Line Seguidor

Theme:

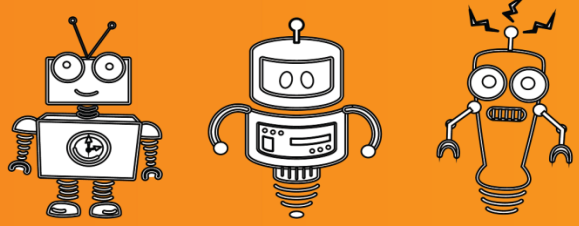
A driverless car is an autonomous vehicle that can drive itself from one point to another without any external assistance. Navigation is accomplished by a system of markers retrofitted on existing roads which provide inputs to the sensors that drive the corresponding actuators on the vehicles.
A line following vehicle is in a way an entry level autonomous vehicle that can navigate any course while following a on a contrasting background.

Problem Statement:

Design and fabricate an autonomous vehicle capable of navigating efficiently through guided black lines on a white floor. The vehicle must be able to effectively follow the guiding path irrespective of the terrain. The racers will be tested on speed and accuracy of path following.

Arena:

The arena shall consist of black lines on a white floor. For ease of navigation, the lines shall be 3cm thick. The arena size shall be 3m x 1.5m. The entire arena shall be conveniently situated in a uniformly-lit room to minimize ambient light. The teams are however advised to cover their sensors to avoid errors due to ambient light.
The arena would consist of smooth curves, U- turns and sharp corners, uniformly distributed line segments with minimum 3cm separation between them .(Fig. 2 to Fig.5).
The arena for the first round is shown in Fig. 1
The arena for the second round will be shown to participants on-spot at the time of competition. (Refer Gameplay Section) . However, all participating teams would be given enough time prior to the competition to make specific changes in their programs to suit the requirements of the given track.



