

FLUXUS ROBO ONE

Task

- Teams have to build a robot which should race along a black track along with other robots simultaneously.
- Each robot would be assigned a separate track to follow.
- There would be tangentially parallel and equidistant tracks.
- A can consist of 4 members at max.

I. Requirements on Equipment

1. Each team is allowed to have only one racing robot.
2. The robot must fit into a cube of **250 mm x 250 mm x 250 mm (lxbxh)** at all times. It may not expand at any point during its run beyond these dimensions.
3. The max potential difference between any two points should not exceed 24 V.
4. The robot must be fully independent, with powering and motoring mechanisms self contained.
5. The robotic equipment is to be fully autonomous. Human operators are not permitted to enter any information into the equipment during a run. The human operator should not directly control the motion of their robots with a joystick or by keyboard commands under any circumstances. Use of wireless communication is not-permitted.
6. The robot cannot be constructed using ready-made Lego kits or any ready-made mechanism.
7. Any microcontroller/microprocessor can be used to make the robot.
8. Any type of sensors can be used by the robot.

II. Stipulations Related with Racing Track

1. Refer to Annexure - 2 for basic parameters of the racing track (excluding number of corners, location and overall layout)
2. The track may contain inclines and banking at a maximum angle of inclination of 30 degrees.
3. Actual layout of the racing track will be published on the competition day.

III. Referee and Technical Judgment

The entire racing event is divided into two phases: qualifying round and the final competition. The qualifying round and the final competition will be carried out by the organizing committee of the event. A Racing Executive Committee will be setup with subordinate technical group, referee group and arbitration committee to solve various issues encountered during the racing. The referee and technical judgment method should be determined by the organizing committee in accordance with the stipulations mentioned above.

IV. Racing Rules for Qualifying round and the Final

Preliminary and the final competition use same racing rules. Racing teams of each group will be ranked separately.

1. Rules for Preliminary Competition

- a. Two trial runs will be allowed to tune the parameters of the racing car system
- b. Only one team will race in the qualifying round.
- d. In each run, racing will run for two laps on the racing track.
- f. Teams who's robots will complete 2 laps on the racing track will qualify for the final competition.
- g. The technical judgment group will perform on-site technical inspection for all the winning cars eligible for the final. If there exists any inconsistencies qualification will be cancelled.
- h. List of finalists will be submitted by the referee group to the organizing committee of the event for approval and announcement.

2. Rules for Final Competition

- a. Two trial runs will be allowed to tune the parameters of racing car system.
- c. The racing teams eligible for the final will be ordered based on their scores in preliminary and compete in reverse order of their scores in preliminary.
- e. Each finalist can only compete for one time.
- f. In each round, racing will run for five laps on the racing track. Time will be calculated when the racing car leaves the starting line.
- h. Score of the preliminary will not be included in score of the final; it is used only for selection and to determine racing order in final. Racing teams failing to participate or appear in time will be disqualified from the final.

V. Rules for Racing Procedure

Referee will direct all the racing teams entering the playing field in accordance with the racing order. There should be only one team on the playing field at any given time. After being called by the referee, each racing team should designate a member to take their racing car to the playing field and place it in the starting area of the racing track. After the referee announces starting of the racing, the racing car should leave the starting area within 30 seconds and run for two laps continuously. After the racing car finishes the racing (2 laps), a member of the corresponding team should take the racing away from the playing field and hand it to the Jury Committee to perform Technical Inspection. After successful competition, a screen will display the best time for a single lap. Rules for Fouls and Failure During the racing, the on-site referee will judge whether the racing car run out of the racing track according to applicable rules. After the racing car runs out of the track for the first two times, the referee should pick the car model up and hand it to the player to start the racing again from the starting area and score of the current lap will be considered invalid. Alternatively, the player can also give up the racing after his/her car runs out of the track.

Any of the following conditions will be considered as running out of the time:

- The racing team fails to enter the playing field and get prepared for the racing in 1 minute and 30 seconds after being called by the referee;
- The racing car fails to leave the starting area within 30 seconds after beginning of the racing;
- The team member can rearrange the car during the race, only if the referee gives consent and time will not be stopped.

Any of the following conditions will be considered as failure in the racing:

- The racing car runs out of the track for more than two times;
- The player touches the racing car after beginning of the racing without consent of the referee;
- The racing car follows a track not assigned to it.
- The racing car fails to pass the technical inspection after the race.
- No score will be given for a failed team.

Forbidden Behaviours:

- No auxiliary lighting equipment or other auxiliary sensors are allowed around the racing track;

- After entering the playing field, players cannot modify any hardware and software except for changing battery;
- Only referee and 1 player per team are allowed in the playing field;
- Any behaviour that might interfere with movement of the racing car is not allowed;
- No copying is allowed in the algorithm and software used in the car. Software Used in the car models of different teams of same university should be different clearly.

