

Name: Anurag . A. Thakur

Roll. No: 205

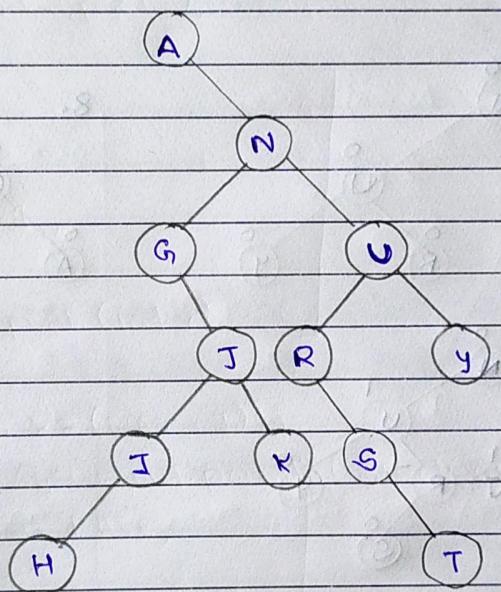
PRN No: 2046491246005

Q1. Create a BST and AVL Tree for your own full name
Soln:-

ANURAG AJAYGINGH THAKUR.

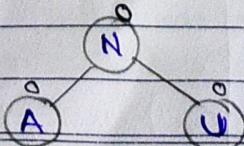
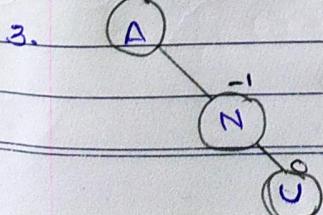
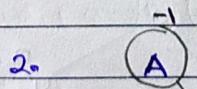
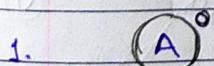
ANURAGJYSGIHTK.

BST:-



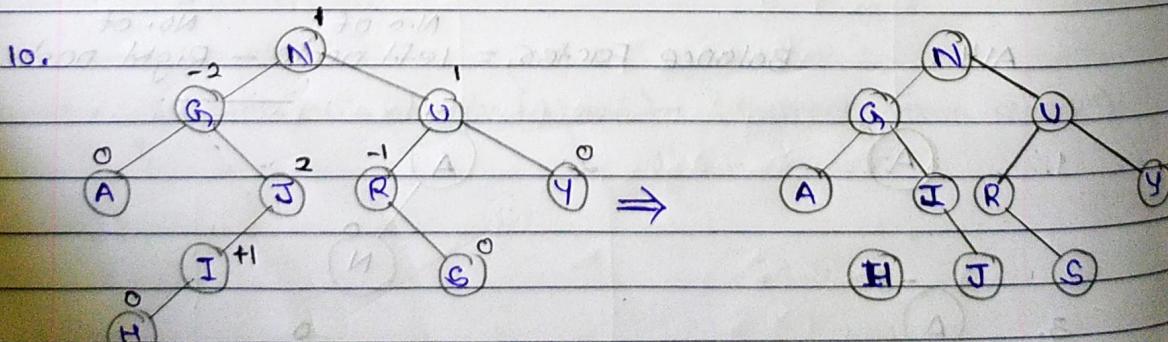
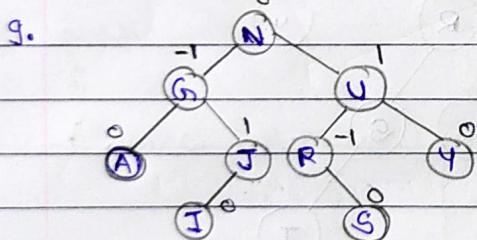
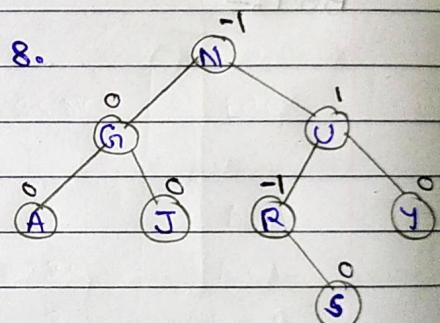
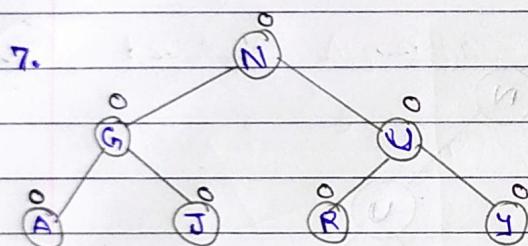
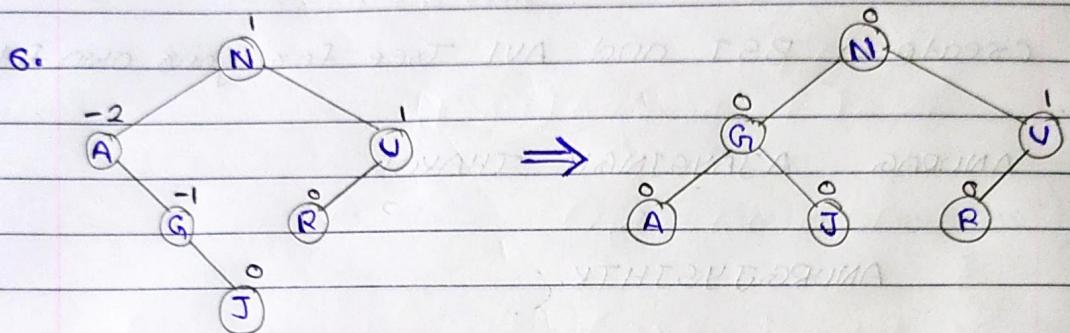
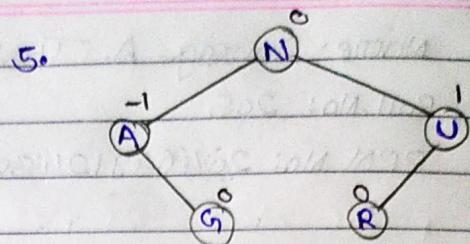
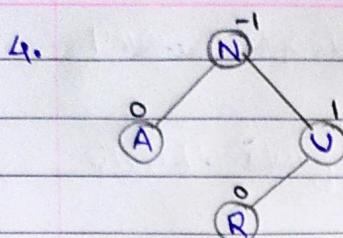
AVL:-

