AAROHAN 2020

Organized by
Team Aavishkar, NIT Durgapur

NIT DURGAPUR

Ministry of Electronics and Information Technology
Government of India

ELECTRONICS INDIA

Digital India

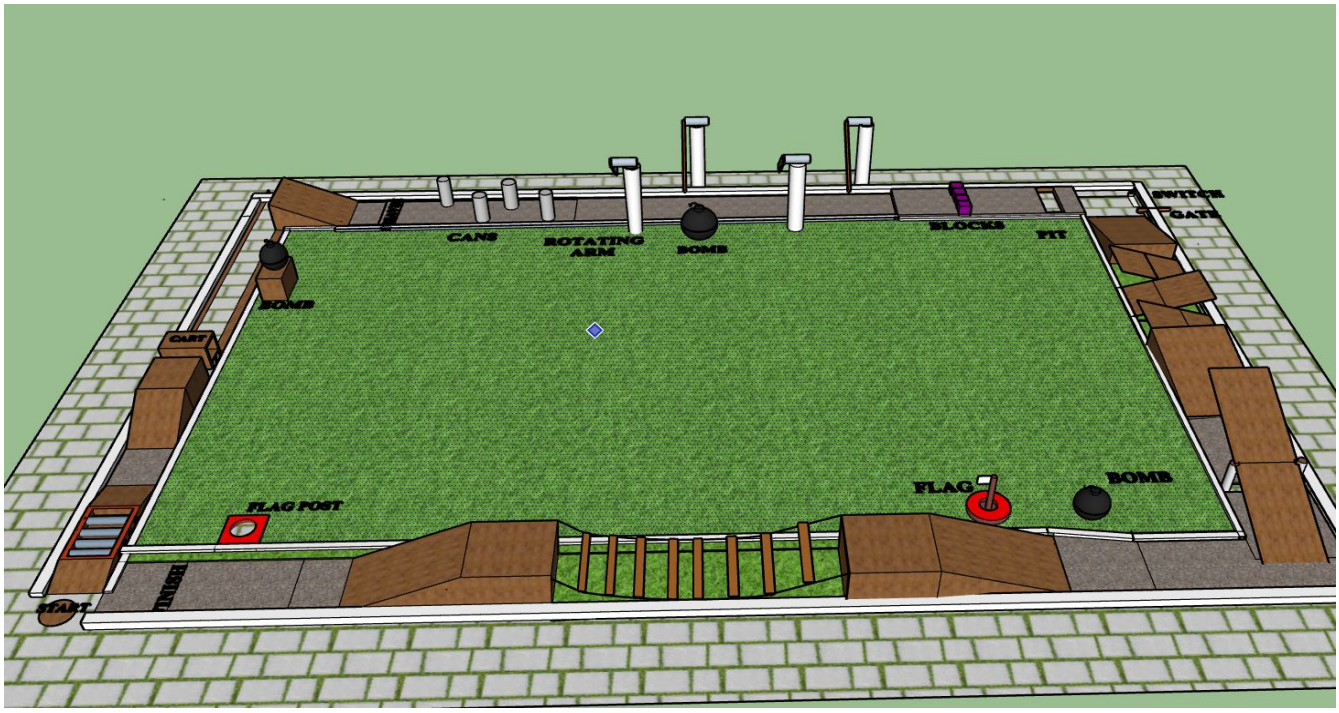
7 8 9 10 February 2020

Nuke-Clear

'Everyone has the fire, but the champion knows when to ignite the spark.'

Problem Statement:

● Design a manually controlled robot having strong gripping (hand) mechanisms to complete this exciting game play, while being on the clock and watch out because you won't be competing alone. It would be a one-on-one battle with your opponents. Put your robot-making and motor skills to the ultimate test through this contest.



A sneak peak to the actual Arena.

Game Play:

● Some notorious terrorists planted bombs in your college, to create havoc and disrupt the daily functioning of the college

. ● Robocell, CCA entrusts you with the task of finding the bomb and defusing it before they blow up, for good!! Overcome the hurdles and defuse the nukes before your opponent team does to win this contest, and make your the arena “Nuke-clear”.

