by blue color LEGO blocks in the circles.

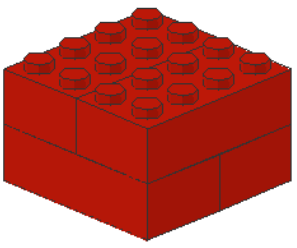


The robot will start from within the start area (green square) carrying 4 blue LEGO blocks to be used as "clean area markers". Randomly placed in the 7 circles are 4 red blocks and 3 blue blocks.

Blue block : Clean area marker



Red Block: Waste/trash



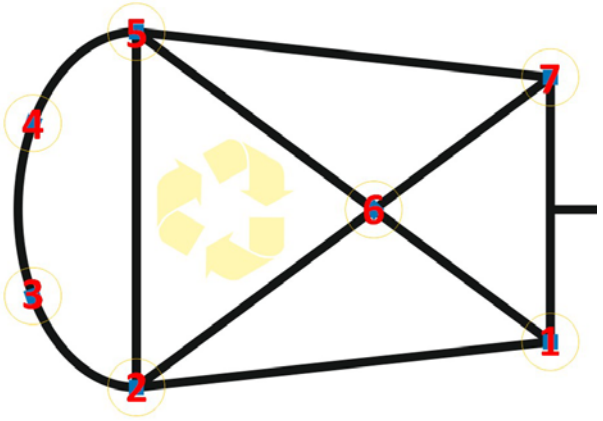
The robot's mission is to put the 4 blue blocks completely inside the 4 circles, containing the 4 red blocks, move the red blocks to be completely inside the waste disposal area (yellow area). The mission is completed when the robot is completely inside the finish area (red square).

The time taken to do the mission is 2 minutes.

2. Match Definition
2.1. Rules & Regulation

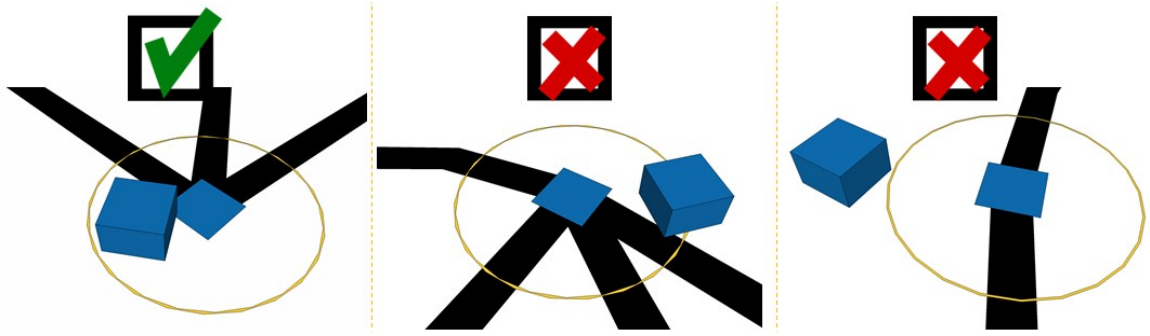
1. Before the robot is placed in the quarantine area for inspection the robot must have only one program with the name "run" in the "Software Files" folder on the NXT brick or only one project on the EV3 brick. The name of the project must be "IRO2016" and the main executable file must be named "run". The judge is allowed to do inspection of the brick before the robot is run. If more than one executable (on the NXT brick) or project (on the EV3 brick) is detected the participant must remove all files, which violates the requirement.
2. The robot will have 2 minutes to complete the challenge. Time begins at the point when the judge gives the signal to start. The robot must be placed in the starting area so the projection of the robot on the game mat is completely within the start area. The participants are allowed to make physical adjustments to the robot in the starting area. However, it is not allowed to enter data to a program, nor changing positions or orientation of the robot parts. Teams that violates this rule might be disqualified from that round. Once physical adjustments have been made to the satisfaction of the participants, the judge will give the signal to start the mission.
3. Before the robot is placed in the quarantine area the team places the 4 blue blocks in the robot as so the robot is still within the size allowed by rules. As part of the inspection during the quarantine it will be checked that the robot does not have elements which are similar to game objects besides the 4 blue blocks. No changes are allowed in the construction of the robot after the quarantine time.
4. Before each round the 4 red blocks and the 3 blue blocks are placed randomly on the blue squares of the 7 circles. The random placement can be done as follows: The 4 red and 3 blue blocks are placed in a non-transparent box. They

are taken one by one from the box and put by studs directed up on the field completely within the blue squares within the 7 circles starting from the circle number 1. The chosen placements of the blocks are kept constant through a round.