ROUND 1

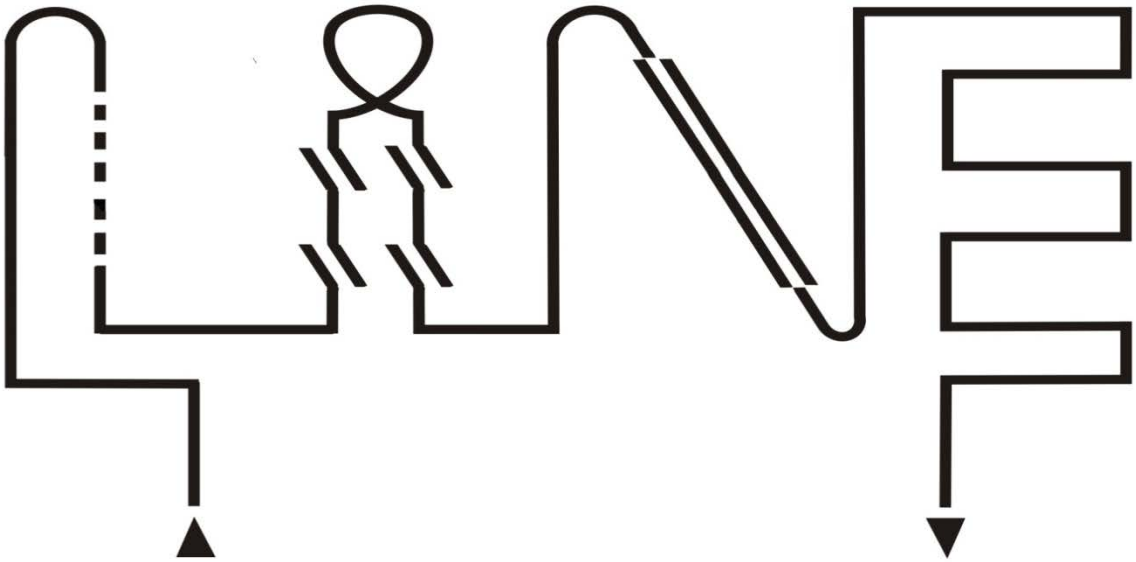


Fig. 1

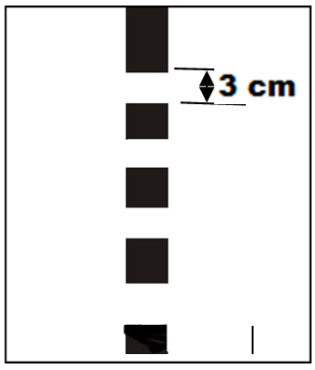


Fig.2

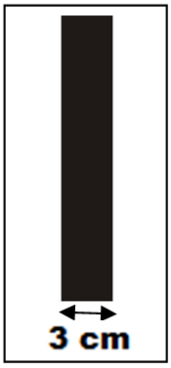


Fig. 3

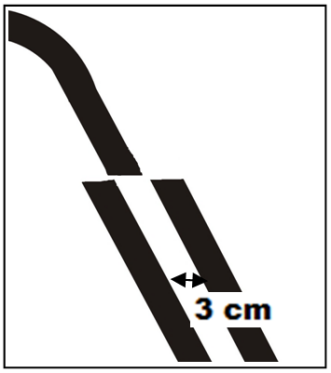


Fig. 4

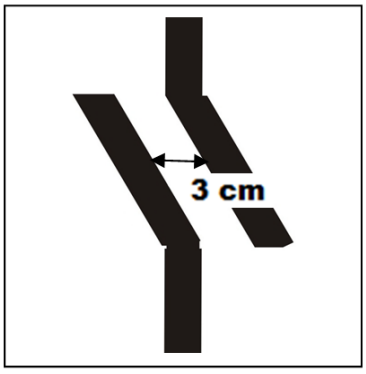
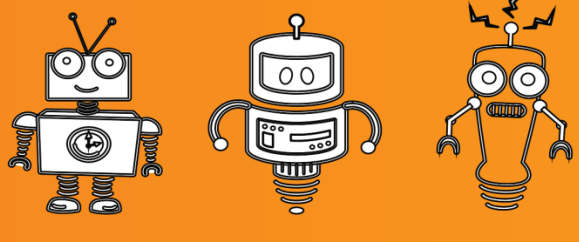


