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Name :- patil Gopal Arun

Class :- BE-IT

Roll no :- 45

Subject :- Is Lab

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Assignment - 1 (A)

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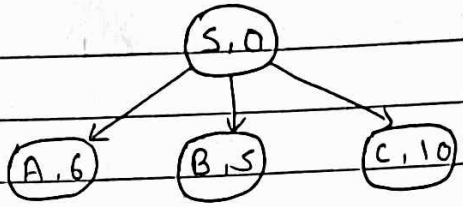
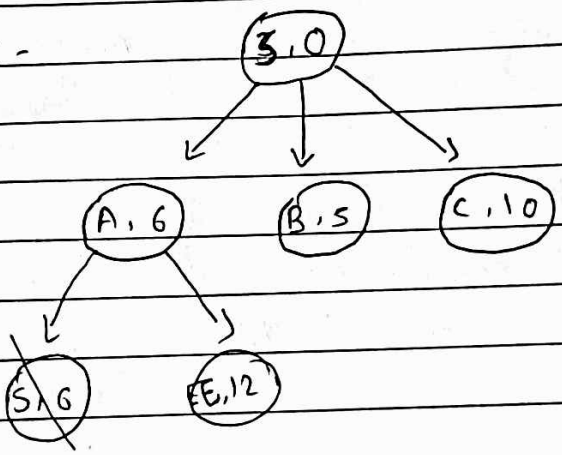
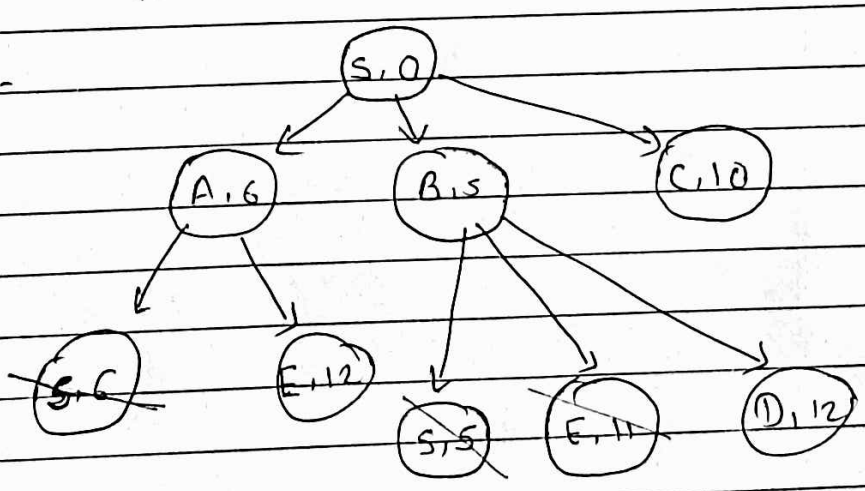
Q. 1

1.1]

