



HTU

MICRO MOUSE

COMPETITION

RULE BOOK

2026

Version 1





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1. Introduction & Objective

Welcome to the Micromouse Maze Solver Contest 2026 (MMRC26). Hosted by the IEEE RAS Student Branch Chapter at Al-Hussein Technical University, this event challenges you to push the limits of autonomous robotics, algorithmic efficiency, and mechanical design.

The Objective: Each team must design and build an autonomous robotic "mouse" that navigates a maze of standard dimensions from a specified corner to its centre aiming to achieve the highest score by maximizing its number of successful runs while minimizing its run time.

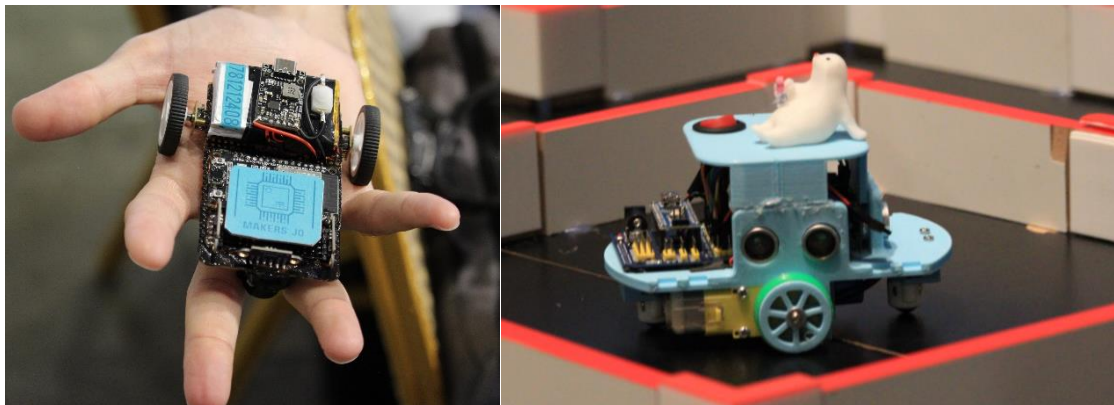
By registering for MMRC26, your team agrees to adhere fully to the rules, physical constraints, and tournament procedures outlined in this official document.

2. Terminology & Lexicon

This section defines the core operational and strategic vocabulary for the MMRC26.

2.1 The Robot

- 2.1.a **Micromouse / Mouse:** The autonomous robot designed and programmed by the competing team.
- 2.1.b **Geometry:** The physical footprint of the robot. If a robot mechanically unfolds or expands after starting, its maximum expanded geometry must still not exceed limits.
- 2.1.c **Self-Contained:** Operating entirely on onboard battery power and internal logic, with no external processing, remote controls, or wireless data tethers permitted.



