Assignment No. 1A

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Roll No. :- 25

Subject :- IS

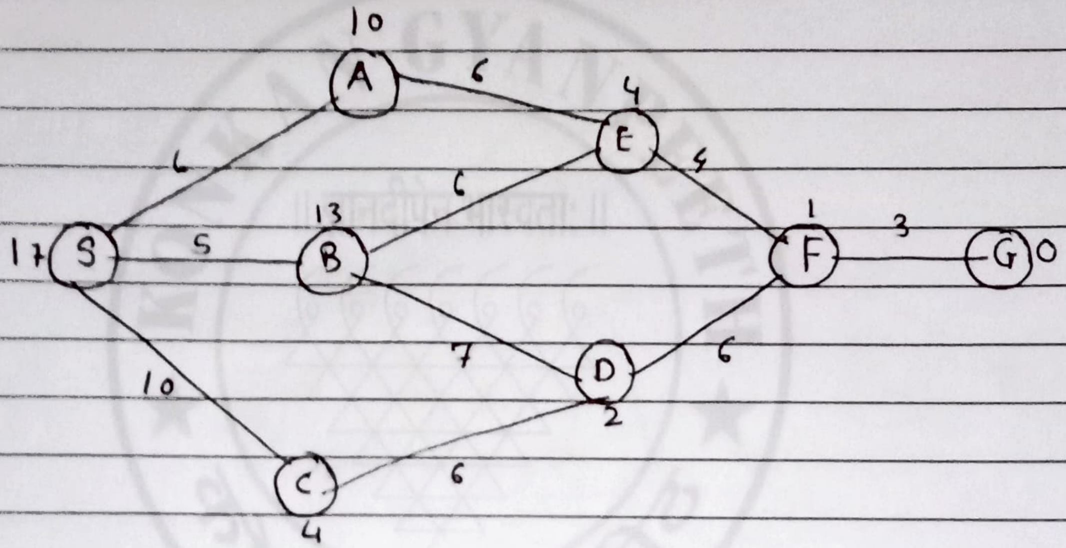
Batch :- I1

Class :- BE

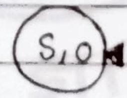
D.O.P	D.O.C	Mark	Sign

Assignment No. 1A

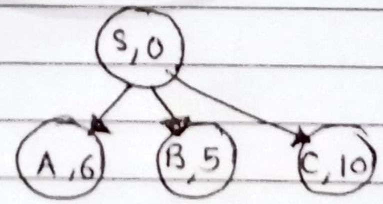
1) Consider following definition of state space For some ab arbitary Problem. Then number mentioned against the edges is cost to be incurred in moving From One node to the other in any direction. The number in red Font mentioned against the node is the heuristic function value.



