SEGUIDOR
## An autonomous event

Description of the Event: Design and construct an autonomous robot which is capable of traversing the arena by following a line in a particular manner and avoid the obstacle that it might encounter. The bot should traverse the arena from the START point to the END point by following a white line laid throughout the black arena. But the task is not that simple. The participants are required to build a line following bot which is capable of detecting an obstacle in front of it and sense the presence of color laid on the floor in front of it. During its operation, the bot will encounter the various obstacle which it needs to understand and take action accordingly. Performing every task smoothly will result in full point and violating it will result in penalties.

Arena Design and Specification:

1. The arena will be absolutely flat and leveled out so additional power is not required to run the bot. Although participants can vary the speed of their robot to give maximum efficiency in following the line.
2. The Surface of the arena will be painted back and the bot is required to follow a white line of thickness 2 centimeters.
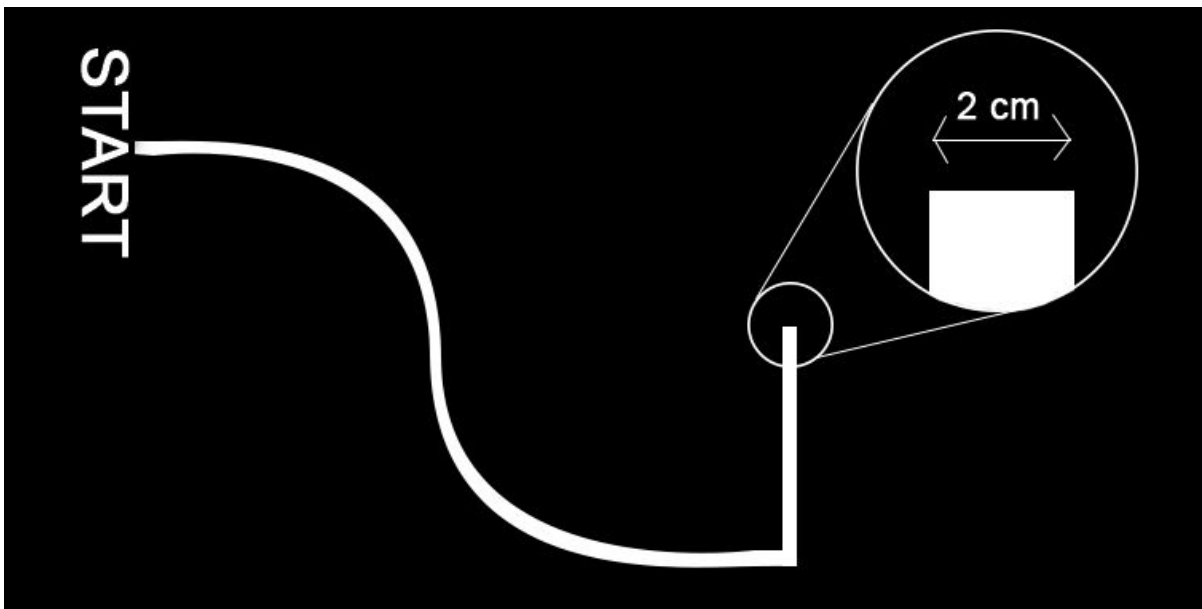

Key Points:

There are some key points of the arena that the participants need to keep in mind while programming their bot to gain maximum points and avoid deviation from the required path.
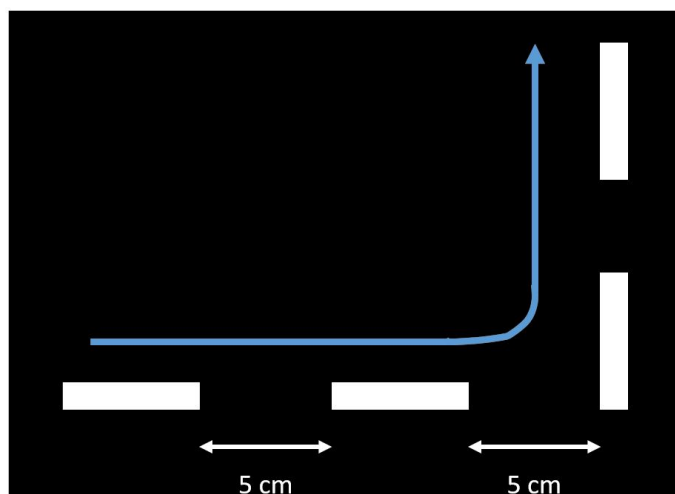
1. At some point in the area, the white line will not be continuous and there will be a gap of not more than 5 centimeters. There will also be a sharp turn after some gaps. So the participants should program their bot in such a way that it does not malfunction at these given points. According to the given figure, the bot should follow the line as the blue line suggest.

