CENTRE FOR COGNITIVE ACTIVITIES
NIT Durgapur, M.G. Avenue, Durgapur, West Bengal, India. PIN - 713209

NIT DURGAPUR

Bridle

Problem Statement:

Design an autonomous robot that can perform given tasks such as line following, wall following, IR detecting and maze solving.

GAME PLAY:

PRELIMINARY ROUND

- **Maximum 2 trials** can be given to a team before the game begins

- The bot have to start from the area demarcated as "START", and the timer is activated as soon as the bot leaves the starting area. **Maximum time limit to complete the task is "5 minutes".**

- In this round the robot makes its way following the line through the loop and reach the **END POINT**.

- If a bot loses its way on the course, or is stuck in a loop, it will be placed at

the outer loop with a time penalty of 10 points.

➢ If the robot is still found to be repeating the same course of action two times (unable to reach the inner loop **twice).** It will be penalized with **25 points,** and will start from the inner loop.

➢ The timer will stop as soon as the bot reaches the END.

FINAL ROUND
(BOTH LINE FOLLOWER AND MAZE SOLVER)

➢ This round consist of two arenas **first** arena consist of maze follower and **second** arena consist of line follower loop same as in preliminary round.

➢ First of all the bot has to cross the **wall following maze**. The bot travels through a path with walls on either side. There are turns and bends in the path, and the bot must make its way through the path and solve it without touching the walls. Each time a bot touches the walls; there is a **penalty** of **10 points.**

➢ The wrong path in the maze is indicated by a **glowing IR LED** (situated 10 cm above ground level) (may or may not be situated both side of wall but guaranteed to be present at least one of the side). By detecting these LED the bot has to traverse through right path.

➢ If the robot fails to detect the IR LED checkpoint and follow the wrong path then it will be placed back to the just previous turn before the checkpoint with **a penalty of 10 points**.

➢ If the robot is still found to be repeating the same course of action two

times (**does not detect the IR twice**) it will be placed towards the right path at the checkpoint after being **penalized with 15 points**.

➢ At the end of this section is **Checkpoint.** (The main checkpoint that mark the completion of the first zone henceforth abbreviated as CP).

➢ At checkpoint, the bot must stop, flash a bright LED thrice, 0.5second pulses each, with 0.5-second spaces in between. If the bot is unable to recognize the CP, it will be **penalized with 10 points**.

➢ After **Checkpoint** the path changes to line follower maze mode, and there are no walls anymore. The robot makes its way following the **line follower loop** to reach **END POINT** (same as preliminary round).

➢ The timer will stop as soon as the bot reaches the END.

Specifications of the bot:

➢ The robot should be capable of detecting obstacles, such as walls, IR and capable of following a path marked on the floor surface on which the bot moves, along with some additional features as specified.

➢ The Robot must be strictly autonomous.

➢ Dimensions of the Robot should be less than 20cm*20cm*15cm and weight should not exceed 1kg.

