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Tutorial ⇒ 6

Q① What do you mean by Minimum Spanning tree? What is the application of MST?

→ Soln:- A MST is a subset of the edges of a connected, edge-weighted undirected graph that connects all the vertices together, without any cycle and with the minimum possible total edge weight.

Application :-

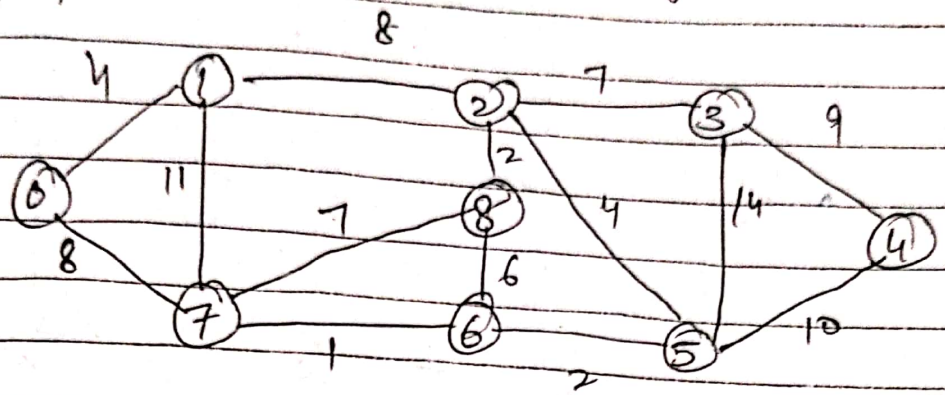
- Designing local Area network.
- Laying pipelines connecting offshore drilling sites, refineries and consumer market.
- Suppose you want to construct highways or railroads spanning several cities then we use the concept of MST.
- To reduce cost, you use the concept of MST to connect the houses.

Ques② Please Analyse the time and space complexity

→ ②

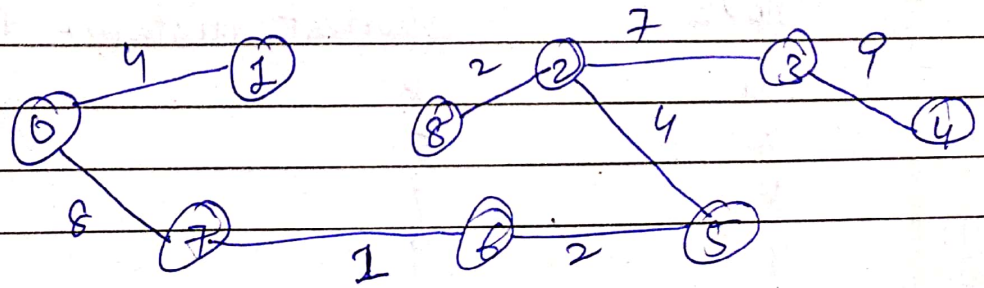
Algorithm	Time Complexity	Space Complexity
prims	$O(V^2)$	$O(V+E)$
Kruskal	$O(E \log V)$	$O(\log(E))$
Dijkstra's	$O(V+E)$	$O(V+E)$
Bellman ford	$O(VE)$	$O(V)$

Ques(3) Apply prims and Kruskal algorithm on the Graph.

