

# Problem Statement

*XLR8-2019*

Event by: Electronics and Robotics Club

Participants: Enthusiastic Freshers

Event Dates: 2nd Sept, 2019

## ~Task~

To build a manually controlled car capable of negotiating different kinds of obstacles and completing the designated track.

## ~Teams~

- A team can consist of 3 to 4 members.
- Only freshmen entries will be considered for the prizes.
- The teams must register online through the link provided on the club webpage. We hold no responsibility to allot any time slot or provide mentorship facility to unregistered teams.

Registrations start: Friday i.e. 9th Aug '19.

Registration deadline: 11.59 pm, 13th August '19.

## ~Venue~

The competition will be held in *Shailesh J. Mehta School of Management (SOM) Well*. Please note that that the arena may possibly be wet. (Chill out on this detail, just general stuff, nothing too serious. You don't have to waterproof and stuff :P)

## **Machine Specifications:**

- The entire bot must fit within a box of size 25cm x 25cm x 25cm at all points of time during the run. This does not include the remote control.
- The power supply onboard must fit into the above mentioned box along with the machine at all points of time during the run.
- There are no weight-restrictions on the machine.
- Only onboard batteries are allowed, please **DO NOT KEEP IT OFF BOARD**.
- Voltage between any two points on the machine should not exceed 12 V at any point of time during the race.
- No readymade steering mechanisms are allowed. Readymade gears, shafts however may be used.
- Lego kits are not allowed.

## **Arena Specifications:**

The teams will have to compete with their cars on a track designed for the competition. The track will either be bounded on both sides by tyres or will be clearly defined by some other means. The width of the track will be between 30cm and 40cm. Staying on the track is compulsory, failing which you will be disqualified. The track surface, on which the teams will have to race their cars, will be SOM Well floor, plywood and the marble-pit.

**NOW COMES THE MOST INTERESTING PART !!**

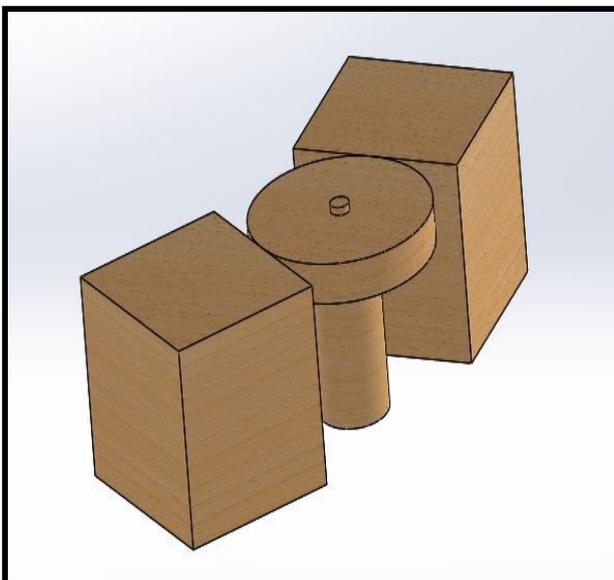
## *~Tasks~*

- ***The Guardian:***

This will be your entry into the arena where your bot would be required to press a push-button switch and then KHULJA SIM SIM!!



- ***Rotating Disc***

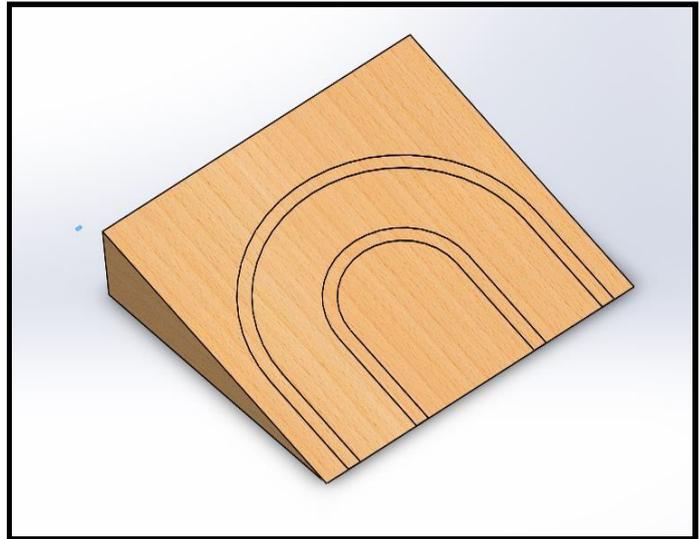


Don't let the pseudo force knock you out! This constantly rotating disc joins two sections of the track which are at an angle to each other. The bot must descend on this disc and time its exit to continue to the next section.

