

Assignment-1A

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Subject: T.S. LAB

DoP

DoA

Marks

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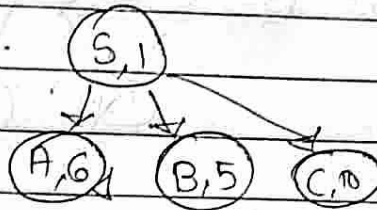
Q.1)

1.1] →

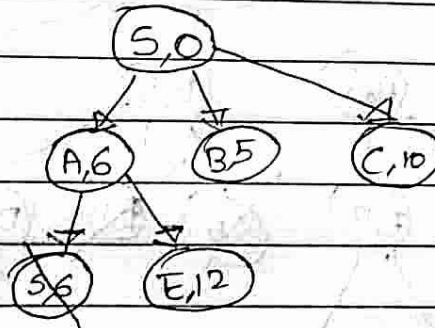
step 0:

(S, 0)

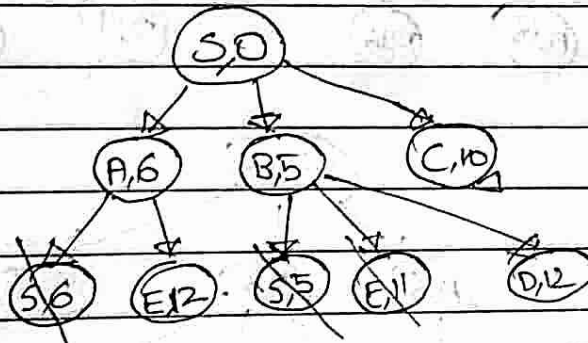
step 1:



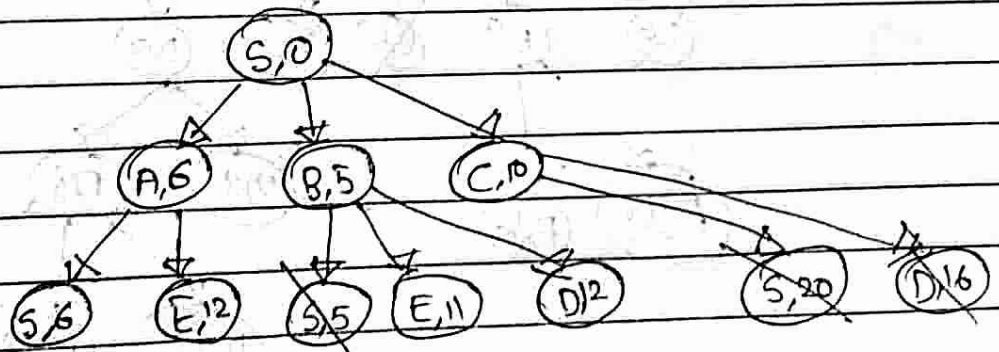
step 2:



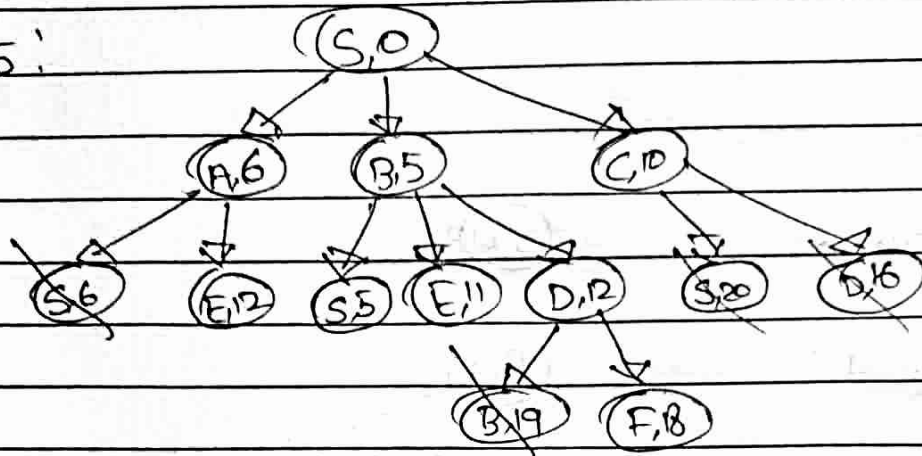
step 3:



