



SLIIT

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Annual SLIIT
Robot Competition
School Competition - Technical Specification

Organized By

Department of Electrical and Computer Engineering
Sri Lanka Institute of Information Technology

ROBOFEST 2018

The Department of Electrical and Computer Engineering of Sri Lanka Institute of Information Technology is holding its 9th annual robotic festival, **ROBOFEST 2018**.

ROBOFEST 2018 is open to students from schools and universities. Participants will be given a chance to participate in the competition by combining the practical application of science and technology with the fun, intense energy and excitement of a championship-sporting event.

Venue: Sri Lanka Institute of Information Technology, Malabe Campus

Date: 06th to 7th September 2018

This year the competition will be organized in three categories:

1. University Competition
2. School Competition
3. Open Competition

School Level Awards

Gold Award - **Rs. 60,000**

Silver award - **Rs. 40,000**

Bronze award - **Rs. 25,000**

7 complementary prizes will be awarded.

Robot Development

School Competition

ROBOFEST 2018 will include a School competition, open to students from schools island-wide. Participants should design and implement a mobile robot capable of navigating along a line maze solving, color detection, payload loading and payload unloading. In this competition the robot who complete the task with the maximum amount of points in the least amount of time will be the winner, being awarded with Gold and the next two robots with Silver and Bronze respectively.

1.0 Robot Specifications

1. The robot must conform to the **maximum dimensions of 15cm wide x 20cm long**, including all accessories. There is **no height restriction**.
2. Robot must be **self-navigating**, with no potential for remote control.
3. The robot must be wheeled.
4. The robot must be designed and built by the competitors alone. No off-the-shelf kits are allowed, except the following:
 - I. Drive gear (wheels, gear box. motor)
 - II. Sensor module (IR, Sonar, etc.)
 - III. Processing Development Boards
5. The robot's power supply must be internal (**no external power is allowed**), and the voltage at any given point of the **robot cannot exceed 40V** at any time.
6. The robot must include a **start switch** that will be activated at the start of the contest. After the robot is switched on, no human interaction with the robot will be allowed until the end of the round.
7. The robot must be able to detect and follow lines along the ground.
8. The robot maybe decorated in any way the team sees fit, as long as the maximum dimensions are not exceeded.
9. The robot should work under any ambient lighting conditions available in the play field.

2.1 Section 1 – line following and maze solving

1. The surface of this section of the playing field will be white (mat) in colour.
2. The robot will have to start navigation from the “**start square (Start)**” and continue to navigate through section 1, following a **3cm wide black line** to end of section 1.
3. The starting block will be a **25cm x 25cm black square**.
4. This section Includes **90° angles, Dead ends** and “**T**” junctions.
5. Some of the possible geometrical characteristics of the path are illustrated in **Figure 2** and they will be appear in the section 1

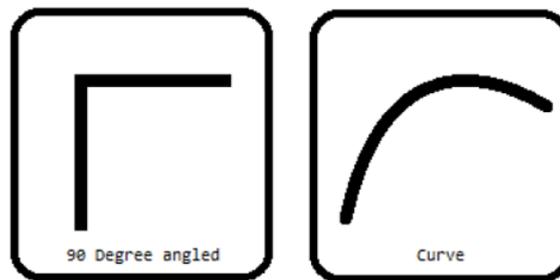


Figure 2: Possible geometric characteristic of the line may appear in the section 1

6. Starting point can be any side of the board.
7. **Figure 3** will give you the **dimension of the section 1**

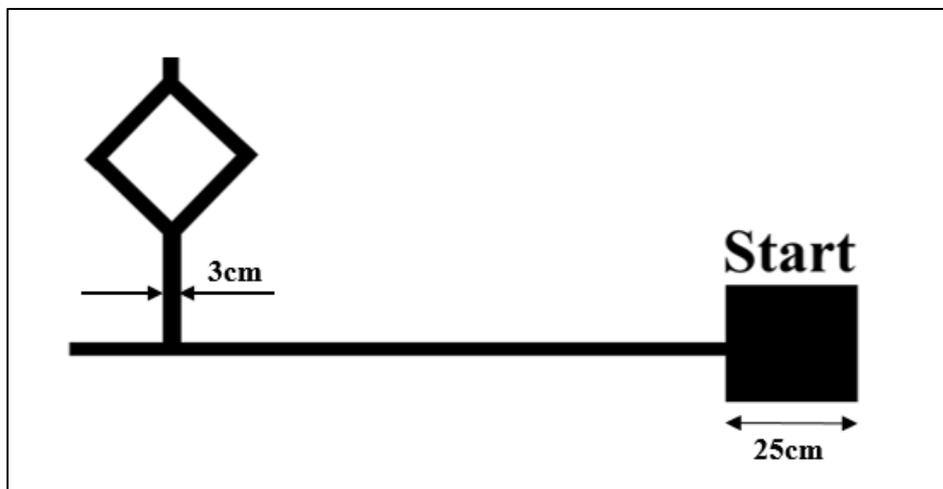


Figure 3: Section 1

8. Participants can use any **Algorithmic Technique** to solve the line maze.
9. Robot should always follow the line.
10. Line orientation can be deviated from the figures shown in the technical specification sheet.

