

NAME : Mural Sanjay Rane

Roll No : 52

Batch : 13

SEM : 7/17

SUBJECT : TS LAB.

DOP	DOP	REMARK	SIGN

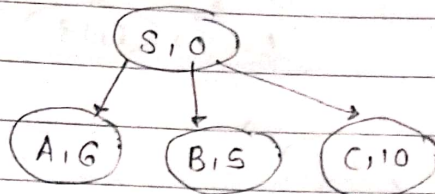
ASSIGNMENT NO: 1A

0.1)

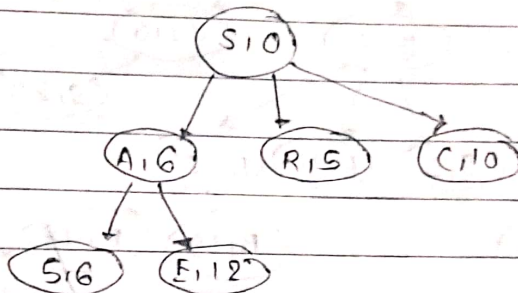
1.1) →

Step 0 : (S, 0)

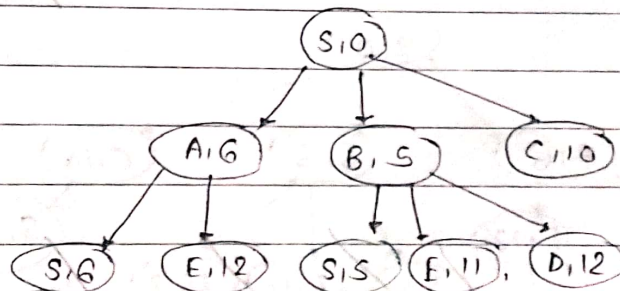
Step 1 :



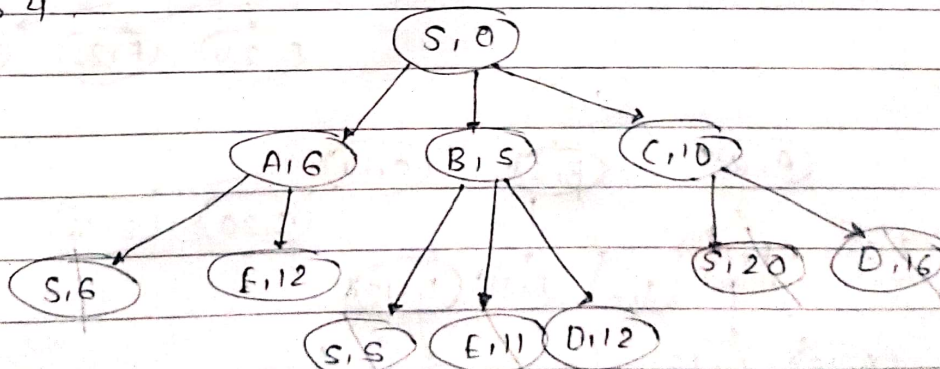
Step 2 :



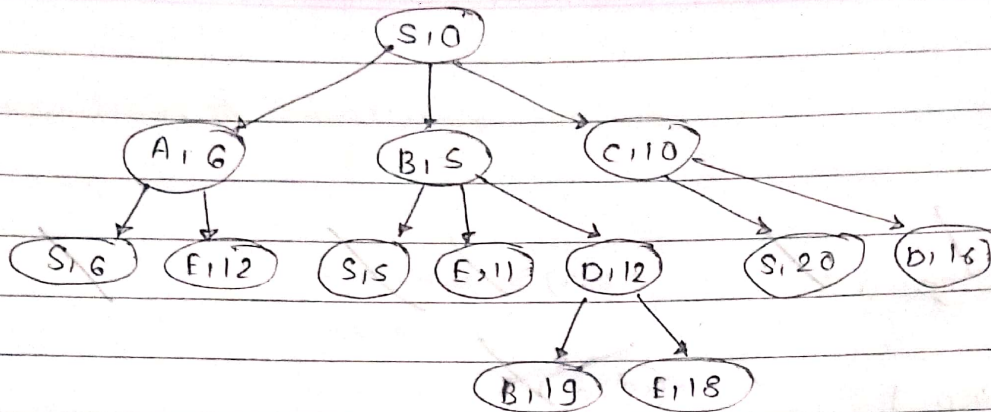
Step 3 :