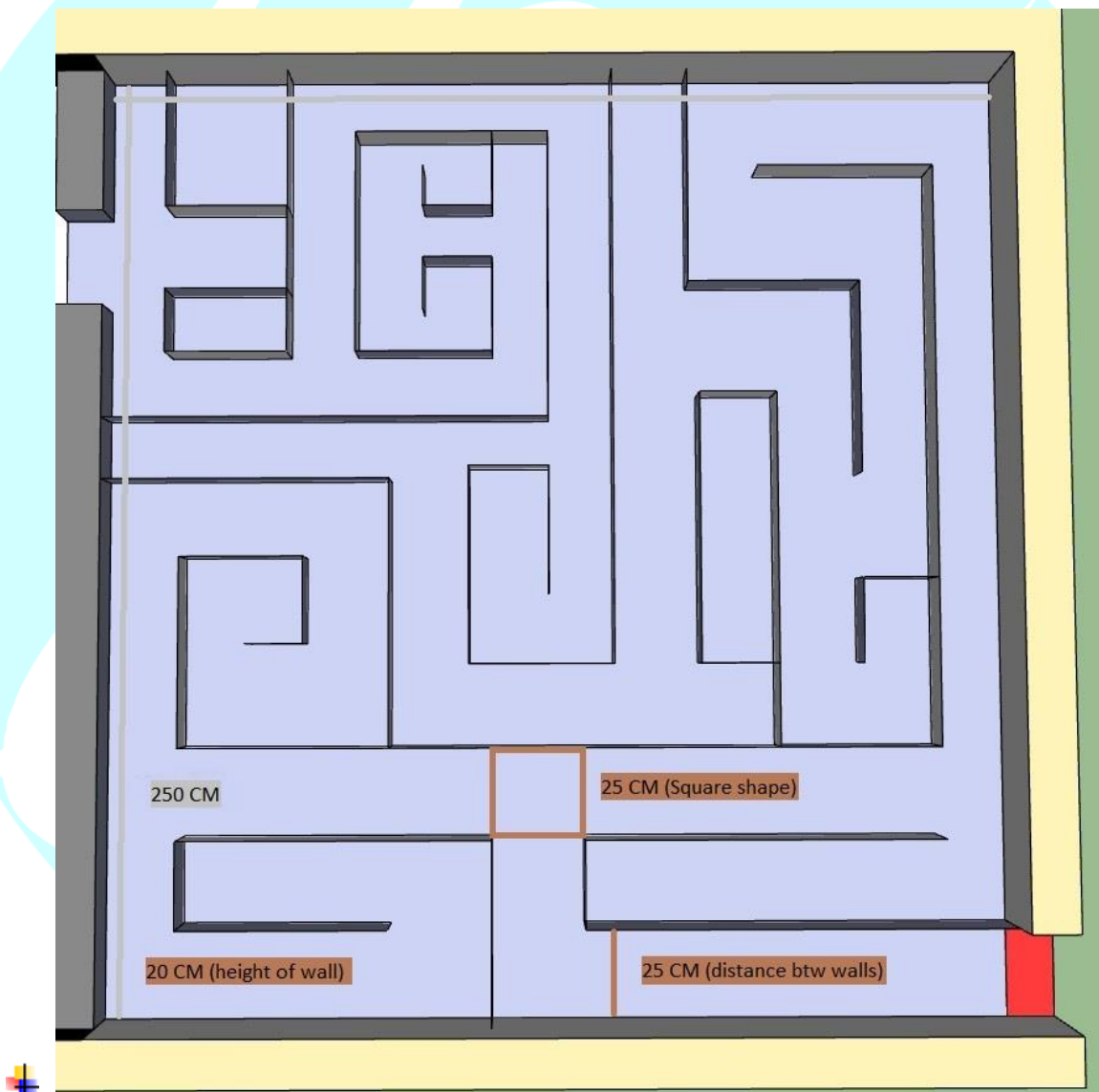➢ A power supply should be of maximum 12-15V.

