MAZE XPLORER

TASK

The year is 2222, where the Earth is just a word from the past. Terra, as it is called now, from a planet to a place of the existential crisis, where wars have become a key aspect of every man's life. As Leaders, Policy Makers and Dictators ravish the resources ambitiously to get to power, mankind's future becomes dark and glum. The only source of hope is held by a group who call themselves to be the "APACHES". Identified as the direct descendants of Indians, the

"APACHES "try to establish peace and prosperity and take us back to the future, the heaven of a future as it should have been. The day is 14th February 2222 as the ruthless cold storm sweeps through the entire geography of KurZekrak, the now Northern front of India. KurZehrak becomes the heart of the War and the conditions are not in favor of justice, the "APACHES "decide to retreat and build a Chakravyuha, one of the strongest military formations to defend their central command. Hid deep through this maze is a code; a code that makes you prove worthy and join the "APACHES ", a code that has the power to change the face of war as it has been, a code to peace and a better future. As no human can break it and only a cyber-physical bot could, which itself becomes an unsolvable challenge, the code vanishes through history. Thus, a task, that no man could solve but a Hero, you are the selected one.

Make a bot to traverse the maze and bring back the code to solve the crisis.

Thus, in front of you, is a code to break,
And a future to make

GAMEPLAY

The gameplay will be a single run consisting of two levels

LEVEL 1.

Solving the maze.

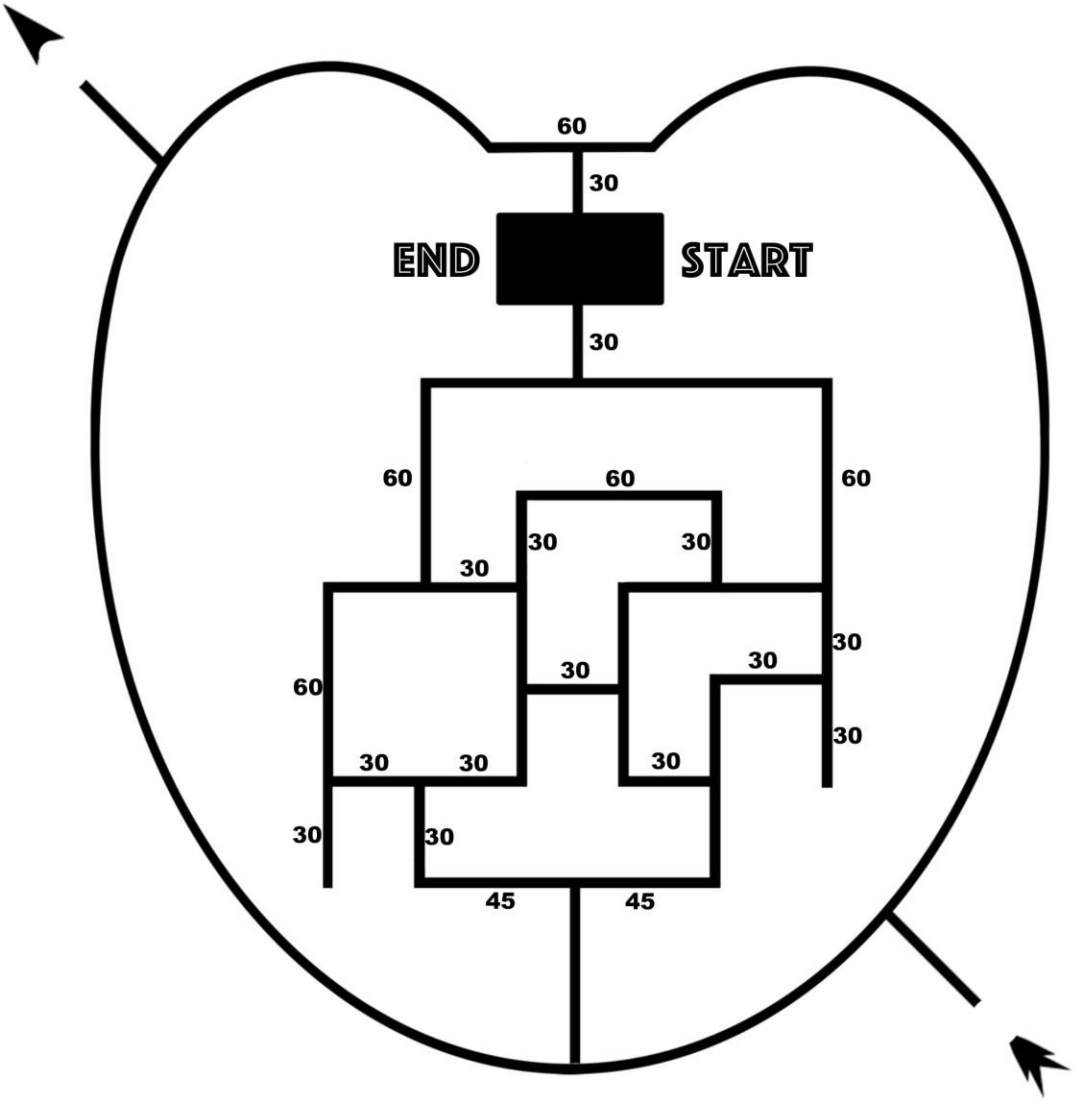
LEVEL 2.

