MeshMerize

Objective:

Teams have to build an autonomous robot which can follow a white line and keep track of directions while going through the maze. The bot has to analyze the path in the dry run and has to go through the maze from the starting point to the ending point in minimum possible time.

Arena:

The game field consists of an arena having dimensions 224 cm X 228 cm (lxb).
It consists of the following:
1. The arena is composed of random paths made up of white strips.
2. All the distances are shown in fig. 1 and fig. 2.
3. Angle between two adjacent white lines in the path is 90°.
4. The width of all white stripes will be 30mm.
5. The figure below shows the sample arena. **The actual arena at the competition will consist of alterations in the path.**
6. A white box of 330 mm x 330 mm is present at the end zone of the arena to indicate the end position.
Note: The dimensions of the arena will be accurate to within 5% or 20 mm, whichever is less.

Gameplay:

The game play consists of two parts:-
1. The first part is the **"Dry Run"**. In this part the bot must start from the 'Start' and find its way to reach the 'End' (White box Indicated in figure 1) of the arena. The bot has to give a signal by **glowing a LED** as soon as it senses the white box below it at the end. The bot has to follow an algorithm to find its path to reach 'End' and bot can store the turns in its memory to explore the shortest path during second part of journey. There are no restrictions to cover all the **checkpoints.**

2. The second part is the **"Actual Run"**. In this part the bot has to restart from the 'Start' again and finds its way to the 'End' through the best possible path by following the path that was stored in first part. The 'End Zone' has a white box of 330mm x 330mm (lxb) that indicates the end of the path for the bot. The timer will be set to zero as the "Actual Run" begins.

