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Information Technology

# MAZE SOLVER RULEBOOK

## TASK

Teams must create an autonomous robot that can navigate a maze by following a white line and keeping track of directions. The bot must navigate the maze from starting point to ending point in the shortest amount of time while analyzing the course during the dry run.

## ARENA

The game field consists of an arena having dimensions 310 cm x 310 cm (l x b). It consists of the following:

- The arena is composed of random paths made up of white vinyl strips.
- The angle between two adjacent white lines in the path is 90°.
- The width of all the white strips is 3 cm.
- A white box of 30 cm x 30 cm is present at the end zone of the arena to indicate the end position.



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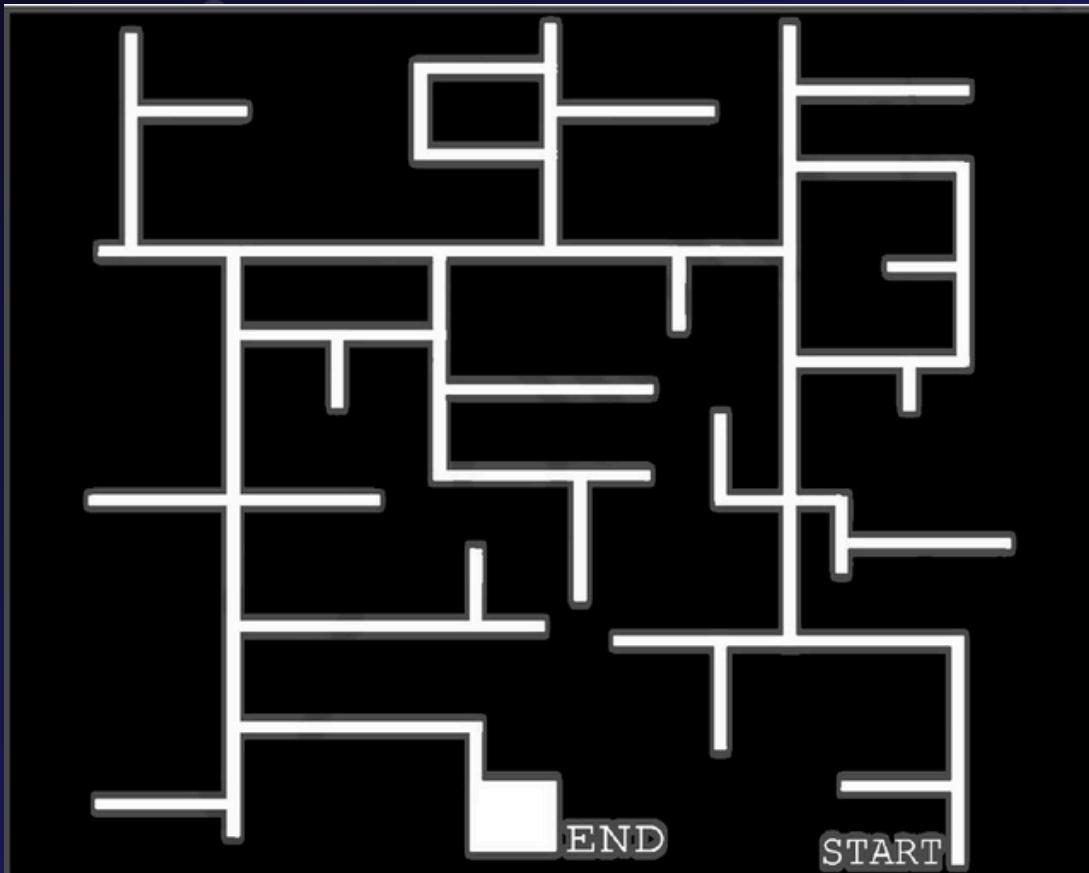
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- The figure below shows the sample arena. The actual arena at the competition will consist of alterations in the path.

**NOTE: The dimensions of the arena will be accurate to within 5% or 2 cm, whichever is less.**



**\*NOTE: Above track is not the final track; it's a test track.**



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## GAMEPLAY

The gameplay consists of two parts:

- The “**Dry Run**” is the initial phase. The bot must begin this run at the “Start” and navigate to the “End” (white box indicated in the provided track) of the arena. The bot has to give a signal by glowing an LED as soon as the bot notices the white box beneath it at the conclusion. The bot should follow an algorithm to determine its course to “End”, and it can store the turns in its memory to later determine the shortest route. It is not prohibited to visit every checkpoint.
- The “**Final Run**” is the second section. The bot must start over from the “Start” in this run and navigate to the “End” using the best route feasible by using the path that was previously saved. A 30 cm x 30 cm (l x b) white box known as the “End Zone” marks the bot’s path’s conclusion. The “Actual Run” will start with the timer set to zero.
- The Dry Run will have a 5-minute time limit.
- The Final Run will have a total time limit of 5 minutes. The timing of the actual run, which lasts 5 minutes, will be reduced if the bot needs longer than 5 minutes to finish the Dry Run.



