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Department

Bs(Cs)

Paper

Design and Analysis of Algorithms.

Semester

4<sup>th</sup>

Date

24 / june / 2020

Q<sup>1</sup> NO) Fill in the blanks.

- 1) Vertex
- 2) multiple / parallel edge
- 3) Adjacent edges
- 4) Simple Path
- 5) Cycle
- 6) Source node
- 7) Sink
- 8) isolated / null graph
- 9) Regular graph
- 10) Labeled graph.

Q No  
1)

$$D - y^* (F/G)$$

Prefix

$$\underline{D} \underline{-y^* (F/G)}$$

$$- \underline{D} \underline{y^* (F/G)}$$

$$- D^* \underline{y (F/G)}$$

$$- D^* y (FG)$$

Post fix

$$\underline{D} \underline{-y^* (F/G)}$$

$$\underline{D} \underline{y^* (F/G)} -$$

$$D y (F/G) * -$$

$$D y (FG) * -$$

Q No)  $T/W^R + S^*M - Y^k$

From infix to prefix

$T/W^R + S^*M - Y^k$

$+T/W^R \underline{S^*M} - Y^k$

$+T/W^R$   $- S^*M Y^k$

$+/T \underline{W^R}$   $- S^*M Y^k$

$+/T^R \underline{WR}$   $- S^*M Y^k$

$+/T^R \underline{WR}$   $-^*SM Y^k$

$+/T^R \underline{WR} -^*SM^R Y^k$

From infix to post-fix

$T/W^R + S^*M - Y^k$

$T/W^R \underline{S^*M} - Y^k +$

$T/W^R$   $S^*M Y^k - +$

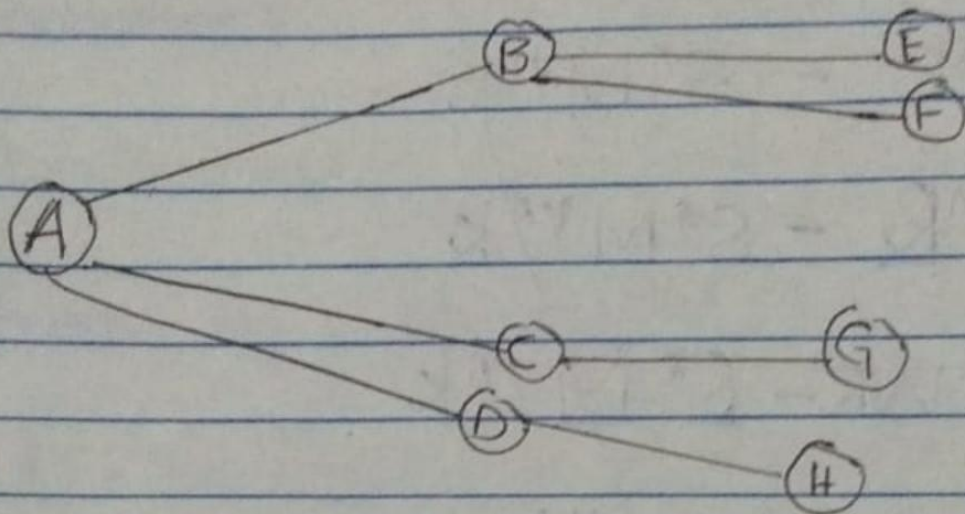
$TW^R/$   $S^*M Y^k - +$

$TW^R/ \underline{S^*M} Y^k - +$

$TW^R/SM^* \underline{Y^k} - +$

$TWR^R/SM^*YK^R - +$  Ans.

Q<sup>3</sup> No) Apply Breadth-First technique on the given tree.

