Assignment 1 A

Name : Shubham Pundalik Bawalekar

Class : BE.IT

Rollno : 04

Subject : IS lab

DOP	DOA	Marks	sign

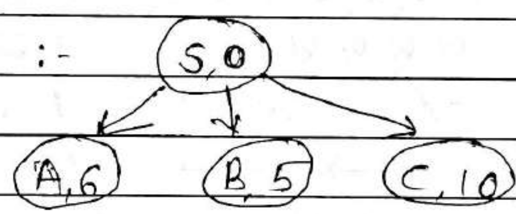
Assignment - 1(A)

Q1. Consider following defination of state space for some arbitrary problem. The number mentioned aganst the edger is cost to be incurred in moving from one node to other in any direction. The number is xd font metioned aganst the node is huristric fuction value.

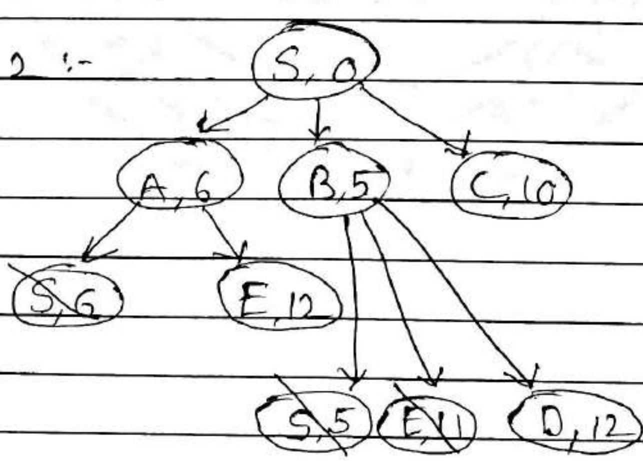
Q1.1. Apply BFS on above graph

Step 0 :- (S, 0)