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## BOT SPECIFICATIONS

- The autonomous robot needs to fit within a box that is 22 cm x 22 cm x 22 cm in size (l x b x h).
- The bot should be IR-based (infrared).
- When the bot enters the arena's end zone, an LED must begin to illuminate.
- The bot must have an on-board power source.
- It is not acceptable for the autonomous bot to divide or become more than one unit. Each bot or unit that touches another or is at the beginning point will be treated as a single bot.
- 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 rests with the organisers.
- When using the electric power supply, the potential difference between any 2 points must not exceed 26 V at any point of time during the game.
- The machine cannot be built using prefabricated "Lego kits" or any other prefabricated mechanism.

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## GAME RULES

- Any team that is discovered to have changed their code after submitting its bots will be instantly eliminated from the competition.
- Only one autonomous bot per team is allowed.
- The bot will be positioned at the task's beginning when it begins.
- When the bot is commencing, only one team member may be in close proximity to the playing area.
- When the bot starts, no team member is allowed to touch the bot or enter the arena.
- Only when the organizers give the signal, run will begin.
- The bot should not be given any manual force or impulse in any direction.
- The bot has to finish the dry run and main run in the given time period only.

## RESTARTS

- A maximum of three restarts are permitted by the team during the whole match.
- If the bot takes a restart in the first part (Dry Run) of the competition, it has to start from the checkpoint.
- The team won't be given another chance at the Dry Run after the bot has finished it.



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- The bot must restart from the start zone of the arena if it needs to during the second phase of the tournament (Final Run). The countdown will not be stopped or reset to zero in any way.
- A competitor cannot feed the bot information about the arena during a restart. Contestants may, however, modify hardware and tweak sensors (gain, position, etc.).
- The competitor cannot make any changes to the bot that lighten it up during the match (e.g. removal of bulky sensor array or switching to lighter batteries to get better speed). In such cases, the organizers reserve the right to arbitrate.

## GENERAL RULES

- Only 1 member of the team is allowed to handle the bot.
- Participants are only permitted to keep the bot inside the arena. Nothing else is permitted.
- Personal devices and laptops are not permitted close to the arena. All other Wi-Fi, Bluetooth, and other devices need to be turned off. The right to search for these gadgets and their use, as well as to disqualify the team, belongs to the organizers.
- The time measured by the organizers will be final and will be used for scoring the teams.
- Time measured by any contestant by any other means is not acceptable for scoring.



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- In case of any disputes, discrepancies, the organizer's decision will be final and binding.
- The aforementioned guidelines are subject to change by the organizers as they see fit. Any changes to the rules will be noted on the website and communicated to the registered teams.
- 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

- Whichever team is unable to finish the track, their ranking will be determined by their points.
- 20 points will be awarded as it crosses any of the checkpoints, but it will be counted only once for each checkpoint.
- 30 points will be provided if the bot successfully completes the Dry Run.
- 30 points will be awarded if the bot goes through the Shortest Path in Actual Run.
- 10 points will be awarded if the bot glows the LED.

## TEAM SPECIFICATION

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



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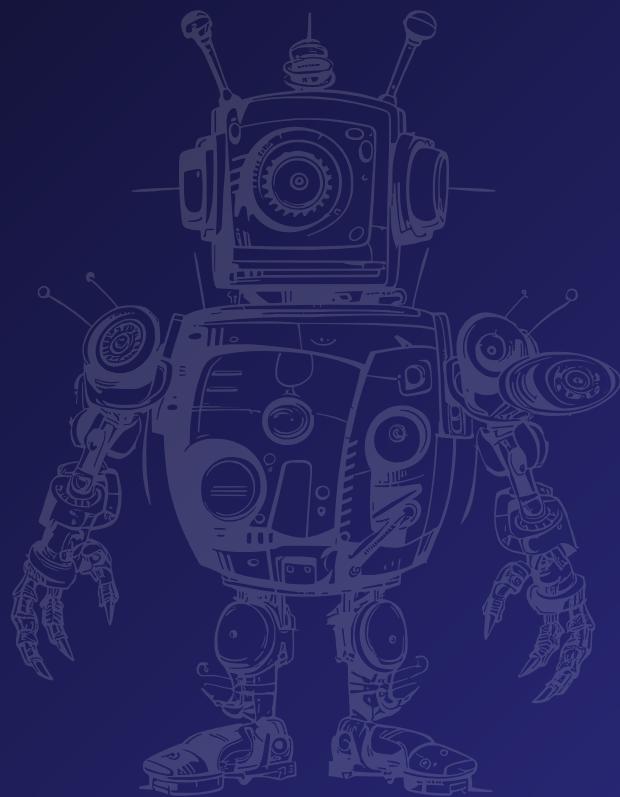
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## CERTIFICATE POLICY

- Prize money will be awarded to the top three teams only.
- Certificate of excellence would be awarded to the top three teams.



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