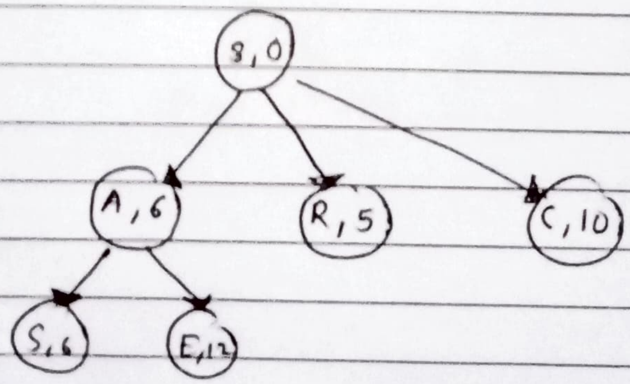
iii) Apply BFS :-



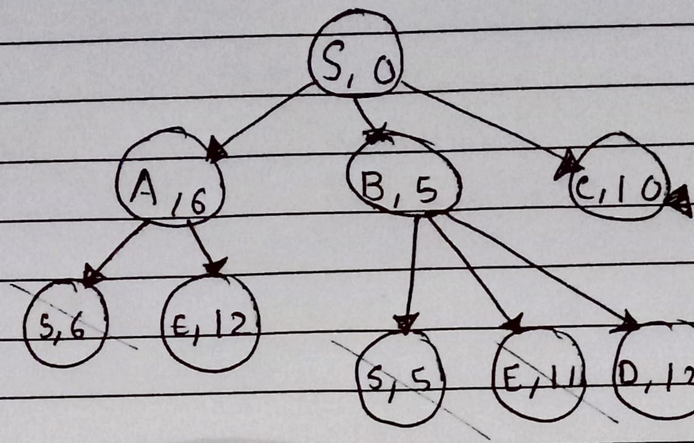
Step 1 :-



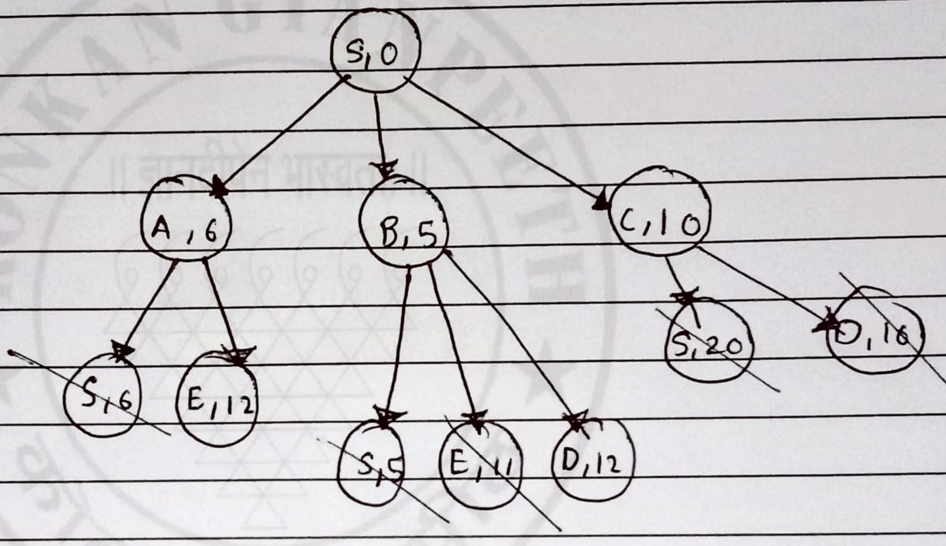
Step 2 :-



Step3 :-



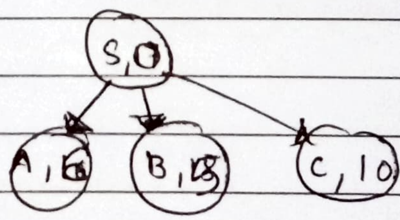
Step 4 :-



