Assignment 2

2024 April Semester

CSC3206 Artificial Intelligence

1 Instructions

1. Form a group of maixmum 4 members.

   The same group from Assignment 1 may be maintained, but not compulsory; inform me if there is any changes in your group so the submission link will be assigned correctly

2. Produce a Python script that implements a search algorithm to solve the problem in section 2 that
   - executes without error, and
   - provides output of the solution upon completion of execution (textual or graphical).

     provide a readme file if your code requires more set up than just running `python <your file name>`

3. Produce a report, per group, that
   - describes your implementation of the algorithm from the aspects of problem formulation including but not limited to state representation, cost function, transition model, etc.,

     do not explain the code from the beginning to the end, explain the important considerations and decisions that lead you to producing the code, explaining important functions such as cost function is okay. You may use flowcharts to explain your code.

   - presents the solution of the algorithm, and
   - evaluates your algorithm (discuss how well it works, does it work as expected, etc.).

4. Your report should fulfil the limitations of
   - maximum 8 pages excluding front and back matters (appendices, cover page, table of content, etc.), and
   - font size of 11 or above.

5. Submit the report and a zipped folder containing the implementation code by 19 July 2024 23:59.

2 Question

2.1 Treasure hunt in a virtual world

You are organizing a treasure hunt in a virtual world filled with obstacles, traps, and treasures. When you enter the virtual world, to travel from one cell to another cell, you will take exactly one step. You must navigate through the virtual world to collect the treasures while avoiding traps. Activated traps will increase the difficulty to explore the world while rewards are available to ease the exploration.

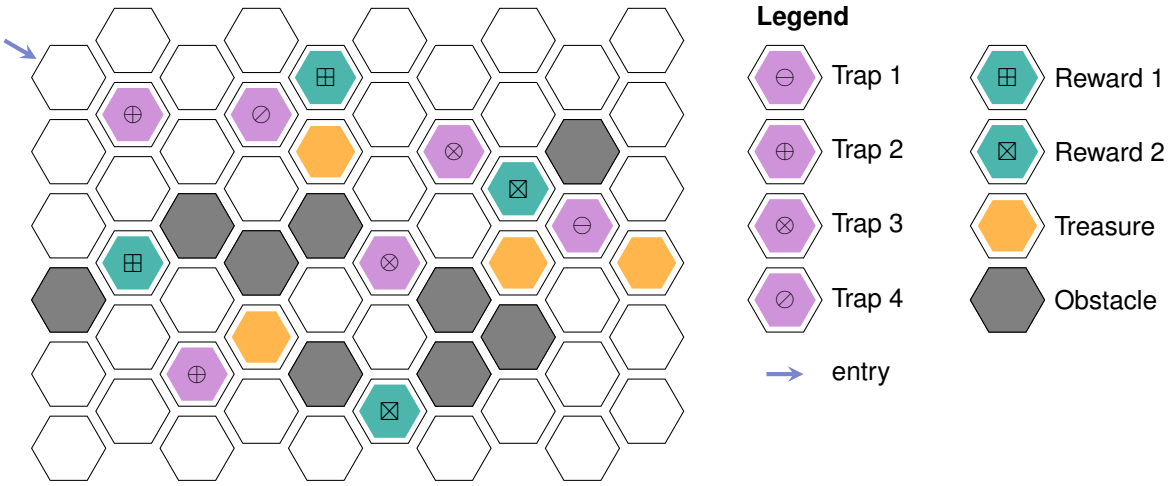

Figure 1: Map of the virtual world

The effect of the traps and rewards are described in Table 1.

Table 1: Descriptions for Traps and Rewards

⊖	Trap 1	This trap will increase the gravity of the world. Every step you take will consume double the energy as previous.
⊕	Trap 2	This trap will decrease your speed. You will take double the steps to move to the adjacent cell.
⊗	Trap 3	This trap will move you two cells away following your last movement direction.
⊘	Trap 4	This trap will remove all treasures that have not been collected. All treasures that are collected will not be affected.
⊞	Reward 1	This reward will decrease the gravity of the world. Every step you take will consume half the energy as previous.
⊠	Reward 2	This reward will increase your speed. You will take half the steps to move to the adjacent cell.

3 Marks distribution

This assignment contributes to 20% of the final grade.

Criteria		**%**
Report		60
• Implementation explanation	30	
• Results display/visualisation	15	
• Evaluations & discussions	15	
Code		40
• Errorless execution	25	
• Output display	15	
Total		100

3.1 Rubrics

		Not available 0	Attempted 1 – 2	Competent 2 – 4	Proficient 4 – 5
Report					
Implementation explanation	30%	Not available in the report.	The explanation is unclear and lacks essential details, making it difficult to understand the implementation process.	The explanation provides a basic overview but leaves out critical details and may contain minor inaccuracies.	The explanation is clear and detailed, accurately describing the implementation steps and their relevance to the problem.
Results display/visualisation	15%	Not available in the report.	Visualizations and results are unclear, poorly labeled, and difficult to interpret, lacking essential details and context.	Visualizations and results are somewhat clear with reasonable detail and context, but minor ambiguities reduce their overall effectiveness.	Visualizations and results are exceptionally clear, well-labeled, and comprehensive, providing a deep understanding and significant impact.
Evaluations & discussions	15%	Not available in the report.	The evaluation and discussion are superficial and lack depth, providing minimal analysis and limited insights into the results.	The evaluation and discussion offer a reasonable analysis with some critical insights, but may miss deeper implications and comprehensive perspectives.	The evaluation and discussion are thorough and insightful, offering a deep analysis of the results and considering broader implications and multiple perspectives.
Code					
Errorless execution	25%	The code cannot be executed.	The code frequently fails to execute without errors, indicating significant issues with syntax, logic, or functionality.	The code executes with few errors, demonstrating general reliability but occasionally encountering minor issues that require troubleshooting.	The code consistently executes without any errors, demonstrating robustness, correctness, and thorough testing.
Output display	15%	Not available.	The code output is unclear, poorly formatted, and difficult to interpret, lacking necessary labels and organization.	The code output is generally clear and well-organized, with minor formatting issues or missing labels that slightly hinder interpretation.	The code output is exceptionally clear, well-formatted, and easy to interpret, with thorough labeling and organization that enhances understanding.
	100%				