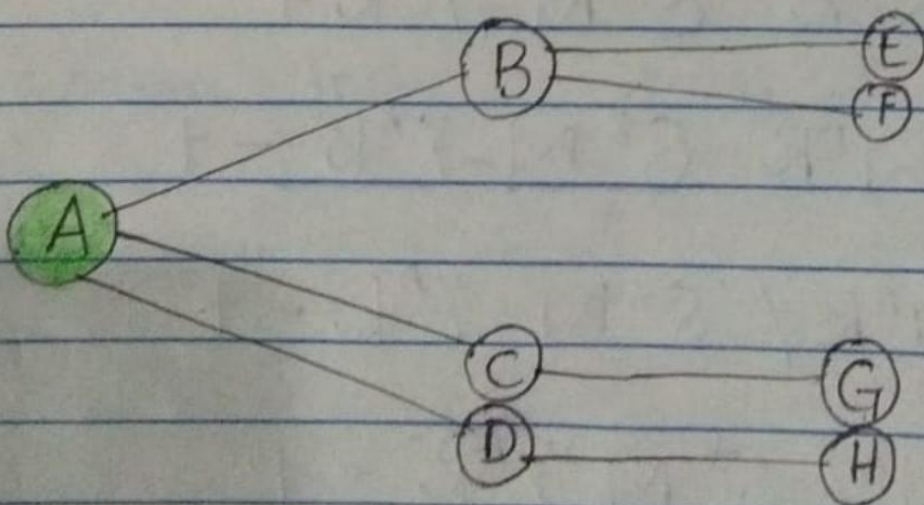


Ans.

① Add Root A to the output sequence.

\* Mark a visited.

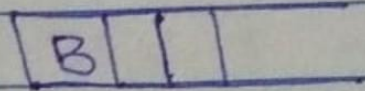
\* A is CWN.



Output Sequence  
A

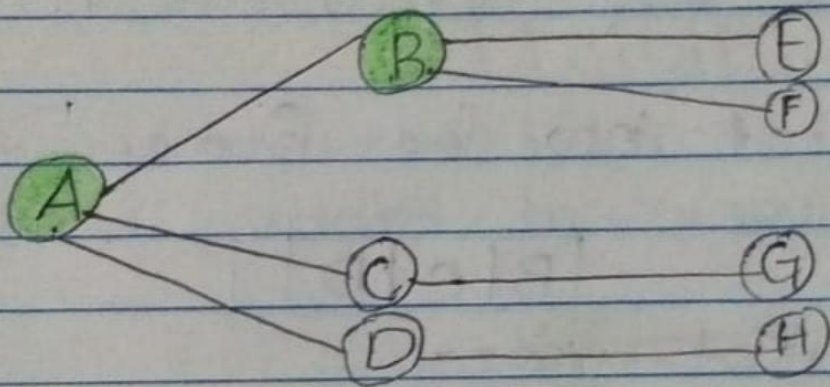
② A is adjacent to B, C and D.

\* Select B and push it into queue.



\* Add B to the output sequence.

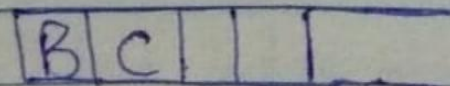
\* Mark B visited.



Output Sequence  
A, B

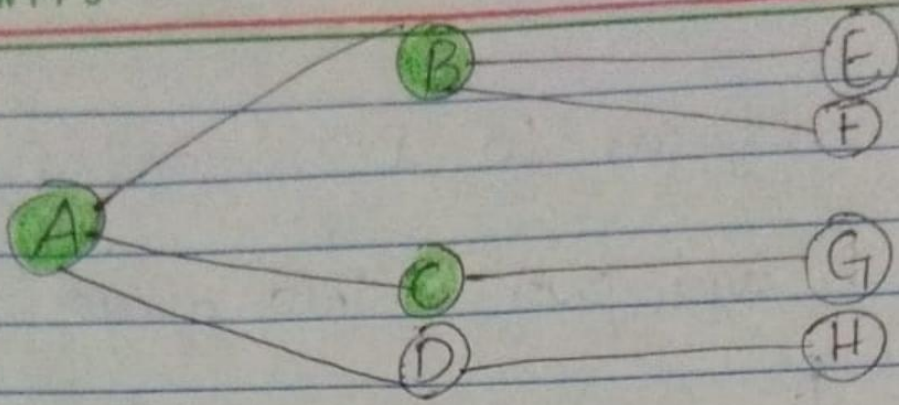
③ From QWN i-e 'A' the adjacent node is 'C'.