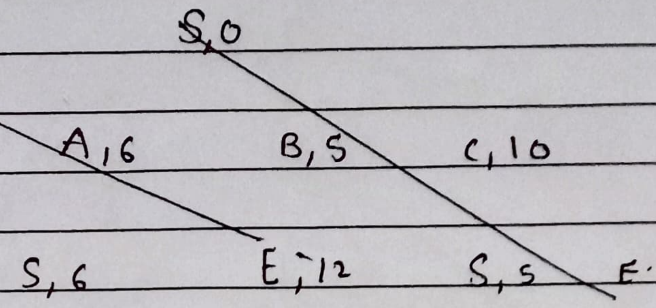
1) Apply A* algorithum

Step1 :-

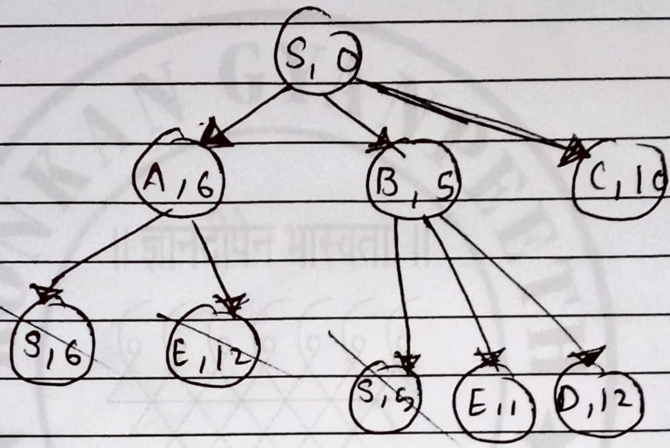
Step 2 :-



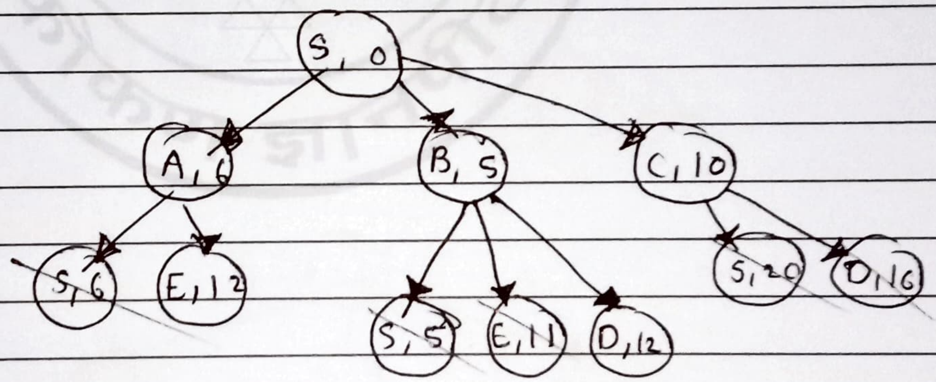
~~Step 3 :-~~



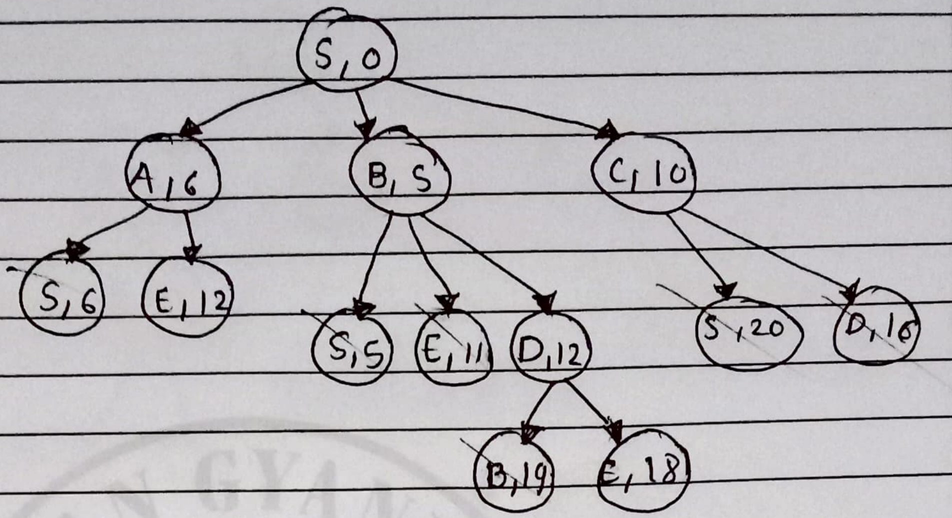
Step 3 :-



