LINE FOLLOWER PROBLEM STATEMENT

**Objective**

Build an autonomous robot which traverses a given track in the least possible time. The "track" is simply a line which the robot has to follow from the start to the finishing point.

**Arena Specifications**

The track will be a white line on a black surface, and will be 30 ± 2mm \* in width.

The track may consist of:

1. Straight Sections

2. Curves with a minimum 400 mm radius of curvature

3. Abrupt turns and bends not exceeding 90 degrees from the straight

4. Discontinuities not exceeding 50 mm in length

5. The track may also cross over itself at points. At such points the robot is expected to move only in forward direction.

The robot must deal with the ambient lighting conditions of a room; it will be set "as is" and won't be modified for individual contestants. However, care will be taken to avoid direct sunlight interference with the track region.

The checkpoints would be located on right side (in the direction of motion of robot) of the Arena.

Separate trial tracks for testing and calibration will be made available before the final competition (26th January).

**Robot Specifications**

The robot base must fit within a rectangle of length 300mm and breadth 250mm at all points of time during a round.

There are no constraints on robot height or weight.

The robot must be powered by an on-board power source.

The potential difference between any two points of the robot must not exceed 12V at any time.

The robot must be completely autonomous. Wired or wireless links to off-board systems are not allowed.

Lego or similar ready-made kits are not allowed to build the robot.

**Important Dates**

**Sessions on PID:** 19th January and 21st January, 2016; 9pm-10pm

**Debugging Sessions:** 23rd and 24th January, 2016

**Track for trial run and debugging session:** 25th January, 2016

**Competition**: 26th January, 2016

**Game Rules**

Each robot shall be allowed 3 rounds and best time will be considered.

Each team would be given a calibration time of 3min before the run.

In each round, the robot shall be said to 'follow' the line only if its vertical projection on the track (i.e. the robot base) is always directly above some part of the line at all times(Maximum deviation of 100 would be allowed).

If the robot goes out of the path at any point of time, 10 seconds will be given to the bot to return to the track. If the bot does not return within this duration, the team can restart from the last check point or any of the subsequent checkpoints. A maximum of three restarts per run are allowed. The timer won’t stop during restart.

Flash photography and IR focusing cameras will not be allowed in the competition area.

Participants are not allowed to keep anything inside the arena other than the machine

**General Rules**

Teams of maximum 4 are allowed.

The final team score shall be taken as the best of the three rounds.

The time measured by the organizers will be final and will be used for scoring the teams. Time measured by any participant by any other means is not acceptable for scoring.

The organizers reserve the rights to change any or all of the above rules as they deem fit.

In case of any disputes/discrepancies, the organizers' decision will be final and binding.

**Scoring Rules and Prizes \***

The score will be determined as follows:

1. The points received on completion of track would be (240–T) + C where T is in seconds (T: Time taken to complete the track from starting point to ending point without going out of the track at any instant of time), C is the points recieved to cross checkpoints. Needless to say if you do not finish all checkpoints then T = 240.
2. Bonus 50 points will be given to the teams who clear on-the-spot surprise element.
3. Two separate challenges which won’t be a part of main competition will be revealed on the day of competition and will be open only on 26th January.

All the teams who finish these will be given prizes! :D

The bot can also be made on Arduino , however the teams using AVR will have more advantage because of the increasing difficulty in making the bot.

Prizes

T.B.A later on the Electronics Club FB Page

**Arena**

All dimensions are in millimetres.

There are 4 checkpoints in all.

CP1 : At the end of the first straight segment

CP2 : At the end of the spiral

CP3 : At the start of the T-intersection

CP4 : At the end of the T-intersection

