



GARRISON ENGINEERING AND ROBOTICS SOCIETY

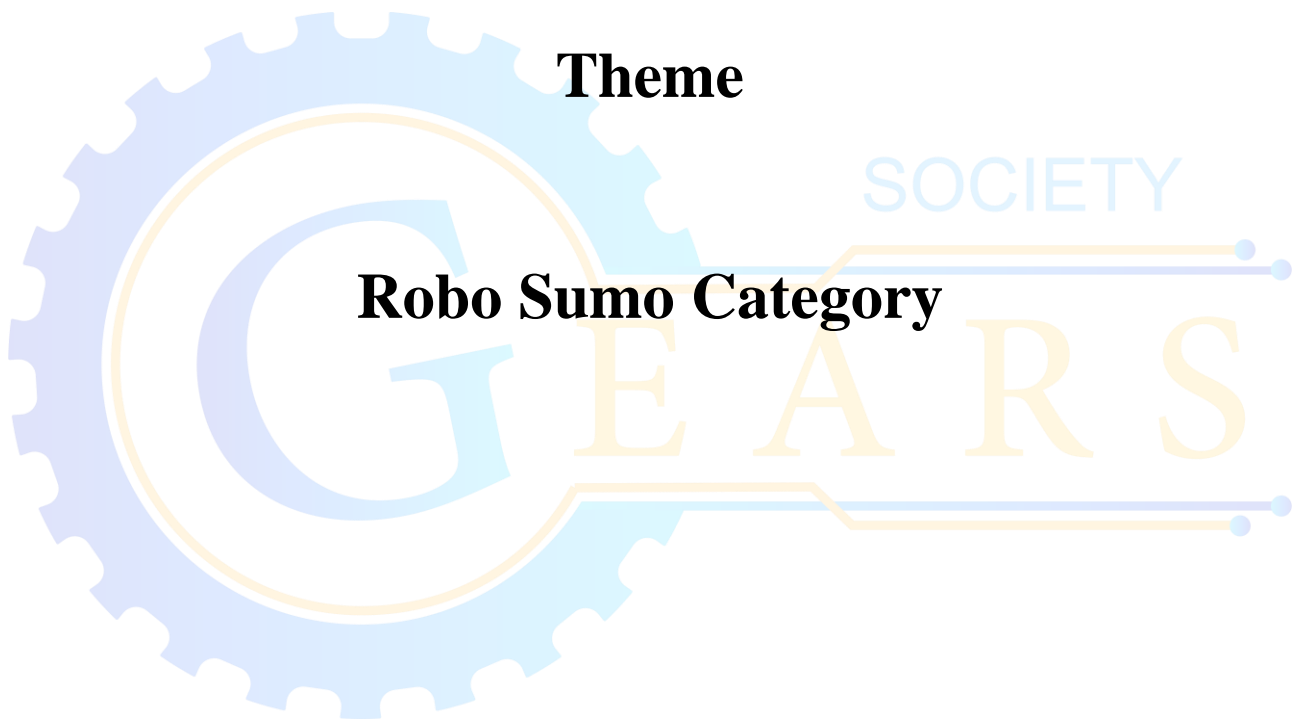
Presents



ROBOTEK '20

Theme

Robo Sumo Category



Organized by:

Garrison Engineering and Robotics Society
Department of Computer Science
Lahore Garrison University

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Introduction

ROBOTTEK is an annual robotics competition organized by Garrison Engineering and Robotics Society (GEARS) supported by Department of Computer Science and Lahore Garrison University (LGU) to groom, empower budding students to make them self-sufficient in the field of robotics and automation by giving them real-time hands-on exposure to build robots. Garrison Engineering And Robotics Society (GEARS) welcomes you all to participate in 4th robotics competition (ROBOTTEK '20).

The main objective of Garrison Engineering and Robotics Society (GEARS) is to make the aspiring engineers acquainted with the conceptual as well as practical knowledge of the upcoming Robotics technology by organizing workshops and competitions. The idea of organizing these workshops and competition is to inculcate the basic fundamentals of Robotics in the students and provide them with a platform to work on, in the near future.

Robotics involves the concept of electronics, mechanics, and software. A Robot is a virtual or mechanical artificial agent. In practice, it is usually an electro-mechanical machine which is guided by computer or electronic programming, and is thus able to do tasks on its own. The guiding force behind the robot will be an Embedded System. At the core of every Embedded System there is either a microprocessor or a microcontroller or any other programmable intelligent unit. In this ongoing cutthroat competition, it is mandatory for every group of students to possess the assigned task. In this competition the students will become equipped with enough knowledge to start with the designing and development of their own projects and implement their raw ideas into reality.