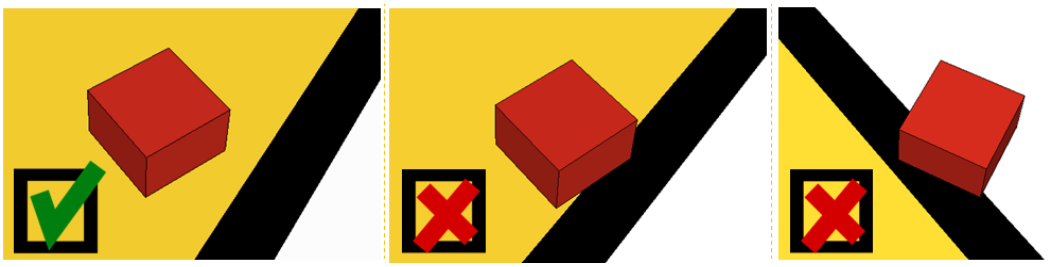


The numbered circles are the cleaning points: my-bed (1), my-room (2), my-house (3), my-street (4), my-bus (5), my-school (6) and my-playground (7).

5. The robot's mission is to put the 4 blue blocks completely inside the 4 circles, containing the 4 red blocks, move the red blocks to be completely inside the waste disposal area (yellow area). The mission is completed when the robot is completely inside the finish area (red square).
6. The blue blocks can be placed by the robot in any orientation and any position completely inside the circles. The block must touch the mat in order to be considered within the circle. The block must not be damaged (disassembled).



7. The red blocks can be placed by the robot in any orientation and any position completely inside the waste disposal area. The block must touch the mat in order to be considered within the waste disposal area. The block must not be damaged (disassembled). The black line is not part of the waste disposal area.



8. If there is more than one blue block in any circle, points will be awarded only for one blue block.
9. If there is a blue block and a red block together inside any circle, the points for the blue block will not be given.
10. The robot must not move the green and red barriers from the grey rectangles on one side of the start and finish area. Penalty will be assigned to the robot if the barrier is not completely in the grey rectangle at the end of an attempt.
11. It is not allowed for the teams to touch the robot during the run.
12. The robot can leave on the field any parts of the robot that are not containing main units (controller, motors, sensors) if needed. As soon as the part is touching the field or its game element and does not touch the robot it is considered as a free LEGO element not being part of the robot.
13. If there is any uncertainty during the task, the judge makes the final decision. They will bias their decision to the worst outcome available for the context of the situation.
14. Your attempt and time will end if:
    a. Challenge time (2 minutes) has ended.
    b. Any team member touches the robot during the run.
    c. The robot has completely left the game table.

