Task

1. Teams must build an autonomous bot which must be able to move to multiple coordinates given to them by the organizer. These coordinates will be assigned to each team before their match starts. Coordinate system is explained in the Figure 2.
2. Once the bot reaches an assigned coordinate it will detect the colour code of the four squares around that coordinate and display it through LEDs.
3. The bot will start from starting zone (as shown in the figure) and then will have to move to the coordinates declared beforehand to them, specifically in the order given by competition organizers to the teams, before the game starts.
4. There are two starting zones as shown in the figure and each bot will be assigned any of the two starting zones at the start of their run. This will be assigned by the organizers. The other starting zone (one which is left) will automatically become the finishing zone for that bot.
5. When the bot reaches an assigned coordinate it has to show the colour code of four squares to which that coordinate is common. These squares are the 4 surrounding squares around the intersection point of any two white lines. The coordinates of this intersection point are the one which will be given to teams beforehand.
6. The colour code should be displayed by 4 LEDs. Each of the 4 LEDs indicating the colour code of respective 4 squares by their on/off state. The 4 LEDs should lie in a square array (2X2 array) such that each LED is in a different quadrant as per the square whose colour code it displays.
7. LED which is indicating colour code of a given square should be within the boundaries of that square. Type A square cell should be displayed by an 'off' state of the LED while Type B square cell should be displayed by 'on' state of the LED. (Type A & B explained later and in Figure 3). **Positions of Type-A and Type-B cells shown in the figure are just an example. The positions will be declared just before the match.**
8. Once the bot reaches an assigned coordinate, reads and displays the colour code of surrounding square cells, the code displaying LEDs should maintain their configuration (on/off condition) until they reach the next coordinate and then display the new colour code of the reached coordinate and maintain this configuration again.
9. After the bot has moved to all the coordinates assigned to it. It has to go to the finishing zone at which point the task will be considered completed.
10. Once bot moves into the finishing zone it cannot come back and the competition ends for that bot.

Arena Details

1. The arena will be made of 2 types of square cells (Figure 3), Type A: Black grid
   Type B: White grid with a black boundary.
   The arrangement of the cells will be completely random in the competition.
2. Apart from starting and finishing zone. All Type A cells are of 300mmX300mm and Type B wherever present will be of 180mmX180mm, with a black boundary of 60mm thickness. The black boundary of

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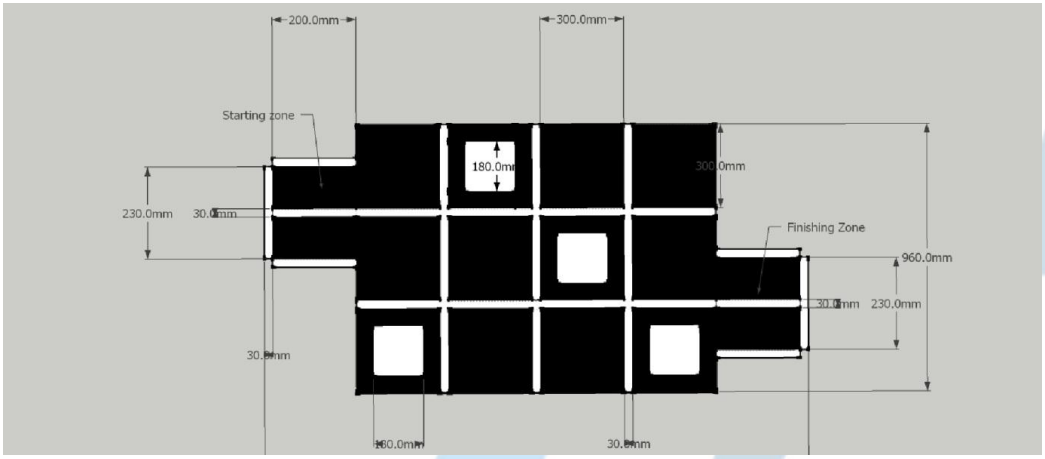
the white square cells makes it 300mmx300mm. Type A and Type B cells are shown in figure 3.

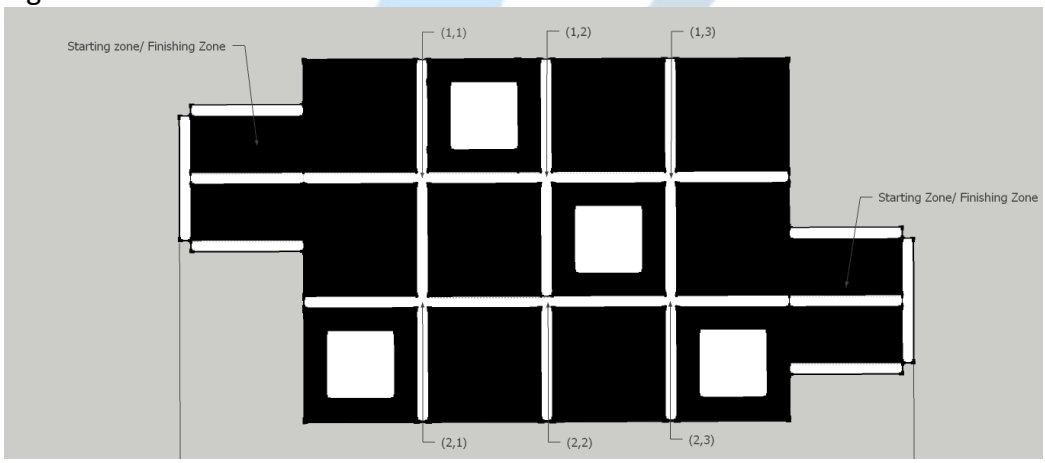
3. Starting and finishing zones are of dimensions 200mmx200mm.
4. All white lines are of 30mm width.

