CS561 - ARTIFICIAL INTELLIGENCE LAB
ASSIGNMENT-4: Hill Climb
(Read all the instructions carefully & adhere to them.)

Date: 28th August, 2023   **Deadline:3rd September, 2023**

Total Credit: 30

Instructions:

1. The assignment should be completed and uploaded by **3rd September, 2023, 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. You should zip all the required files and name the zip file as:
5. **roll_no_of_all_group_members .zip , eg. 1501cs11_1201cs03_1621cs05.zip.**
6. Upload your assignment (**the zip file**) in the following link: https://www.dropbox.com/request/AWScViWcfkX00oQOXutS

For any queries regarding this assignment you can contact:
Aizan Zafar (aizanzafar@gmail.com)
Gitanjali Kumari (gitanjalisingh228@gmail.com)
Jitendra Solanki (solankijitendra032@gmail.com)

---**Questions**---

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.

Initial 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