Assignment 1A

Q2a) In 8 Puzzel 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 Puzzel instance?

→

The lowest Path of g(n) can be Cost to reach the goal Configuration in least steps In our Cause, we reach the final final Configuration in at least moves: UP, UP, LEFT, LEFT since all the moves are equally Costly, we complete g(n) as

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

$g(n) = 4$

Consider the followings Arbitrary 8 Puzzle instance which gives solved 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}} →

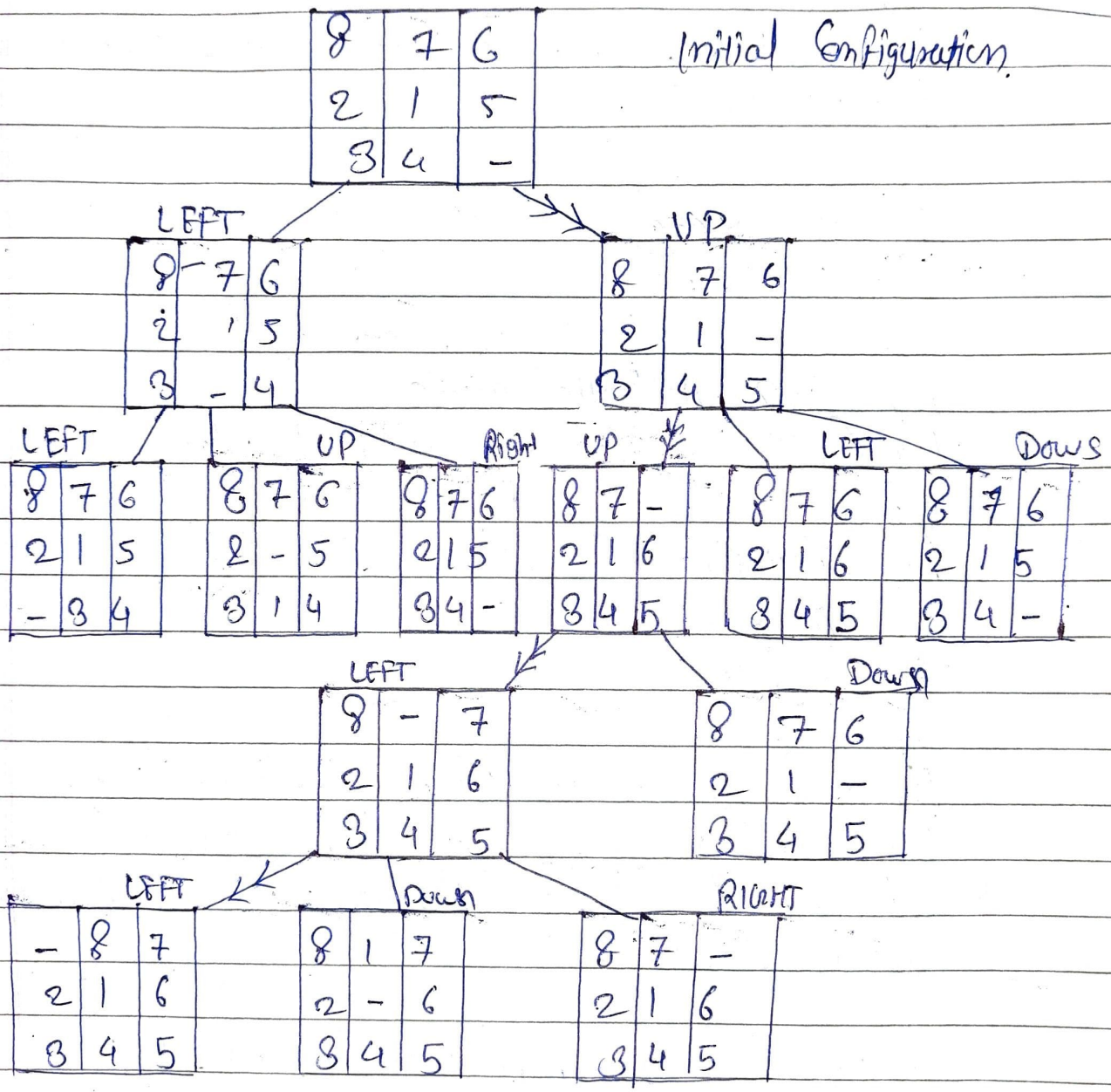
{{8,7,-} {2,1,6}, {3,4,5}} → {{8,-,7}, {2,1,6}, {3,4,5}} → {{-,8,7}, {2,1,6}, {3,4,5}}

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

g(n) = 6

~~(g=2(t))~~

Q.2(c) Draw exhausive state space tree of depth limited to 4 for instance of 8 Puzzle Problem in the question:-



Final Configuration.

Q.2(e) Compute $h_i(n)$ where $i=1,2,3$ & n = initial state, goal state from question.

for $i=1$, n = initial state
h_1(initial) = misplace files count except space
h_1(initial) = 4

h = goal state
h_1(goal) = 0

For $i=2$, n = initial state
h_2(initial) = correctly replaced files count 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 manhatan distance between current & correct 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