The bot has to run through the maze detecting the color on its way till the end is reached and return back to the node having the same color as end.

EXPLANATION

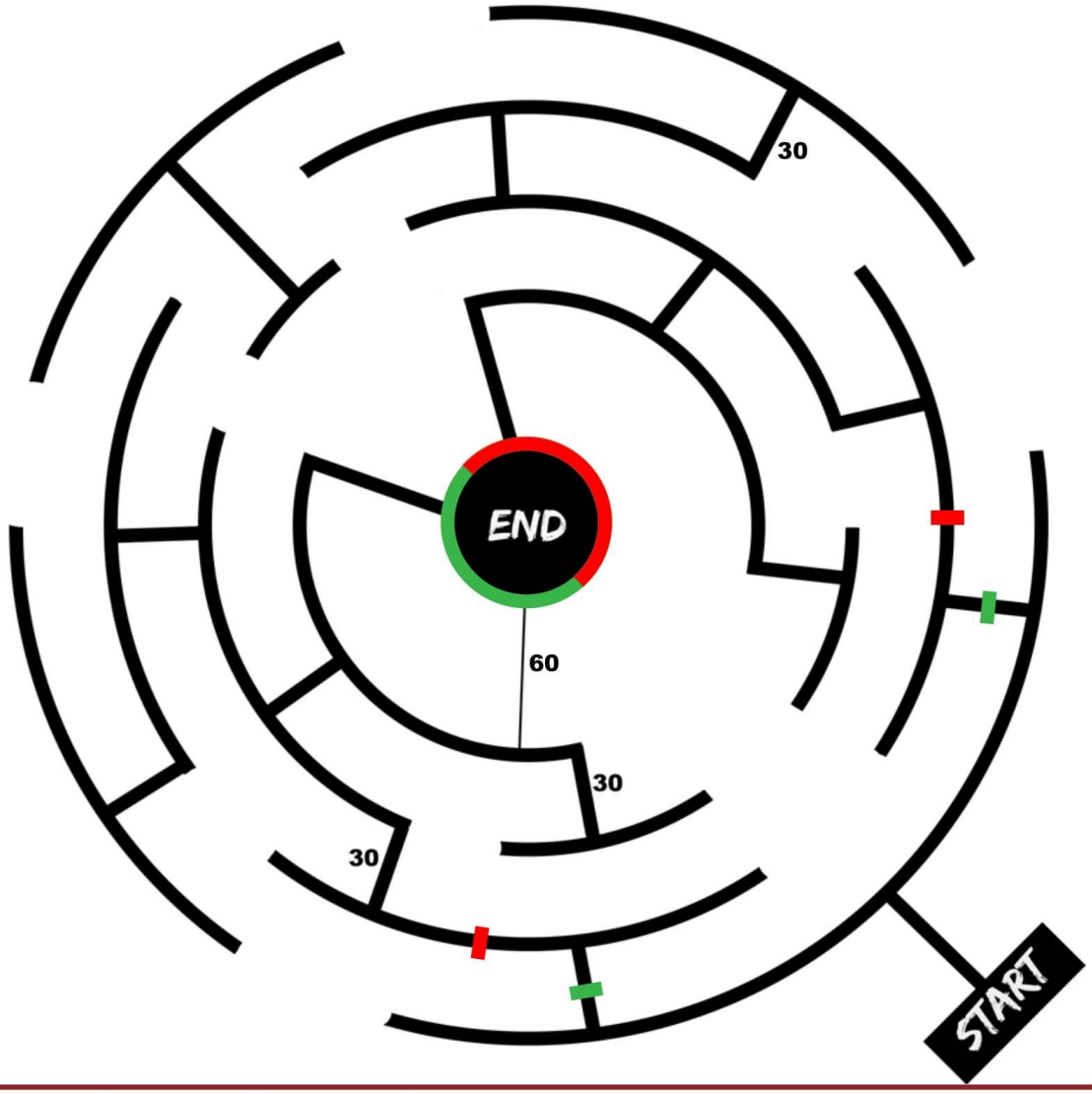
LEVEL 1:

This part consists of a MAZE which has to be traversed by the bot, beginning from the start point and then come back to the same point. The maze consists of angled turns along with curves and straight lines.


