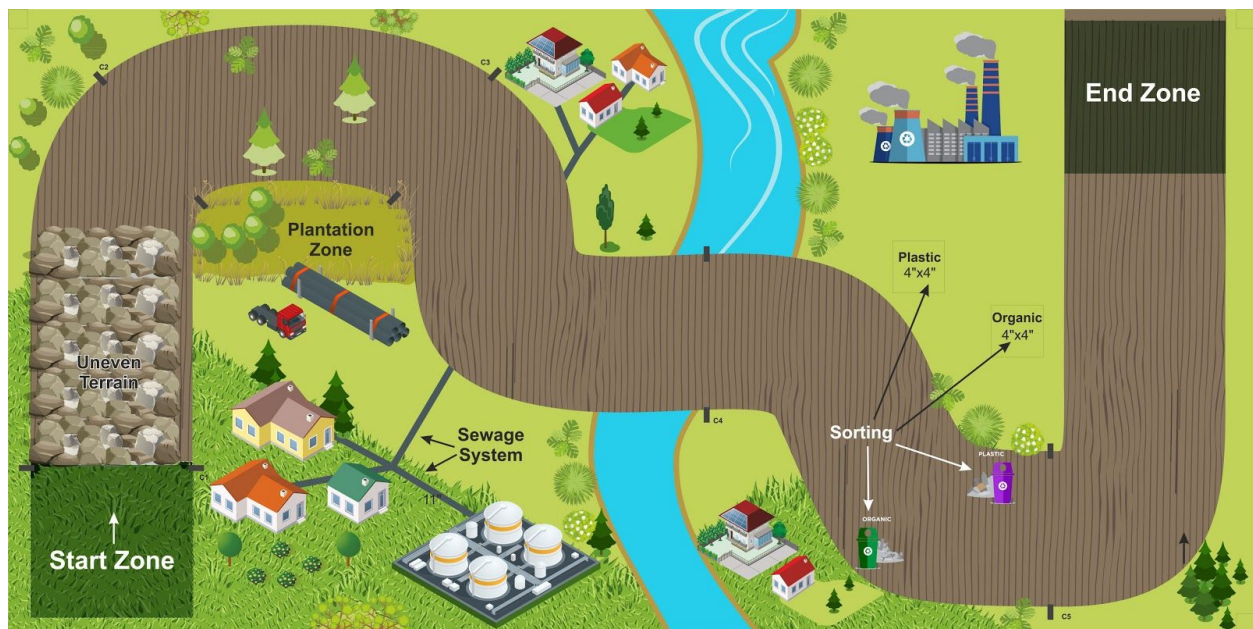# SwachhBot

Metropolitan cities in India support large human settlements. People from rural and semi-urban areas flock to these cities in search of livelihood and better living conditions. However, rapid population growth and urbanisation gradually render cities to crumble. Every monsoon, we hear stories of heavy rains halting normal life in Bangalore and Hyderabad; the infamous pollution levels of Delhi.

We stop to dust the couches inside our home, but fail to notice the piling garbage blocking the city drains; we water plants in our gardens, but never consider the felling of trees across the city to make way for skyscrapers. Blocked sewages, poor waste management, pollution, etc. are some of the major issues plaguing the Indian cities. Also, manual scavenging is one of the ugly truths of India. We often fail to see the bigger picture. The need of the hour is to address these problems, which affect not only the society at large but also our individual lives; and also propel the present generation to ponder over them.

The Next RoboTricks team of Next Education invites young volunteers to design a robot which can address some of these pressing issues in Indian cities.

Attuned to the Swachh Bharat Mission, this competition invites students to design remote-controlled robots which will be able to maneuver an obstacle course, plant trees, set up sewage pipelines, sort and dump wastes.

The Robot must be able to complete the mission within a stipulated time of 3 minutes.

The arena for SwachhBot is of dimensions 4 feet x 8 feet. It is made of flexible wooden sheet (MDF Sheet) of thickness 5 mm.

Robot dimensions: 12 inches x 12 inches (max)
Width of the path: 12inches

Gameplay [150 points]

A team can score a maximum of 100 points in the arena and a maximum of 50 points for the group presentation. (Refer to the scoring section for more details.)

The robot has to successfully complete the qualifying round to participate in the final mission.

Qualifying Round

In this round, the robot has to perform either of the following tasks:
1. Cross the obstacle course
2. Sort the waste

The task to be attempted will be decided on the same day through a draw.
1. A team will get a maximum of 3 chances to complete the task.
2. A team has to successfully accomplish the task within 1 minute 30 seconds, the time would not be stopped.

