

Micromouse Competition Rules

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Competition Description
 In this contest the contestant, or team of contestants, must design and build an autonomous robotic "mouse" capable of traversing a maze of standard dimensions from a specified corner to its center in the shortest time.

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1. Contest Eligibility

1.1 IEEE Membership

All contestants must be IEEE student members from a Region 2 school at the time of entry in the MicroMouse contest. Undergraduates and up to two graduate students per team are allowed as stated in Rule B.4 below, providing each meets all other requirements.

1.2 Presentation

The contestant(s) will make a brief presentation of their mouse design prior to the competition (5 minutes max), if time allows.

1.3 Member Contribution

The Micromouse entry may be the effort of an individual or a team. In the case of a team it should be possible to demonstrate that each individual made a significant contribution and that they are all IEEE members.

1.4 Team Size

A team may consist of up to five people. A team of four or five people may include no more than two graduate students. A team of two or three people may have no more than one graduate student. A team consisting of a single graduate student is not allowed.

1.5 Teams per University

Each Student Branch may participate in either or both the "From Scratch" and "From Kit" competitions with, at most, one team in each competition.

1.6 Competitions

The day of the competition will include a competition for micromouse robots designed from scratch and another competition for those designed from an off-the-shelf robotics kit. These robotic kits can include any modifications the team deems necessary as long as it adheres to the rules stated in Section 2. It is up to the participant's discretion on entering the scratch or kit competition.

2. Rules for the Micromouse

2.1 Self-Containment

A Micromouse shall be self-contained (no remote controls). A Micromouse shall not use an energy source employing a combustion process.

2.2 Dislodged Parts

A Micromouse shall not leave any part of its body behind while navigating the maze.

2.3 Method of Movement

A Micromouse shall not jump over, fly over, climb, scratch, cut, burn, mark, damage, or destroy the walls of the maze.

2.4 Micromouse Size

A Micromouse shall not be larger either in length or in width, than 25 centimeters. The dimensions of a Micromouse that changes its geometry during a run shall not be greater than 25cm x 25cm. There are no restrictions on the height of a Micromouse.

2.5 Rules Violation

Any violation of these rules will constitute immediate disqualification from the contest and ineligibility for any associated prizes.

3. Rules for the Maze

3.1 Maze Dimensions

The maze is composed of 18cm x 18cm unit squares arranged as 16 x 16 units. The walls of the units of the maze are 5 cm high and 1.2 cm thick (assume 5% tolerance for mazes). The outside wall encloses the entire maze.

3.2 Maze Coloration

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.

3.2.1 Maze Discontinuities

WARNING: 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 and parts from different mazes may be used. Do not assume the floor provides a given amount of friction. It is simply painted plywood and may be quite slick. The maze floor may be constructed using multiple sheets of plywood. Therefore there may be a seam between the two sheets on which any low-hanging parts of a mouse may snag.

3.3 Start/End Zones

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 center of the maze. At the center

of this zone is a post, 20 cm high and each side 2.5 cm. (This post may be removed if requested.) The destination square has only one entrance.

3.4 Lattice Points

Small square zones (posts), each 1.2 cm x 1.2 cm, at the four corners of each unit square are called lattice points. The maze is so constituted that there is at least one wall at each lattice point.

3.5 Multiple Paths

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.

4. Rules for the Contest

4.1 Time

Each contesting MicroMouse is allocated a total of 10 minutes of access to the maze beginning with the moment the MicroMouse crosses the start line. Any time used to adjust a mouse between runs is included in the 10 minutes. Each successful run (from the start square to the destination square) in which a mouse successfully reaches the “destination square” is assigned a measured “run time” in seconds. The minimum run time within the ten-minute access time shall be that mouse’s official run time. First prize goes to the mouse with the shortest official run time. Second place is assigned to the mouse with the next shortest time, and so on. **NOTE**, again, that the 10-minute timer continues even between runs. Mice that do not enter the center square will be ranked by the judges based on two criteria: (1) How close the mouse gets to the destination square, and (2) Evidence that the mouse knows where it is relative to the destination square. All mice who enter the center square within their 10-minute allotment are ranked higher than those who do not enter the center square.

