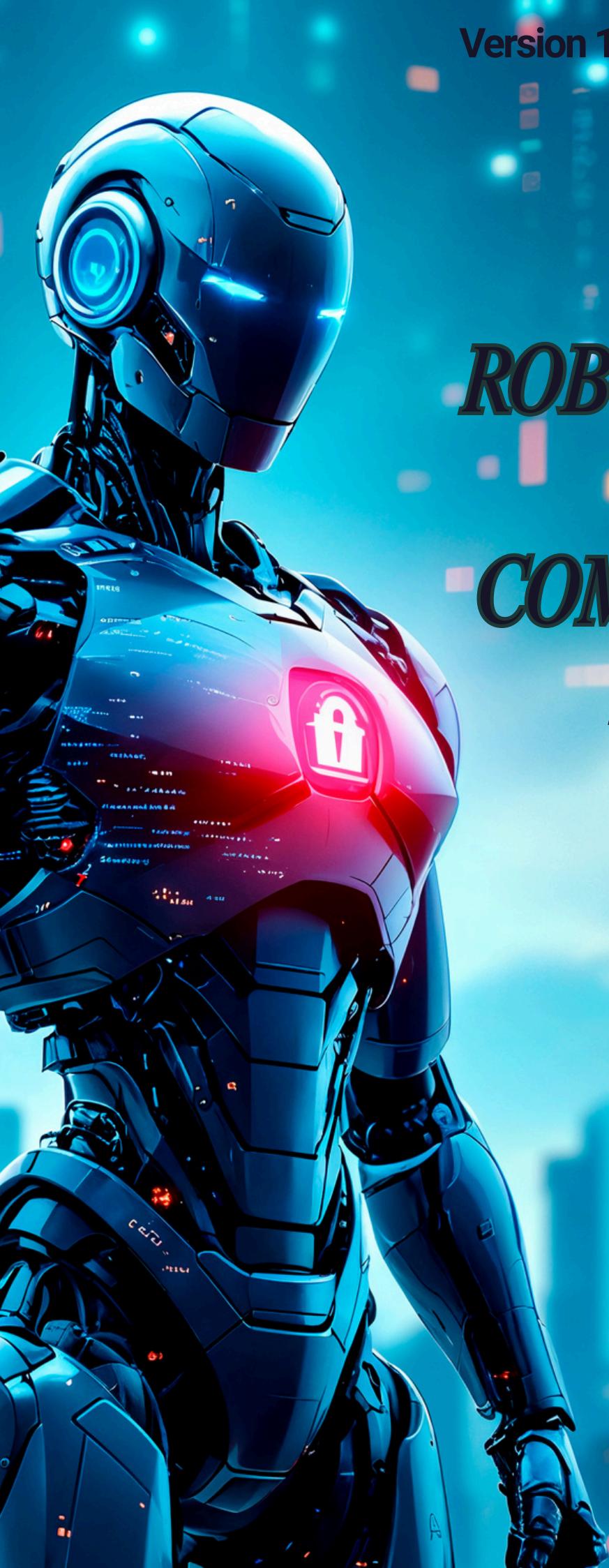


Version 1.0



ROBOT DESIGN AND COMPETITION 2025

ADVENTURE AGENDA

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THE CALL TO ADVENTURE

LONG AGO, THE KINGDOM OF MECHATRONIA THRIVED UNDER THE GLOWING POWER OF THE CRYSTALS OF POWER, RELICS THAT KEPT THE LAND IN HARMONY. BUT DARKNESS FROM THE NORTHERN WASTELANDS SHATTERED THESE CRYSTALS, SCATTERING THEIR FRAGMENTS ACROSS DANGEROUS REALMS. FORESTS TWISTED INTO LABYRINTHS OF SHADOWS, MOUNTAINS CRACKED INTO RAMPS OF TRIALS, AND ANCIENT FORTRESSES CONCEALED THEIR SECRETS BEHIND SHIFTING WALLS.



IN THIS HOUR OF PERIL, THE SAGES OF MECHATRONIA AWAKENED A HERO: THE GUARDIAN BOT, A MECHANICAL CHAMPION FORGED WITH COURAGE, WISDOM, AND PRECISION. ITS MISSION: NAVIGATE THE PERILS, RECOVER THE SCATTERED CRYSTALS, AND RESTORE BALANCE TO THE KINGDOM. THE JOURNEY, CONSISTING OF 6 TASKS, WILL TEST EVERY SKILL, FOR DANGER RESIDES IN EVERY SHADOW, AND ONLY THE WORTHY WILL SUCCEED WHERE THERE IS NO ROOM FOR ERROR.

