IESL Robogames - Challenge 1

This is an optional challenge that you can try to complete before the actual ranked challenge of Robogames 2022. Even though it is optional it is highly recommended that you complete this challenge as the final challenge will only have a duration of a week and there will be lots to do. All who complete this challenge will have a head start.

Resources

You will be provided with this document, and a Webots project containing the world file. The world file will contain the maze (arena), “E-puck” robot, and a supervisor robot (not a physical robot). The supervisor robot will determine the rules of the challenge. It will keep the score and generate collectibles etc.

Extract the .zip file, go to worlds folder and double click on “FinalizedMaze.wbt” to open the world.

Challenge Description

This is a simple challenge. As you are most probably aware, Sri Lanka now faces an economic crisis centred around the currency. The robot “Dave”, has decided to collect rupees scattered across the country and convert them into US Dollars. You have to teach Dave to collect Rupees and convert it into Dollars.

Rules

- Rupees are yellow spheres. They will be generated randomly. (Run the simulation to see a couple of them)
- Only two of these will be present in the maze at the same time.
- Dave needs to move towards a yellow sphere to collect the rupees.

- Each yellow sphere contains 1000 LKR.
- The exchange rate is 360 LKR = 1 USD
- When Dave moves into the white square in the maze (the goal), all rupees Dave currently possesses, will be converted into Dollars.
- Only dollars will be counted for the final score. Not rupees.
- Dave's wallet can only hold 3000 LKR at once.
- Dave can hold an infinite amount of Dollars.
- If you exceed the maximum amount allowable in Dave's wallet, the Exceeding amount will be lost.

Emitter

The supervisor robot will contain an emitter that will transmit certain data in channel 1. This data will be useful for Dave. Since Dave has a receiver built-in, he can listen to channel 1 and receive that data. Click here to see how to use Receivers in Webots. The data will be transmitted as a JSON string.

Data that will be transmitted:

- Time passed since the start of the simulation in milliseconds.
- X,Y coordinates of collectibles (yellow spheres that contain rupees)
- Amount of rupees that Dave currently possess
- Amount of dollars that Dave currently possess
- X,Y coordinates of the goal (Try to make Dave reach the centre of the goal because even though the goal looks like a white rectangle, the actual goal that the supervisor considers is a circle. As long as Dave reaches the precise goal coordinates that the emitter transmits, it will work)

Deliverables

You will need to submit the controller code of Dave. This is the only submission that will be accepted. You cannot make any changes to the robot.

Warnings

- DO NOT change the supervisor code. You can easily edit the supervisor code and change the rules of the challenge, but since we only accept the controller code of Dave, those changes will not be there when we run your code to evaluate.

- We will run your code on our computers to evaluate. If there are any errors we will let you know as we want all of your submissions to be valid.

- There are only 2 weeks until the initial challenge ends and the final one begins. Only 1 week will be there for you to complete the final challenge. If this plan seems impractical, we will release another challenge after 1 week, so that the difference in difficulty between the initial and the final challenge will diminish.

- DO NOT try to hard code your solution by observing patterns in the generation of collectibles. We will be changing those random patterns when we evaluate your code.

Notes

- You are welcome to point out any mistakes we have made, as mistakes are inevitable. If you are correct we will update the challenge so that everyone has a fair chance.

- Although collectibles are generated randomly, they are generated pseudo-randomly, so that everyone will have the same challenge.

- Contact Oshanath (077 243 5654) to report any bugs or inconsistencies in the challenge.

- If you need help in completing the initial challenge, we are happy to assist you. Depending on the nature and frequency of your questions, we will be able to organise another workshop session where we discuss any problems you face.

Changelog

- In version 2 released on the 17th November 2022, the emitter will also provide the location of the robot. The goal is to make localization simpler.

- In version 3 released on the 18th November 2022, the emitter will also provide the direction the robot is facing. It will give the angle relative to some direction, in degrees. It will always give and angle between 0 and 360.