1. Categories

1.1 Background

Garrison Engineering and Robotics Society was founded in 2016 and primary focus was to build students interest in field of Robotics and for that purpose LEGO kits were utilized. In ROBOTEK '17 only single category (Modular University) was offered for students of Lahore Garrison University students only. ROBOTEK '17 played a vital role in building students' interest, idea went diverse and supervisor of the GEARS motivated and encouraged the interested students to work on indigenous robots. In ROBOTEK '18, Garrison Engineering and Robotics Society added Modular Schools category along with Modular University Category to promote Robotics at root level. ROBOTEK '19 was organized at bigger scale than all its previous versions. ROBOTEK '19 invited teams from all over Pakistan and offered three categories which were Indigenous Category, Modular University Category and Modular Schools Category.

1.2 ROBOTEK '20

This year Garrison Engineering and Robotics Society (GEARS) has intended to make ROBOTEK bigger and better which features bigger cash prizes and added new category of ROBO SUMO. This year ROBOTEK '20 will be featuring four categories which are:

- a. Modular Schools Category
- b. Modular University Category
- c. Indigenous Category
- d. Robo-Sumo Category

Universities, Schools and Colleges from whole country are invited to attend the event.

1.2.1 Modular Category

The modular robots are built by assembling the LEGO kits. These kits include sensors, large & medium motors and a brick (brain of LEGO kit). Once assembling is done, it can be coded using provided graphical pallets or using MATLAB or some other programming language.

1.2.2 Indigenous Category

Indigenous Category includes robots which are made from scratch. Their mechanical design, Electrical circuits are the product of team's own abilities. These electro-mechanical machines are then programmed to complete tasks own their own.

1.2.3 Robo Sumo Category

To participate in the “Robo Sumo” Category, participants need to prepare an autonomous robot that is capable of pushing the enemy robot out of the circle.



