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Assignment NO - 1A

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class - BE-IT

RollNO - 20

Subject - IS lab

D.O.P.	DOA	Sign	marks

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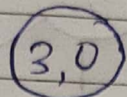
Assignment No - 1(A)

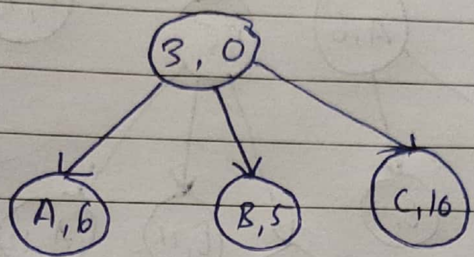
Q.1.

1.1.

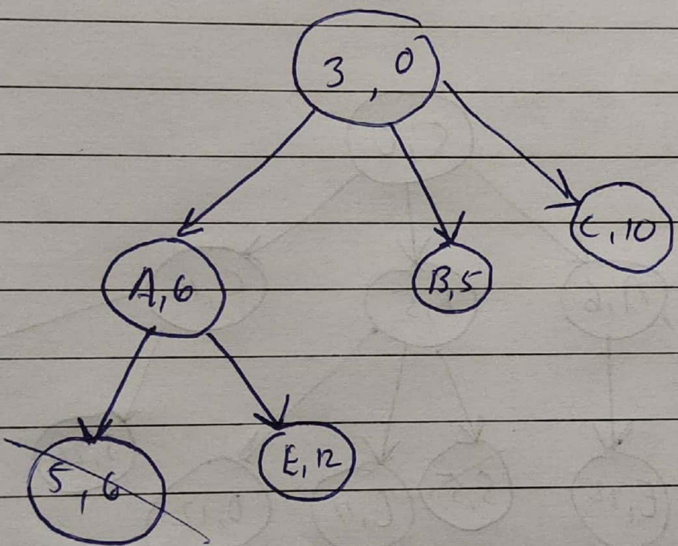
→ step 0 :



Step 1



Step 2



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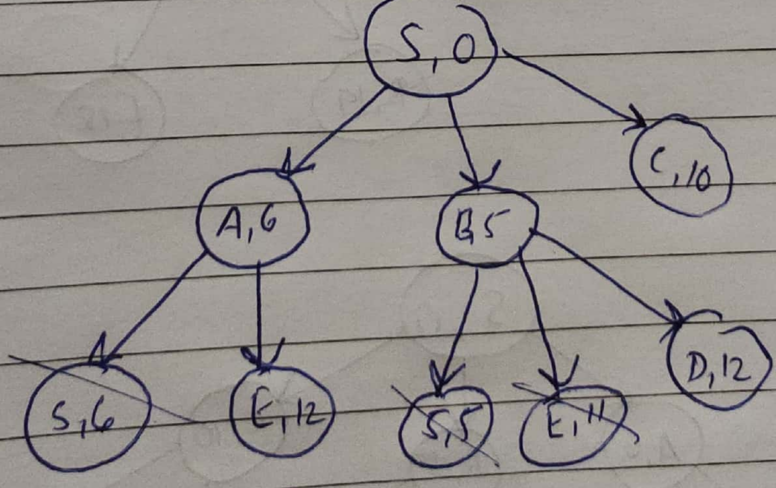

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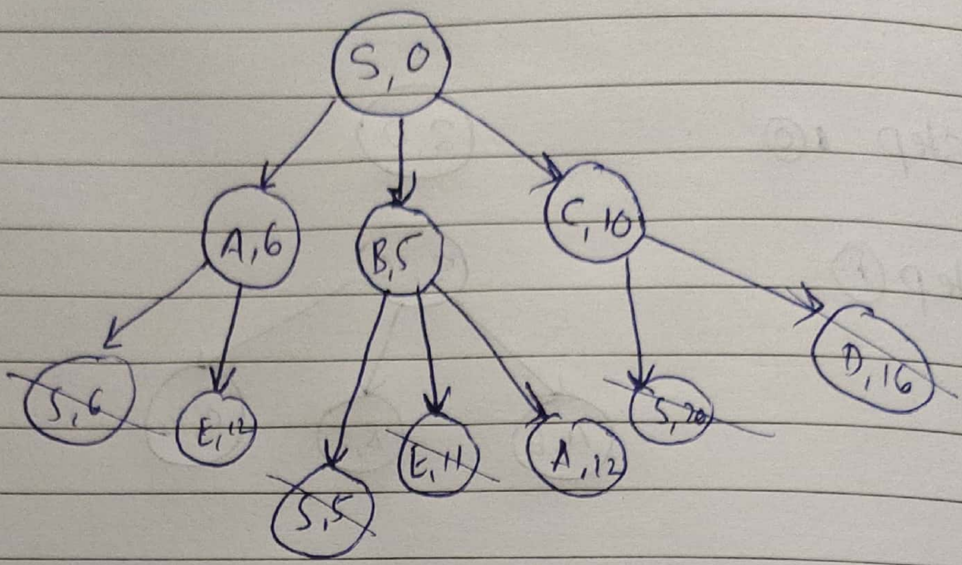