step 0 = 

step 1 :- 

step 2 :- 

step 3 :- 

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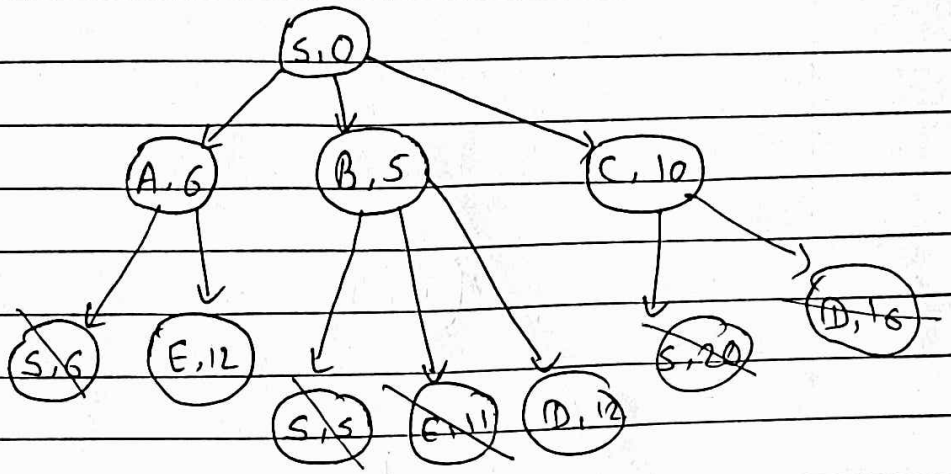
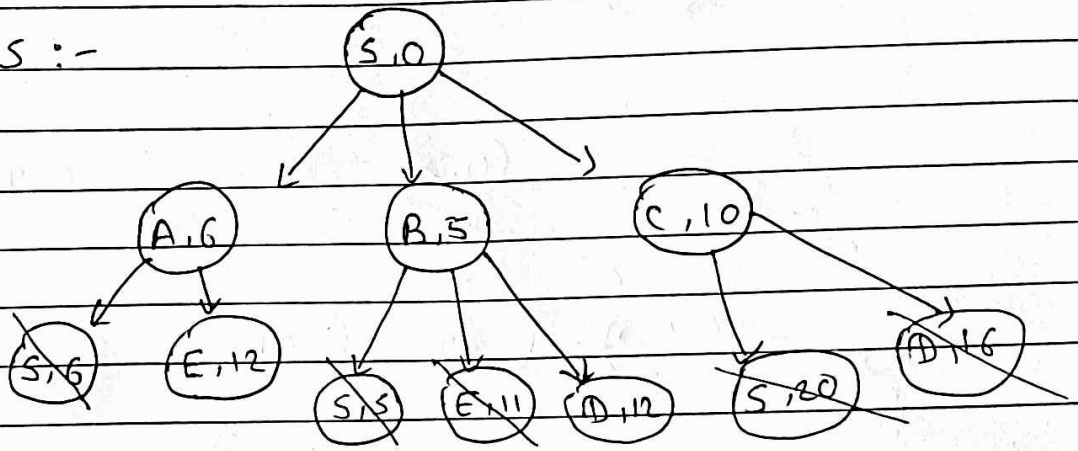
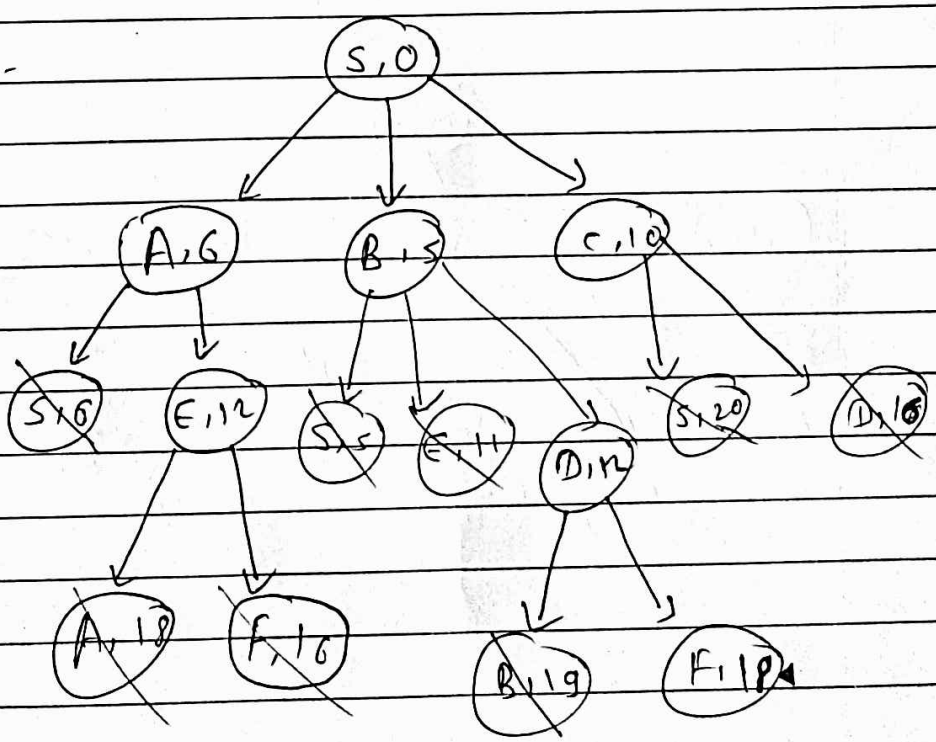
step 4 :-



