AAROHAN 2020

Organized by
Team Aavishkar, NIT Durgapur

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Explorateur

'Explorateur' is the French word for pathfinder, one who decides their path using their own discretion; much like an autonomous bot which finds its way through the track all by itself.

Problem Statement:

Design a fully autonomous robot which is capable of following a black line on a white floor, detecting obstacles.

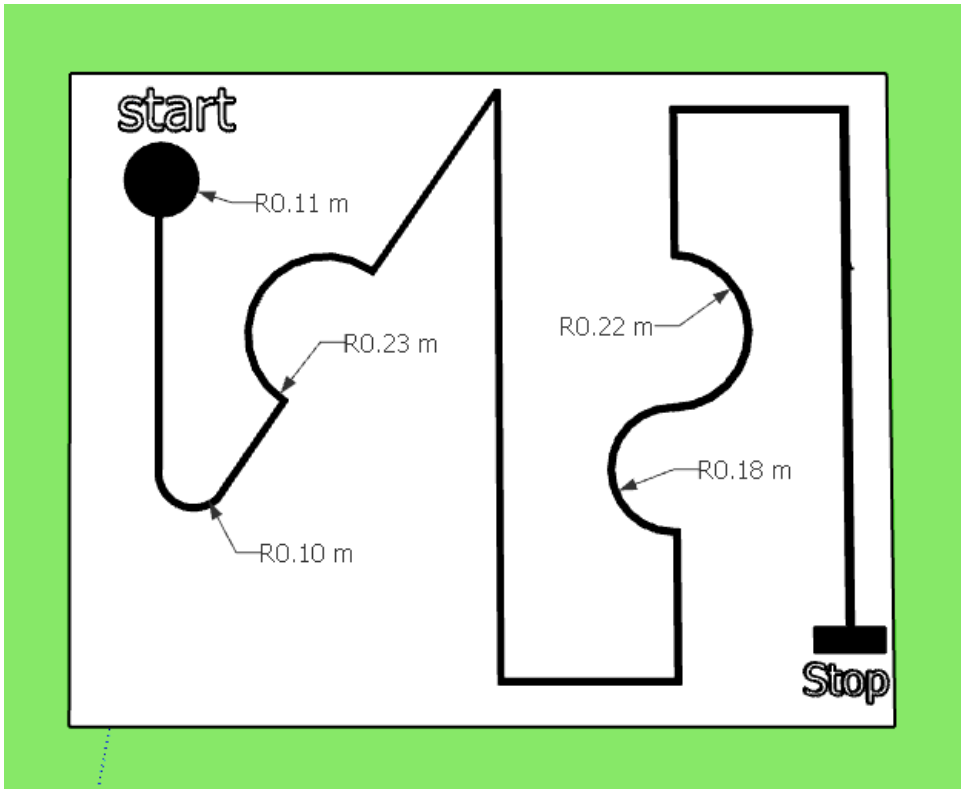
The event has 2 rounds:

1. Preliminary Round
2. Final Round

Preliminary round:

The Preliminary Round is **the line follower** round.

The track to be followed:



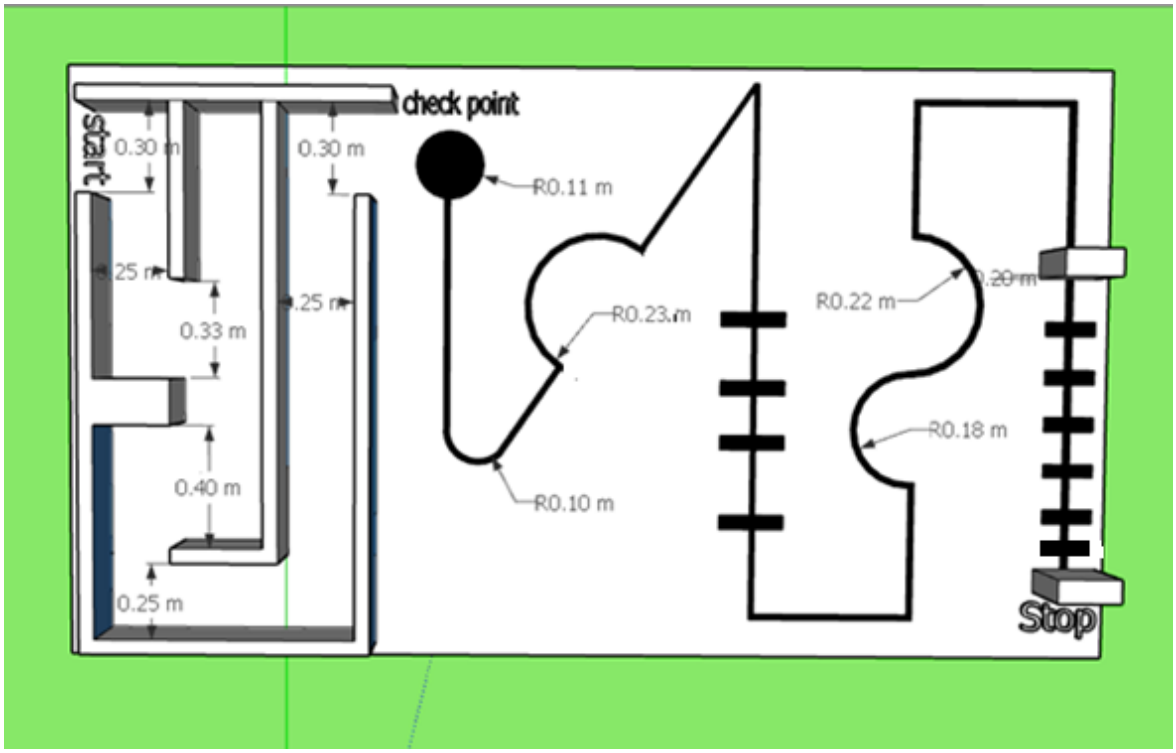
- The bot starts from the "start" position and follows a black line on a white surface.
- Your bot should be able to follow the black line and finally reach the black rectangle where it should stop automatically. This is the end of the track.
- The entire journey will be timed with a maximum time of 5 mins (900 seconds) after which your team shall be disqualified.
- Points will be deducted when some manual assistance is needed or if your bot goes out of track (even if it comes back on track without manual assistance).

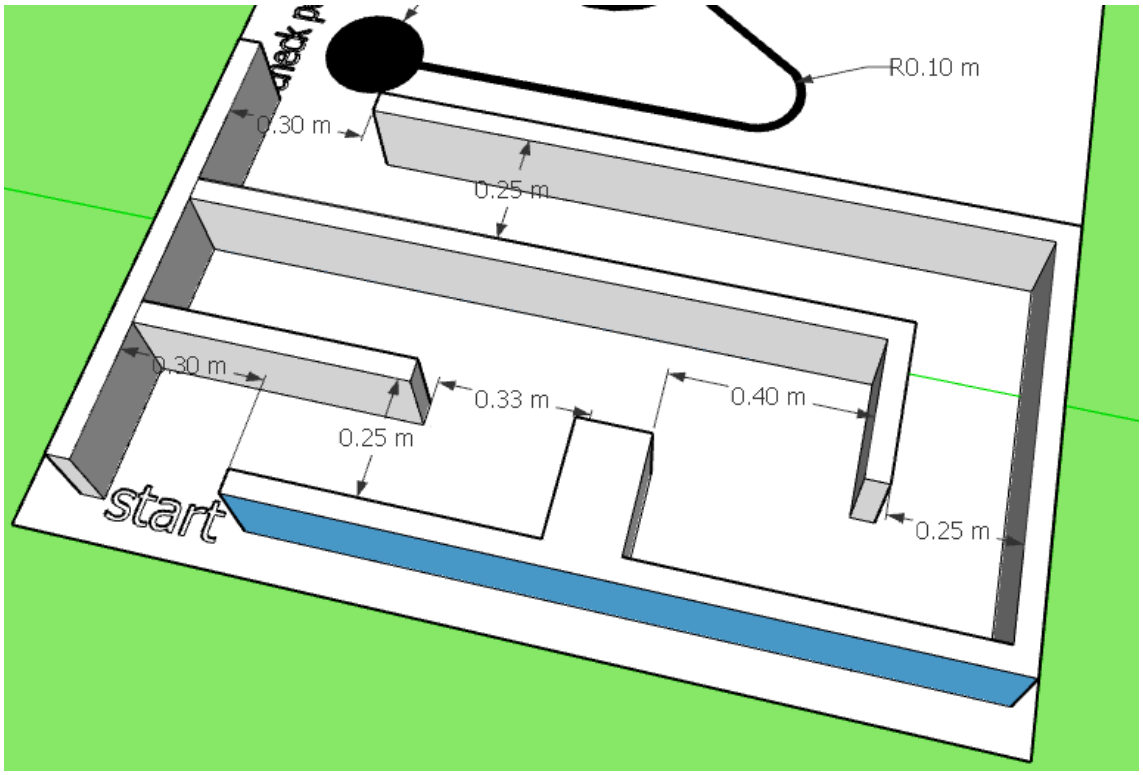
Final round:

The final round consists of two parts:

1. The Maze region 2. The Line following region

The full track in shown in the picture below:





The average gap between two walls in the maze is about 25cm (0.25m). The walls are 20cm (0.20m) in height. The entire arena is about 2m x 3.5m in dimensions.

- The bot starts from the "**start**" position, travels through the maze avoiding walls (obstacles) and reaches a check point as shown above.
- At the **check point**, time will be given to upload a new code after which the bot shall follow a black line on a white surface.
- The wooden block indicates a barricade (obstacle). The bot must stop on detecting the first barricade (points will be deducted if the bot hits/touches the barricade).
- The bot must count the number of black strips in its path (lying perpendicular to the direction of bots motion) till this point (say n). **(Note: the number of black strips placed will vary from team to team which will be decided by rolling a die, the number of black strips in the given figure is just an example)**
- The barricade is then removed.

- Once the barricade is removed, the bot must continue to follow the line and then stop for 20 secs at the nth black strip present after the barricade. The bot must also use a buzzer to buzz once after stopping at the nth strip.
- After waiting for 20 seconds it should continue to follow the line and stop on detecting the 2nd barricade. This is the end of your track.
- The entire journey will be timed with a **maximum time of 10 mins** after which your team shall be disqualified.
- Points will be deducted when some manual assistance is needed or if your bot goes out of track (even if it comes back on track without manual assistance).

Specifications of the bot:

- Bot of any dimension is allowed as long as it can go through the track without destroying the arena.
- The bot should be fully autonomous.
  Using a semi-autonomous bot (Bluetooth or Wi-Fi controlled) is allowed in the maze, but your score obtained will be halved.

General Rules:

- Each team can have a maximum of four participants.
- Only a maximum of two participants are allowed to enter the arena during the game.
- Number of timeouts allowed per team: 2 in preliminary round, 3 in final round.
- Maximum time allowed per timeout: 60 seconds.
- No harm is to be caused to the arena or to the other bots.
- The judges' decision is final and binding.

Scoring System:

- Each team is initially awarded with 500 points in the preliminary round and 1000 points in the final round.
- 50 points are deducted each time the bot deviates from its path or touches the walls.
- 100 points are awarded if the bot stops at the stop rectangle (in prelims).
- 50 points are deducted if the bot does not stop on detecting the barricades (in final round).
- 200 points awarded if the bot halts at the correct strip after the first barricade (in final round).

Contact Details:

Riddhi: 9874614344

Aashrey: 9637752014

ALL THE BEST FOR AAROHAN!