# ASSIGNMENT:-06

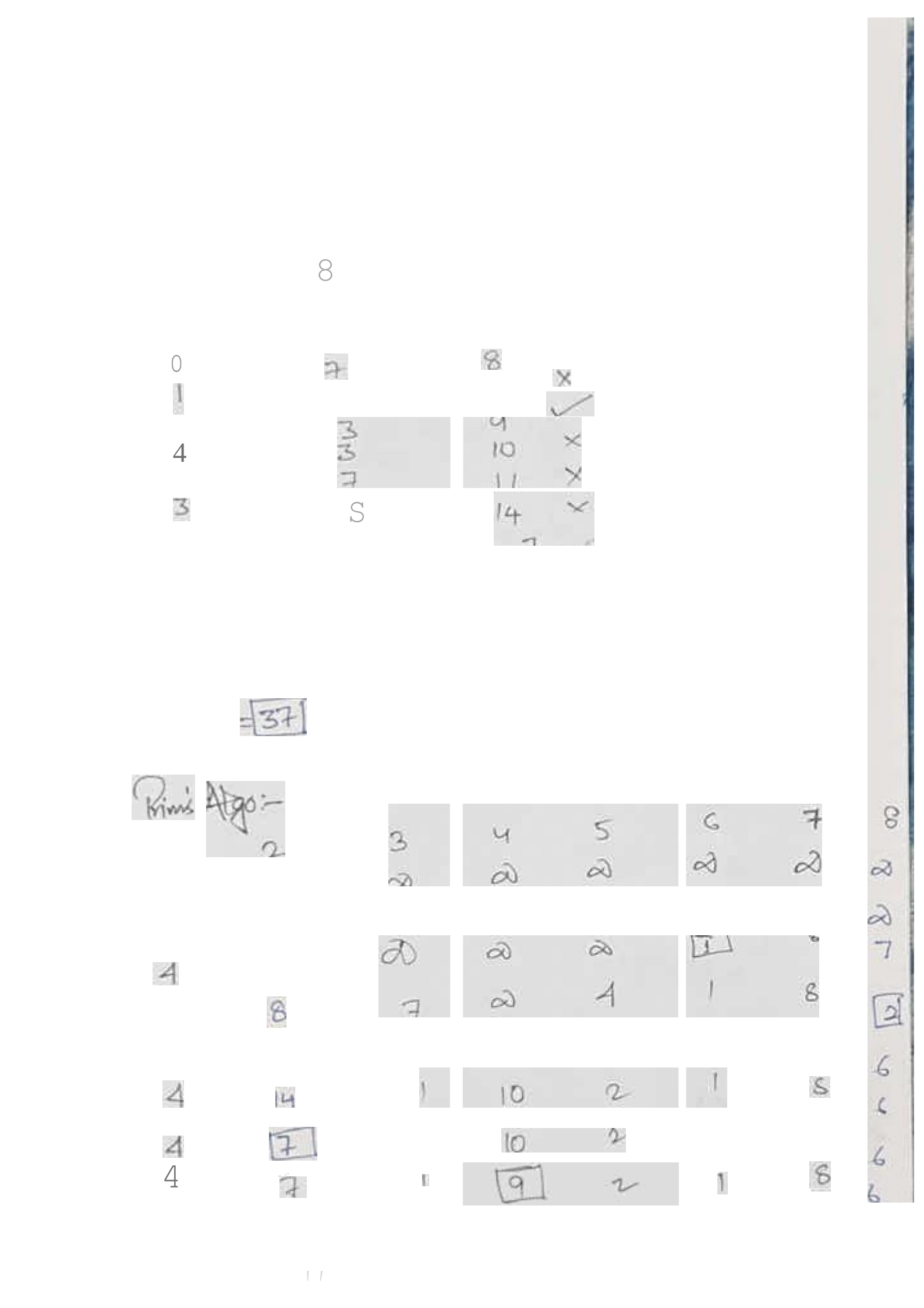
Ans 1) MINIMUM SPANNING TREE:-
It is a subset of the edges of a connected edge-weighted undirected graph that connects all the vertices together, without any cycles and with the minimum possible total edge weight.

Applications:-
- Consider n stations are to be linked using a communication network, and laying of communication link b/w any 2 stations involves a cost; so we use MST for a better output.
- Same goes with roadways & highways & airlines.
- Design LAN
- Laying pipelines connecting offshore drilling sites, refineries & markets.

