TECHFEST 2021-22

MESHMERIZE

TASK

Teams have to build an autonomous robot which can follow a white line and keep track of directions while going through the maze. The bot has to analyze the path in the Dry Run and use this information in the Actual Run to go through the maze from the starting point to the ending point in minimum possible time.

ARENA

The game field consists of an arena having dimensions 190cm × 180cm (l×b) consists of the following:

- The arena is composed of random paths made up of **white strips**.
- All the distances are shown in Fig. 1 and Fig. 2.
- The angle between two adjacent white lines in the path is always 90°.
- The figure below shows the arena.
- A white box of 30 cm × 30 cm is present at the End Zone of the arena to indicate the end position.

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

GAMEPLAY

The gameplay consists of two parts:-

- The first part is the **"Dry Run"**. In this run, the bot must start from the 'Start' and find its way to reach the 'End' (White box) of the arena. The bot has to follow an algorithm to find its path to reach 'End' and the bot can store the turns in its memory to explore the shortest path during the second part of the journey. There are **no restrictions** to cover all the checkpoints.
- The second part is the **"Actual Run"**. In this run, the bot has to restart from the 'Start' again and finds its way to the 'End' through the best possible path by following the path that was stored in the first run. The 'End Zone' has a white box of 300mm×300mm (l×b) that indicates the end of the path for the bot. The timer will be set to zero as the "Actual Run" begins.
- A total of **4 minutes** will be provided to complete the Dry Run.
- A total of **3 minutes and 30 seconds** will be provided to complete the Actual Run.

