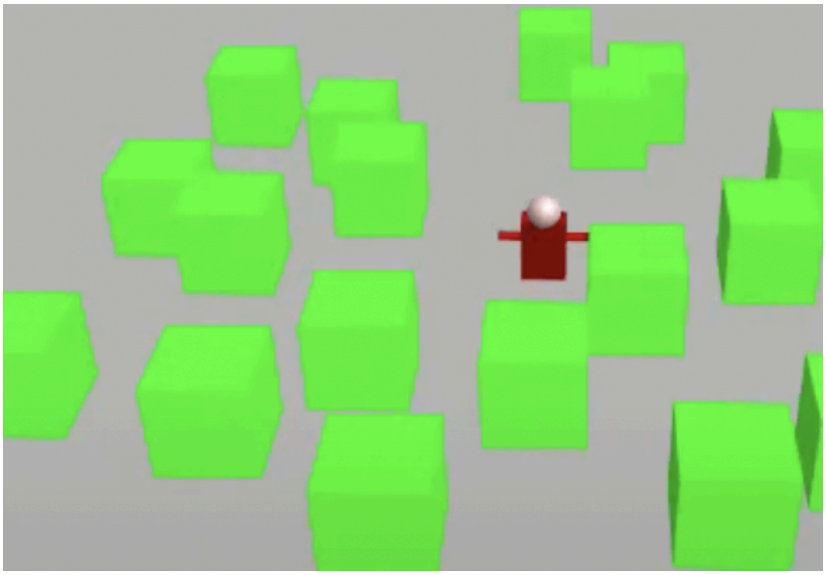
Instructions :

1. Strongly recommend using AI tools like ChatGPT.
2. Try to finish Task 1 in 2.5 hours, Task 2 in 2.5 hours and Task 3 in 2.5 hours
3. Task 1 is compulsory, Task 2 and 3 are optional.
4. Task 1 is in python, Task 2 and 3 will require knowledge of frontend
5. We will evaluate your problem-solving approach.
6. Use this Repo: Sim-1 Repo



Task: Part 1: Implement Automatic Collision-Free Route Planning

Objective: Automatically generate a collision-free path for the robot to reach the exit or a predefined goal position.

Steps:

1. Run the Simulator:

- Clone and start the project using the README instructions.

- Make sure the WebSocket and Flask servers are running.
- Play with the end points given in the readme, to understand the sim.

Your Mission is to create a self-driving robot which will move toward a set goal point, in increasingly complex environments with minimum collisions.

- The goal should be dynamically set in the code close to one of the corners.
- The robot should be able to use the **/capture** end point to avoid obstacles by seeing in the image, and move toward the goal using (**/move or /move_rel**) to navigate.
- It's critical that solutions have to leverage computer vision, and cannot use hardcoded locations of obstacles.
- The robot must reach the goal with minimum collisions.
- Must be fully autonomous: No manual input after launch.

Deliverable:

- **Level 1: Video** of robot moving autonomously in the environment, reaching a goal for four runs, with goal posts in different corners, and the average number of collisions it did to reach the goal.
- **Level 2**: **Video** with the obstacles moving (with the help of the moving obstacles end point) and the robot reaching the goal (four attempts, with goals in four corners respectively) with moving obstacles.
- **Level 3: Submit a graph** of speed of the obstacles vs the average no. of collisions for that speed taken to reach the goals.
- Submit your code as a **Github Repo Link**, with instructions to run. (keep your repo private, just give collaborator access to liveamrit, techtera and thor-harsh)

We have an upper cap of candidates who will be selected by this task, so please don't share your work. Further, shortlisting will be based on the basis of what performance is achieved. Also tasks without Video submissions will be rejected.

If you are able to create Level 1 Video, submit, and then start working on Level 2 Video. So, you can do multiple submissions (your final submission) should have all the best videos. Repo must not be updated after final submission.

Submission Form

Deadline: 11:59 PM (19th Tuesday)