

ROBOParade™



Fully autonomous robot floats follow an indoor parade route while detecting other robots in front of them without human help

V 0.1 – Fall 2022 Version (2023 Pre-Season)

(Each country may clarify/adapt/change rules for each country’s qualifying competitions.)

This file can be found under the **Get Involved** → **RoboParade** Page on the website

Coaches are responsible for communicating rules updates to participants

www.robofest.net

robofest@ltu.edu

248-204-3568

**Room J233 Taubman Complex, LTU
21000 West 10 Mile Road, Southfield, MI 48075, USA**

1. RoboParade Overview

Learning Objectives

- STEM learning with Arts and Design
- Artistic creativity
- Autonomous navigation
- Basic computer programming logic
- Line following
- Object detection
- Autonomous stopping and restarting
- Adjusting to environmental conditions
- Problem solving
- Teamwork skills

Synopsis

- An Open Category competition. No qualifying competitions for this challenge.
- Hosted at the Robofest World Championship
- Local events may also host RoboParade (Teams must re-register for World Championship event)
- Fully autonomous Robot floats constructed and programmed by student participants
- Programmed to follow an indoor parade route while detecting other robots in front of them. Robot must stop and start without human help
- A great STEaM (Science, Technology, Engineering, Arts, and Math) learning opportunity for students
- An ideal event for beginners in autonomous robotics

2. RoboParade Theme

Fall 2022 event at LTU - “Halloween”

Robofest World Championship 2023 event – To be Announced

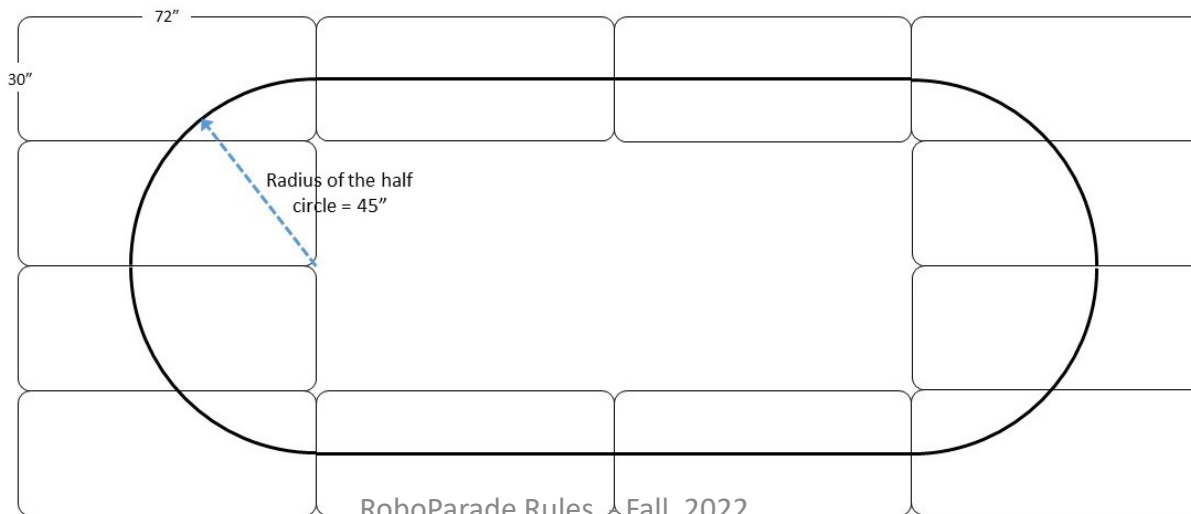
3. RoboParade Age Division and Team Size

- One Age Division: Grades 4-8
- Maximum five (5) members per team
- A team can enter only one robot float
- Team Registration Fee: \$75 at the Robofest World Championship (Registration fee at local event may be different)
- Related important document - Robofest General Rules at [robofest.net](https://www.robofest.net)
- Each team member, as well as the coach, must bring the signed [Robofest Consent and Release Form](#) on the day of the event, if not completed on-line

4. RoboParade Route Tables

- Parade route is made from plastic folding tables (30" x 72"). A suggested source for the tables can be found at: <https://www.lifetime.com/lifetime-2901g-6-foot-folding-table-commercial>
- Tables can be placed on the floor using the table legs, or on a crate with the table legs folded in. Alternatively, a table covered with white paper or white vinyl table cover can be used
- Standard black electrical tape can be used to make a closed rectangular shape with 4 rounded corners

example of a possible official parade route configuration



4. RoboParade Route Tables (1/2)

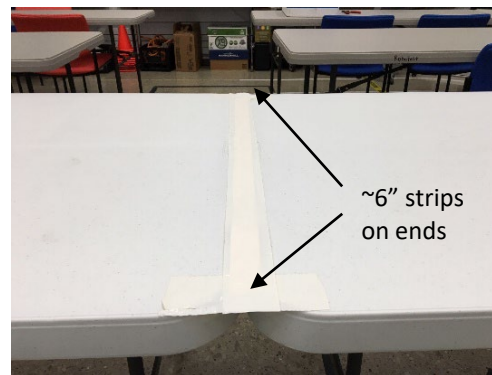
- A thin strip of poster paper is used to cover the joints formed by the table edges
- 2" wide tape (colored duct tape, masking tape, or similar) can be used to connect and hold tables together. The tape should have a color that matches the table
- Standard black electrical tape is then applied to the tables and over the joints



a) table joint with gap



b) with poster paper filler (~1" wide)



c) with 2" tape



d) Finished connections with 2" tape and black line from electrical tape

4. RoboParade Route Tables (2/2)

- Parade route at World Championship will have retaining walls
- Walls made of 2x2 wood attached to tables with dual lock tape

