

K.G.C.E.  
Karjat - Raigad

Assignment :- 1 (A)

Page No. :

Date :

Name :- Apeksha B. Dhutargao

Class :- BE IT

Rollno :- 15

Subject :- IS LAB

DOP

DOA

Remark

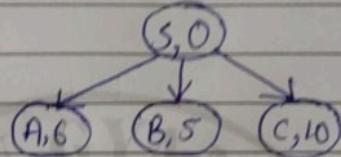
Sign

Q1.  
1.1.

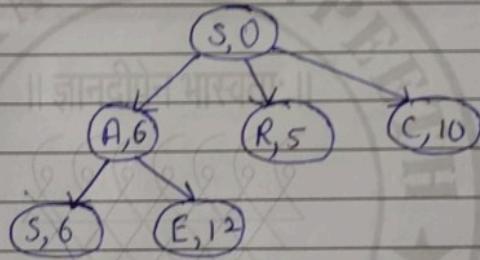
Step 0 :-

(S, 0)

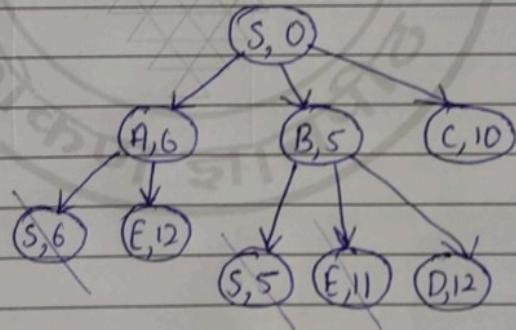
