

## **REGULATIONS «MAZE SOLVING»**

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## 1. Introduction

1. The Maze Solving challenge was adopted from the “Official Rules for North American Micromouse Contests” and its regulations have been adopted within the framework of the ROBOTEX INTERNATIONAL so that it corresponds to modern technological developments.

## 2. Objective

1. In this challenge, the mission of the autonomous robot is to drive through a labyrinth, a maze, from specified corner to its centre in the shortest possible time.

## 3. The Team - Eligibility of Participation

1. The competition accepts participation of teams and not individuals.
2. The team consists of two (2) – five (5) persons.
3. **Only one player** of category X is eligible to participate in a team of the immediate higher category. That is:
  - A player of category «4th – 6th Grade Primary» is allowed to participate in a team of category «Gymnasium»
  - A player of category «Gymnasium» is allowed to participate in a team of category «Lyceum»
  - A player of category «Lyceum» is allowed to participate in a team of category «University».
  - The opposite of the rule 3.3 above does not apply. That is, one player of category X is not allowed to participate in a team of any lower category. For example, a player that belongs in category «Lyceum» is not allowed to participate in a team of category «Gymnasium» or «4th – 6th Grade Primary»; a player in the «University» category is not allowed to participate in the category «Lyceum» or «Gymnasium» etc.
4. The coach of the team is not allowed to participate in the same competition with his/her team.
5. The team defines one of its members as a leader who will be responsible for the communication with the Organizing Committee and the judges, for the technical control process and for operating the robot during the competition.

## 4. The Robot

1. The robot shall be autonomous and self-contained (no remote controls).
2. The robot shall not leave any part of its body behind while negotiating the maze.
3. The robot shall not jump over, fly over, climb, scratch, cut, burn, mark, damage, or destroy the walls of the maze.
4. The maximum dimensions of the robot are (16 centimetres length X 16 centimetres width).
5. If a robot changes its geometry during the competition, its dimensions must still be at maximum (16 centimetres length X 16 centimetres width).
6. There is no restriction on the height of the robot.
7. The body of the robot body must entirely block time measuring system light beam with a diameter of three (3) mm at the height of three (3) cm.
8. Any violation of the above rules will constitute immediate disqualification of the robot from the competition.

## 5. Additional Devices

1. Especially for the ARDUINO Maze Solving competition, additional devices such as a smart phone may be attached and connected to the robot.

## 6. The Maze

1. The maze is composed of 18 cm x 18 cm unit squares and comprises up to 16 x 16 unit squares.
2. The walls of the maze are 5 cm high and 1.2 cm thick (assume 5 % tolerance for mazes). Thus, the distance from wall to wall within a square is 16.8 cm. The outside wall encloses the entire maze.
3. The sides of the maze walls are white, the tops of the walls are red, and the floor is black, finished with matt colour.
4. 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 has a given amount of friction.
5. 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.
6. The destination is the four (18 cm x 18 cm) cells at the centre of the maze. The finish line is

at the entrance to the destination square.

7. The destination has only one entrance and it will be positioned so that a wall-hugging mouse will not be able to find it.
8. The maze of the competition remains secret until the competition day. Participants are expected to take into consideration the details above and develop a generic code that can perform successfully on any maze.
9. After the maze is disclosed, the team shall not feed information on the maze into the robot.

## 7. Categories & Levels

1. The competition is organized for the ENGINO, LEGO EV3, LEGO SPIKE, ARDUINO, RASPBERRY Pi, ARM, ESP and EDISON platforms for the categories and levels indicated in the table below:

**Table 1: Categories & Levels for MAZE SOLVING**

Category →		Primary	Gymnasium	Lyceum	University	Special Category
Challenges ↓	Level →	4 <sup>th</sup> – 6 <sup>th</sup>	1 <sup>st</sup> – 3 <sup>rd</sup>	4 <sup>th</sup> – 7 <sup>th</sup>	All Years of Study	Soldiers & Adults
Maze Solving (ARDUINO, RASPBERRY Pi, ARM, ESP)	NOT APPLICABLE	✓	✓	✓	✓	✓
Maze Solving ENGINO	✓	✓	✓			NOT APPLICABLE
LEGO Maze Solving (LEGO EV3, LEGO SPIKE)	✓	✓	✓			NOT APPLICABLE