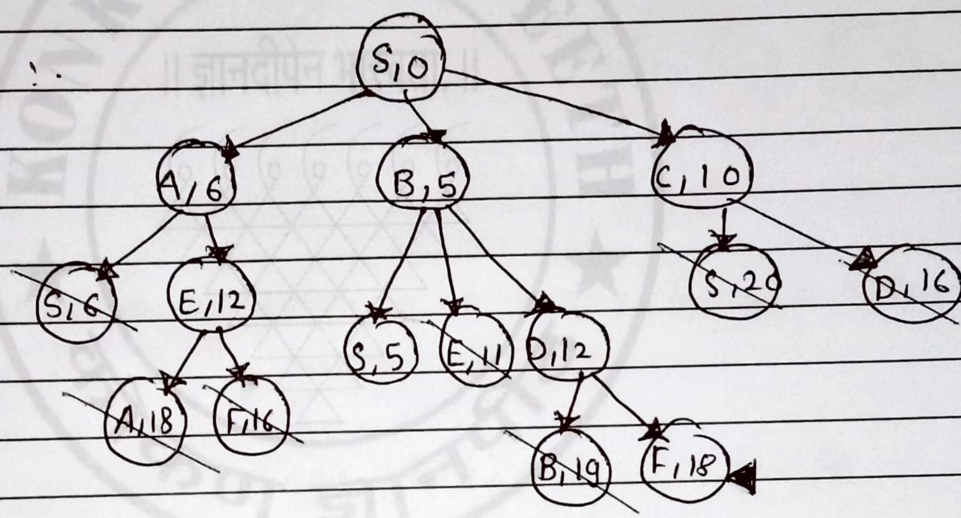
Step 4



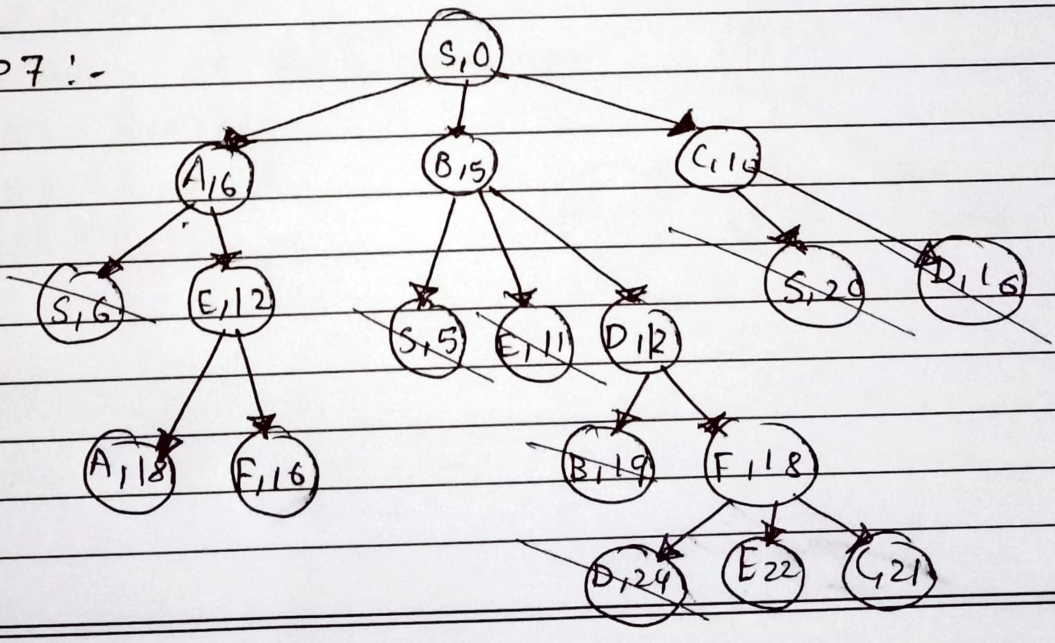
Step 5

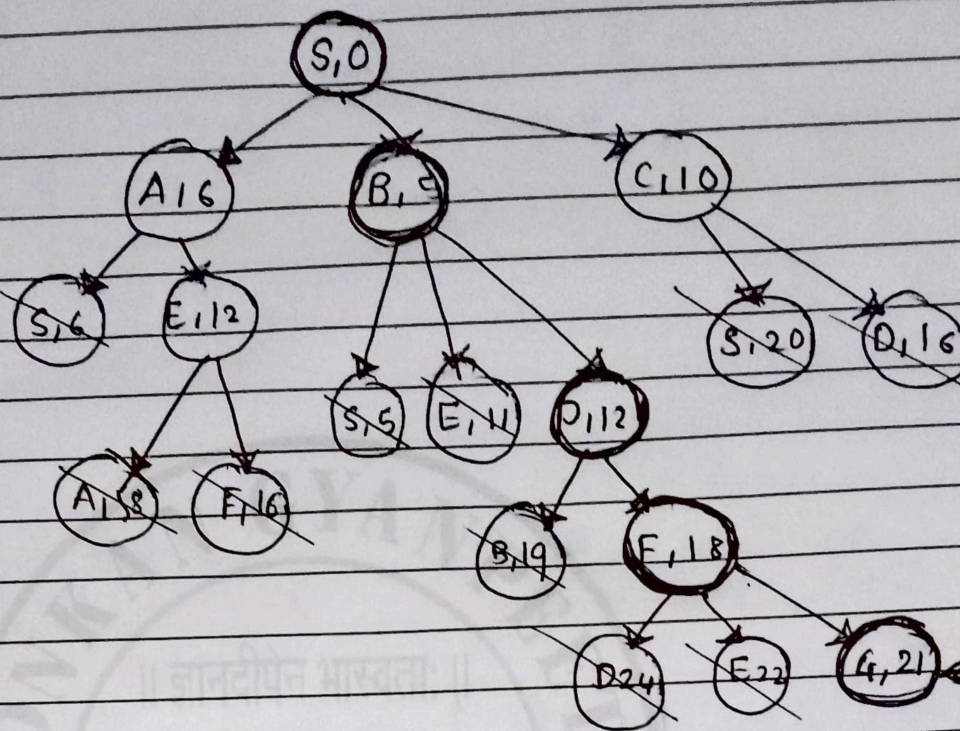


step 6 :-

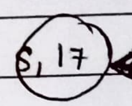


step 7 :-



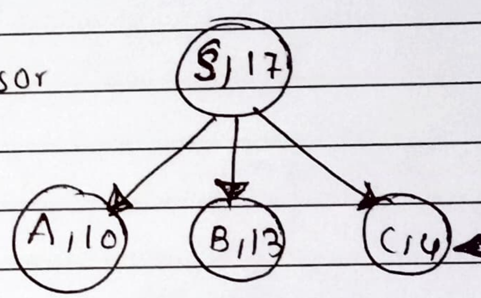


1.4. Initialization :- compute & secure for S & put it in the openlist.



F - Secure S : F(S) = h(S) = 17

step 1 :-
F - secore of ~~sucessor~~ score Sucessor
F(A) = h(A) = 10
F(B) = h(B) = 13
F(C) = h(C) = 14