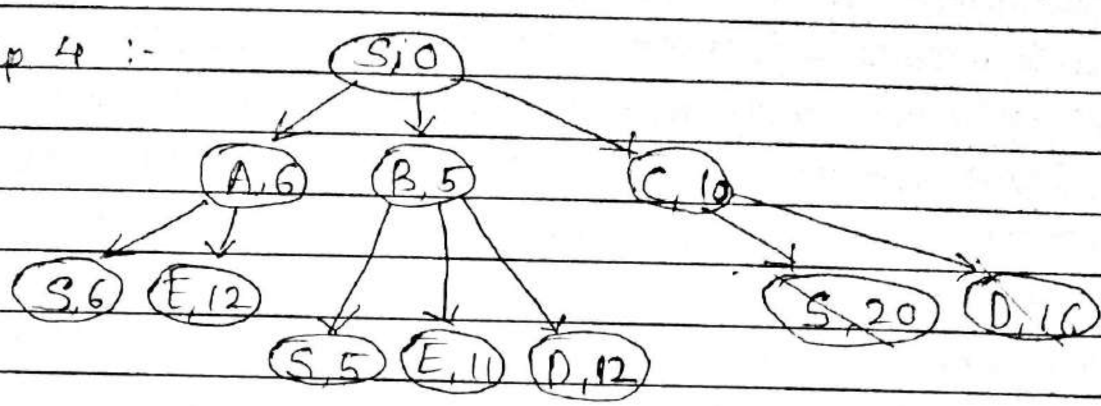
Step 1 :-



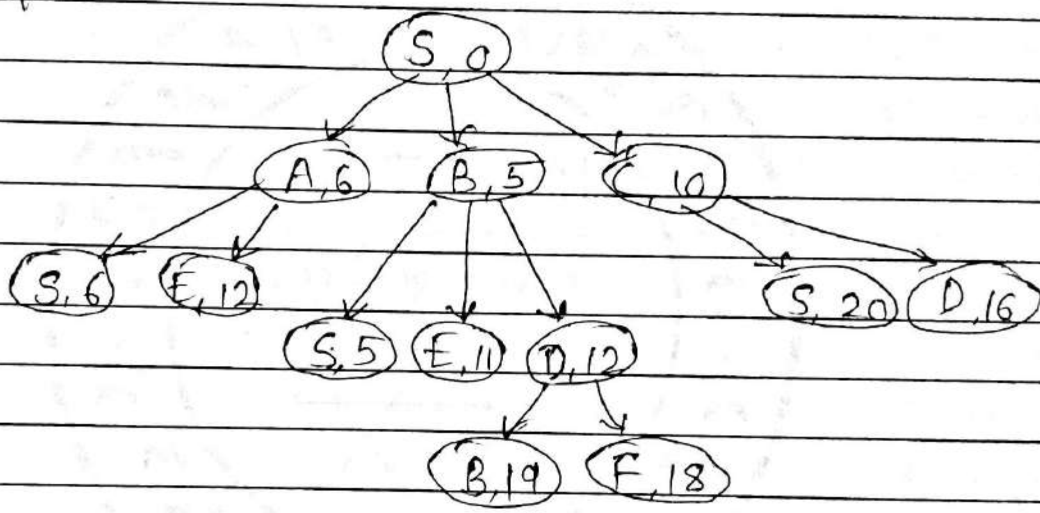
Step 2 :-



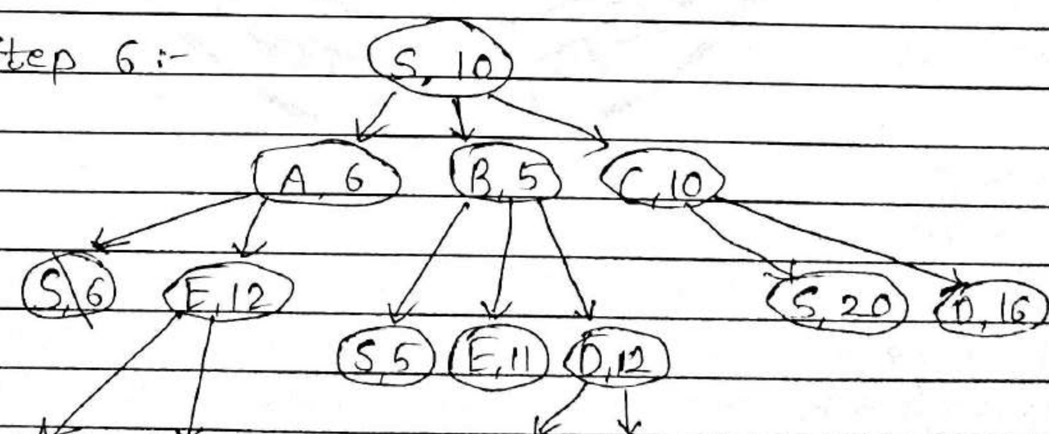
Step 4 :-



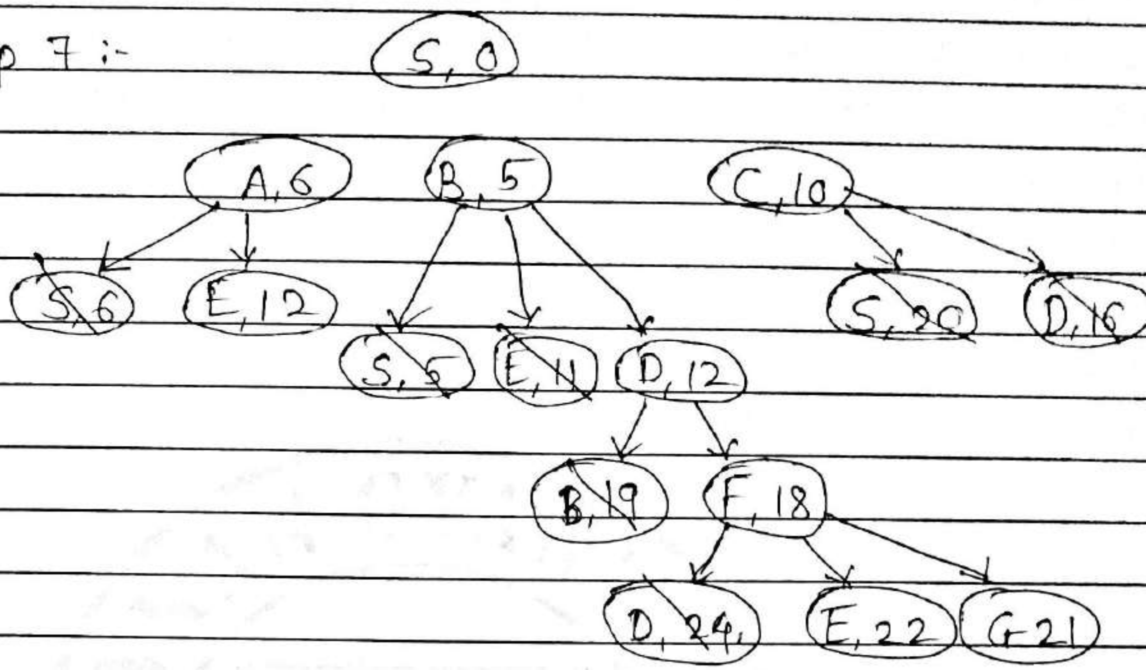
Step 5 :-



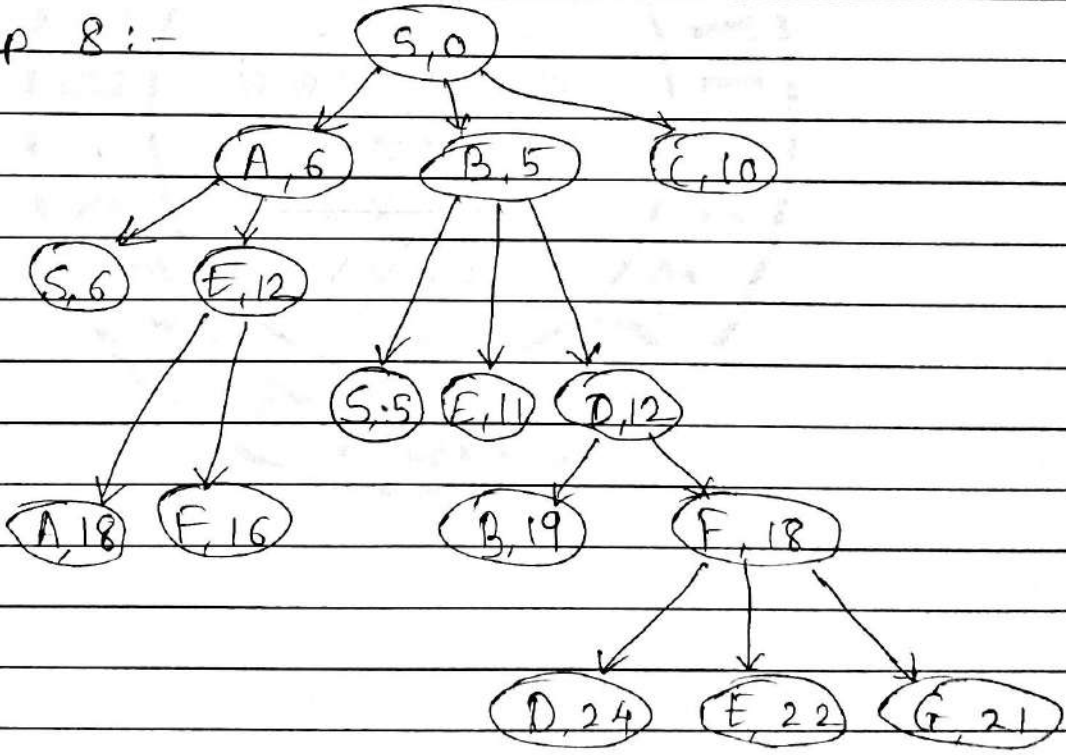
Step 6 :-



Step 7 :-


S, 0
A, 6
B, 5
C, 10
S, 6
E, 12
S, 5
E, 11
D, 12
S, 20
D, 16
B, 19
F, 18
D, 24
E, 22
G 21

Step 8 :-


S, 0
A, 6
B, 5