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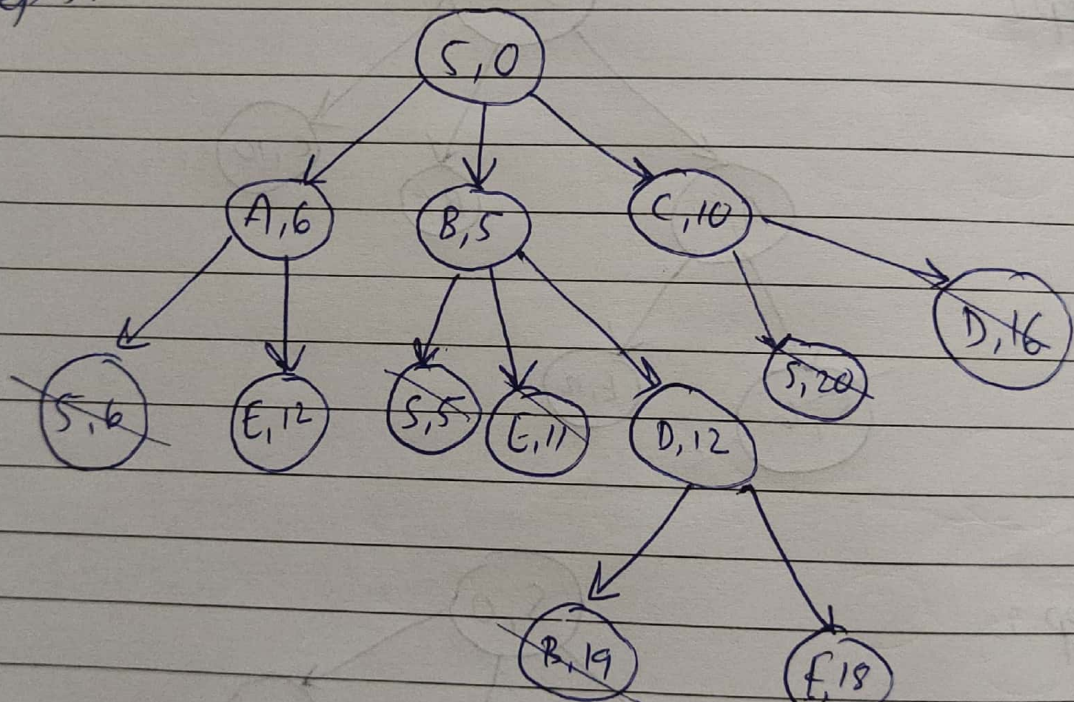