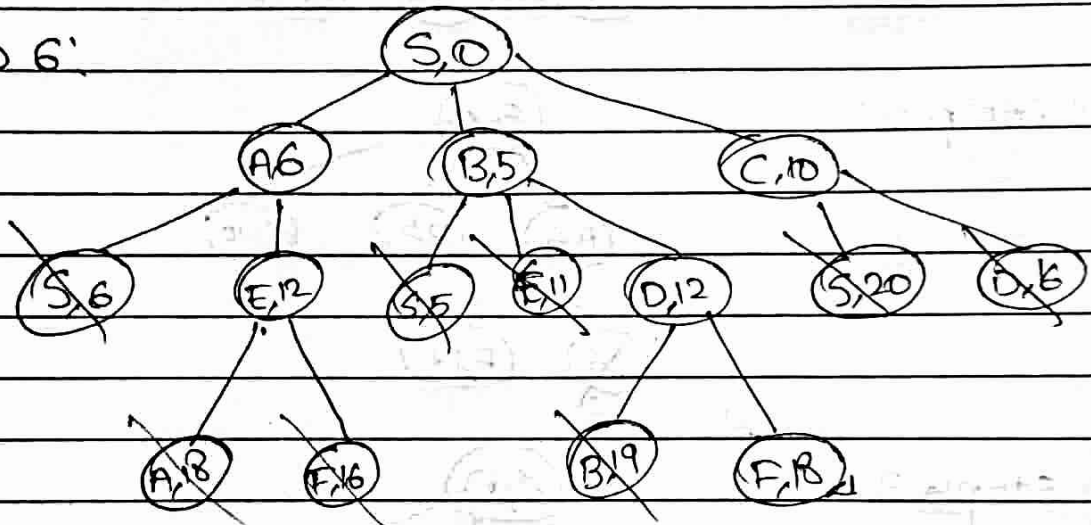
step 4:



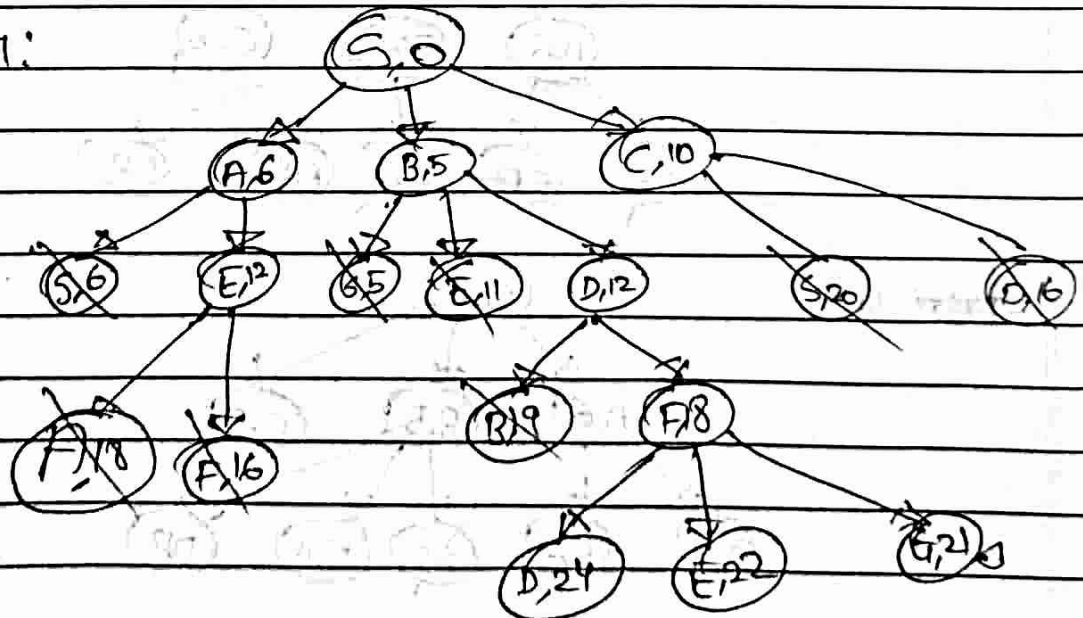
Step 5:



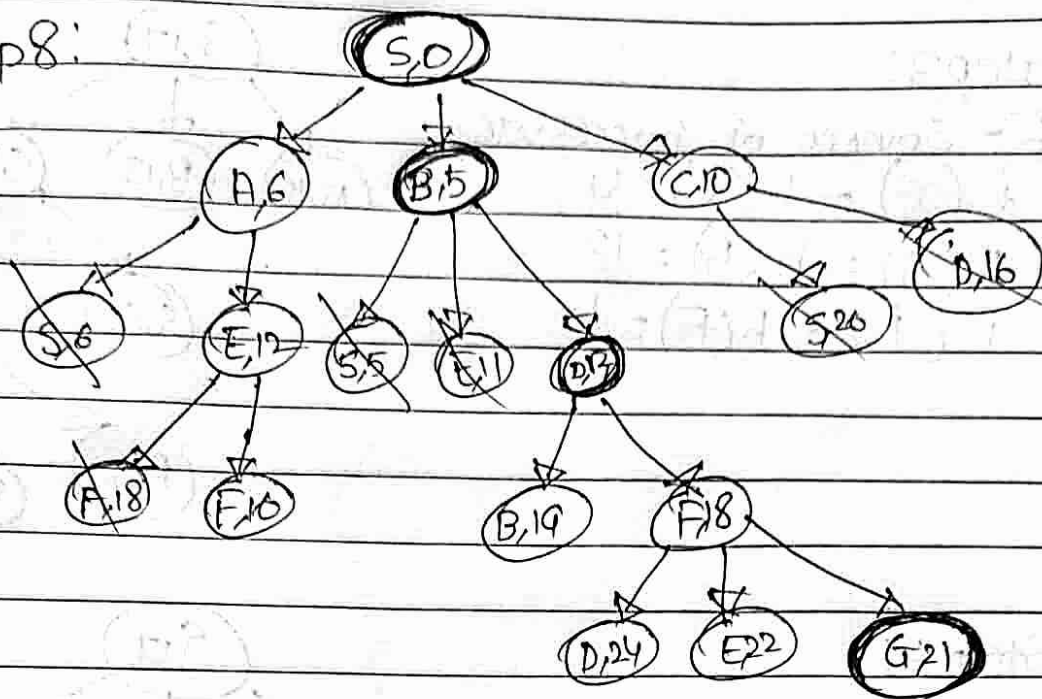
Step 6:



Step 7:



step 8:



1.4] →

Initialization: Computer f-source for S & put it in openlist.

F-source S: $F(S) = h(S) = 17$ (S,17)

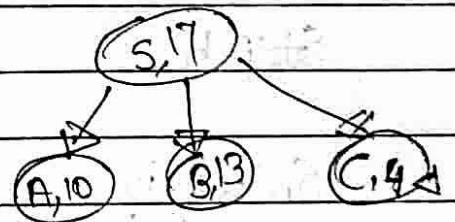
step 1:

F-source of successors

$$F(A) = h(A) = 10$$

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

$$F(C) = h(C) = 4$$

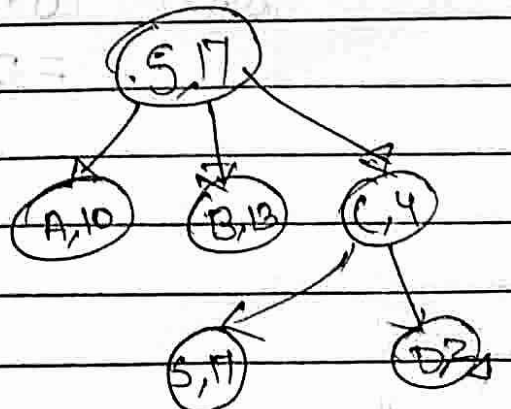


Step 2:

F-source of Successors

$$F(S) = h(S) = 17$$

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



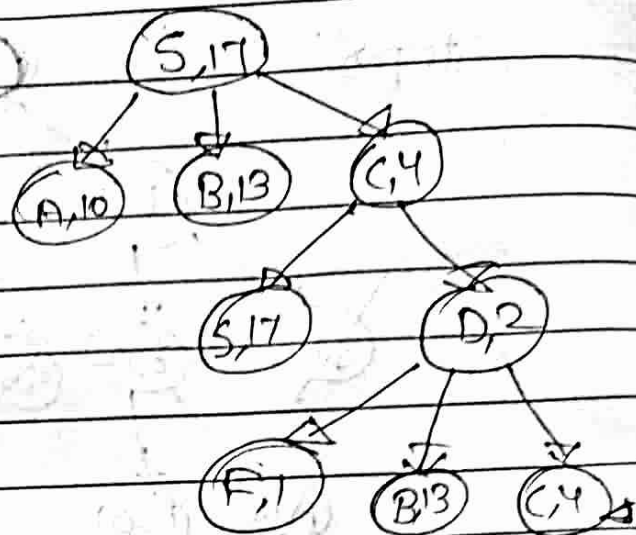
Step 3:

F - Source of Successor

$$F(C) = h(C) = 4$$

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

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



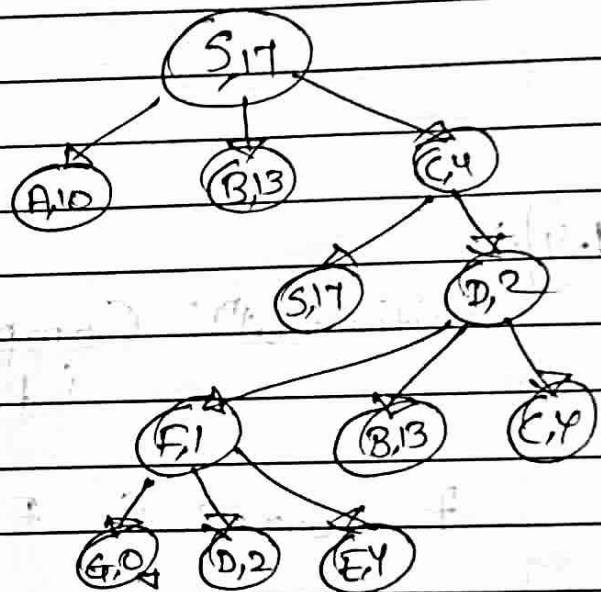
Step 4:

F - Source of Successor

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

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

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



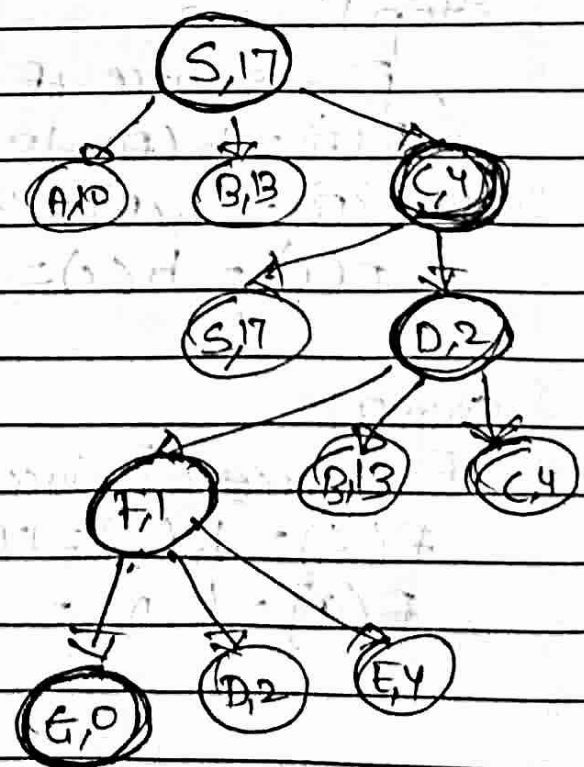
Step 5:

Solution is:

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

solution: $10 + 6 + 6 + 3$

$= 25$



Q.2)

- a) Lowest path $g(n)$ can be cost to reach goal configuration in least steps.
 In our case, we can reach final configuration in at least 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 foll. 8-puzzle instance:

8	7	6
2	1	5
-	3	4

Solution can be represented as:

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

Since all moves are equally costly, cost would be

$$g(n) = 6$$

c)

8	7	6
2	1	5
3	4	-

Initial Config.

left

up

8	7	6
2	1	5
3	-	4

8	7	6
2	1	-
3	4	5

left

up

right

up

left

down

8	7	6
2	1	5
-	3	4

8	7	6
2	-	5
3	4	-

8	7	6
2	1	5
3	4	-

8	7	-
2	-	1
3	4	5

8	7	6
2	-	1
3	4	5

8	7	6
2	1	5
3	4	-

Down

8	-	7
2	1	6
3	4	5

8	7	6
2	1	-
3	4	5

left

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

e) -)

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

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

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

$n = \text{goal state}$

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

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

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

For $n = \text{goal state}$

$$h_2(\text{goal}) = 0$$

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

$h_3(\text{initial}) = \text{Sum of dist. between current \& correct position of all tiles except space}$

$$h_3(\text{initial}) = 0 + 0 + 0 + 0 + 1 + 1 + 1 + 1 = 4$$

For $n = \text{goal state}$

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