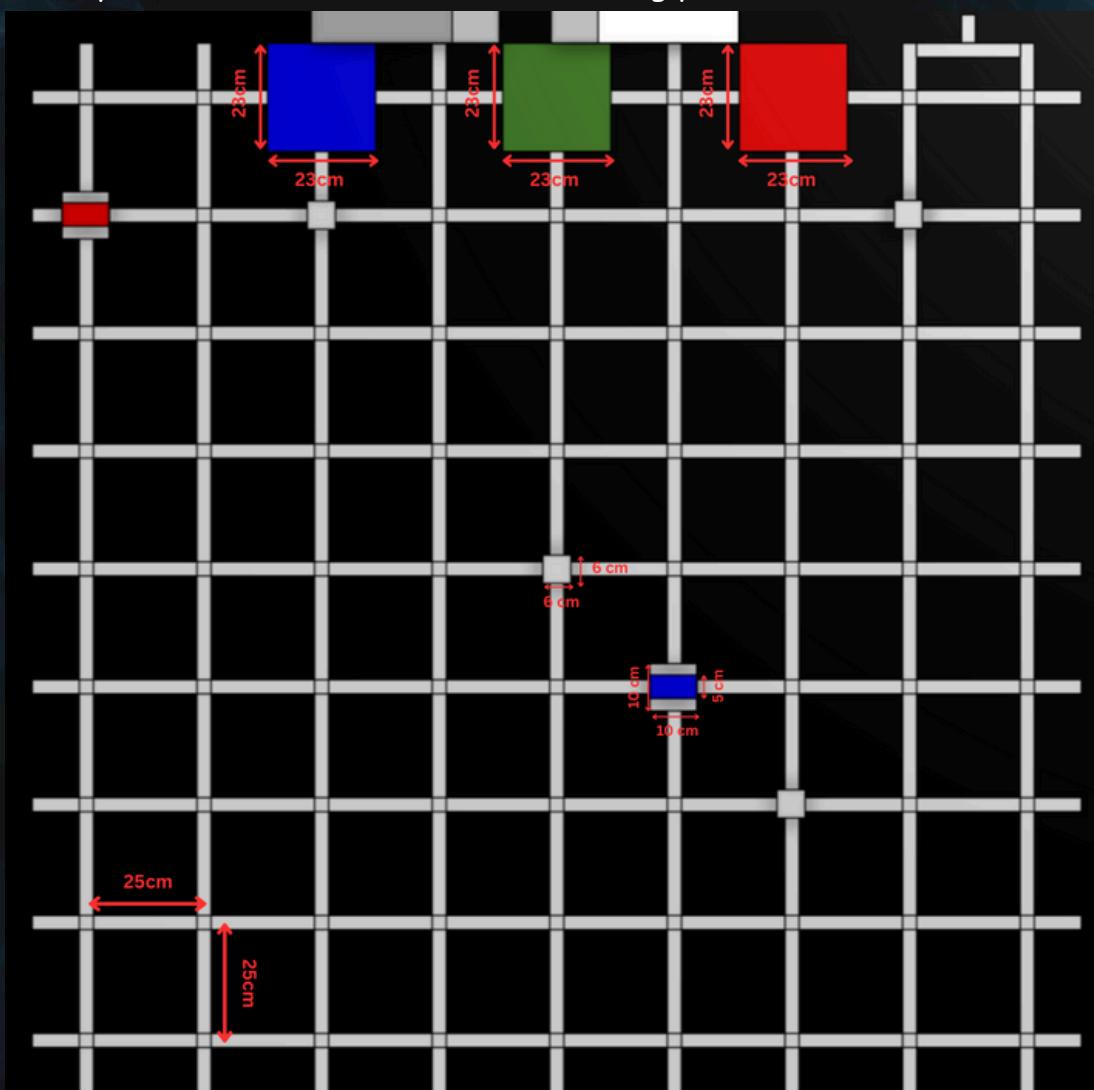
TASKS

You are expected to design a mobile robot within the specified physical constraints for this task, which accounts for 30% of your overall marks. There will be a 30-minute live coding session at the event, during which teams will be tasked with coding for an unknown region, as specified in Figure 9 of Task 7. This challenge will test the teams' ability to adapt and develop solutions in real-time under time constraint.

TASK ONE

THE LABYRINTH OF SHADOWS(GRID SOLVING)

The Guardian Bot begins at the Gates of Eldoria, entering the Labyrinth of Shadows—a maze of shifting paths and hidden obstacles

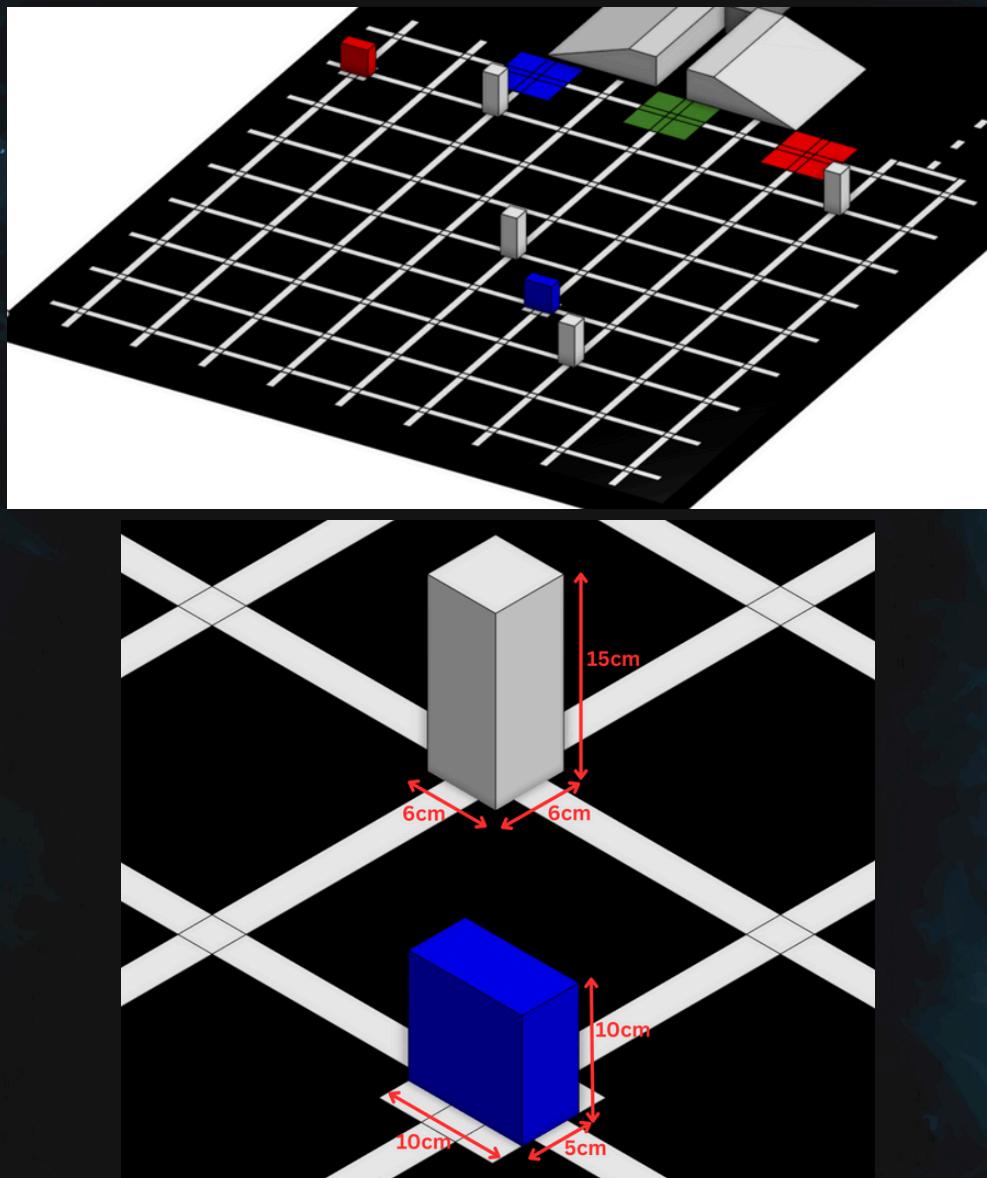


The maze consists of a Grid where a **Grid Size of 8×8**

Line width : 3cm (white line on a black surface)

Grid Cell size: 25×25 cm

The Bot must avoid obstacles on its way, with a **maximum** of 4 obstacles on the grid. The obstacles are **6 cm x 6 cm** in width and **15cm** in height. The placement of obstacles within the 8x8 grid is restricted exclusively to the designated central region, as highlighted in Figure [2]. No obstacles are located outside this bounded area. There will be 2 collection points to collect the red, blue, or green boxes. Here, the two boxes could be any two colors from Red, Blue, and Green. While collecting the Crystals of Power, matching its Clan—Red for the Fire Clan, or Blue for the Water Clan, and Green for the Tree Clan, placing them in the Sanctuary of Colors, the sacred resting place of the crystals. Each box is **5cm x 10cm and 10cm** in height. Boxes will **not** be placed in the region shown in Figure[2]. The robot should pick up the box and place the box in the given area, and then exit the Grid from the 8th cell to do the next task.