2. As the image suggests, at some point of the arena the line shift suddenly to either the right or left by not more than 1 centimeter. The participant needs to program their bot in such a manner that it could understand the shift and traverse the path according to the blue line shown in the image.

3. At some points of the arena, the lines will have sharp turns but the edges of the turn will be removed as you can see in the given image. So the participant needs to program their bot in such a way that it does not malfunction in this part.
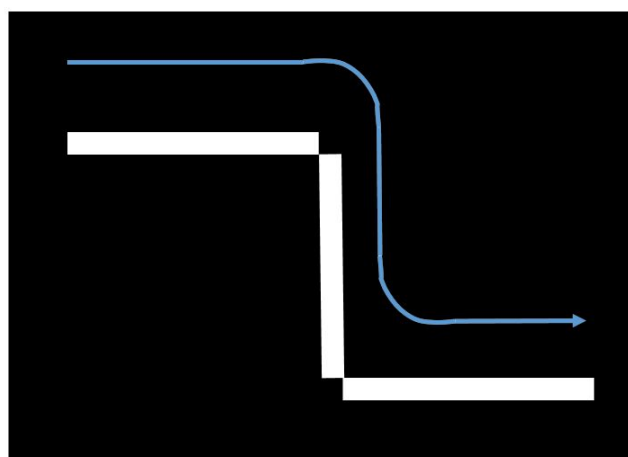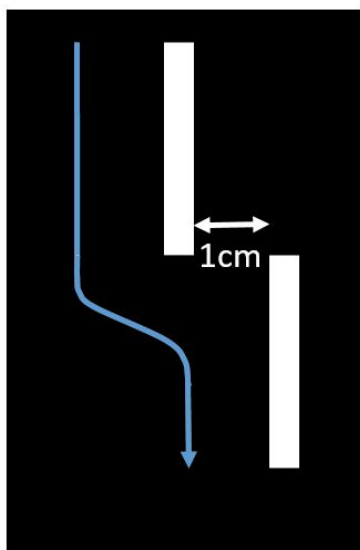
4. At some points of the arena, the path could have a turn with an angle of at most 45 degrees. So the participants will have to program their bot accordingly. If the bot leaves the path, it will have to restart from the last checkpoint and penalties will be imposed for every such action.
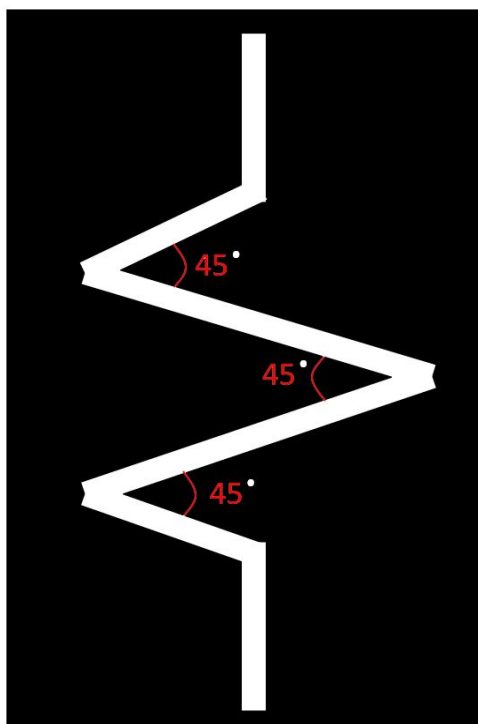
5. Some part of the arena will constitute curved dotted lines with a gap of a maximum of 1 centimeter. The line will not bend with a very sharp turn but will almost look like a straight line. So the contestant need not worry so much about this part as they will easily be able to traverse with a minor change in the program.
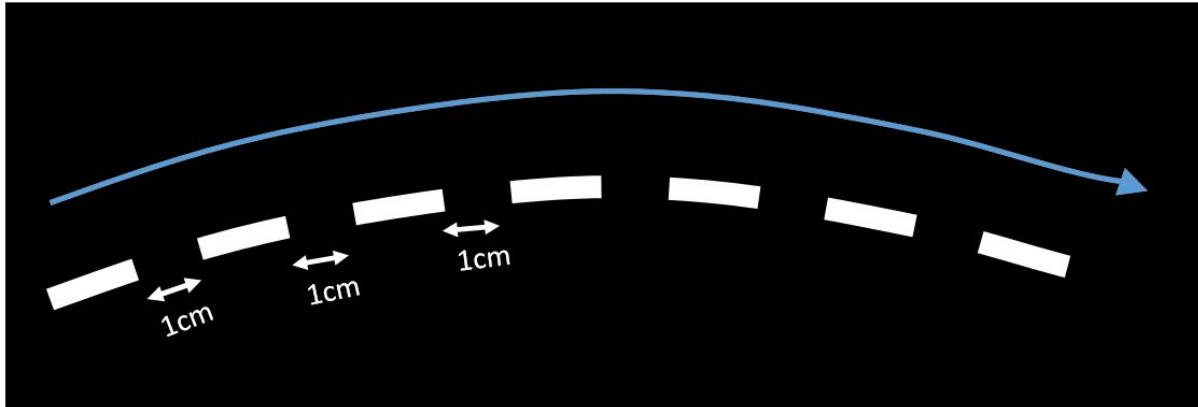

