MAZE EXPLORER

TASK

You are in the year 2170 and your EARTH is facing huge catastrophe and you do not have appropriate technology to overcome it. So, you must travel to multiverse via complex breach to reach another Earth before our EARTH get destroyed. After reaching multiverse Earth, you have to send Signal to OUR EARTH to give hope to people. So, your task is to build an autonomous bot to bring the technology to our Earth and Save our earth.

GAMEPLAY

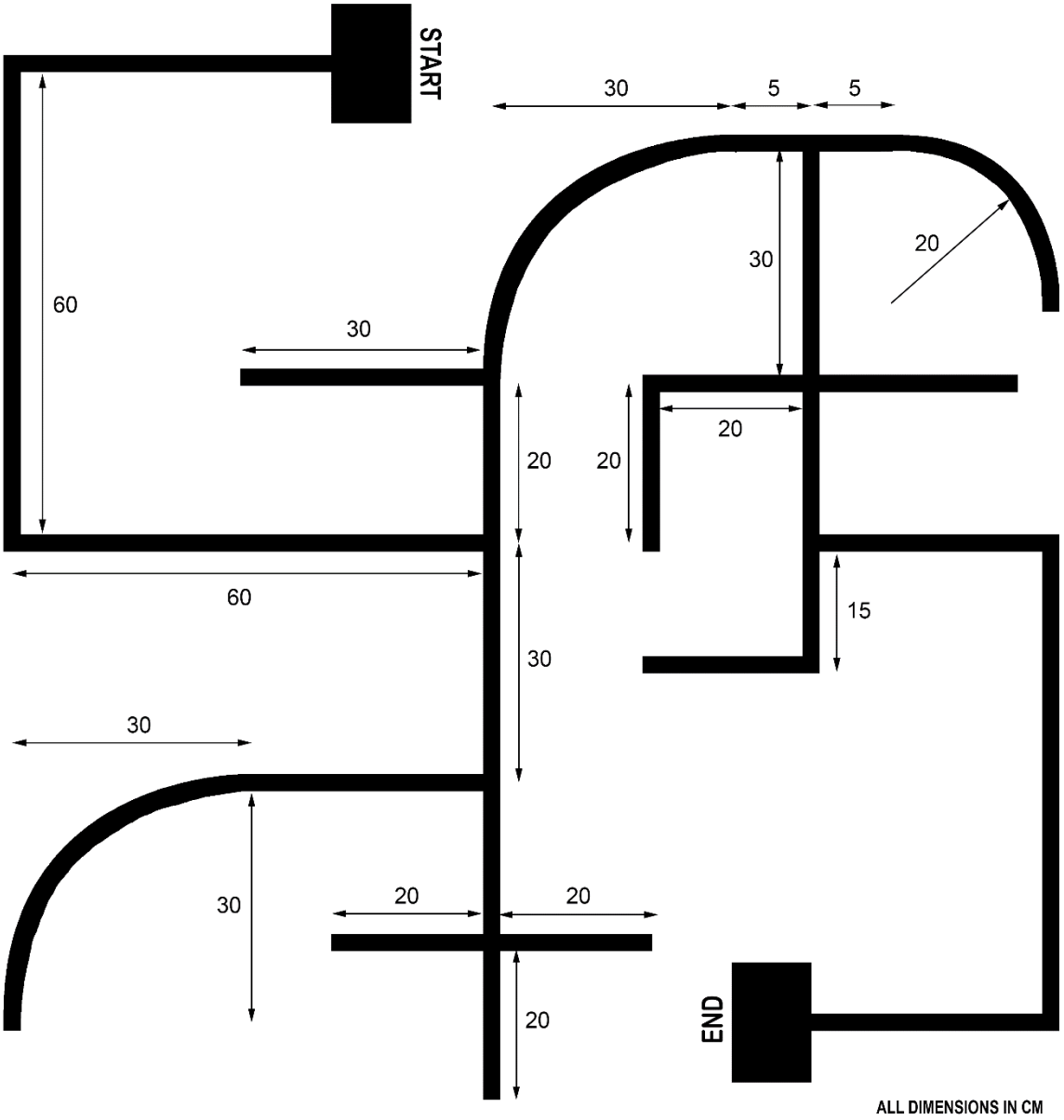
The game play will be a single run consisting of two levels

LEVEL 1. Solving the maze.