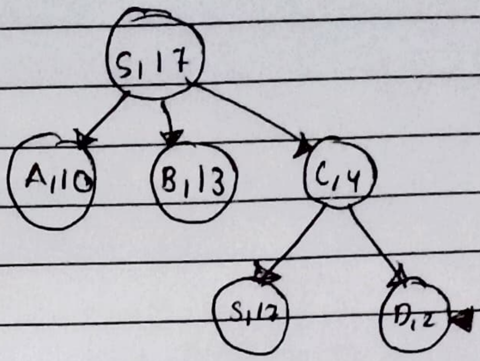


Step 2 :-

F - score of sucessor

f(S) = h(S) = 17

F(D) = h(D) = 2



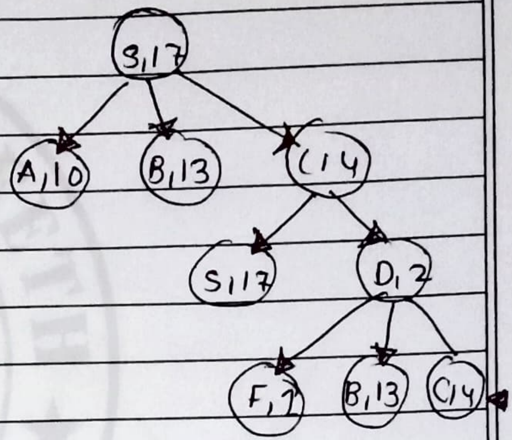
Step 3 :-

F - score of sucessor

F(C) = h(C) = 4

F(B) = h(B) = 13

F(F) = h(F) = 1



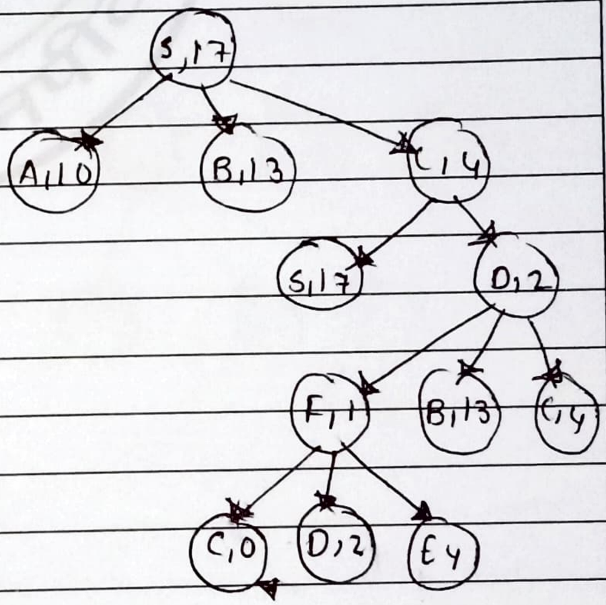
Step 4 :-

F - score of Seccessor

F(D) = h(D) = 2

F(E) = h(E) = 4

F(G) = h(G) = 0

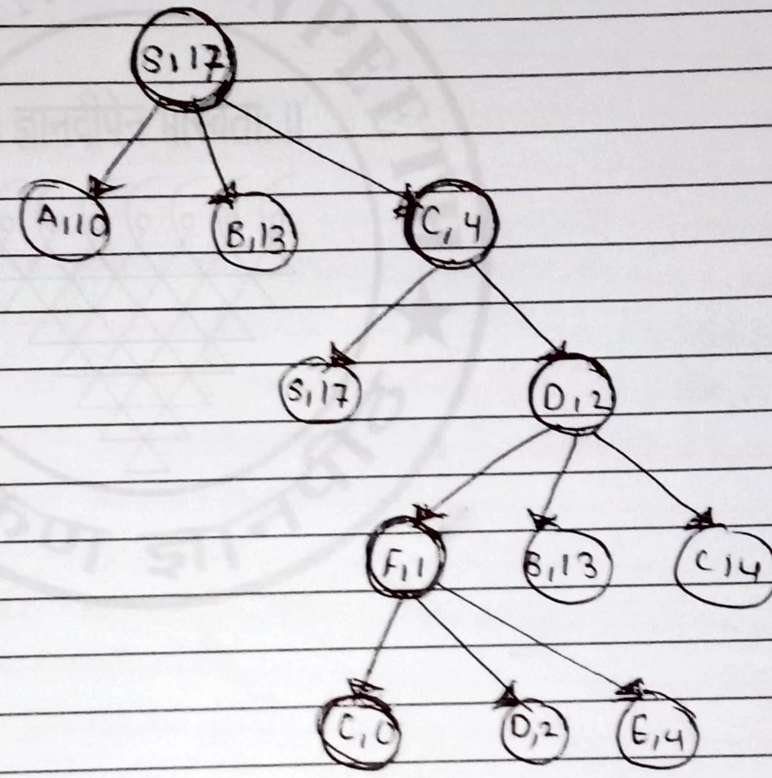


step 5 :-

Solution is :-

S → C → D → F → G with

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



2) Consider following Instance of 8 pluzze Problem

8	7	6
2	1	5
3	4	-

Initial configulation

-	8	7
2	1	6
3	4	5

Goal Configuration.