Note that the color that is not present in the grid will be the color of the balls that you have to pick in Task 4. i.e, if the two boxes placed in the grid are red and green, then you must pick blue balls in Task 4.

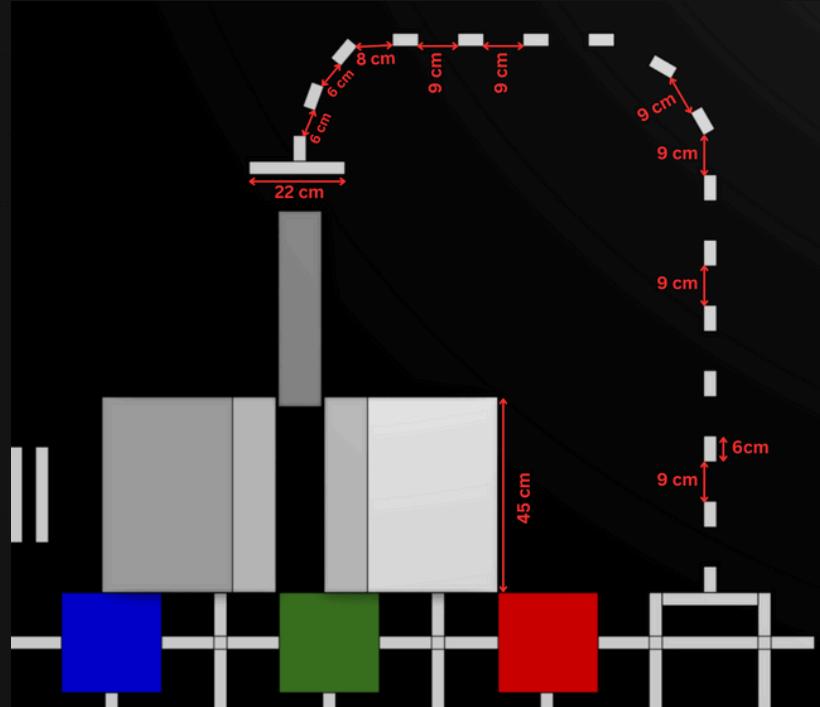
Penalty: -5 marks for collision with an obstacle. -5 marks for placing the box in the wrong area. Marks allocation: 10 marks for placing the box in the correct area and 30 marks for exiting the grid successfully.

TASK TWO

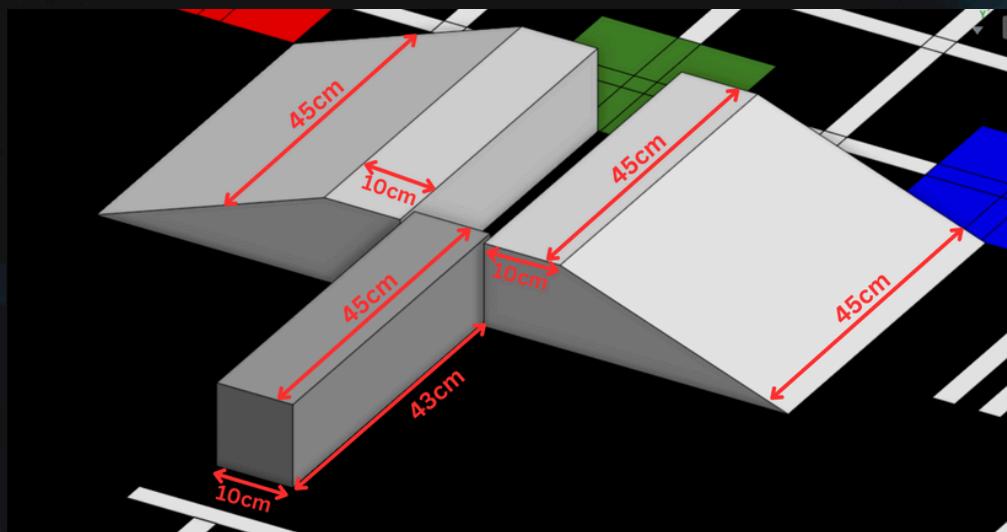
THE RAMP OF TRIALS(CREATION, ASCENDING, AND DESCENDING RAMP).

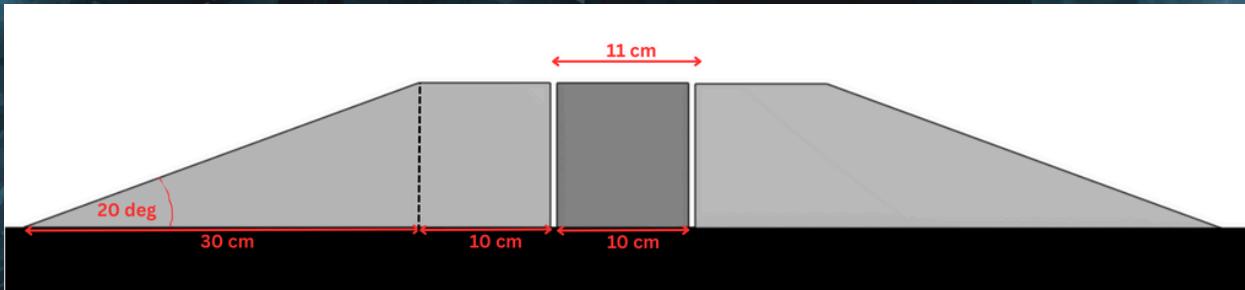
Beyond the labyrinth lies the Ramp of Trials, a broken ancient bridge with a huge gap. The Guardian Bot must grab a stone block and use it to repair the broken bridge, filling the gap and crossing the bridge

Here, the robot has to push the box and fill the gap on the flat area of the ramp. The Box will be 10cm in length, 45cm in width, and 15cm in height.