Colour Sensing:

1. There will be points in the arena where the line will divert into two paths at 90 degrees. At this point, there will a rectangular patch of red color laid on the floor 3 cm ahead of the turning point as shown in the diagram. The participant needs to construct their bot and program it in such a manner that it should be able to detect this color in front of the line and take 90 degrees turn to the left side. Taking a right turn in this point and following the path will result in negative points. If the left path is traversed, the team will gain points in their favor.

2. There will be points in the arena where the line will divert into two paths at 90 degrees. At this point, there will a rectangular patch of yellow color laid on the floor 3 cm ahead of the turning point as shown in the diagram. The participant needs to construct their bot and program it in such a manner that it should be able to detect this color in front of the line and take 90 degrees right turn. Taking a left turn in this point and following the path will result in negative points. If the right path is traversed, the team will gain points in their favor.
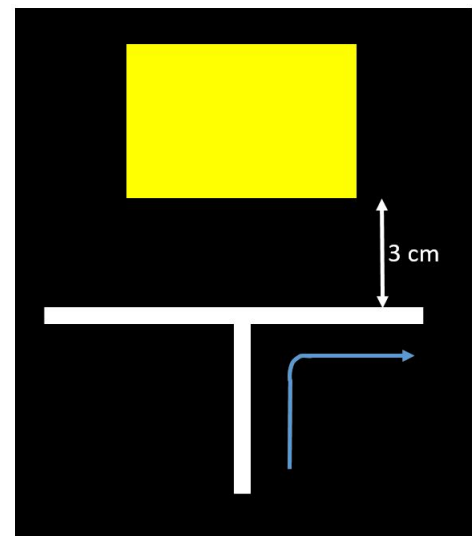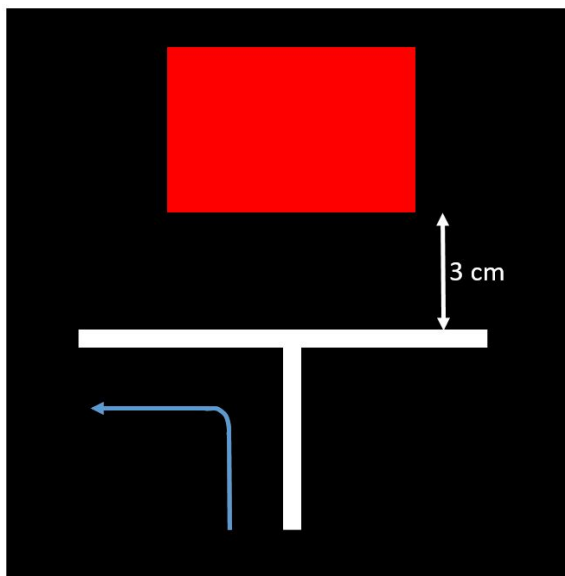
3. When patches of blue color will be present on the floor in front of the line the bot should take a 180 degrees turn clockwise or anticlockwise and follow the path backward and take another left turn to follow the right path. Skipping the blue patch and following the wrong path will result in negative marking.