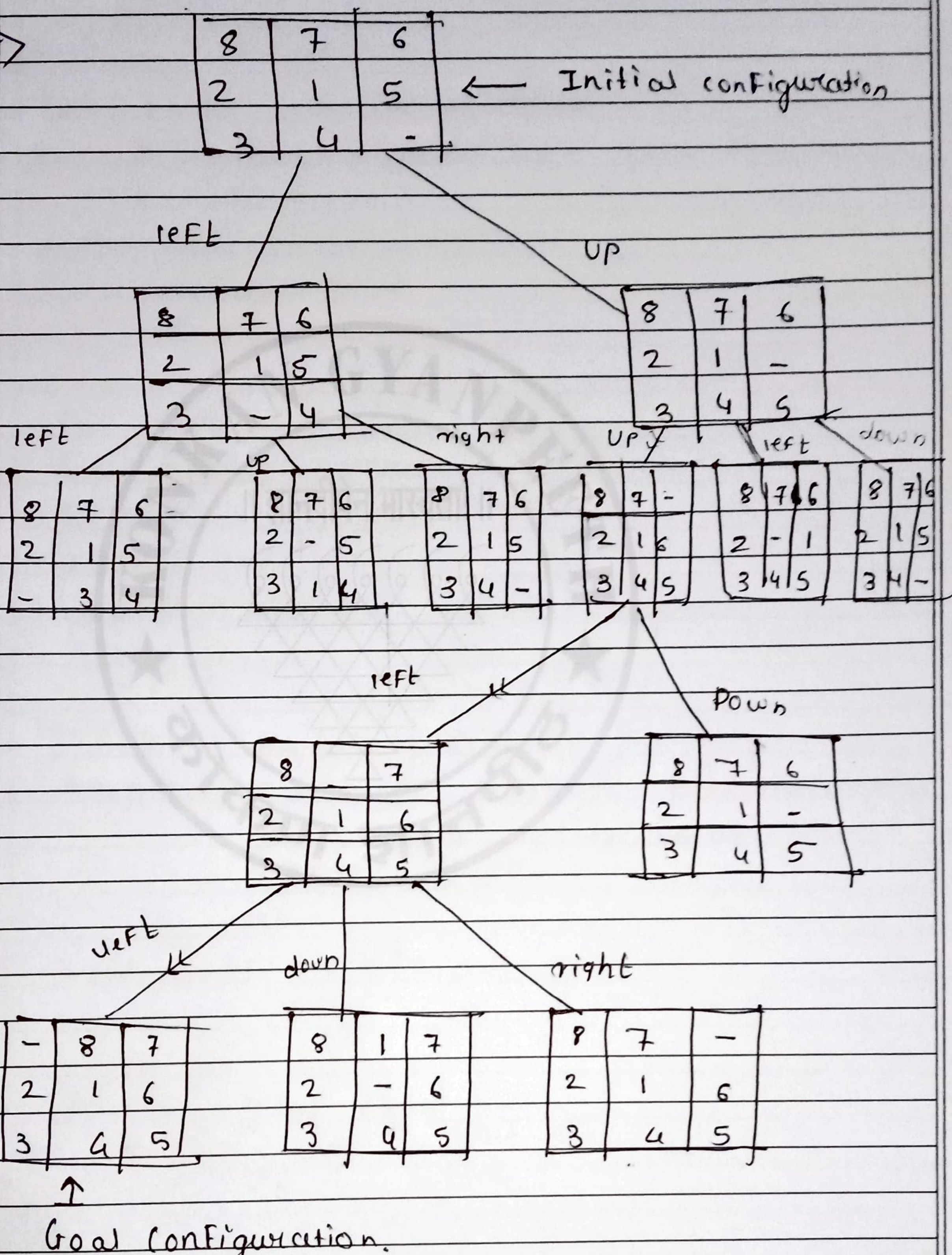
8	7	6
2	1	5
3	4	-

a) 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}, {2,1,5}, {-,3,4}} →
{{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 move are equally constanly the cost would be
$g(n) = 6$

∴ path cost = 8 direction + 4 staircase
= 12

c] ->


Initial configuration
left
up
left
up
right
up
left
down
left
Down
left
down
right
Goal configuration.

e) →

For $i = 1$, n = initial state

h_1(initial) = misplace tile count except space

h_1(initial) = 4

n = goal state

h_1(goal) = 0

For $i = 2$, n = initial state

h_2(initial) = current

h_2(inital) = 4

For n = goal state

h_2(goal) = 8

For $i = 3$, n = initial state

h_3(inital) = sum of distance between current and correct position of all tiles except space.