- Two teams A and B have to start **simultaneously** at the point marked **'START'** on the arena.
- The teams must defuse the bombs in the specific order as marked in the sketch, while overcoming the hurdles that come along the way.
- Points will be awarded or deducted on the basis of performance of the robot in the Arena. the "Scoring-scheme” given later in the document. Winners would be decided on the basis of these points.

Description of Main Hurdles:

- The bot starts from the position marked as **"START"**.
- The bot immediately faces an obstruction from an array of rollers.

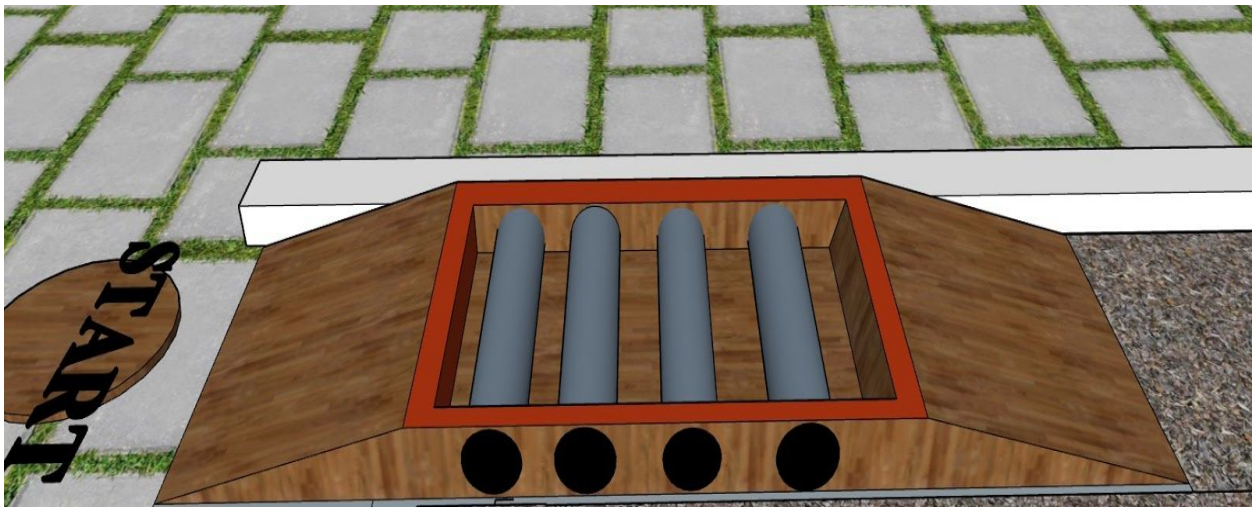


Figure:1. (The start of the competition and the the array of rollers.)

- Now the bot must face a wedge. The controller must drive the robot safely and there will be a mobile cart which moves only when the button on its top left corner is pressed by the robot, and reaches near the bomb on it's way which needs to be diffused by the the bot itself using the Hand mechanism. It can move down from the moveable cart from the next wedge.

