CAMM 2017 Competition Rules

The object of the contest is to build a robot which can negotiate a specified maze in the shortest time. A robot participating in this contest is termed a *Micromouse*. The person who places the micromouse in the maze and starts its operation is termed the *Operator*.

1. Rules for Eligibility

1.1. All contestants must be an Undergraduate or Graduate student (or equivalent) at an accredited United States or International college or university. Any student who graduates anytime during the Fall-Spring academic 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.

1.2. 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 contribution.

1.3. All entrants for the California Micromouse Competition must declare their intention to enter the contest at least 2 days before the date of the Competition, that is before May 21th, 2017. The notice (registration form) must be submitted to the contact person(s) by email or through the online Google Form located on the UCSD IEEE website (under Projects -> Annual --> Micromouse -> Competition Details).

2. Specifications for the Maze

2.1. The maze shall comprise 16 x 16 multiples of an 18 cm x 18 cm unit square. The walls constituting the maze shall be 5 cm high and 1.2 cm thick. Passageways between the walls shall be 16.8 cm wide. The outside wall shall enclose the entire maze.

2.2. The sides of the maze walls shall be white, and the top of the walls shall be red. The floor of the maze shall be made of wood and finished with a non-gloss black paint. The coating on the top and sides of the walls shall be selected to reflect infrared light and the coating on the floor shall absorb it.

2.3. The start of the maze shall be located at one of the four corners. The starting square shall have walls on three sides. The starting square orientation shall be such that when the open wall is to the `north', outside maze walls are on the `west' and `south'. At the center of the maze shall be a large opening which is composed of 4 unit squares. This central four squares shall be the target.

2.4. Small square posts, each 1.2 cm x 1.2 cm x 5 cm high, at the four corners of each unit square are called lattice points. The maze shall be constituted such

that there is at least one wall touching each lattice point, except for the destination square.

2.5. The dimensions of the maze shall be accurate to within 5% or 2 cm, whichever is less. Assembly joints on the maze floor shall not involve steps of greater than 0.5 mm. The change of slope at an assembly joint shall not be greater than 4 degrees. Gaps between the walls of adjacent squares shall not be greater than 1 mm.

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

2.7. 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; parts from different mazes may be used. Do not assume the floor provides a given amount of friction. There may be seams between sections of the maze base, on which any low-hanging parts of a mouse may snag.

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

3. Specifications for the Micromouse

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

3.2. The length and width of a micromouse shall be restricted to a square region of 25 cm x 25 cm. The dimensions of a micromouse which changes its geometry during a run shall never be greater than 25 cm x 25 cm. The height of a micromouse is unrestricted.

3.3. A micromouse shall not leave anything behind while negotiating the maze.

3.4. A micromouse shall not jump over, climb, scratch, damage or destroy the walls of the maze.

4. Rules for the Contest

4.1. The total cost of the materials of the mouse may not exceed $500.00. This is judged on actual cost and market value of any donated materials used in the mouse. An individual or a team must have the description of components and their market prices at the time of contest to present it at judges' request. Since market values may vary from source to source, contestants maybe be asked to submit the copies of catalog pages along with the cover page of the catalog or quotes to confirm unusual prices.

4.2. Once the maze is disclosed to contestants, the operator shall not program the mouse with any information about the layout of the maze. This includes flashing new firmware, giving specific instructions about maze layout, or having any wired or wireless communication with the mouse. The contestant

may not alter the mouse, e.g. to remove a bulky sensor array. However, the following *is* allowed:

- 4.2.1. Changing switch settings or maze algorithm selection
- 4.2.2. Loading maze data from previous runs of this maze (if this can be done entirely on the mouse)
- 4.2.3. Replacing batteries between runs (if they are all the same size)
- 4.2.4. Adjusting sensors
- 4.2.5. Changing acceleration or max speed settings
- 4.2.6. Making minor physical repairs

4.3. Two or more mice of near identical design from the same school are allowed, however, only one of them will be able to claim prizes.

4.4. The mouse may not perform maze solving or exploration while in physical contact with the mouse operator.

4.5. A mouse shall have 10 minutes, or 10 runs, total (whichever comes first). The 10 minutes shall start when the mouse leaves physical contact with the operator when being placed in the maze.

4.6. The Micromouse shall be scored based on the fastest run time that it takes for the mouse to get from the selected starting square, to one of the four center squares of the maze. If the mouse does not reach the center square, its score will be based on the maximum number of unique cells that the mouse traversed in a unique run. Placing shall be ranked based on the fastest run time, and then based on the most unique cells traversed.

4.7. Each run shall start from the starting square of the maze.

4.8. A run time starts when the Micromouse begins to exit the starting square, and ends when the mouse begins to enter a center square.

4.9. The operator may abort a run at any time. If the operator touches the mouse while in the maze, and has exited the starting square, but not started to enter the center squares, that run is considered aborted. The runtime shall be discarded; however, unique cell count shall not be discarded, and will count towards the score of the mouse.

4.10. If a mouse has not completed a run, but has returned to the starting cell, that run shall be considered aborted (but, unique cell count counted towards the score of the mouse).

4.11. An aborted run does count towards the 10 runs that a mouse is allocated.

4.12. If the mouse has completed a run, it may continue exploring the maze. If the mouse returns to the start square, exiting that square constitutes starting a new run.

4.13. 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 (e.g., if the structure of the maze is jeopardized by continuing operation of the mouse).

4.14. Each team is allowed a maximum of 2 mice to compete. However, only the one with the best score will be counted.