 Note: The qualifying round will be conducted in a separate arena.

Mission

1.The mission comprises five tasks in the given order.

> T1: Obstacle course
> T2: Plant trees
> T3: Set up pipelines
> T4: Sort the waste
> T5: End Zone

2. Each team will get only one chance to accomplish the mission.

3. The maximum time duration to complete the mission is 3 minutes.

Note: All tasks have to be attempted in the stated sequence only.

Checkpoints

Five checkpoints will be provided in the arena.

- **First checkpoint: In between Start Zone and Obstacle Course**
- **Second checkpoint: In between Obstacle course and Plant trees**
- **Third checkpoint: In between Plant trees and Set up pipelines**
- **Fourth checkpoint: In between Set up pipelines and Sort the waste**
- **Fifth checkpoint: In between Sort the waste and End Zone**

When can a team opt for a retake?

1. **A team is allowed a maximum of four retakes.**
2. **During a retake, the timer will be paused and will only be resumed once the robot is placed on the previously crossed checkpoint.**
3. **A team can opt for a retake by requesting the referee.**
4. **A retake can be opted if the robot leaves its path or fails to complete the task.**
5. **If a team opts for a retake in between the Start Zone and the first checkpoint, then the robot will be placed back in the Start Zone.**
6. **While opting for a retake or while performing a task if the wire connections of the robot are disturbed, the participant will be allowed a retake with a deduction of 5points from the total score.**

Kindly note that a team is NOT ALLOWED to touch the robot at any point during the run, though the cables can be handled by one of the team members.

Scoring

A team can score a maximum of 150 points.
A total of 100 points can be scored by successfully attempting the following tasks.

- **Cross the Obstacle course [20 points]**
- **Plant trees [20 points]**
- **Set up a Sewage system [20 points]**
- **Sort the waste in the Sorting Area [20 points]**
- **Reach the End Zone [20 points]**

The rest 50 Points are allotted for the performance of the team in other areas described below:

1. Presentation [40 points]
 Each team need to make an attractive poster or a chart displaying the stages/steps of construction of their model, how it works and the strategy applied by their robot to do the tasks. The name of the robot should also be written on the poster. This poster will be presented to the judges.

Five minutes will be allotted for the presentation.
The presentation will include

- An oral presentation and demonstration of the robot.
- The contribution of each member to the project.

2. Symbolic representation [10 points]

Judges will observe how well a team is presenting itself and displaying unity. This could be in terms of a common T-shirt with the team name on it, a cap or even a slogan.

When deciding the team name or acronym, see if you can create a theme around it to make your team more interesting and recognisable.

The final score will be a sum of all these points.
In case of a tie, the teams will be judged based on the best time clocked on the main arena by a team.

Penalty

A team will be issued warnings by the referee in case of the following events:
· If the robot moves before the whistle
· Touching (any kind of interruption) the robot without asking the referee
· If the team performs an act that is not in the spirit of fair play

The first warning will not be considered for penalty.

If a second warning is given to a team, it will result into a penalty.

If a third warning is given to a team, it will result into a second penalty.

A penalty will be a reduction of 10 points from the total score obtained.

In the event of a third penalty, the team will be disqualified.

Robot Specification

1. Only one Tele-operated robot is allowed per team.
2. The dimension of the robot should not exceed 12 inches x 12 inches.
3. During inspection, the robot will be placed in a 'sizing box'.
4. The robot can expand in size or shape once it is out of the Start Zone.
5. External power supply is not allowed.
6. AC plug points will not be provided.
7. Each team has to bring their own power supply (batteries) for their robot.
8. The maximum allowable power supply voltage is 12 V DC.
9. The robot should not detach its parts or leave mechanisms in the arena.
10. The robot can grab, grasp, grapple or get attached to any arena structure as long as it is not against the spirit of fair play.
11. The robot should not damage any part of the arena.

Instructions

1. The referee will terminate the competition by blowing the whistle, if
   - The robot reaches the End Zone.
   - The maximum duration of the competition (3 minutes) is elapsed.
2. The following will NOT be a valid justification for leaving the arena.
   - Low battery condition
   - Remote/motor loose connection
   - Robot mechanical/electrical/operation failure.
3. Timeout will not be given in any case.
4. In case of a tie, the result will be based on the time taken by each team to complete the whole mission. The team which takes the least time to complete the mission will be ranked higher.
5. In case of a tie, the time measured by the organisers will be as final. Time measured by any person other than the judges will not be accepted for scoring.
6. Robots should not be disassembled until the results are declared.
7. Mentors are not allowed in the qualifying and the main arena.
8. The decision of the judges shall be treated as final and binding on all.
9. Readymade structures/toys are not allowed.