THE TRACK

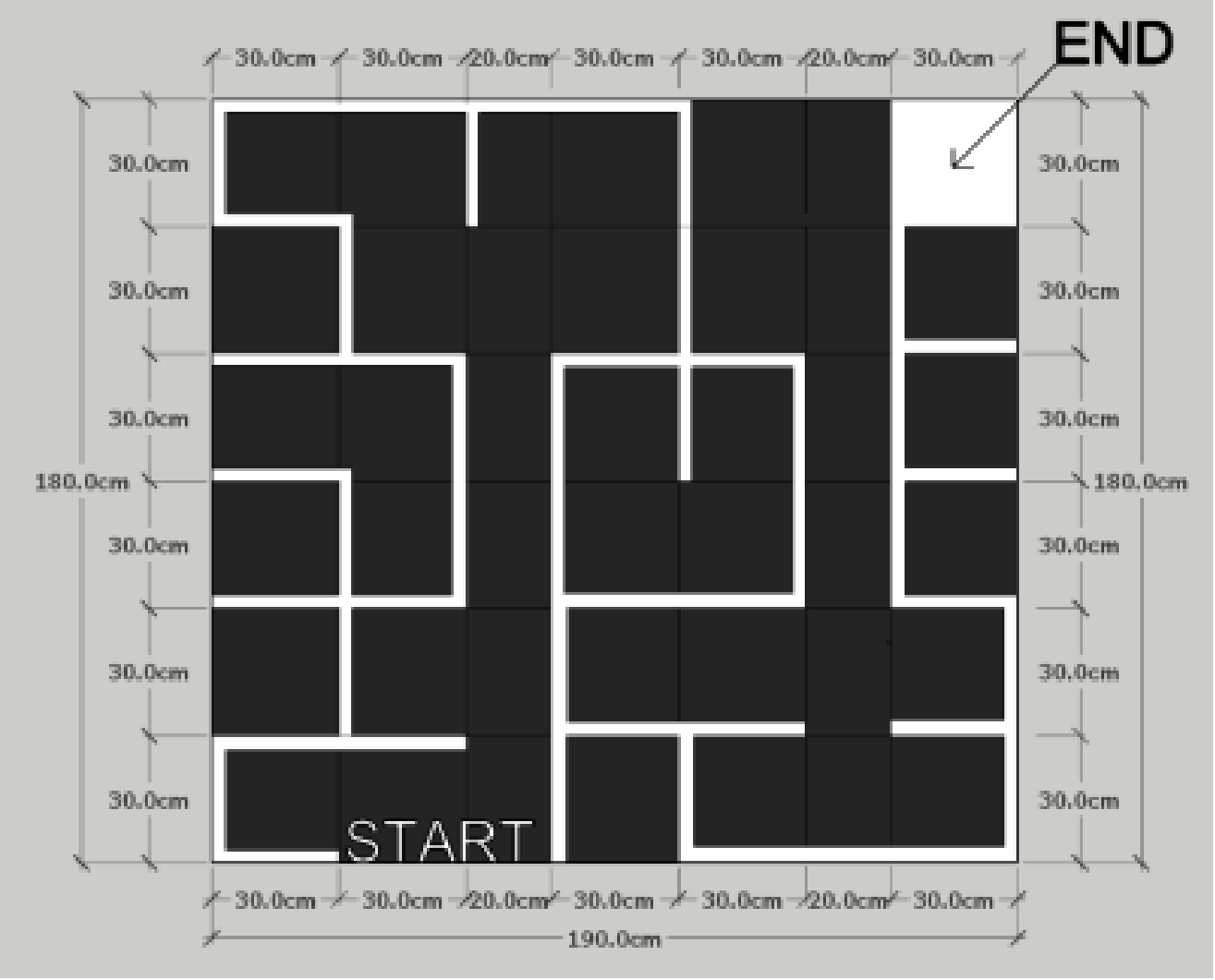

Fig 1 : Top View

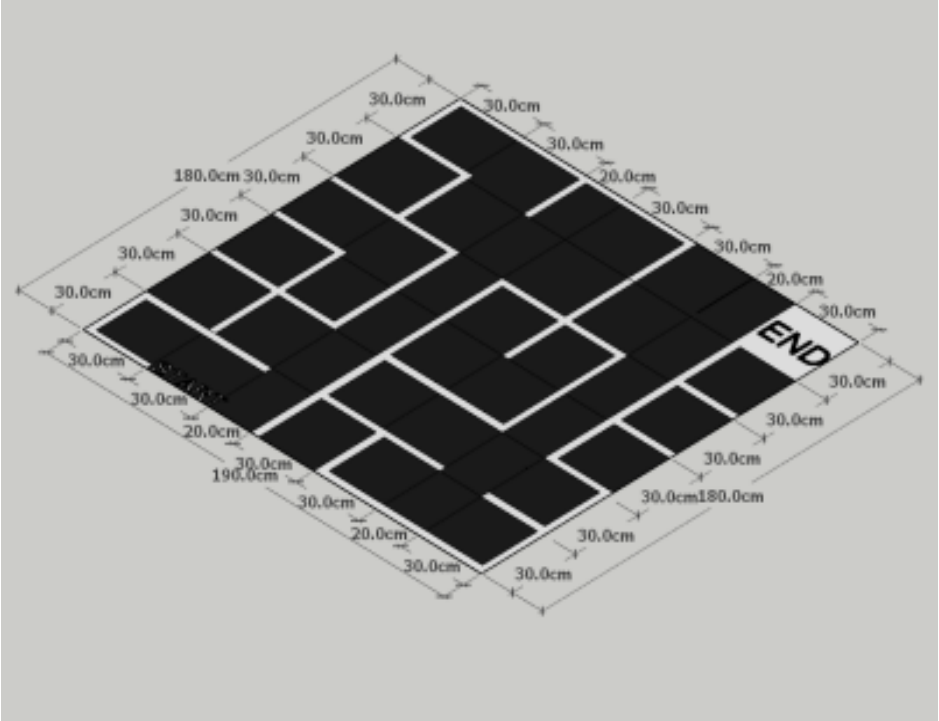

Fig 2 : Isometric View

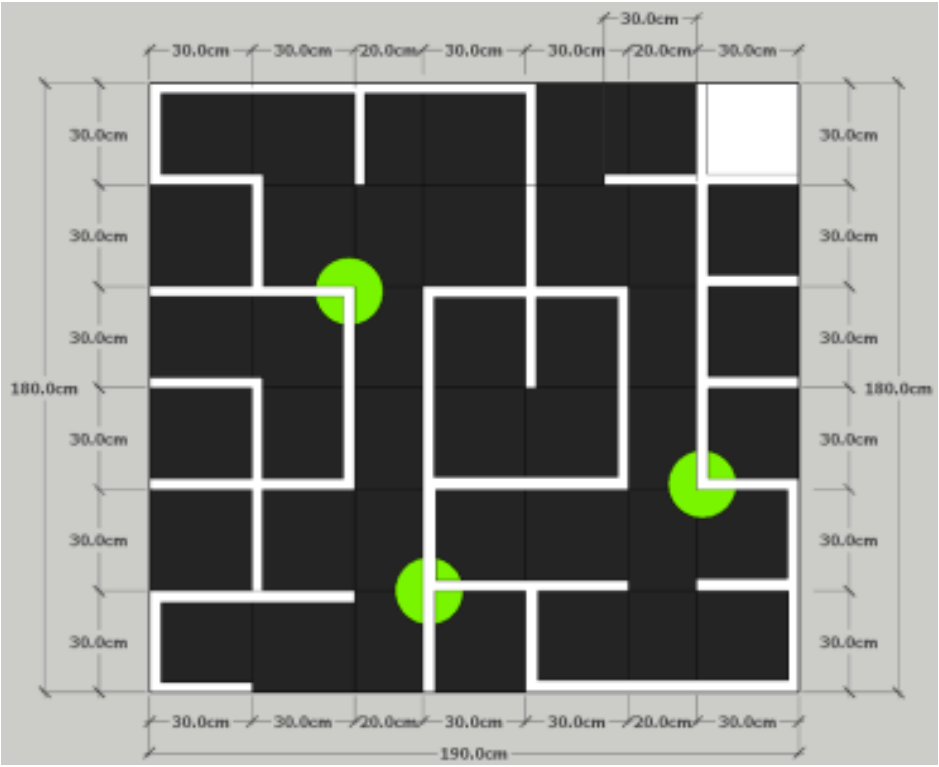

Fig 3 : Checkpoints (Indicated as Green Circles)

CONSTRUCTING THE TRACK

Since the runs will be conducted online, you are expected to construct this track at your homes. The following points guide you through this process-

- The total track spans **190cm × 180cm**. Use a room with plane flooring and negligible slope with at least **2m × 2m** of free space.
- Cover the whole area with black chart paper. Stick it firmly to the floor using tape or adhesive.
- For making the white stripes, you can use either of the three materials that work with your sensors and are available to you. It can be white chart paper, white tape or white vinyl strips.
- The width of the white strips should be kept **less than 40 mm**. The width of all strips must remain equal throughout the track.
- Stick the strips firmly to the black chart paper on the ground. Make sure the bot does not damage or remove the strips in any manner.
- The checkpoints are marked in green just to indicate their position. They are not to be made on the Track.
- For the End Zone, cover the **30 cm × 30 cm** square completely in white using any of the three materials.
- The words START and END are just for indication. They are **not** to be reciprocated in the actual track.

BOT SPECIFICATIONS

- The autonomous bot must fit into the box of dimension **220 mm × 220 mm × 220 mm** (l×b×h).
- Bot must be started by a single switch. However, a team may have an onboard switch for the restart.
- Bot must have a **LED** which will glow once it reaches the end zone of the arena.
- Bot must have an 'on board' power supply. When using the electric power supply, the potential difference between any 2 points **must not exceed 24 V** at any point of time during the game.
