

2023 Annual Engineering Robotics Competition

Obstacle Battle

Goal

The goal of the competition is to cross the finish line on the other side of the obstacle course as quickly as possible. In the course there are walls and one other competitor robot.

You can gain extra points by:

- Knocking the opponent's robot onto its side
- Remaining active at the end of the time.

Tournament Structure

The tournament will be conducted in two stages: preliminary rounds and playoffs. During the preliminary rounds, each team will play the same number of matches. A rough schedule will be provided before the event, and the official match schedule will be created and distributed once registration is complete on the day of the competition.

The top eight scoring teams after the preliminaries will move on to the playoffs.

In the event of a tie, the advantage will be given based on the following criteria in order.

1. Higher score from the most recent match both robots participated in.
2. Sudden death battle.

Tournament Rules

1. **The referee's word is final** on all competition matters, including but not limited to the rules and the results of matches.
2. At the start of a match, each robot must fit into a 20 cm x 20 cm square, with no height limitation. Robots will be measured before the tournament to ensure they comply with this rule. The referee has the discretion to re-measure a robot before any match. Parts of the robots may extend outside this area after a match has started, however they must start in the configuration that they were measured in. Failure to meet the criteria will result in disqualification for that round.
3. Matches start on the command of the referee and last a maximum of 3 minutes.
4. **Each robot must have a 5-second delay after the operator pushes start before their robot starts to move.**
5. The robots will be placed at their starting positions of the competition area with their front ends facing any direction.
- 6.
7. Points for each match are awarded as follows:
 - 1st Place: 15 points
 - 2nd Place: 12 points
 - 3rd Place: 10 points
 - 4th Place: 9 points
 - 5th Place: 8 points
 - 6th Place: 7 points
 - 7th Place: 6 points
 - 8th Place: 5 points
8. If the robot is still traversing or does not complete the maze when time runs out it will receive 3 points
9. If a robot knocks over the opponent robot it will receive **15 points**
10. If the robot is stuck in one spot (unmoving from that x,y position) for more than 20 seconds, it is disqualified
11. A wheel must cross the line to be considered complete and attached to the robot
12. Only wheels may be used, not tracks

13. If a robot is unable to start a match for any reason it will receive zero points for that match.
14. In the event that there is more than one robot that finishes at the same time at the end of a match, the points for first place will not be awarded, and each team will receive points for the lower placement of the tied teams. For example, if there are two robots finishing at the same time at the end of the match, then they will both be awarded 2nd place and 12 points each. In a 3-way tie, the three teams will be awarded 3rd place and 10 points. This means that the next robot will receive 4th place 9 points.
15. For all preliminary round the arena will be the layout provided (See page #4)
16. For the Playoff round the arena will change, and the competitors will not see it until the match begins

Arena

The arena (Figure 1.) is 8 feet by 4 feet where there are two sides that have mirrored features. There will be two robots, one on either side of the arena in the indicated corners (green and red). These corners indicate the start and finish lines, if you start in red you will finish in green and if you start in green you will finish red.