LEVEL 2. Traversing a maze in shortest path using node detection.

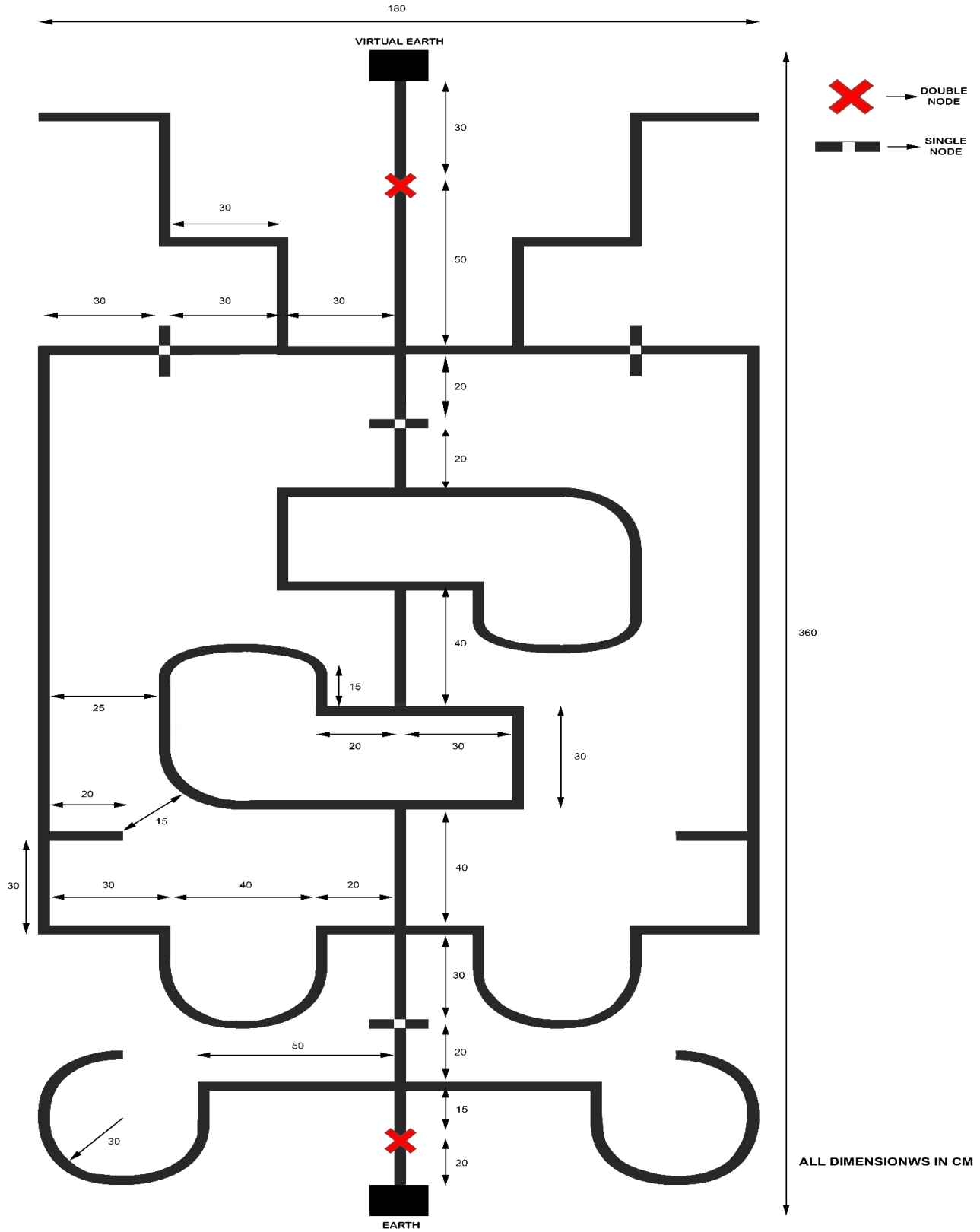
LEVEL -1: SOLVING THE MAZE

This part consists of a MAZE which has to be traversed by the bot, beginning from a specified start point and then reach the end point which is characterized by a black patch of dimensions 15 cm x 10cm. The maze consists of angled turns along with curves and straight lines.