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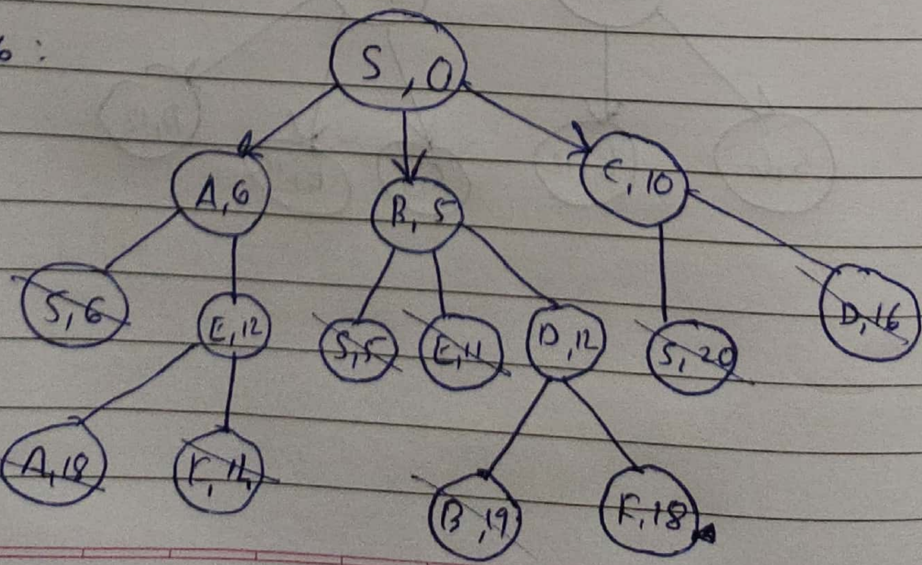
