

ESONANCE 2018

EEE, IUT

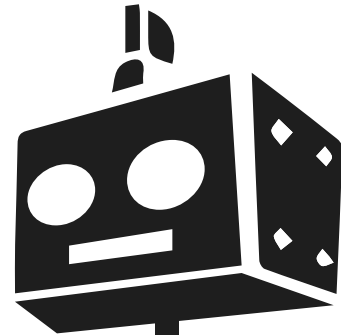
A yellow graphic of a circuit board with several lines and circular components, positioned to the right of the text.

RESONANCE OF ENGINEERING INNOVATION

**PROUD
ORGANIZER**

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING
ISLAMIC UNIVERSITY OF TECHNOLOGY





RoBoMANIA

U5.0

PAYMENT PROCEDURE

DATE: OCTOBER 19, 2018

VENUE: ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)

Task:

The participating team needs to design one autonomous line follower robot for this competition.

- Autonomous line follower: The autonomous robot has to follow a Black line on white surface in line follower arena through various conditions (such as: round loops, sharp turns like 900, 600, 450, 1200, 1350, line gaps, bridge, tunnels, etc.).

There will be 2 stages in this competition, each of an increasing level of complexity.

- Qualifying Stage
- Final Stage

- Top 10 teams in qualifying stage will be eligible for Final stage.*
- Top 3 teams will be awarded as Champion, 1st runners up, 2nd runners up.
- A maximum of 4 minutes in the qualifying stage and 5 minutes in the final stage will be allotted for each participating team.

**No. of eligible team in this stage will be decided on the competition day based on the number of participant team.*

- The competition is open to all the students of school, college and undergraduate students of all universities.

Arena Specification:

1. The game field consists of an arena having dimensions **26feet X 20feet** (rectangular shape).
 2. Autonomous Arena: It is Black line on white surface.
 3. Autonomous Start/Finish Zone: Black square with dimensions 30cmX30cm. The autonomous bot must start from and finish the game at this zone.
 4. Autonomous Track: 3cm Black line on white surface (width 30cm). Line may include various patterns like circle, triangle, square, zigzag, sharp turns like 900, 600, 450, 1200, 1350, line gaps.
- **Inclined Bridge:** The autonomous bot will have to climb up the inclined bridge following the line. On the bridge, the line will be present and the bot has to move forward following that line and complete the bridge.
 - **Curved Subway (Underpass):** A semicircular underpass, autonomous bot has to cross it following the lines.
 - **Object:** A small and light object will be placed on the track. The bot can either push or grab and place the object on the hollow region few centimeters ahead, which will complete the track.
 - **Tunnel:** A transparent curved tunnel will be placed on the track. Inside the tunnel the lines will be missing and the bot has to move forward based on the walls of the tunnel. *(Tunnel will be present in the final stage only.)

- Line gaps: It will be anywhere in the track. To be published on competition day.

Note:

- The dimensions of the arena will be accurate to within 5% or 20 mm, whichever is less.

Autonomous Robot Specification (Line Follower):

Design Rules: Robot must be a ground wheeled autonomous vehicle. The line follower bot must be completely autonomous with just one switch to start/reset it. Bot must be started individually by only one onboard switch. However, a team may have separate onboard switches for restart. These switches have to be shown before the run to the organizers.

Maximum no. of switches allowed is 4 in total.

- **Length:** Maximum length is 30 cm.
- **Width:** Maximum width is 20 cm.
- **Height:** Not to exceed 20 cm.
- **Weight:** 5 kg maximum.
- **Power:** Maximum 24 volts on-board power supply.

Each team has to bring its own power supply for robot. No additional equipment/parts will be supplied in the competition.

The robot may be:

- Built from scratch by the participants (recommended).
- Built from readymade chassis (but no construction set such as LEGO or Meccano or any other Brand is allowed). Teams who use readymade chassis will get a penalty (details will be given later).
- No wired/wireless communication between the operator and the line follower is allowed.
- Any sort of stimulus from outside by the participants to their bot will not be allowed.
- If any of the above mentioned circumstance is found the team will be disqualified immediately.

Gameplay:

- 1) The autonomous bot starts from the start zone (at a time or on their own) and finish at the same zone after completing the track.
- 2) The autonomous bot will follow the line track with various patterns. If there is multiple path to cross a section bot can take any path to follow.
- 3) While following the line the autonomous bot will face inclined bridge, curved subway, tunnel, object and the hollow region where the object must be placed.
- 4) The autonomous bot is not allowed to bypass any checkpoint. But if team wants it can bypass any portion of the track from checkpoint to checkpoint, which will give them penalty specified for that portion and a restart penalty.
- 5) The autonomous bot must not receive any input from anywhere outside the arena.