\* 'C' is pushed into the Queue



\*\* 'C' is marked visited.

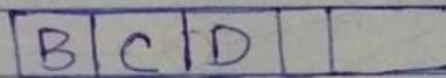
+ 'C' is added to output Sequence.



Output Sequence  
A, B, C

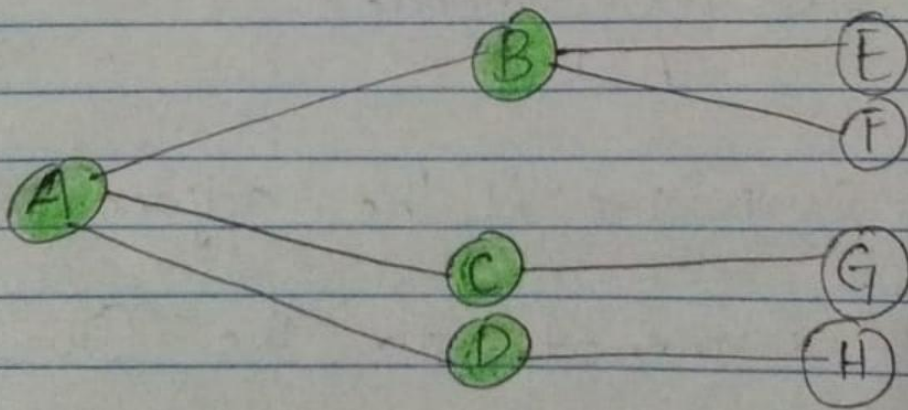
④ As 'D' is also adjacent to 'A'

\* D is pushed into the Queue.



\* D is marked visited

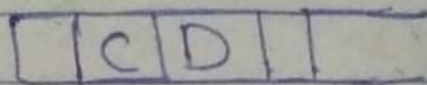
\* D is added to the output Sequence.



Output Sequence  
A, B, C, D

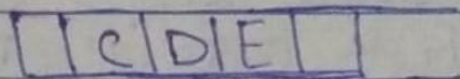
\* Now cwn is updated.

- \* 'B' is Selected as now CWN.
- \* 'B' is popped from Queue.

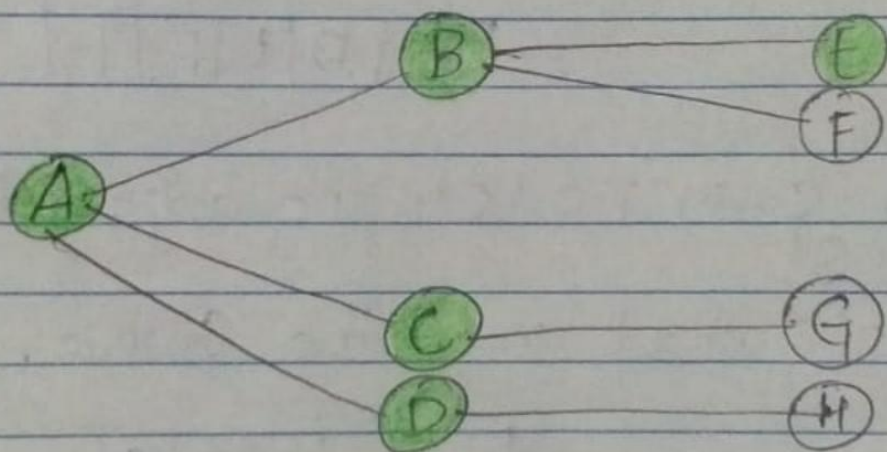


⑤ A B is adjacent to E and F.

- \* 'E' is Selected and pushed into the Queue.

