

RobotChallenge - RoboParade

Synopsis:

- Fully autonomous robot floats constructed and programmed by student participants.
- Programmed to follow an indoor parade route (black-line) while detecting a robot in front of it and stop. then restart when it has cleared.
- A great STEAM learning opportunity for students.

Learning Objectives:

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

Changelog

10.29.2024

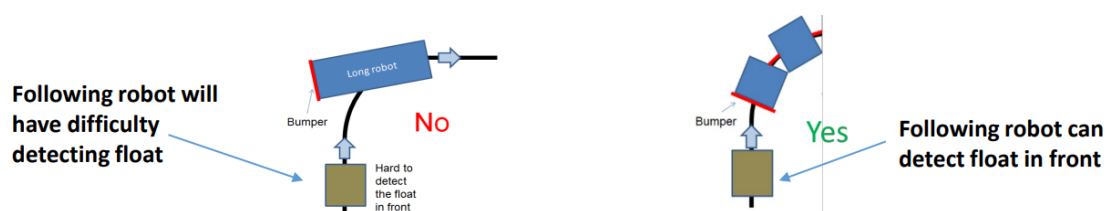
[Please refer to the theme attachment for the season theme](#)

1. Team Size

- Team Size: Maximum three (3) members.
- Teams of 1 allowed, but will receive a low score for teamwork.

2. Robot Requirements

- Any robot kits are allowed. Any programming language can be used.
- Number of robot controllers, sensors (any type), or motors: unlimited.
- Each robot is required to carry a small flag with a parade ID, which will be assigned once the robot completes the Test Parade Checklist.
- 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 speed must be between 9 cm/sec and 18 cm/sec.
- Robot needs to be programmed to display the current speed in cm/sec.
Recommended display interval is 1 second.
- No overall height or weight limitations.
- Maximum width: 35 cm.





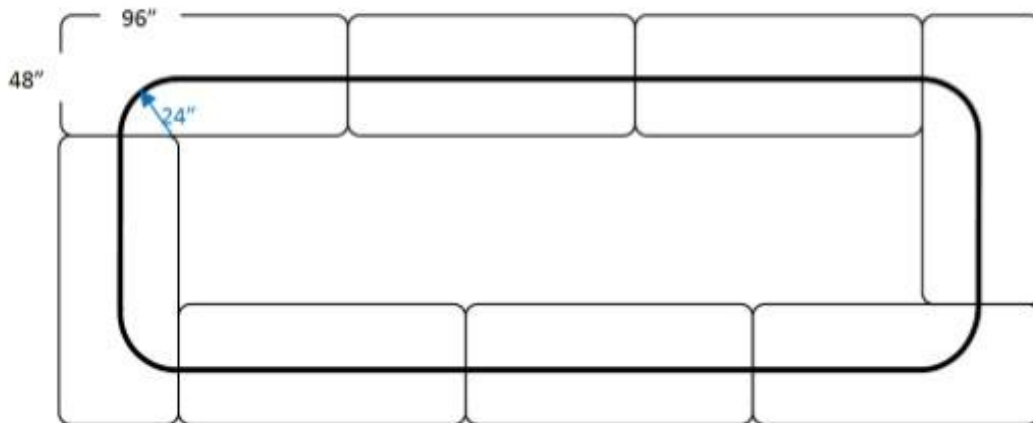
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- J. Maximum overall length of all sections of robot plus float(s) is 60cm . Maximum length of any individual float section is 35cm.
- K. The rear of the float must have a flat bumper at least 10cm tall and 28 cm wide and be 2.54 cm off the ground so that the robot behind is able to sense reliably your robot using its distance sensors.
- L. The rear bumper must remain over the line throughout the parade course (straight lines and curves).
- M. Robot must have a reliable program to follow a black line consistently and efficiently on a bright surface.
- N. Robot must be able to follow both clockwise or counter-clockwise parade routes.
- O. 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.

3. Participation process

- A. A. All robots will complete the test competition under the guidance of the referee. Robots that pass the test will receive the flag for the main competition, and they need to plant the flag to participate in the main competition.
- B. B. Robots that have not completed the test can also receive flags to participate in the main competition, but corresponding scores will be deducted during the referee's defense.
- C. C. In the test race, the robot may run clockwise or counterclockwise.
- D. D. During the main competition, the robots will complete a walking performance in the order requested by the referee, and the referee will require each team to complete their defense one by one.
- E. E. Each team has a defense time of 3 minutes.

4. RoboParade Route Tables



5. Test Parade Checklist

Test Item	Details	Tally of attempts	Pass or No-pass	Notes
Line Following	AutonomousPerformance(Clockwise)			
Line Following	AutonomousPerformance(Counter-clockwise)			
Object	Waits and restarts on straight line			
Speed limit	9cm/s-18cm/s			
Speed Display	9cm/s-18cm/s			



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Rear Bumper	at least 10cm tall and 28 cm wide and be 2.54 cm off the ground			
Robot width	< 35cm			
Robot Length	< 60cm			

Test score points explanation:

***This test item corresponds to the scoring table 4. Robot performance score points. The referee will give a score of 1-5 based on the clockwise and counterclockwise completion during the robot testing competition. Test one straight track and one curved track in each direction.**

Clockwise and counterclockwise total	No Off line	5 points
	Offline once	3points
	Offline less than or equal to 3 times	1 points
	Offline more than 3 times	0 points

****This test item corresponds to the score point of task completion item 8 on the scoring table. Among them, there are 5 test points, including waiting test, restart test, speed control and speed display, as well as bumper size check and robot work size check. Each test point is worth 1 point, for a total of 5 points.**

Scoring rules: (*) Judgement scoring

5: Strongly Agree	excellent, outstanding, advanced, exemplary, or amazing
4: Agree	good, accomplished, or proficient
3: Neutral	average, intermediate level, or acceptable
2: Somewhat Disagree	attempted but needs work
1: Disagree	little attempted or needs lots of help

Judging Category	Sub Categories	Weight	Score (1-5)
1. Artistic Creativity	Robot float is unique, artistically appealing, and aligned with theme.	3	
2. Robot Design	Students applied unique, technically creative, and innovative elements to the robotics project. Robot mechanical design is creative, user-friendly, sturdy, robust, and performed reliably	2	
3. Interactions	There are elements of wireless interaction between the robot and the team players using sensors or other communication technologies	2	
4. Robot performance	Robots can reliably move forward or stop along the line without the help of team members. This item is scored based on the completion of clockwise and counterclockwise cycling in the robot testing competition	3	
5. teamwork	Teamwork and team spirit are evident.	2	
6. Robot Design	The mechanical design of robots is creative, user-friendly, and robust. (If most of the robot parts are purchased finished products, this item will only be counted to 1 point)	2	
	This project consists of multiple complex functional components	2	
7. Team Independence	believe the project was mostly designed, developed, and programmed by the students, not by adult coaches, parents, tormentors	2	
8. Task completion items	The robot completes waiting, restart, speed control and display, bumper size compliance, and robot check size compliance, which are rated based on the completion of 5 test points	2	