

# **Robian19**

## **Introduction:**

Robian19 invites participants from all over Pakistan to test their skills, build robots and compete to win cash prizes. This contest provides a platform for roboticists to apply their technical knowledge and skills and learn from their peers and seniors.

There will be **two categories** in Robian19.

1. Remote controlled sumo robots
2. Autonomous line following robots

Both the categories are **open to everyone**. Whether you are an undergraduate student, a graduate student, an educator, a researcher, a professional or a hobbyist, you are welcome to participate.

The rules and regulations of the contest are presented in this document. The students will also learn to work in groups and teams and develop coordination skills.

## **Date and Venue:**

### **Date:**

**Saturday 7<sup>th</sup> December 2019 Qualifiers**

**Monday 9<sup>th</sup> December 2019 Finals (Seminar Hall)**

**Time:** 10:00 am to 2:30 pm

**Venue:** Seminar Hall, Academic Block I, EE Department

## **Rules and Regulations:**

This section describes the rules and regulations regarding groups and teams, the arena, the size and weight of the robot etc for all categories of the contest. **Note:** These rules and regulations are not finalized and may be updated in the days leading up to the contest. Kindly visit the contest website regularly for updates.

## Category 1: Autonomous Line Following Robots

### Brief Description:

Each participating team will build an autonomous line following robot. Each robot will be allowed three (3) tries on the track and the score for the best try will be considered. There will be 1 minute breaks in between the laps so that the participants may recalibrate the sensors etc.

