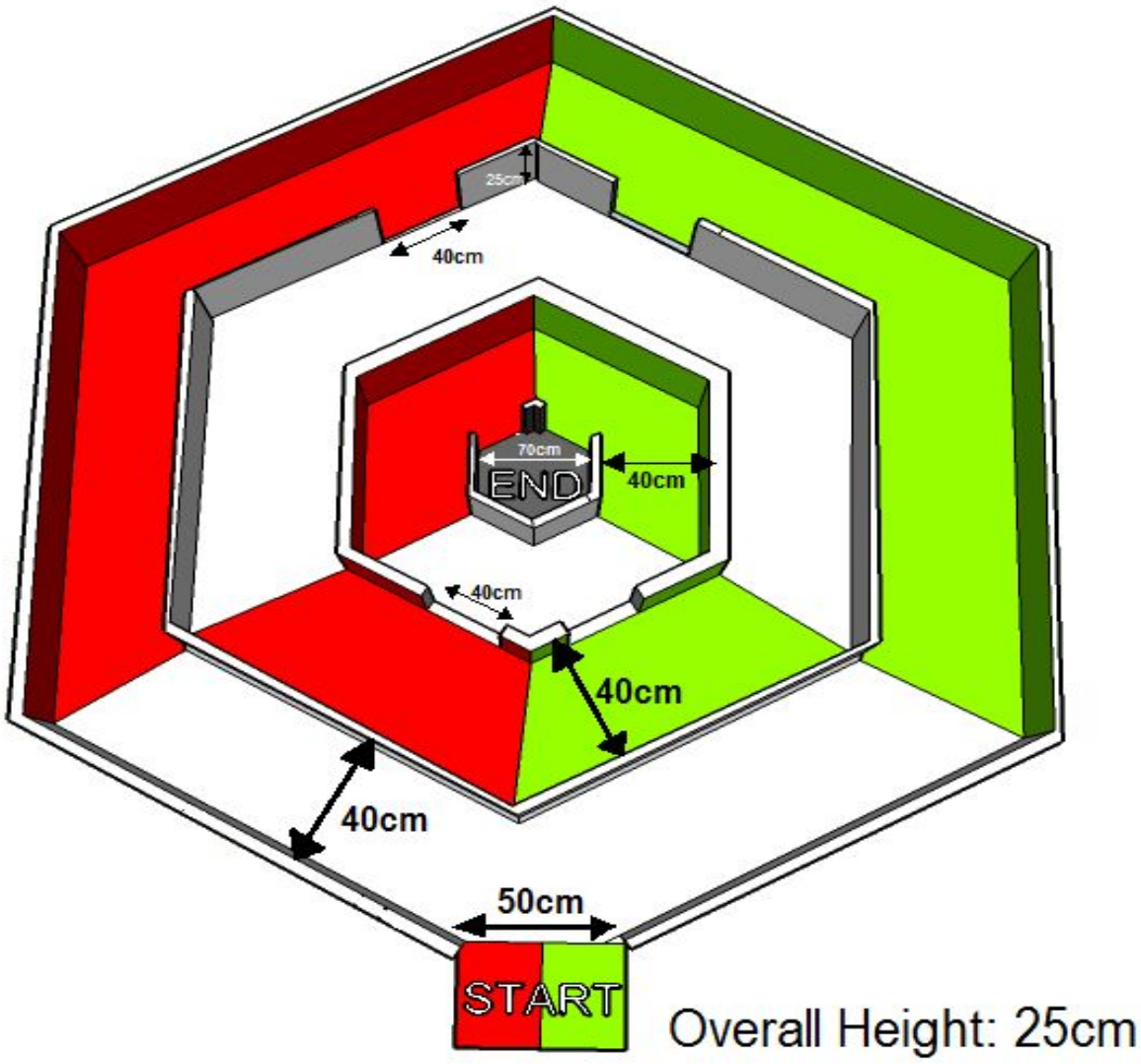
Mystifying Colours

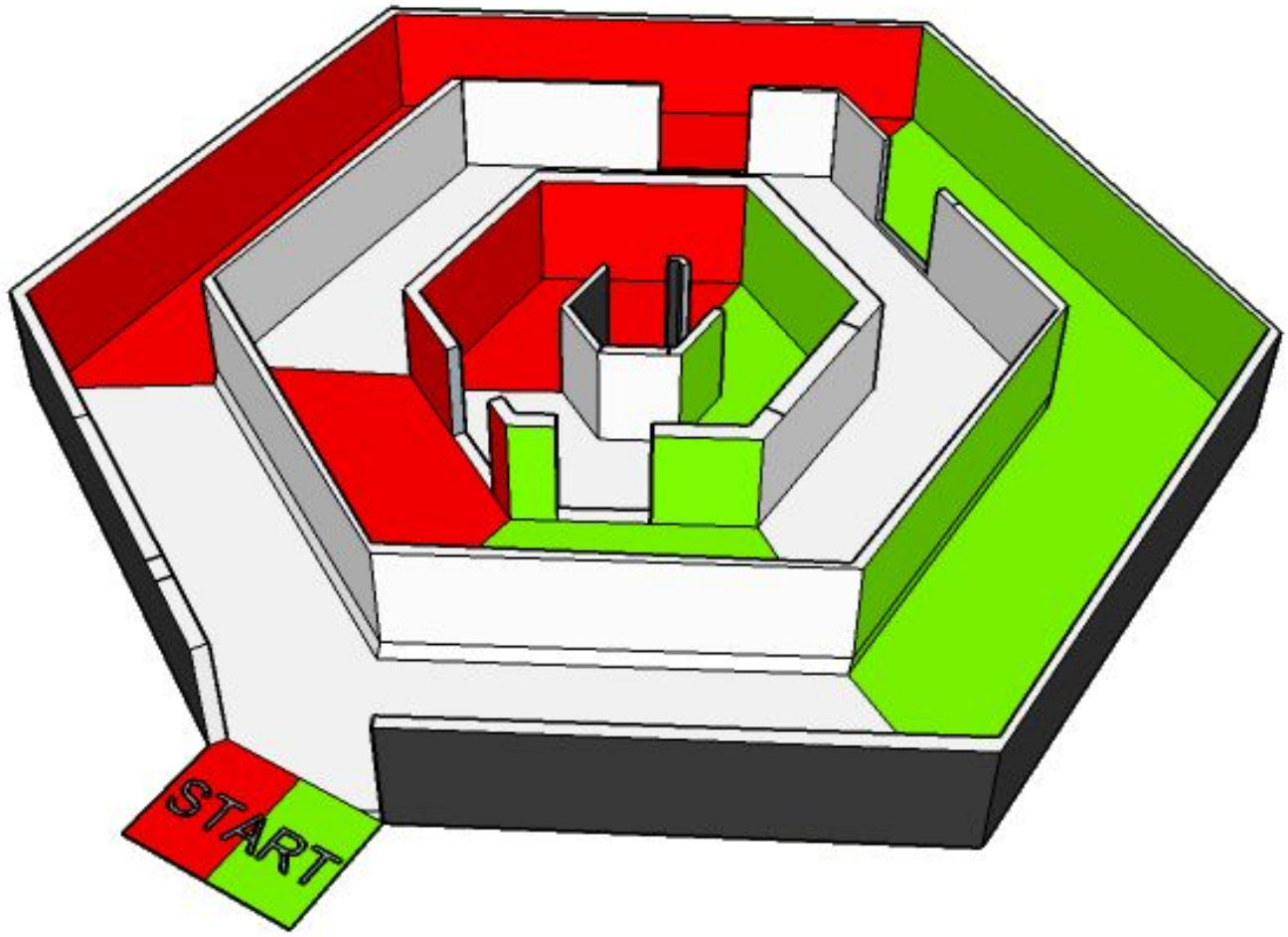
PROBLEM STATEMENT

Aim: Design and construct an autonomous robot which is capable of traversing the arena by principles of colour detection and path planning & completing the given task.

The Task: Reach the END point that is at the centre of arena, which is guided by coloured walls having openings, following a specified coloured path and avoiding other coloured paths whenever possible.

Arena Design and specifications:





- Arena is hexagonal structure consisting of concentric hexagonal structures, having a height of 20-25cm.
- The walls and floor of the arena will be of two different colours, and uncoloured spaces will be white.
- The lanes are of 40cm width as shown in picture.
- The end point is at the centre and will be painted black on the walls and floor.
- The starting tile will have floor colour as selected by team Leader by lottery system.
  The bot has to read the colour of starting tile & follow the path.