Inspection and Display:

- Before commencement of normal racing, each racing team can test the racing environment on site.
- Before actual competition, all car models will be collected and placed in at allocated parking spaces by the organizing committee until end of the competition. Once the cars are placed in the parking slots, the racing teams are not allowed to modify software and hardware of the car model.
- During the racing, technical group of the organizing committee will perform technical inspection for all car models participating in the competition. In the event of any violations, the organizing committee is entitled to cancel qualification of corresponding team.

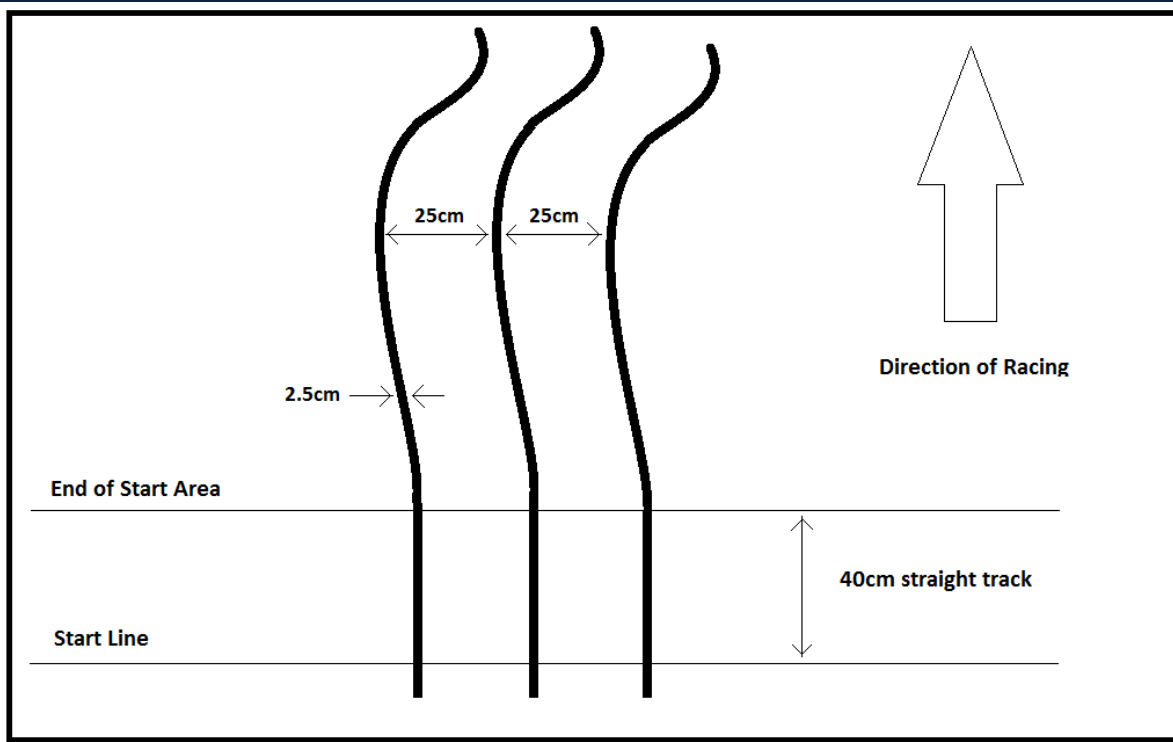
Miscellaneous:

- Racing qualification will be cancelled for any other cheating behaviour during the competition;
- The rules should be interpreted by the organizing committee of the event.

Annexure 1: Basic Parameters of the Racing Track (excluding number of corners, location and overall layout)

- 1) Surface of the racing track will use base material suitable for racing.
- 2) Width of the racing track will not be less than 70 cms. Length of the racing track can be increased during the final.
- 3) Specific specification for material used for surface of the racing track will be provided on web site of the event
- 4) Surface of the racing track is white, with continuous black line (25 mms wide) drawn in the middle as the pilot line.
- 5) **The minimum bending radius of the racing track will not be less than 10 cms.**
- 6) The racing track can intersect with a crossing angle of 90°
- 7) There is a starting area of 40cm long in the racing track, as shown in figure below. Start time and end time should be determined when front part of the racing car passes the starting line.
- 8) The tracks will be tangentially parallel and equidistant.
- 9) The tracks will be made in such a way that the competition is fair for each team.

Annexure 2



**** The rules and conditions are subject to change by FLUXUS if necessary. ROBOTICS CLUB, IITI reserves the right in their sole discretion to cancel, suspend and/or modify The Robo1 at any time.**

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