C, 10
S, 6
E, 12
S, 5
E, 11
D, 12
A, 18
F, 16
B, 19
F, 18
D, 24
E, 22
G, 21

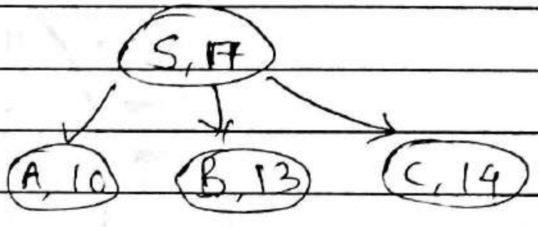
Q1. 4. Apply ~~but~~ best first Search and clearly show all the steps using search tree.

Initialization : Compute F-scorce for S and put it in the openlist.

F-scorce S: F(S). h(S) = 17 (S, 17)

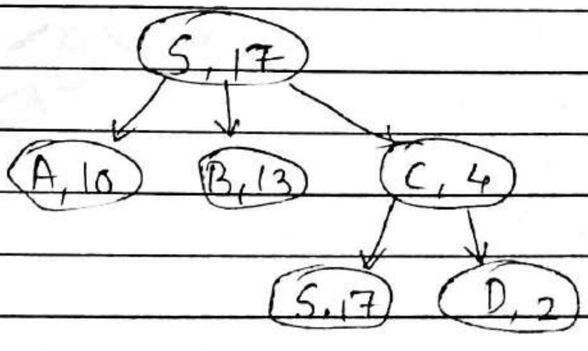
Step 1 :- ~~F-Source~~ F-score of successors

