

ROBOFEST- GUJARAT 5.0

**Guidelines for submission of Ideation Proposal
Junior category**

All teams must be present and ready to perform their challenge. The committee may assign any team to the task at random. Any kind of absence and lack of readiness will be subject to suitable actions, including the deduction of score/disqualification.

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Students are required to perform their task and answer the questions. Mentors should not be involved in the task. The committee may allow mentors during question-answer if it feels necessary, depending on the situation.

Sample images given in these guidelines are only for visual understanding.

Maze Solving Robot (Junior Category)

Objective:

Design and develop an autonomous robot capable of solving a maze without human intervention. The robot should explore and identify the optimal path from a random start point to a defined endpoint, and optimize its traversal over multiple runs.

Robot Requirements:

- Type: Wheeled autonomous robot
- Power: Battery-operated only (no external power)
- Size Limit: Must fit within a 20cm x 20cm square footprint
- Control: Fully autonomous; no remote control, Bluetooth, or external interference allowed

Maze Design:

- Structure: A wooden maze with walls of 10 cm height
- Shape: Can be Rectangular or Circular
- Path Width: 30 cm (to ensure safe turns and manoeuvrability)
- Dimensions: 2m x 2m
- Randomization: The maze layout will be revealed only on the day of the competition
- Start/Finish: Random start and goal points per round

Challenge Tasks:

1. Autonomous Navigation: The robot must identify and traverse from the start to the finish without prior map knowledge.
2. Obstacle Zones: Certain dead ends will contain coloured objects; the robot earns bonus points for identifying and avoiding them.
3. Path Optimization: The robot should reduce its traversal time using the learned optimal path on a second trial.
4. Speed Bonus: Additional points for completing the maze in under a defined threshold time.
5. Penalty: Points deduction for touching walls or stalling beyond 30 seconds.

Scoring Criteria:

Task	Points
Successful Maze Completion	50 points

Task	Points
Path Optimization (Second Run)	20 points
Speed Bonus	Up to 10 points
Obstacle Identification	10 points
Wall Collision Penalty	-5 per hit
Maximum Total Score	100 points

Game Field Diagram:

A 2D top-down schematic of a 2m x 2m maze with:

- Marked start and end zones
- Intersections, dead ends, and alternate routes
- Coloured blocks (red/yellow) indicating penalty zones
- Neutral grey maze walls with black floor track

(Already created and will be displayed at the venue and in the competition handbook.)

This challenge aims to develop foundational robotics, AI path planning, and sensor-based navigation skills in young learners while fostering creativity and logical thinking.