3. A total of **3 minutes** will be provided to complete the dry run.

4. A total of **2 minutes and 30 seconds** will be provided to complete the actual run.

5. If the bot takes more than 3 minutes for completing the dry run, then the extra time taken will be deducted from the timing of the actual run which is 2 minutes and 30 Seconds.
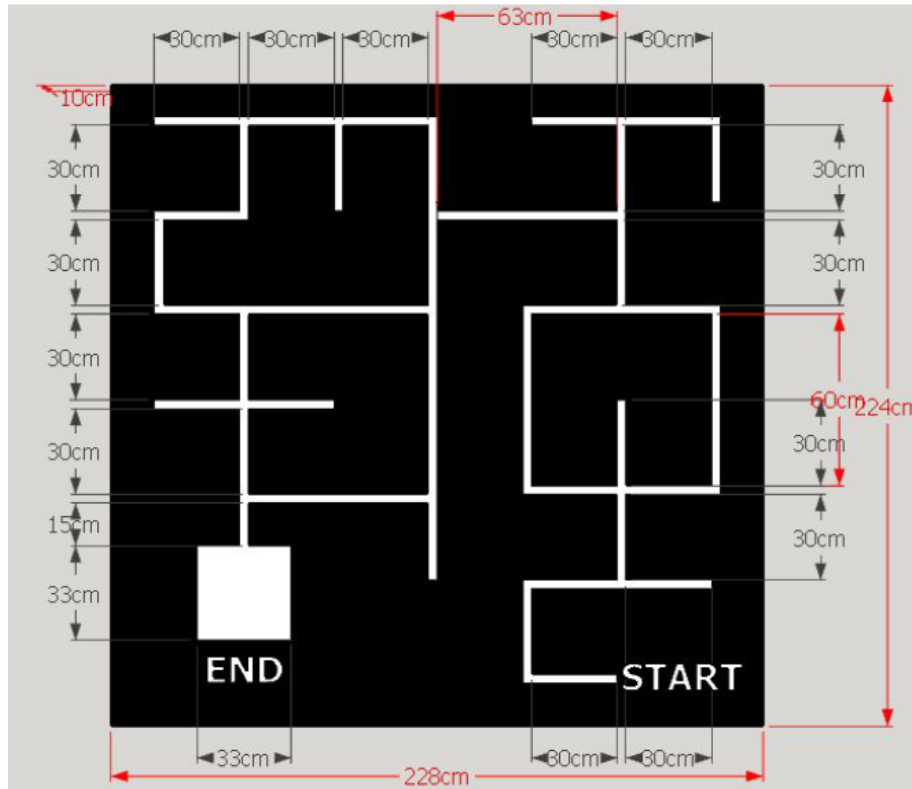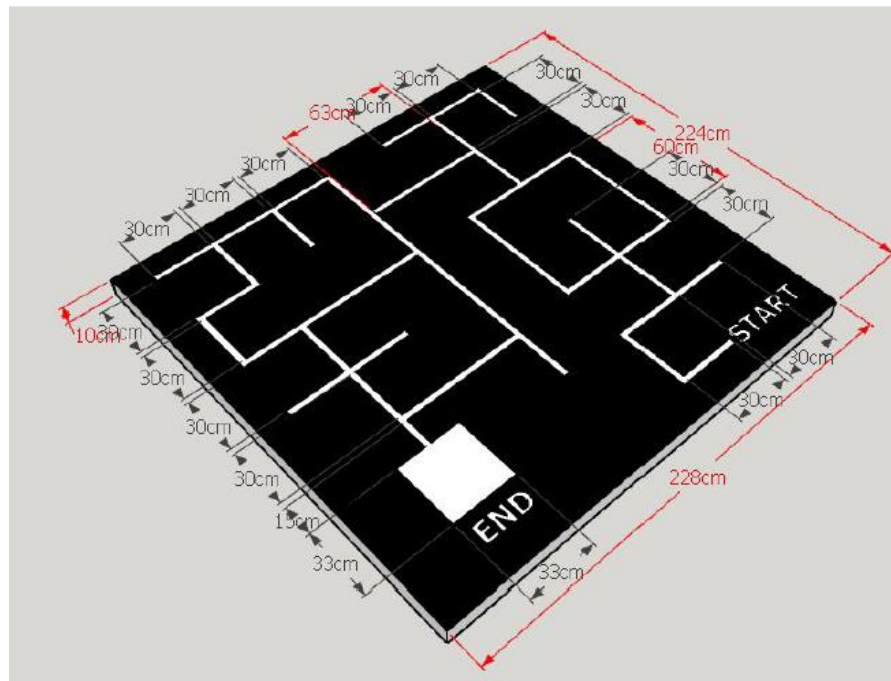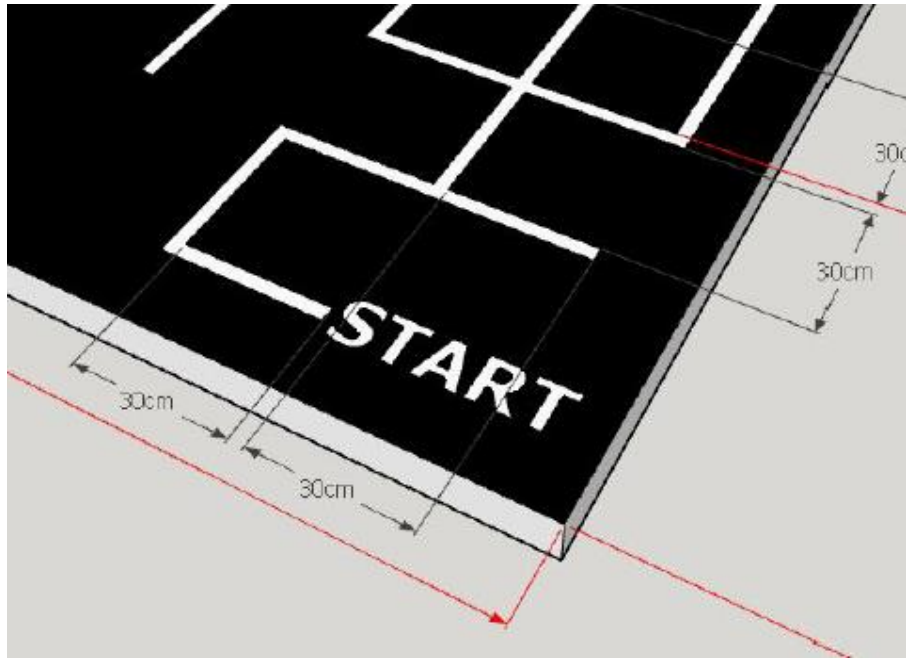
Fig. 1 Top View

Fig. 2 Isometric View

Fig. 3 Start Point

Fig. 4 End Point

Fig.5 Checkpoints

Checkpoints:

1. The check points are shown in the figure 5. (There would not be any blue circle in the arena as shown in the figure. They are used only for reference)
2. Each check point carries 25 Points.