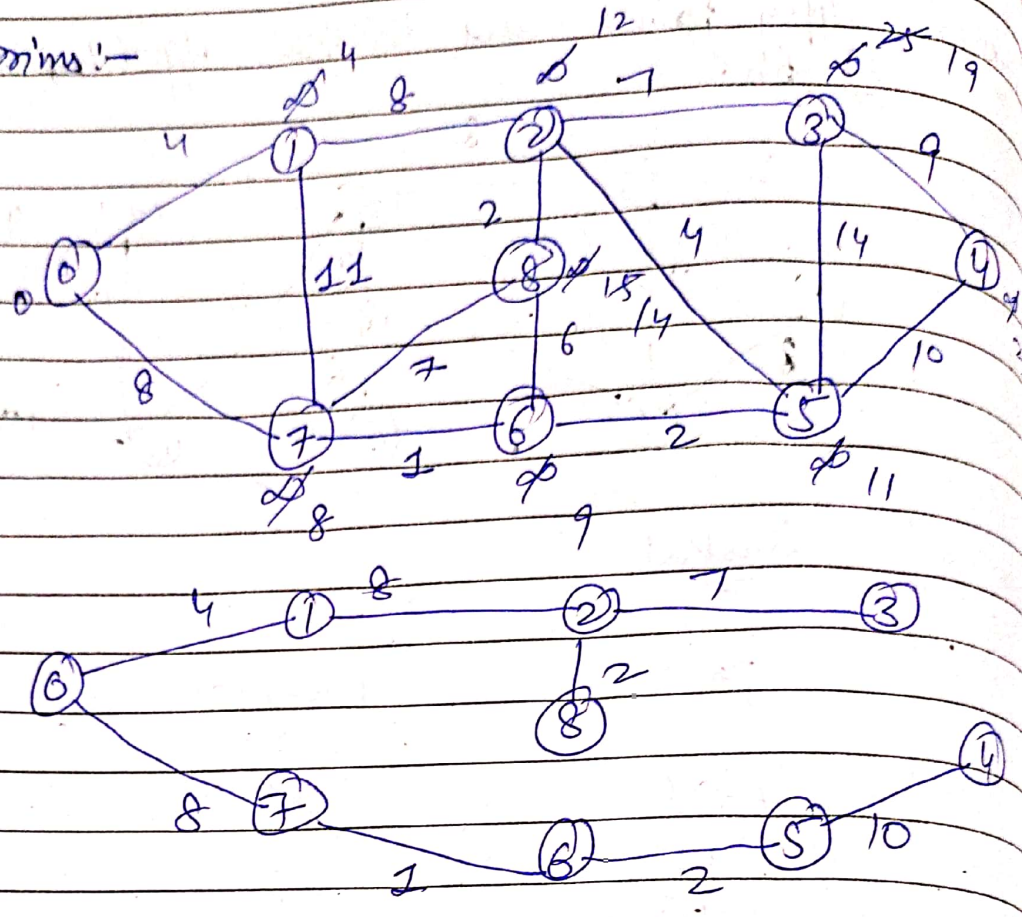


→ Sol" Kruskal

path	weight
7 → 6	1
6 → 5	2
2 → 8	2
0 → 1	4
2 → 5	4
8 → 6	6
2 → 3	7
7 → 8	7
1 → 2	8 → 0 → 7 8
3 → 4	9
5 → 4	10
1 → 7	11
3 → 5	14

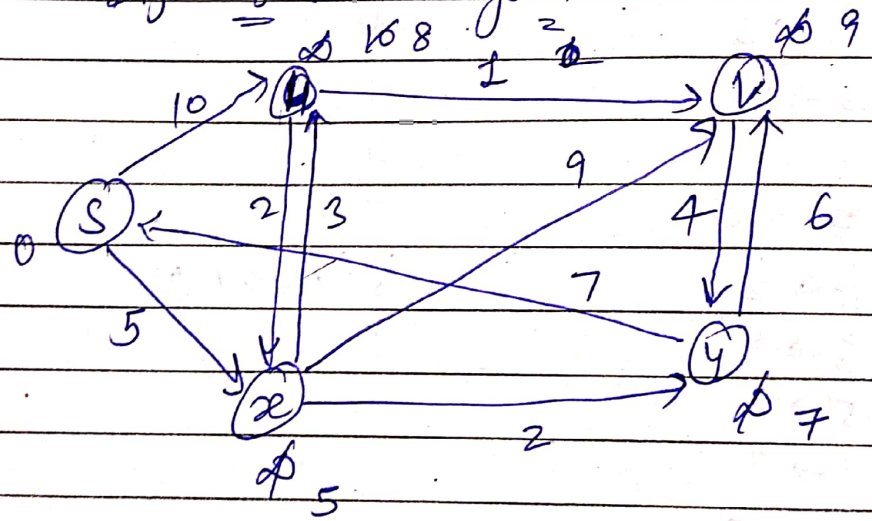


prims :-



Ques 4)

=> Dijkstra's Algorithm



node	Shortest distance from source
u	8
x	5
v	7
y	9

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Bellman Ford Algorithm

	s	t	u	v	x	y
1st →	0	10 ~~6~~	∞	~~∞~~ 5	∞	
2nd →	0	10	~~∞~~ 11	5	~~∞~~	
3rd →	0	~~10~~ 8	~~11~~ 9	5	~~∞~~ 7	
4th →	0	8	9	5	7	

Final Graph