

# Contest Rules

## RULES FOR HALF SIZE MICROMOUSE CONTEST

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## INTRODUCTION

Micromouse Contest is a contest which an autonomous robot runs through a designated maze to compete for intelligence and speed. A robot participating in this contest is termed Micromouse.

### 1. RULES FOR MICROMOUSE HALFSIZE

- 1.1. Micromouse must be autonomous. It is not allowed to use an energy source given by combustion process.
- 1.2. Micromouse must not have any hardware or software added, deleted, replaced or modified by the operator during the contest. It is however permitted to make minor repairs.
- 1.3. Micromouse is not allowed to leave any of the parts on the maze.
- 1.4. Micromouse is not allowed to jump over, climb, scratch, damage or destroy the walls.
- 1.5. The projection of the Micromouse on the floor must be contained within a square of each sides in 12.5 cm. This must be satisfied even when the shape of the Micromouse changes during the contest. There are no restrictions to the height of the Micromouse.

## 2. RULES FOR THE MAZE

- 2.1. The side of the walls are white, and the top of the walls are red. The floor of the maze is painted in black. It is made of wood finished with non-gloss black paint.
  - 2.1.1. However, the exterior walls of the starting point (outside the maze) and the interior walls of the finish zone are painted in red.
  - 2.1.2. The top of the walls in the starting unit and finish zone is painted white.
- 2.2. The maze are composed of 9 x 9 cm unit squares. The maximum number of squares will be 32 x 32 squares. The height of the walls is 2.5 cm and its thickness is 0.6 cm (see Fig. 1 for details).

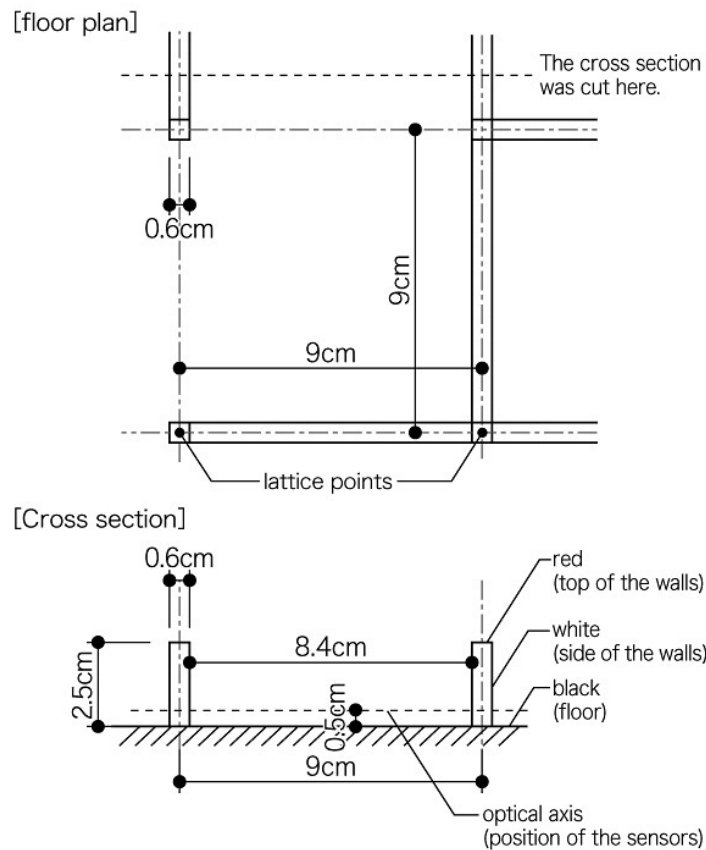


Fig. 1. Structure of the maze

- 2.3. The starting point of the maze will be located at one of the four corners of the maze. Micromouse starts in a clockwise direction. The finish point and the size of the finish zone will be determined individually for each competition. The entry point to the finish zone will be indicated by a set of x-y coordinates. (See Fig. 2 for an explanation on how to read coordinates.)