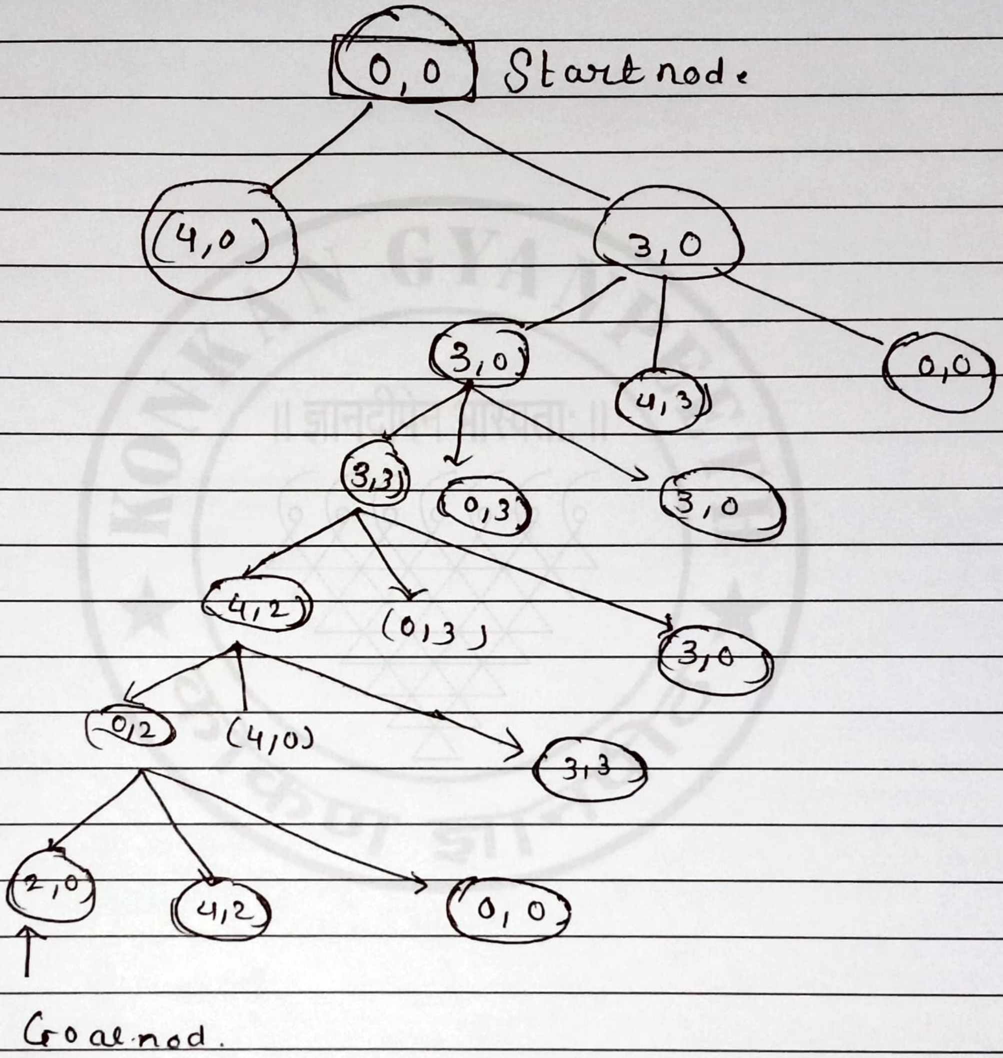
h_3(initial) $= 0 + 0 + 0 + 0 + 1 + 1 + 1 + 1$
$= 4$

For n = goal state

h_3(goal) = 0

water jug Problem using

e) Depth First Search (DFS)



f) what should be minimum value of depth limit set by the algorithm so that Depth first search when applies to thi ~~pro~~ problem gives optimal solution. Explain

1) Fill the wate jug
2) Empty water jug
3) Traffer the water jug
Initiation
start state : (0,0)

Iteration 1 :-
Fill 3-gallon jug
Now the state is (x,3)

Current state (x,3)

Iteration 2 :- Pour all water from 3-gallon jug into 4-gallon jug

Now the state (3,0)

Current state (3,0)

Iteration 3 :- Fill gallon jug
Now the state is (3,3)

Current state : (3,3)

Iteration 4 :- Pour water from 3-gallon jug into 4-gallon jug until 4-gallon jug is full
Now the state is (4,2)

Current state : (4,2)

Iteration 5 :- ~~current~~ Empty 4-gallon jug
Now state is (0,2)

current state ~~is~~ (0,2)

Iteration 6 :- pour gallon water from 3 gallon jug into 4 gallon jug

goal state is (2,0)

goal state (2,0)

3) Consider following formulation of water jug problem

1) State defination :- <x,y) --> indicates x lit water in jug with capcity 5 and y lit ~~wate~~ water jug with capcity 3 lit
2) Initial state : <0,0> --> both jug are empty.
3) Goal state : <4,0), --> 5 lit Jug has 2 lit and 3 lit jug has upto 2 lit or <4,1>, <4,2> water.
4) Action allowed :-
   1. <x, -> ---> <0,-> We Just empty jug 1
   2. <-, y> --> <-,0> we Just empty Jug 2.
   3. <x, y> ---> <5,-> we Just Fill Jug 1 to its capcity.
   4. <-, y> ---> <-,3> we Fill jug 2 to its capcity
   5. <x,y> ---> <x-z,3> we Fill jug 2 to its capcity by transferring water from jug 1 here y+z=3
   6. <x,y> ---> (5, y-z> we fill 1 to its capcity transferring water from jug 2 here x+z=5

5. Step cost will be equal for all actions and one step counts as 1 unit cost.

Based on above problem formulation answer following questions.