Line Follower

Event Description:

The objective of this competition is for an autonomous robot to follow a black line on a white background, without losing the line, and navigating several right angle turns, obtuse angled turns and curves. The robot to complete the course in the shortest period of time while accurately tracking the course line from start to finish wins.

Rules:

- **Team members:**   Three
- **Length of Event:**   4 minutes (Maximum)
- The robot must be self-fabricated and must adhere to the specifications mentioned here. The teams that don't comply with these specifications will be disqualified.
- **Maximum weight of the robot:**   1000g
- **Robot Dimensions:**   W:30cm x L:25cm x H:12cm
- The robot must be controlled autonomously with no human aid. The controller unit should be embedded in the robot and cannot be placed outside the robot. The robot must be started manually with a start button. The button will be pressed by a judge.
- The robot must be powered by a battery fixed on the robot. The Robot cannot be powered by a stationary power source connected to the robot by a cord. The potential difference across any two points on the robot must not exceed 12V.

Field specification:

The track will be printed on a vinyl sheet with BLACK lines in a white background. The thickness of the black line will be 2cm with tolerance of ±10%. The organizing committee will make every possible attempt to ensure that there is no variation in the intensity of BLACK colour throughout the track, although slight deviations might

be present. The competitors must be prepared to deal with these slight imperfections. The shapes that can be present in the track are depicted below:

The robot will start with 90% of the robot behind the START line. The START line will be 30cm wide. The finish block will be a 30cm square. The robot must come to halt within the FINISH block and stay there for at least 5 seconds before it is removed from the track.

Characteristics of the track:

- There shall be no crossovers (e.g. places where the line crosses itself)
- Adjacent sections of the line shall be no closer together than 20cm when measured from the centre of each line.
- The closest approach of the track to the edges of the arena shall be no less than 15cm, measured from the centre of the line.
- The minimal curve radius will be 7.5 cm.
- Sharp angles may occur, but will not be smaller than 90°

Game Play:

On the day of the competition each team has PREPARATION TIME which is 30 minutes. All the preparation should be done during this time (adjusting the sensors, reprogramming the robot…etc).

Start and Restarts:

- One team member is elected as the robot handler. Only that team member is permitted to handle the robot during the game.
- All other team members must remain outside the game zone.
- The robot will be placed at the START tile and checked by one of the referees.
- A robot may restart the run as the handlers deem necessary with the timer still running. The restart can be requested only if the robot doesn't follow the line, has stopped on half way or has lost the directions.
- At any restart, the robot must be positioned back at the point where the robot left the line. The location will be announced the referee in case a restart is requested.
- It is not allowed to reprogram the robot or to add/remove parts except batteries on the robot during the trial but it is allowed to adjust the sensors.

Judging Criteria:

- Race time is the time considered for tracing the route from START to FINISH. The robot with the least race time is considered to be the winner.
- The robot violating any of the rules described above will be disqualified from the competition or forced to restart the robot from the START line. Any kind of touch by a human which affects the robot direction or speed will cause a fault state and force the team to restart from the START line.

All decisions about scoring, game play and timing are made by the referees. Teams should completely respect their vote and decisions. Their decision will be binding and final.

Sample Track:

Resources:

http://www.engineersgarage.com/contribution/line-follower-robot?page=1

https://diyhacking.com/make-line-follower-robot/

http://www.instructables.com/id/Robot-Line-Follower/

http://www.instructables.com/id/Line-Follower-Robot/

http://playwithrobots.com/simple-line-follower-robot/

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