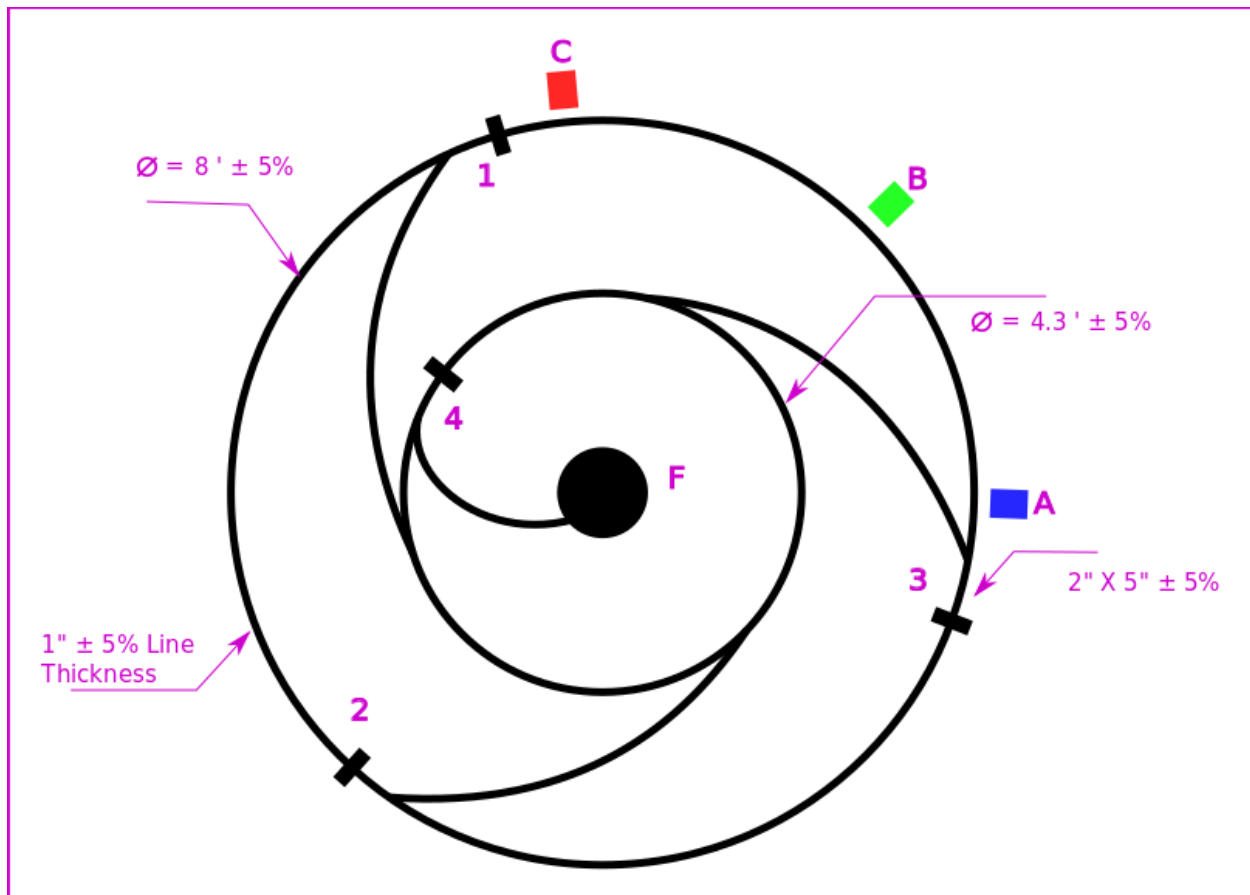


Figure 1: Arena for Autonomous Line Following Robots

### Running a try:

One person from each team will approach the arena on his/her turn. They will be directed to place their robot on the line and adjacent to one of the starting points A, B or C (chosen randomly by the referee).

The robot will determine its starting point based on the color it starts on. The robots will then have to complete one full circle of the outer ring. After

completing one full circle, the robot will decide upon the correct entry points (labeled 1, 2 and 3 in the diagram) based on its start point (A to 1, B to 2 etc) and turn into the inner circle. Then the robot will have to detect check point 4 and turn towards the end point. Score will be calculated according to criteria given in a later section.

Top 8 teams will qualify for the final round.

### The Arena:

- The arena will comprise of a black track drawn on a white background on a panaflex sheet of dimensions 10' x 10' feet.
- The line for the track will be black in color and will be 1 inch wide.
- There will be 4 checkpoints on the track for each robot (*shape and location of checkpoints may vary in the final arena design*)
- The robots will be required to start from randomly chosen starting points from 3 possible colors (marked A, B and C in Figure 1).
- The robot will have to stop after reaching the end point marked F in Figure 1.
- All purple markings in Figure 1 will not be printed on the actual arena.

### Visiting Check Points:

The robot should give a visual indication (LED blink) and an audio signal (beep) when moving over a check point. This will count towards the score for the lap. The dimensions of the Check Point are given in Figure 2.

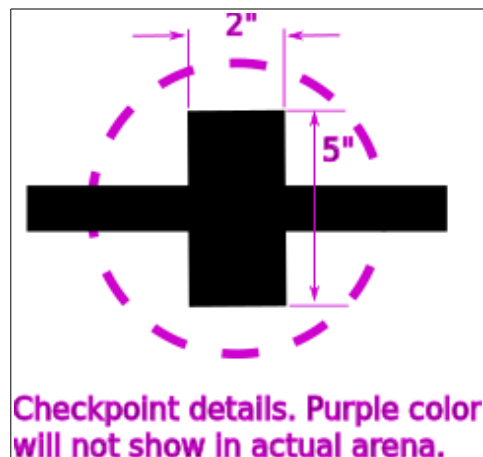


Figure 2: Check point dimensions

## The Robots:

### Size and Weight:

- The robot must fit in a box of 20 cm x 20 cm (5% tolerance). Teams will face points deductions or disqualification if the robot is larger.
- The height of the robot also must not exceed 20 cm.
- The robot must not exceed 1 Kg weight limit.

### Cost:

There is no limitation on the cost of the robot.

### Other Restrictions:

- The participants must build their own robots. Ready-made robots are not allowed. (simple DIY kits with only chassis, motors, and wheels are allowed).
- One robot must be used by only one team.
- Participants must not use items that can damage the arena e.g. Liquids, Fire, Sticky materials etc.

### Penalties:

- 10 marks will be deducted if the robot exceeds the dimensions by more than 5% but is within 10% of the maximum limits in any dimension.
- Team will be disqualified if the robot exceed by more than 10% of the maximum limits in any dimension.
- 10 marks will be deducted if the robot exceeds the weight limit by more than 5% but is within 10%.
- Team will be disqualified if the robot exceeds the weight limit by more than 10%.

### The Teams:

The contestants will register as teams. Each team will consist of a maximum of **3 members**. Each team will choose a name for registration and will designate one member as the team lead. All the official communication with the team will be through the team lead.

### Scoring system:

The teams will earn points for their robot's tries according to the following table. Score for the best try will be counted. The decision of the judges in recording the points will be deemed final and will not be contestable.

No	Task Description	Points
1.	Robot moving and sensing	10
2.	Successfully marking a check point (4 checkpoints)	10 x 4
3.	Successfully complete 1 <sup>st</sup> round of outer circle.	10
4.	Successfully detect and enter the correct turning point to the inner circle.	15
5.	Stop at the end point.	5
6.	Completion time bonus = $(30 - 0.25 * \text{seconds to complete track})$ Zero if robot takes more than 120 seconds	30
	<b>Total</b>	<b>110</b>

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