

MICROMOUSE CONTEST RULES FOR MAY 1996

CENTRAL AREA, REGION 6

1.0 OBJECTIVE

In this contest the contestant or team of contestants design and build small self contained robots (micromice) to negotiate a maze in the shortest possible time.

2.0 RULES FOR THE MICROMOUSE

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

2.2 A micromouse shall not leave any part of its body behind while negotiating the maze.

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

2.4 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 25 cm x 25 cm. There are no restrictions on the height of a micromouse.

3.0 RULES FOR THE MAZE

3.1 The maze is composed of multiples of an 18 cm x 18 cm unit square. The maze comprises 16 x 16 unit squares. [In the Central Area contest, a 12 x 12 maze may be used.] The walls of the maze are 5 cm high and 1.2 cm thick (assume 5% tolerance). The outside wall encloses the entire maze.

3.2 The start of the maze is located at one of the four corners. The mouse shall begin negotiating the course in a clockwise direction. The start square is bounded on three sides by walls, with the exit facing clockwise. At the center of the maze, there is a central square that is composed of four unit squares. This central square is the destination. At the center of this square 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. [In the Central Area contest, when a 12x12 maze is used, the destination square is placed 6 squares forward and 6 squares toward the center of the maze from the starting square. That is, the destination square is at the same location, relative to the

starting square, as it would be if the maze were 16x16.] The start line is located between the first and second squares. That is, as the mouse exits the corner square, the time starts.

3.3 Small square zones. 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 except for the destination square.

3.4 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. **BEWARE:** 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; 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. **BEWARE:** The Central area maze floor may be constructed using two 4 x 8 sheets of plywood. Therefore there may be a seam between the two sheets on which any low-hanging parts of a mouse may snag.

4.0 RULES FOR THE CONTEST

4.1 Each contesting micromouse is allocated a total of 10 minute use of the maze, including any time used to adjust a mouse between runs. [In the Central Area there will be no limit on the number of runs within the 10 minute time limit.] Each run 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. First prize goes to the mouse with the shortest official time. Second prize to the next shortest, and so on. **NOTE,** again, that the 10-minute timer continues even between runs.

4.2 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.

4.3 After the maze is disclosed, the operator shall not feed information on the maze into the micromouse however, switch positions may be changed.

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

4.5 The run timer will start when the mouse crosses the start line and stops when 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 Every time the mouse leaves the start square, a NEW run begins. If the mouse has not entered the destination square, the previous run is aborted, as if the mouse were touched. 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 The mouse may, after reaching the destination square, continue to navigate the maze.

4.8 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 make several runs without being touched by the operator. It may make its own way back to the beginning to do so.

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

APPENDICES

A.0 CONTESTANT ELIGIBILITY FOR CENTRAL AREA CONTEST

A.1 A contestant must be an undergraduate student at a Region 6 school with an IEEE student branch and/or Chapter at the time of entry in the micromouse contest. Any student who graduates ANYTIME during the fall-spring school year in which the contest is held is eligible to enter the contest. A student graduating after competing in the contest still remains eligible to compete in succeeding Area, Region, and higher contests as an undergraduate student. Up to two graduate students per team are also allowed as stated below, providing they meet all other requirements.

A.2 A contestant must be an IEEE Student Member or must have submitted an application for membership prior to entry in the Student Branch and/or Chapter Contest.

A.3 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.

A.4 A team may consist of up to five people of which no more than two may be graduate students. A team of three or fewer people may have no more than one

graduate student.

A.5 All entrants to the Student Branch Area contests must declare their intention to enter the contest (6) weeks before the date of the Area contest. This notice must be submitted to the current Student Activities Coordinator, Central Area, Region 6, by mail, email, or phone.

A.6 If the total number of declared mice, from all schools, is less than twelve (12), all shall be eligible to race in the area contest. However, only the entrants with the winning mouse of a Student Branch contest will have their expenses paid for travel and subsistence to the Area contest (if funds are available in the Region 6 budget.) Two mice of the same design from the same school will be disallowed. If there are more than twelve (12) declared mice then only one entry per school shall be permitted to enter the Area contest. In the case of multiple entries from any one school, the school shall hold a Branch and/or Chapter contest, thereby selecting their best mouse for advancement to the Area Contest.

B.0 MICROMOUSE SPECIFICATIONS

B.1 The total cost of the mouse (in materials, labor is assumed to be free) may not exceed \$500.00. This is judged on actual cost and market value of any donated materials used in the mouse. Contestants should be prepared to present a list of materials and their market values to the judges upon request. Since market values may vary from source to source, contestants should be prepared with catalogs or quotes to confirm unusually low prices. The judge's decision shall be final in these matters.

C.0 MAZE SPECIFICATIONS

C.1 The maze may consist of any combination of "L", "T", "J", "+", and straight ("I") sections. NOTE: There may be unit squares NOT bounded by walls, allowing crossing paths with the "+" combination.

C.2 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.

C.3 For the Central Area contest, the outside wall encloses an area of only 12x12 unit squares. The destination square is still located as if it were in the center of a 16x16 unit square. That is: in Cartesian Coordinates, numbering the start square as (1,1), the unit squares ((8,8), (8,9), (9,8), (9,9)) comprise the destination square. This is done to maintain compatibility with international rules.

D.0 CONTEST SPECIFICATIONS

D.1 As mentioned, a contestant may not feed information on the maze to the micromouse. However, the following do NOT violate this rule: Changing batteries between runs, setting switches to alter algorithms (i.e., Stop/Run), adjusting sensors, changing speeds, repairing. The following DO violate this rule: changing ROMs, loading new programs. The judges shall arbitrate. However, a contestant may not tamper with the mouse in a manner that alters its weight (i.e., removal of a bulky sensor array to get better speed after mapping the maze is not allowed).

D.2 There is only one IEEE Central Area micromouse contest each year. All mice, whether or not they have competed in previous contests, compete on an equal basis. First prize will go to that mouse which travels from the start square to the destination square in the least amount of time. Second and third prizes will be awarded to the second and third fastest respectively. A rotating trophy will be awarded to the first place mouse. Verbal recognition and certificates will be given to the top three mice among those who are competing for the first time. If you and your mouse are first-time contestants, be sure to so stipulate when you register for the contest and notify the contest judge at the time of the contest.

D.3 If Rule A.6 does not apply, a single design team MAY enter more than one mouse, and each mouse is eligible for a prize. Mice that are of nearly identical designs will not be allowed.

D.4 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.

E.0 REGION 6 CENTRAL AREA: CONTACTS FOR INFORMATION

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