General Rules

1. Each team can have a maximum of 3 Students and 1 mentor
2. Per school maximum 2 teams can register in Manual category
3. A team may consist of participants up to Grade 6
4. The top 2 teams emerging from this competition will be awarded cash prizes and trophies
5. The remaining teams will be awarded participation certificates
6. Prizes will also be given in the following two categories:
   - Best Mechanism
   - Best Presentation

The SwachhBot has to accomplish the task in a sequence to complete the mission.

1. Obstacle course [20 Points]

The mission starts with the robot traversing over an uneven terrain, finding its way to the planting zone. Accomplishing the task 20 points will be awarded.

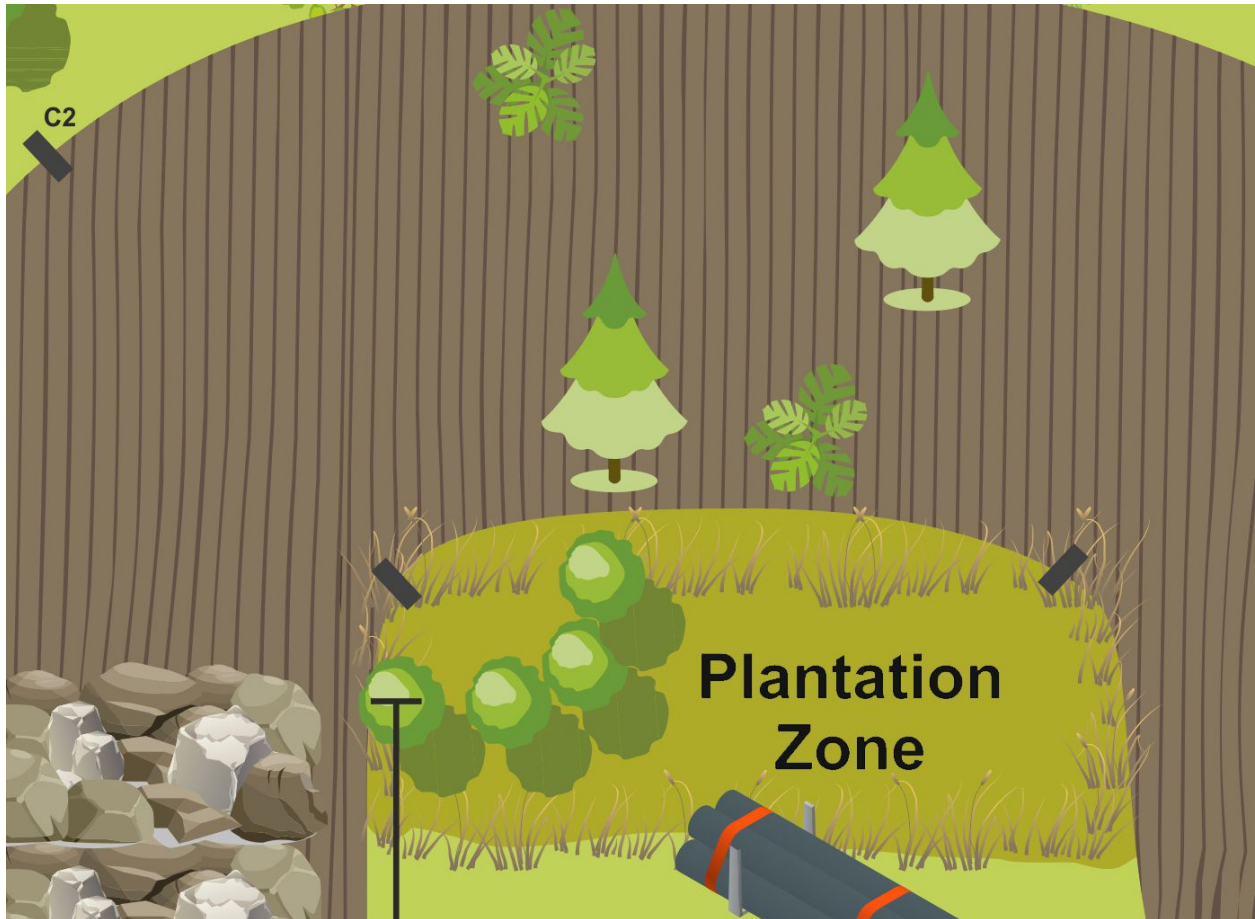**Task: The robot has to find its way through the uneven terrain**

