Karjat - Raigad

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DOP DOA Remark Sign

Consider following instance of 8 puzzle problem

8	7	6		8	7
2	1	5	2	1	6
3	4	-	3	4	5

initial Final configuration

Consider Heuristic function defined below

h1: Misplayed tiles count excepts space
h2: Correctly placed tiles count except space
h3: Sum of Manhan distance between current and correct posibon of all thries except space

Answer the following question

a) In 8 puzzle problem we are concerned with getting to goal configuration with least number of step. All moves are thus equally costly. Define g(n) in your own wards. what will be the cost of 6 Step Solution to Some arbitary 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 :

$\{\{8,7,6\},\{2,1,5\},\{-,3,-4\}\} \rightarrow \{\{8,7,6\}\{2,1,5\},\{3,-,4\}\} \rightarrow$
$\{\{8,7,6\},\{2,1,5\},\{3,4,-3\}\} \rightarrow \{\{8,7,6\}\{2,1,-\},\{3,4,5\}\} \rightarrow$
$\{\{8,7,-\}\{2,1,6\}\{3,4,5\}\} \rightarrow \{\{8,-,7\},\{2,1,6\}\{3,4,5\}\} \rightarrow$

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

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

$$g(n) = 6$$

Draw exhustive state space tree of depth limited to 4. for instance of 8 puzzle

problem in question

Q Compute $h_i(n)$ where i = 1, 2, 3 . and n = initial state final state from question

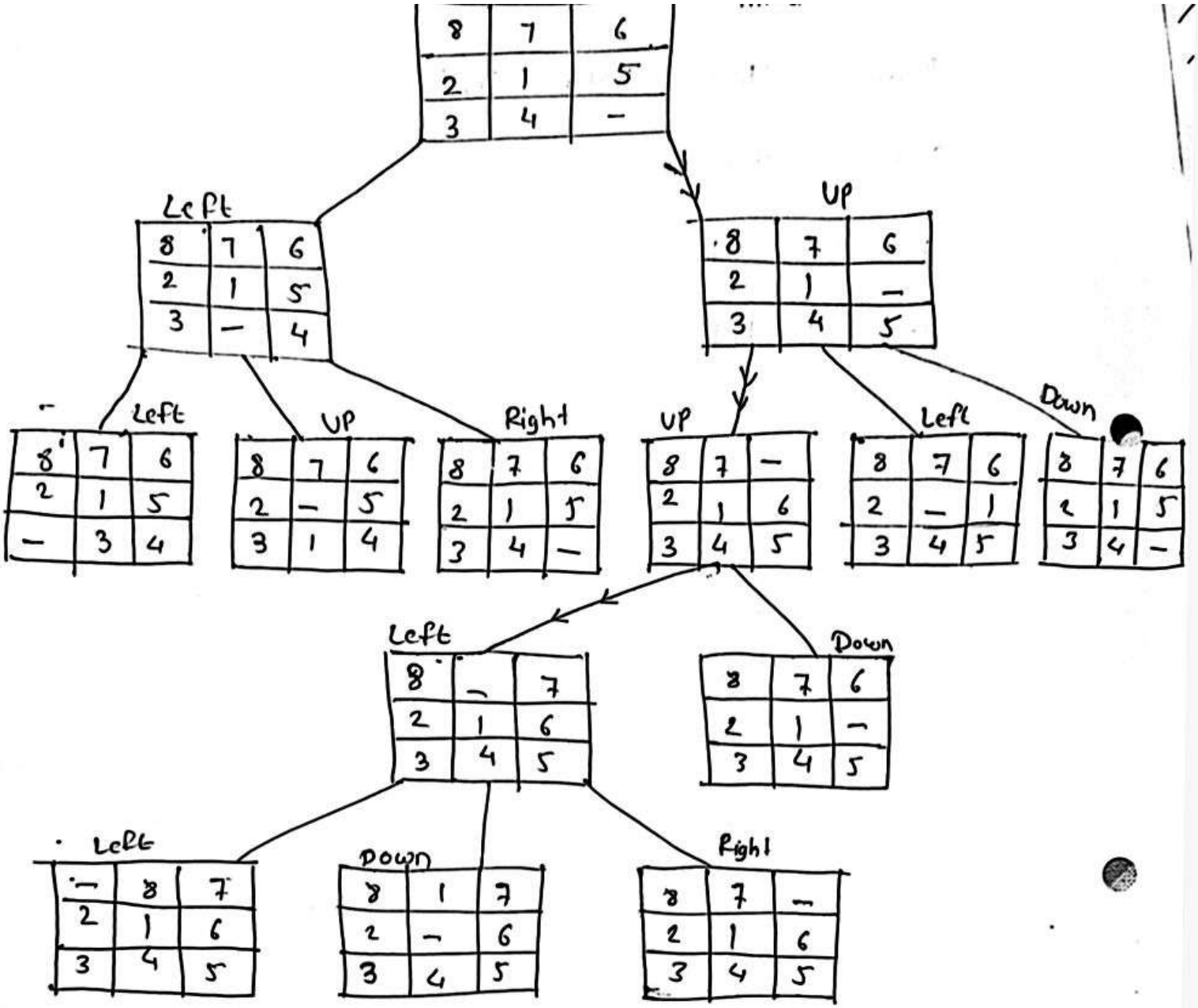
for i = 1, n = initial state
h_1 (initial) = misplaced tiles count except space
h_1 (initial) = 4.

n = goal state
h_1 (goal) = 0

for (i = 2 , n = initial state
h_2 (initial) = correct placed tiles except space
h_2 (initial) = 4
for (n = goal state
h_2 (goal) = 8

For (i = 3 , n = initial state
h_3 (initial) = Sum of manhattan distance distance between current & current position of all tiles except space.
h_3 (initial) = 0 + 0 + 0 + 0 + 1 + 1 + 1 + 1
= 4

for n = goal state
h_3 (goal) = 0


Left
UP
Left
UP
Right
UP
Left
Down
Left
Down
Left
Down
Right
Final
Configuration.