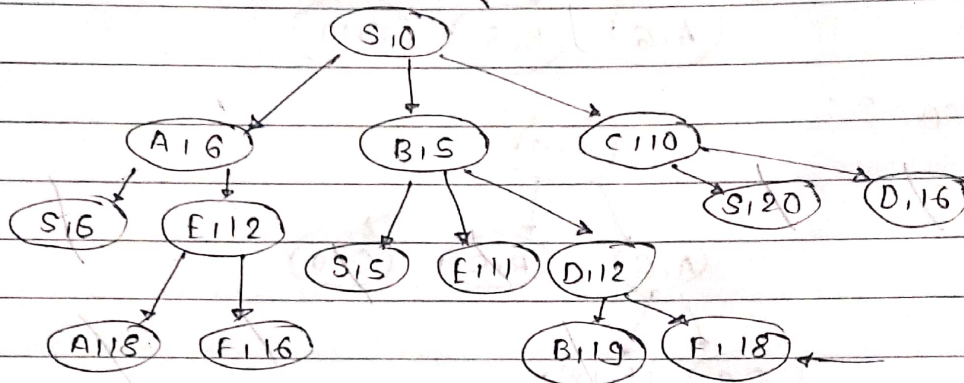
Step 4 :



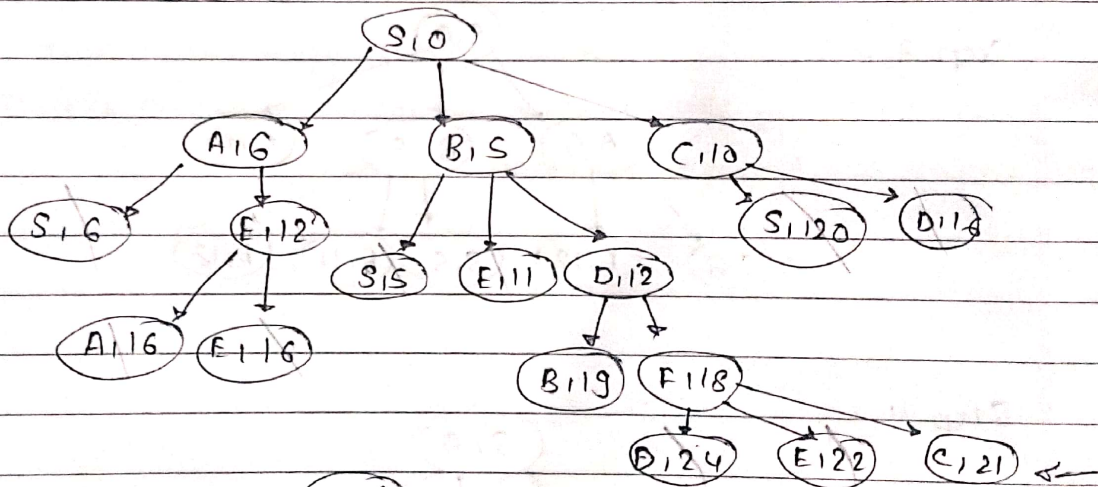
Steps



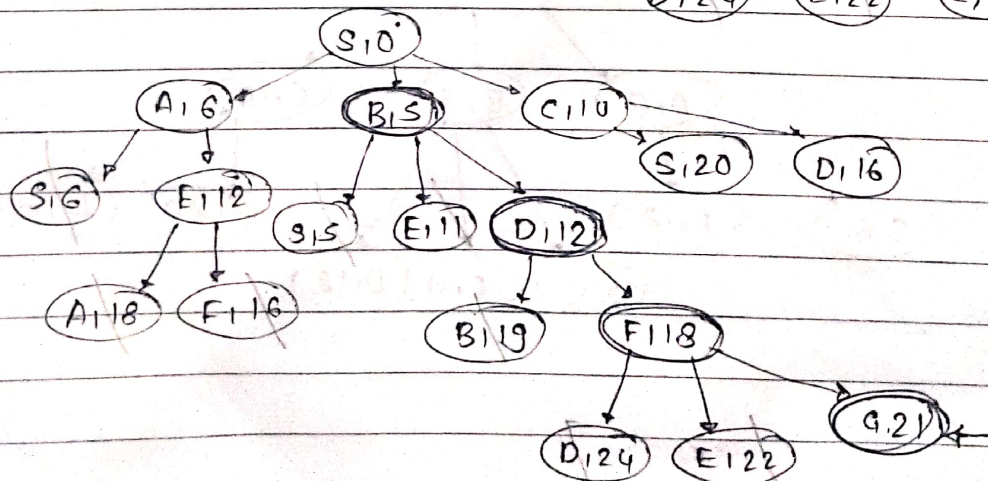
STEP 6 :



STEP 7 :



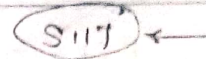
STEP 8 :



1.4)