1.1 During the run if the robot topples or gets stuck on the patch it will be considered as unsuccessful attempt

1.2 Crossing the uneven terrain and reaching the checkpoint will be considered as an successful task.

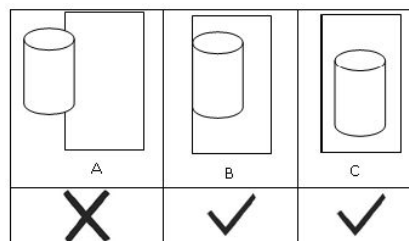# 2. Plant trees[20 Points]

On reaching the Planting Zone, the robot has to build a bio-system by planting the trees and saplings in the designated areas marked in the arena.

Task: Move 2 cylindrical object into the marked area

2.1 The cylindrical object will be placed anywhere on the path between the second checkpoint
   and third checkpoint, it will have a approximately 16 CM and the height of the structure from the base will
   be 17 cm

2.2 Maximum of 20 Points will be awarded if the objects are completely moved inside the
   rectangular area marked on the arena (**As shown in the Image B and C)

2.3 No Points will be awarded for partially moving the object (** As shown in the Image A)

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3. Set up a sewage system [20 Points]

On reaching the Plumbing Zone, the robot has to set up a domestic sewage pipeline all the way to the water recycling station. Properly setting up pipe in the grooves provided in the arena will be considered as a successful task and 20 points will be awarded.

Task: The robot has to set up pipes in the designated area marked on the arena
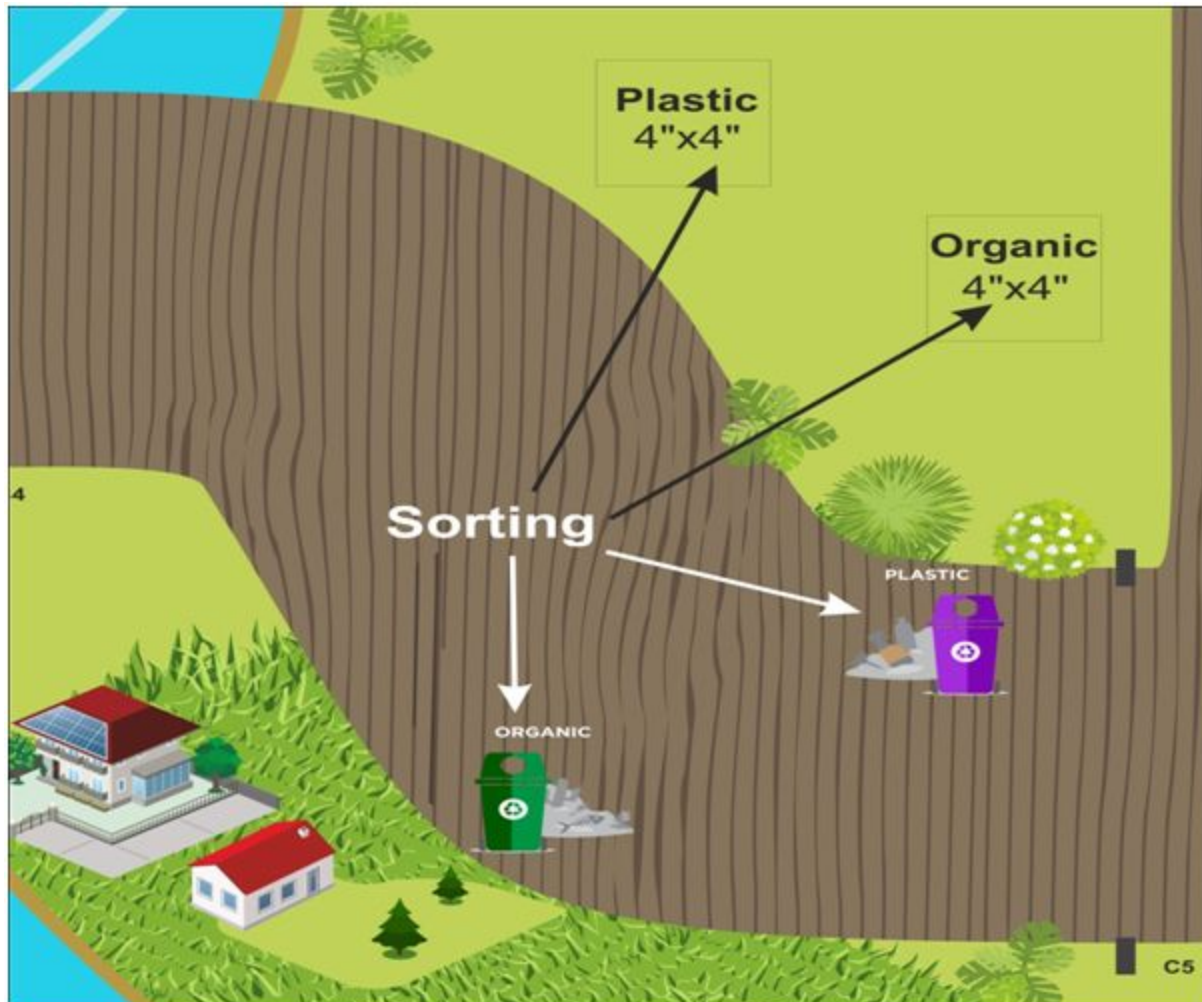