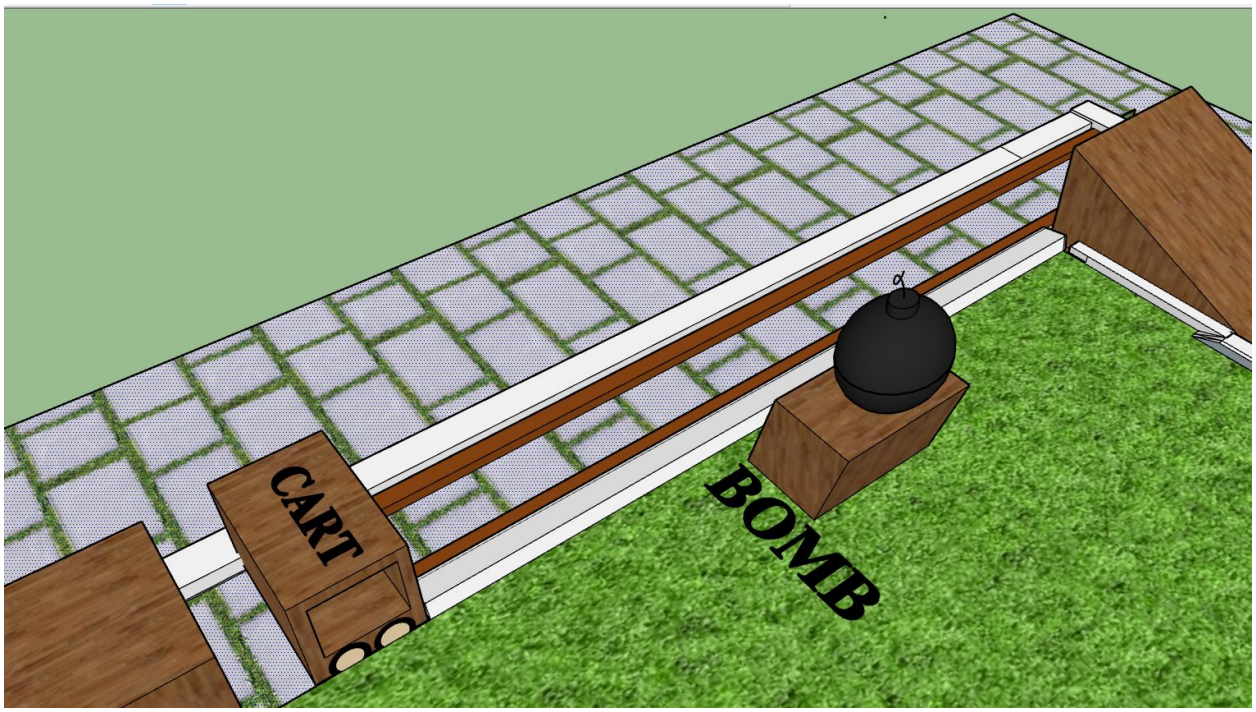


Fig .2 (The First bomb and the electric cart.)

- There is an obstruction in the path, and the controller must drive carefully, so as to not get off-track.

o The robot then has to cross a way filled with gravel and then a path with cans without disturbing them. Points will be deducted for the destruction on the paths.