The robot can carry or drag the box. The ramp indication marks will be 10cm in length. There will be no guidelines on the ramp. Ramp width will be 30cm. Only by completing this task can it reach the next area.





TASK THREE

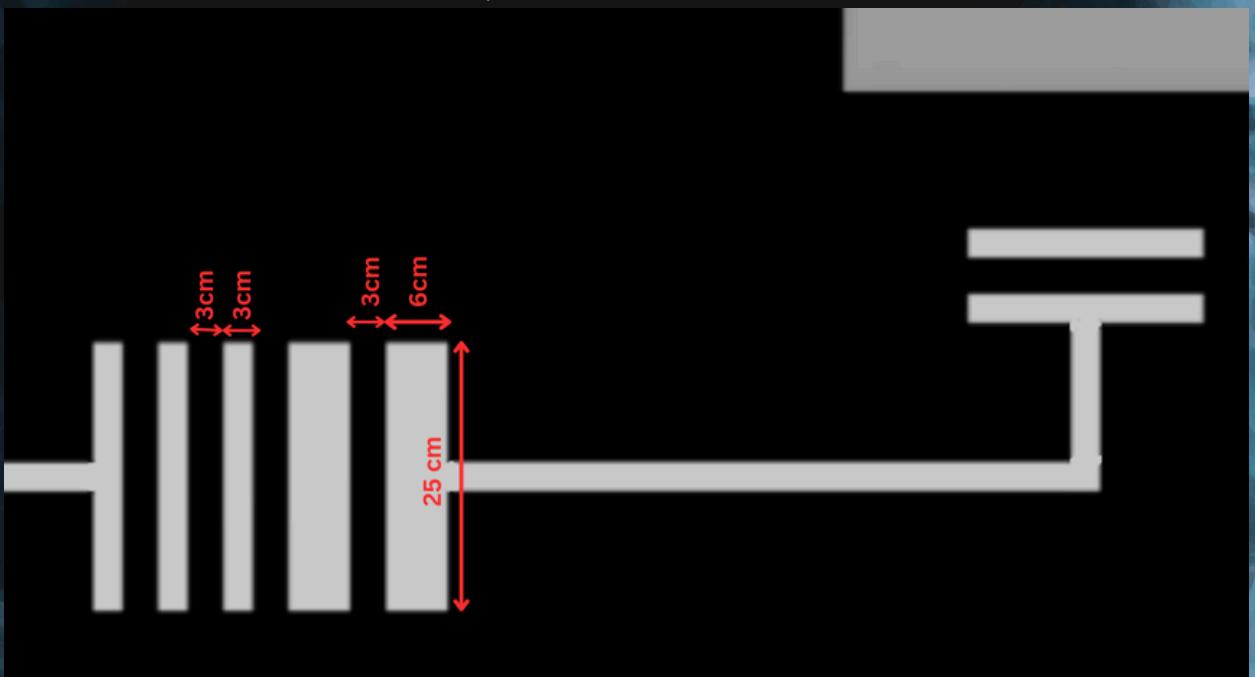
THE ORACLE OF RUNES(BARCODE READING)

After crossing the bridge, the Bot encounters the Oracle of Runes, ancient markings on the ground holding cryptic knowledge. The Bot should read these symbols and decode the number of magical spheres needed to save the world.

The robot needs to read the barcode on the floor. There will be 5 lines on the floor. 4cm lines indicate logic 0, and 8cm lines indicate logic 1. Starting from MSB and ending with LSB. Then, need to divide the number by 3, and the remaining gives the corresponding number of spheres that need to be grabbed.

Remainder	No. of Spheres
0	2
1	3
2	4

Then it should indicate the number of spheres using a proper method. The correct indication, 10 marks will be awarded.

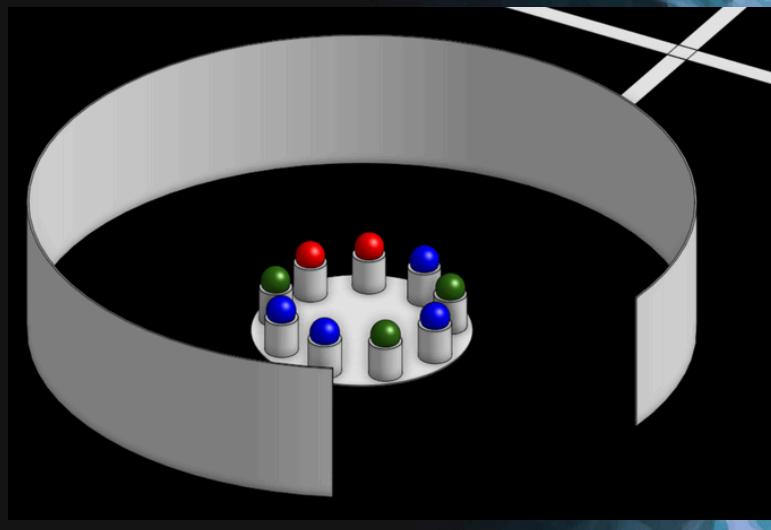
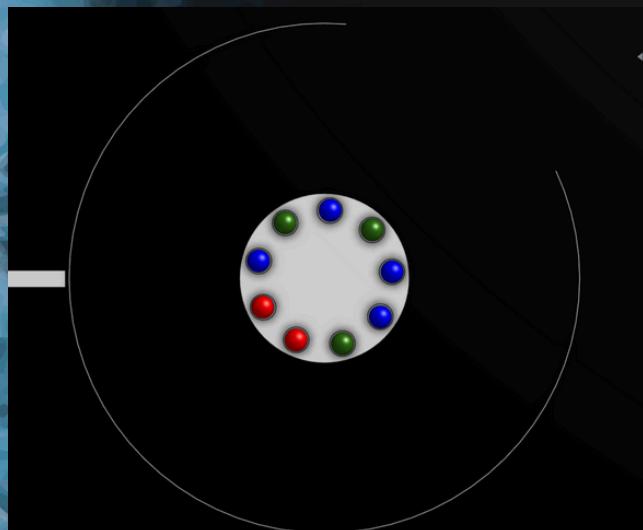