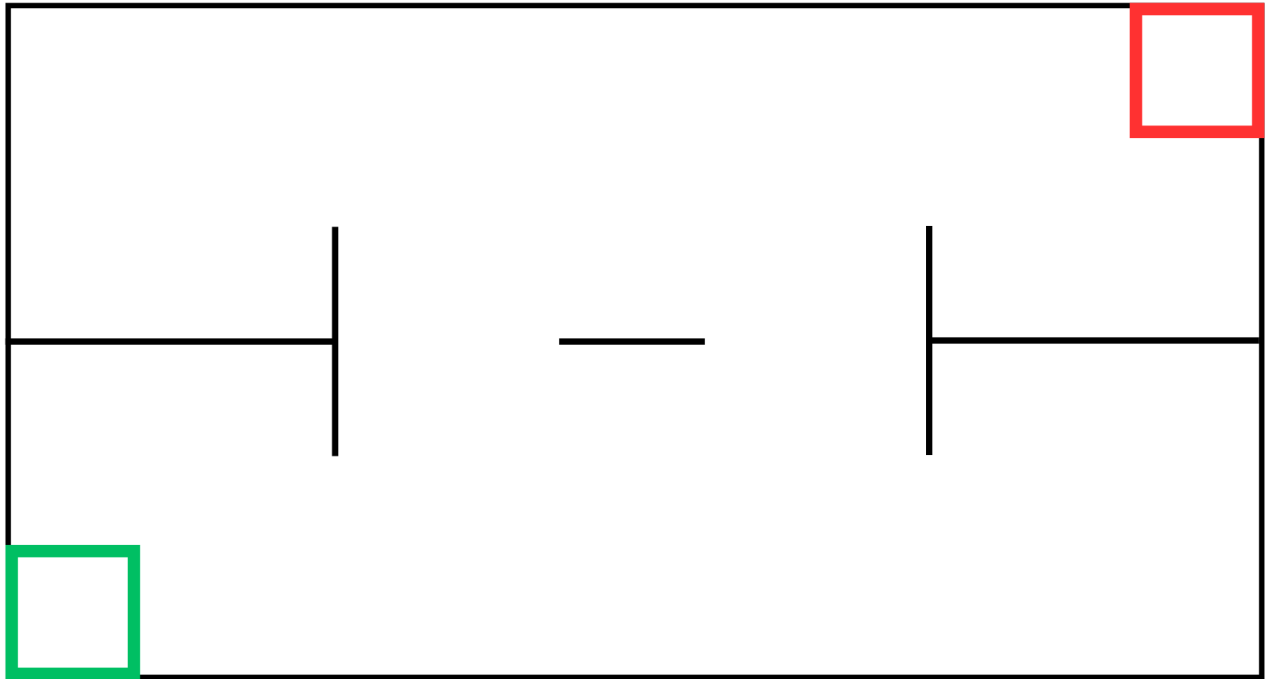


Figure 1: Competition Table in the preliminary arrangement

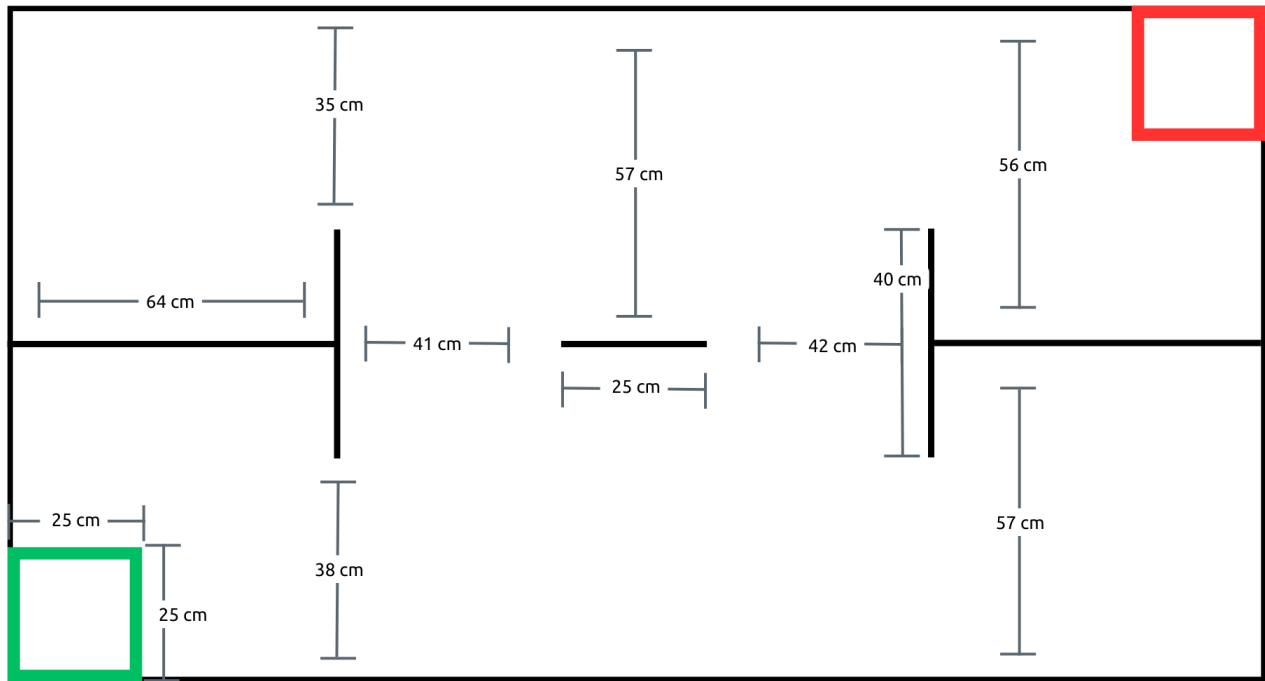


Figure 2: Competition Table in the preliminary arrangement with measurements TOLERANCE 2 cm

The inner wall thickness is 1.3 cm (1/2 inch) and the height is 14 cm (5 1/2 inches).

Engineering Design Rules

The following rules govern the design, build, and coding of the robot. Any infractions will result in point deductions, match disqualification, or competition disqualification at the discretion of the referees or tournament committee.

1. Teachers are NOT allowed to build, program, or in any other way do work on the robot. Teachers are there to be a guide to the students of the team.
2. Robots are to act autonomously, i.e., with no human control or interference during a match. Neither the Bluetooth nor the WIFI functionality of the NXT brick may be used. No wired connection during the match.
3. The robots may be programmed using languages or IDEs other than the Mindstorms NXT or EV3 software.
4. The number of sensors on the robot is limited to four, the number of motors is limited to three, and tracks (e.g. instead of wheels) are not permitted.

5. The competition committee reserves the right to create a list of ineligible components at any point or to assign a penalty for using certain components in the event that these certain components are found to give a significantly unfair advantage to a robot.
 - a. Teachers are strongly encouraged to provide the committee with the specifications of any component(s) that they are considering that may provide a significant advantage to the robot so that an early ruling can be made. Such rulings will be posted on the competition website.

Please note there is no technical report this year.

Awards

Awards will be given for the following merits:

- 1st, 2nd, 3rd – Based on placement in the final match.
- Best Engineering Design – Determined by judges.
- Referee's award for Sportsmanship – Determined by referees.
- Women in Engineering – Determined by the referees and judges.
- Most Novel Design – Determined by referees and judges.