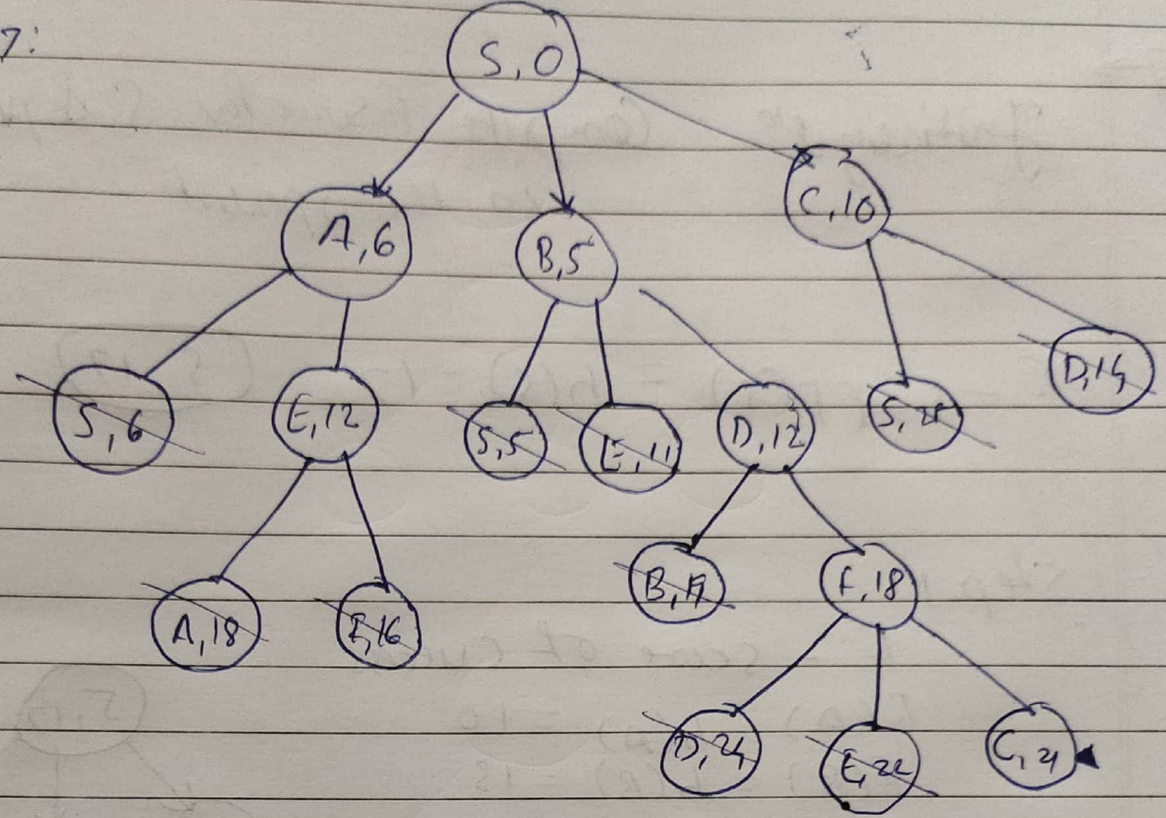
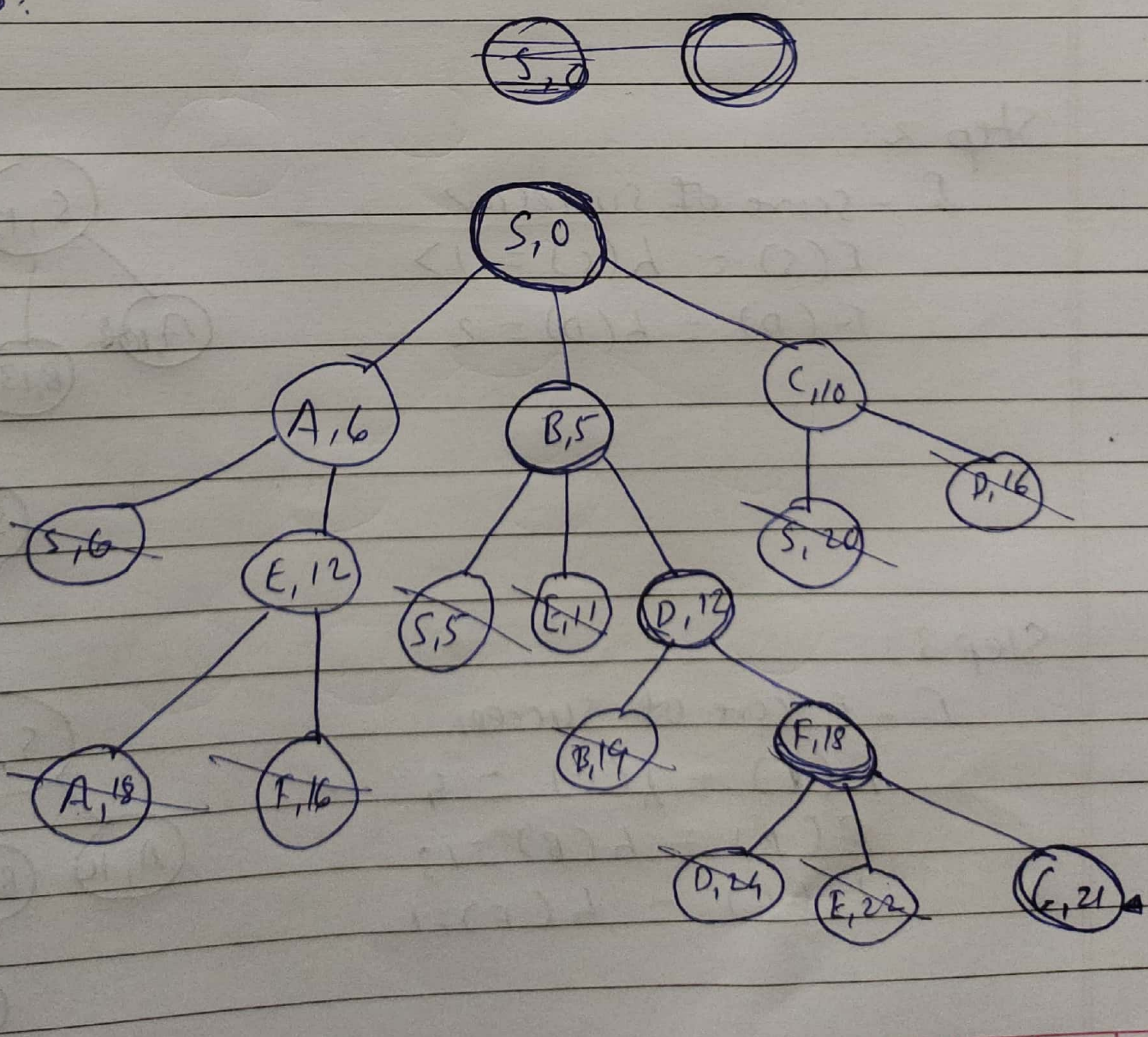