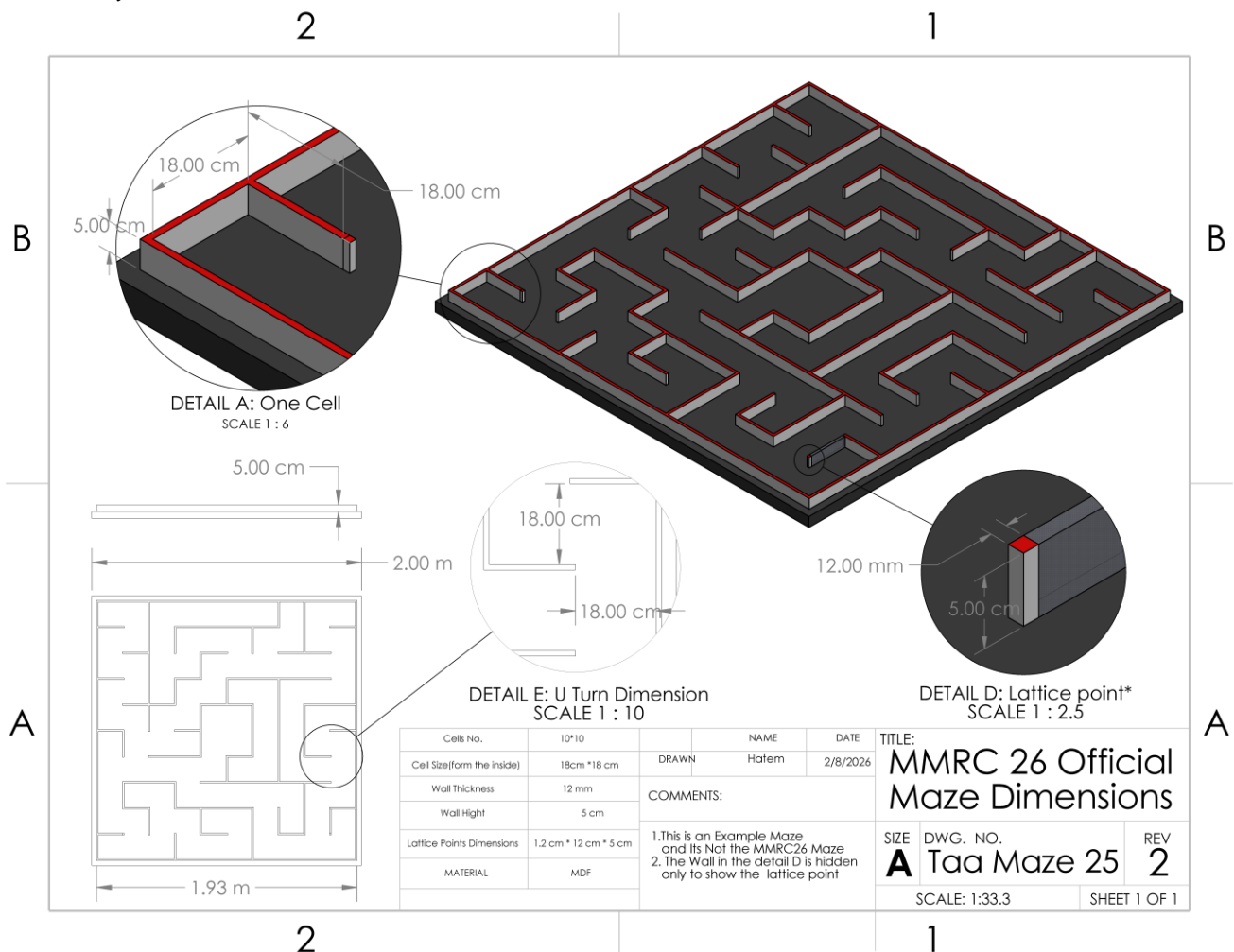
2-1 : Examples of Micromouse Robots



2.2 The Maze

- 2.2.a **Cell / Unit Square:** A single 18 cm × 18 cm navigable space within the maze. (The dimension from the inside of the walls is 18 cm × 18 cm).
- 2.2.b **Lattice Point (Post):** The 1.2 cm × 1.2 cm square intersection at the four corners of any unit square where the physical maze walls connect.
- 2.2.c **Start Square:** The specific cell located in one of the four corners of the maze where the robot must begin every run. It is bounded on three sides by walls.
- 2.2.d **Destination Zone (Centre):** The target configuration of four cells at the exact centre of the maze. It has only one entrance.
- 2.2.e **Start Line / Finish Line:** The invisible thresholds between cells that trigger or stop the official timing system.
- 2.2.f **Simply Connected Maze:** A maze layout containing no closed loops and no isolated wall sections.
- 2.2.g **Island Goal:** The specific configuration used for the MMRC26 Destination Zone. The walls forming the centre are completely detached from the outer perimeter wall of the maze.