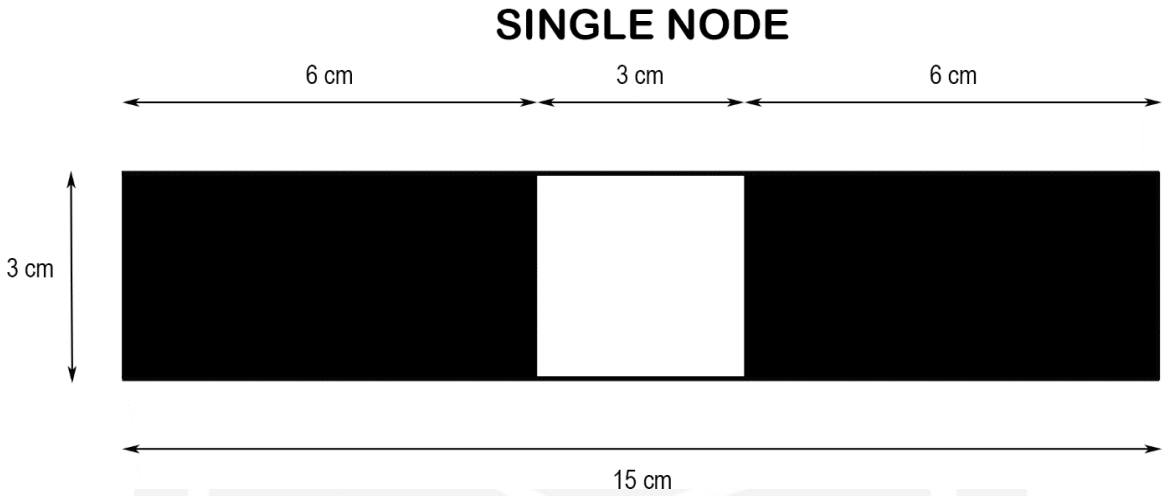
LEVEL -2: MAZE TRAVERSING AND NODE DETECTION

This part consists of a maze having two type of nodes (a node may be present on the ground level or at a height of 20cm with adjustable level of ±5cm (i.e. from 15cm to 25 cm)) which has to be traversed by the bot, beginning from a specified start point(earth) and then reach the end point of dimensions 15X10cm (Virtual Earth), and blink a **WHITE LED 3 times**. The maze consists of angled turns along with curves and straight lines and consists of loops. The nodes are represented by white squares of size 3 x 3 cm. The bot has to traverse the maze and if the bot detects a single node it should blink **RED LED** and go straight at next immediate junction/turn. If the bot detects double node (i.e. both at ground level and at height) it should blink **BLUE LED** and follow their respective algorithm of maze travel. The position of the nodes will be dynamic and completely random.