TASK FOUR

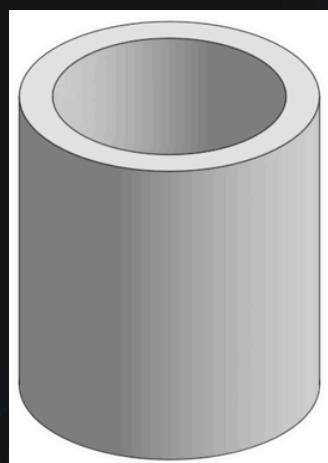
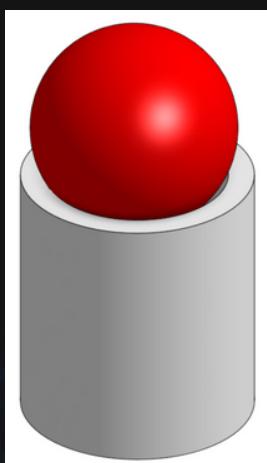
THE CIRCULAR FORTRESS(WALL FOLLOWING AND BALL COLLECTION)

Next, the Bot encounters the Circular Fortress, a circular wall with a secret opening. Using cunning and skill, the Guardian Bot must locate the entrance, enter, and collect the Magical Spheres

After passing the barcode, the robot needs to find a T junction, and there will be a circular wall with an opening. The direction of the opening is not fixed, and the robot needs to find the opening and go inside to pick the balls. There can be a maximum of 4 balls and a minimum of 2 balls from each color. The robot should pick the assigned color and the number of spheres. Then the robot needs to return to the line again.



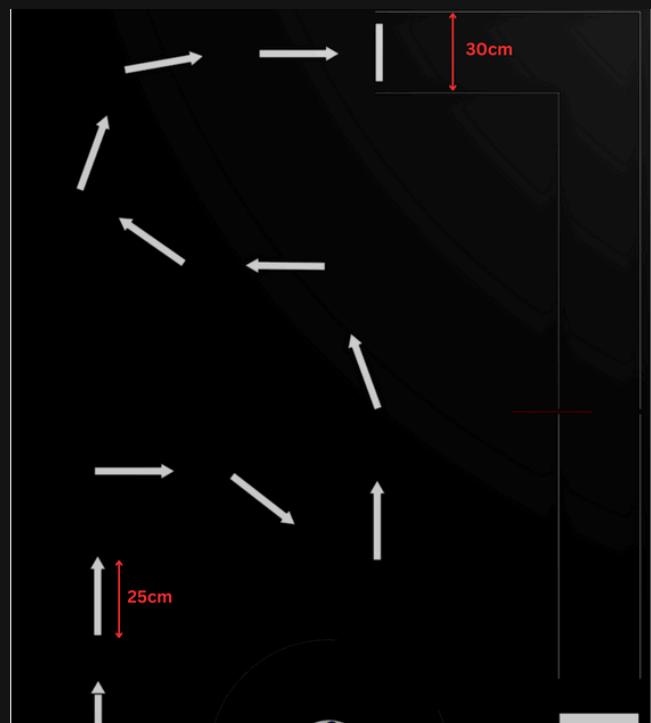
The wall color will be white and 20cm tall. The diameter of the outer circle will be 90cm, and the diameter of the container is 20cm. The balls are standard ping pong balls(radius 2cm). Ping pong balls are kept on a cylindrical base of height 5cm. Following the Oracle's prophecy, it should select only the spheres of the destined color and number.



TASK FIVE

THE WALL OF WHISPERS & PENDULUM OF DOOM

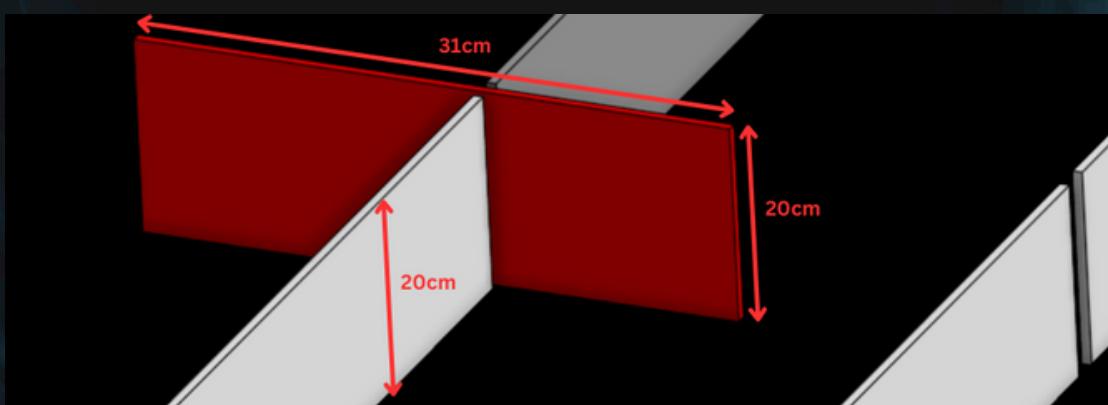
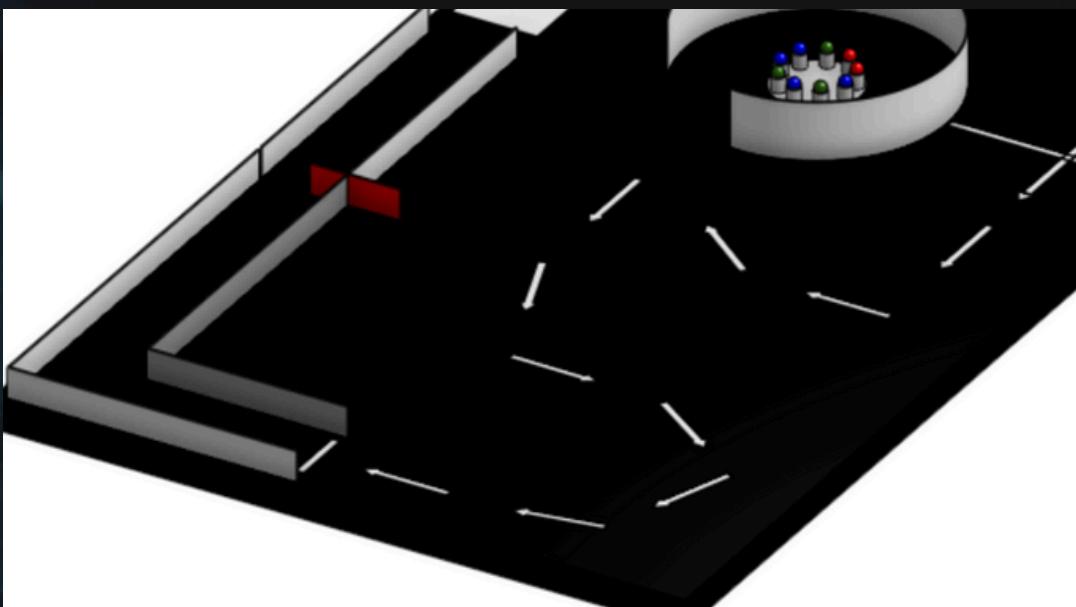
Emerging from the fortress, the Bot faces the Wall of Whispers, where it should follow the walls and face a hidden challenge testing its intelligence. Then comes the Pendulum of Doom, a swinging peril designed to strike intruders. With precise timing and unwavering courage, the Guardian Bot should pass safely without getting hit by the Pendulum.