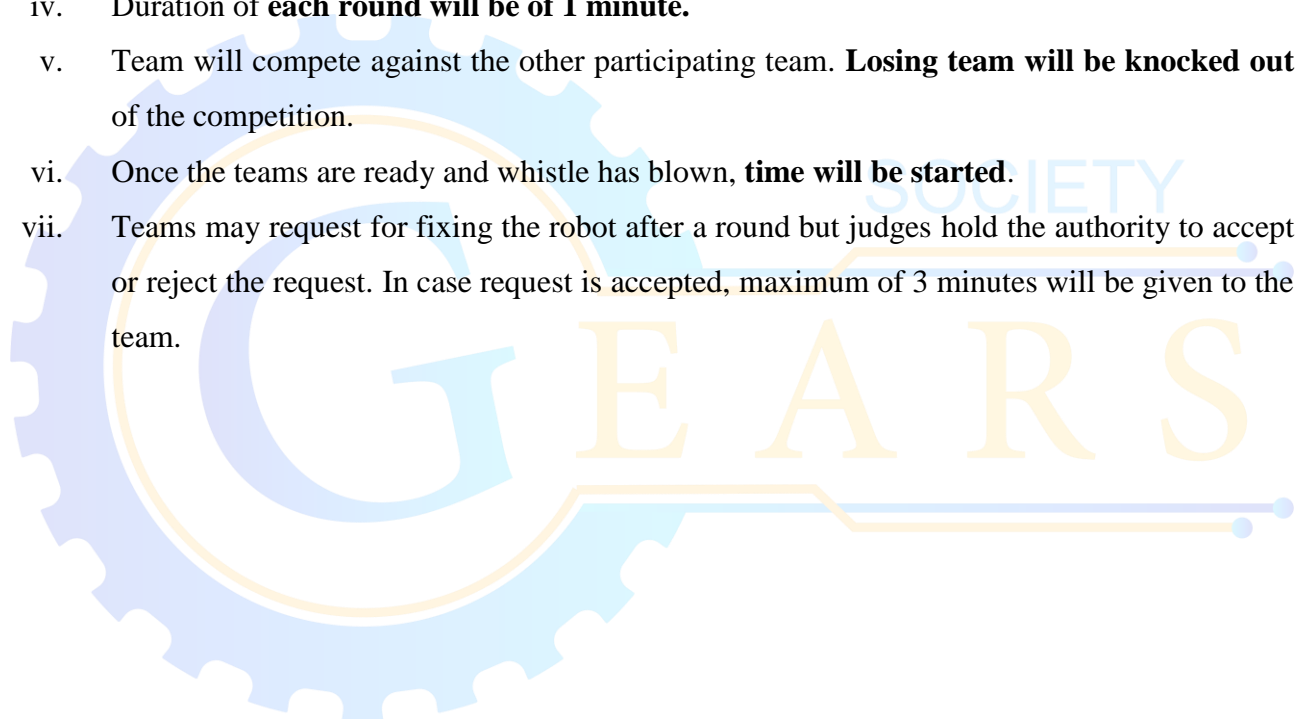
2. Structure of the Competition

Competition will follow the structure given below for Robo Sumo Category:

2.1 Head to Head Matches

In Robo Sumo category teams will have to go head to head against the other team. Head to head matches will be a knockout round.

- i. Each team will be permitted 1 minute before the match to check their robot (None of the teams can run their robot on the main arena before match).
- ii. Schedule will be displayed on GEARS Facebook page.
- iii. Each match consists of **three rounds**.
- iv. Duration of **each round will be of 1 minute**.
- v. Team will compete against the other participating team. **Losing team will be knocked out** of the competition.
- vi. Once the teams are ready and whistle has blown, **time will be started**.
- vii. Teams may request for fixing the robot after a round but judges hold the authority to accept or reject the request. In case request is accepted, maximum of 3 minutes will be given to the team.



3. Robo Sumo Category

Robo Sumo is the new category introduced by Garrison Engineering and Robotics Society for the first time in any ROBOTTEK event. In this category participants need to prepare an autonomous robot that is capable of pushing the enemy robot out of the circle.

- i. Contest Ring is made up of **white laminated wooden sheets** (Lasani Sheet).
- ii. There will be **no wall** on the sides of ring.
- iii. The **inner side of the ring is 100 cm** whereas the **boundary of the ring will be 2.5 inches thick**.
- iv. The **red dot marks the center of the ring**. In the centre of the circle the starting zones of the robots are marked with red stripes.

3.1 Rules for Sumo Robot

- i. Maximum height of robot is 20 cm.
- ii. Maximum length of the robot is 20 cm.
- iii. Maximum width of the robot is 20 cm.
- iv. The weight of the robot must not exceed 2 kg (including batteries).
- v. Participants may use any kind of material to build robot.
- vi. Construction restrictions:
 - a. It is forbidden to use in the construction of the robot any components that may in one degree or another damage the surface of the ring.
 - b. It is forbidden to use materials, parts and components that imply a deliberate destructive effect in the design or appearance of rival robots.
 - c. It is forbidden to use any adhesive devices on the wheels and the body of the Robot.
 - d. It is forbidden to use any lubricants on the exposed surfaces of the robot.
 - e. It is forbidden to use any devices that give the robot increased stability for example creating a vacuum environment;
 - f. It is forbidden to interference with the infrared and other sensors of the opposing robot as well as interference with electronic equipment.
 - g. It is forbidden to use devices that throw anything into the opponent robot.
 - h. It is forbidden to use liquid, powder and gas substances as a weapon against a rival robot.
 - i. It is forbidden to use any flammable substances as a weapon.

NOTE: Robots that violate the above prohibitions would be removed from the competition.

3.2 Points

- i. Robot can score maximum of **1 score in a single round** by pushing the opponent robot out of the circle.
- ii. If a robot wins two consecutive rounds, third round will not be commenced.

