BRAC UNIVERSITY
CSE422 : Artificial Intelligence
Assignment 1

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1. Consider the following initial and final state of an 8-puzzle problem:

2	8	3
1	6	4
7		5

Initial State

1	2	3
8		4
7	6	5

Final State

You are to find the most cost-effective path to reach the final state from the initial state using the A* algorithm. Consider that g(n) = depth of node and h(n) = hamming distance. Draw the search tree that the algorithm generates. In addition, write the values of g(n) and h(n) for each state in that search tree.

2. Consider a maze of size N x N, where horizontal and vertical moves cost 1 and diagonal movements cost $\sqrt{2}$. Let h_1 = Euclidean distance and h_2 = Manhattan distance.
a. Prove that h_2 is not admissible.
b. Show that, if h_1 is multiplied by 1.2, h_1 will not be admissible.

3. Consider the following objective function:

$$E(\theta) = |\theta * sin(\theta) * cos(\theta^2)|$$

Find any maximum of $E(\theta)$ using the hill climbing algorithm. Consider that the initial value of θ is 0.7 and the value of θ can be changed by 0.1 at each step.