Tutorial: 06 DAA

Q-1)

Ans: Minimum Spanning Tree

It is a spanning tree which has minimum total cost. If we have linked undirected graph with a weight combine with each edge. then the cost of spanning ~~combine with each edge~~. would be the sum of ~~all~~ the cost of its edge.

Application: in design of networks, including computer networks, telecommunication networks, transportation networks.

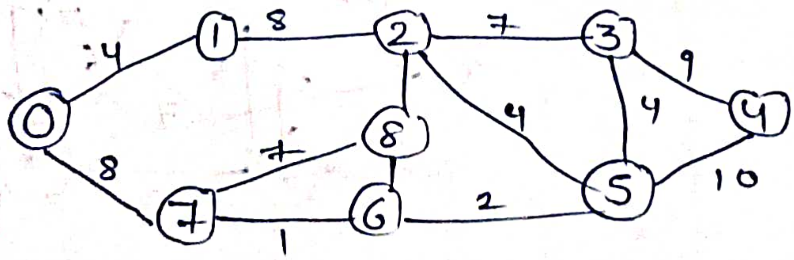
Q-2)

Ans:

	Prim	Dijkstra	Bellmann Ford
Time Complexity	O((V+E)logV)	O(ElogV)	O(VE)
Space	O(V+E)	O(V²)	O(N)

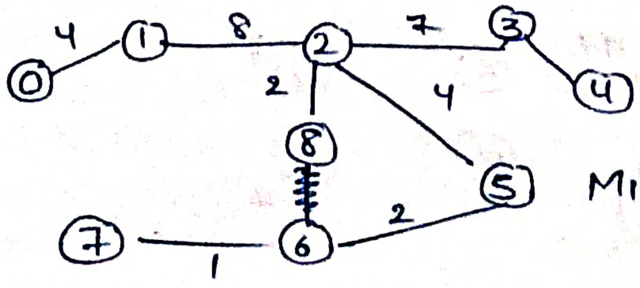
Q-3)

Ans:



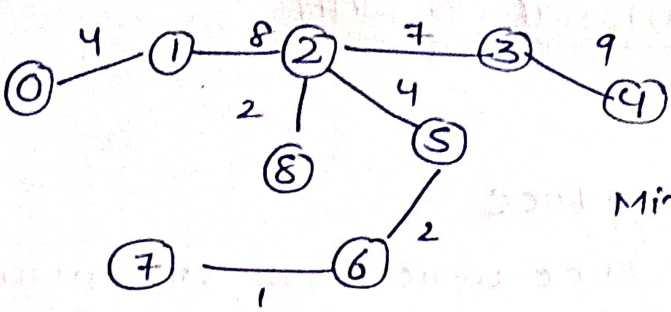
(i) Krushkals

[1,2,2,4,4,6,7,7,8,8,9,10,11,14]



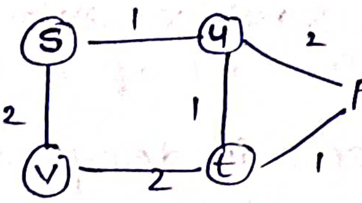
Min wt = 37

Q-6) Ans (ii) Prim



Min wt = 37

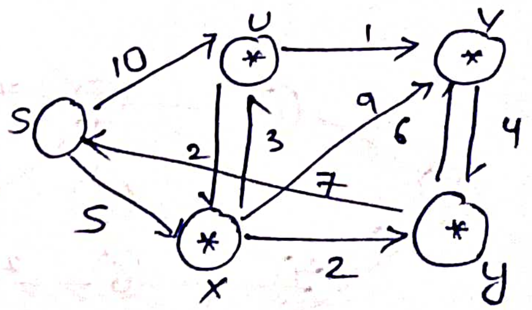
Q-4)
Ans: Let we have initial shortest path
$S \to V \to t$



a) if we increase every edge by 10units then also shortest path is same.
b) if we multiply every edge by 10units then also the shortest path is same.

Q-5) Dijkstra

node	dist/ non
U	8
V	9
x	5
y	7



Bellmann Ford

S 0 U ~~∞~~ 10 V ~~∞~~ 9 x ~~∞~~ 5 y ~~∞~~ 7

S 0 U ~~10~~ 8 V ~~11~~ 9 x 5 y 7

S 0 U 8 V 9 x 5 y 7

Q-6)

Ans:

$$A_i = \begin{bmatrix} 0 & \infty & 6 & 3 & \infty \\ 3 & 0 & \infty & \infty & \infty \\ \infty & \infty & 0 & 2 & \infty \\ \infty & 1 & 1 & 0 & \infty \\ \infty & 4 & \infty & 2 & 0 \end{bmatrix}$$

$$A_1 = \begin{bmatrix} 0 & \infty & 6 & 3 & \infty \\ 3 & 0 & 9 & 6 & \infty \\ \infty & \infty & 0 & 2 & \infty \\ \infty & 1 & 1 & 0 & \infty \\ \infty & 4 & \infty & 2 & 0 \end{bmatrix}$$

$$A_2 = \begin{bmatrix} 0 & \infty & 6 & 3 & \infty \\ 3 & 0 & 9 & 6 & \infty \\ \infty & \infty & 0 & 2 & \infty \\ \infty & 1 & 1 & 0 & \infty \\ \infty & 4 & 13 & 2 & 0 \end{bmatrix}$$

$$A_3 = \begin{bmatrix} 0 & \infty & 6 & 3 & \infty \\ 3 & 0 & 9 & 6 & \infty \\ \infty & \infty & 0 & 2 & \infty \\ \infty & 1 & 1 & 0 & \infty \\ \infty & 4 & 13 & 2 & \infty \end{bmatrix}$$

$$A_4 = \begin{bmatrix} 0 & 4 & 4 & 3 & \infty \\ 3 & 0 & 7 & 6 & \infty \\ \infty & 3 & 0 & 2 & \infty \\ \infty & 1 & 1 & 0 & \infty \\ \infty & 3 & 3 & 2 & 0 \end{bmatrix}$$

$$A_5 = \begin{bmatrix} 0 & 4 & 4 & 3 & \infty \\ 3 & 0 & 7 & 6 & \infty \\ \infty & 3 & 0 & 2 & \infty \\ \infty & 1 & 1 & 0 & \infty \\ \infty & 3 & 3 & 2 & 0 \end{bmatrix}$$