Note: This is an example maze for illustrative purposes only and is not the official MMRC26 layout



2-2: MMRC26 maze engineering schematic (Not the official MMRC26 maze)



2.3 The Match & Timing

- 2.3.a **Match (Allotted Time):** The total, continuous 8-minute window granted to a team to access the maze. The timer does not stop between runs.
- 2.3.b **Run:** A single, continuous attempt by the robot to travel from the Start Square to the Destination Zone.
- 2.3.c **Run Time:** The specific time recorded for one successful Run.
- 2.3.d **Official Time:** The absolute shortest Run Time the robot achieves during its 8-minute Match.
- 2.3.e **Touch:** Any physical contact made by a human operator with the robot after a Run has officially started.
- 2.3.f **Abort:** When an operator manually ends an active Run, usually by executing a Touch to rescue a stuck or malfunctioning robot.

2.4 Strategy & Algorithms

- 2.4.a **Wall-Hugging:** A basic algorithmic strategy that simply follows a continuous wall. Because the MMRC26 utilizes an Island Goal, wall-hugging algorithms will result in an infinite loop.
- 2.4.b **Search Run (Mapping Run):** A robot's initial, typically slower run where it explores the maze, detects walls, and builds an internal map.
- 2.4.c **Speed Run (Fast Run):** A subsequent run where the robot utilizes its internally generated map to calculate the optimal path and navigates to the centre at maximum speed.
- 2.4.d **Shortest Traversable Path:** The most efficient route to the centre that avoids all physical walls.

3. Team Eligibility & Registration

- 3.a The Micromouse entry may be the effort of an individual or a team.
- 3.b A team may consist of up to 3 members.
- 3.c The contestant(s) will make a brief presentation of their mouse design prior to the competition (5 minutes maximum) if time allows.



4. Rules for the Micromouse

- 4.a A Micromouse shall be self-contained (no remote controls).
- 4.b A Micromouse shall not use an energy source employing a combustion process.
- 4.c A Micromouse shall not leave any part of its body behind while navigating the maze.
- 4.d A Micromouse shall not jump over, fly over, climb, scratch, cut, burn, mark, damage, or destroy the walls of the maze.
- 4.e A Micromouse shall not be larger either in length or in width, than 25 centimetres. during the entire match. There are no restrictions on the height of a Micromouse.
- 4.f Any violation of these rules will constitute immediate disqualification.

5. Rules for the Maze

- 5.a The maze is composed of multiples of an **18 cm x 18 cm** unit square. The dimension of one cell from inside of the walls is 18 cm x 18 cm. The maze comprises **10 x 10 unit** squares. (assume 5% tolerance for mazes). The outside wall encloses the entire maze.
- 5.b The sides of the maze walls are white, the tops of the walls are red, and the floor is black. The maze is made of wood, finished with non-gloss paint. Do not assume the walls are consistently white, or that the tops of the walls are consistently red, or that the floor is consistently black. Fading may occur. Do not assume the floor provides a given amount of friction. It is simply painted plywood and may be quite slick.
- 5.c The start of the maze is located at one of the four corners. The start square is bounded on three sides by walls. The start line is located between the first and second squares. That is, as the mouse exits the corner square, the time starts. The destination goal is the four cells at the centre of the maze. The destination square has only one entrance.
- 5.d The maze is constituted so that at least one wall is attached to every lattice point.
- 5.e Multiple paths to the destination square are allowed and are to be expected. The destination square will be positioned so that a wall-hugging mouse will NOT be able to find it. *because the layout utilizes an **Island Goal** configuration rather than a **Simply Connected Maze**.*