There will be arrows showing the path to enter the walls of whispers from the previous task. When the robot enters the wall following area. The wall will be white in color and 20cm in height. They maintain approximately 30cm gaps. Then there will be a hidden task, and the task will be revealed 30 minutes before the competition, and each team will get 30 minutes to program the robot for the hidden task.



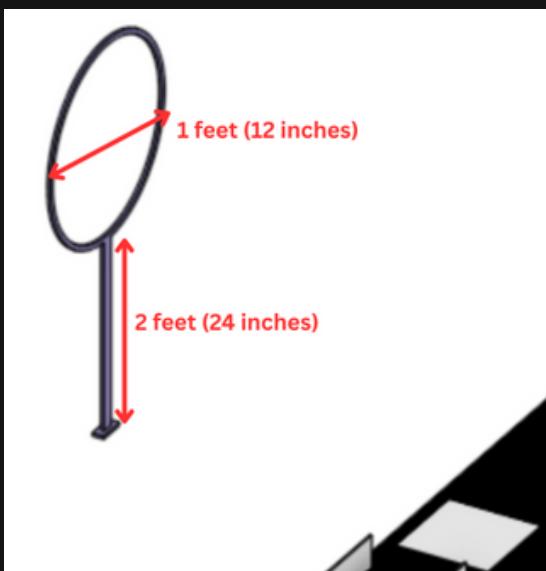
There will be a pendulum which has an oscillation period of around 3 seconds, and it will trigger automatically when you come halfway on the wall following area. If the robot hits the pendulum, 10 marks will be deducted. 50 marks for completing the hidden task, 30marks for successfully crossing the pendulum



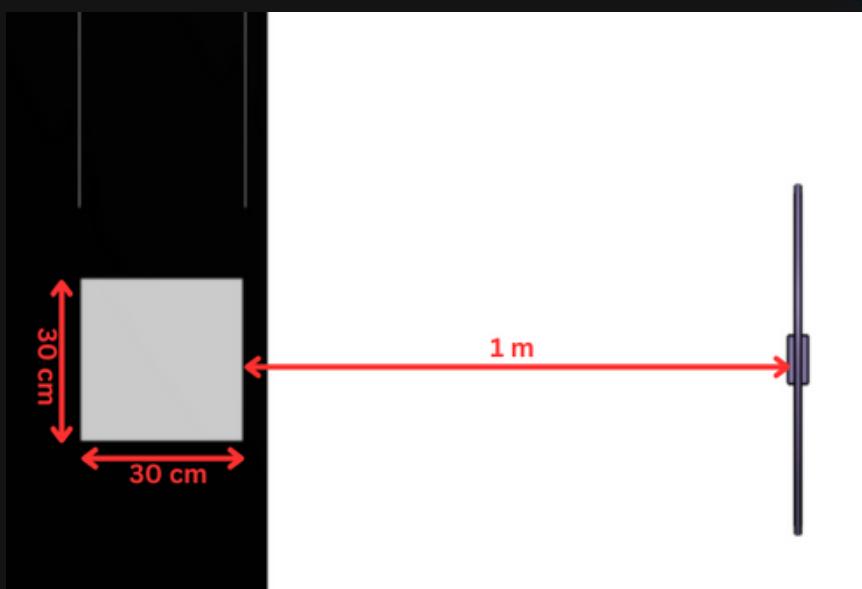
TASK SIX

THE LINE OF DESTINY & THE RING OF TRIUMPH(SHOOTING TASK)

Finally, the Guardian Bot should follow the Line of Destiny until it reaches the Sacred T Junction. Here, it should shoot the collected Magical Spheres through the Ring of Triumph, completing the quest.