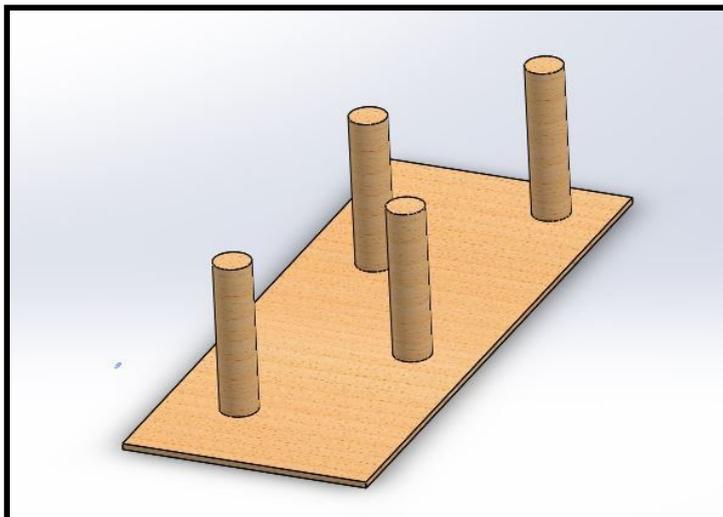
Timing is all that matters here!

- ***U-TURN (Bonus!)***

You all must have studied banking of roads formulae in JEE. Time to put them to use. Run the bot across  $15^\circ$  curved banked surface to obtain bonus points. The bot has to climb an incline, turn around at the top (banking) and come down. You can try this in your hunt for bonus points. Else, it can be skipped.



- ***MAZE AMAZE!***



Dodge your way through the columns!

- **SPIRAL STAIRCASE**

The bot will have to carefully descend down a spiral staircase.

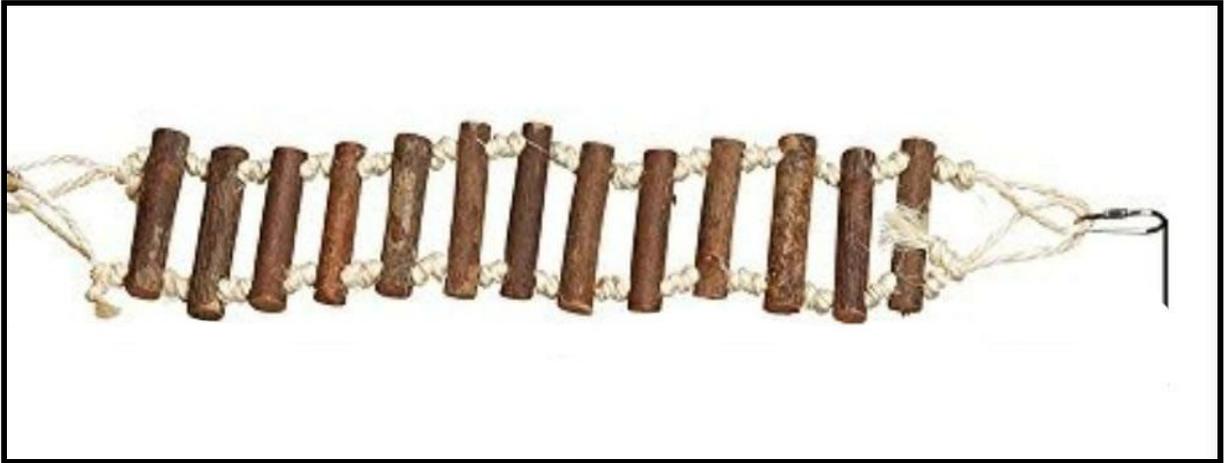


- **Humpy Bumpy**

We don't have negative marking but bumps are a must!  
After all, even life doesn't have a smooth road.



- **Suspension bridge:**



Fasten your seat belts. Oh no no, jumper wires :-p (though you can't) as you cross the suspension bridge to get to the next part of the track.