4. According to the given figure, at some point in the arena, there will be no line to follow. Instead, there will be a wall in front. The participant will have to construct their bot in such a way that it should detect the wall in front of it and take a 90 degree turn to the right and continue to detect a line again. If the bot is not able to detect the wall in front of it or it is deviating from its required path, then it will have to take a restart and start from the last checkpoint with penalties.
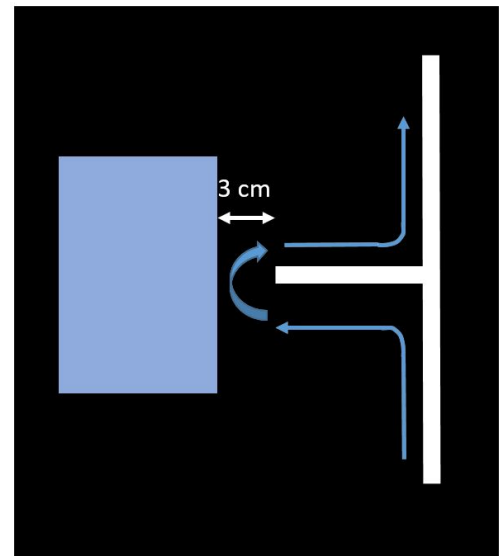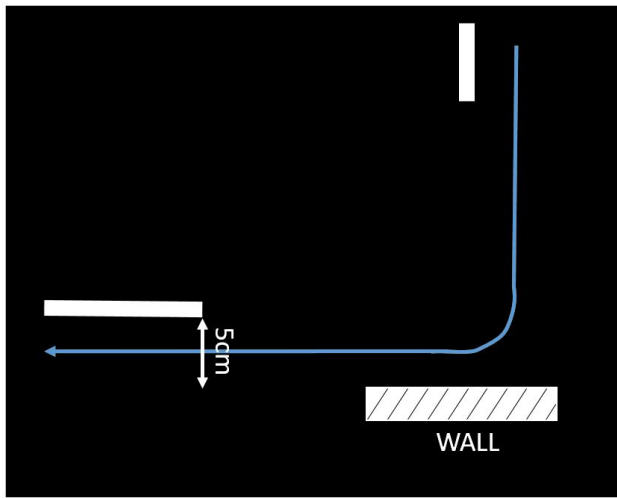
NOTE:

1. The Arena will contain various checkpoints, completing which will result in additional points. After any checkpoint, if the bot deviates from its path, then the bot will start its journey from the last checkpoint.
2. The contestant will need to program their bot so that it is capable of turning clockwise or counter-clockwise at exactly at the angle required at each key points of the arena. Failing which will result in negative marking.

Robot Specifications:

1. The robot must not contain any readymade kits or Lego kits or any such assembly.
2. However readymade microcontroller boards, sensors, chassis, gears, and shafts may be used.
3. The voltage difference between any two points on bot must not exceed 24 volts.
4. The robot dimension must be limited by 20cm x 20cm x 20cm.
5. The robot must be completely autonomous. - It should not receive any input from outside the arena.
6. The robot should not contain more than 6 IR sensors for fair competition.
7. Motor RPM should not exceed 200.