Step 1 :-



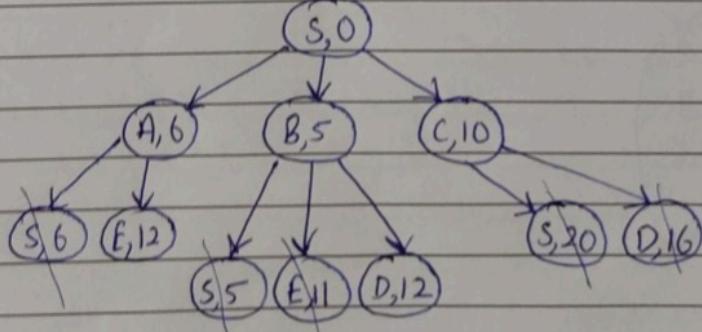
Step 2 :-



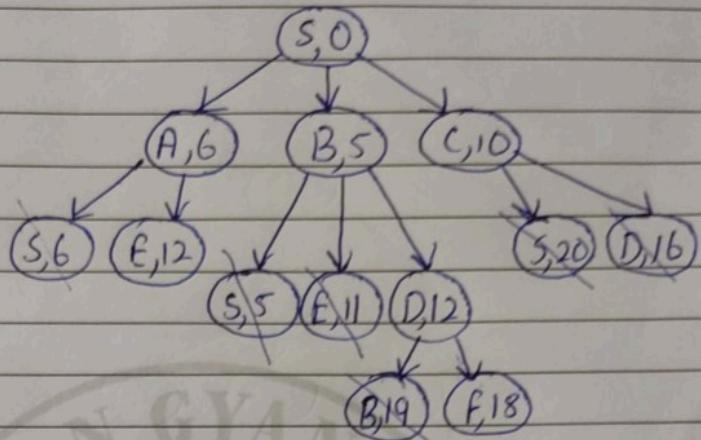
Step 3 :-



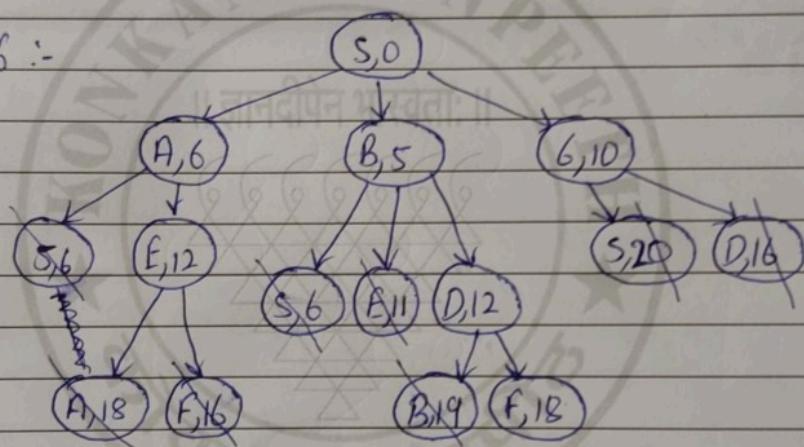
Step 4 :-



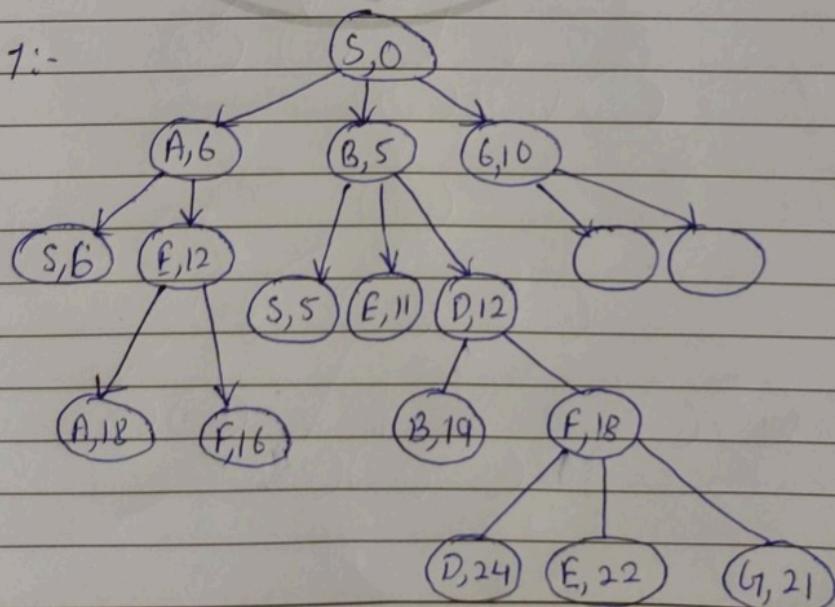
Step 5 :-



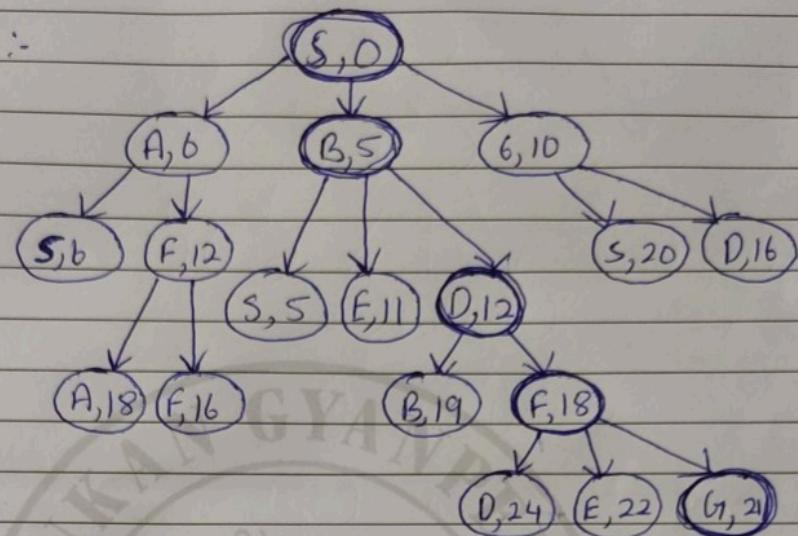
Step 6 :-



Step 7:-



Step 8 :-



1.4.

