RoboRAVE International
Robotics Education and Competition

2019 a-MAZE-ing Challenge

This challenge concludes in a **single elimination tournament**
Top 8 teams from each division, based on scores, will compete for awards

Goal

To design, build, and program a robot that can follow a raised wooden maze without falling off. The faster you can complete the maze increases your overall score.

Who Can Play

Teams in this challenge compete in **separate divisions**, typically:

- Elementary School
- Middle School

Requirements

Autonomous robot, any platform, costing $1,500 USD or less, and meets the following design constraints, which will be **verified during Check-In:**

- Robot can navigate a *46cm* long straight board, 90 degree right, *46cm* long straight board during check in.
- Robot is **not allowed to use any external sensors** to assist it in following the maze but wheel encoders are allowed.
- Volume of the robot must **not** exceed *65030cm*^{3}.

General Rules of Play

- The robot has **2 minutes** to complete the maze with the clock running backwards from 120 seconds.
- Teams can attempt as many runs as needed to post their best scores.

Challenge Specifications

All a-MAZE-ing tracks are identical in design and constructed of particle wood that is *24cm* wide and *2cm* tall. There are various lengths with combinations of 45, 90, and 135 degree angled turns in either direction.

While both divisions will utilize the same track, each division has a different finish line:

- Elementary Division – Finish line will be halfway between the 3rd and 4th angled turn.
- Middle School Division – Finish line will be at the end of the last straight.

All Challenge Dimensions are Approximate

Scoring

- Each completed straight-away is worth 50 points, once completed with back wheels passing over the scoring zone.
- Each completed angle is worth 100 points, once completed with back wheels passing over the scoring zone.
- If the robot falls off the maze before reaching the finish line, then the run is concluded, and the score received includes any portion of the maze that is completed in its entirety, **but** no **time bonus** points are awarded.
- **Time bonus** points are awarded, if and only if, the robot reaches the finish line before the 120 seconds ends. Any remaining time (integer in seconds) is then added to the maze score as a "time bonus" point value.
- The averaged score using the top 5 scores that a team posts will be utilized to determine the top 8 teams per division of the a-MAZE-ing challenge.

Scoring Matrix

	1st Straight Completed	1st Turn Completed	2nd Straight Completed	2nd Turn Completed	3rd Straight Completed	3rd Turn Completed
ES	50	100	50	100	50	100
MS	50	100	50	100	50	100

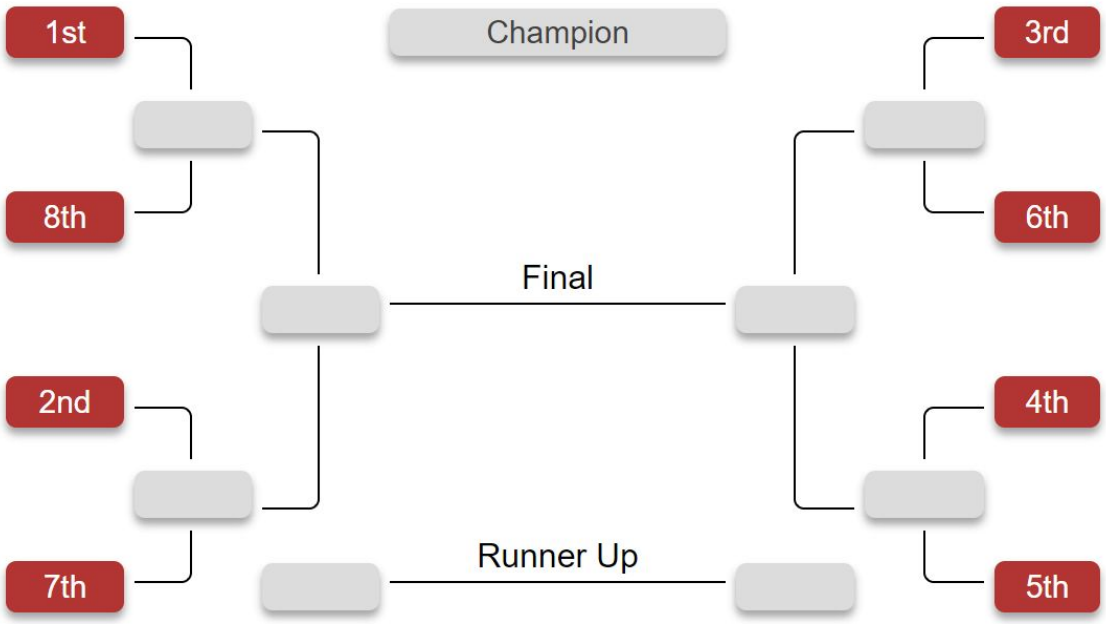
	4th Straight Completed	4th Turn Completed	5th Straight Completed	5th Turn Completed	6th Straight Completed	Total Score
ES	50	N/A	N/A	N/A	N/A	500
MS	50	100	50	100	50	800

Time Bonus: Finished required distance under 120 seconds? Remaining seconds (integer part only) are added to score.

For example - a robot finishes the MS track: 800 points for finishing + 35.8 seconds remain. Team score = 800 points + 35 seconds time bonus (integer value only) = 835 points.

Tournament Scoring

- The top eight teams from each division will compete in the final tournament.
- Advancing teams will be seeded into the tournament bracket according to their aggregate score (see bracket below).



- Runner Up is used to determine 3rd place based on outcome of semi-finals.