MAZE RUNNER

GC Points: 250

Venue: Robotics Club Room, New SAC

Date : 28/10/19

Contact Details

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Introduction

A quick development of innovation moves us to plan the best choice for an accurate mission. Numerous independent automated innovations are intimated in the lives of individuals making their work much easier. Autonomous navigation is an important feature that allows a mobile robot to independently move from one point to another without intervention from a human operator.

Applications of such maze-solving autonomous vehicles range from simple tasks like robots employed in industries to carry goods through factories, office buildings and other workspaces to dangerous or difficult to reach areas like bomb-sniffing, finding humans in the wreckage, etc.

Maze solver can be very helpful for the military where robots may traverse unknown terrain finding their own path while avoiding or moving obstacles out of the way and in rescue or emergency scenarios. In addition, it may be useful in earthquake-affected areas that it may deem unstable rubble.

In this problem-

- We challenge you to build a bot which is capable of solving a maze in the least possible time without human intervention.
- There will be 3 mazes in total each with an increasing level of difficulty.
- The mazes may have paths leading to dead ends. In this case, the bot is expected to return and find the right path autonomously.

Specifications of Maze-

- Width of the gap is 30 cm
- Height of walls in the maze is 20cm
- All the turns are of 90 degrees.
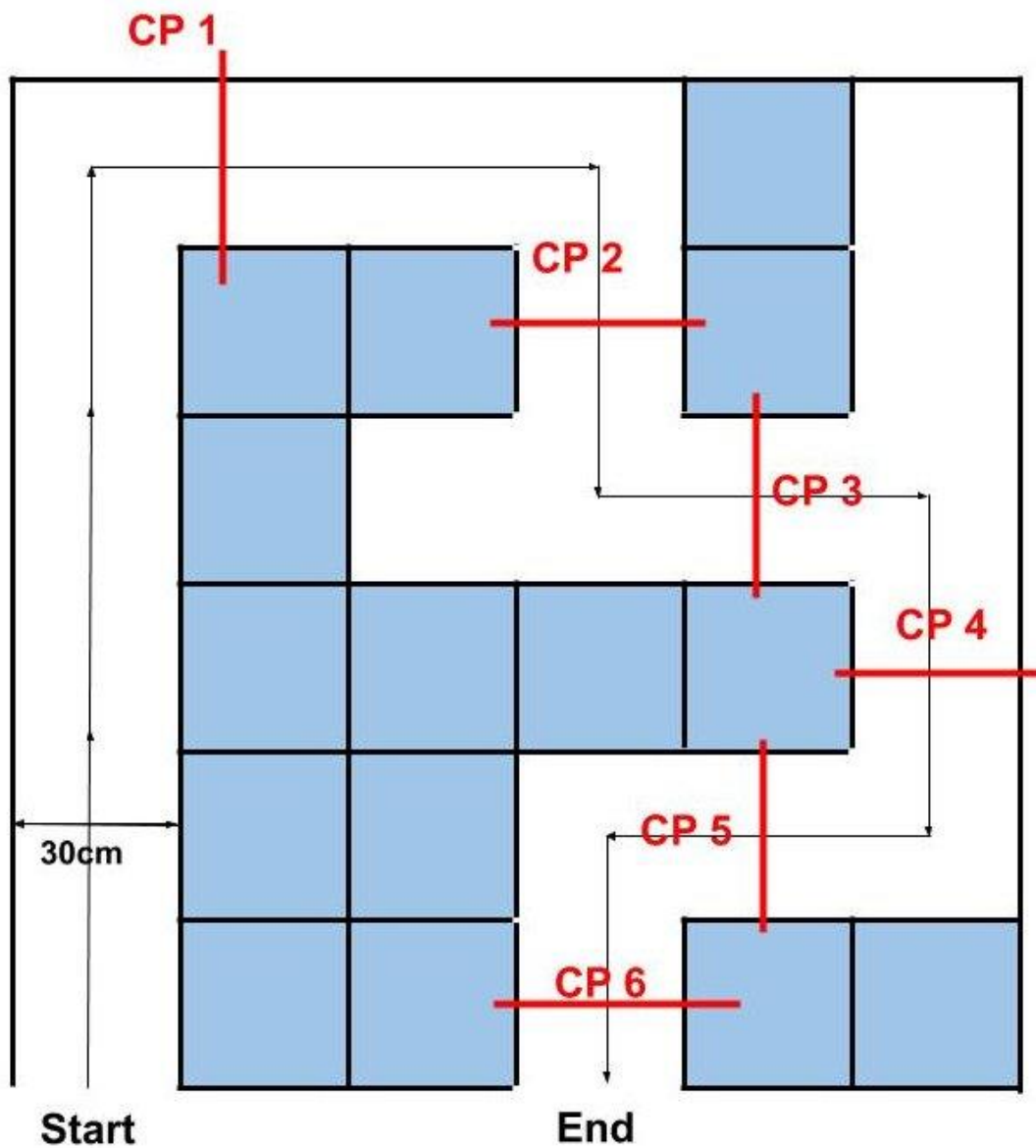- Sample maze is shown below

