

# **ROBO TRACER**

**Open Category**

## **RULES & REGULATIONS**

**PETROSAINS RBTX CHALLENGE 2019**

# **Robo-Tracer Open Category Contest Rules & Regulations**

This category is open to ALL, with no age limit.

The challenge of the competition is to make a robot that can move on a given line (black on white). The robot which completes the task in the fastest time will be declared as the winner.

## **1.1. General Rules**

### **1.1.1. Rounds**

Every team will compete in two rounds.

One round should not last more than three minutes (labelled as RUNTIME).

If a robot has yet to reach the finish line once the RUNTIME is over, a BUZZER will sound and the team will be asked to remove the robot from the COMPETITION FIELD.

### **1.1.2. Race clock**

Once the robot moves from the START line, a timer will start to count the RACETIME.

As the robot reaches the finish line, the timer will stop and the final recorded RACETIME value will be saved.

### **1.1.3. Robot Control**

Once a robot has crossed the START line, it must remain fully autonomous, or it will be disqualified.

### **1.1.4. Competition Area**

A robot that moves out of the COMPETITION FIELD will be disqualified. A robot shall be deemed to have left the arena when any wheel, leg, or track has moved completely off the competition surface.

### **1.1.5. Losing the Line**

Any robot that loses the line course must reacquire the line at the point where it was lost, or at any earlier (e.g. already traversed) point.

## **2. Competition Field**

## **2.1. Field specifications**

- 2.1.1. Lines to be followed are 18mm to 20mm in width and are white in colour.
- 2.1.2. Expect all measurements and dimensions to have a 10% tolerance.
- 2.1.3. The organizing committee will make every possible attempt to ensure that there are no 'bumps' between the tiles although there may be slight deviations in height and width of up to 3mm. Competitors must be prepared to deal with these slight imperfections.
- 2.1.4. There will be one START line and one FINISH LINE.
- 2.1.5. The dimensions of the COMPETITION FIELD is 10 feet in length and 6 feet in width.
- 2.1.6. Characteristics of the line course are as follows:
  - i. There shall be no crossovers (e.g. places where the line crosses itself)
  - ii. Switchbacks and hairpins are possible, but the adjacent sections of the line shall be no closer together than 15cm when measured from the center of each line.
  - iii. The closest approach of the line course to the edges of the arena shall be no less than 15cm, measured from the centre of the line.
  - iv. The minimal curve radius is 7.5 cm.
  - v. Sharp angles may occur.

## **3. The Robots**

### **3.1. Dimensions**

Each team must comply with the following robot specifications:

Width – 150mm max

Length – 150mm max

Height – no limit

### **3.2. Control and Programming**

- 3.2.1. The robot must be controlled autonomously with no human aid.
- 3.2.2. The controller unit should be embedded in the robot and cannot be placed on the robot's exterior.

### **3.3. Sensors**

3.3.1. A maximum of five line sensors are allowed.

### **3.4. Power Source**

3.4.1. The robot must be powered by a power source such as a battery fixed on to the robot.

3.4.2. The robot cannot be powered by a stationary power source connected to the robot by a cord.

### **3.5. Construction**

Any robot kit or building material may be used, as long as the robot fits the above specifications.

## **4. Game Play**

### **4.1. Game Zone**

An area around the field will be designated as the GAME ZONE. No one is allowed inside the game zone except for the robot handlers and the referees.

### **4.3. Start and Restarts**

4.2.1. One team member is elected as the robot handler. Only that team member is permitted to handle the robot during the game.

4.2.2. The robot will be placed at the START line and checked by one of the referees.

4.2.3. A robot may restart the run as the handler deem necessary within the RUNTIME.

The restart can be requested only if the robot doesn't follow the line, has stopped halfway or has lost the directions.

4.2.4. At any restart, the robot must be positioned back at the START line.

4.2.5. Adjusting the sensor position on the robot is allowed during the allocated RUNTIME.

4.2.6. The RACETIME will be reset to zero during every restart. The RUNTIME will keep running during all restarts.

4.2.7. There is no limit for the number of restarts within the RUNTIME of three minutes.

4.2.8. A robot must restart if:

- The robot handler asks for a restart.

- The robot is touched by a contestant.
- The robot moves off the field.

### **4.3. Following the line**

- 4.3.1. For the purposes of determining if the ROBOT has left the line or left the tile, the referee will use the CONVEX HULL of the robot. This measure is done by stretching an imaginary rubber band around the extremities of the robot and using the enclosed space as a silhouette.
- 4.3.2. A team's robot must remain at the field until it has completed its game.

## **5. Scoring**

- 5.1. RACETIME is the time considered for tracing the route from START to FINISH. The time it does that will be recorded.
- 5.2. RACETIME is started automatically by the on-field optical sensors that detects the robot's movement and/or by the referee.
- 5.5 The team with the fastest average RACETIME of Round 1 and Round 2 will be the WINNER. If there are two teams or more with the same fastest average RACETIME, the team with the fastest RACETIME during Round 2 will be at a higher standing.

## **6. Code of Conduct**

### **6.1. Fair Play**

- 6.1.1. Robots that cause deliberate interference with other robots or damage to the field will be disqualified.
- 6.1.2. Contestants that cause deliberate interference with robots or damage to the field will be disqualified.
- 6.1.3. It is expected that the aim of all teams is to play a fair and clean game.

### **6.2. Behavior**

- 6.2.1. Contestants who misbehave may be asked to leave the competition area and risk being disqualified from the contest.

6.2.2. The rules will be enforced at the discretion of the referees, officials, and local law enforcement authorities.

## **7. Juries**

- 7.1. All decisions about scoring, gameplay and timing are made by the juries. Teams should completely respect their vote and decisions.
- 7.2. Juries may discuss and announce new rules or decisions pertaining to any issues that are not mentioned in the rules and regulations. Objections will not be entertained.

Revised and reviewed by:

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