- The autonomous bot should not separate or split into two or more units. All bots/units which are touching each other or are in the starting point will be considered as one bot.
- The autonomous bot cannot be constructed using readymade 'Lego kits' or any readymade mechanism. But they can make use of readymade gear assemblies. Violating this clause will lead to disqualification of the team.

GAME RULES

- Only one autonomous bot per team is allowed.
- When the autonomous bot starts, no team member is allowed to touch the bot.
- At the start of the task, the bot will be placed at the starting point. Only 1 team member is allowed to be near the game field while starting the bot.
- Run will start only when organizers give the signal.
- The starting procedure of the bot should be simple and should not involve giving the bot any manual force or impulse in any direction.
- A total of **7 minutes and 30 seconds** will be given. The bot has to finish the Dry Run and the Actual Run in that period only.
- Only 1 member of the team is allowed to handle the bot.
- Participants are not allowed to keep anything inside the arena other than the bot.
- The time measured by the organizers will be final and will be used for scoring the teams.
- Time measured by any contestant by any other means is not acceptable for scoring.
- **In case of any disputes/discrepancies, the organizers' decision will be final and binding.**
- **The organizers reserve the rights to change any or all of the above rules as they deem fit.**
- Change in rules, if any will be highlighted on the website and notified to the registered teams.
- The contestant must not alter the bot in any manner that reduces its weight (e.g. removal of a bulky sensor array or switching to lighter batteries to get better speed). The organizers reserve the right to arbitrate in such circumstances.

