Laboratory Project 03: Autonomous Line and Wall Following Robot

Description

Design and implement an autonomous robot which can traverse through a given path by detecting the environment using sensors. The robot must be designed and optimized to complete the task in a minimum amount of time.

Arena Specifications

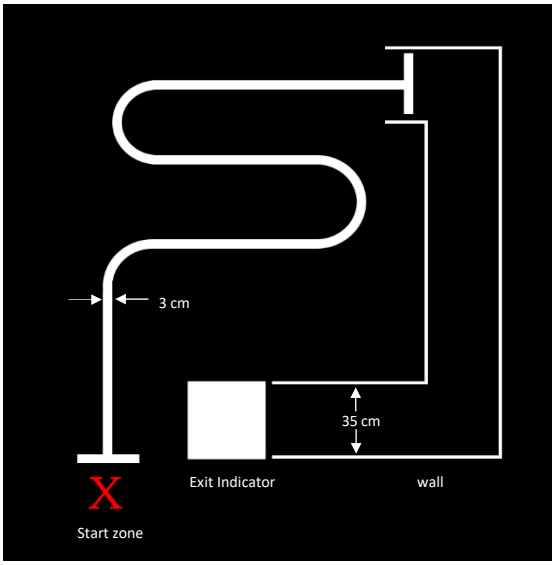

Figure 1: Arena

1. Building the arena is the responsibility of the contestants. (The sooner you have the arena, the sooner you can start preparing for the game). Refer Figure 1 for the proposed arena.
2. **Start zone:** Marked with a red "X" in Figure 1. The robot always starts from this location
3. **Line following zone:** Each line segment should have a width of 3cm. Note that, the line following part of the **arena will not contain 90^0 turns**. (There will be curved lines instead).
4. **Wall following zone:** Inner width between two walls is approximately 35cm. The wall will be made by white color wall segments of length 35 cm and height 10 cm. Wall segments are not fixed to the arena. It should be possible to change the traversing path by rearranging the wall segments.
5. **Exit Indicator:** A white square with 35 x 35 cm^2.

Robot specifications

1. Only one robot is allowed per one team. The robot cannot separate during operation.
2. Maximum dimensions of the robot are 20 x 20 x 20 cm^3.

3. The robot must be battery powered. External power sources and cables are not allowed.
4. The robot must be completely autonomous. Manual interventions are not allowed.
5. The robot must not harm the arena during operation.

Design rules

1. Teams have the autonomy to select off the shelf structures or self-designed structures.
2. Arduino or any electronic development boards will not be allowed. However, teams are free to use any microcontroller (PIC, ATMEL) in making the robot.
3. Arduino IDE is not allowed for programming.
4. All PCBs should be designed and manufactured by members of each team. (Off the shelf motor control boards, line following sensor panels are not allowed)
5. Teams are allowed to use any type of proximity sensors, motors.

Supervisor meetings

1. For any issues with the specifications contact the project supervisor.
2. Bi-weekly meetings will be held for each group according to a timetable (distributed later). All team members must attend all meetings during the timeslot.

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