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.

Rule revision v1-2025.03.24
joining ROBOBOOM

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

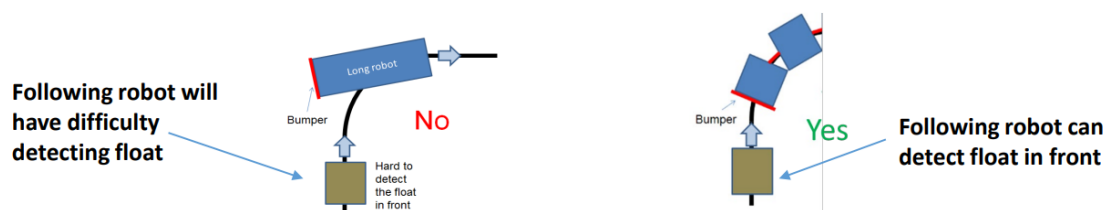• Presentation & communication skills

• Teamwork skills

Please refer to the theme attachment for the season theme

1. Team Size

A.   Age ≤ 12 years old.

B.   Team Size: Maximum three (3) members.

C.   Teams of 1 allowed, but will receive a low score for teamwork.

2.Robot Requirements

A.   Type of participating robot: Any equipment must be fully automatic.

B.   Number of controllers, sensors, and actuators: no limit.

C.   Each robot that passes the test match will receive a small red flag, which must be placed on the robot.

D.   Participating robots can have their own sponsorship LOGO.

E.   No height and weight restrictions.

F.   Width must be less than 35CM.

G.   The rear of each participating robot must have a bumper 2.54CM high from the ground, 10CM high and 28CM wide to facilitate the sensor sensing of the participating vehicles behind it.

H.   The length of the robot must be less than 60CM. If the length of each robot box is longer than 35CM, it must adopt a chain structure similar to that of a train car.

I.   Teams may use electronic devices for human-computer interaction.

Following robot will have difficulty detecting float

No

Following robot can detect float in front

Yes

3. Programming requirements

A. Participating cars must have a stable program so that the car can follow the black parade track with a light colored surface.

B. The robot must be able to complete a route that follows a clockwise or counterclockwise march.

C. The robot must be able to stably detect the car in front and stop in a timely manner, and be able to automatically restart when it determines that the robot in front is far away.

D. The speed of the robot must be between 7CM/S~16CM/S, and the real-time speed must be displayed on the robot's display.

E. Determine the correct display speed

    a) Speed = distance/time

    b) Each time the wheel rotates, the robot will move

   c) Distance = (wheel diameter) x π x (number of turns)

Use the wheel geometry

PI = 3.14
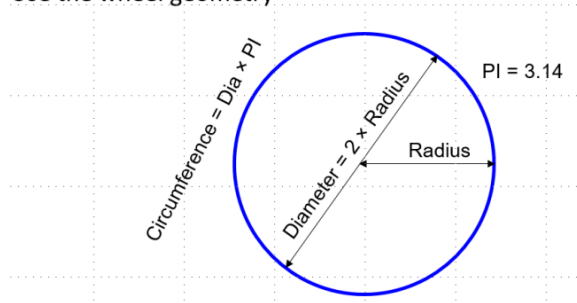
4. Entry process

A. All robots will complete the test competition under the command of the referee. Robots that pass the test will receive the main competition flag, and the robots must put up the flag to participate in the main competition.

B. Robots that have not completed the test can also get a flag to participate in the main competition, but the corresponding points will be deducted during the referee's defense session.

C. In the test match, the robot may run clockwise or counterclockwise.

D. During the main competition, the robot will complete the tour performance in the order required by the referee, and the referee will ask each team to complete their defense one by one.

E. Each team will have 3 minutes to defend.

5. Stage setting
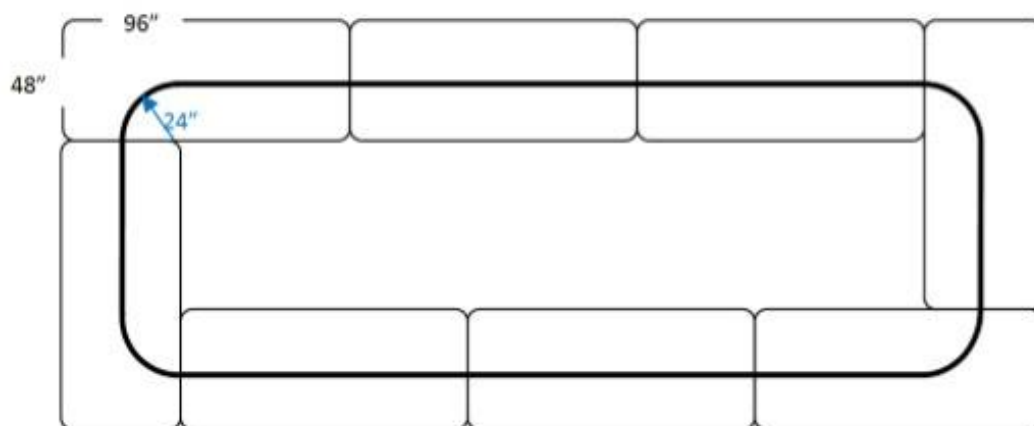
6. Test Parade Checklist

| 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	7cm/s-16cm/s			
Speed Display	7cm/s-16cm/s			
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.

	No Off line	5 points
Clockwise and counterclockwise total	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.

7. How Robot Speed is Measured during the Test Parade

A.   As shown in the figure below, the test is conducted on a straight line, and it is recommended to travel a distance between 100 centimeters and 200 centimeters

B.   Use a stopwatch to time from the starting line to the finish line

C.   Speed calculation: Speed=Distance traveled/Time traveled

D.   The measured speed will be compared with the speed displayed on the robot (must be within ± 1.5 cm/s)
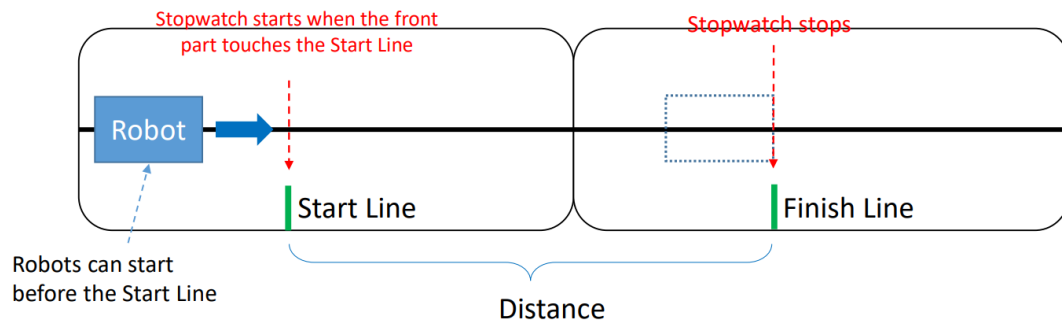
Scoring rules: (*) Judgement scoring

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	