

## NERC 2019- CONTEST THEME

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The focus of NERC 2019 theme is to create autonomous robots that can simulate Kitchen Recycling. In this theme there will be two robots. One of them is working in the kitchen preparing orders and handing over recycling objects. This robot is called the feeder bot. The feeder bot will hand over four different types recycling objects (squash balls) including plastic, glass, food waste and food boxes. The second robot called the Janitor robot will take these recycling objects from the feeder bot and throw them in respective bins(hoops) one by one. The first team to throw all the recycling objects correctly into the bins will be declared the winner.

1. The Contest arena shown in Figure 1 consists of two sub arenas, both the sides are identical to each other.
2. Laminated wooden sheets (lasani) are used for the construction of the arena. The floor of each will be of white color as shown in the map.
3. The walls have a height of 4 inches throughout the arena.
4. The entire arena is divided into 20x20 cm grids. Each grid is assigned a row and a column number. The dashed lines in Figure 1 represents solid black lines marking the grids.
5. The robot will start at the grid line (1,7) facing in the direction of the arrow as marked in Figure 1. The starting position and orientation of the janitor robot is fixed.
6. The robot will follow the lines marked in the arena to reach the Kitchen. The Kitchen is an empty grid unit of size 20x20cm. The teams will place their feeder bot at this grid unit. The feeder bot is a manual/electronic mechanism which will transfer the recycling objects (squash balls) to the janitor robot.
7. The feeder bot cannot move from the location it is placed in. The feeder bot cannot extend beyond the space it is placed in.
8. The feeder bot will be pre-loaded with four squash balls before the start of the match. The team will place the feeder bot at the location marked as Kitchen before the start of the match.
9. After the start of the match, the team cannot touch the feeder bot however it can be controlled wired/wirelessly by the team from a distance of at least 60 cm or the janitor bot can interact with it mechanically /wired/wirelessly
10. The janitor robot can only receive the recycling objects from the feeder robot. The janitor robot cannot have any pre-loaded objects. The use of both the robots is compulsory for this theme.
11. After loading the balls, the janitor bot will throw the objects (squash balls) to the bins (hoops). The hoops are labelled with Alphabets. The robot must throw the objects in ascending alphabetical order.

12. The robot will only be allowed to throw the ball in a hoop after it completely enters inside the shaded region i.e. the robot will only be allowed to throw the ball in hoop B if it throws the ball in hoop A or reach the grid unit adjacent to the hoop A. Similarly, the ball can only be thrown in C after B and D can only be thrown after C.
13. The hoop D is shared between the two arenas. The team which (after throwing successively in hoop A, B and C) throws the ball in hoop D first will be declared the winner.
14. The janitor robot can through the ball in the hoop D from anywhere in the arena.
15. The robot can pick or throw the balls in the hoops from the respective shaded grid as shown in Figure 1. (Note the shaded region is only on figure. Actual arena will not have the grids as shaded)
16. Each team must bring their own feeder bot and janitor bot.
17. In case of a retry, the team can reset both robots.
18. The recycling objects are considered to be standard squash balls. The bins are the hoops.
19. The height of the hoops A, B, C is 15cm while the height of the hoop D is 20cm.
20. The maximum dimension of the janitor robot is 20x20cm (LxW).

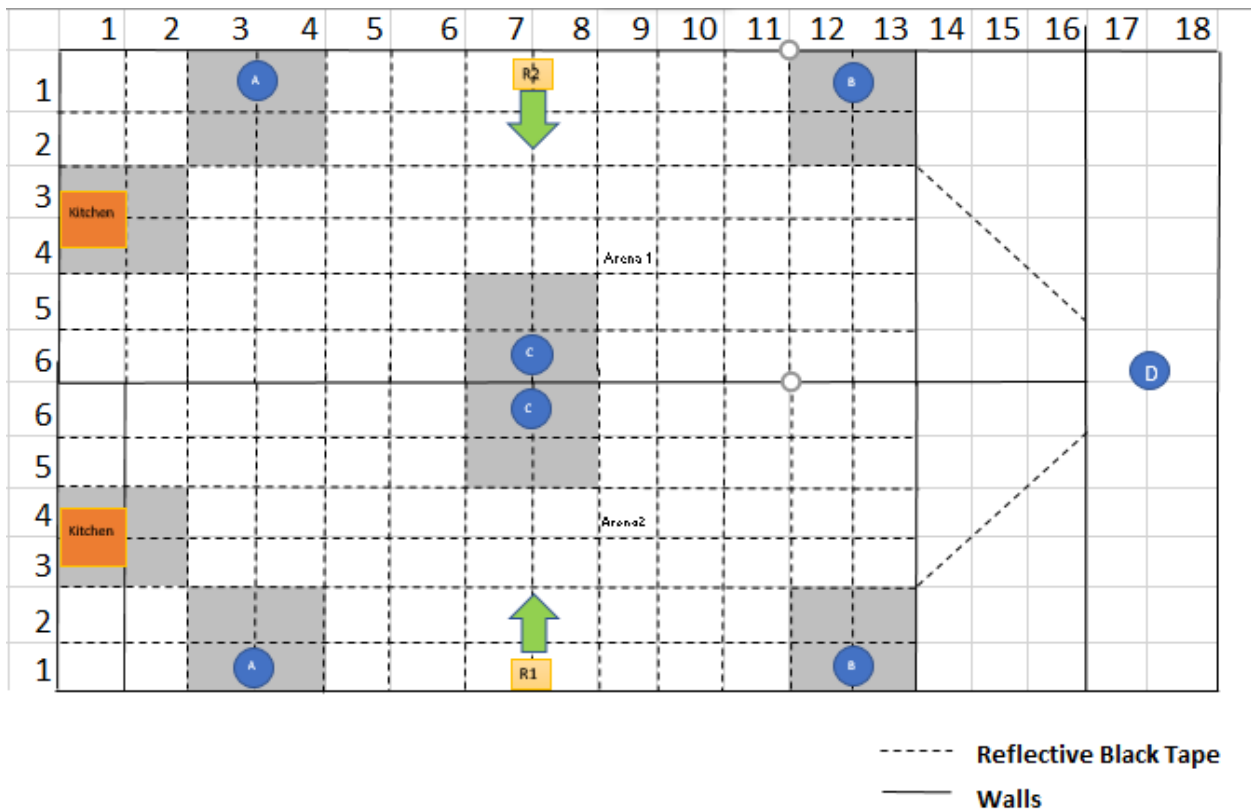


Figure 1. Contest Arena

## Points:

Tasks	Score
Reaching to Kitchen	10
Loading the balls (5 points per ball)	(4x5=20)
Shooting the ball in A*	15
Shooting the ball in B*	15
Shooting the ball in C*	15
Shooting the ball in D	25

\*Failing to successfully shoot the ball in the respective hoop will result in half points only provided that the robot is present in the shaded region.

**DISCLAIMER: This is the short draft of the theme. Slight changes may occur when the complete theme is released.**