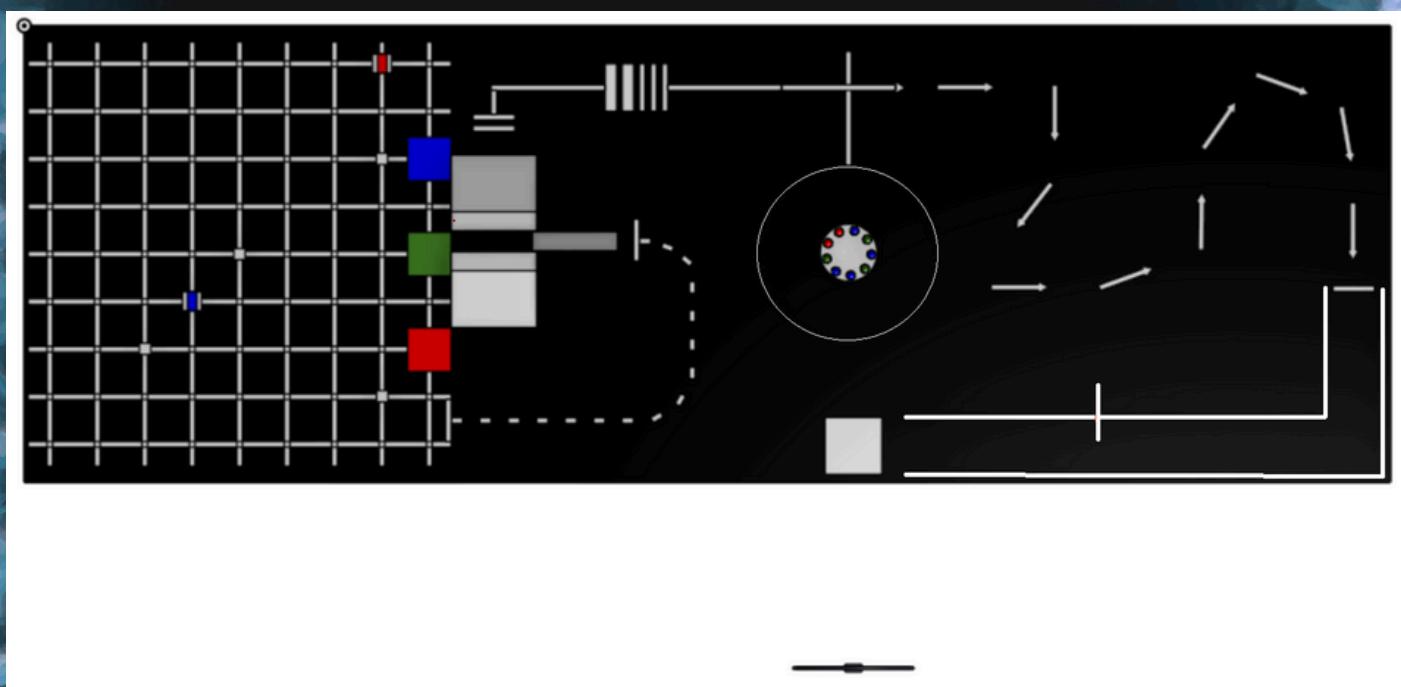
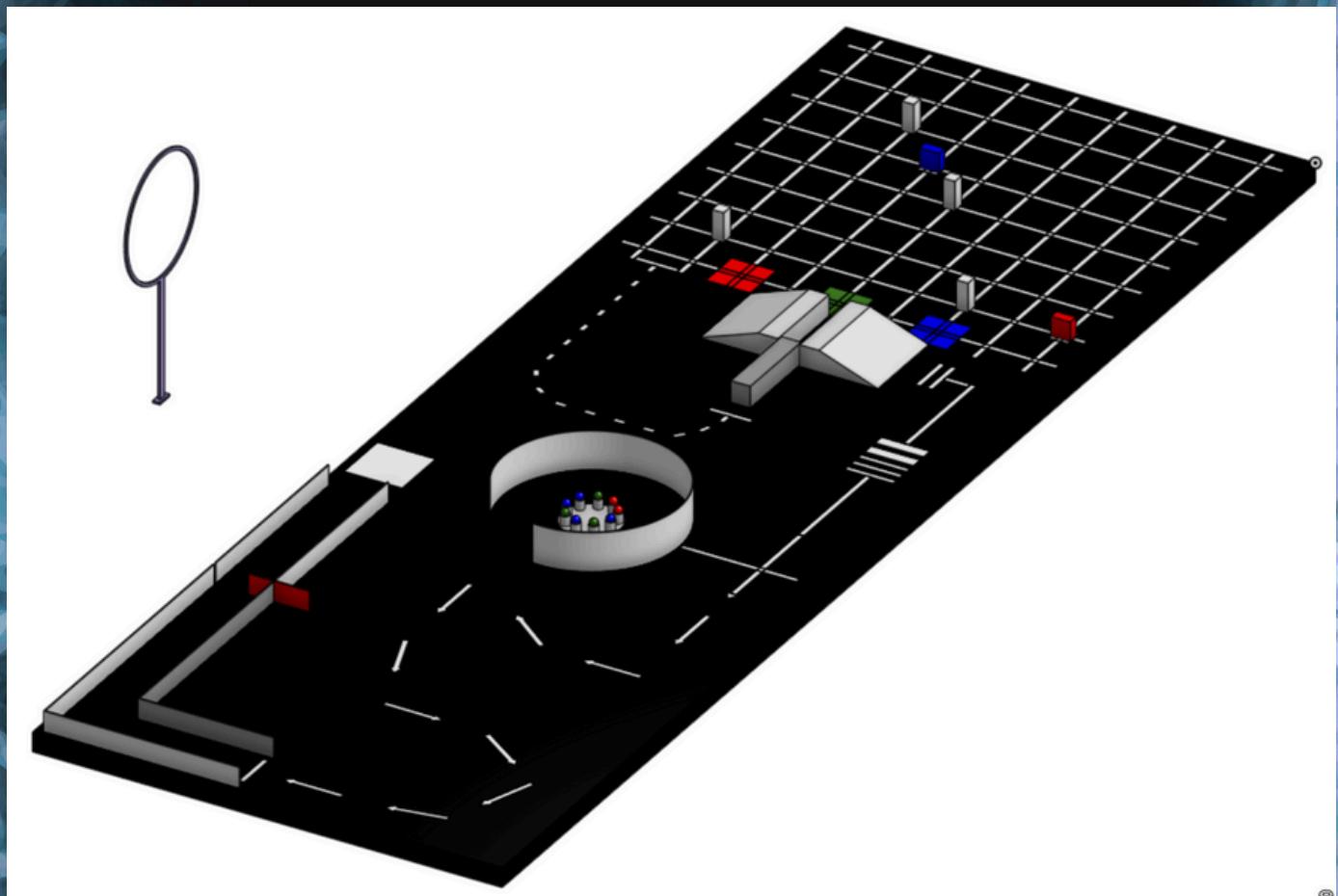
The ring is placed 1m away from the T junction, and it is 2ft tall, and the ring will be 1 ft in diameter. The team will get 30 marks for each successful pass.



Thus, the Crystals of Power shine once more, balance is restored to Mechatronia, and the Guardian Bot's heroic deeds are spread across the kingdom.