$$\text{Balance Factors} = \frac{\text{No. of Left node}}{\text{No. of Right node.}}$$

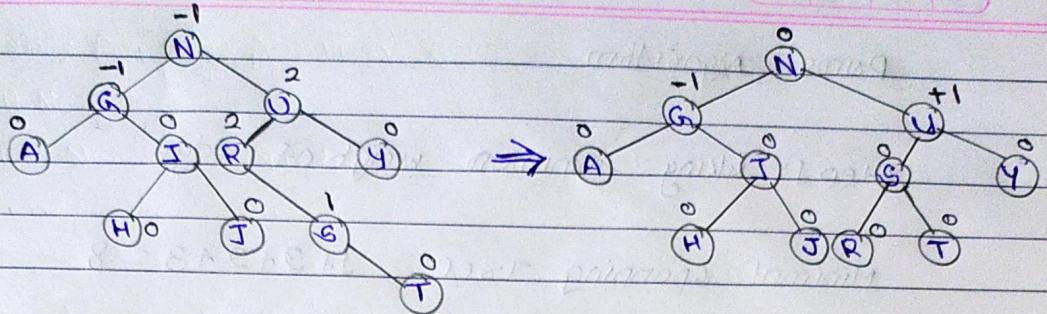


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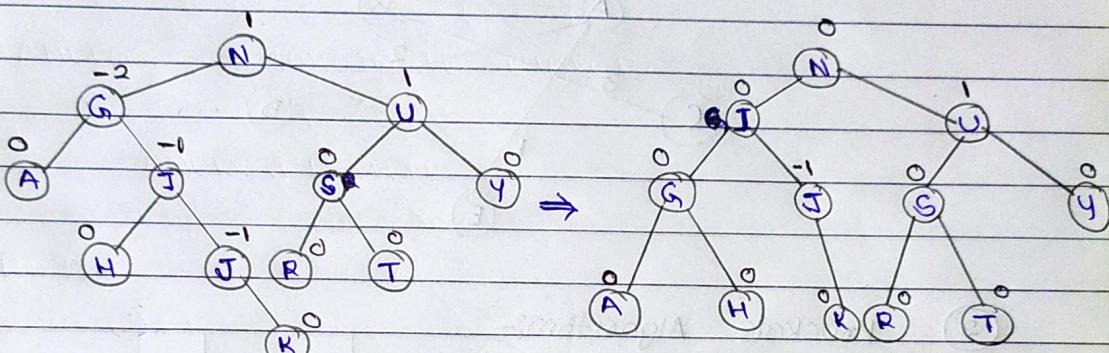
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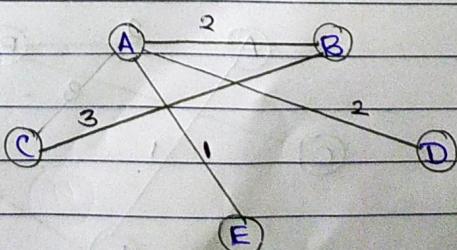
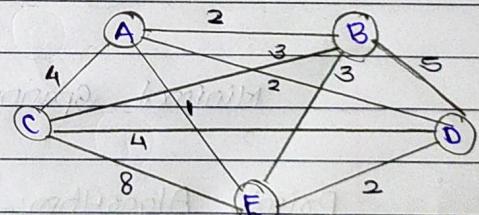


(Final AVL Tree)

Q4. For the given graph, calculate minimal spanning tree using Prim's and Kruskal's Algorithm