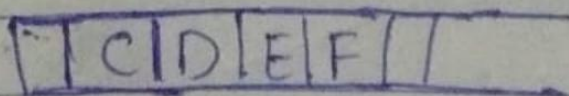


- \* 'E' is marked visited.
- \* 'E' is added to output Sequence.



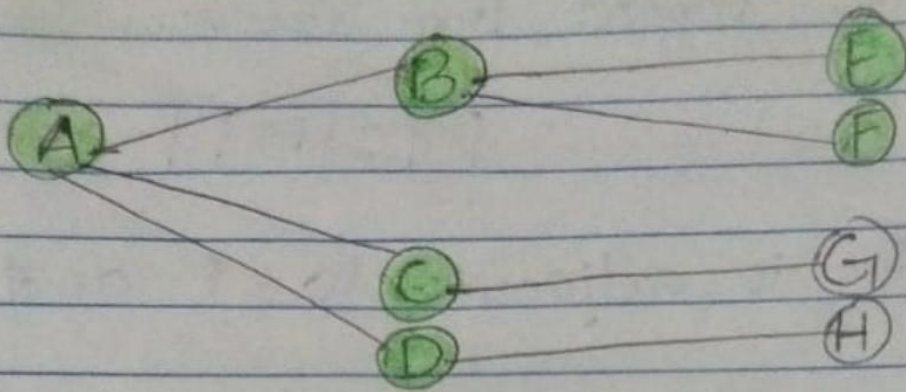
Output Sequence  
A, B, C, D, E

- ⑥ \* From CWN i-e 'B' the adjacent node 'F' is Selected.
- \* 'F' is pushed into the Queue.





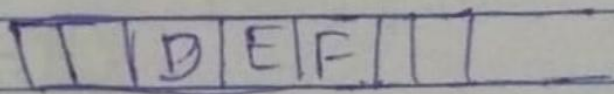
- \* 'F' is marked visited.
- \* 'F' is added to output Sequence.



Output Sequence:

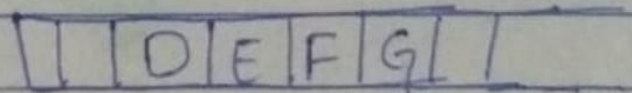
A, B, C, D, E, F

- \* Now CWN is updated to 'C'.
- \* 'C' is popped from Queue.

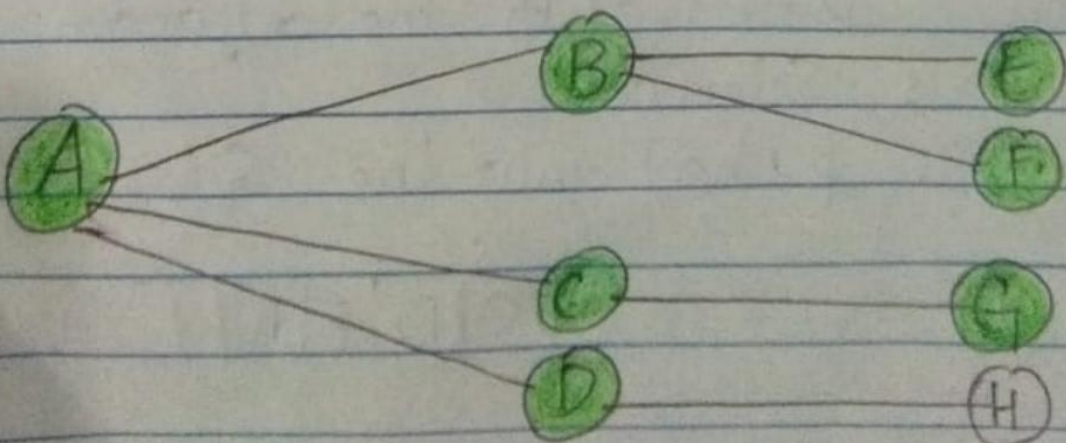


⑦ From CWN i.e 'C', the adjacent node is 'G'

- \* G is pushed into the Queue.



