

## SPEED LINE FOLLOWER

### GENERAL INFORMATION

Competitors must design and develop a completely autonomous robot, capable of running a black line race track on a white background. The robot that completes the circuit in the shortest possible time will win the competition.

### TECHNICAL CHARACTERISTICS OF THE ROBOT

1. The dimensions of the robot base cannot exceed 20 cm wide x 25 cm long. Neither the height of the robot nor the weight is limited.
2. The robot will be started manually or by radio control at the go signal. Robots cannot have their wheels in motion before the starting signal.
3. If the robot is activated wirelessly, the activation control must be visible to the judge and this system must only activate and deactivate the robot during the competition.
4. **RESTRICTIONS:**
  - a. The only wireless communication system allowed with the robot is on and off.
  - b. The robot must perform completely autonomously throughout the journey.

The robots must consist of hardware and software designed by the participants. The type of system controller is up to the user. The use of development cards and/or modules will be allowed (Arduino, Raspberry pi, Baby Orangutan, Orange pi, Pic32 Pingüino, Node MCU, etc.). Commercial robots or robots built upon development kits of any kind (examples: LEGO, mbot, roboblogs, pololu, etc.) will not be allowed. If you have any questions, please contact the Organizing Committee.

The structure or chassis of the robot must be designed and built by the student with any type of materials (or printed in 3D). The participation of robots created with commercial robot structures or chassis is prohibited.

No changes to the hardware or software in the robots by the competitors will be allowed during the contest. However, it is permissible to make minor repairs.

### CHARACTERISTICS OF THE ROBOT WORK AREA

The track characteristics will be announced five (5) days before the opening of the event through the official page.

The beginning and the end of the route will be marked with perpendicular lines to the right of the trajectory line, according to the direction of the route.

- The main characteristics of the track where the competition will take place are shown below:
- The track will be on white canvas; the line that makes up the circuit will be black.
- There will be no line crossings on the track.
- The closest approach of the course line to the edges of the runway will be not less than 15 cm, measured from the center of the line.
- The minimum radius of the curves will be 7.5 cm.

Special lighting is not guaranteed.

## STANDARIZATION

It will be verified that the technical specifications of the robot are satisfactorily met, such as the dimensions and verification that it is not a commercial robot.

A test lap will be carried out on the track to ensure correct operation and the restrictions mentioned in the TECHNICAL CHARACTERISTICS OF THE ROBOT section.

## COMPETITION DEVELOPMENT

All line followers must have their batteries fully charged before each phase, recharging of these between races will not be allowed. Only in case of reaching the second round, during the 10 minutes of repair if required (not software), can the batteries be recharged or replaced.

In the final round, if required, the participants will have a maximum of ten minutes just to make some repairs. It will not be allowed to make any adjustments to the robot to improve its operation, such as its programming; however, batteries may be recharged or replaced.

The robots will be collected before starting the elimination round, this in order to avoid changing hardware, software and recharging batteries between turns.

The line followers will be located and protected in the judges' area. The prototypes will be delivered to their respective owners at the end of each round.

The competition begins when the line follower crosses the starting line; right at this moment, the ride will be timed.

The ride time will be stopped and registered only when the robot crosses the finish line.

Each robot will have a maximum time of three (3) minutes to completely finish the track. Likewise, it will have three (3) opportunities to achieve the objective, in case of finishing the track more than once, the shortest time made by the robot will be registered.

The robot is to stay inside the track and follow the marked path throughout the race. If the vehicle goes off the track and returns to the same point by itself, you can continue the race.

If the robot remains still for five (5) seconds, goes off the track completely or returns to the track at another point, that attempt will be terminated and that time will not be taken into account.

The robot operator will not be able to touch the vehicle while competing; in case this happens, it will be disqualified. Robots can only be touched when you start or finish the tour.

Only the robot operator may enter the competition area. In case another team member enters the area, the robot will be disqualified.

If the robot does not work from the beginning or stops working for any reason, it automatically loses the competition.

## EVALUATION

It is the decision of the organizing committee to develop the competition in two phases:

### Classifying phase:

1. The robot will go around the track in a maximum of three attempts. The best time will be recorded.
2. The robots with the best time records will make it to the next round. The number of participants who make it to the next round will be determined by the organizers, considering the number of registered participants.

### Final phase:

1. The robot will go around the track in a maximum of three attempts. The best time will be recorded.
2. The winner will be the robot with the best time record in a final individual route on the track designated by the organizers.

During the standardization process, the participants will be informed about the time and place of the previous meeting in which the method for the eliminatory and final rounds will be discussed. meeting in which the method for the eliminatory and final rounds will be discussed.

If you have any questions about these regulations, contact the Organizing Committee.

## RECOMMENDATIONS

Design the robot sensors so that they can be easily adjusted during the development of the competition, since the external lighting conditions can change, as well as other external factors that can influence the sensors. The Organizing Committee will try to control these factors as much as possible, but in no case is it responsible for them.

Always seek maximum reliability in the design of the robot, since during the competition there will not be much time for repairs, except for the time when moving on to the next round.

Each team must be in charge of bringing to the competition the necessary tools to use and/or repair the robot in case of breakdown.

Competitors will be provided with a table and a power outlet for each team.

## JUDGES

- I. The role of the judge is important in the competition, he will be in charge of complying with the rules and regulations established by the organizing committee.
- II. The judges for this competition will be appointed by the organizing committee.
- III. Contestants may present their objections to the judge in charge of the category before the end of the competition.
- IV. In case of doubt in the application of the norms, the judge will make the final decision.

# RULES



- V. In the event of a controversy about the decision of the judge or judges, a written disagreement can be sent to the Council of Judges. Once the competition is over, the arguments presented will be evaluated and a decision will be made in this regard. This decision is final.