ARENA
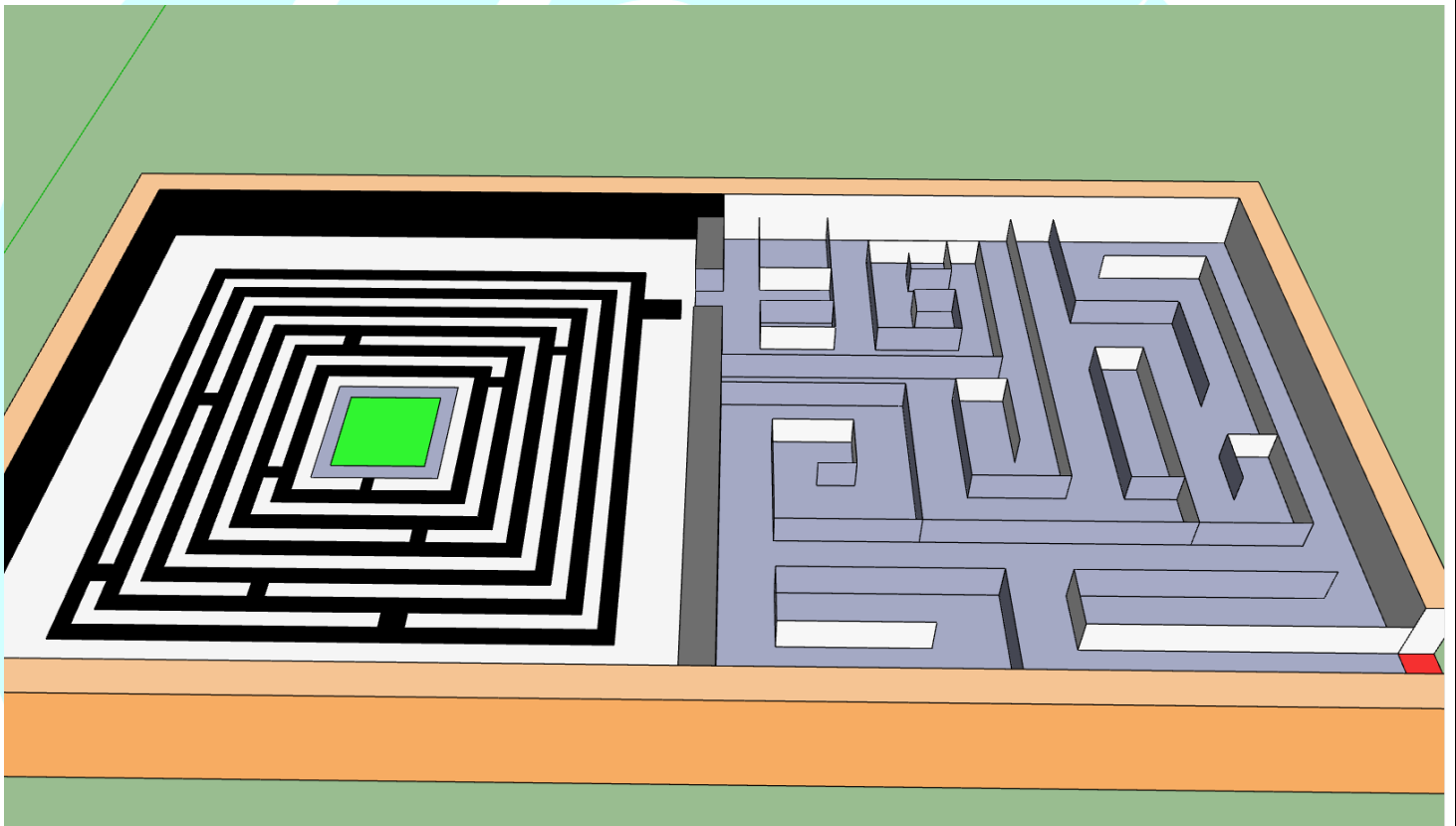
ARENA IS DIVIDED INTO TWO HALVES, BOTH OF THEM ARE DESCRIBED BELOW:

- **WALL FOLLOWER:**

➢ Dimensions of the wall: 25cm*25cm*20cm
➢ Spacing between the walls: 25 cm
➢ Total area: 250cm*250cm