Restarts

- The participants are allowed to take a maximum of 3 restarts in the entire match.
- If the bot needs to restart in the first part (Dry Run) of the competition, it must do so from the checkpoint.
- Once Dry Run is completed by the bot, the team won't be given any other chance for Dry Run.
- If the bot needs to restart in the second part (Actual Run) of the competition, it has to start from the start zone of the arena. The timer will not be set back to zero and will not be paused in any case.
- During a restart, a contestant must not feed information about the arena to the bot.

JUDGING

- 25 points will be awarded as it crosses any of the checkpoints but it will be counted only once for each checkpoint.
- 30 points will be provided if the bot successfully completes the Dry Run.
- 20 points will be awarder if the bot successfully completes the Actual Run
- 30 points will be awarded if bot goes through the shortest path in Actual Run (over and above the 20 points in bullet 3).
- 10 points will be awarded if the bot glows the LED upon reaching the End Zone.

SCORING

- A = 25 points × (Number of checkpoints covered during the Dry Run)
- B = 30 points if the bot successfully completes the Dry Run
- C = 180 - Total time taken in seconds in completing the Dry Run
- D= 20 points if the bot successfully completes the Actual Run
- S = 30 Points if Bot successfully completes through the Shortest Path
- T = 150 - Total time taken to complete the Actual Run (only if the bot completed in Shortest Path)
- L = 10 points if the LED glows upon reaching the End Zone. This LED should not glow in between the Dry/ Actual Run.

  Total = (A + B + C + D + S + L + T)

TEAM SPECIFICATIONS

- A team may consist of a maximum of 4 members.
- Students from different educational institutes can form a team.

Eligibility: All students with a valid identity card of their respective educational institutes are eligible to participate.

ROUND 1: ABSTRACT SUBMISSION

Participants have to submit a complete abstract with the design of the device/project. The qualifying teams will be eligible for the final round to be conducted in Techfest 2020-21. It should consist of the following:

Description of device/project	1 page
List of components utilised	Table
Gripper Mechanism employed	1 page
Photographs **OR** CAD model of the bot	All angles

Submission Details

- The abstract must be submitted in PDF format.
- Create a separate folder for the photographs/CAD model of the bot
- The Abstract and this folder must be sent via email to meshmerize@techfest.org.
- Subject of the mail: **"Meshmerize_TeamID"**
- Filename of the abstract PDF: **"Abstract_TeamID"**
- Mention your team details clearly in the mail.

The Abstract submission round is just a soft selection round. However, it is necessary to submit the abstract before the deadline to qualify for the 2nd round of the competition,which consists of the actual track runs.

Last date for Abstract Submission is **30th October.**

ROUND 2: FINAL RUNS

This is the second and final round of the competition. The teams will have to build the track according to the details provided. This round will be held in online mode. Further details will be communicated to the qualifying teams. The team with the highest score will be declared the **Winner of Meshmerize 2021-22**

TIMELINE

Last Date of Registration	30 October
Abstract Submission Deadline	30 October
First Round Results Announcement	5 November
Final Round	4/5 December

PRIZE

The prize money will be awarded to top 3 teams via **NEFT** and will be processed within 30 working days after receiving the prize money from sponsors. Top 10 participants will get a **certificate of excellence**, and top 60% participants will get a certificate of participation. Winners have to mail the following information (immediately after the announcement of results) to kunal@techfest.org.

Format of Mail

Subject: Meshmerize, Team Id, Position (example - Meshmerize, MM211003, 1st Position)

Body of mail

1. Account Holder's Name
2. Account Number
3. Bank name and Branch name.
4. IFSC Code
5. Photograph of Bank Passbook as a proof