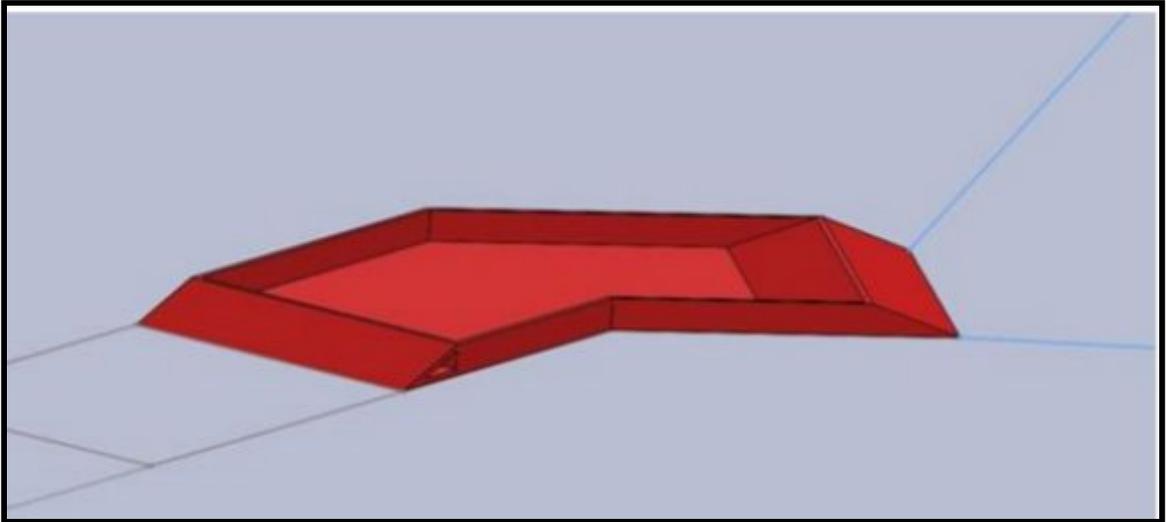
- **Black-Box!**



The track will be blocked by a rotating 'door' which can be opened by pushing against the far end of the door. Once the door is rotated, the bot needs to return back onto the main track to continue. This track will lead to a tunnel. The tunnel will be L in shape and to clear this challenge, on-board power supply is a must. This will lead to a blind path

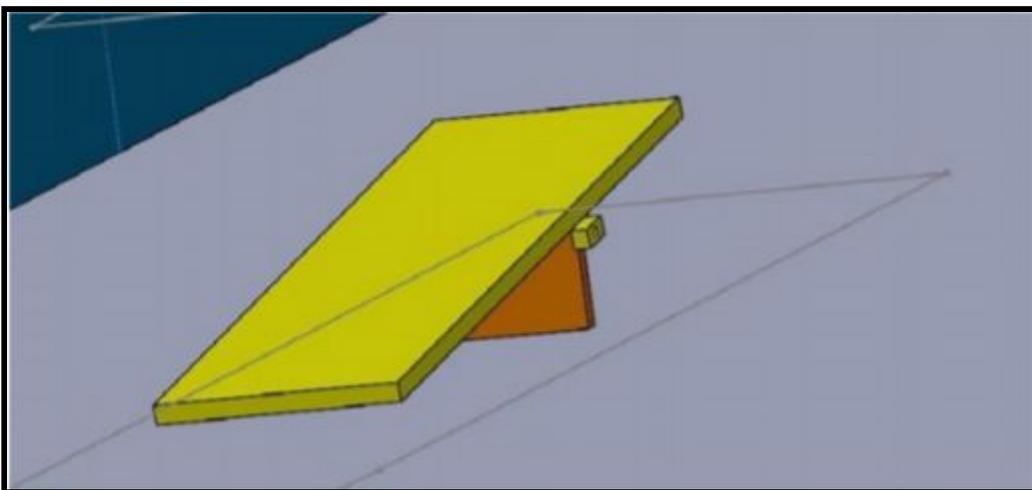
which you will have to cross intuitively.

- **Marble Dash**



This will be an area where small and medium sized marbles and/or pebbles will be put. The bot must trudge its way out without getting stuck. The angle of turn is  $45^\circ$ .

- **Walk the Plank**



A plank kept at an angle of 15 degrees while moving up and down.

- **Surprise**



We are never short of surprises. All we can reveal is that gravity will save you here! Keep guessing!!

### **Grading:**

To be released soon!

### **General Rules:**

- Maximum of 2 team-members will be allowed to control the car at a time.
- Teams will not get any extra time for practice, testing or calibrations on the arena before the final run.
- There will be certain number of checkpoints on the track, which will be informed to the participants before the start of the run. If a machine falls from a height off the track or gets stuck, then it will be placed back on the last checkpoint the machine has passed. This will be done by the organizers. Teams are not allowed to touch the machines during the run (except if the team announces time-out as per rule)..

- The timer will keep running during this process. No Strategic timeout advantages will be permitted, any team attempting to do so will be disqualified.
- There will be a time-out allowed per team exactly once during the round. If the team calls for a time-out, the timer for that round will be paused and the team will get a maximum of a minute to place the car back at the last reset point it has crossed after which the timer will be resumed and the car must complete the rest of the track from the previous checkpoint.
- If a car is unable to move for more than 30s then it will be assumed that the car has failed and that round will be considered to have ended.(Time would pause and resume after application and removal of timeout respectively).
- Other communication devices are not allowed (including other RC remotes) near the arena while the competition is on. This includes remote control of your car while some other team's run is on. The organizers hold the right to check for these devices and their usage.
- Machines found damaging the arena will be liable for disqualification.
- No extra points will be awarded for completing the same hurdle more than once.
- Each team will get 2 laps, out of which best will be considered for final scoring.
- All the teams are requested to be present for their runs during their respective time slots. The organizers do not hold the guarantee of reallocating a new time slot for latecomers.
- The time measured by the organizers will be final and will be used for scoring the teams. Time measured by any contestant by any other means is not acceptable for scoring. In general, the decision of the organizers will be final and binding in all circumstances