CS561-ARTIFICIAL-INTELLIGENCE LAB

ASSIGNMENT-3: Hill Climbing and Simulated Annealing

(Read all the instructions carefully & adhere to them.)

Date: September 5, 2022 **Deadline: September 11 ,2022**

Total Credit: 30 (Implementation:20; Documentation & Explanation:10)

Questions

1. A local search algorithm tries to find the optimal solution by exploring the states in the local region. Hill climbing is a local search technique that always looks for a better solution in its neighborhood.
    a. Implement the **Hill Climbing Search Algorithm** for solving the 8-puzzle problem.
    b. Check the algorithm for the following heuristics:
        i. h1(n) = number of tiles displaced from their destined position.
        ii. h2(n) = sum of the Manhattan distance of each tile from the goal position.

Instructions:

1. Input is given in a file in the following format. Read the input and store the information in a matrix. Configuration of the start state and the goal state can be anything. For example, given below, T1, T2, …, T8 are tile numbers, and B is blank space.

Start State

T6	T7	T3
T8	T4	T2
T1	B	T5

Goal State

T1	T2	T3
T4	T5	T6
T7	T8	B

2. The output should have the following information:
    a. **On success:**
        i. Success Message
        ii. Start State / Goal State
        iii. Total number of states explored
        iv. Total number of states to the optimal path
        v. Optimal Path
        vi. Optimal Path Cost
        vii. Time taken for execution
    b. **On failure:**
        i. Failure Message
        ii. Start State / Goal State
        iii. Total number of states explored before termination

Instructions:

1. The assignment should be completed and uploaded by 2nd Sep, 2021, 11:59 PM IST.
2. Markings will be based on the correctness and soundness of the outputs. Marks will be deducted in case of plagiarism.
3. Proper indentation and appropriate comments are mandatory. \
4. Make your observations to compare Hill climbing with respect to the time complexity (for near-optimal solution) and no of steps.
5. You should zip all the required files and name the zip file as: roll_no_of_all_group_members .zip, eg. 2021cs11_2021cs03_2021cs05.zip.
6. Upload your assignment (the zip file) in the following link: https://www.dropbox.com/sh/etl2qjjnhpu7vsu/AADPuF_pCnY1dY_Lr0RpM5Wja?dl=0

   For any queries regarding this assignment, you can contact:
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