- \* 'G' is marked visited.
- \* 'G' is added to output Sequence.



Output Sequence.  
A, B, C, D, E, F, G

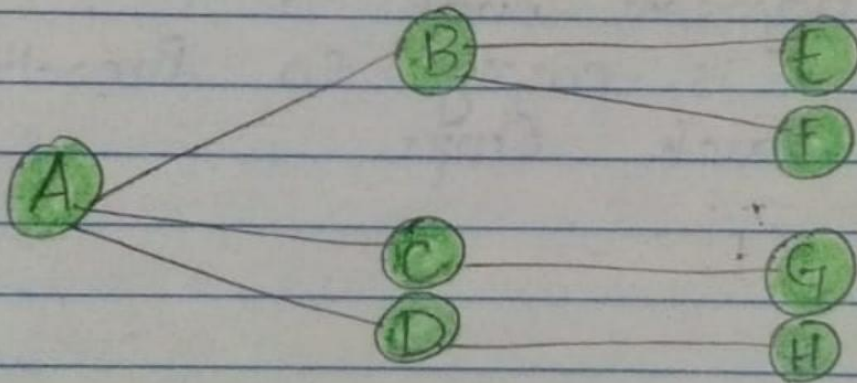
- \* Now cwn is updated to 'D'.
- \* 'D' is popped from Queue.

□ □ □ E | F | G □

- (8) 'H' is adjacent node to 'D'.
- \* 'H' is pushed to Queue.

□ □ □ E | F | G | H □

- \* 'H' is marked visited.
- \* 'H' is added to output Sequence.



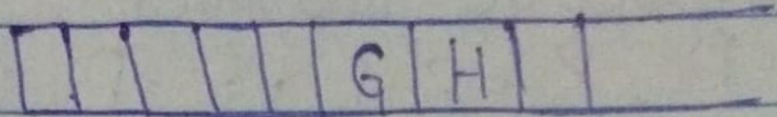
Output Sequence.  
A, B, C, D, E, F, G, H

- \* Now cwn is updated to 'E'.
- \* 'E' is popped from Queue.

□ □ □ □ F | G | H □

- \* No adjacent node to 'H'.
- \* Now again cwn is updated to F.

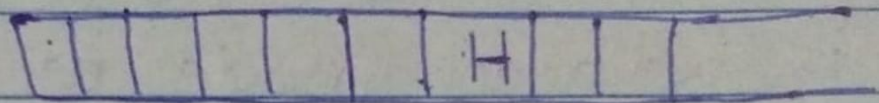
\* 'F' is popped from Queue.



\* No adjacent node to 'F'.

\* Now again CWN is updated to 'G'.

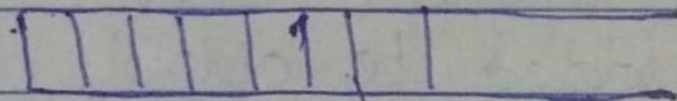
\* 'G' is popped from Queue.



\* No adjacent node to 'G'.

\* Now again CWN is updated to 'H'.

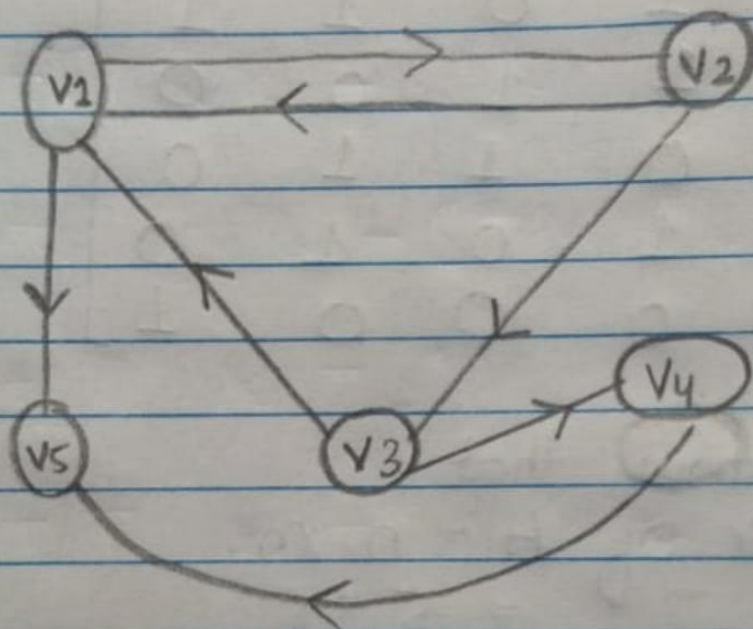
\* 'H' is popped from Queue.