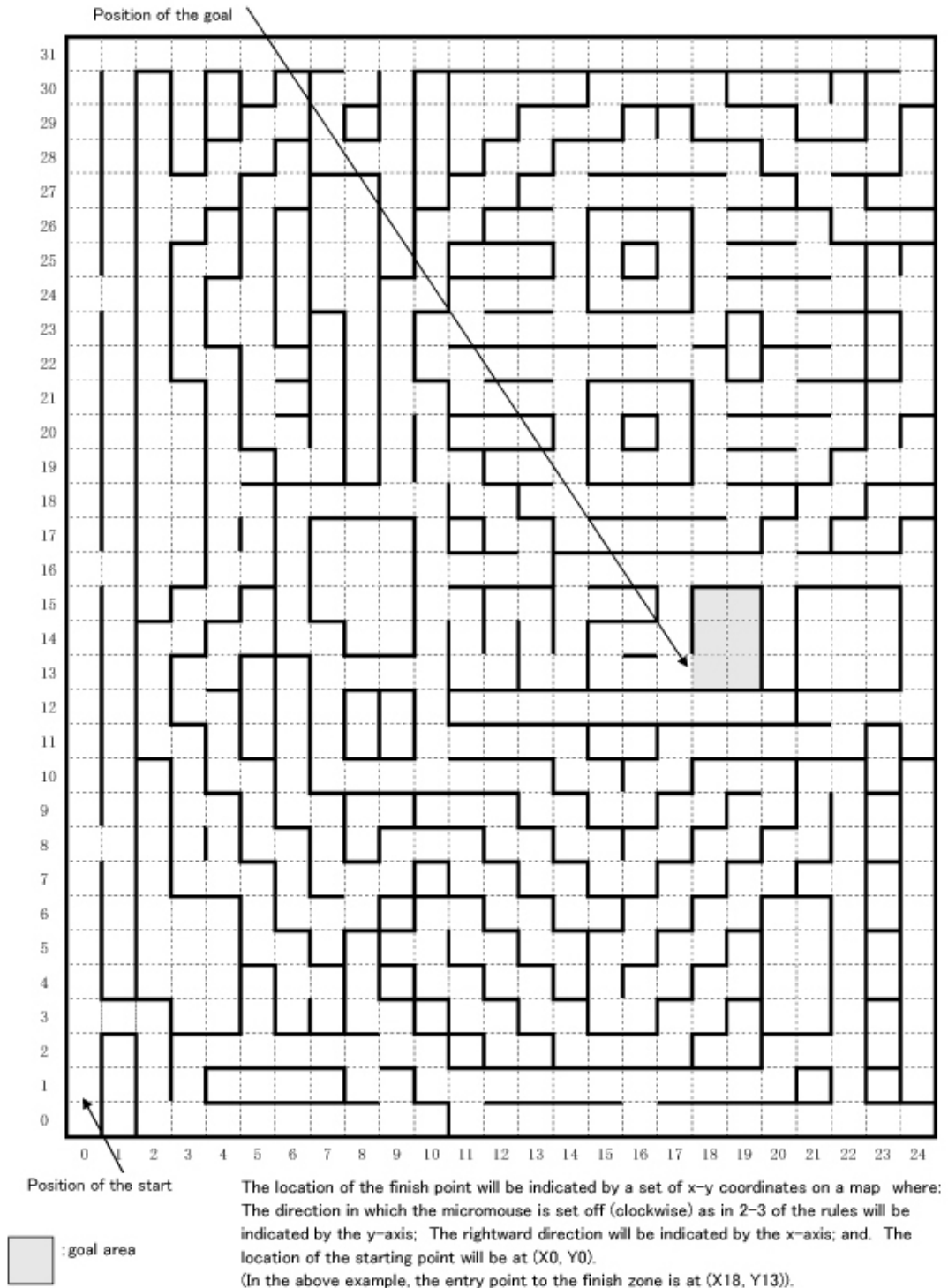


Fig. 2. The x-y coordinates for sensor locations and the entry point to the finish zone

- 2.4. There are Small square zones, each 0.6 cm x 0.6 cm, at the four corners of each unit square. This zone is called lattice points, and a maze are built so that there are at least one wall to a lattice point except for the interior of the finish zone (see Fig. 1 for details). The entire maze will be completely surrounded by exterior walls (see Figs. 1 and 2).

### 3. RULES FOR THE CONTEST

- 3.1. The fastest lap from the start to the finish zone will be recorded as its official time. Micromouse Contest will be evaluated on the fastest lap and its independence. The prizes will be awarded according to the recorded official times. The fastest Micromouse will get the first prize and so on.
- 3.2. After the maze is open to public, the operator is not allowed to feed any maze information to Micromouse. During the contest, the operator is not allowed to change any maze information gathered by the search run, using switch or its kind.
- 3.3. After the maze is disclosed, the operator shall not feed information on the maze into the MicroMouse however, switch positions may be changed for the purpose of changing programs within the robot (changing algorithms is allowed. Entering info on the maze is not allowed and does not constitute "changing algorithms.).
- 3.4. Micromouse begins its run from a starting point and ends when it came back. The run will also finish when Micromouse stops for 2 seconds or it is approved by chairperson.
- 3.5. When Micromouse returns to the starting point and beings another run automatically, Micromouse must stop for at least two seconds at the starting point.
- 3.6. The operator is not allowed to touch the Micromouse during the run unless instructed or given permission by a tournament chairperson to do so. The tournament chairperson accepts an operator's request to discontinue its run if an apparent malfunction is found in his/her Micromouse's run. For the cases in which a request to discontinue is made for any other reasons, permissions will be made on the condition which all memory of the maze is erased.
- 3.7. The time limit for Micromouse is 5 minutes maximum for each round. Micromouse is permitted to make up to 5 runs in the specified timeframe.
- 3.8. The lap have considered to have completed when the entire lower portion of its body, defined as its portion up to 2.5 cm above the floor level has entered the finish zone.  
  