Ans 2)

| Algorithm | Time Complexity | Space Complexity |
|---|---|---|
| Prim's Algorithm | O(V+E) | O(V) |
| Dijkstra's Algorithm | O(V²) | O(V²) |
| Kruskal Algorithm | O(E log V) | O(\|V\|) |
| BellMan Ford | O(VE) | O(V) |

Ans 3) Graph:-



Prnt:-

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| -1 | ✗ | ✗ | -1 | -1 | -1 | ✗ | ✗ | -1 |
| | 6 | 1 | | | | 1 | 1 | |

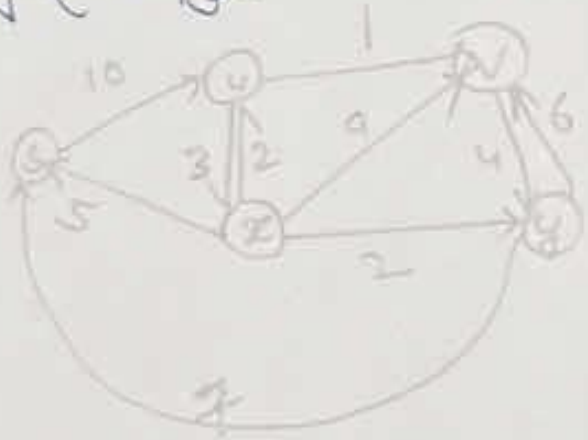

Wgt. = 37.

Ans4)

i) Shortest path may change. The reason is that there may be different path from 's' to 't'. for example:-
Let shortest path be of weight 15 & edg 5. Let there be another path wi 2 edge and total weight 25. Hence, the shortest path increases. Mean weighted of other paths are also increase.

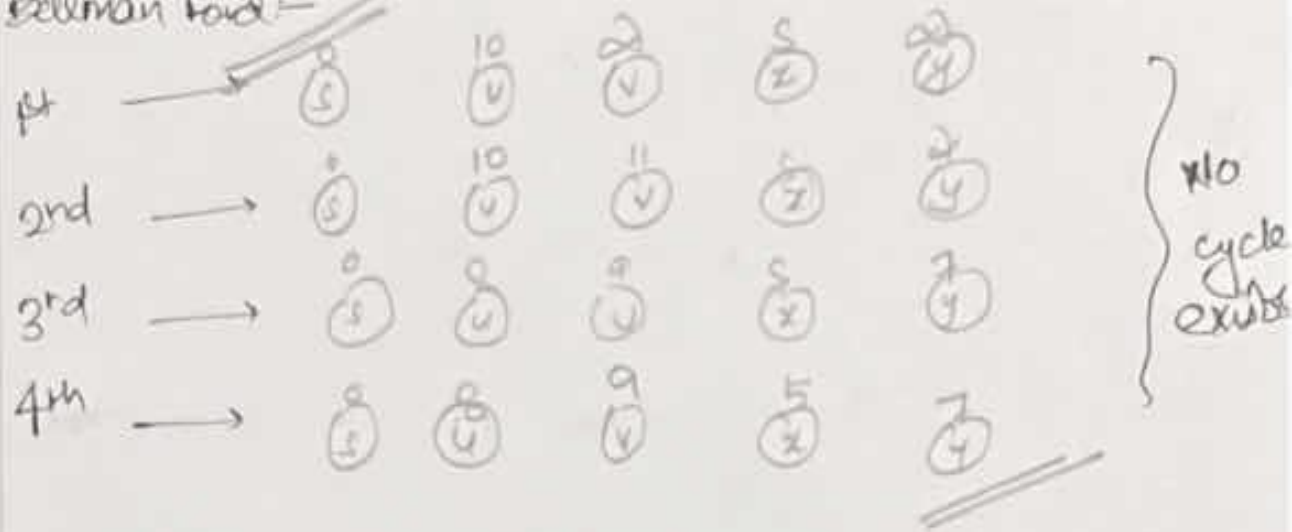
(ii) If we multiply all edges wgt by 10, shortest path won't change. Only the weight will be increased by 10x otherwise it will follow the same path.

Ans5) Dijkstra's Algo:-




| Node | Shortest distance from source node |
|---|---|
| u | 8 |
| x | 5 |
| y | 9 |
| z | 7 |

Bellman ford :-




Question 6 Floyd Warshall Algo :-

TC = $O(|V|^3)$

SC = $O(|V|^2)$