①

SOLN:	Grd. No	Edge e	Weight
1.		A-E	1
2.		A-B	2
3.		A-D	2
4.		D-F	2
5.		B-C	3
6.		B-F	3
7.		A-C	4
8.		C-D	4
9.		B-D	5
10		E-C	8

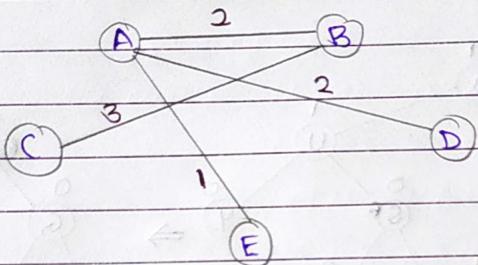


Kruskal's Algorithm = $2+2+1+8 = 8$

Prims Algorithm:-

Step 1: Taking minimum weight of edge.

Minimal Spanning Tree:- $1+2+2+3 = 8$

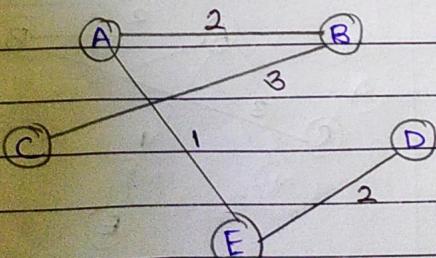


(2) Kruskals Algorithm:-

S. No	Edge	Weight
1.	A-E	1
2.	A-B	2
3.	E-D	2
4.	B-C	3

Minimal Spanning Tree = $1+2+2+3 = 8$

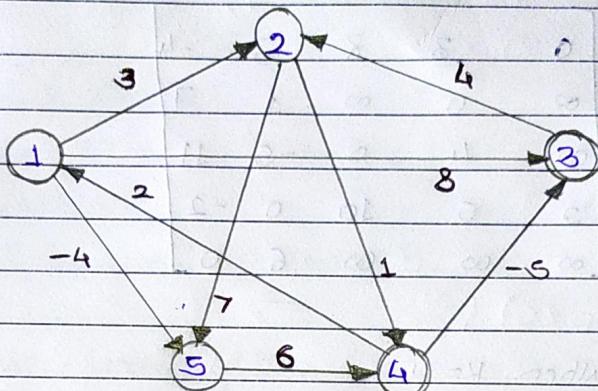
Prims Algorithm:-



Minimal Spanning Tree -

$$1+2+2+3=8$$

Q5. Find all pairs shortestpath using Floyd - Warshall Algorithm



Soln:-

$$\text{Step 1: } k=0, \quad d_{ij}^{(k)} = \min(d_{ij}^{(k-1)}, d_{ik}^{(k-1)} + d_{kj}^{(k-1)})$$

$$D(0) = \begin{bmatrix} 0 & 3 & 8 & \infty & -4 \\ \infty & 0 & \infty & 10 & 7 \\ \infty & 4 & 0 & 0 & -5 \\ 2 & \infty & \infty & 0 & 0 \\ \infty & \infty & \infty & 6 & 0 \end{bmatrix}$$

$$\text{Step 2: } k=1$$

$$D(1) = \begin{bmatrix} 0 & 3 & 8 & \infty & -4 \\ \infty & 0 & \infty & 10 & 7 \\ \infty & 4 & 0 & 0 & -5 \\ 2 & 5 & 10 & 0 & -2 \\ \infty & \infty & \infty & 6 & 0 \end{bmatrix}$$

$$\text{Step 3: } k=2$$

$$D(2) = \begin{bmatrix} 0 & 3 & 8 & 4 & -4 \\ \infty & 0 & \infty & 1 & 7 \\ \infty & 4 & 0 & -5 & 11 \\ 2 & 5 & 10 & 0 & -2 \\ \infty & \infty & \infty & 6 & 0 \end{bmatrix}$$

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Date

Step 4: When K=3

$$D(3) = \begin{bmatrix} 0 & 3 & 8 & 3 & -4 \\ \infty & 0 & \infty & 1 & 7 \\ \infty & 4 & 0 & -5 & 11 \\ 2 & 5 & 10 & 0 & -2 \\ \infty & \infty & \infty & 6 & 0 \end{bmatrix}$$

Step 5: When K=4

$$D(4) = \begin{bmatrix} 0 & 3 & 8 & 3 & -4 \\ 3 & 0 & 11 & 1 & -1 \\ -3 & 0 & 0 & -5 & -7 \\ 2 & 5 & 10 & 0 & -2 \\ 8 & 11 & 16 & 6 & 0 \end{bmatrix}$$

Step 6: When K=5

$$D(5) = \begin{bmatrix} 0 & 3 & 8 & 3 & -4 \\ 3 & 0 & 11 & 1 & -1 \\ -3 & 0 & 0 & -5 & -7 \\ 2 & 5 & 10 & 0 & -2 \\ 8 & 11 & 16 & 6 & 0 \end{bmatrix}$$