

CSE 4082 - Project 1

(Due 11.12.2019 at 23:59, electronic submission only, to cse.cse482@gmail.com)

Implement a Java/C/C++ program for solving 2D mazes using

- Depth First Search
- Breadth First Search
- Iterative Deepening
- Uniform Cost Search
- Greedy Best First Search
- A* Heuristic Search

Your program should input a maze file the format of which will be determined by yourself. The letter "S" denotes the starting square, the letter "G" denotes one or more goal squares and the letter "T" denotes the squares with trap. The cost of each move is one point, however, when the agent moves in a trap square, the cost of the move will increase by 6 (i.e. the total cost of the move will be 7 instead of 1). For every search method, the order of node expansion should be East, South, West, North. An example maze is as follows:

	1	2	3	4	5	6	7	8
1								
2				T				
3		S				T	G	
4								
5								
6							G	
7						T		T
8					G			G

For the above maze and for each search method, your program should display

- The cost of the solution found.
- The solution path itself.
- The list of expanded nodes.

Notes:

- a. For Greedy Best First Search and A* Heuristic Search, you should use city block distance (Manhattan distance) as an admissible heuristic or a more informed admissible heuristic.
- b. You should also submit a design document describing the classes (fields and methods) used in the project. The document should also contain the output of your program for the example maze.
- c. Details of the project will be discussed in the class.
- d. The project can be done in groups of two.
- e. All your files (i.e. your *source codes* which are extensively commented and appropriately structured and your design document) should be emailed to cse.cse482@gmail.com in a zip file. Make sure that your zip file name contains student IDs.
- f. Bonus (10 pts): Implement a graphical applet or program that visualizes the search steps.