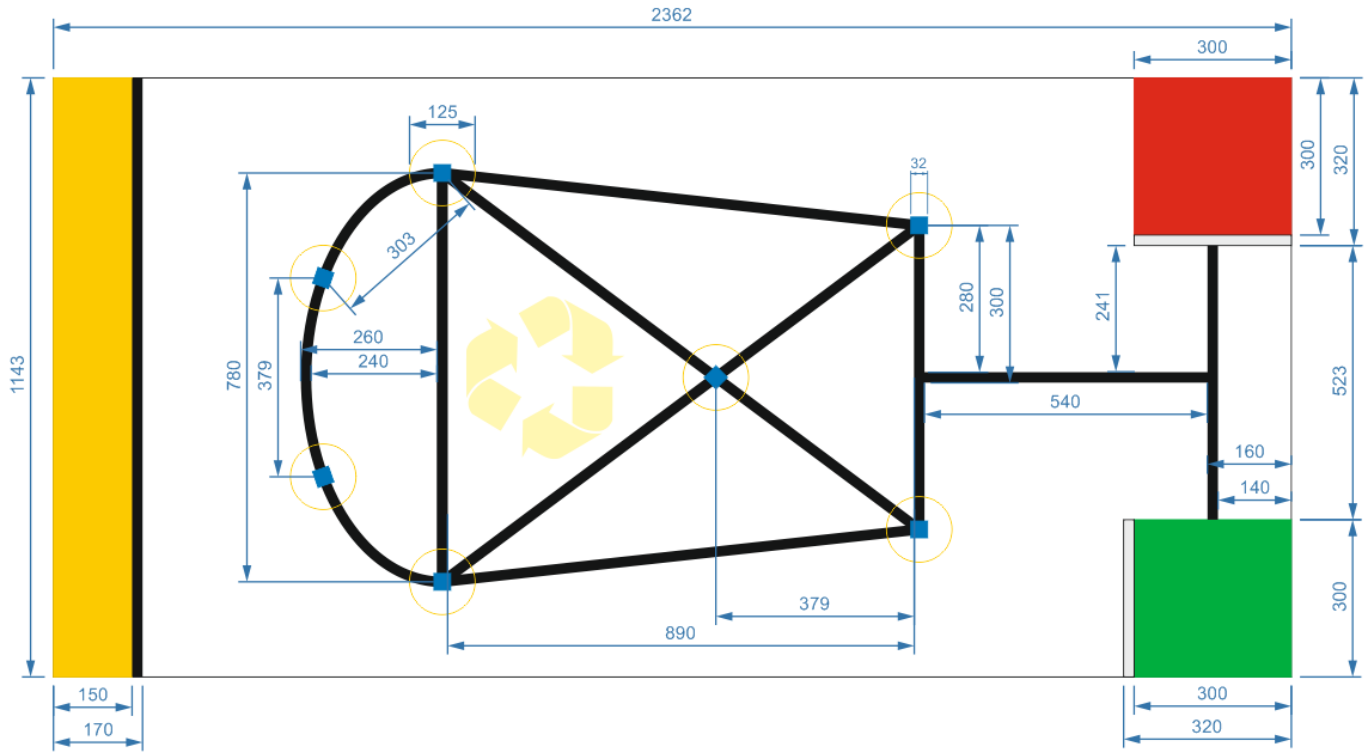
d. A team member shouts "STOP" to end the run.
e. Violation of the rules and regulations within.
f. When the all parts of the robot which is touching the mat is completely in the finish area.

2.2 Scoring

1. Score will only be calculated at the end of the challenge or when time stops.
2. Maximum score: 100 points.
3. If teams have the same score, ranking is decided by the fastest time recorded.

Particulars	Points Each	Total
Remove red blocks completely out of the circles.	5 points per block	20 points
Blue blocks placed completely inside circles where a red block was positioned initially.	10 points per block	40 points
Red blocks deposited completely in waste disposal area. No blue blocks in this area.	5 points per block	20 points
Robot ends completely in finish area.		5 points
Mission completed successfully: 4 red blocks completely in yellow disposal area, only 7 blue blocks completely inside 7 circles, no other blue blocks on the field, the robot completely in the finish area.		15 points
Robot displaces barriers from its marked position alongside the start or finish area.	-5 points per barrier	-10 points
Maximum score	100 points	

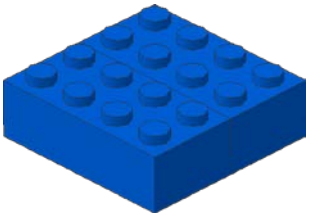
3. Table Specifications



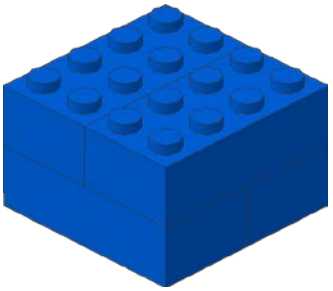
1. The internal sizes of a game table are 2362 mm x 1143 mm.
2. The external sizes of the table are 2438 mm x 1219 mm.
3. Primary color of a table surface is white.
4. Height of the borders: 70 ± 20 mm.
5. All back lines are 20 ± 1 mm.
6. Dimensions may vary within ± 5 mm.

4. Challenge Objects

There are 3 Blue 4x4 blocks – Clean Area Markers and 4 Red 4x4 blocks – Waste/Trash.

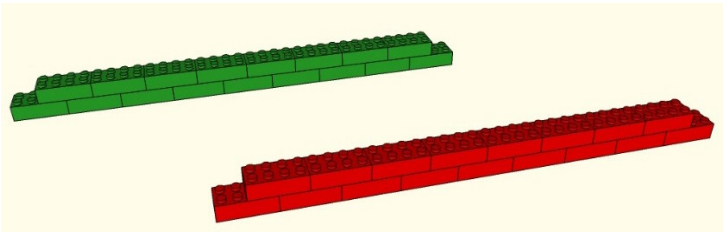


Step 1



Step 2

A green and red barrier made out of 4x2 LEGO bricks and located within the grey rectangles on one side of the start and finish area:



Each barrier is made of 17 LEGO Bricks 2x4