6. Rules for the Contest & Tournament Structure

6.1 General Contest Rules

- 6.1.a Each contesting Micromouse is allocated a total of 8 minutes of access to the maze from the moment the contest administrator acknowledges the contestant(s) and grants access to the maze. Any time used to adjust a mouse between runs is included in the 8 minutes. Each run (from the start cell to the centre zone) in which a mouse successfully reaches the destination square is given a run time. The minimum run time shall be the mouse's official time.
- 6.1.b The 8-minute timer continues even between runs.
- 6.1.c Each run shall be made from the starting square. The operator may abort a run at any time. If an operator touches the Micromouse during a run, it is deemed aborted, and the mouse must be removed from the maze. If a mouse has already crossed the finish line, it may be removed at any time without affecting the run time of that run.
- 6.1.d After the maze is disclosed, the operator shall not feed information on the maze into the Micromouse; however, switch positions may be changed. Feeding any maze information is strictly prohibited, and all source codes will be collected and checked by the judges to ensure compliance.
- 6.1.e The illumination, temperature, and humidity of the room shall be those of an ambient. Do not make any assumptions about the amount of sunlight, incandescent light, or fluorescent light that may be present at the contest site.
- 6.1.f The run timer will start when the front edge of the mouse crosses the start line and stops when the front edge of the mouse crosses the finish line. The start line is at the boundary between the starting unit square and the next unit square clockwise. The finish line is at the entrance to the destination square.

6.2 Tournament Phases

- 6.2.a **Check-In and Randomization:** Once the registration window closes at 09:00, the organizers software will generate a randomized run order. This release will also assign the specific time slots for judging evaluations. Any team that fails to present their robot at the arena during their assigned slot will forfeit their Phase 1 run and therefore forfeit from the competition entirely.
- 6.2.b **Phase 1: The Qualifiers:** All registered teams play sequentially on a standardized official maze. Teams have their standard 8-minute Match window to achieve their best Score.
- 6.2.c **Phase 2: The Knockout League:** The advancing teams are seeded into a single-elimination bracket (e.g., Round of 16, Quarter-Finals, Semi-Finals). Two teams share a simultaneous 8-minute match timer on identical side-by-side mazes. The winner of each head-to-head matchup advances.



6.3 Scoring, and Tiebreakers

In both Phase 1 and Phase 2, robots are ranked using the Division Index Bonus formula. The team with the higher Final Score ranks higher.

The Formula:

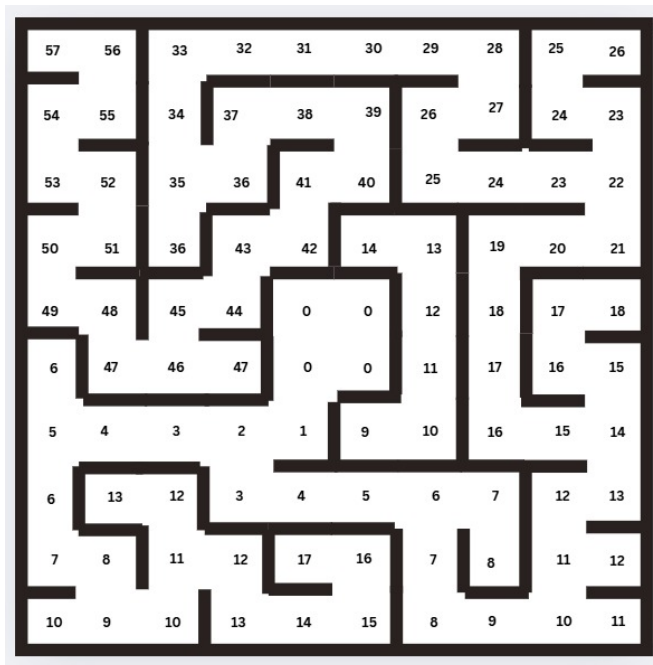
$$\text{Final Score} = \left(\frac{\text{Total Number of Successful Runs}}{\text{Official time}} \right) * 1000$$

Scoring Example:

- Team A completes 4 successful runs. Their fastest single run is 25 seconds.
Calculation: $(4 / 25) * 1000 = 160.0$
- Team B completes 1 successful run. Their fastest single run is 18 seconds.
Calculation: $(1 / 18) * 1000 = 55.5$ (Team A ranks higher).

Unfinished Mazes & Tiebreakers

- All mice who enter the centre square within their 8-minute assigned match are ranked higher than those who do not enter the centre square.
- Mice that fail to reach the central destination are ranked by their remaining path distance, with lower values on the traversable path chart indicating a higher placement, as illustrated below:



6-1: Maze cell distance map on a simply connected maze (Not the official MMRC26 maze)

The numbers shown in the maze map indicate the remaining block count to reach the destination (finish line); therefore, the score for an unfinished run is determined by the value of the final block where the robot stops.

