TRACKER

Accuracy is as important as speed when it comes to line follower robots. Following a single line with a few curves and loops seems to be an easy job but not every robot stands up to the constraints that a single line imposes. The discipline of your automatons are set to be tested when they enter the tracker arena on 23rd- 25th January with hundreds of others that will race against time to bustle from “start” to “finish” in the minimum possible time. A perfect blend of speed and accuracy is the demand of the hour.

GENERAL RULES

• A team may have a maximum of 4 members. A team may comprise members from different schools or colleges.

• Higher secondary school students, students pursuing graduation, students pursuing post-graduation in or after 2018 are ONLY allowed to participate in this event.

• Please present your school or college ID card at the registration desk when registering to participate.

• No person shall be a member of two teams.

• No two teams should participate with the same robot for this event.

• Adopting unfair means will lead to disqualification of the team.

• The right spirit of participation is expected from every participant.

• The decision of the coordinators will be final and binding upon any participants.

• Any or all of the rules are subject to change at any point of time.

EVENT RULES

• All teams will be given a calibration and trial time of 10 minutes ONLY before their run.

• The robot is to follow a white line on a black surface or a black line on a white surface or maybe both, the width of the line being 3cm.

• The time of any run is measured from the time the robot starts moving from the point marked “START” until the time it crosses the point marked “FINISH”. A robot is deemed to have crossed the line when the forward most wheel, track-belt, or leg of the robot contacts or crosses over the line.

• Maximum time limit for the robot to complete the arena is **4 minutes**.

• Whenever a robot reaches a checkpoint (will be marked by a white or black line strip across the line of length **9cm**), it is supposed to indicate that with a suitable indicator (LED, Buzzer, etc.), clearly noticeable to the judges. The indicator should stay ON for at least a second. This indicator should be off all other times. Proper detection and indication of the checkpoints will give bonus of 40 points. “FINISH” point needs to be treated by the robot as a checkpoint too.

• The participants should clearly describe how their robot detects and indicates the check point. The coordinator needs to be notified about the position and the type of indicator beforehand.

• Each team is allowed only 1 run.

• A team can take a maximum of **2 TIMEOUTS** of 2 min each. The robot will start from the last checkpoint in case it takes a TIMEOUT. The teams can check the calibration and other physical parts of the robot at this time. But programming the robot is NOT ALLOWED. A penalty of 50 points will be imposed for each TIMEOUT taken.

• A team may take a maximum of **1 RESTART.** The robot will start again from the “START” point and the timer will be RESET. It will be considered as a NEW RUN. The teams can check the calibration and other physical parts of the robot at this

time. But programming the robot is NOT ALLOWED. But teams taking a RESTART will incur a penalty of 100 points.

• The robot NEEDS TO STOP at the “FINISH” point after the run is over

• The competition comprises multiple rounds. The rules and arena are subject to change in further rounds.

• In any circumstances, the decision of the coordinators will be final.

ROBOT SPECIFICATIONS

• The robot must be **completely autonomous**. It should not receive any help from humans during the course of its run.

• The robots should have the capability to **process data on-board**. No remotely kept computer should control the robots.

• No wireless communication device is allowed on the robot during run.

• The robot has to be developed and designed by the team itself. The usage of commercially available modules (sensors, development boards, etc.) is allowed, but it is forbidden to use a complete robotic system which is sold ready for the purpose of the competition (like LEGO kits).

• The size of the robot must not exceed **20cm *18cm * 18cm(L*B*H)**. Individual parameters to be measured with a tolerance of 10%. Robots must have passed inspection prior to competing.

• Robots must not damage the tournament area which may lead to disqualification of the team.

• The robot may use an external or on board power supply. The potential difference between any two points on the robot must not exceed **18 volts**.