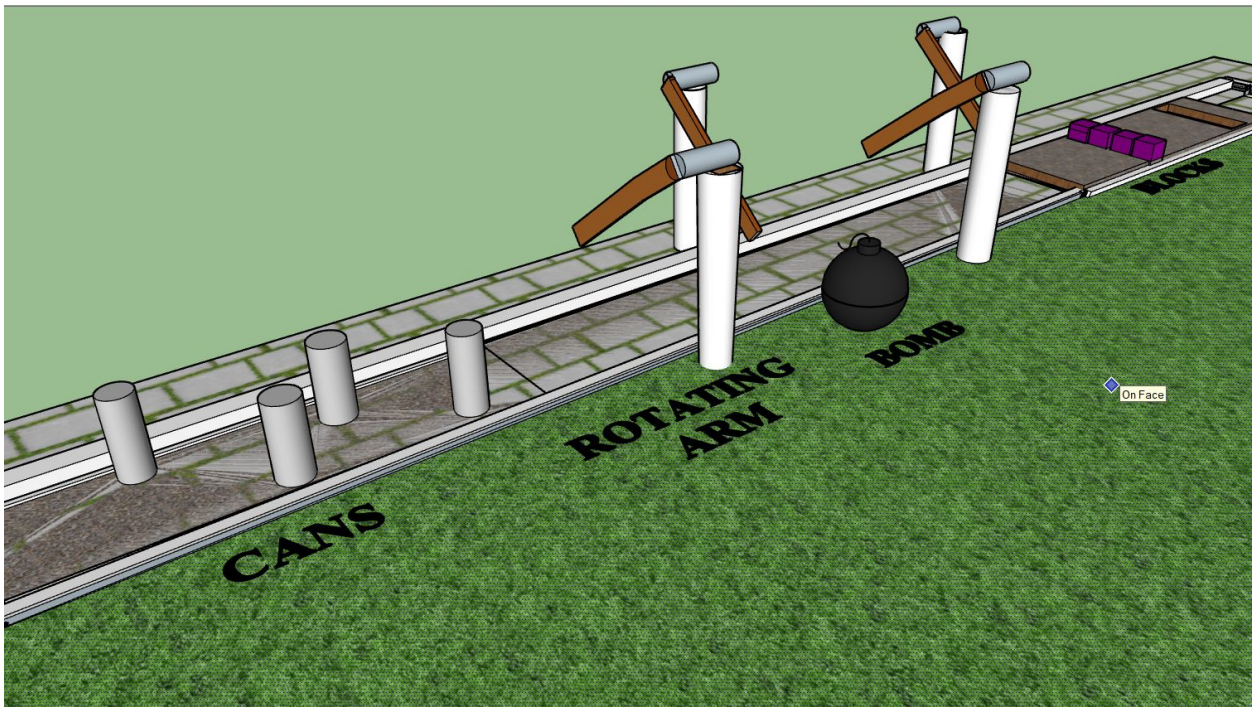


Fig.3 Cans and Rotating arms and the Second BOMB.

o Next, there would be rotating arms, which would be rotating in vertical axis and a bomb is placed by the terrorists between these rotating arms. The bot has to diffuse the bomb and simultaneously save himself from the rotating arms. The number of rotating arms touched will increase the no of instalments of ransom.

o After crossing a few rotating arms, the terrorists demand a ransom. A ransom of 4 boxes of Gold. Upon payment of this ransom, the terrorists agree to share the location of the 3rd and final bomb to be defused, which would save us all from the catastrophe.

o The ransom has to be carried across dangerous terrain, but with the constraint that, it would be paid in number of instalments. The controller has to carry the blocks one by one across the hornet's nest as soon as possible, or else the final bomb would blow off.