→ Initialization: Compute f -score for s put s in the openlist

f -score s : $f(s) = h(s) = 17$



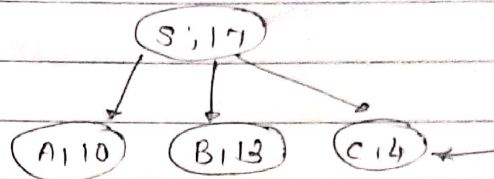
STEP 1:

f -score of successors

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

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

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

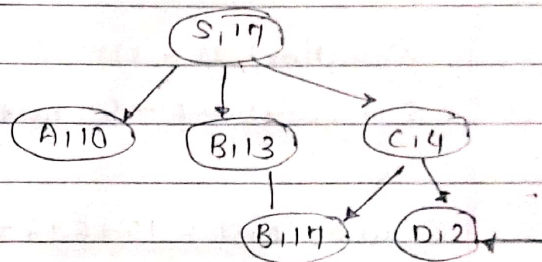


STEP 2

f -score of successors

$f(s) = h(s) = 17$

$f(B) = f(D) = 2$



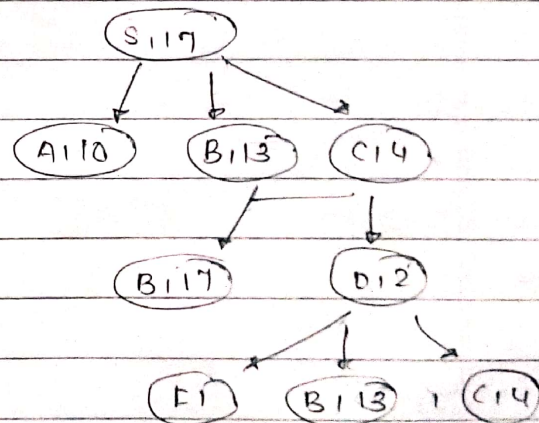
STEP 3

f -score of successor

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

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

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



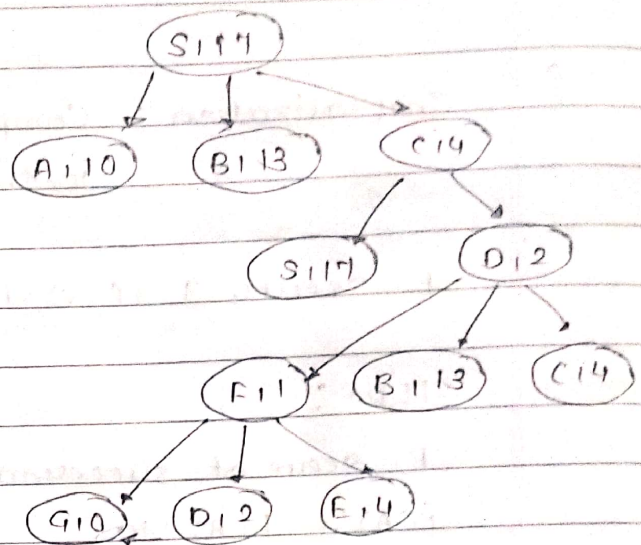
STEP 4:

F-Score of successors

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

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

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

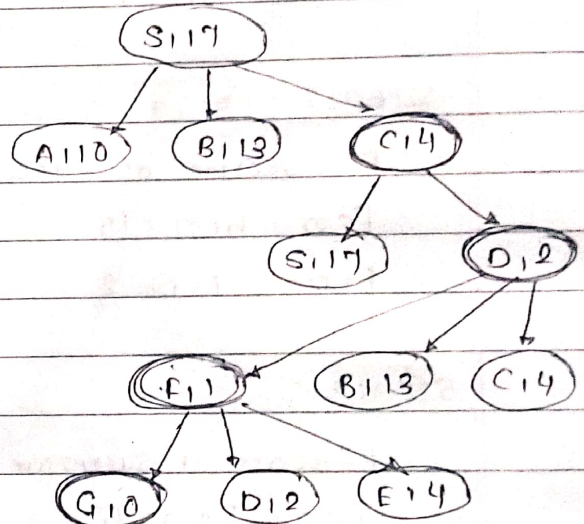


STEP 5:

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)

a)

→

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

In our case, we can reach the 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 the following 3-puzzle instance:

8	7	6
2	1	5
-	3	4

Solutions 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 the moves are equally costly the cost would be

$$g(n) = 6$$

c)

8	7	6
2	1	5
3	4	

Initial config.

left			up		
8	7	6	8	7	6
2	1	5	2	1	-
3	-	4	3	4	5

left			up			right			up			left			left			down		
8	7	6	8	7	6	8	7	6	8	7	6	8	7	-	8	7	6	8	7	6
2	1	5	2	-	5	2	1	5	2	-	1	2	-	1	2	-	1	2	1	5
-	3	4	3	1	4	3	4	-	3	4	5	3	4	5	3	4	5	3	4	-

left			down		
8	-	7	8	7	6
2	1	6	2	1	-
3	4	5	3	4	5

left			down			right		
-	8	7	8	1	7	8	7	-
2	1	6	2	-	6	2	1	6
3	4	5	3	4	5	3	4	5

Final configuration.

e)

→

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

$h(\text{initial}) = \text{misplaced tiles count exact space}$

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

$n = \text{goal state}$

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

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

$h_2(\text{initial}) = \text{sum of Correctly explained tiles count except space}$

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

for $n = \text{goal state}$

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

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

$h_3(\text{initial}) = \text{sum of manhattan dist betw}^n$
current & correct position of all tiles,
except space

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

for $n = \text{goal state}$

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