Assignment-1A

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Class - B.E. IT

Roll No - 46

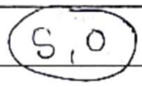
Batch - I2

Subject - AIS LAB.

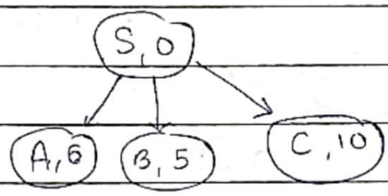
Q1.

1.1] →

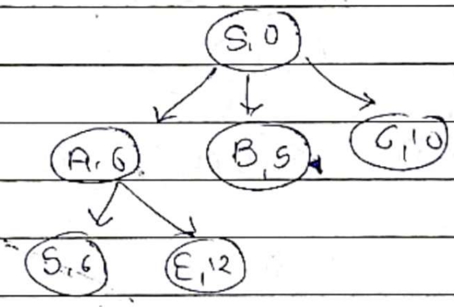
Step 0:



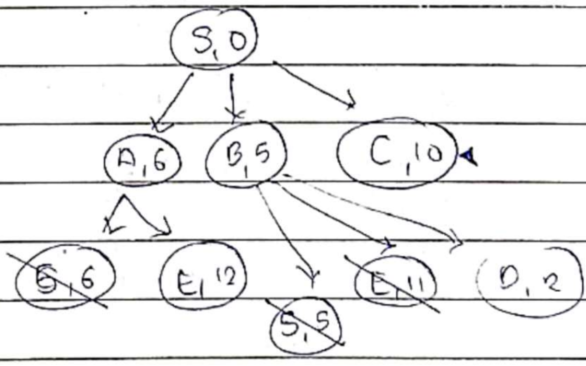
Step 1:



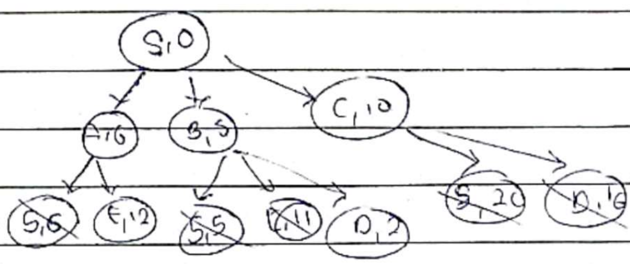
Step 2:



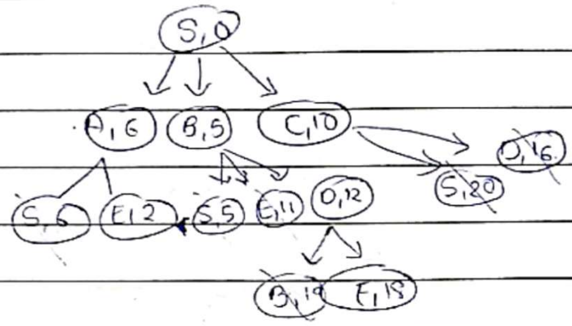
Step 3:-



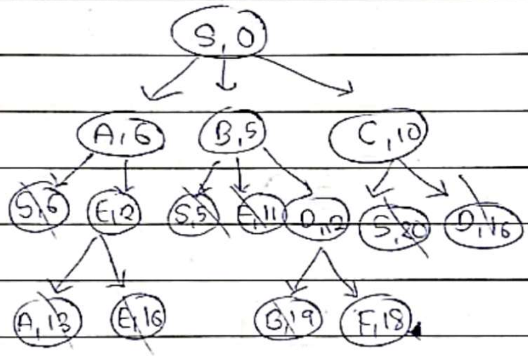
Step 4



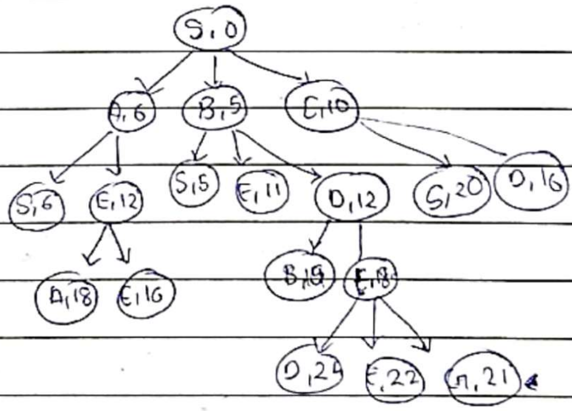
Step 5.