(Length and breadth dimensions of complete arena will be 1290mmx960mm.)

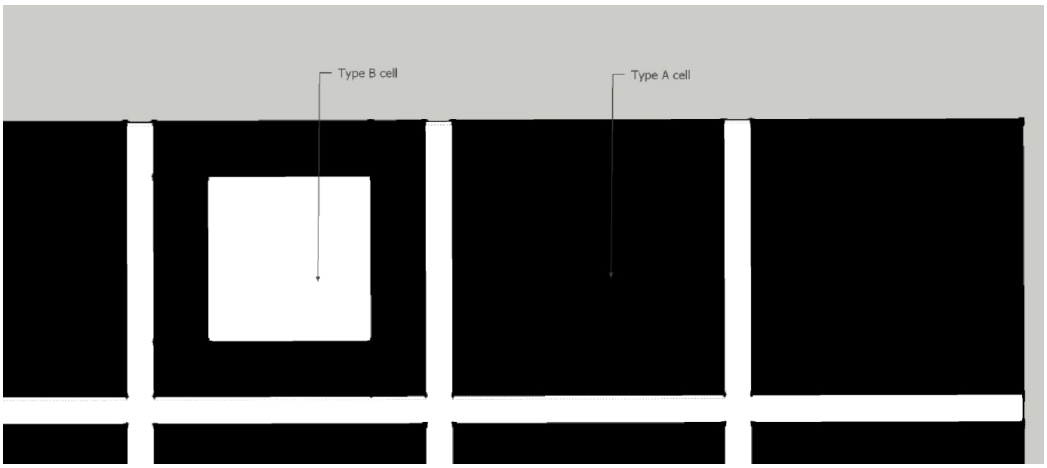
If left side is starting zone then right side is finishing zone and also the coordinate system will be as shown in figure 2.
And if right side is starting zone then left side is starting zone and also the coordinate System will be according to that starting zone.



Arena dimensions
Figure-1



Arena coordinates specification
Figure-2



Cell types
Figure 3

Dimensions and Fabrication

1. The bot must fit within a box of dimensions 200mmx200mmx200mm **(lxbxh)** at the beginning of the game.
2. The bot should be autonomous.
3. Teams must use an on-board power supply.
4. Bot must be started individually by only 1 on-board switch. However, a team may have a separate on-board switch for restart. This switch will have to be shown before the run to the organisers.
5. The autonomous bot must be stable and must be able to stand on its own at the beginning of the run when put in the starting zone. Bots not fulfilling this criterion will be disqualified.
6. During the run, the autonomous bot can expand itself provided it does not damage the arena in anyway. However, it is not allowed to leave anything behind or make any marks while traversing the grid. Any bot found damaging the arena will be immediately disqualified. The final decision is at the discretion of the organisers.
7. The 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 teams are allowed to use ready-made micro-controller boards/ready-made sensor kits. However the teams are not allowed to use ready made lego kits or any such assemblies.
9. Machine cannot be constructed using readymade Lego kits or any readymade mechanism. But you can make use of readymade gear assemblies. Violating this clause will lead to the straight disqualification of the team.

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Controls

1. The bot must be completely autonomous.
2. It should not receive any input from outside the arena.
3. There should be a square array of 4 LEDs on the bot to detect the 4 surrounding square cells.

Power Supply

1. The machine must use an on-board electric power supply.
2. When using the electric power supply, the voltage at any point on an individual component must be lower than or equal to 24 V at any point of time during the game.

Rules

Game Rules

1. Bot has to move to multiple coordinates assigned, which will be assigned to them before the match.
2. At the start of the task, the bot will be placed at the starting point. Only 1 member from the team is allowed to be near the game field while starting the bot.
3. Starting Procedure –
   The bot must be started by only 1 on-board switch.
4. The starting procedure of the bot should be simple and should not involve giving bot any manual force or impulse in any direction.
5. Teams can have a separate on-board switch for restart. This switch will have to be shown before the run to the judges.
6. Countdown will start when the organizer gives the signal to start.
7. Restarts –

A maximum of 3 restarts will be given to a team. No penalty will be awarded for a restart. During a restart, the bot will have to be restarted by putting it back on the starting point and turned on again on the signal of the judges. **In a restart, the timer will not be set back to zero.**

8. During a restart, a contestant must not feed information about the grid to the bot.
9. However, contestants are allowed to: adjust sensors (gain, position etc.) and make repairs. However, a contestant may not alter a bot in a manner that alters its weight (e.g. removal of a bulky sensor array or switching to lighter batteries to get better speed). The organisers shall arbitrate.
10. The team will be given 1 minute time before the run for calibration.
11. General Rules –

-Only 1 member of the team is allowed to handle the bot.

-Participants are not allowed to keep anything inside the arena other than the bot. -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.

-The time measured by the organisers 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 organisers' decision will be final and binding. 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

Scoring system

1. 5 points will be awarded for moving to the correct coordinate.
2. 10 points will be awarded displaying a correct grid cell colour code, if a bot displays all the four grid cell colour correctly at a coordinate it will gain 20 bonus points.
3. 30 points will be awarded if a bot successfully enters finishing zone but these 30 points will only be awarded only if the bot moves to atleast one of the coordinate and also displays its colour code correctly.

*The team which completes the task with maximum points will be the winner.

*In case no team finishes the task, team with highest points will be the winner. To evaluate in this case differential marking has been done at various checkpoints.

*In case of a tie, the team who has taken least time will be the winner.

Eligibility:

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

Team Specification –

A team may consist of (a maximum of) 3 participants. Students from different educational institutes can form a team.

Certificate Policy:

Certificate of Excellence will be awarded to the top 3 teams. Certificate of Participation will be given to team scoring at least 15 points. Disqualified teams will not be considered for any certificates.

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