



# Vortex: Wildcard

# <u>Task</u>:

Teams have to build an autonomous robot which can follow white line and keep track of directions while going inside the maze. On reaching the center of the arena, the bot has to come out of the maze in minimum possible time.

# Arena:

- 1. The game field consists of an arena having dimensions 2020mm X 1790mm.
- 2. The arena is composed of 4 concentric regular hexagons. Each individual hexagon has some discontinuities to block the way of the bot. There is only one way that would lead the bot to the centre.
- 3. The diameters of the incircle of the innermost and outermost hexagons are 350mm and 1430mm respectively.
- 4. The length of the white strip connecting any 2 adjacent hexagons is 150mm.
- 5. The width of all white stripes will be 30mm.
- 6. The figure below shows the sample arena. The actual arena at the competition will consist of slight alterations in the path.
- 7. A cross is present at the centre of the arena to indicate the centre position. Note: The dimensions of the arena will be accurate to within 5% or 20 mm, whichever is less.





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Figure 2: Isometric view of complete arena



Figure 3: Grid dimensions

# **Bot Specifications:**

- 1. The bot must be completely autonomous and it must fit into the box of dimension 220mm×220mm×220mm.
- 2. Bot must be started individually by only one switch. However a team may have on-board switch for restart. This switch has to be shown to the organiser before the run.
- 3. Bot must have a red LED which will glow once it reaches the centre of the arena.
- 4. During the run, the autonomous bot must not damage the arena in anyway. 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 organisers.

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- 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.

#### Gameplay:

- 1. The gameplay consists of two parts.
- 2. The first part is the dry run. In this part the bot must start from the indicated arrow outside the biggest hexagon and find its way to reach the centre of the arena. The bot will be given a maximum of 3 minutes to reach the centre. The bot has to follow an algorithm to find its path and store only the correct turns and ignore the ones that lead him to the blocked way.
- 3. The second part consists of getting out of the hexagon by following the path that was stored in first part. The bot will get a maximum of two minutes to complete this part.
- 4. Timer will be started as soon as the bot reaches the centre.
- 5. The bot has to complete the task in minimum possible time.

#### Game Rules:

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 a time of 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.

- 1. Only one autonomous bot per team is allowed.
- 2. When the autonomous bot starts, no team member is allowed to touch the bot.
- 3. At the start of the task, the bot will be placed at the starting point(indicated by the arrow). Only 1 member from the team is allowed to be near the game field while starting the bot.
- 4. Run will start only when the organizer gives the signal.
- 5. The starting procedure of the bot should be simple and should not involve giving bot any manual force or impulse in any direction.
- 6. If the time for the dry run exceeds 3 minutes, then the extra time taken for the dry run will be deducted from the actual run time of 2 minutes. However no advantage will be given if the dry run ends before 3 minutes.

# 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 starting line.
- 3. If the bot takes a restart in the second part, it has to start from the centre of the arena.
- 4. The timer will not be set back to zero and will not be paused in case of a 'Restart'.





- 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 organisers 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 organisers hold the right to check for these devices and their usage and disqualify the team. The bot should not receive any kind of input from outside the arena.
- 4. The time measured by the organisers 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 organisers' decision will be final and binding.
- 7. The organisers 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. 30 points will be awarded to reach the centre.
- 2. 5 points will be awarded if the bot glows LED just after it reaches the centre.
- 3. 20 points will be awarded every time it goes from inner hexagon to outer hexagon after it reaches the centre. i.e. during the 2<sup>nd</sup> part of the gameplay.
- 4. (120-T) points will be awarded if it completed the task successfully (T = time taken by bot to go from the centre of the hexagon to the end of the path).
- 5. Total score will be sum of all the points mentioned above. Once the bot has reached the centre, the total score will always include the points it acquired to reach the centre successfully irrespective of any restart.
- 6. Final score will be the maximum of total score attained in any 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 identity card of respective educational institutes are eligible to participate.

# Certificate Policy:

- 1. Top 3 teams will be qualified to finale and awarded Certificate of Excellence for the wildcard round.
- 2. Certificate of participation will be awarded to top 50% teams (provided they have a non-zero score).