2019 World
Championship
course with
2x2 retaining walls

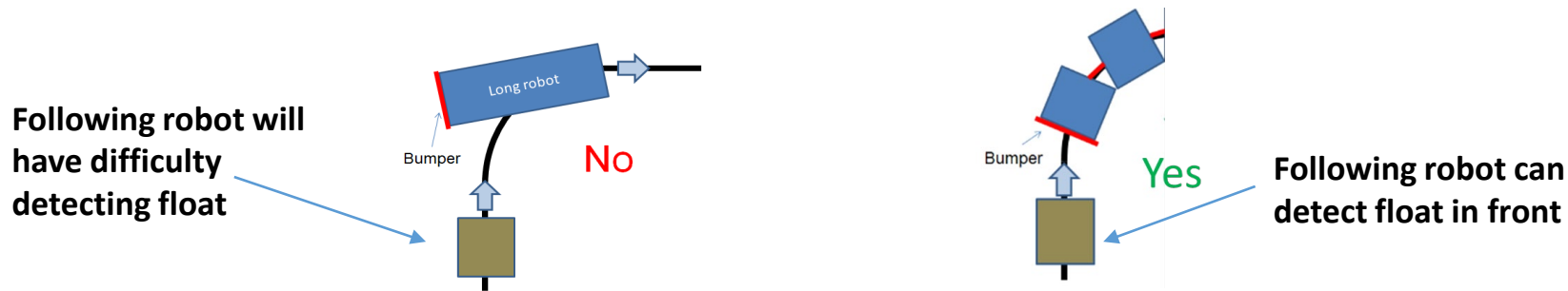


5. Robot Requirements (1/2)

- Number of robot controllers, sensors (any type), or motors: unlimited
- Each robot is required to carry a small flag with a number, which will be given once the robot passes the Test Parade
- Each robot may have its own sponsor logos
- Wireless interaction between the robot and team players using sound, ultrasonic, vision, or light sensors is encouraged
- Robot data display
 - Examples: current speed, distance (traveled in cm, for example), and elapsed time
 - Robots that do not display data can still participate, but it will be a factor in judging
See Judging Rubric <http://www.robofest.net/images/1920/RoboParade2022Rubric.pdf>
- No overall height or weight limitations
- Maximum width 35cm (13.78 in)

5. Robot Requirements (2/2)

- The rear of the float must have a flat bumper *at least 10cm (3.9") tall and 28 cm (11") wide* and be 2.54cm (1 inch) off the ground so that the robot behind is able to sense your robot using its distance sensors
- Maximum overall length is 60cm. If longer than 35cm (13.78 in), it must have train-like flexible bending structures at curves as shown:



- Robot must have a reliable program to follow a black line on a bright surface
- Robot must be able to follow both clockwise or counter-clockwise parade routes
- Robot must have the ability to detect a vehicle in front of it without touching it and stop. Robot then must automatically restart when the vehicle in front has cleared
- Robot speed must be between 9 cm/sec and 18 cm/sec

6. RoboParade Competition Procedure.

- Each team must pass a **Test Parade** to ensure that all robot vehicles meet the specifications and functional requirements
 - World Championship Qualifying will be available the day before the competition date
- Early qualification is encouraged. This gives a team early feedback on whether they are ready or what they need to improve
- The parade route will be made available for practice before the qualification period begins
- No limit to the number of qualifying attempts
- Upon passing the Test Parade, the float ID (flag) will be given which allows the robot to participate in the official parade
- Teams that do not fully meet requirements may still be given a flag and allowed to compete, though ability to meet requirements will be considered in the judges' evaluations

7. RoboParade Test Parade Checklist

Test Item	Details	Pass / No Pass	Note
Line following	<i>Clockwise, counter-clockwise</i>		
Object Detection	<i>Wait and restart</i>		
Speed limit	<i>9cm/sec ~ 18cm/sec</i>		
Rear bumper	<ul style="list-style-type: none"> • <i>at least 10cm tall and 28 cm wide</i> • <i>2.54cm off the ground</i> 		
Width	<i>Maximum 35cm</i>		
Length	<i>Maximum 60cm</i>		<i>For a float longer than 35cm it must have multiple units connected</i>

8. RoboParade Judging-In Person

- Each team member who participates in the official RoboParade will receive a medal
- A panel of Judges will score the team's performance using the RoboParade Judging Rubric by observing teams all day and especially official parade times
<http://www.robofest.net/images/1920/RoboParade2022Rubric.pdf>
- Judges will interview teams
- Winner trophies will be awarded based on the overall scores
- Special award trophies may be given to recognize an extraordinary aspect of a parade float