

Assignment 1A

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Class :- BE-IT

Roll No :- 7

Subject :- IS-Lab

D.O.P. D.O.T. Remark Sign.

Assignment - T(A)

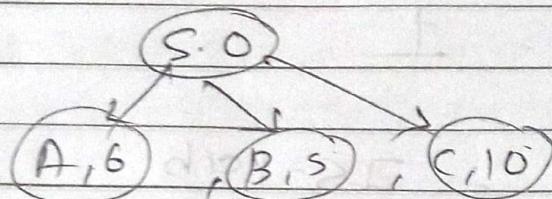
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Q.1]

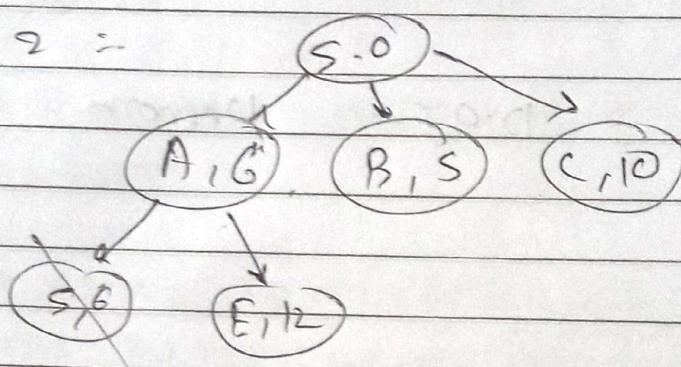
1.1 Step 0:

(3.0)

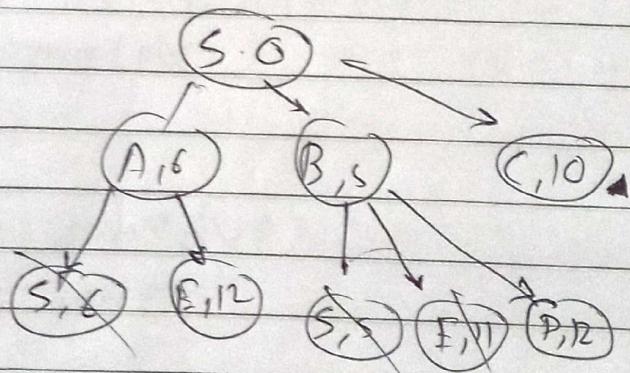
Step 1:



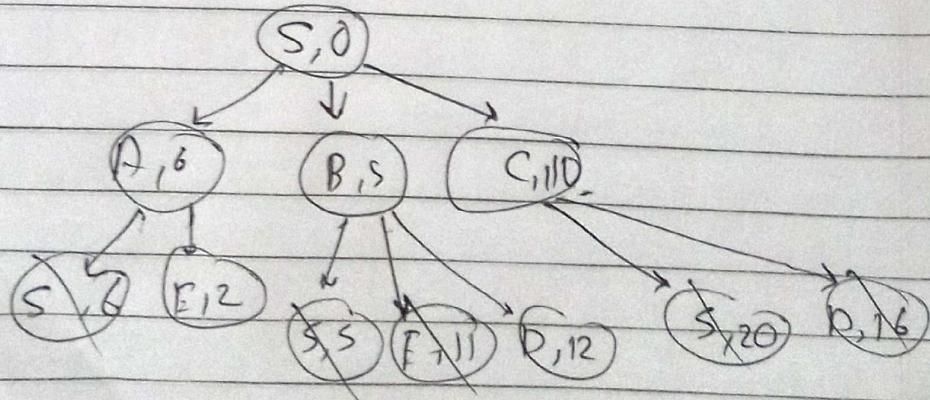
Step 2:



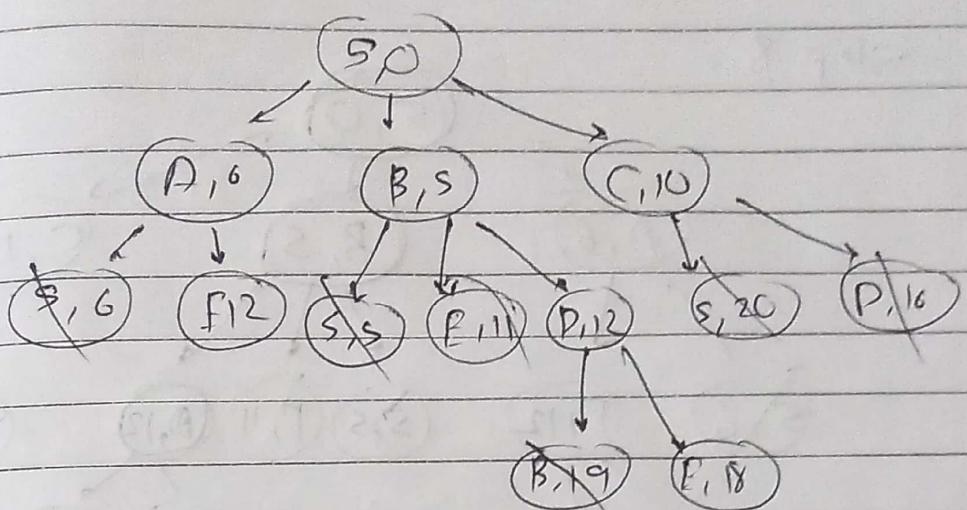
Step 3:



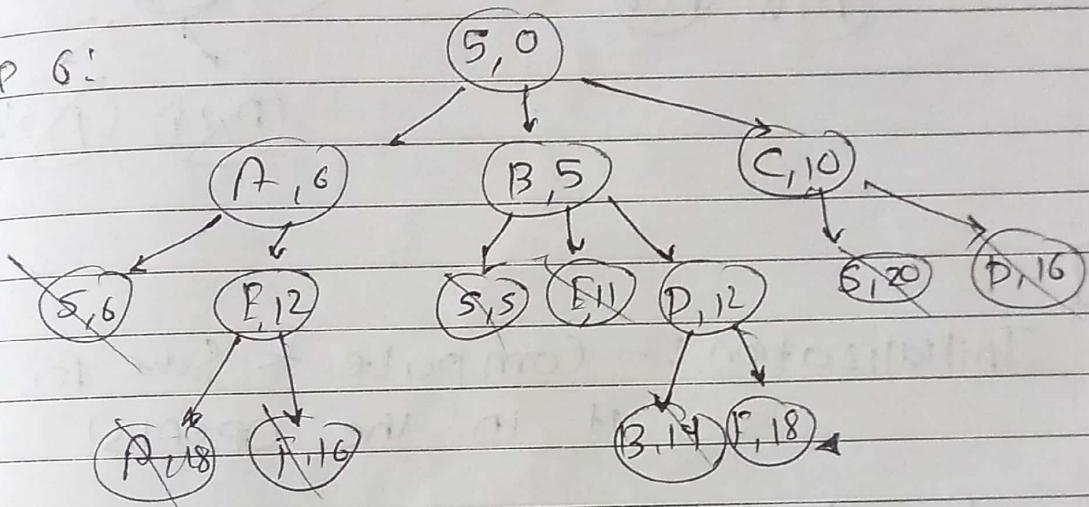
Step 4:



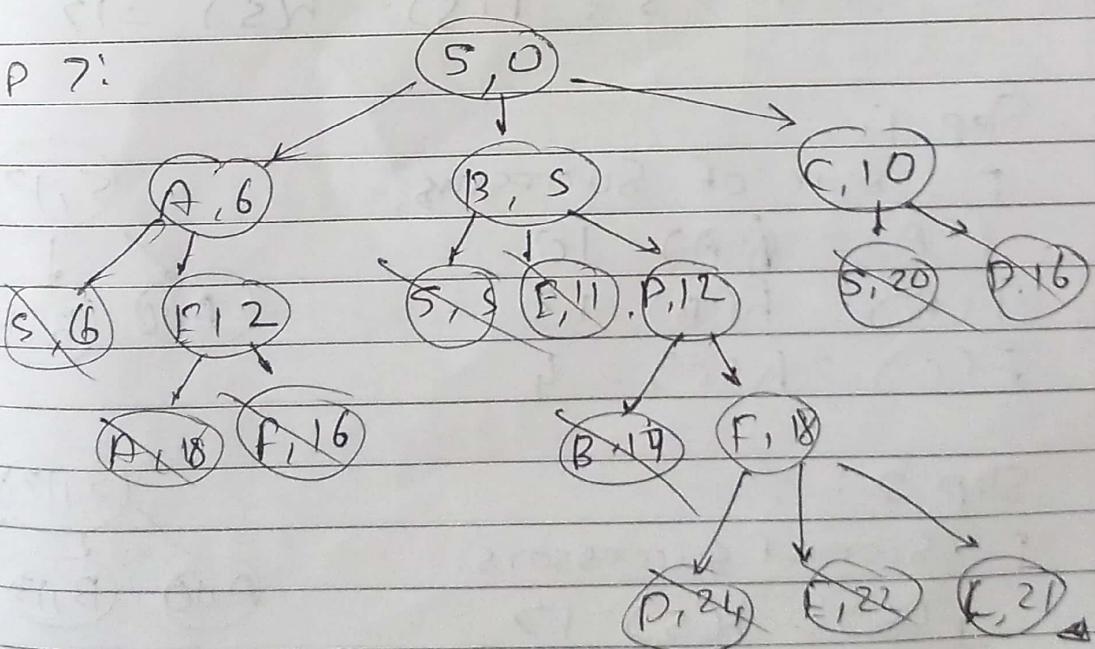
Step 5:



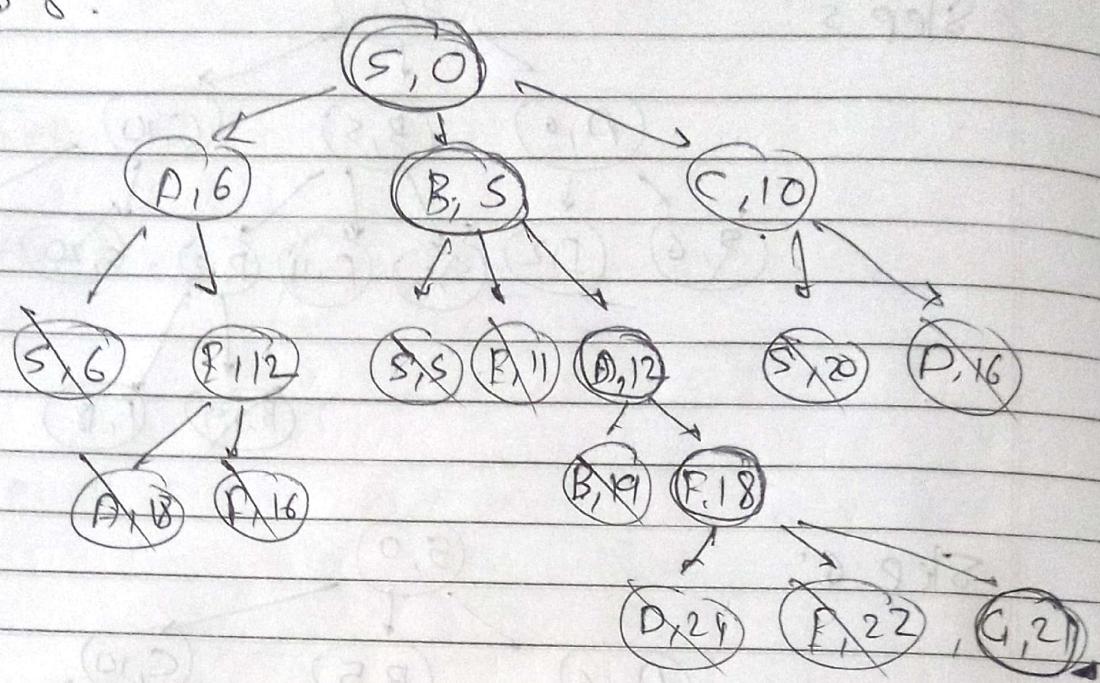
Step 6:



Step 7:



Step 8:



1.4]

Initialization: - Compute f-Score for S & put it in the openlist

f - Score . $S \vdash f(S) = h(S) = 17 \quad S, 17$

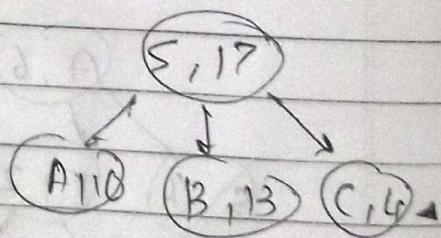
Step 1:

f - Score of Successors.

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

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

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

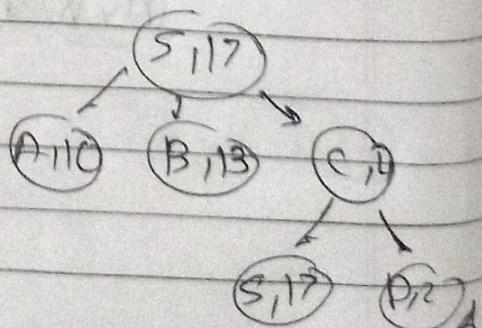


Step 2:

f - Score of Successors

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

$$f(P) = h(P) = 2$$



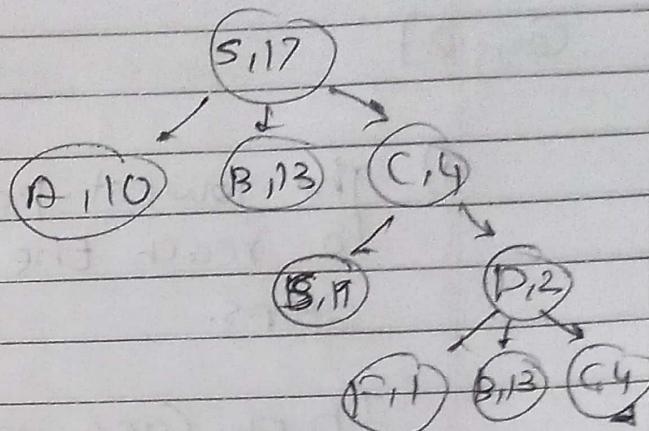
Step 3:

F - Score of successors

$$F(D) = h(D) = 4$$

$$F(B) = h(B) = 13$$

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



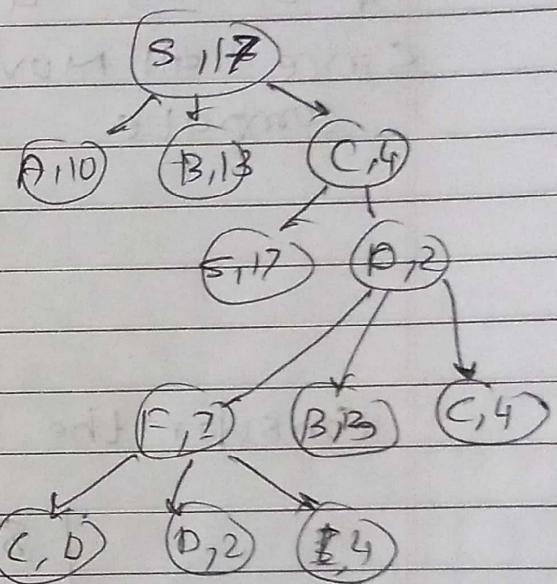
Step 4:

F-Score of successors.

$$F(D) = h(D) = 2$$

$$F(E) = h(E) = 4$$

$$F(G) = h(G) = 0$$

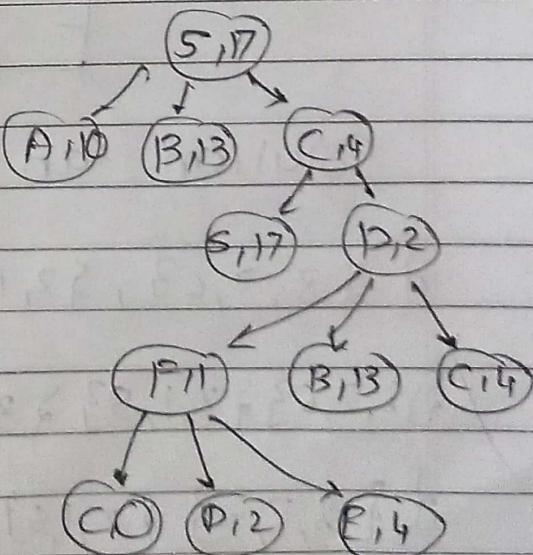


Step 5:

Solution is:

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

$$\begin{aligned} \text{Solution cost} &= 10 + 6 + 6 + 3 \\ &= 25 \end{aligned}$$



Q.. 2]

q) The lowest path cost $g(n)$ can be the cost to reach the goal configuration in the least 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:-

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

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

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

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

Since all the moves are equally costing
the cost would be

$$g(n) = 6$$

E]

8	7	6
2	1	5
3	4	-

initial config

left

up

up

right

right

up

left

down

8	7	6
2	1	5
-	3	4

8	7	6
2	-	5
3	1	4

8	7	6
2	1	5
3	4	-

8	7	6
2	-	1
3	4	5

8	7	6
2	-	1
3	4	5

8	7	6
2	1	5
3	4	-

left

now

8	-	7
2	1	6
3	4	5

8	7	6
2	1	-
3	4	5

down

right

-	8	7
2	1	6
3	4	5

8	1	7
2	-	6
3	4	5

8	7	-
2	1	6
3	4	5

final configuration.

→

for $i = 1$, $n = \text{initial state}$

$h_1(\text{initial}) = \text{Misplaced tiles count except Space}$

$$h_2(\text{initial}) = 4$$

$n = \text{goal state}$

$$h_1(\text{goal}) = 0$$

for $i = 2$, $n = \text{initial state}$.

$h_2(\text{initial}) = \text{Correctly placed files count except Space}$

$$h_2(\text{initial}) = 4$$

for $n = \text{goal state}$

$$h_2(\text{goal}) = 8$$

for $i = 3$, $n = \text{initial state}$.

$h_3(\text{initial}) = \text{Sum of Manhattan distance}$
 Count & correct position of all
 tiles except space.

$$\begin{aligned} h_3(\text{initial}) &= 0 + 0 + 0 + 0 + 1 + 1 + 1 + 1 \\ &= 4 \end{aligned}$$

for $n = \text{goal state}$

$$h_3(\text{goal}) = 0$$