BOT SPECIFICATIONS:

1. The autonomous bot must fit into the box of dimension 220 mm X 220 mm X 220 mm (l x b x h).
2. Bot must be started individually by only one switch. However a team may have onboard switch for restart. This switch has to be shown to the organizer before the run.
3. Bot must have a red LED which will glow once it reaches the end zone of the arena.
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.
6. When using the electric power supply, 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. Machine 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
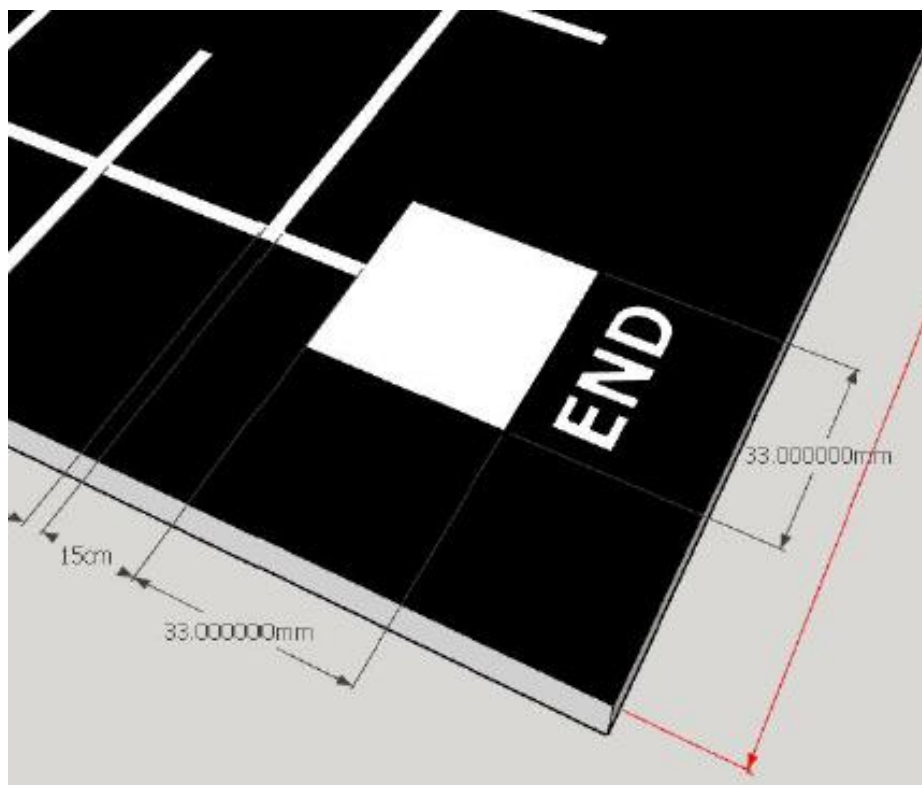
Game Rules:

1. The teams will have to submit their bot before the start of the competition. Only those teams which submit their bots will be allowed to participate. The bot will be handed back to the team during the time of their run. They will be given 1 minute for calibration. 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.
7. A total of 5 minutes and 30 seconds will be given. The bot have to finish the dry run and main run in that period only.

Restarts:

1. The participants are allowed to take a maximum of 3 restarts in the entire match.
2. If the bot takes a restart in the first part of the competition, it has to start from the checkpoint.
3. If the bot takes a restart in the second part of the competition, it has to start from the start zone of the arena.
4. The timer will not be set back to zero and will not be paused in any case.
5. 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.
6. 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.
8. Only one team is allowed to be present during the run, other teams will have to stay outside the hall. **No team is allowed to take photograph or record their run.**

Judging:

1. 25 points will be awarded as it crosses any of the checkpoints but it will be counted only once for each checkpoint.
2. 30 points will be provided if the bot successfully completes the Dry Run.
3. 30 points will be awarded if bot goes through the Shortest Path in Actual Run.
4. 5 points will be awarded if the bot glows the LED.

Scoring:

1. A = 25 points * (Number of check points covered during the Dry Run)
2. B = 30 points if the bot successfully completes the Dry Run
3. C = 180 - Total time taken in seconds in completing the Dry Run
4. S= 30 Points if Bot successfully completes the Shortest Path
5. T = 150 - Total time taken to complete the Actual Run
6. L = 5 points if the LED glows
7. Total = A + B + C + S + L + T

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:

The top three teams will get the entry in the Grand Finale to be held at Techfest, IIT Bombay during 29th-31st December 2017.

Certificate of Participation:

The participation certificate will be awarded to teams scoring a **minimum cut-off** which will be decided later.