University of Pittsburgh Line Follower Competition

Rules and Regulations

1. Summary
   - 1.1. The objective of this contest is for a robot to follow a black line on a white background, without losing the line. The robot that completes the course in the shortest period of time while accurately tracking the course line from start to finish wins. Each competing team will be allowed three attempts to run the course as quickly as possible. Only the fastest run by each robot will be used to determine the winner.

2. Robot
   - 2.1. The robot must fit within a 10in. x 10in. x 10in. bounding box when placed on the starting line.
   - 2.2. The robot must be self impelled and self controlled (autonomous) with the exception of a system to begin the operation of the robot.
     - 2.2.1. The contestant may start the robot by any means, as long as they do not impart energy into the robot while doing so.
   - 2.3. The robot can be made of any material, and can utilize any sort of processor, electronic sensor, or battery. The robot may not utilize any form of combustion, and must be designed for all components to remain attached to the robot for the duration of the competition.
   - 2.4. A robot must not emit smoke, leak oil, disperse powder, or destroy the course in any way.
   - 2.5. The robot must have no user inputted information about the maze before the first timed run, but may remember information gathered during successive timed runs.
   - 2.6. Each robot will be inspected prior to competition. During inspection, a judge could require the team to modify the robot if it does not fall within the required dimensions or if they feel it is unsafe. This is up to the judge's discretion; failure to comply could lead to disqualification.

3. Course
    3.1. The course will be a closed loop printed on a 48inch x 96inch sheet of paper.
        3.1.1. The starting and finishing gates will be spaced 12 inches apart along a straight section of the line.
            3.1.1.1. The opening of the starting and finishing gates will be 12 inches.
        3.1.2. The line will be black, printed on white paper.
        3.1.3. The line will be a constant width of 1/2 inch.
        3.1.4. The line will not intersect or overlap itself.
        3.1.5. No two segments of line will be closer than 4.5 inches.
        3.1.6. No portion of the line will be closer than 6 inches from the edge of the course.
    3.2. Overhead fluorescent lighting will be used in the competition room.
    3.3. No flash photography will be allowed during timed runs.

4. Competition Format
    4.1. There will be three rounds, in which each robot will have the opportunity to perform a timed run.
        4.1.1. Each robot will only get one timed run per round.
        4.1.2. If the robot crosses the starting line under its own power then it will be considered to have started its run.
        4.1.3. There will be a minimum of 10 minutes between rounds in which teams may make modifications to their robots.
            4.1.3.1. Contestants may not input maze information or perform practice runs during this time.
            4.1.3.2. Sensor calibration may be performed.
        4.1.4. The order of the timed runs will be randomly drawn at the start of each round.
        4.1.5. Contestants may choose to skip a timed run if they are not prepared during their time slot.
        4.1.6. Practice runs will not be allowed after the first round has started.
    4.2. At the start of a timed run, the robot must be placed on the line somewhere after the finishing gate and before the starting gate.
        4.2.1. The contestant may calibrate the line sensors of their robot before starting their run.
    4.3. The winner of the competition will be the robot that completes the course the fastest.
        4.3.1. Only the fastest of the three runs will be considered when choosing a winner.

4.4. In the case of a tie, the tied competitors will compete in a fourth tie breaker round in which they will run the course once in reverse to determine the winner.

4.4.1. The previous three run times will not be considered during a tie breaker.

4.4.2. A tie for second or third will still result the competitors competing in a fourth round, but their times cannot be used to raise their standing higher than second or third, respectively.

5. Timing

5.1. Timing will be performed electronically.

5.2. The timer will start when the robot first breaks the plane of the starting gate, and will stop when it breaks the plane of the finishing gate.

5.3. A run is considered successful if the robot starts stationary within the finishing and starting gates, follows the line throughout the course without losing it, and then breaks the plane of the finishing gate in the correct direction.

5.3.1. If the robot loses the line, that run will be disqualified.

5.3.1.1. The robot will be considered to have lost the line if no part of the robot is not on top of the line, and does not return to the line within 3 inches of where it left the line.

5.3.1.2. Losing the line and returning to the line in an already traversed location will not count as losing the line.

5.3.2. If the contestant touches the robot after it crosses the starting line, that run will be disqualified.

5.3.3. If the robot crosses the starting or finishing gates in the wrong direction, that run will be disqualified.

5.3.4. If the robot does not cross the line within 3 minutes of crossing the starting line, that run will be disqualified.

5.3.5. If the contestant touches their robot after it crosses the starting line but before it crosses the finishing line, that run will be disqualified.

5.3.6. If the contestant does not start their run within 1 minute of being called, that run will be disqualified.

6. Teams
    6.1. Organizations may bring multiple teams consisting of any number of members.
    6.2. Teams may enter multiple robots in the competitions, but the robots must compete independently.
        6.2.1. The order of timed runs will be linked to specific robots, not teams in general. If a robot is called to perform a timed run, it must be the robot that competes.
        6.2.2. Times will be linked to specific robots, not teams in general. If a robot is part of a tie, it must be the one to compete in the tie breaker round.

7. Power of Officials
    7.1. Failure to follow competition rules, both blatant and accidental, may be grounds to disqualify a team from a timed round or the competition as a whole.
    7.2. The judgement of any gray area not explicitly defined in these rules is left to the discretion of the officials.
    7.3. The decisions of all officials regarding these rules and the conduct of the event shall be final.
    7.4. Questions regarding clarification of these rules may be directed to: ras@pitt.edu