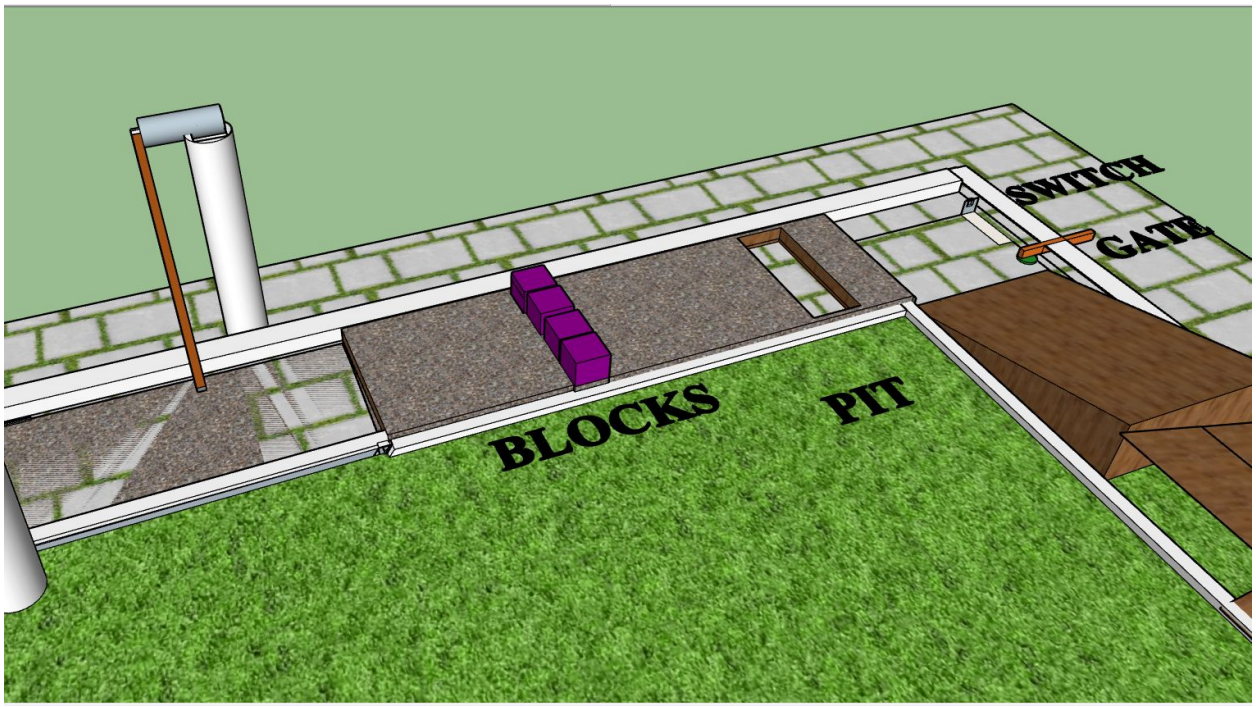


Fig4. (The blocks gold , switch and Gate.)

o As two teams are competing together, the one who reaches the Switch First will be allowed to cross the terrain of the see-saw and other team need to be waiting for the first team to cross the terrain.
After crossing this terrain, the terrorist will agree to give 'Location of the Last Bomb' .

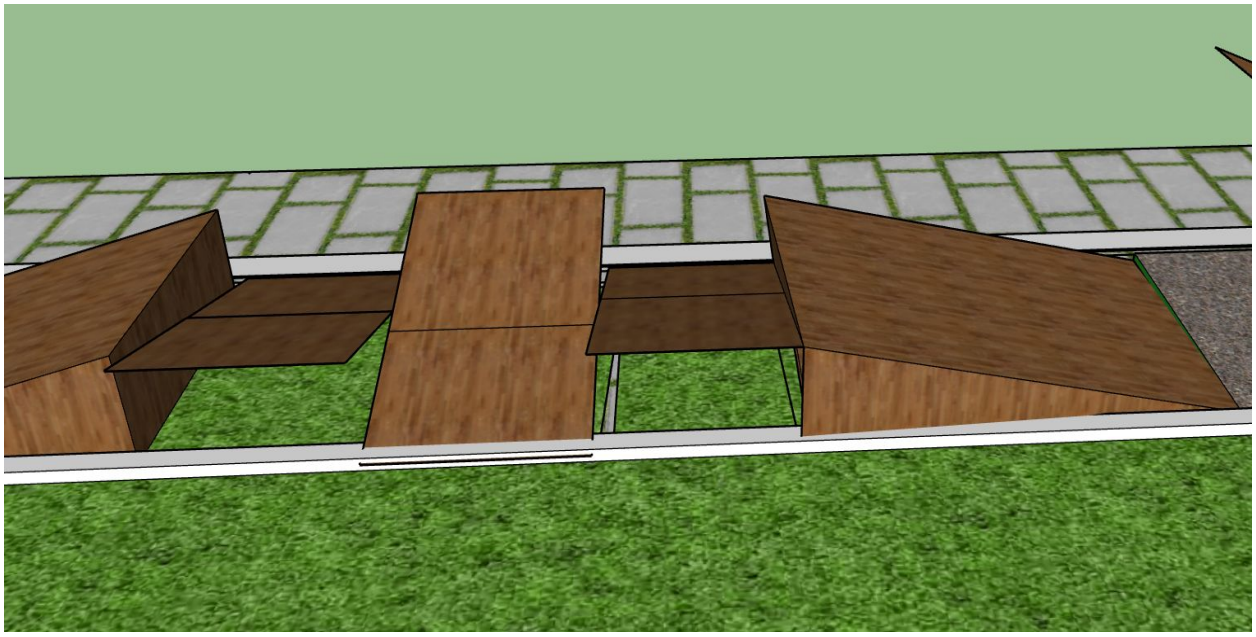


Fig 5. (Terrain of See-Saw.)

o After defusing the third bomb, the controller must hurry up to the final stage of this contest, where the bot places the bomb at the specified place and hoists the flag. Taking the flag, the bot has to cross an elevated ropeway. The controller must be careful not to topple the root as it is on the ropeway.

o After this hurdle, the robot has to hoisting the flag which will be a sign of Victory. Then rushing to the "**FINISH**" will mark the end of Game Play.