Specifications of Bot-

- Maximum dimensions 20cm X 20cm X 20cm (including wheels and sensors).
- If the bot goes outside specified dimension then 5% deduction will be done for 1st centimetre and then 1% deduction per millimeter from the total marks they have gained.
- The bot should be completely autonomous.
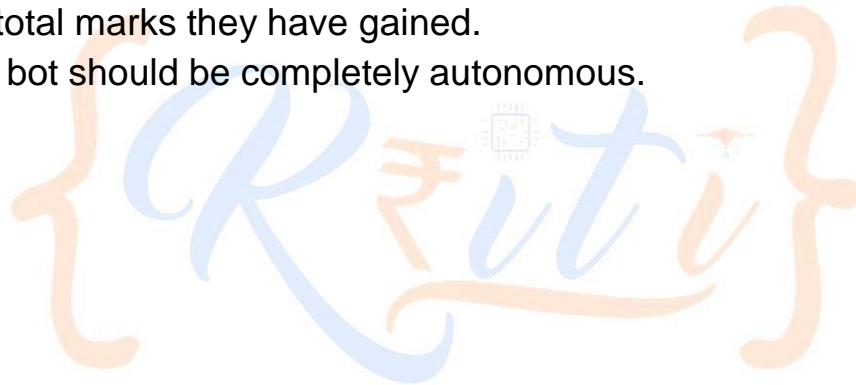
Sample Maze

- This is just a sample maze. At the time of event 3 mazes will be used which will be different from the above show one.
- CP → Check Point

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Marking Scheme

- Total marks = 350
- There are a total of three stages, each with an increasing level of difficulty of the maze.
- Total marks scored are sum of the marks scored in each maze.
- Maze 1, maze 2 and maze 3 have total marks of 60, 100 and 150 respectively.
- You need to clear maze 1 to proceed to maze 2 and maze 2 to proceed to maze 3.
- Each maze has several checkpoints crossing which will fetch marks.
- Marks for presentation are 40. To qualify for presentation, the bot needs to successfully cross the first checkpoint of maze 1.
- In case you need to touch the bot marks will be deducted in Arithmetic Progression. Marks deducted = $a + (n-1)d$ where $a = 10$ and $d = 5$ i.e. -10 for 1st touch, -15 for 2nd and so on.
- In case two or more teams score the same points:
  - First, the number of stages cleared would be compared.
  - If both teams cleared n stages and the tie persists, then the following quantity would be compared:
    Time Term = $(T1 + T2 + T3)/3$
    Ti: Time taken to clear stage i
    The team with lower time term wins.
  - If the tie still persists, both teams get the same rank.

Marking Scheme for GC

- For this event, the GC Point distribution will feature a different structure.

- All teams crossing checkpoint 1 on maze 1 will be considered for ranking (tie-breaking for these teams will be done according to the aforementioned marking scheme).

1st	250 points
2nd	200 points
3rd	150 points
4th	125 points
5th	100 points
Others	50 points • For the presentation and successfully crossing checkpoint 1. 0 points • If unable to fulfil even 1 of the above-mentioned conditions.

People who cannot participate:

- Vineet Singla
- Tejasvee Panwar
- Umang
- Sparsh Dutta