

NRC NATIONAL ROBOTICS CHALLENGE

India's first robotics competition that brings genius brains under one roof Dare to take the challenge?

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Problem Statement-1

ROBO WARS

The Game

THE **ROBO WARS** is a unique robotic competition between two Robo teams. Each team will consist of two robots performing as ATTACKER and DEFENDER. The attacker will place the flags in other region while the defender will defend against attacker. The competition is about to place the maximum number of its own flags in opponent prohibited region. The team completing the task first in predefined time duration will be declared a winner.

Each winning team will continue to the next round by beating its opponent in the previous round.

ROBO Specification

1. The time duration of war will be 1 minute trial to run on arena & 5 minutes actual time.
2. The BOT can be wired or wireless. Wireless BOTs should be immune to frequency interference like using two modes of frequency to avoid frequency interference.
3. The controlling wires should be bound into a single strip and long enough, it should not entangle with the opponent's wires. The length of the wire from the BOT to the controlling unit (switch board) should be more than 5m. The wire should always remain slack throughout the competition.

4. Maximum size of the robot should be 20cm x 20cm x 20cm including its expanding arms etc. Even expanding arms should not exceed the dimension limits during the match also. (The BOT will be checked for its specifications before it enters the tournament, any aberrations in the BOT size will lead to disqualification.)
5. The teams are allowed to use some weapons for just defending from opponent. The teams should ensure that the weapons are **safe for the spectators and the arena**. Weapons involving fire or a liquid/gel of any kind that may damage the arena are NOT allowed. (The organizers have the right to disqualify the team with unsafe weapons).
6. The voltage in a BOT should not exceed 24V/2 Amps.
7. The total weight of bot should not exceed 5 kg on arena.
8. Weight of wireless BOTs will be counted as 90% of its Actual Weight. Weight of external power source (batteries and adaptors) and the remote controller will not be counted.
9. One BOT can just defend but it should not harm other BOT.
10. In case, there is no flag is put in opponent court by any BOT, then additional time 2 minutes will be given to each BOT separately. The BOT, which will place the maximum number of flags, will be the winner. In this time, opponent will not defend the other BOT.
11. The stick of flag is made up of iron whose length is 25 cm long and the weight will be less than 200 gram. The flag will be made up of card-board.

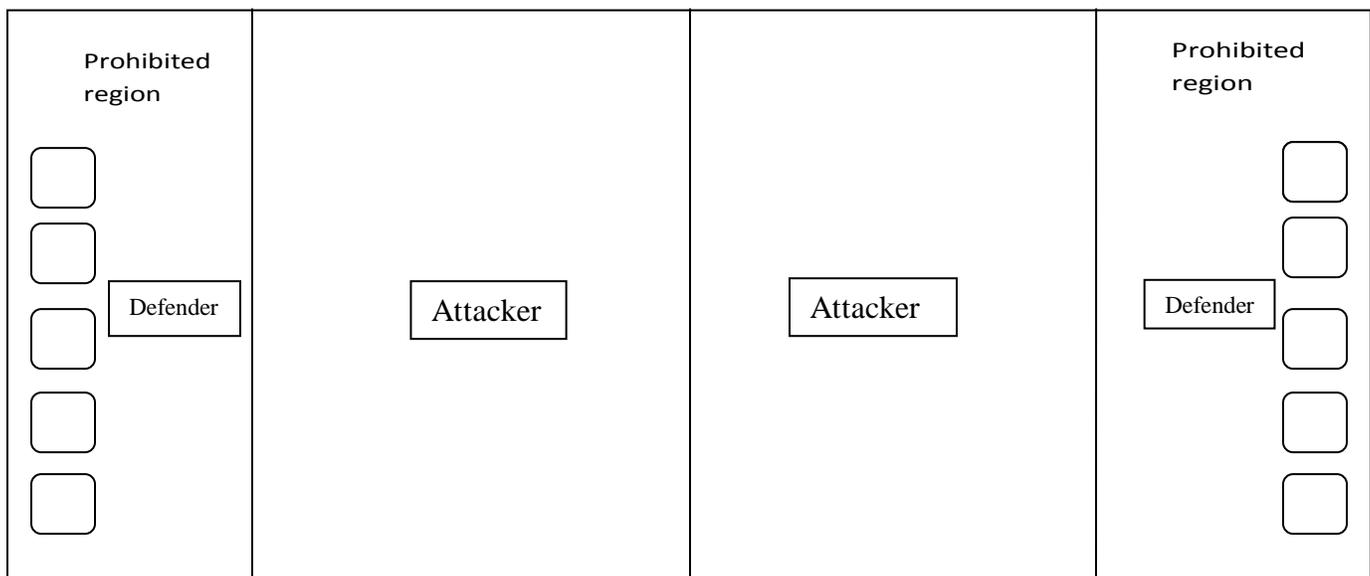
General Rules

1. The permissible team size is between 2 to 4 members.
2. The registration fee is Rs. 125/- per member per event of the team (including snacks & lunch on Event Day).
3. Participating students need to demonstrate their College Identity Card at the beginning of this competition.