2.2 Section 2– Payload Detection and Payload loading

1. Section 2 consists with a straight line where coloured payload is placed on the line. **Red box with the letter “B”** in the **Figure 4** illustrate the position of the payload.

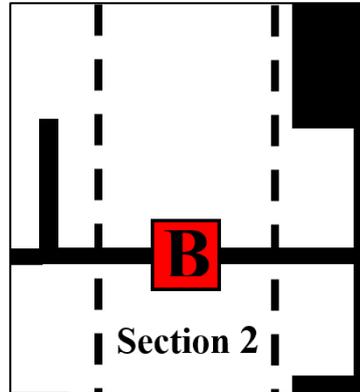


Figure 4: Position of the payload

2. Robot should always follow the line
3. Payload Information
 - Dimensions: approximately 6 cm × 6 cm × 6 cm.
 - Weight: Less than or equal to 100 grams.
 - Colour: The robot should be able to differentiate between colours Red, Green and Blue.

There will be a significant difference between the three colours of the given boxes and the exact intensities will not be specified.

4. Payload cannot be dragged through the platform and payload cannot be damaged in any way.
5. If robot drops the payload while carrying it, robot can complete the task but marks for carrying the payload will be deducted. However, if the robot picks up the payload again, marks for carrying will be awarded but a penalty will be deducted.
6. Marks allocated for unloading the payload will not be awarded in the following cases:
 - No payload to be unloaded.
 - Unloading the payload at a wrong place (outside the unloading square or in a wrong unloading square).
 - Robot has the payload but doesn't unload it in the section 3.

2.3 Section 3– Payload unloading

1. Robot should identify the payload colour. There will be 3 separate arenas to unload the payload which will depend on the colour of the payload. For example if the payload's colour is green it has to be unloaded to area which is labelled with a green square.
2. Unloading square will be marked using colour square as the **Figure 5** shows. These unloading locations are fixed throughout the competition. From the centre point “*O*” to the three unloading points the distance will be same.

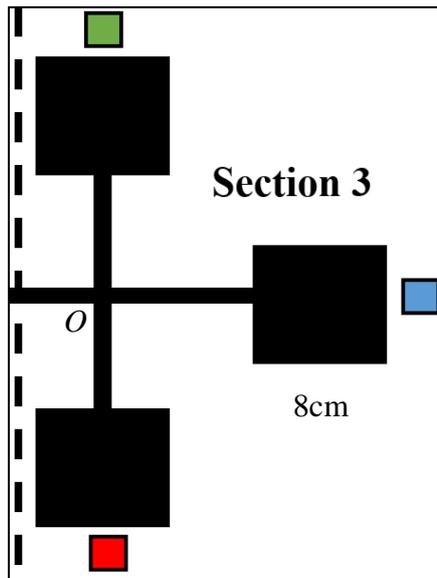


Figure 5: Payload unloading area

3. Robot can adjust the box after unloading. The payload should be in the unloading square (8cm × 8cm) at the time of task completion in order to gain the full amount of marks allocated for unloading.
4. Judges will decide whether the box is placed correctly, a penalty will be given if the box is placed partially inside the unloading square.

3.0 Scoring

Timing and the **accuracy** of the robot will be key criteria in selecting the winner. The robot should always **follow the line**. Each robot will be given **ten minutes (10min)** to reach the goal. Additionally, each robot will be allocated points in the following manner:

1. Successfully navigating: (Line following and maze solving)
2. Overall construction:
 - a. Shape
 - b. Resource Utilization
 - c. Performance

In the event none of the robots do not reach and stop at the Finish Line, the winners will be judged based on the points.

4.0 Team Organization

This section provides teams with the necessary information on how to form a team, contact the ROBOFEST organizing committee, and register for the event.

4.1 Forming a Team

1. Create a Team with maximum **five members**.
2. Make up your own **Team Name**.
3. **Name of a teacher** that will accompany the team should also be included in the application form.
4. Design your own **promotional materials** for your teams.

4.2 Completed application/s must be posted to following address

Mr. Jayasanka Anushka Ranaweera,
School event coordinator – ROBOFEST 2018
Sri Lanka Institute of Information Technology,
New Kandy Road,
Malabe.

Note: - You should also send a scanned copy of your application form to: robofest@slit.lk

4.3 Please fill out the following google form

<https://docs.google.com/forms/d/e/1FAIpQLSfclDD-cbNXV771LyUU18q01LmugkuDUpr86enF-sPaOD0AOQ/viewform>

Note: - Attached a scanned copy of the ID copies of the students which is signed and authorized by the school principal (End of the form link is available).

For further details visit www.robofest.lk

Deadline for Applications: 31th July 2018