3.3 Ring for Robo Sumo Category

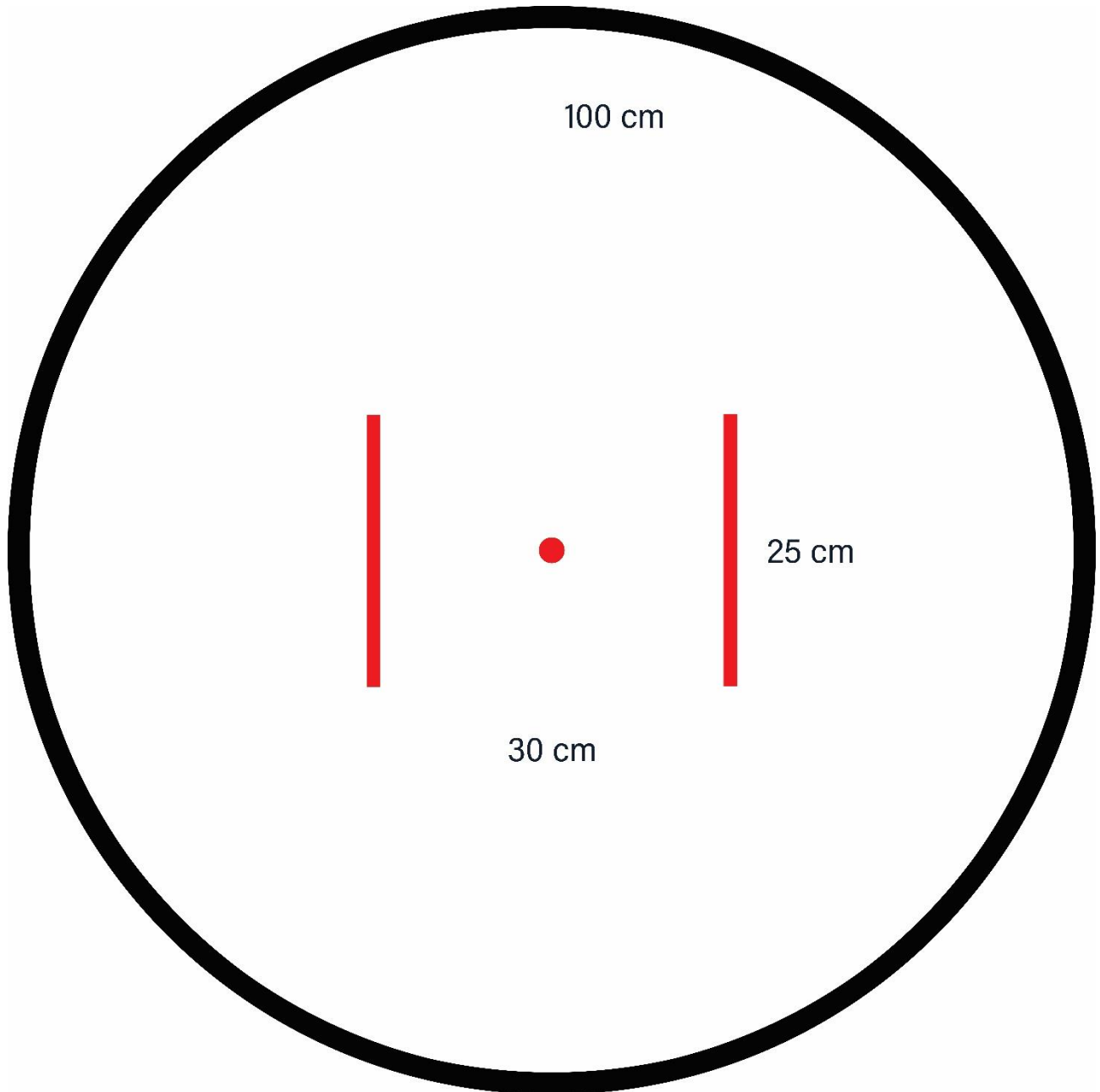


Figure 1 – Robo Sumo Category Ring

4. Rules and Regulations

Following rules will be initiated for smooth execution of the competition:

4.1 General

- i. Judges can stop any robot at any time if they feel that it is performing, or is about to perform any action that is dangerous or hazardous to people or any equipment.
- ii. You can find all the relevant information from GEARS official page. You can also text on GEARS official page for any information.
- iii. Any correspondence with any official of GEARS via E-mail or telephone or any other means will not be considered as rule.
- iv. If team feels that they have faced any kind of injustice by the referee or judges they can launch a protest by filling the protest form (attached at the bottom of the document) within 30 minutes after the match.
- v. Judge's decision will be final in all cases.

4.2 Teams

- i. A team can consist of maximum 5 members.
- ii. A team must have a valid team name and team logo.
- iii. A team must be from BISE, technical board or HEC registered institutes.

4.3 Match Rules

- i. Team will be declared as **Team Red** or **Team Blue** based on the coin toss before every match.
- ii. Team Red will run their robot on the right side and Team Blue will run their robot on Blue side.
- iii. Once turned on, the robot must be **self-controlled** without any human intervention.
- iv. **Remote control** of any sort (wired or wireless) cannot be used. Participants are not allowed to touch their robots or enter the arena after startup.
- v. Once the whistle is blown, the **robot needs the push opponent robot out of the ring in 1 minute**.
- vi. In case of draw, the team may be asked for a rematch or winner may be decided on a coin toss as per discretion of judges.