Initialization : Compute  $f$ . for  $s$  & put it in the openlist.

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

$S, 17$

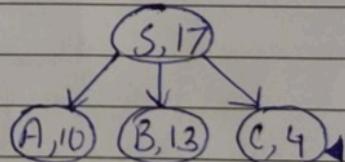
Step 1 :-

$f$  - score of successors.

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

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

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

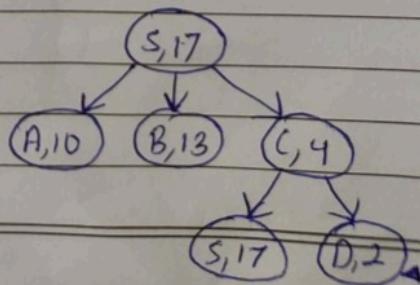


Step 2 :-

$f$  - score of successors

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

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



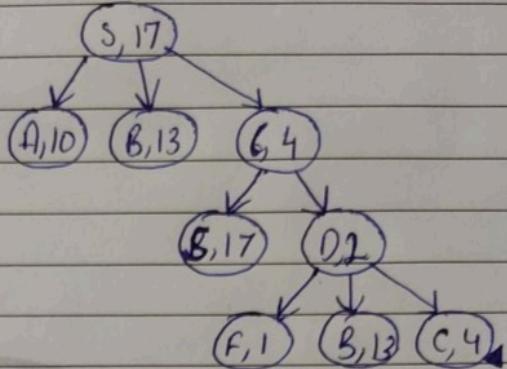
### Step 3:

## F-slope of Successor

$$f(c) = h(c) = 4$$

$$f(8) = b(8) = 13$$

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



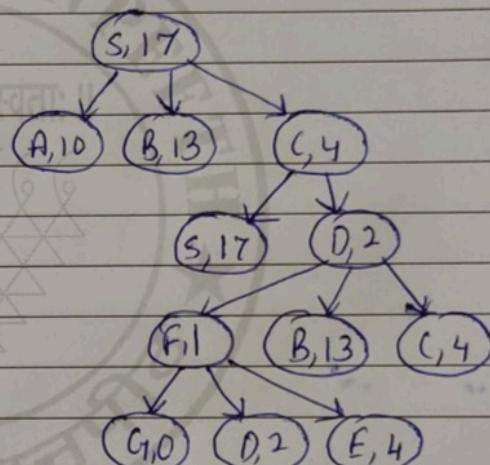
Step 84:

F-score of success

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

$$g(E) = h(E) = 4$$

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

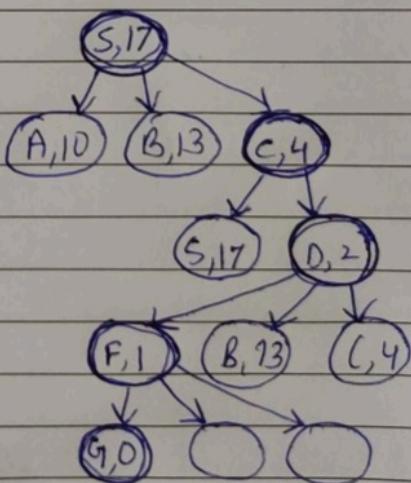


Step 5 :-

Solution is -

$S \rightarrow C \rightarrow D \rightarrow F \rightarrow G_1$  with

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



g [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 8 puzzle instance :

8	7	6
2	1	5
-	3	4

Solution can be represented as :

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

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

2 1 5

3 - 4

8 7 6

2 1 -

3 4 5

left

up

right

up

left

down.

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

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.

P.T.O

e]

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

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

$h_1(\text{initial}) = 4$

$n = \text{goal state}$

$h_1(n) = 0$

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

$h_2(\text{initial}) = \text{incorrectly placed tiles count except space}$

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

for  $n = \text{goal state}$

$h_2(n) = 8$

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

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

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

for  $n = \text{goal state}$

$h_3(n) = 0$