F(A) = h(A) = 10
F(B) = h(B) = 13
F(C) = h(C) = 4



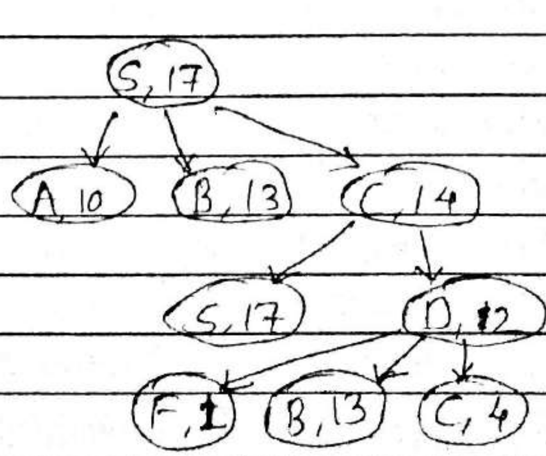
Step 2 :- F-score of successors

F(S) = h(S) = 17
F(D) = h(D) = 2



Step 3 :- F-score of successors

F(C) = h(C) = 4
F(B) = h(B) = 13
F(F) = h(F) = 1

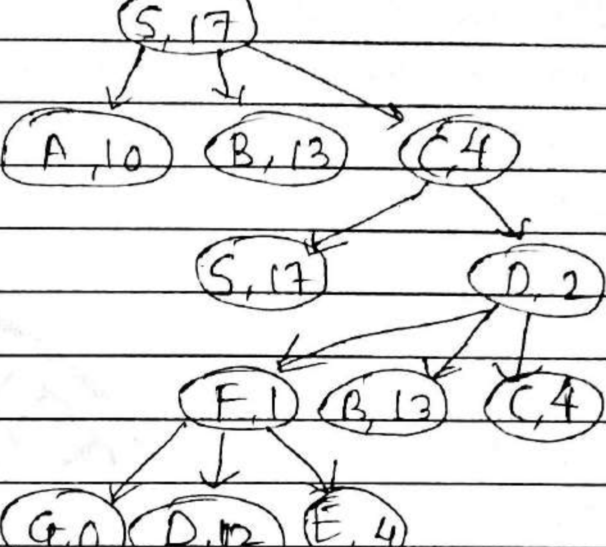


Step 4 :- F - score of successors

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

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

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

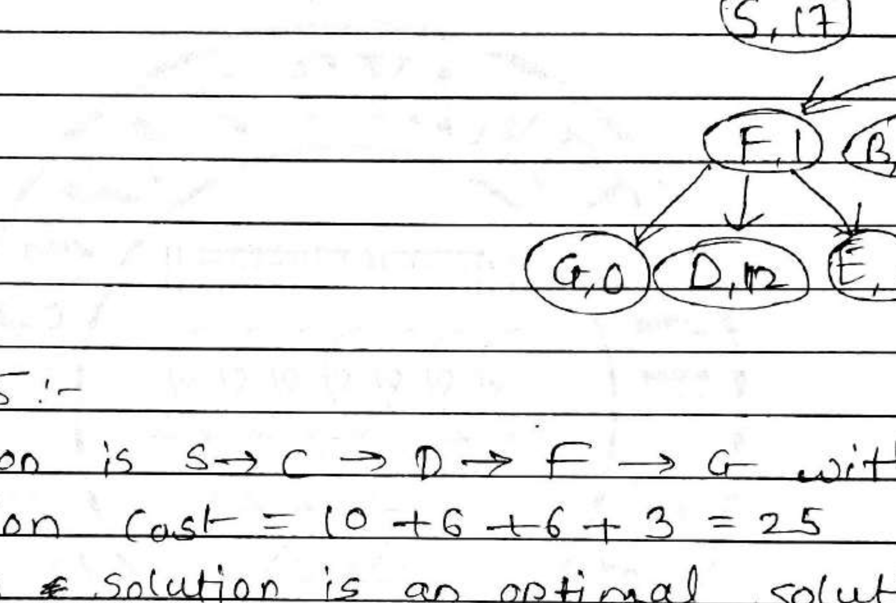


Step 5 :-

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

Solution cost $= 10 + 6 + 6 + 3 = 25$

This is ~~a~~ solution is an optimal solution



Q2.