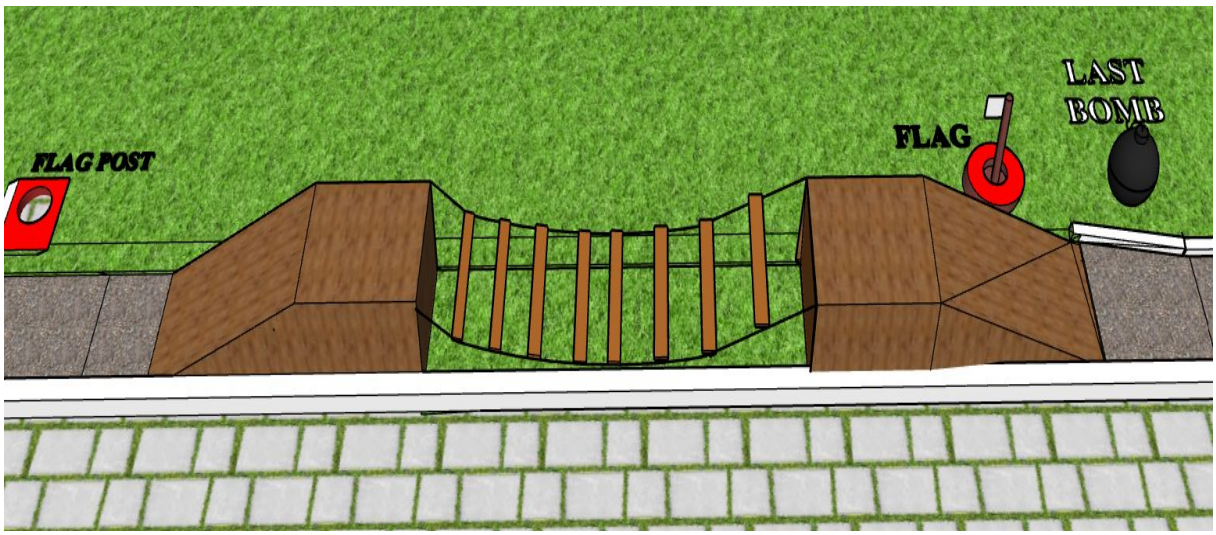


Fig 6.(Ropeway and Flag)

Scoring Scheme:

Every team would start with 500 points.

- 30 points would be deducted each time the bot goes off track (also known as deflection).
- Each obstacle, if skipped manually, would mean a deduction of 200 points.
- 100 points would be awarded for every bomb defused, 50 extra points as a BONUS for completing the task within stipulated time limit. 75 points would be deducted if the task is not completed within the stipulated time.
- 30 points to be deducted as a penalty if the robot hits any of the rotating shafts/cans.

- 50 points to be deducted if manual assistance is provided or if the robot falls off from any of the raised platforms, or topples on its ascent, or descent, or while in motion while on the elevated platforms or the ropeway.
- 50 BONUS points are given for the team which finishes first.
- The overall time taken by the team (in seconds) to be deducted from the final score. The team with the maximum score would be declared as the winner.
- However, the maximum permissible time for the completion of the contest is 900 seconds i.e., 15 minutes.
- Any damage to the arena by any bot or participant would lead to instant disqualification of the team.

General Rules and specifications of the Robot:

- The dimensions of the robot must not be more than 35cm*25cm*25cm(l*b*h) throughout the event (including the gripping mechanism). The robot must not weigh more than 1.25 kg. If a bot doesn't adhere to these specifications, it would lead to disqualification of the team from this contest.
- A team can consist of 4 members, out of which only 3 can step inside the arena.
- The bot must have strong hand mechanisms to catch hold the object

-
- The maximum power input to the robot should be 12V, the wire of the robot should be slack at all times.
- A 220V AC supply would be available in the arena
- Two timeouts of one minute each will be available to each team to fix technical issues, if any. The bot must not leave the arena for debugging.
- Primary tools can be made available by the organizers. However, the participants can bring their own tools and equipment.
- In case of any dispute, the decision of the organizers would be final and binding.

The above described Arena is subject to changes and the organizers can change the Arena and the scoring scheme as they deem fit.

Contacts Details:

- Abhishek Kamal: 8420968795
- Ayush Nath: 8008545350