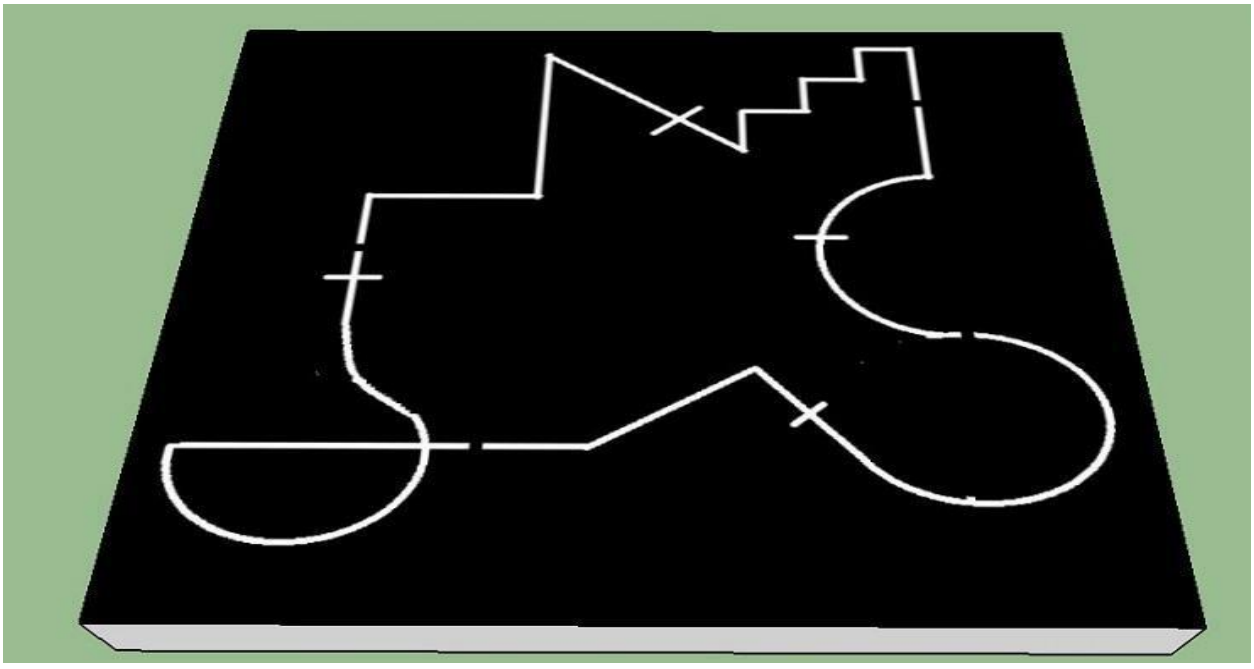
• Computers, programmers and software need to be arranged by the team themselves.

• In case of external power supplies, pulling wires to alter the movement of the robots WILL NOT BE TOLERATED at all and the responsible team will be DISQUALIFED.

Participants are advised to bring their own battery for the 3rd round. For further help you can watch the YouTube videos of previous year Tracker competition of **Innovación**.

SAMPLE ARENA

The arena contains a number of difficulties the participant is likely to face in real tracks.



SCORING

Solving each problem will provide with a certain amount of points that the problem contains.

ROUND 1:

• The time taken by the robot to finish the run will be recorded in seconds.

• The track will be a circuit. The robot needs to finish **2** laps of the circuit.

• A penalty of **50** points is given for each TIMEOUT, and a penalty of **100** points is given for a RESTART.

• The robot needs to properly indicate the checkpoints using LEDs, buzzers etc. Proper detection of the checkpoints will give a bonus of **40** points for each correct detection.

• A penalty of **25** points is given for each HAND TOUCH, the robot has to resume from the position of hand touch.

• Maximum numbers of TIMEOUT, RESTART and HAND TOUCH in this round are **2, 1 and 5** respectively.

• The robot needs to stop for at least **10** seconds at the STOP. A bonus of **50** points will be awarded for it.

• SCORE = 1000 + 40 * [Number of checkpoints correctly detected] - 50 *[Number of TIMEOUTS] - [100 points if a RESTART is taken] -25*[Number of HAND TOUCHES] + [50 points if STOP is detected] - 4 * [Time taken in seconds]

ROUND 2:

• The time taken by the robot to finish the run will be recorded in seconds.

• The robot needs to properly indicate the checkpoints using LEDs, buzzers etc. Proper detection of the checkpoints will give a bonus of **40** points for each correct detection.

• A penalty of **50** points is given for each TIMEOUT, and a penalty of **100** points is given for a RESTART.

• A penalty of **25** points is given for each HAND TOUCH, the robot has to resume from the position of hand touch.

• Maximum numbers of TIMEOUT, RESTART and HAND TOUCH in this round are **2, 1 and 5** respectively.

• The robot needs to stop for at least **10** second at the STOP. A bonus of **50** points will be awarded for it.

• SCORE = 1000 + 40 * [Number of checkpoints correctly detected] - 50 *[Number of TIMEOUTS] - [100 points if a RESTART is taken] -25*[Number of HAND TOUCHES] + [50 points if STOP is detected]- 4 * [Time taken in seconds]

ROUND 3:

• This will be a race between two bots.

• No TIMEOUT and RESTART are allowed in this round.

• There is no limit of HAND TOUCH in this round. Each of them will impose a penalty of 5 seconds.

• The participants of the race will be picked randomly. We will be transparent about the selection so there is no question of partiality.

• The participants will race in a round robin format. The loser is eliminated while the winner progress to the next round. Ultimately the final winner will be crowned champion.

• In this round, it is recommended that participants use on board power supply.

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