Assignment - 1A

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D.O.P.	D.O.C.	Remark	Sign

Q. 2. Consider following instance of 8 puzzle problem:

8	7	6
2	1	5
3	4	—

Initial configuration

—	8	7
2	1	6
3	4	5

Goal configuration

Consider Heuristic functions defined below:

h1 : Misplaced tiles count except space
h2 : Correctly placed tiles count except space
h3 : sum of Manhattan distance between current position of all times except space.

a] In 8 puzzle problem we are concerned with getting to goal configuration within least number of steps. All moves are thus equally costly. Define g(n) in you own words. What will be the cost of 6 step solution to some arbitrary 8 puzzle instance?

→ The lowest path cost g(n) can be the cost to reach the goal configuration in least steps.

In our case, we can reach the final configuration in atleast 4 moves: UP, UP, LEFT, LEFT Since all the moves are equally costly, we compute g(n) as

$g(n) = 1+1+1+1$

$g(n) = 4$

Consider the following arbitary 8 puzzle instance which gives solution in 6 steps:

8	7	6
2	1	5
-	3	4

The solution can be represented as:

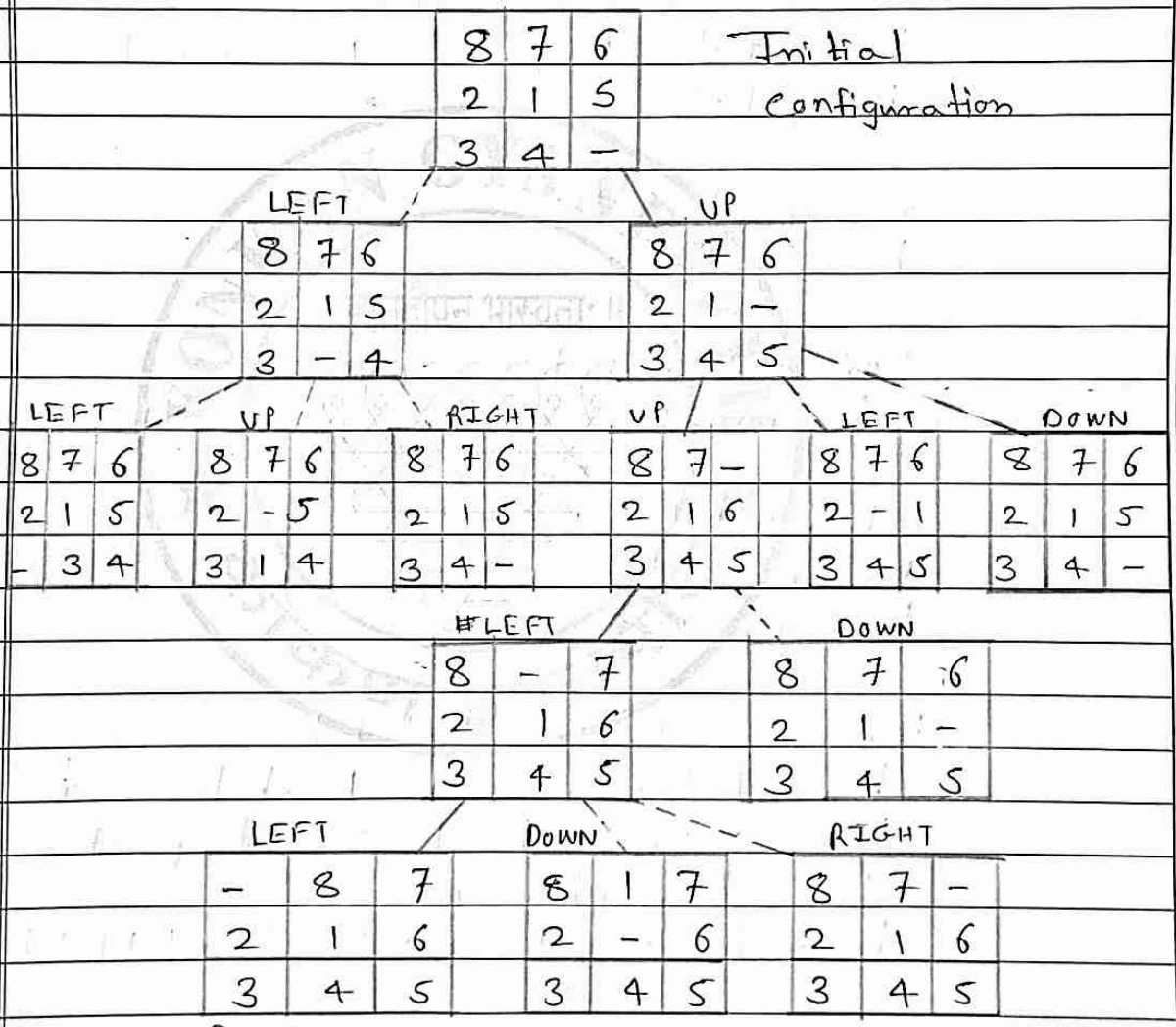
{{8,7,6}, {2,1,5}, {-,3,4}} → {{8,7,6}, {2,1,5}, {3,-,4}} → {{8,7,6}, {2,1,5}, {3,4,-}} → {{8,7,6}, {2,1,-}, {3,4,5}} → {{8,7,-}, {2,1,6}, {3,4,5}} → {{8,-,7}, {2,1,6}, {3,4,5}} → {{-,8,7}, {2,1,6}, {3,4,5}}

Since all the moves are equally costly, the cost would be

$g(n) = 6$

Q. 2.

c]→ Draw exhaustive state space tree of depth limited to 4 for instance of 8 puzzle problem in the question.



final Configuration