Judgement:

BOT	CRITERIA	POINT
AUTONOMOUS BOT	LEAVING THE STARTING ZONE	10
	PER CHECKPOINT	50
	PASSING THE TUNNEL	20
	STOP AT ENDING ZONE	10

1. Penalty:

For autonomous bot:

Criteria 1,2 has no penalty.

Bypassing any checkpoint will result in deduction of 50 points.

Bypassing the tunnel will result in deduction of 20 points

2.Restart:

In case of a restart the robot must be picked up and rerun from the last checkpoint it successfully crossed. Every restart will result in deduction of 20 points. No. of maximum restarts allowed for each bot is 5.

3. Line Loss:

For autonomous bot:

The arena is green and the track is a white on black or also black on white (30cm in which 3cm is the line to follow). In case a robot enters (major portion of the bot is out of track) the green zone, it will be considered as a line loss. Consequently a restart is to be taken. In this case, the timer will remain running during restart.

Final score:

Let S = Total Score

A = Total points earned by autonomous bot

$T = t$ - total time taken to complete the run [$t=240$ in qualifying stage and $t=300$ in final stage]

P = Total penalty incurred

Therefore, $S = A + T + P$

Note: T will be considered only if a team completes all the tasks (may include bypasses and restarts) within the stipulated period of 240 seconds in qualifying stage or 300 seconds in final stage. Otherwise $T=0$.

- If any team is not able to pass through all the checkpoints the team will get $T=0$.

For example:

If autonomous bot skips a checkpoint then it will not get marks for that check point and will get restart penalty along with $T=0$.

Team with the highest value of S, ranks first.

Robomania authority holds the right to update any given information stated above if required, and will inform the participants before the competition starts. Final decision about the maximum time, allocated point and location of the checkpoints will be revealed on the day of the competition.

Ratifications of Robots

- Each participating robot has to be submitted to the tests of ratification.
- The tests of ratification consist in verifying that the dimensions of the robot correspond to the technical specifications and the other specifications mentioned in "Robot Specification".
- Any of the robots not satisfying the tests of ratification will be excluded from the competition.
- The ratification will be realized on the day of the competition.
- Team leader should present the robot to the homologation desk.

Competition Rules

- Team must place the robot in their respective position and make ready for run within 3 minutes after calling them to come to the arena. Otherwise team will be disqualified.
- Only two team members may enter the arena during the run.
- The autonomous bot will be placed at a pre-assigned starting point and may be started by hand when directed by the judge.
- Once the line follower robot starts its run it cannot be touched. If it is picked up or touched, it will be considered as a restart.
- A restart can be taken by the team if the robot takes a wrong turn or seems to lose the line. But they have to inform/declare the organizers prior to taking the restart.
- Time will be measured by an electronic gate system or by a judge with a stopwatch, based on the availability of equipment. In either case the recorded time will be final.
- The judges can ask for an explanation of any mechanism on the robot and there would be an immediate disqualification of defaulters of any kind.
- Any damage of the track by the autonomous bot will lead to disqualification of that bot for further run.

General rules:

Each team can have a minimum of 3 and maximum of 6 participants. Team members may be from same or different institutions. The team members must submit the copy of their institutional ID card attested by the respective departmental Head/Chairman.

- Each team will be recognized by its registered team name and registered team leader.
- The winning team will be declared based on its points.
- Judges' decision will be final. So no objections shall be declared against the judges' decisions.
- 1 team member can be within the arena for restart of the robot or getting the robot in line.
- The team leader can present objections to the Committee, before the race is over, if there are any doubts.
- During the competitions, only the team leader is authorized to present the robot and to contact committee members for any claim or specific need.

The following comportments could lead a team to be disqualified:

- Evidence of disrespect to other teams and competitors.
- Evidence of disrespect to security rules.
- Evidence of disrespect to competition judges.
- Competition judges are not part of the competition committee; they are assisted by the competition Committee members, but remains completely independent for their decisions.
- A team should agree all the above rules and present a written agreement to the homologation desk.
- The competition Committee reserve the right to change the rules as they deem fit.
- Competition rules may change anytime which will be pre-notified through internet and will be applicable to all teams.

Flexibility of Rules

- As long as the concept and fundamentals of the rules are observed, these rules shall be flexible enough to encompass the changes in the number of players and of the contents of matches.
- Modifications or abolition of the rules can be made by the competition committee at any time, and the committee has full right to change the rules however contestants would be informed when any rules are updated.

Liability

- Participating teams are always responsible for the safety of their robots and are liable for any accidents caused by their team members or their robots.
- The "ESONANCE" organization and the organizing team members will never be held responsible nor liable for any incidents and / or accidents caused by participating teams or their equipment.