(Other match rules for matches are stated above)

NOTE: Judges have full authority throughout the competition. All participants must comply with their decisions.

4.4 Robot's Power Supply

- i. Robot needs to be battery powered and no use of direct wired connection is allowed.

4.5 Disqualification

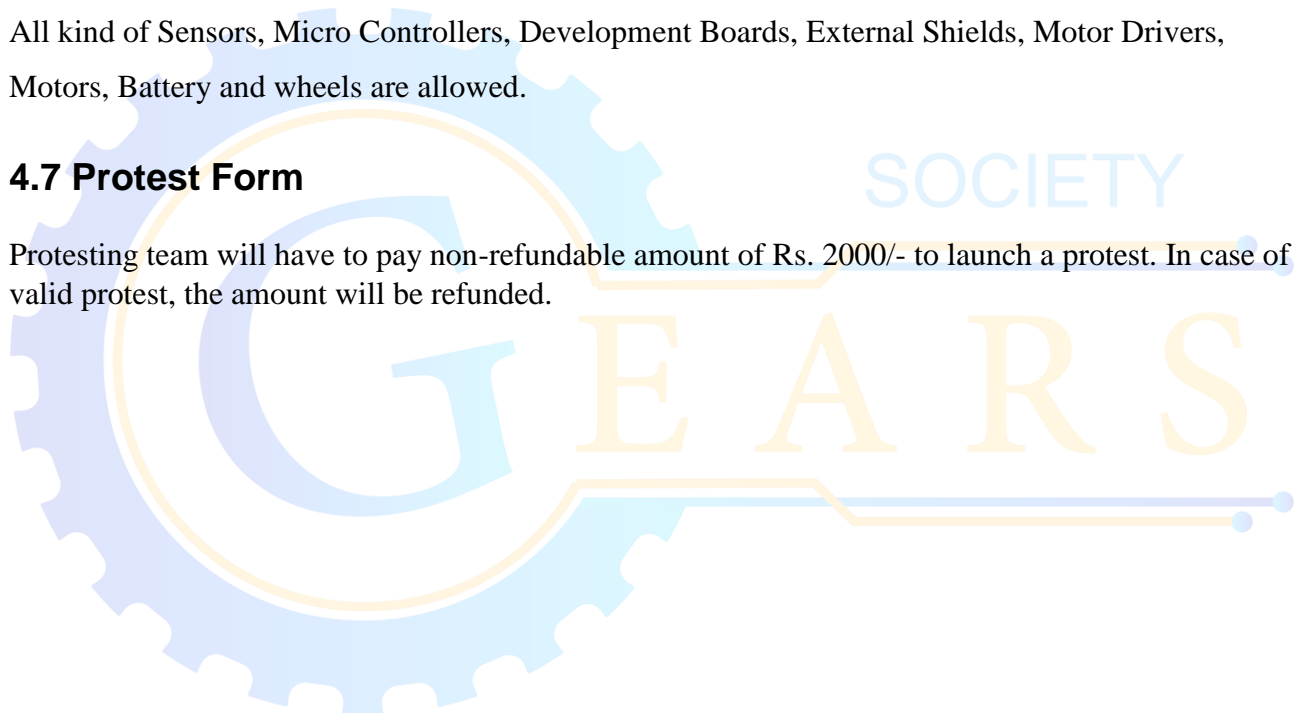
- i. If the team misbehaves with any stage officials, the team will be disqualified straight away.
- ii. If the team is found using any Wi Fi, Bluetooth or any other module which can help the robot to be controlled wirelessly will result in disqualification of the team.
- iii. If the team is found using any means which are against the fair game rules then it can be disqualified.

4.6 Components List

All kind of Sensors, Micro Controllers, Development Boards, External Shields, Motor Drivers, Motors, Battery and wheels are allowed.

4.7 Protest Form

Protesting team will have to pay non-refundable amount of Rs. 2000/- to launch a protest. In case of valid protest, the amount will be refunded.



APPENDIX - I



GARRISON ENGINEERING AND ROBOTICS SOCIETY

Robotics Lab adjacent to Lab 80, 1st Floor, Old Building

Contact: 0335-1549132 | www.facebook.com/lgugears

Protest Form

Category (LEGO/ Indigenous)

Team Code

Team Name

University Name

Reason of Protest:

Leader's Signature: _____

Match Start Time: _____

Match Finish Time: _____

Judges Remarks:

Judge Signature: _____