step 5 :-



step 6 :-



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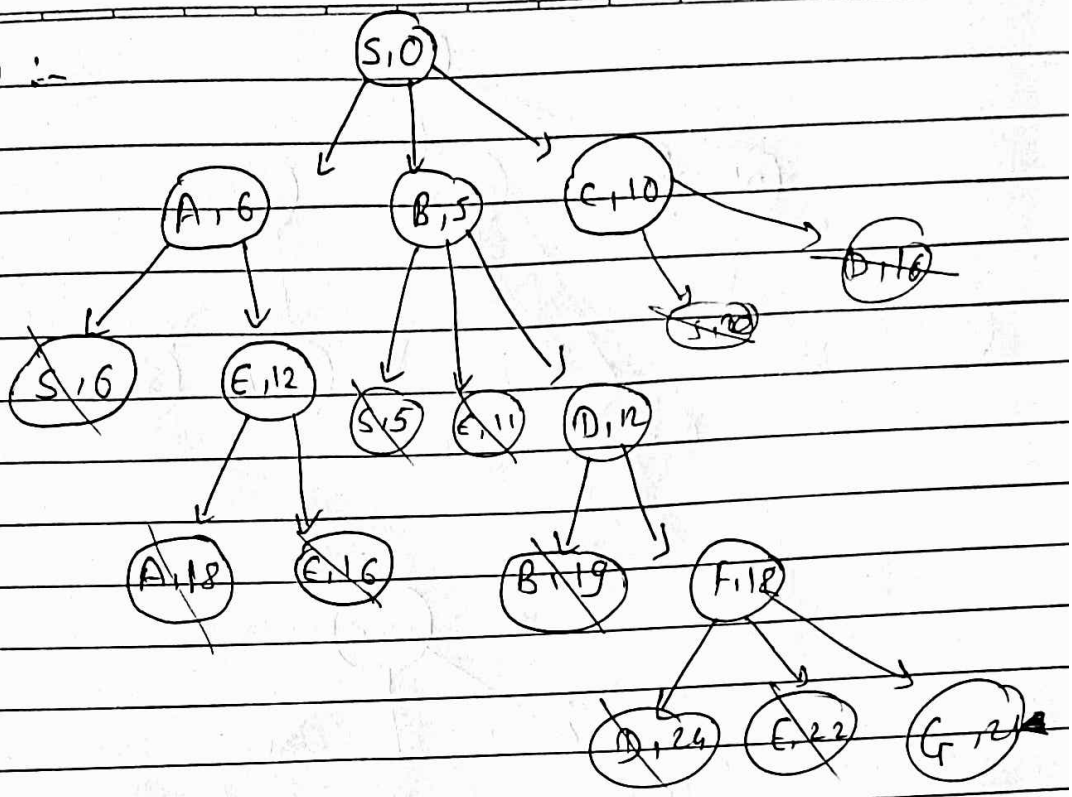
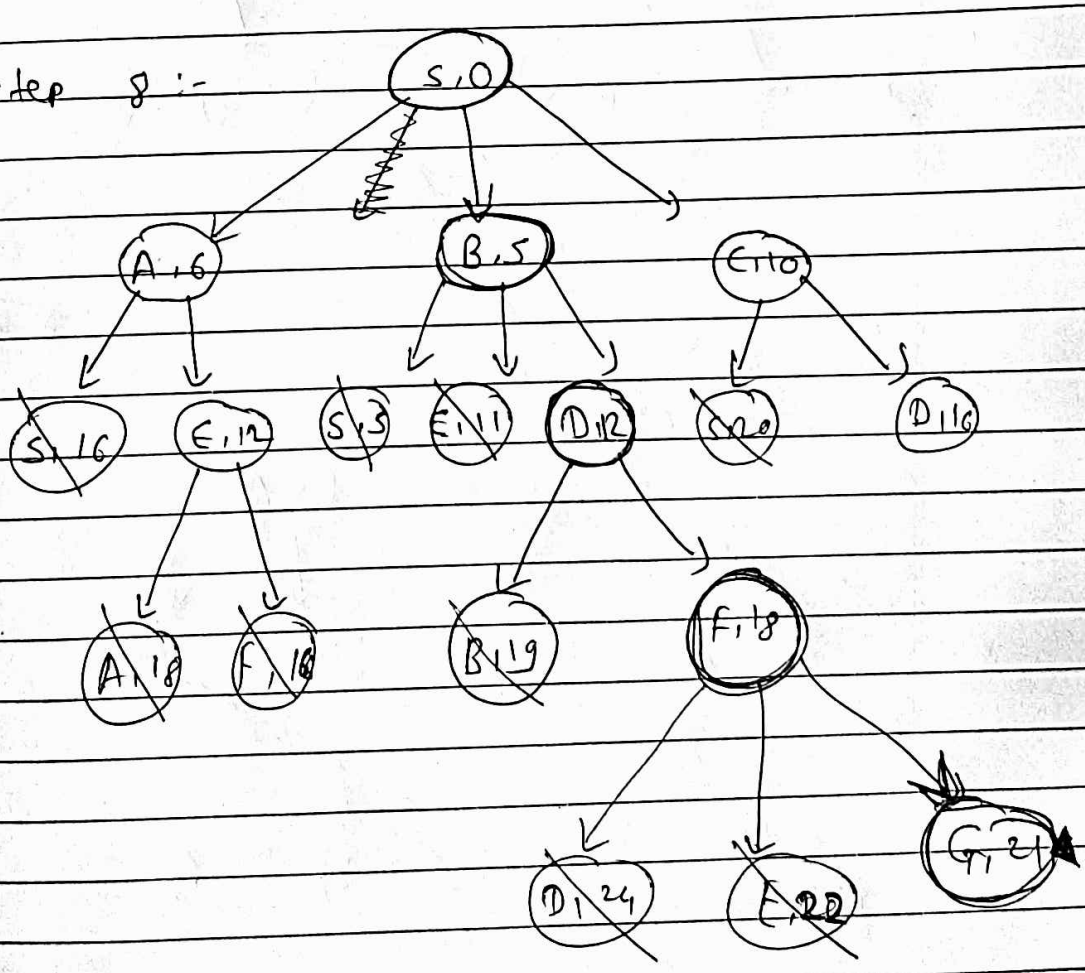
step 7 :-