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 four moves :-
UP, UP, LEFT, LEFT
Since all moves are equally costly, we compute g(n) as

$g(n) = 1+1+1+1$
$g(n) = 4$

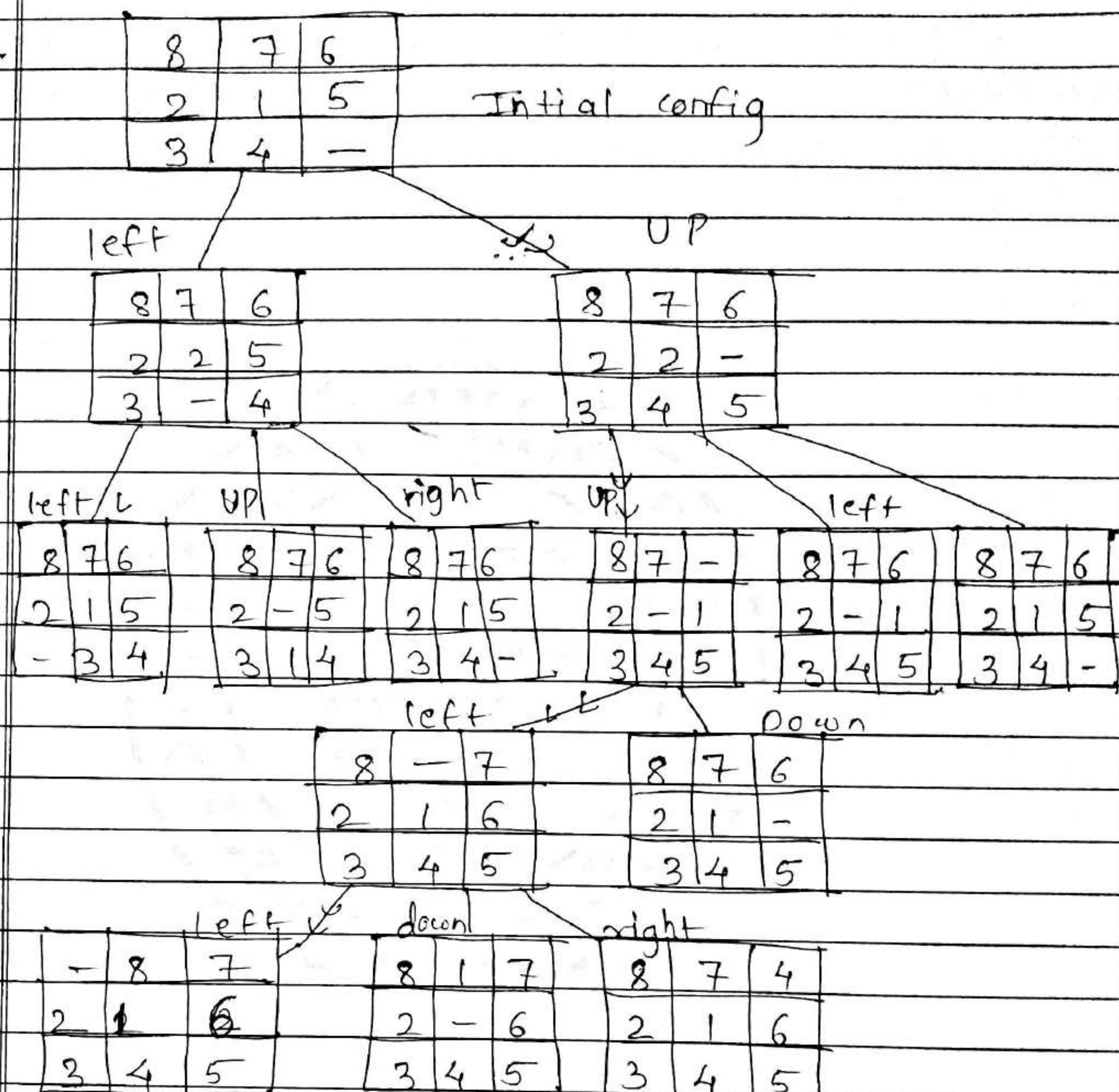
Consider the following 8-puzzle instance :

8	7	6
2	1	5
–	3	4

Solution can be represented as:-
{{8,7,6} {2,1,5} {-3,4}} → {{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.



final configuration

C.
→

For $i=1$, n = initial state

h1 (initial) = misplaced tile count except space
h1(initial) = 4
n = ~~goad~~ state
~~h1(goal) = 0~~
h1(goal) = 0

For $i=2$, n = initial state

h2 (initial) = currently replaced tiles count expect space
h2 (initial) = 4
For ~~n~~ = goal state
h2 (goal) - 8

For $i=3$, n = initial state
h3 (initial) = sum of manhattan dist between ~~uner~~ and correct position of all tiles ~~or~~ except space
h3 (initial) = 0 + 0 + 0 + 0 + 1 + 1 + 1 + 1
~~F~~ = 4
For n = goal state
h3(goal) = 0