



TESLA CHALLENGE

Problem Statement:

Design and build an autonomous robot smart enough to follow lanes and avoiding obstacles. The robot that arrives at its destination in the least amount of time by following the lane is declared the winner.

Robot Specifications:

1. Size:

- At its largest (all retractable projections included), the robot should fit into a box of 25cm x 25cm (L X B) and weighing no more than 4 kg.
- There are no height restrictions for the robot.
- After the match begins, a robot must not expand in size, must not physically separate into pieces, and must remain as a single centralized robot. During the match, the robot's feet must not expand. Robots that violate these rules will be disqualified.
- During the caging session, robot measurements will be taken.

2. Control:

- The robot must be entirely autonomous. There is no external control or involvement permitted.

3. Design:

- Usage of readymade parts like LEGO kits is strictly prohibited.
- Only electrically powered actuators are allowed.



- The power supply must be built-in. A maximum voltage of 12V DC is permissible.
- Jamming devices, such as infrared LEDs designed to affect the opponent's IR sensors, are not permitted.
- Parts that may break or damage the arena are not permitted.
- No team formation is allowed.

Important:

- ❖ The robot must adhere to the above-mentioned specifications, no tolerance is permitted.
- ❖ Students are not permitted to make adjustments to the robot once it has been caged. If so, they are considered as disqualified.
- ❖ No participant will be given a second opportunity.

Calibration:

- Each participant will be given two minutes of calibration time at the start of the race.

Rules:

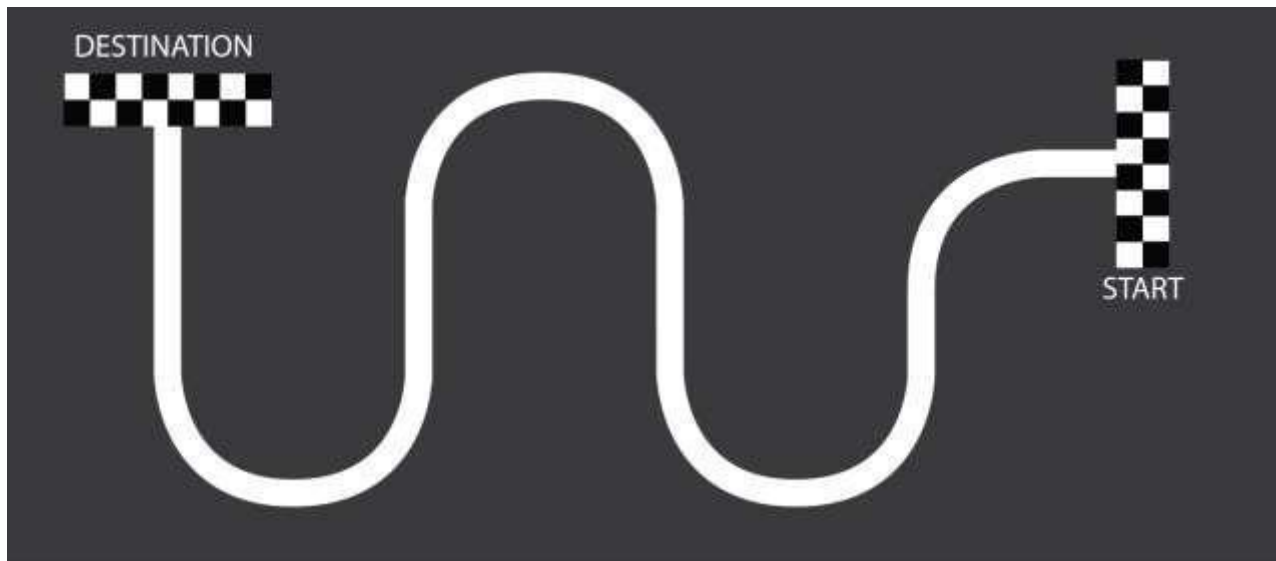
- Robots shall be inspected and caged during the caging session.
 - The robot should follow the path without distracting.
 - The robot should not collide with any obstacles in its path. After it senses an obstacle, it should stop and only move again when the obstacle is gone.
-



- If the robot collides with an obstacle or fails to follow the line correctly, it will be disqualified.
- Both the game and the stopwatch begin as soon as the whistle is blown. A fair Recorded Time begins when the whistle is blown.
- Any robot movement prior to the whistle will be considered a False Start.
- All robots shall receive only one False Start warning; subsequent False Starts will imply that the robot has lost.
- Winning is determined by the best time for each robot to complete the lane as well as the points earned during the game.
- During the competition, if the robot does not demonstrate any positive action to start or complete the lane (e.g., getting crashed or running out of track for no apparent reason), the judges may ask the robot to retire.
- Once the robot has begun its race in the lane, the robot handler cannot access the robot until it has crossed the Finishing Line or the robot has completely exited the track.
- Modification of robot during competition is strictly prohibited. No extra parts are to be added to or removed from the robot once the competition time starts.
- The maximum allowable runtime is 5 minutes; if the robot runs longer than that, it is not considered for final evaluation.
- All robots should be returned to the caging area after its run.
- The participants are not allowed to take back their robots before the whole competition is concluded.
- Any breach of the above regulations will result in disqualification.
- Student should use same type of battery throughout the event. They are not allowed to change the battery type. For eg: From NiMh to LiPo/LiPo to NiMh.
- The decision of the judge will be final. Any type of disagreement in front of the judges will result in disqualification.



Gameplay and Arena Specifications:



- Arena will contain a black road on white background or white line in the black background (thickness of 2 cm).
- The participant will be given 2minutes to calibrate the robot at the start.
- The robot will have to trace the black line on white background or white line in the black background and reach the final destination.
- There will be moving obstacles. The robot should ensure that it detects the obstacles in front and stops before hitting them. Specifications of the obstacles:
 - LxBxH - 3cmx3cmx15cm
 - Colour - Different colours except black





- After a while, the moving object will shift away, and the robot may resume its path.
- The above two - Lane following and pedestrian detection are compulsory
- Scoring Pattern:
 - Scoring will take place ONLY if the time taken to finish the path WITHOUT hitting any obstacles is less than 5 minutes.
 - Score = 300 - Time taken in seconds
 - Points for not hitting the obstacles- 150
 - 50 points will be reduced for the participant upon every hit on obstacles.
 - The Maker with the highest score will be the winner.