Fig. 5



ROUND 2

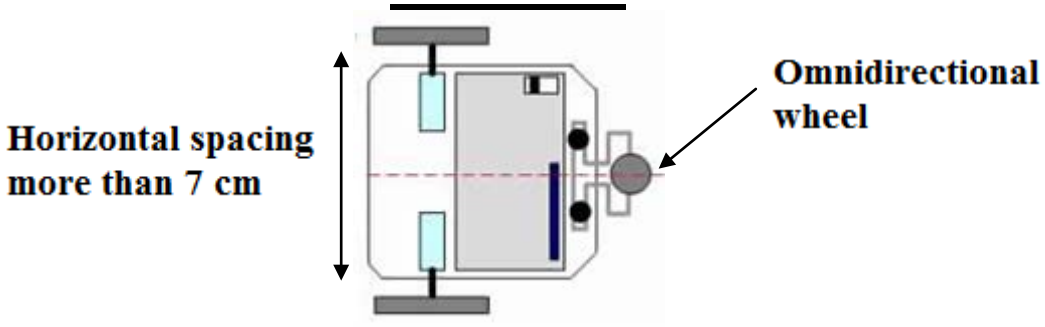


Fig. 6

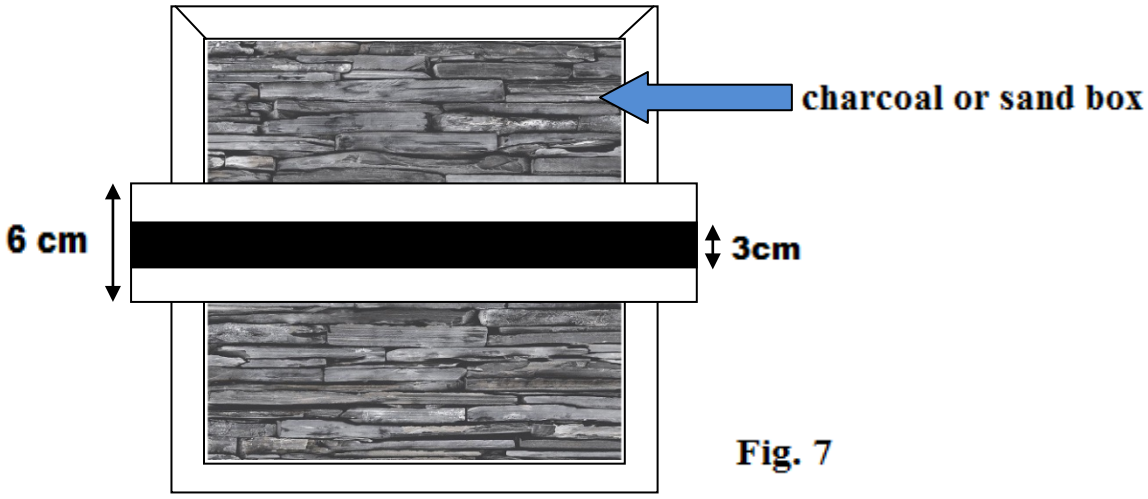


Fig. 7

Gameplay:

The Gameplay consists of two rounds:

ROUND 1:

- The bot must start from ‘Start’ and find its way to reach the ‘End’(Arrows indicate the Start and End in Fig.1).
- A total time of 2 minutes 30 seconds will be provided to complete the arena.
- There are no checkpoints in the round 1 and the bots will be evaluated based on the time taken to complete the arena.

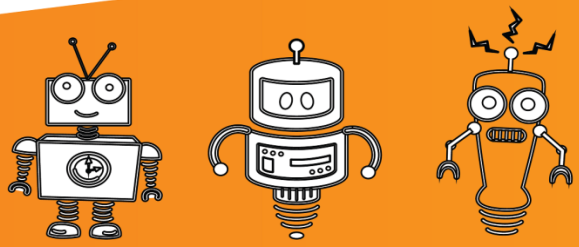
ROUND 2:

- The arena will be revealed on-spot on the day of competition.
- All the qualifying teams will have 1 hour to make adjustments to the bot and get ready.
- The arena will be a rough terrain comprising of a middle strip of guiding black line(3 cm wide) on white background (6 cm wide). (refer Fig. 7)
  - A charcoal box of 30x15 cm with line marking on top
  - A sand box 30x15 cm with line marking on top.
  - A ramp with an inclination of 35 degrees and declination of 45 degrees.
- The omnidirectional wheel of the bots(if any) will run on the middle strip while the other wheels present on either side of bot must run on the rough terrain. (refer Fig. 6)
- A total time of 3 minutes will be provided to complete the arena.
- The arena comprises of 3 checkpoints. Passing each checkpoint will account points in the total score.

SCORING:

ROUND 1:
The Top 10 teams will be shortlisted depending on the total time taken to complete the arena.

ROUND 2:
The arena comprises of 3 checkpoints. Passing each checkpoint will account points in the total score.
The teams would be shortlisted on basis of their Average speeds (counting all time penalties).
PROGRAMMERS BEWARE!!