4. Participants are allowed to use weapons in the BOT. The weapons of one BOT can be used to just defend from other BOT.
5. The participants should make sure that weapons used should not harm the spectators and the arena. The organizers have the right to disqualify the team with unsafe weapons.
6. 220V AC Power supply will be provided. The participating teams must bring own extension board, adaptors/eliminators of the required voltage rating.
7. The Game rules are subject to change by organizers as and when required. Any change in rules, if any, will be notified to the participants.
8. All the judgments by the judges/referees will be final.
9. If total number of teams is odd, then one venue team will qualify directly for the second round.
10. BOTs will be placed at **Starting Points** before starting competition.

Arena Specification

1. The arena of the ROBO FIGHT will be made of ply board.
2. The dimension of the arena is 6 feet x 4 feet.
3. The ARENA will be as shown in figure:



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Problem statement-2

LINE FOLLOWER ROBOT

Problem Statement

The Robot will follow a line from a starting point to the finish line. The robot that will complete that goal in the shortest time will be the winner.

General Rules:

1. The permissible team size is between 2 to 4 members.
2. The registration fee is Rs. 125/- per member per event of the team (including snacks & lunch on Event Day).
3. All the students with their identity card of the college are eligible to participate in this competition.
4. All participating teams are requested to reach the venue on time.
5. If there is any change then it will be highlighted on the website.
6. The organizers' decision regarding scoring and judgment will be final.

Track Specification

1. The track surface is minimum of 8 meters wide.
2. The course line is 10 cm wide for line following track. It will be made of black line on white surface.
3. The line will be end with Rectangular Box. But there is no need to stop the BOT at the end point. BOT can either stop in Rectangular box or cross the Rectangular Box by moving.
4. The course line may be curved, with central line radius of 100 mm. There might be also the abrupt angle.
5. The robot must deal with lighting condition as they appear. That is room lightening or nature lightning will be set as it and won't be modified for individual contestants.

Robot specification

1. Robot must be autonomous & powered by on board power supply. Human operated robots are not allowed.
2. The maximum robot base dimension is 30cm (L) x 30cm (B).
3. There are no constraints on robot height and weight.
4. The robot may start the race from either direction.

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Problem statement-3

ROBO RACE

Problem Statement

The Robot will follow a specified track as per the rule. The robot that will score the maximum marks will be declared as a winner.

Robot specification

1. The dimension of the robot will be at maximum of 30cm (L) x 30 cm (B)
2. There are no constraints on robot height and weight.
3. There may be an arm in a robot so it can pick the ball and then place in the basket.
4. The BOT can be wired or wireless.
5. The controlling wires of BOT should be very long enough. The length of the wire from the bot to the controlling unit (switch board) should be more than 5m. The wire should always remain slack throughout the competition
6. The robot may start the race from starting point. .
7. The participating teams are not allowed to use any sort of weapons in the Bot.
8. The organizers have the right to disqualify the team with unsafe weapons.

9. The potential difference between any two points should not exceed 24V.
10. Weight of wireless robots and wired robots having on-board power supply will be counted as $0.6 \times \text{Actual Weight}$. Weight of external power source (batteries and adaptors) and the remote controller will not be considered.

General Rules & Arena Specification

1. Arena will consist the plane track with buzzer. The bot should avoid the contact with buzzer.
2. The successful crossing of one hurdle will reward the (+50) marks and If it touches with buzzer, then (-5) marks will be deducted.
3. Marking scheme will be same in different segment of the track.
4. But the picking of balls will rewards the (+15) marks and dropping on basket will reward you another (+15) marks.
5. Arena will have plain track with huddles (like buzzers, boxes & sends etc.). The length of the plane track is of 2.00 meters with 4 buzzers.
6. Then there will be a sloppy surface with inclination of 30 degree and then inclination will be continued till the height of the track is 20 cm from normal surface.
7. Then, there will be normal track with 4 hurdles boxes with 2.00 meters. Then there be decline plane till the normal surface. Then there will be a normal plan track with 2 buzzers & 2 boxes as a hurdle.
8. Then there will be sandy track with pebbles then plane track with buzzer. The length of the track will be 2.00 meters.
9. Then there will a water tank & robot has to move into it though decline plane. The depth of the water tank is 15 cm.
10. Then robot will move for 1meter on normal plane then there will a wall made from strong card board the robot have to break the ball and move forward.
11. Then Robot will move 2 meters and then Bot will pick the ball and placed in basket.
12. The time duration will be 1 minute trial & 5 minutes actual run time.

13. If any Bot completes one round and some time is left, then it will repeat the race till the time is over.

Round of event

1. The event will be conducted in 2 rounds.
2. First round will be conducted from the specified track with mentioned hurdles. Top 6 teams will be selected for second round or final round.
3. All bots have to move through more complex hurdles in next round.
4. The maximum marks achiever will be the winner.