step 8 :-



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1.4]

Initialization :- compute f score for s & put it in the openlist

f - score s : $f(s) = h(s) = 17$ (S,17)

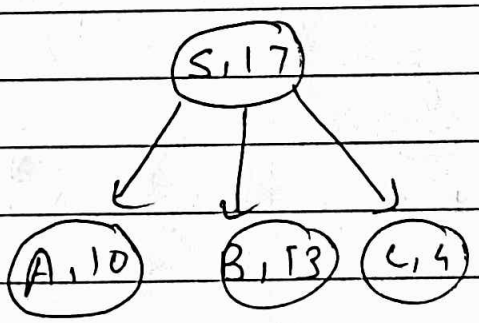
step 1 :-

f - score of successors

$f(A) = h(A) = 10$

$f(B) = h(B) = 13$

$f(C) = h(C) = 4$

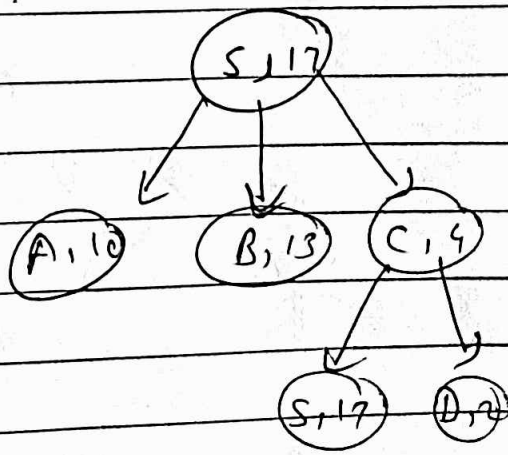


step 2 :-

f - score of successors

$f(S) = h(S) = 17$

$f(O) = h(O) = 2$



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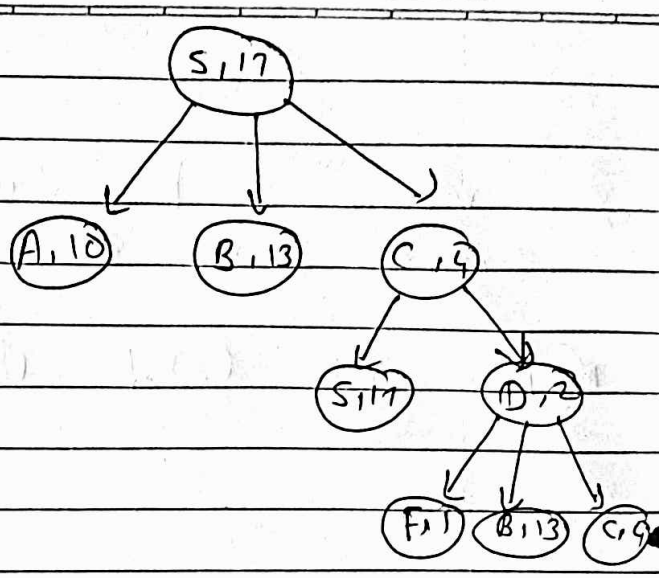
Step 3 :