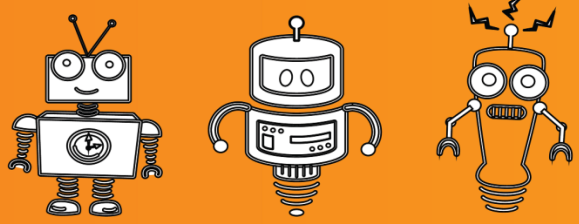


BOT SPECIFICATIONS:

1. The bot must be autonomous and must fit into the box of dimension 30 cm X 30 cm X 30 cm (lxbxh).
2. Bot must be started individually by only one switch. However, a team may have an onboard switch for restart. This switch has to be shown to the organizer before the run.
3. Bot must have atleast 7 cm of horizontal spacing between the two big wheels.
4. During the run, the autonomous bot must not damage the arena in any way. It is not allowed to leave anything behind or make any marks while traversing the arena. **Any bot found damaging the arena will be immediately disqualified.** The final decision is at the discretion of the organizers.
5. Bot must have 'on board' power supply. No external power source will be provided.
6. The potential difference between any 2 points **must not exceed 24 V** at any point of time during the game.
7. The autonomous bot should not separate or split into two or more units. All bots/units which are touching each other or are in the starting point will be considered as one bot.
8. The **Bot cannot be constructed using readymade 'Lego kits' or any readymade mechanism.** But they can make use of readymade gear assemblies. Violating this clause will lead to disqualification of the team

Game Rules:

1. Teams will be given 1 minute for calibration at the time of run. If any team is found to alter its code after depositing its bots, then it will be immediately disqualified from the competition. They are however allowed to make any other hardware changes.
2. Only one autonomous bot per team is allowed.
3. When the autonomous bot starts, no team member is allowed to touch the bot or enter the arena.



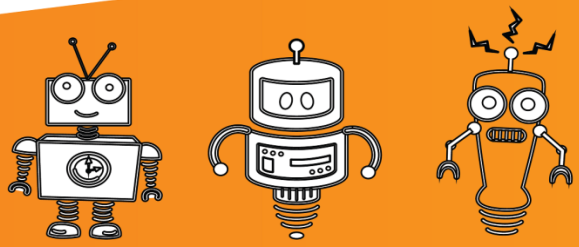
4. At the start of the task, the bot will be placed at the starting point. Only 1 team member is allowed to be near the game field while starting the bot.
5. Run will start only when organizers give the signal.
6. The starting procedure of the bot should be simple and should not involve giving bot, any manual force or impulse in any direction.

Restarts:

1. No restarts are allowed in the first round.
2. The teams can have 1 restart in the second round but a penalty of 20 seconds will be added to their final time.
3. If the bot takes a restart in the second round of the competition, it has to start from the start zone of the arena.
4. During a restart, a contestant must not feed information about the arena to the bot. However, contestants are allowed to adjust sensors (gain, position etc.) and make hardware changes.
5. The contestant must not alter the bot in any manner that reduces its weight (e.g. removal of a bulky sensor array or switching to lighter batteries to get better speed). The organizers reserve the right to arbitrate in such circumstances.

General Rules:

1. Only 1 member of the team is allowed to handle the bot.
2. Participants are not allowed to keep anything inside the arena other than the bot.
3. Laptops/personal computers are not allowed near the arena. Other Wi-Fi, Bluetooth, etc. devices must be switched off. The organizers hold the right to check for these devices and their usage and disqualify the team.
4. The time measured by the organizers will be final and will be used for scoring the teams.
5. Time measured by any contestant by any other means is not acceptable for scoring.
6. **In case of any disputes/discrepancies, the organizers' decision will be final and binding.**



7. **The organizers reserve the rights to change any or all of the above rules as they deem fit.** Change in rules, if any will be highlighted on the website and notified to the registered teams.

Judging:

1. 50 points will be awarded for successfully completing Round 1.
2. 25 points will be awarded as it crosses any of the checkpoints but it will be counted only once for each checkpoint.
3. 30 points will be provided if the bot successfully completes the Run.

Team Specifications:

A team may consist of a maximum of 4 participants. Students from different educational institutes can form a team.

Eligibility:

All students with a valid Student identity card of their respective educational institutes are eligible to participate.

Certificate Policy:

1. Winner and Runner teams are given the prize the same day.
2. All participants are mailed with e-certificate of participation shortly after the event.

Organizers:

1. **Shubham: 9731283890**
2. **Srinivas: 8073032826**