250 CM

25 CM (Square shape)

20 CM (height of wall)

25 CM (distance btw walls)

- **LINE FOLLOWER:**

➢ Length of the black line: 4cm

➢ Area of the first loop (outer boundary): 200cm*200cm

➢ Spacing between two loops: 16cm

➢ Area of main central region: 40cm*40cm

➢ Total area: 250cm*250cm
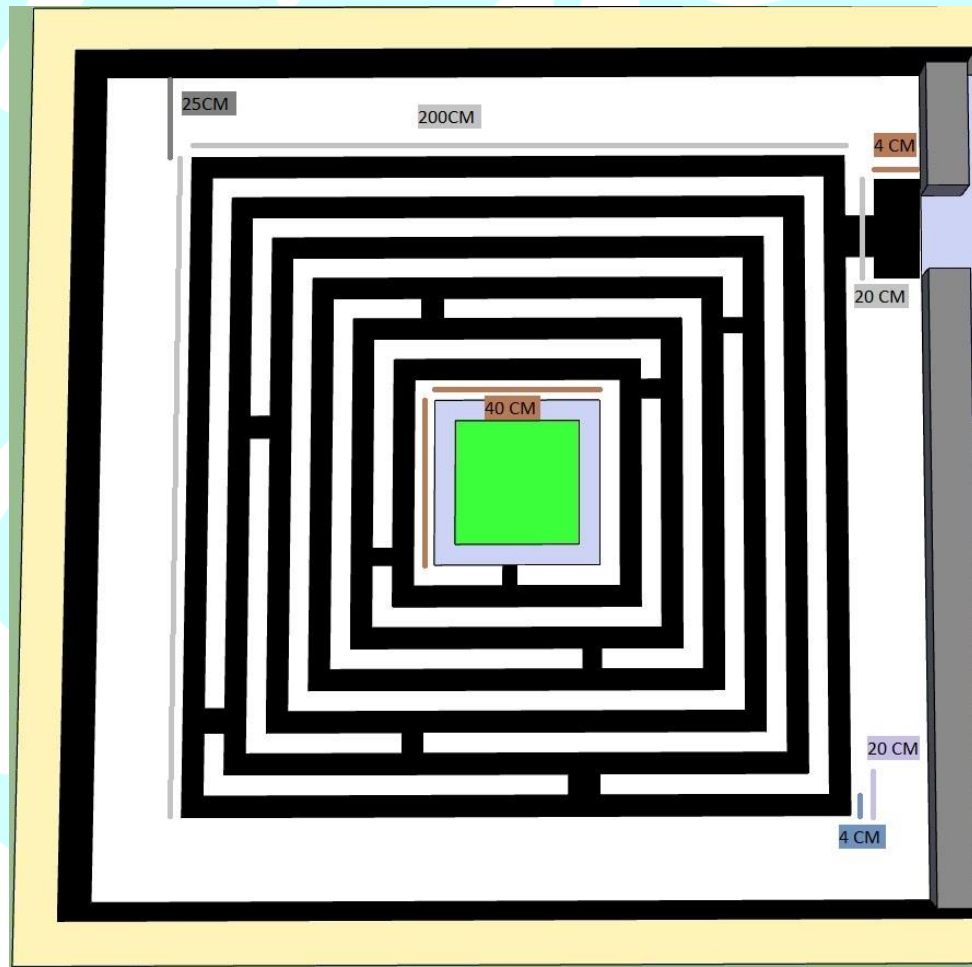
SCORING CRITERIA:

- All teams will get 400 points initially.

- 50 points will be awarded for crossing a Checkpoint.

- 10 points penalties will be awarded if the bots touch any Obstacles/Wall.

- 100 points for reaching the end.

- 100 points will be deducted if the bot destroys the arena.

- Bonus points = 900- Time in seconds

- The bot with the maximum score will be announced as the Winner.

- In case of a tie, the Winner will be decided based on the minimum numbers of penalties encountered.

- Each team will get two timeout of three minutes each.

- Maximum time for completion of preliminary round is 5 minutes and final round of event is 15 minutes.

Certification policy and prizes:

- Certificate of Excellence will be awarded to winner and runner-up.
- Certificate of Appreciation will be awarded to 2nd runner-up.
- Certificate of Participation to all the teams participating in Event.

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There may be small changes in the arena design. In case of any dispute or argument the Organizer's decision will be final.