However, elapsed time is measured from the moment the sensors placed at the starting point senses the Micromouse and to the moment the sensor located at the entry point to the finish zone senses the same Micromouse.
- 3.9. The lightings, temperature and humidity of the room in which the maze is located will be those of an ambient environment. Requests to adjust the lightings will not be accepted.
- 3.10. The tournament chairperson has the rights to ask to the operator about the Micromouse if it is appropriate. The tournament chairperson also has the rights to stop a run, declare disqualification, or ask for instructions if it is appropriate.
- 3.11. The grand prize is a remote controlled quadcopter. Further prizes for 2016's contest will be introduced later in a contest schedule and site information document.

### 4. FURTHER REGULATIONS

- 4.1. The contestant is not permitted to load programs or replace ROM during a contest.  
  
It is also prohibited to send any information to Micromouse from development unit or console box that is independent from the main Micromouse unit.



- 4.2. The contestant is permitted to remove dust and debris on the tires during a contest using adhesive tape, etc.; however, no solvents and likely may be used for the purpose of increasing friction.
- 4.3. In each of its runs, Micromouse may continue its search even after it has reached the destination. In such a case, the elapsed time when Micromouse has reached the finish zone for the first time will be recorded.
- 4.4. If Micromouse returns to the starting point and begins another run within two seconds, it is assumed that the next run has begun. However, this run will be invalid.
- 4.5. Except for the run, Micromouse may not be placed for adjustment or other purposes in any part of the maze other than on the starting point.
- 4.6. Dimensions of Micromouse

The size of the lower structure of Micromouse is constrained by the size of the maze despite the provisions of Article 1.5.

#### 4.7. Structure of Maze

The maze is made in a sensible accuracy. So that there will be errors to the maze dimension to some extent. As the maze is designed to come apart for preservation, it may produce gaps or difference in level of approximately 1 mm between sections of the walls or the floor. There may be non-uniform coloring, discoloring and stains.

#### 4.8. Type and position of the Sensors for recording

Type: Transmission infrared sensors. Optical axis placed 0.5 cm above the floor. (See Fig.1)

Position:

Start sensor: At the boundary between the starting unit square and the next unit square.

Goal Sensor: The entry point for the finish zone.

#### 4.9. A goal marker may be placed at some point in the finish zone.

It may also be removed subject to the approval of the tournament chairperson.

## 5. CONTEST AND ENVIRONMENTAL DETAILS

### 5.1. Beforehand information announcement

The overall size of the maze, the location of the entry point to the finish zone (the x-y coordinates) and time given will be announced two months before the contest.

### 5.2. Operating Micromouse

As a general rule, a person or the group which made the Micromouse has to be the operator.

### 5.3. Limit of the number of Micromouse to register

In Half-sized Micromouse Contest, the same designer can register only one Micromouse.

However, seeded contestant can register another Micromouse in preliminary round. If the Micromouse passes the preliminary round, the person can choose which Micromouse are going to take part in the final round.

### 5.4. Preliminary round

In the final round, if more than one Micromouse is registered by the same group exhibiting technical similarities, only one of them can enter. It should be noted that an operator (as a general rule, the designer is the operator of the mouse) is allowed to operate only one mouse.

### 5.5. Exchanging batteries

Contestants are not allowed to change batteries during a contest.

### 5.6. Lighting conditions and the use of flashes for photography in the arena

The basic aim of the Mechatronics, Optics and Engineering Informatics Department in sponsoring this competition is to encourage the development of robots that move in any given conditions where humans conduct their life to the maximum extent possible, rather than the development of robots that function only in controlled environments.

#### 5.6.1. Lighting conditions

In line with the above spirit, the competitions will be held under regular lighting as provided by the arena.

#### 5.6.2. Flash photography

There will be an announcement in the arena asking the audience to refrain from using flashes for all competitions other than the final round of the Micromouse Contest. Please take note, however, that some video and camera equipment use infrared rays for their auto-focus function, and participants are expected to come up with ideas to successfully cope with these disturbance.

### 5.7. Keeping system in the final round

For the final round, the secretariat will keep the robots at a designated location before the contest. Secretariat will keep the Micromouse until the contest is over. Before the run, each operator must receive his/her own robot at the designated area. After Micromouse complete its runs, the operator must return their Micromouse to the designated area.