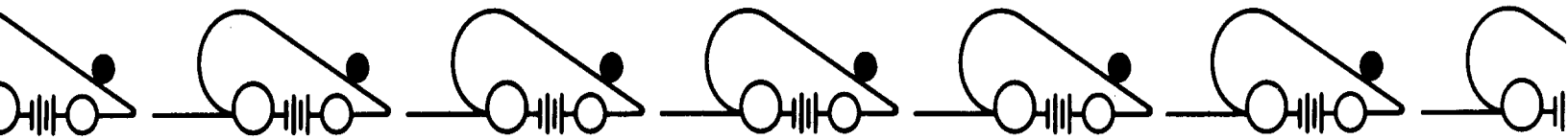


APEC MICROMOUSE CONTEST RULES

updated 11/29/09

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 a *handler*.

I. Specifications for the Maze

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. 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 infra-red light and the coating on the floor shall absorb it.

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 square shall be the destination.

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.

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.

II. Specifications for the Micromouse

1. A micromouse shall be self-contained. It shall not use an energy source employing a combustion process.

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

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

III. Rules for the Contest

The basic function of a micromouse is to travel from the start square to the destination square. This is called a *run*. The time it takes is called the *run time*. Traveling from the destination square back to the start square is not considered a run. The total time from the first activation of the micromouse until the start of each run is also measured. This is called the *maze time*. If a mouse requires manual assistance at any time during the contest it is considered *touched*. By using these three parameters the scoring of the contest is designed to reward speed, efficiency of maze solving, and self-reliance of the micromouse.

1. The scoring of a micromouse shall be done by computing a handicapped time for each run. This shall be calculated by adding the time for each run to 1/30 of the maze time associated with that run and subtracting a 2 second bonus if the micromouse has not been touched yet (For example assume a micromouse, after being on the maze for 4 minutes without being touched, starts a run which takes 20 seconds; the run will have a handicapped time of: 20 + (4 * 60 / 30) - 2 = 26 seconds). The run with the fastest handicapped time for each micromouse shall be the official time of that micromouse.

2. Each contesting micromouse shall be subject to a time limit of 7 minutes on the maze. Within this time limit, the micromouse may make up to 7 runs.

3. When the micromouse reaches the maze center it may be manually lifted out and restarted or it may make its own way back to the start square. Manually lifting it out shall be considered touching the micromouse and will cause it to loose the 2 second bonus on all further runs.

4. The time for each run shall be measured from the moment the micromouse leaves the start square until it enters the finish square. The total time on the maze shall be measured from the time the micromouse is first activated. The mouse does not have to move when it is first activated but it must be positioned in the start square ready to run.

5. The time taken to negotiate the maze shall be measured either manually by the contest officials or by infra-red sensors set at the start and destination. If infra-red sensors are used, the start sensor shall be positioned at the boundary between the start square and the next unit square. The destination sensor shall be placed at the entrance to the destination square. The infrared beam of each sensor shall be horizontal and positioned approximately 1 cm above the floor.

6. The starting procedure of the micromouse shall not offer a choice of strategies to the handler.

7. Once the maze configuration for the contest is disclosed, the operator shall not feed the micromouse with maze information.

8. The illumination, temperature, and humidity of the room in which the maze is located shall be those of an ambient environment. Requests to adjust the illumination may be accepted at the discretion of the contest officials.

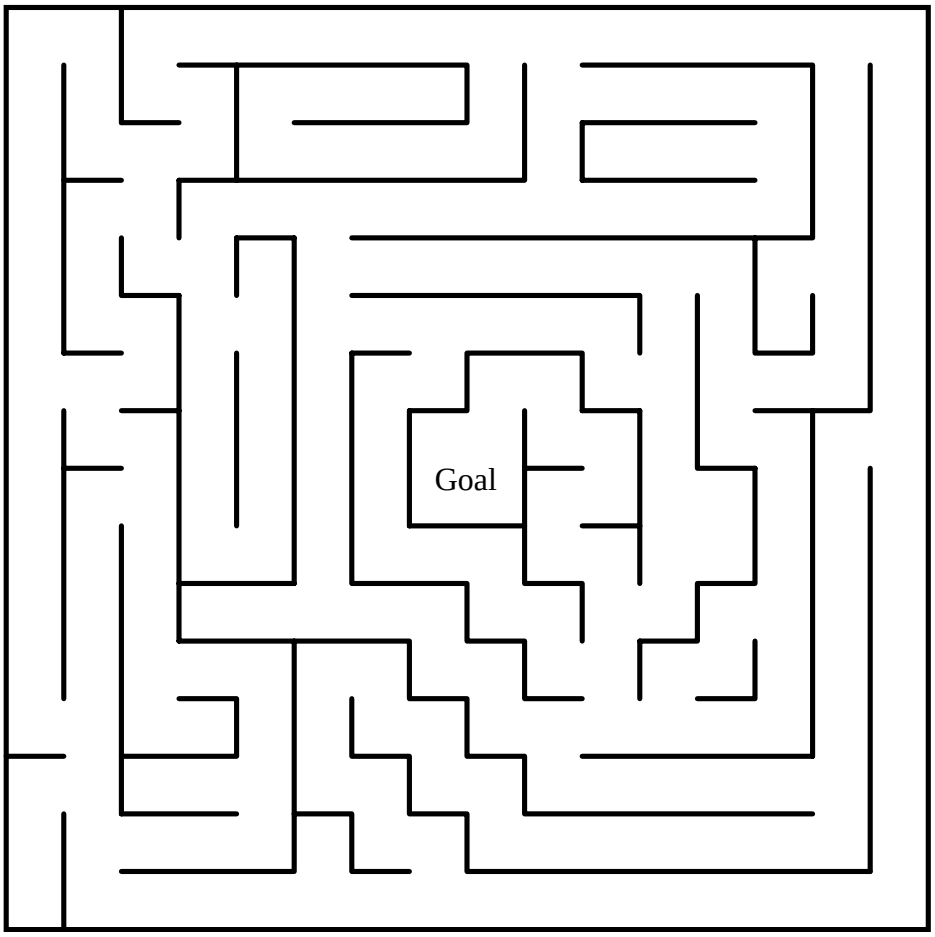
9. If a micromouse appears to be malfunctioning, the handlers may ask the judges for permission to abandon the run and restart the micromouse at the beginning. A micromouse shall not be re-started merely because it has taken a wrong turn.

10. If any part of a micromouse is replaced during its performance, such as batteries or EPROMs, or if any significant adjustment is made, the memory of the maze within the micromouse shall be erased before restarting. Slight adjustments, such as to the sensors, may be allowed at the discretion of the judges, but operation of speed or strategy controls is expressly forbidden without a memory erasure.

11. No part of the micromouse (with the possible exception of batteries) shall be transferred to another micromouse. For example if one chassis is used with two alternative controllers, then they are the same micromouse and must perform within a single 10 minute allocation. The memory must be cleared with the change of controller.

12. The contest officials shall reserve the right to stop a run, or disqualify a micromouse, if they believe its continued operation is endangering the condition of the maze.

13. Following the completion of a run and prior to the start of its next run, a micromouse must remain in the start square for a minimum of 1 second. If an infra-red start sensor is used, it must not be obstructed during this time.



Sample Maze used at the Boston Computer Museum Mouseathon