Remote-Controlled Car Race

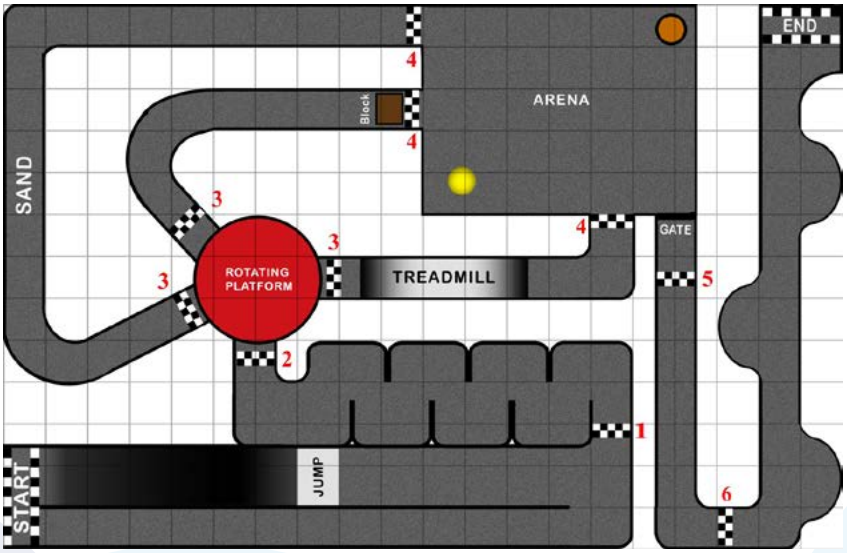
Eligibility

- The team can have maximum of four members. There is no minimum requirement.
- All team members must be students in a college and should present college ID upon participation.
- There can only be one car per team.

The Machine

- The cars must be electric powered, and assembled by the team themselves. Cars bought from the market or built from a DIY kit available for purchase will be immediately disqualified.
- The teams are allowed to use a single battery of maximum 15 volts on the car.
- The car must fit into a bow 30cmx25cmx25cm at any point in the race.
- The cars must be remote controlled. Any wired cars will be immediately disqualified.
- The remote control can be purchased.
- The teams are responsible to use proper encoders to avoid radio interference.
- Ready-made wheels are allowed.
- Since the arena presents a wide variety of obstacles, the teams are encouraged to decide on which path they are going to take and design the car around that.

The Arena



Description:

The Arena is divided into sections, divided by checkpoints. In section one, the team has a choice to place the car in one of two tracks. Track one is a short downward sloping ramp which ends in a jump. Choosing this track ears a 50 point bonus. The ramp is approximately 1 meter high and jump approximately 30 cm wide

(See picture). There will be a touch sensor on the jump area to detect if the car cleared the gap without falling. So if the car fails to complete the jump, the time it spends on the sensor will be recorded and penalty levied (See formula at end). The second choice entails going through a plane wet dirt path, without a gravity assist.

Section two is a self-explanatory snake track. There is a 15 cm gap through which thin cars can go directly.

Section three starts with a rotating platform. The platform is a 70cm diameter plywood disc rotating at ~60rpm and placed ground level. The team can decide between three choices. The shortest choice is the treadmill, which is moving in the opposite direction wrt the car at 1.5-2 m/s. The next choice is a slightly longer track ending in a wooden block, weighing 2kg which needs to be moved at least 30cm for the car to pass. The last choice is a long track part of which is a sandy surface.

Section four is a small arena where the car is supposed to direct a ball into a pit on the top right corner to open the gate leading to the next section.

Section five starts with a straight track filled with speed bumps. The track after checkpoint 6 is a 5 degree upward incline. After the car passes checkpoint 6, tennis balls start rolling down the incline every 5 seconds. The car is supposed to avoid the tennis balls by hiding in the space provided. Heavy penalty will be levied if the car comes in contact with a ball.

- Teams will hit the track one car at a time.
- The Arena is divided by checkpoints. If the machine stops working or tumbles off, it will have to be lifted and placed at the last checkpoint crossed by a team member. Any repairs must be done on the spot. The timer will be running during this.
- The car is not allowed to leave the track at any point during the race. Should the car leave the track it will have to be lifted back to the previous checkpoint.
- The team members are not allowed to touch their car or the car of their opponents once the timer is running (except for lifting the car).
- There shall be a countdown preceding the start of the race. No participant is allowed to touch the machine during the countdown period.

Judging

- All teams will be given two laps on the track. The track with greater points will be considered.
- As far as possible, the points will be calculated by a microcontroller monitoring the track. But all decisions regarding disqualifications and penalties will be in the hands of the judges.
- Maximum time for completing the race is 10 minutes.
- Total Score = $(600 - T) - P_1 - P_2 + B$
- T = Total time of completion, P_1 = 100 points per second spent on the touch sensor for the jump, P_2 = 100 points for each collision with a ball, B = 50 points if the ramp is chosen in section one.