## 8. The Competition

1. Each competing robot is allocated a total of five (5) minutes of access the maze in one (1) round.
2. The robot can attempt the maze as many times as required during the available time of five (5) minutes.
3. Any time used to adjust a robot between runs is included in the five (5) minutes.
4. The run timer will start when front edge of the robot crosses the start line and stops when the front edge of the robot crosses the finish line
5. Each run shall be made from the starting square. The operator may abort a run at any time.
6. If the leader/operator touches the robot during the route, the attempt is considered void and the robot has to return to the starting point.
7. The leader of the team is allowed to:
  - change switch positions;
  - adjust sensors;
  - make repairs in case the robot breaks down.
8. Every time the robot reaches the destination square successfully, its time is recorded in the system.
9. The minimum time amongst the attempts of the robot will be the official time for the robot.
10. If the robot does not reach the destination at all, then the robot's distance from the destination is recorded and taken into account.
11. The distance is defined as the number of successive squares from the destination.

## 9. Declaring the Winning Team

1. Upon completion of the first round, robots will be ranked based on the minimum official time and the minimum distance from the destination.
2. The winner per robot platform and per category/level is the robot with the minimum official time.
3. In case that no robots reach the destination (and thus they have no official time), the winner is the robot closest to the destination square, i.e the robot with the smallest number of consecutive squares from the destination.
4. In the event of a tie, either on time or on the distance, an extra match is made amongst the robots in tie.
5. Based on this race, the winner is decided for the first round, per robot platform and category/level.
6. The winner robots per robot platform and category/level will be promoted to the final round (best-of-the-best round).
7. In the final round robots will have the field available for five (5) minutes and the procedure described in paragraph «**7. The Competition**» will be repeated.
8. Upon completion of the final round, a ranking will be made to declare the one winner robot of the competition based on the above procedure.

## 10. Terms and Conditions of Participation

1. Participation in ROBOTEX CYPRUS assumes and requires acceptance of all terms and conditions for participation by competitors, the coaches and the organizations they represent.
2. In case of any difference in the competition rules between the English and the Greek versions, the English version is considered as correct.
3. The robot must be registered before the competition. The registration process includes technical inspection of the robot, marking the robot with a number sticker, and the order in which it will compete which is generated by an algorithm in the information system supporting the ROBOTEX CYPRUS organization.
4. In this challenge, there are two (2) judges. An additional head judge may also be present to supervise the whole process.
5. All questions and issues that may arise during the competitions must be reported to the judges.
6. The final decision about objections will be taken by the judges in cooperation with the organizers.
7. Judges' decisions on any objections are considered final and can't be challenged by participants, the coaches or the organizations they represent.
8. In the case of a deliberate alteration or change of marking of the unique number of robots, the coach and his team will be automatically expelled from the event. As a result they will not be able to take part in any other challenge they may have enrolled. The coach and his team will leave the venue immediately. The coach also loses the right to take part in the next ROBOTEX CYPRUS event and is automatically excluded from participating in ROBOTEX INTERNATIONAL in case one of his/her teams has won a ROBOTEX CYPRUS competition. The Organizing Committee reserves the right to publicly announce the coach, the team and its members.
9. It is expected that both the coaches and the members of the teams will exhibit a spirit of noble rivalry and will behave with mutual respect, decency and esteem both to themselves and to the organizers, judges and volunteers. The behaviour of all coaches and team members should promote "fair play". Therefore, the Organizing Committee reserves the right to expel anyone from the venue of the event who violates the above principles of good practice.

## 11. Robot Technical Control

1. An initial technical control of the robot technical control will take place on the day of the competition at an area and on time specified by the organizers.
2. Technical control takes place before each phase of the competition (preliminary, qualifying, final) in which the team may participate.
3. Failure of a team to come in time for a robot's technical check leads to the team being excluded from the event.
4. The leader of the team only is responsible to take the team's robot for technical control.
5. Technical control includes the control of the robot based on the above and the section «**4. The Robot**». If the robot does not meet the requirements it will not be accepted to compete and will automatically be disqualified from the event.

## 12. Changes and Cancellation of Rules

1. Any changes and/or cancellations in the rules of the competition are decided by the Cyprus Computer Society in consultation with the Organizing Committee of ROBOTEX CYPRUS. You may address comments and suggestions to the Organizers at [robotex@ccs.org.cy](mailto:robotex@ccs.org.cy).