3.1 The pipe will be placed vertically, near the zone

3.2 Proper placement of the pipe as per their lengths on the groove provided will be considered as successful task

4. Sort the waste [20 Points]

Once the pipelines are successfully set up, the robot has to reach the Sorting Zone where it needs to sort the organic waste and Plastic waste, and empty the two tubs in the appropriate color-coded area.
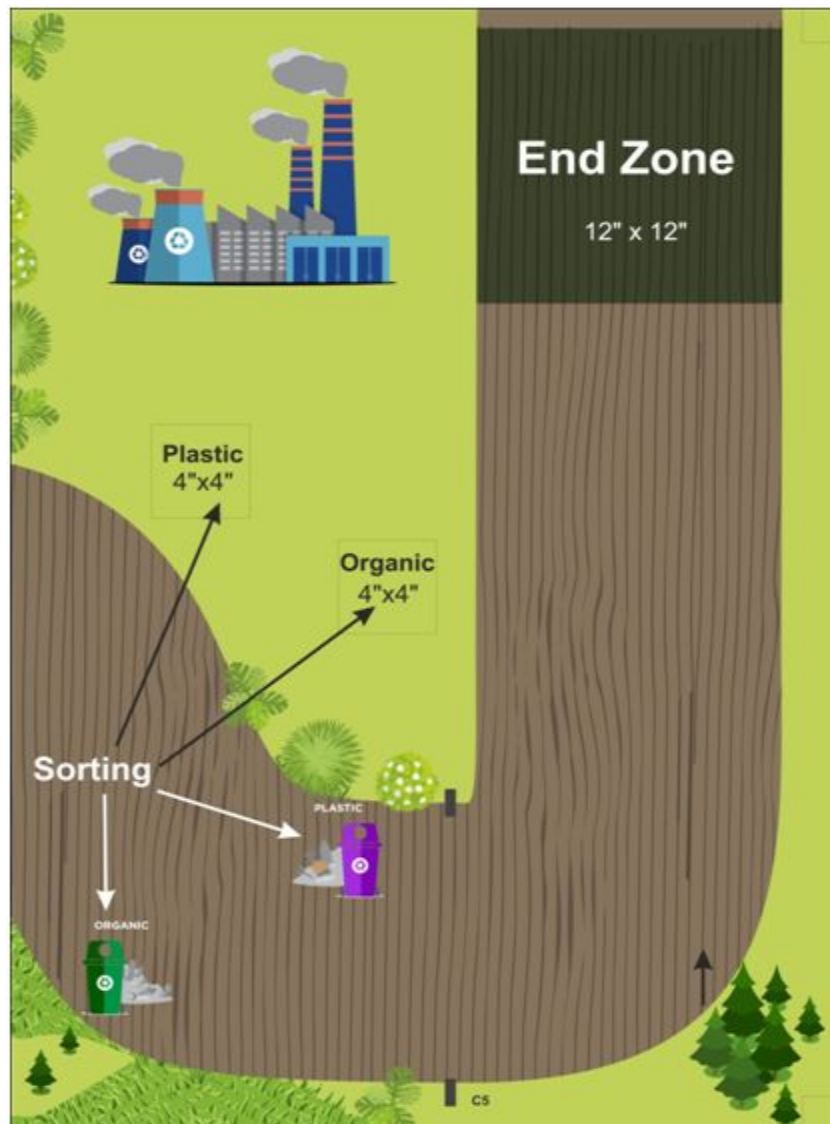