-THE END-

TASKS OVERVIEW



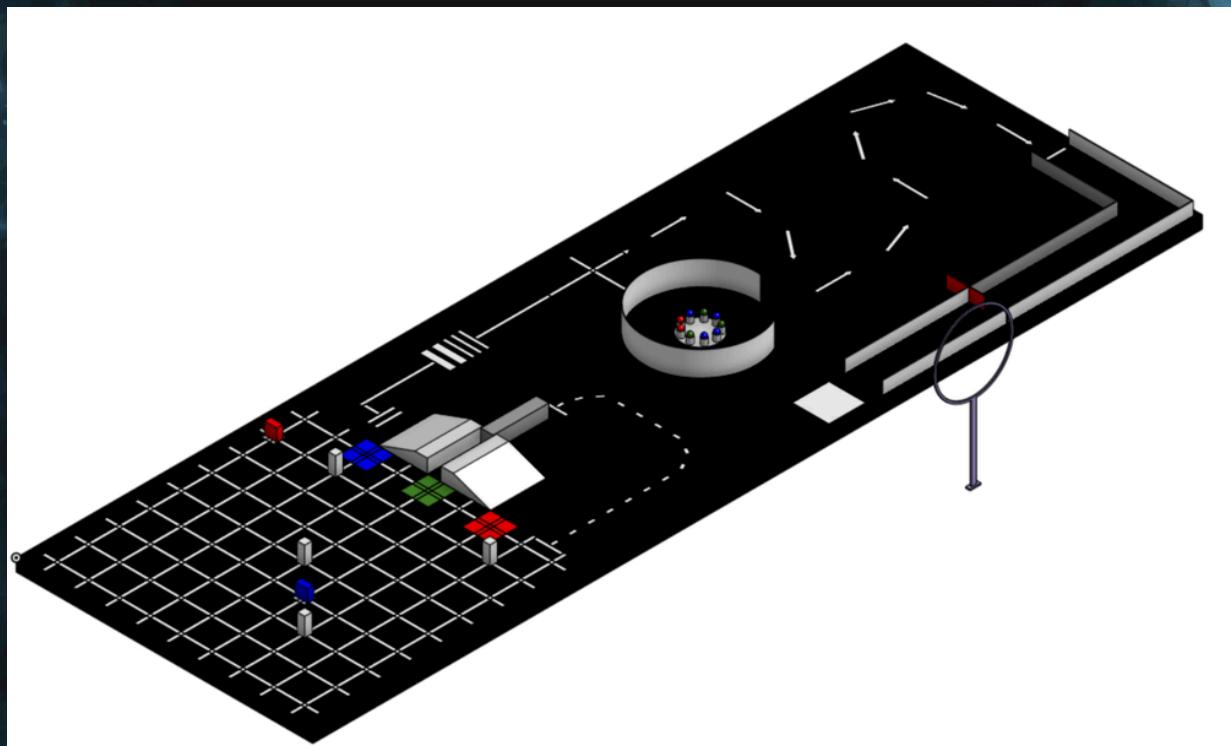
ARENA SPECIFICATIONS

Paths and Lines

- Line width: 30 mm.
- Non-reflective matte surface.

Walls

- Colored white.



Scan for the 3D view of the arena



ROBOT SPECIFICATIONS

1. Autonomous Operation

- Robots must operate autonomously without external input.
- Once the robot initiates its actions, team members are prohibited from making any contact with it.

2. Dimensions

- Maximum size: 250 mm x 250 mm.
- No height restrictions.
- The robot must be started using a single onboard switch.
- Teams may use separate switches for restarting and for starting from checkpoints, which must be presented to the judges before the run.

3. Stability

- The robot must demonstrate stability and stand independently at the starting zone when the run begins. Failure to meet this criterion will result in disqualification.

4. Mechanisms

- Expansion during the run is allowed without damaging the arena.
- Robots must remain a single entity. (The robot cannot split into multiple units during gameplay.)
- It is strictly prohibited to leave behind any parts or marks while moving within the arena.

5. Components

- Pre-made microcontroller boards and sensor kits allowed.
- Wireless modules, ready-made Lego kits, and off-the-shelf kits are prohibited.

6. Starting Procedure

- Simple starting procedure without manual force.

7. Team Limit

- One robot per team.

GAME RULES

1. Submission and Preparation

- Robots must be submitted before the competition starts.
- 2 minutes for hardware adjustments and calibration procedures, if necessary. No code modifications allowed.

2. Time Limit

- Maximum task completion time: 15 minutes.

3. Arena Damage

- Robots must not damage the arena.

4. Equipment

- No external items allowed inside the arena.
- Electronic devices like laptops and personal computers must be turned off.
- The organizers retain the right to inspect these devices, their usage, and disqualify teams accordingly.

5. Safety

- Organizers can halt robots if deemed hazardous.
- Flammable, explosive, or hazardous processes are prohibited.

6. Restarts

- Up to 3 restarts allowed within 10 minutes.
- Starting from a checkpoint is considered a restart.
- No information can be provided to the robot during restarts.

7. Restart Process:

- While restarting the bot, contestants are not allowed to provide any information to the bot. However, they can adjust sensors' positions and undertake minor repairs. Any alteration to the bot's weight is prohibited during this process.

8. Disassembly

- Robots must not be disassembled until results are announced.

9. Line Following

- Robots deviating from the line and failing to return within 10 seconds will require a restart.

10. Pause Rule

- The timer will not be paused during restarts.

11. Judges' Authority

- Judges' decisions are final.

12. Power Supply

- On-board power supply required. No external power supply will be allowed.
- Each team should bring its own on-board power supply.
- Maximum voltage: 24 V DC.

13. Controls

- No external input allowed; wireless/wired communication leads to disqualification.

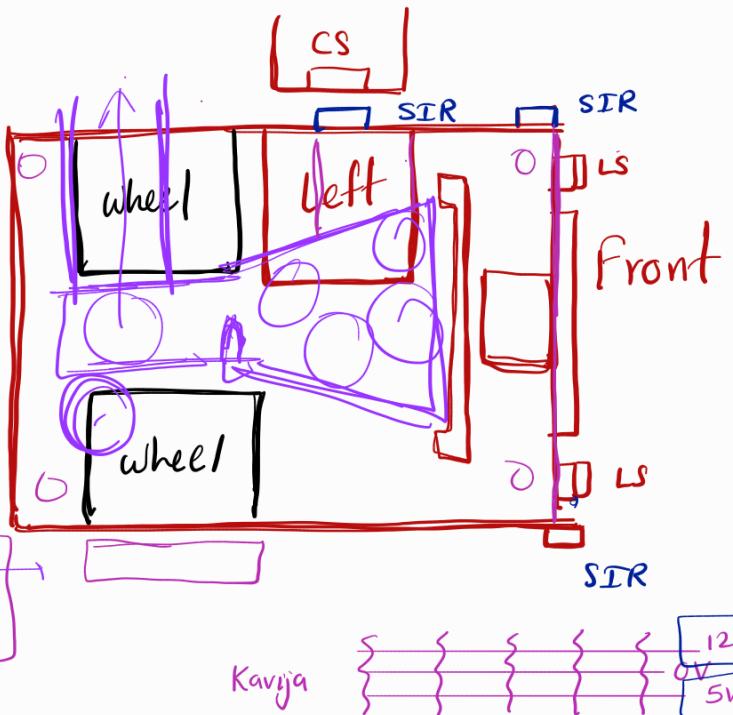
CONTACT DETAILS

Contact via WhatsApp is preferred

Pankaja : 0701380990

Banuka : 0771236446

Induwara : 0766787578



CS → colour Sensor
SIR → Sharp IR
LS → Limit switch

Hiruna
wheel rim → 2
slide → 1
shooting item → 1
Sharp IR → 3
IR / LS → 2

Hasith
Arm