F - score of successor

$f(a) = h(a) = 4$

$f(B) = h(B) = 13$

$f(F) = h(F) = 1$



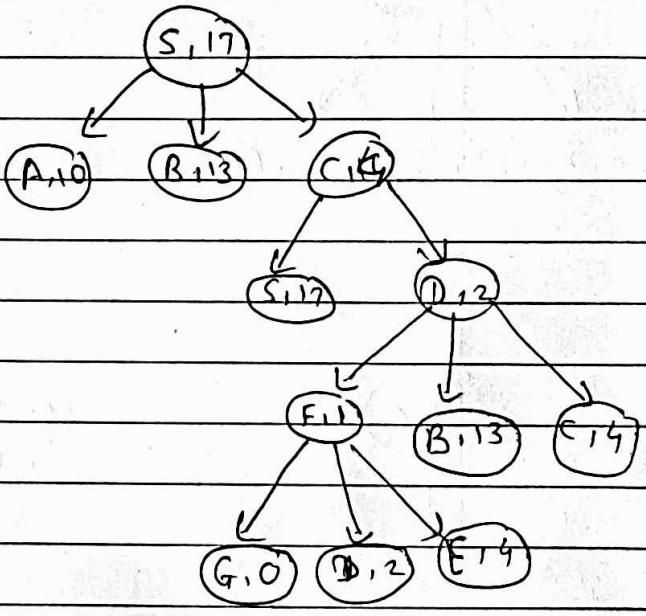
Step 4 :-

F - score of successor

$f(a) = h(a) = 2$

$f(E) = h(E) = 4$

$f(4) = h(4) = 0$



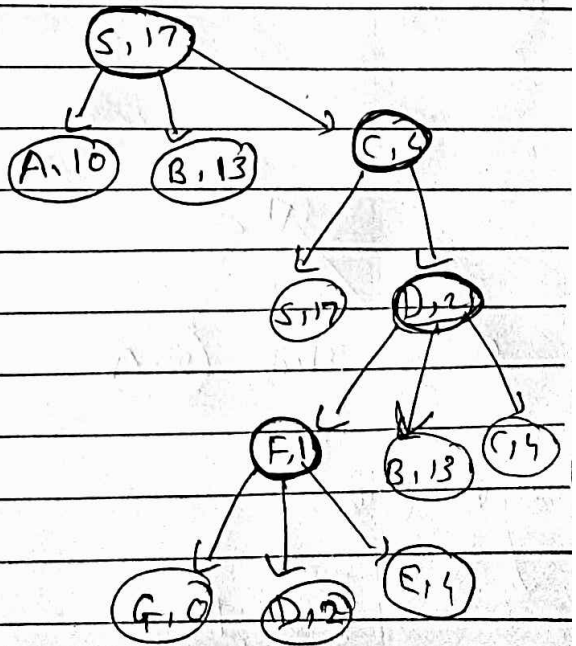
Step 5 :-

Soln is

$S \rightarrow C \rightarrow D \rightarrow F \rightarrow G$ with

Soln cost = $10 + 6 + 6 + 3$

$= 25$



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

8	7	6
2	1	5
3	4	-

-	8	7
2	1	6
3	4	5

Initial configuration Goal configuration

Consider Heuristic functions defined below.
h_1 :- misplaced tiles count except space
h_2 :- correctly placed tiles count except space
h_3 :- sum of manhattan distance bet^n current and correct position of all tiles except space.

Answer the following questions:

a) In the 8 puzzle problem we are connected 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 sol^n to some arbitary 8 puzzle instance?