Example: A robot begins its run at block 57 and terminates its movement "STOPED" at block 20, the resulting score for that attempt run will be 20.

- In the event of a tie between competing teams, the final determination will rest solely at the decision of the judges.



7. Awards and Recognition

- **1st Place (MMRC26 Champion):** Awarded to the winner of the Grand Final Match.
- **2nd Place:** Awarded to the runner-up of the Grand Final Match.
- **3rd Place:** Awarded to the winner of the Semi-Final runner-up bracket.
- **Best Code Award:** Granted to the team demonstrating the most elegant logic, algorithmic efficiency, or innovative mapping techniques (evaluated during the mandatory source code audit).
- **Best Creative Design Award:** Granted to the team with the most exceptional physical build (unique hardware solutions, custom PCB layouts, or innovative chassis geometry).



8. Official Event Schedule

Time	Activity	Location
08:00 - 09:00	Team Check-In, Registration & Hardware Inspection	Registration Desk
09:00 - 09:30	Opening Briefing & Phase 1 Schedule Release	Main Arena
09:30 - 13:30	Phase 1: Single-Maze Qualifiers	Main Arena
13:30 - 14:30	Lunch Break & Phase 2 Cutoff Announcement	Campus / Pit Area
14:30 - 17:30	Phase 2: Dual-Maze Knockout League (up to Semi-Finals)	Main Arena
17:30 - 18:00	Closing Ceremony & Secondary Technical Awards	Main Arena
18:00 - 18:20	The Grand Final Match	Main Arena
18:20 - 18:45	Winner Announcements & Trophy Presentation	Main Arena

Schedule Disclaimer: All times are approximate and subject to change on the day of the event. Teams are strictly responsible for monitoring live announcements in the venue for any schedule updates.



9. Organizer Contact and Event Support

The MMRC26 is hosted and managed by the IEEE Robotics and Automation Society (RAS) Student Branch Chapter at Al-Hussein Technical University (HTU).

Because the event floor will be busy, we have structured our support team by zone. All official organizing committee members and judges can be easily identified by their **Official Event Badges and Uniforms**.

9.1 How to Get Help on Event Day

Instead of seeking out specific individuals, please direct your questions to the designated support teams stationed throughout the venue:

- **For Match Queueing & Arena Logistics:**
 - Speak to the **Arena Logistics Staff** stationed near the maze entrances. They will coordinate your time slot, manage the staging area, and grant you access to the maze when it is your turn.
- **For Schedule, Roster, or General Venue Inquiries:**
 - Go to the **Registration Desk** at the main entrance. The team here can assist with name badges, schedule clarifications, and directions around the campus (e.g., restrooms, food court).
- **For Major Technical Disputes & Final Rulings:**
 - Major disputes are handled exclusively by the **Lead Organizer and Faculty Advisors**. These must be escalated formally at the Judges' Table.

9.2 Official Venue Desks

- **The Registration Desk:** Located at the main entrance. Opens at 08:00 sharp and serves as the primary information hub throughout the day.
- **The Judges' Table:** Located directly in front of the Main Arena. Teams may only approach the Judges' Table when officially called for their match, to submit their mandatory code files, or to request a formal rule clarification.
- **Emergency & First Aid:** Basic first-aid kits are located at the Registration Desk and the Judges' Table. In the event of a medical emergency, immediately notify **any** committee member to rapidly escalate the situation to campus security and medical personnel.

Important Notice: Participation in MMRC26 constitutes an agreement to abide by all rules within this manual. It is the competing team's responsibility to thoroughly read this document and to routinely check their registered email for any official rulebook updates. Access the latest documentation, event policies, and live updates by scanning the QR code or visiting the link below.

Official MMRC26 Website: <https://www.mmrchtu.tech/>