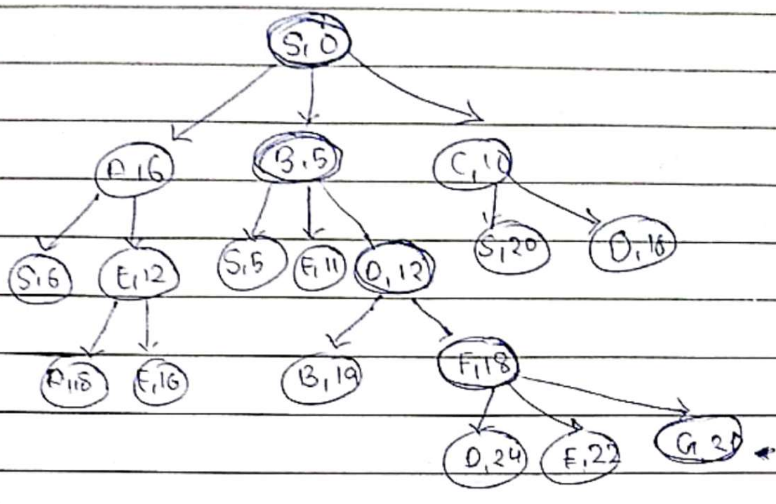
Step6 :



step7:



Step 8 :



1.4.

→ Initialization: Compute and score for S & put it in the openlist.

F - score S : f(S) = h[S) = 17 (S,17)

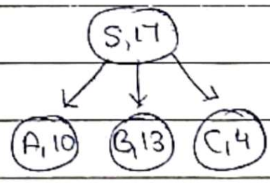
Step 1:

F - score of successors

f(A) = h(A) = 10

f(B) = h(B) = 13

f(C) = h(C) = 4

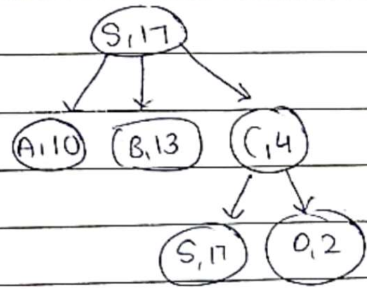


Step 2:

F - score of successors

f(S) = h(S) = 17

f(D) = h(D) = 2

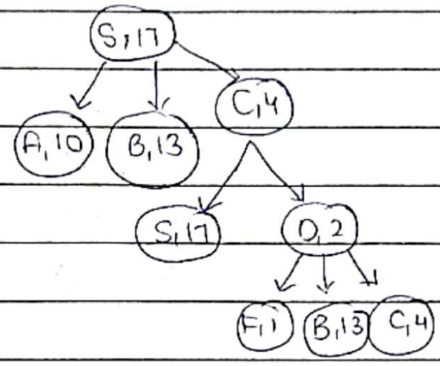


Step 3:

F- score of successor

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

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



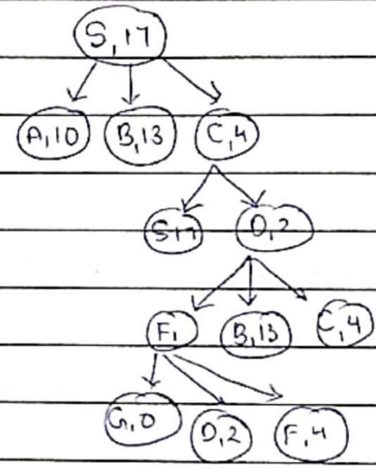
Step 4:

F-score of successor

$f(D) = h(D) = 2$

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

$f(G) = h(G) = 0$



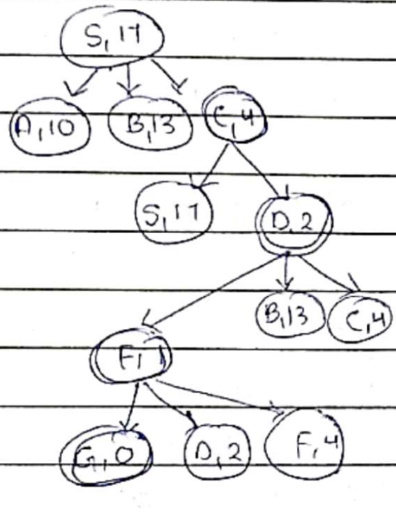
Step 5:

Solution is -

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

Sol^n cost = $10+6+6+3$

$= 25$



Q 2)

a)

→ The lowest path cost g(n) can be the cost to reach the goal config in least steps.