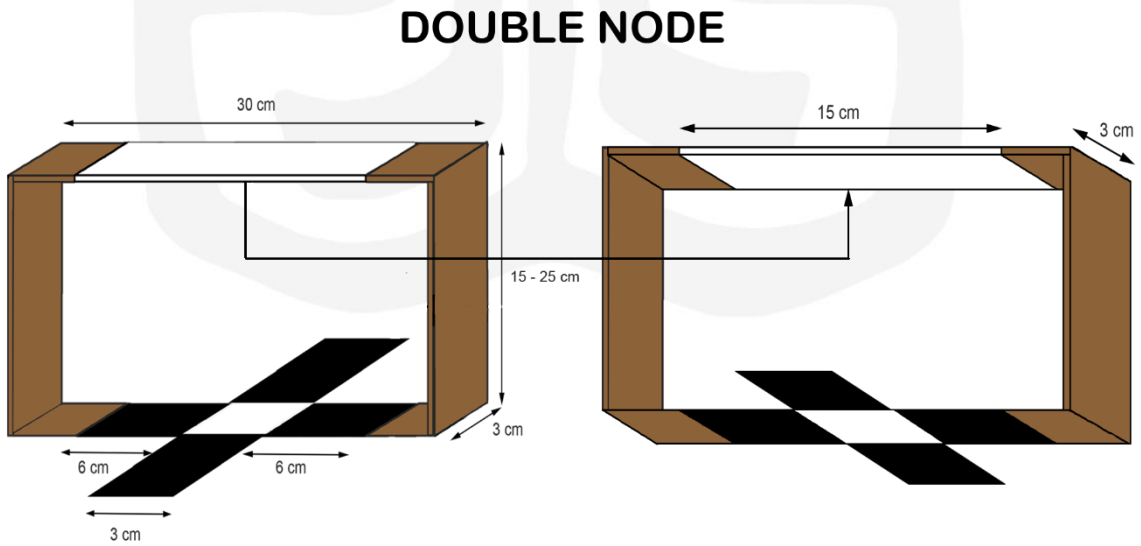

180
VIRTUAL EARTH
30
50
30
30
30
30
20
20
40
15
25
20
30
30
20
15
40
30
30
40
20
30
50
20
15
30
20
EARTH
360
DOUBLE NODE
SINGLE NODE
ALL DIMENSIONWS IN CM

TECHNICAL TERMS

Single Node: It is represented by a white square of 3*3 cm and occur only at the intersection of 4 lines



Double Node: It consists of two nodes, one at the ground level and the other at a height of 20cm with an adjustable level of 5cm just above ground node. The ground Node is represented by white square of 3*3 cm which occur at the intersection of 4 lines. A white rectangle at a height of 15cm (± 5cm) from the ground level is the other node.



ARENA

1. Black lines of width 3cm on white background.

2.The Level -1 maze has a dimension of 120cm x 120cm and Level -2 maze has a dimension of 360cm x 180cm.

3. The nodes will be located at 20cm distance from the turn and it is white square of 3x3cm.

4. The upper node will be at a distance 20cm (±5cm) and participant should fix the sensor so that it detects on the upper node.

5. The maze consists of a number of dead ends but there exist some paths from the entry point of the maze to the destination, one of which the bot needs to traverse.

RULES FOR 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 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 in each level.
5. The bot has to complete the levels in minimum possible time.
6. 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.
7. Reorientation of the bot during run is not permitted.

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.

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 main arena for final run.

SCORING

FOR LEVEL -1

1. **20 points** will be awarded for completing the maze.
2. **(300 – T) points** will be awarded to the bot finishing the maze traverse in T seconds for T< 300 seconds.
3. **10 points** will be awarded for proper PID following.
4. **5 points** will be awarded for traversing the maze without restart.

FOR LEVEL -2

1. **5 points** will be awarded for correct detection of single type node and blinking of correct color LED at each node.
2. **10 points** will be awarded for correct detection of double type node and blinking of correct color LED at each node.
3. **30 points** will be awarded for completing the maze by traversing shortest path.
4. **20 points** will be awarded for completing the maze.
5. **10 points** will be awarded for blinking **White LED** at end.

Winner will be decided according to maximum points earned by the bot in each level.
In case of a tie, winner will be decided by time taken to complete the maze.

GENERAL RULES

• Participant from different registered educational institution can form team.

• Max team size should be of 5 members.

• Each team should get ready in given time for run, failing can cause disqualification.

• The bot should not cause damage arena and surrounding by any mean.

• Bots will undergo 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 Organizer shall be treated as final**.

NOTE

- Position of nodes on the maze can vary.
- Actual maze may differ then the images shown.

CONTACTS

- VISHAL SHEKHAR SINGH
  8948208043
  vishalshekhar.singh.mec16@itbhu.ac.in
- VISHAL SINGH
  8604872677
  vishal.singh.ece16@itbhu.ac.in
- SHUBHANSHU
  7525980212
  shubhanshu.student.ece16@itbhu.ac.in
- AMIT RAJAN
  9431399340
  amit.ranjan.mec16@itbhu.ac.in