Step 7:


S,0
A,6
B,5
C,10
S,6
E,12
S,5
E,11
D,12
A,18
F,18
D,24
E,22
C,21

Step 8:


S,0
A,6
B,5
C,10
S,6
E,12
S,5
E,11
D,12
S,20
D,16
A,18
F,16
B,19
F,18
D,24
E,22
C,21

1.5 →

Initialisation : Compute f score for S & put it in the openlist

f - S: f(S) = h(S) = 17 (S, 17)

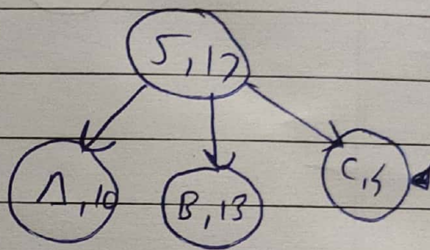
Step 1:

f - score of success

F(A) = h(A) = 10

F(B) = h(B) = 13

F(C) = h(C) = 4

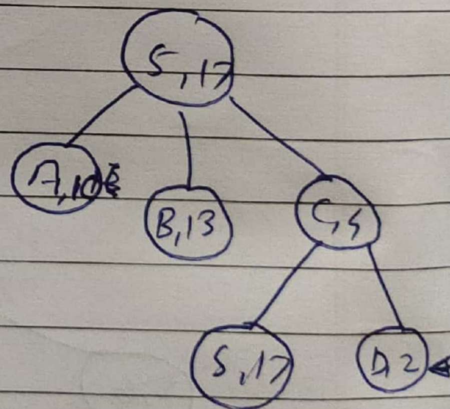


Step 2:

f - score of successor

F(S) = h(S) = 17

F(D) = h(D) = 2



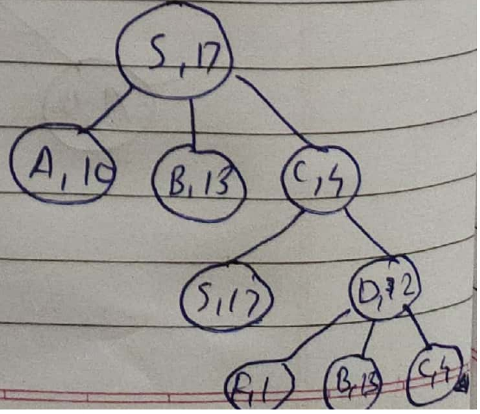
Step 3:

f - score of success

F(A) = h(A) = 4

F(B) = h(B) = 13

F(F) = h(F) = 1

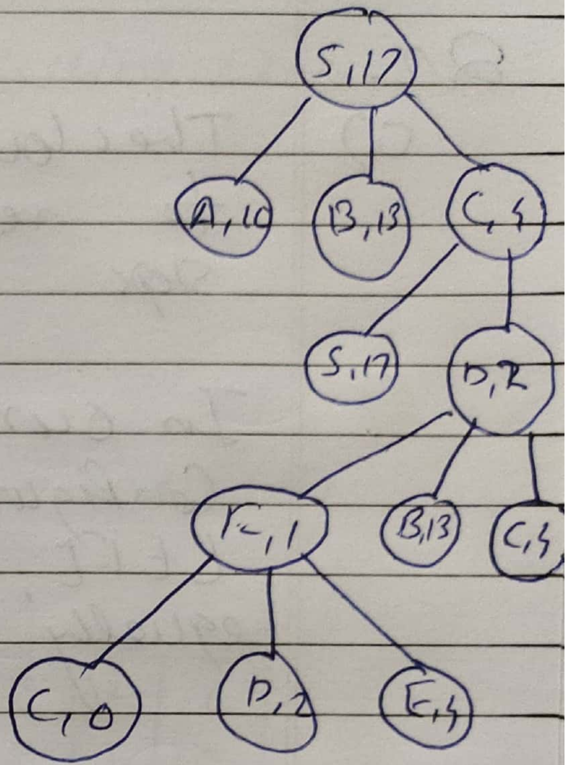


Steps:

Solution is

S → C → D → R → G with

Solution cost = 10 + 6 + 6 + 3
= 25



Q2.

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

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

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

Consider the following 8 puzzle instance

8	7	6
2	1	5
–	3	4

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,-1} } → { {8,7,6} {2,1}, {3,4,5} } →