In our case, we can reach the final configuration in at last 4 moves : up, up, left, left

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

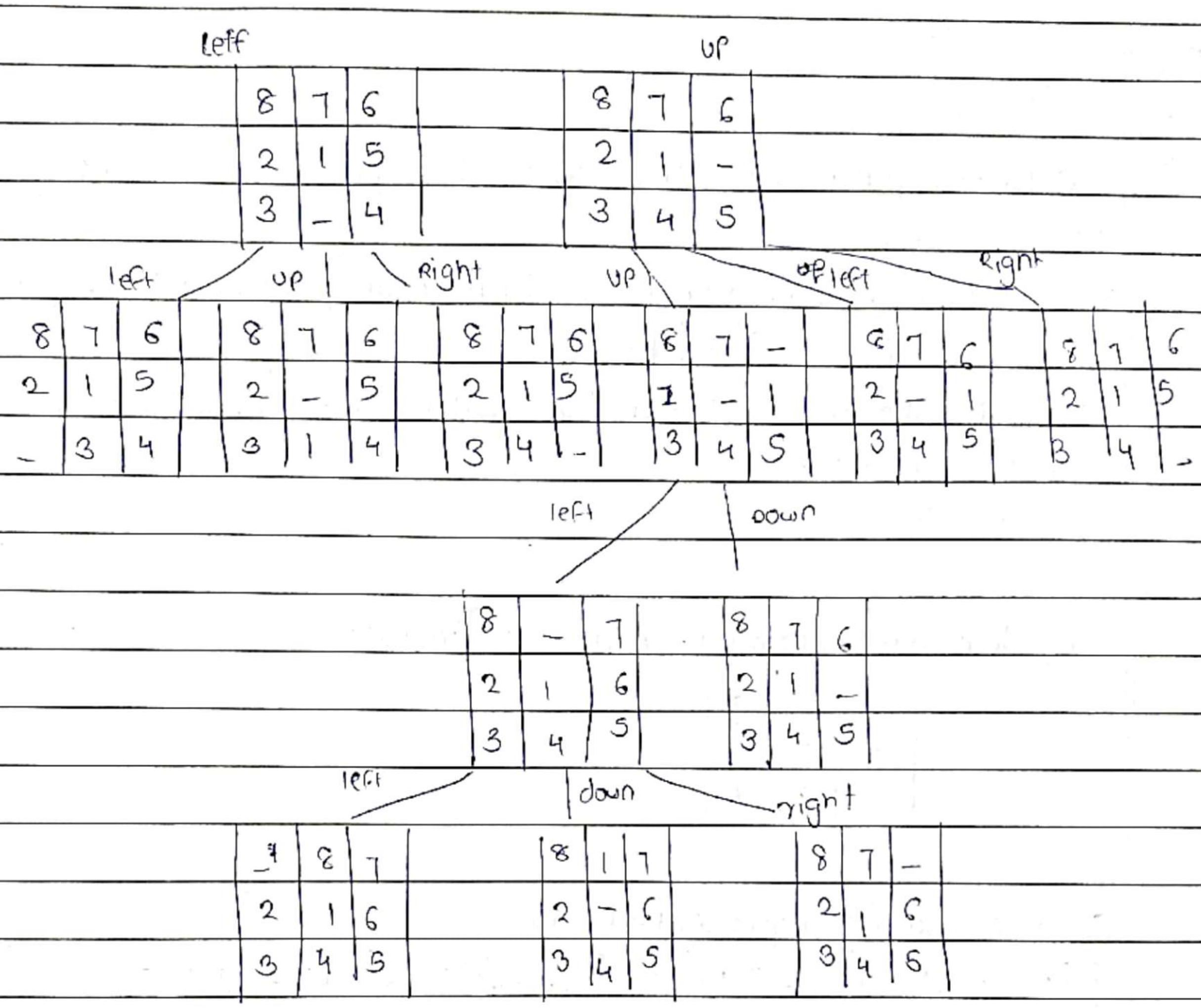
Since all the moves are equally costly the cost would be

$g(n) = 6.$

c)

8	7	6
2	1	5
3	4	-

Initial config



Final configuration

e)

→ For i=1, n= initial state

h_1(initial) = Misplaced tikes count except space

h_1(initial) = 4

n= goal state

h_1(goal) = 0

For i=2, n= initial state

h_2(initial) = directly replaced tiles 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 manhattan 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.