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Sec: I
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[Tutorial-6]

Q1:

⇒ A minimum spanning tree or minimum weight spanning tree is a subset subset of the edges of a connected edge-weighted undirected graph that connects all the vertices together, without any cycle & with the min. possible total edge weight.

Application:

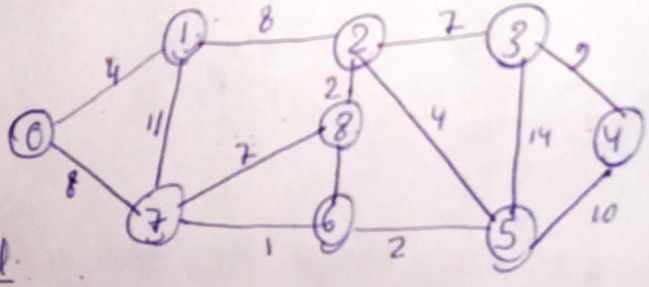
- Designing local area Network
- Laying pipeline connecting offshore drilling sites refineries and consumer markets.
- In construction of highways & railroads.

Q2

⇒

Algorithms	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	$O(VE)$	$O(V)$

Q3:

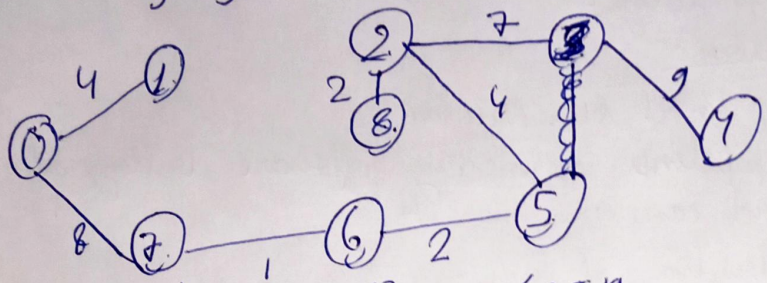


⇒ Kruskal

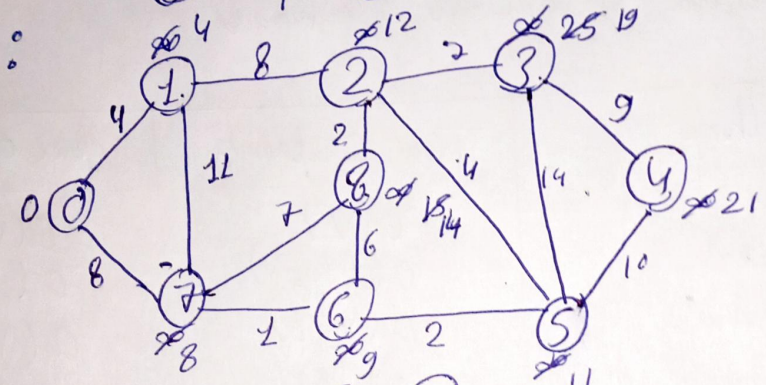
Path	Weight
7 - 6	1
6 - 5	2
2 - 8	2
0 - 1	4
2 - 5	4
8 - 6	6
2 - 3	7
7 - 8	7

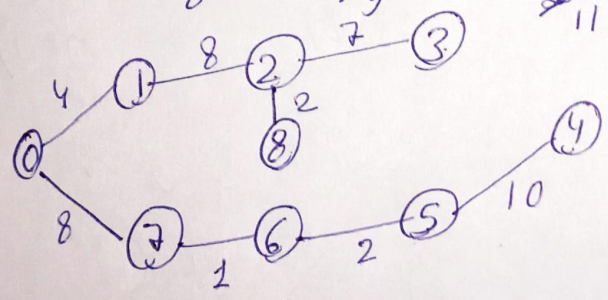
1 - 2
3 - 4
5 - 4
1 - 7
3 - 5

8
9
10
11
14



Prims :





MST

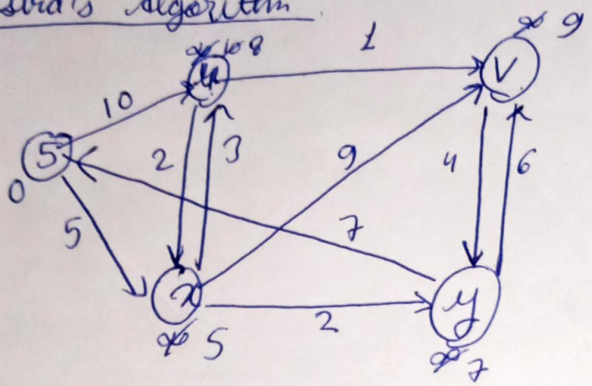
Q4:

(1) The shortest path may change. The reason is that there may be different no. of edges in different path from 's' to 't'. ~~from~~ For example let shortest path of weight 15 & has 5 edges let there be another path with 2 edges & total weight is 25. The weight of the shortest is increased by 5 * 10 becomes 15+50 weight of other path is increased by 2 * 10 it becomes 25+20, so the shortest path changes to the other path whose weight is 45.

(ii) If we multiply all edge weight by 10, the shortest path doesn't change. The reason is simple. Weight of all paths from s to t get multiplied by some amount. The no. edges on a path doesn't matter.

Q5:

⇒ Dijkstra's Algorithm



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

Bellman Ford Algorithm

1st →	5	u	v	x	y
2nd →	5	u	v	x	y
3rd →	5	u	v	x	y
4th →	5	u	v	x	y

Final graph.