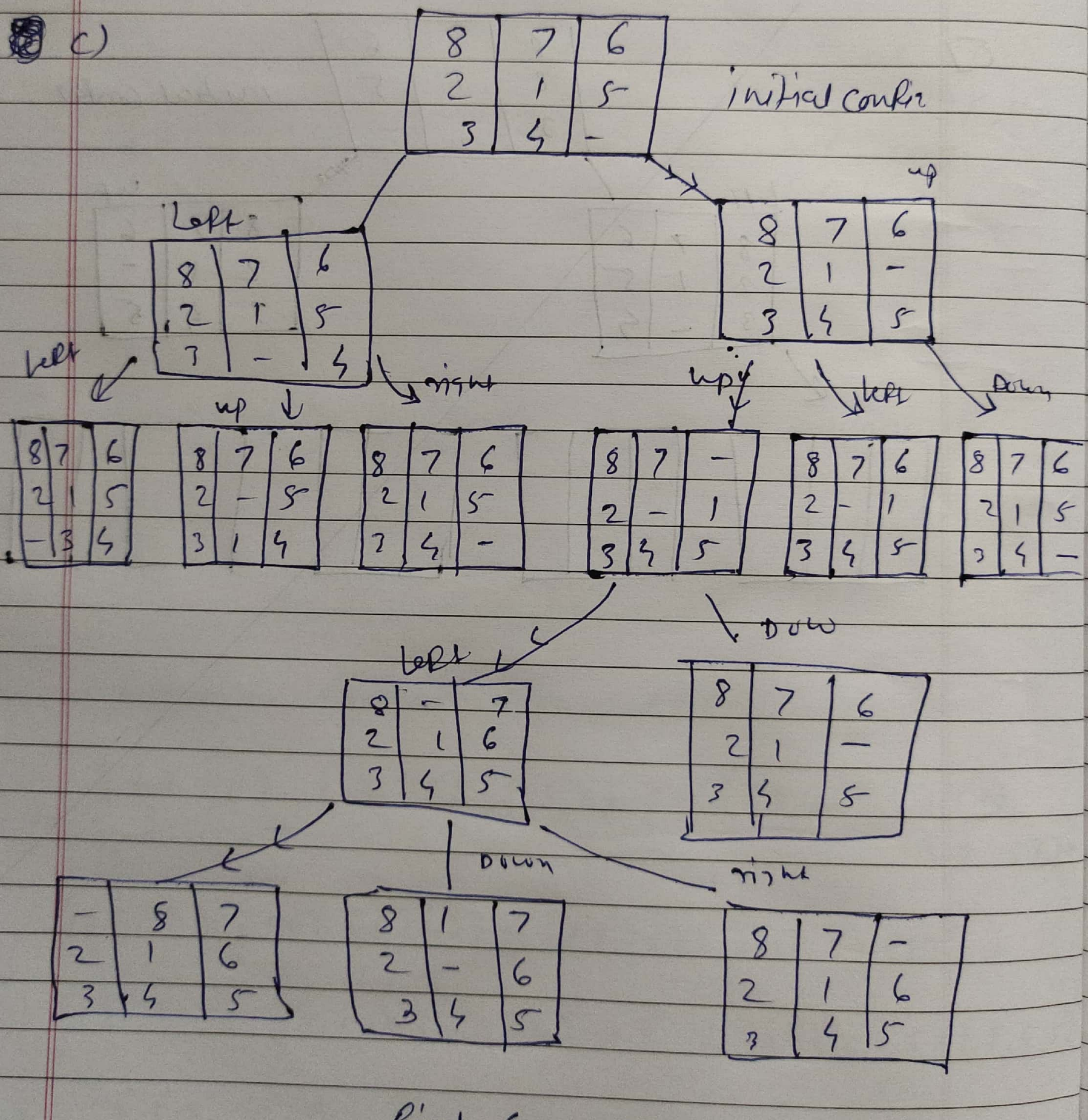
{ {8,7,-}, {2,1,3} {3,4,5-} } → { {8,-7} {2,1,6} {3,4,5}

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

Since all the moves equally costing the cost would be

$$g(n) = 6$$

c)



Final Configuration

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e)

For $i=1$, n = initial state

h_1 (initial) = misplaced tiles count except space

h_2(initial) = 4

n = goal state

h_1 (goal) = 0

For $i=2$ n = initial state

h_2 (initial) = correctly placed tiles count expect space

h_2 (initial) = 4

For n = goal state

h_2 = (goal) = 8

For $i=3$, n = initial state

h_3 (initial) = ~~manhattan di~~ sum of manhattan dist abs count position of all tile except space

h_3 (initial) $= 0+0+0+0+1+1+1+1+1$

$= 4$

For n = goal state

h_3 (goal) $= 0$