→

The lowest path cost $g(n)$ can be the cost to search the goal configuration in least steps. In our case, we can reach the final configuration in at least 4 moves: UP, UP, LEFT, LEFT. since all the moves

are equally costly. we compare $g(n)$ as

$$g(n) = 1+1+1+1$$
$$g(n) = 4$$

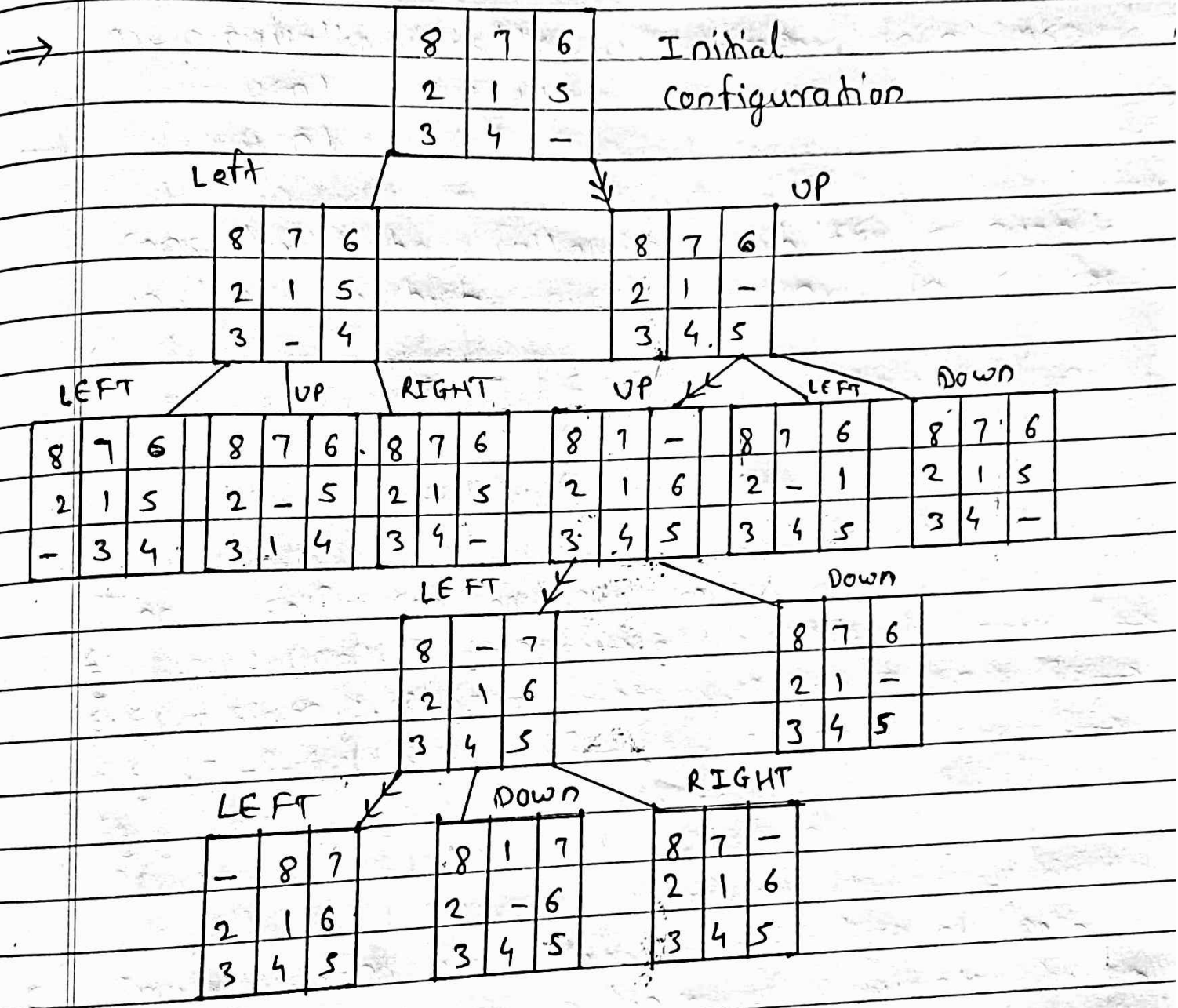
Consider the following arbitary 8 puzzle instance which gives slouthion in 6 steps.

8	7	6
2	1	5
–	3	4

The soln can be represented as :-

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

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



Final configuration

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) = misplaced tiles count except space

h_1 (initial) = 4

h = goal state

h_1 (goal) = 0

for $i = 2$, n = initial state

h_2 (initial) = correctly placed tiles count except space

h_2 (initial) = 4

for h = goal value

h_2 (goal) = 8

for $i = 3$, n = initial value

h_3 (initial) = sum of manhattan distance bet^n current ✱ and 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