60
30
END
START
30
60
60
60
30
30
30
30
60
30
30
30
30
30
30
30
30
45
45

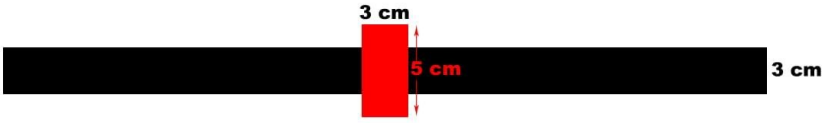
LEVEL 2:

This part consists of maze having colored nodes (2 colors). Firstly, the bot has to traverse maze till the end node by detecting the color of each node. At each colored node the bot has to blink an LED (Red LED for red and Green LED for green color node) After the node the bot has to follow their respective path (EXCEPT the END NODE). The 3rd colored node detected will be the end node. The color of end node will be one of the previous colors detected. The bot has to then reach back to the node having the same color as that of END node that was detected earlier and blink BLUE LED. The position of colored node will be dynamic and completely random.



ARENA

1. Black lines of width 3cm on white background.
2. The Level -1 maze has a dimension of 300 cm * 300cm and Level -2 maze has a dimension of 300cm * 300 cm.
3.The maze consists of various dead ends but the END is a colored node (3rd colored node from start).
4.Colored node is a rectangle of 5cm*3cm



RULES FOR THE EVENT

1. Only one team is allowed to run on the track at a time.
2. Each team has to complete maze-level 1 to qualify for the next round.
3. If a team qualifies for the second level, the team will be allowed to change their code for level 2 and same code should be submitted.
4. Three restarts are allowed on each level.
5. The bot has to complete the levels in minimum possible time for the first round. For the second round there is no time limitation.
6. For the second round if the bot reaches the respective color (after the end node is detected) using shortest path then extra points will be awarded.
7. The bot will be marked by a number and it should be there till the event has completed. If the team tries to remove or change the number the team will be disqualified.
8. Reorientation of the bot during the run is not permitted except at the END node of the second round.

ELIGIBILITY

1. The participant must be a registered student of an educational institution.

BOT SPECIFICATION

1. Each team is allowed to have only one autonomous bot.
2. The bot must fit into cuboids of 20x20x20cm {Length x Breadth x Height}.
3. The bot should not communicate with any other devices. Data transfer violation will lead to disqualification.
4. During the run, the autonomous bot must not damage the arena in any way. It is not allowed to leave anything behind or make any marks while traversing the arena. Any bot found damaging the arena will be immediately disqualified. The final decision is at the discretion of the organizers.
5. The Machine 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
6. The robots can use on-board or off-board power supplies.

POWER SUPPLY

1. The potential difference between any two points of the robots must not exceed 24 V DC.
2. The robots can use on-board or off-board power supplies.
3. The method of propulsion is at the discretion of the builder, provided that the power source is non-polluting.
4. 12-volt power supply adapter will be available at the main arena for the final run.

SCORING

LEVEL 1:

1. 40 points will be awarded for completing the maze.
2. (180– T) points will be awarded to the bot finishing the maze traverse in T seconds for T< 180 seconds.
3. 10 points will be deducted for every restart. (maximum 3 restarts are allowed)

LEVEL 2:

1. 40 points will be awarded for reaching the end.
2. 10 points will be awarded for every correct detection of colored node and blinking respective LEDs including the END node..
3. 20 points will be awarded for shortest path.
4. 10 points will be deducted for every restart. (maximum 3 restarts are allowed)

GENERAL RULES

• Participant from different registered educational institution can form a team.
• Max team size should be of 5 members.
• Each team should get ready in the given time for the run, failing can cause disqualification.
• The bot should not cause damage arena by any mean.
• Bots will undergo an authenticity check for the qualifying round, the participant should not dismantle their bot before completion of all rounds.
• Hard coding will lead to immediate disqualification.
• Participants must bring a valid identity card of their respective institutions.
• Participants are not permitted to enter any information into the equipment during the run, thus bot has to be fully autonomous.
• Decision made by the Organizer shall be treated as final.

NOTE

- Position of nodes on the maze can vary and color of END node may vary from the given figure.
- Colored Nodes will be of RED and GREEN color.
- Winner will be decided on the basis of round 2 score. In case of tie, time will be the tie breaker.
- The actual maze may differ from the images shown.

CONTACT

- UTKARSH MADDHESHIYA
  - 6307510922
  - utkarsh.maddheshiya.ece17@itbhu.ac.in
- ATIF ASHHAR
  - 8423796870
  - atif.ashhar.ece17@itbhu.ac.in
- UTKARSH SAXENA
  - 9517623507
  - utkarsh.saxena.chy17@itbhu.ac.in
- S. ABHISHEKK
  - 7800069375
  - sugali.alnaikk.ece17@itbhu.ac.in
- ARPIT KUMAR SINGH
  - 8004505920
  - arpitkumar.singh.met17@itbhu.ac.in