4.2 Stopping/Removing the Micromouse

Each run shall begin from the starting square. The operator may abort a run at any time and start over, all within the 10-minute allocated maze-access time limit. If an operator touches the MicroMouse excessively during a run, the judges may deem to abort the particular run. If a mouse has entered the destination square, it is expected that the MicroMouse will return, on its own, to the starting square, and then commence with another run to the center. Alternatively, the operator may elect to remove it from the maze without affecting the runtime(s) up to the time of removal. If a mouse is placed back in the maze for another run, a one-time penalty of 30 seconds will be added to the mouse’s next run time.

4.3 Reprogramming After Reveal

After the competition maze is disclosed, the operator shall not reprogram his or her MicroMouse, but may elect to change the positions of switches.

4.4 Room Conditions

The illumination, temperature, and humidity of the room shall be those of an ambient environment. (40 to 120 degrees F, 0% to 95% humidity, non condensing).

4.4.1 Ambient Light

BEWARE: Do not make any assumptions about the amount of sunlight, incident light, or fluorescent light that may be present at the contest site.

4.5 Run Timer

The run timer will start when 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.

4.6 Starting Runs

Every time the mouse leaves the start square, a new run begins. If the mouse has not entered the destination square, no run time is recorded. For example, if a mouse re-enters the start square (before entering the destination square) on a run, that run is aborted, and a new run will be deemed begun, with a new time that starts when the starting square is exited.

4.7 Continued Navigation

The mouse may, after reaching the destination square, continue to navigate the maze, for as long as their total maze time allows. If a mouse continues to navigate the maze after reaching the destination square, the time taken will not count toward any run. Of course, the 10-minute timer continues to run. When the mouse next leaves the start square, a new run will start. Thus, a mouse may and should make several runs without being touched by the operator. It should make its own way back to the beginning to do so.

4.8 Judges Discretion

The judges reserve the right to ask the operator for an explanation of his or her Micromouse. The judges also reserve the right to stop a run, declare disqualification, or give instructions as appropriate (e.g., if the structure of the maze is jeopardized by continuing operation of the mouse)

4.9 Changing the Micromouse

A contestant may not feed information on the maze to the Micromouse. Therefore, changing ROMs or downloading programs is NOT allowed once the maze is revealed. **However, contestants are allowed to:**

- Change switch settings (e.g. to select algorithms)
- Replace batteries between runs
- Adjust Sensors
- Change speed settings
- Make repairs

4.10 Changing Weight

However, a contestant may not alter a mouse in a manner that alters its weight (e.g. removal of a bulky sensor array or switching to lighter batteries to get better speed after mapping the maze is not allowed). The judges shall arbitrate.

4.11 Prizes

There is only one official IEEE Micromouse contest each year in each Area or Region. All mice, whether or not they have competed in previous contests, compete on an equal basis. All mice must be presented to the judges by the original design team, which must meet all other qualifications. First prize will go to the mouse which travels from the start square to the destination square in the least amount of time (including possible 30-second penalty from Rule 4.2). Second and third prizes will be awarded to the second and third fastest respectively. As stated in Rule 4.1, mice that do not enter the center square will be ranked by (1) Proximity to the destination square, and (2) Evidence that the MicroMouse knows its location relative to the destination square.

4.12 Breaks

A break will be provided for a mouse after any run if another mouse is waiting to compete. The 10-minute timer will stop. When the mouse is re-entered, the 10-minute timer will continue. The judges shall arbitrate on the granting of such breaks.

4.13 Requesting Breaks

If requested, a break will be provided for a mouse after any run if another mouse is waiting to compete. The 10-minute timer will stop. When the mouse is re-entered, the 10-minute timer will continue. The judges shall arbitrate on the granting of such breaks.