Task: The robot has to sort the waste and empty it in the appropriate color-marked spots

4.1 The tubs will be partially filled with color coded pebbles
4.2 The tub will have a approximately 16 CM and the height of the structure from the base will be 17 cm
4.3 Emptying the tubs in the appropriate area will be considered as successful task
4.4 Partial scoring is not possible in the task

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5. Stop on reaching the End Zone [20 Points]

Once the robot has successfully sorted the wastes, it has to move over an incline plane and stop in the End Zone. Once the robot reaches the End Zone, the mission will be considered as complete and time will be stopped.
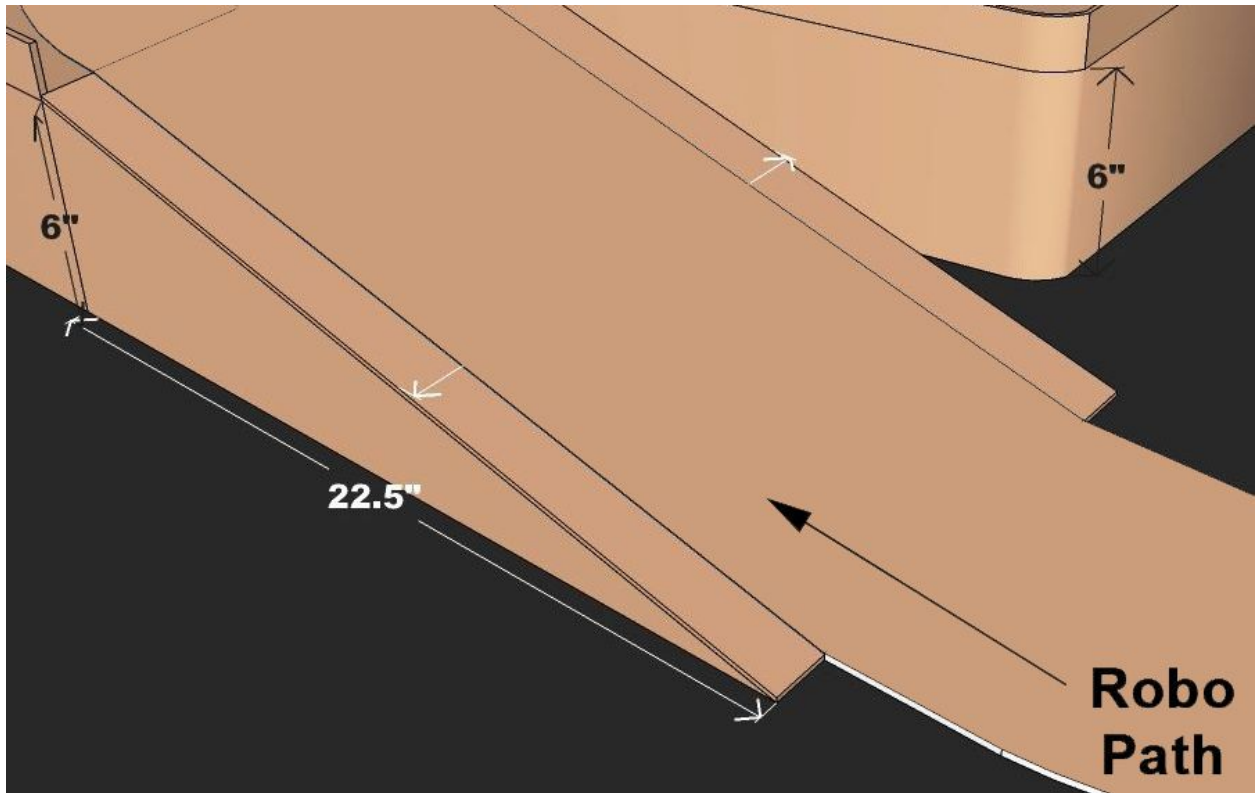
Task: The robot parks itself in the End Zone

 5.1 Dimension of the End zone is 12"X12"

5.2 The Robot has to completely move into the Black area which is 12"X12"

5.3 The end zone can be reached by moving through an incline plane (Refer to the below image for dimensions)

5.4 The task will be considered as complete only after all the wheels of the Bot has moved into the End zone

Note: The timer will stop as soon as all the wheels of the robot is completely moved inside the End Zone.