Technical Details:

1. Team members will not be allowed to touch any part of the arena, only organizers are allowed to handle the arena in any situation, the team will be disqualified whose member is found touching the arena.
2. Teams will not be allowed to change bot's mechanism and parts once the game starts.
3. Participants are not allowed to keep anything inside arena other than the bot.
4. During the run, the bot should not damage the arena in any way. It is not allowed to leave anything behind or make any marks while traversing. All machines found damaging the arena will be immediately disqualified. The final decision is at the discretion of the organizer.
5. The time measured by organizers will be final and will be used for scoring.
6. Time measured by participants is not acceptable for scoring.
7. Organizing team will not be responsible for any kind of damage to your bot.
8. Organizer's decision will be final and binding in case of any dispute.
9. Organizers reserve the right to change any of the above rules they deem to be fit.
10. The participants will be provided with 220 Volts, 50Hz standard AC supply if required but it is advised to construct a bot containing a self-powering mechanism.
11. Participants will have to themselves arrange for any other power supply required for their robot.
12. There may be a slight variation in dimension of the arena.
13. The arena & color pattern may be different from the picture shown above.

Rules and Regulations:

1. This event is restricted to students currently studying in any recognized Educational Institute.
2. A maximum of four participants are allowed per team.
3. Students from different colleges can be a part of the same team.
4. An individual cannot be part of more than one team. Participants must bring a valid identity card of their institute and KIIT FEST ID.

Gameplay:

1. 1. PRELIMS:
   - Prelims will contain only some key points of the problem statement and the participant ability to build a perfect line follower will be tested. This will a qualifying round in which contestant will compete each other to qualify for the finals and get yourself one step closer to the winning prize!!
   - Two dry runs of 8 minutes will be given followed by one final run of 5 minutes. The dry run will help the participant anticipate any change in the program that they might need to do to make their bot more perfect (Any change in the construction is not allowed). But they cannot take more than 5 minutes or leave the arena during their dry and final run otherwise, the team will be disqualified.
   - The score of only final run will decide if the participant qualifies in the next round or not. And only one final run will be made and the scoring will be final under every circumstances.
   - If the bot deviates from the path, it will have to start again from the last checkpoint. Three such restart will be allowed, after that negative mark will be imposed on them.
   - For completion of every checkpoint there will be positive making.
   - Completing the whole path of the prelim will result in additional points other than the checkpoint.
   - Skipping is not allowed in the prelims.
2. 2. FINALS:
   - Finals will contain all the key points of the problem statement. This is where it will get really interesting. The Actual coding skill and teamwork of the participant will be tested and the challenges will not be as easy as the prelims.
   - Similarly like the prelims, two dry run of 10 minutes and one final run of 8 minutes will be allowed.
   - The score of only final run will decide winner. And only one final run will be made and the scoring will be final under every circumstances.
   - If the bot deviates from the path, it will have to start again from the last checkpoint. Three such restart will be allowed, after that negative mark will be imposed on them.
   - For completion of every checkpoint there will be positive making.
   - Completing the whole path of the prelim will result in additional points other than the checkpoint.
   - Any team can skip a checkpoint after 3 deviation but not directly. A maximum of 2 skips will be allowed with heavy negative marking.

Judging Criteria:

Scoring will be done on the basis of time and points and it will be only for the final run. The team will be qualified or declared winner on the score of final run only. The decision taken by the organizer will be final.

If, T=time left on the clock in seconds after completing the course,

C=10, for completing a checkpoint,

A=Number of checkpoints cleared,

D=Number of deviation from the path, after the third time,

S=20, for every skip,

B=Number of skip,

F=50, for completing whole course, 0 for not.

Final Score= 100+T+C*A+F-(D*5)-(S*B)

Prize Money:

Worth Rs. 30,000/-

Contact Details:

A. Anirban Nag (+91-9973769996)

B. Shuvam(+91-9938283553)