GAMEPLAY:-

PRELIMS :

- The Team leader will be called for a Toss to select the colour, over which the bot shall move. A tile of the same colour will be kept at the start point.
- The robot will be placed at the Starting tile and will be supposed to read the colour of starting tile.
- The bot is then allowed to move into the arena and find its suitable path to reach the end point at centre, keeping in mind that the bot can traverse over white colour and the chosen colour (which is the colour of starting tile), without any negative score.
- If your bot traverse over the other coloured path (except White), it suffers a negative marking of 30 in your net score.
- Your bot will be given 8 minutes time for the 1st run, which will be considered as dry run to calculate the shortest path from start to end point, avoiding negative scores.
- After the dry run, you will be given 5 minutes for your main run, within which you need to reach the centre of the arena.
- After the bot reaches END point it should glow a LED of any colour.
- Max 5 free touching with walls, after which points shall be deducted
- The top teams on the basis of score will be shortlisted for 2nd round..

FINALS :

- Like the prelims, the bots need to perform the same task but with a slight difference that the bot has to return back to its start position after reaching the END point..

- The bot should have LEDs of different colours, as per the colour of arena, and should glow the LED of respective colour of path it cross, i.e. when the bot traverse over Red path, it should glow Red LED & green LED when traversing over green path.

TIMING:-

A maximum of 8 minutes for the dry run and 5 minutes for the main round will be allotted. For the final round, 7 minutes will be allowed to complete the task.

SCORING:-

- Initially 100 points will be awarded to every team.
- Total time taken to complete the task (in minutes) *10 will be deducted from the final score.
- For following colour other than chosen colour, 15 points will be deducted.
- For following the chosen colour 15 points will be awarded.
- No points shall be awarded for white path.
- 10 points will be awarded for crossing one hexagon and getting into the concentric hexagon.
- 5 points will be deducted for touching the guide walls (if touching limit is crossed).
- 20 points will be deducted for every manual touching.
- 30 points will be deducted for each restart taken.
- 5 points will be awarded for every correct LED glow (in finals).
- 100 points will be awarded for successfully completing the task within stipulated time.

SCORING FORMULA :

Total Score =100 – 10*T – 30*X + 30*C + 10*H – 5*W +5*L – 20*M – 30*R

T = Time in minutes
X = Number of times bot went over other colour
C = Number of times bot went over the chosen colour
H = Number of Hexagon / lanes passed
W =No. of wall touch (touching limit crossed)
L = Correct LED glow (in finals)
M = Manual Touching.
R = Number of restart.

If the entire task is completed within stipulated time

Total Score= Total Score + 100

ROBOT SPECIFICATIONS:-

- Robot must not contain any readymade kits or Lego kits or any such assembly.
- However readymade microcontroller boards, sensors, chassis, gears and shafts may be used.
- The voltage difference between any two points on bot must not exceed 24 volts.
- The robot dimension must be limited by **20cm x 20cm x 20cm.**
- The robot must be completely autonomous.
- It should not receive any input from outside the arena.

TECHNICAL DETAILS:-

- Team members will not be allowed to touch any part of arena, only organizers are allowed to handle the arena in any situation, the team will be disqualified whose member is found touching the arena.
- Teams will not be allowed to change bot's mechanism and parts once the game starts.
- Participants are not allowed to keep anything inside arena other than the bot.
- During the run, the bot should not damage the arena in anyway. It is not allowed to leave anything behind or make any marks while traversing. All machines found damaging the arena will be immediately disqualified. The final decision is at the discretion of the organizer.
- The time measured by organizers will be final and will be used for scoring.
- Time measured by participants is not acceptable for scoring.
- Organizing team will not be responsible for any kind of damage to your bot.
- Organizer's decision will be final and binding in case of any dispute.
- Organizers reserve the right to change any of the above rules they deem to be fit.
- The participants will be provided with 220 Volts, 50Hz standard AC supply.
- Participants will have to themselves arrange for any other power supply required for their robot.
- There may be slight variation in dimension of the arena.
- The arena & colour pattern may be different from the picture shown above.

TEAM RULES:-

- This event is restricted to students currently studying in any recognized Educational institute.
- **A maximum of four participants are allowed per team.**
- Students from different colleges can be a part of same team.
- An individual cannot be part of more than one team. Participants must bring a valid identity card of their institute and KIITFEST ID.

CONTACT (For any queries):-

Udit Narayan mandal
Mob.: 8250287112
mandaluditnarayan@gmail.com

Debasish Dhar
Mob: 7005367884
dhar.debasish.1996@gmail.com