\* No adjacent node to 'H'.

\* Queue is empty, so Breadth first Search stops.

24) Design Adjacency Matrix for the given graph.



Ans)

No of nodes =  $m = 5$   
 order of  $A = 5 \times 5$   
 $= 25$

	$v_1$	$v_2$	$v_3$	$v_4$	$v_5$	outdegree
$v_1$	0	1	0	0	1	2
$v_2$	1	0	1	0	0	2
$v_3$	1	0	0	1	0	2
$v_4$	0	0	0	0	1	1
$v_5$	0	0	0	0	0	0
						7
Indegree	2	1	1	1	2	

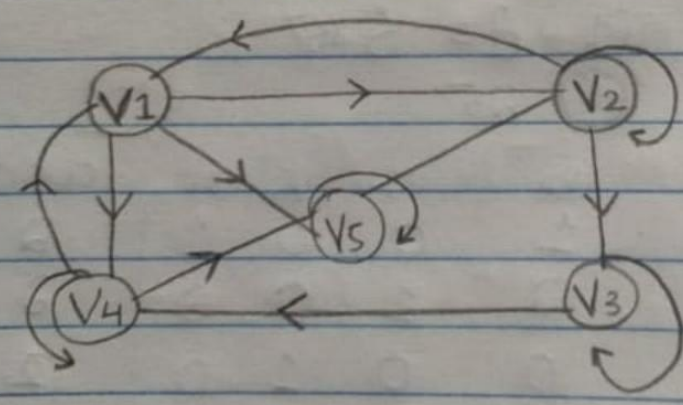
Any.

Q No) Design directed graph for the given Adjacency Matrix

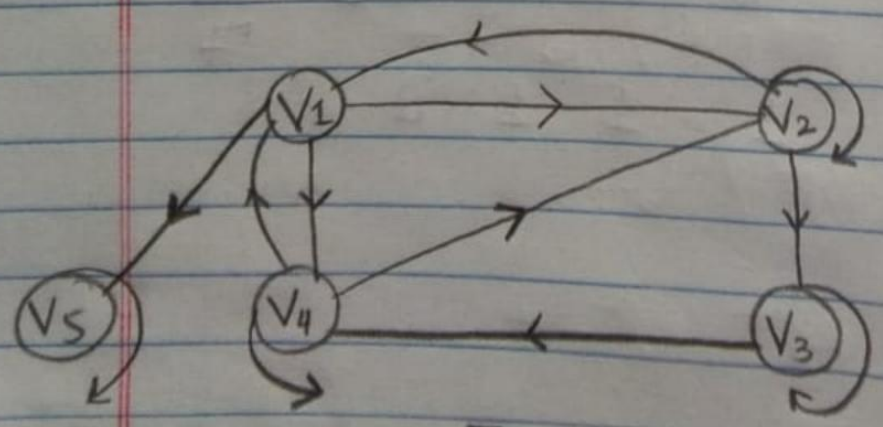
$$A[i][j] = \begin{bmatrix} 0 & 1 & 0 & 1 & 1 \\ 1 & 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ 1 & 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

As - As we know that  
 order of  $A = m \times m$   
 $= 5 \times 5$   
 $= 25$

Let the nodes be  $v_1, v_2, v_3, v_4, v_5$



OR



The required graph