IT-081 Pankhania Anandi R.

DAA -

Prim's Algorithm (Greedy method)

Problem Analysis:-

→ It's minimum spanning tree algorithm that takes graph as input & finds subset of edges of that graph includes ⇒ form tree which include every vertex & has min. sum of weights among all trees that can be formed.

Approach:-

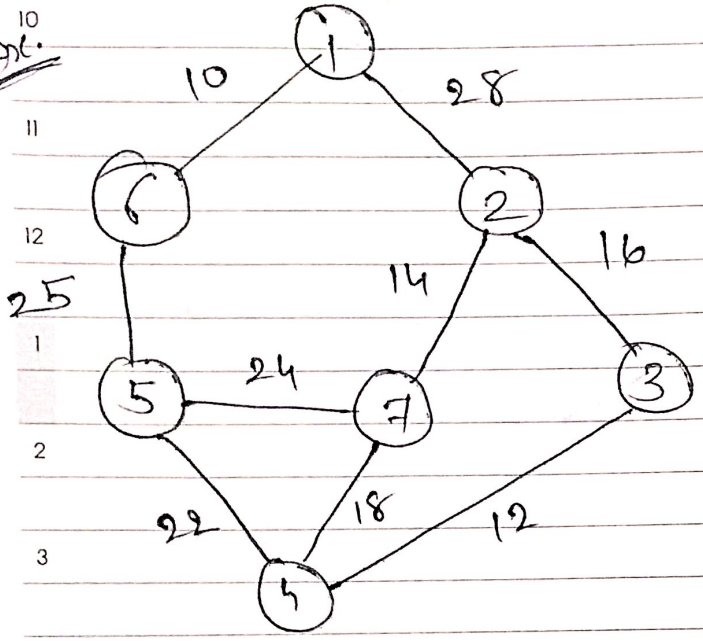
→ first select min. cost edge (initially)

→ then always select min. cost edge but make sure it's connected to already selected vertices. // always maintain //tree.

→ repeat above step until we get min. cost spanning tree.

Analysis:-

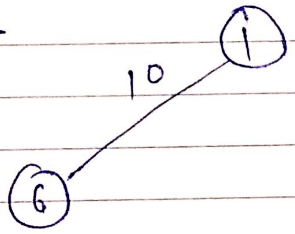
Ex:



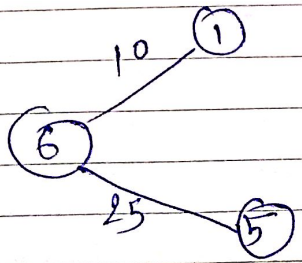
→ for this problem let's take node 1 as initial node as it has least weight in one of it's edge

→ (1) — (6)

→



2) one way from six (6) ie. (5)

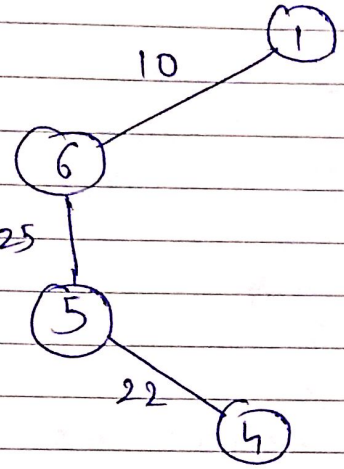


// there are other edges having small cost but we don't select as that will break the cycle.

3) from (5) two possibilities (5) —24— (7)

(min.) → (5) —22— (4)

so,..



from (4) : (4) —18— (7)

or

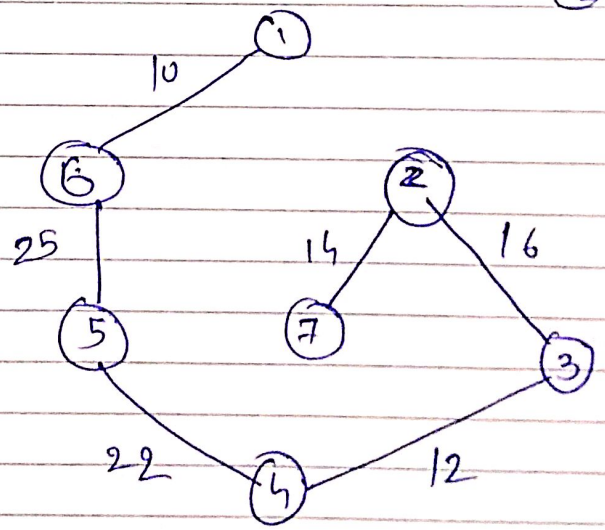
(4) —12— (3) (min)

4 from (3) only one option

(3) — (2)

4 from (2) :

(2) — (7)



cost

= 10 + 25 + 22 + 12 + 16 + 14

= 99

Algorithm:-

// for spanning tree with minimum weight from a given weighted graph
// to implement Prim's Algo.

1.> Begin
2.> Create edge list of given graph, with their weights.
3.> Draw all nodes to create skeleton for spanning tree.
4.> Select an edge with lowest weight and add it to skeleton and delete edge from edge list.
5.> Add other edges. while adding an edge take care that the one end of the edge should ~~be~~ always be in the skeleton tree and its cost should be minimum.
6.> Repeat step 5 until n-1 edges are added.
7.> Return.

18 DAY, 322-043 SUNDAY

Time Complexity:-

Prim's Algo containg two nested loops. Each is having O(n) so,

time complexity = $O(N^2)$