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Date

Assignment No.3

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Class - TE4
Subject -

Problem Statement -

Implement Greedy Search Algorithm for any of the following application -

1. Selection Sort.
2. Minimum Spanning tree.
3. Single-Source shortest path problem.
4. Job scheduling problem.
5. Prim's minimal spanning tree algorithm.
6. Krushkals minimal spanning tree algorithm.
7. Dijkstra's minimal spanning tree algorithm.

Theory -

* Introduction of Greedy Search Algorithm.

- Follows local optimal choice of each stage with intend of finding global optimum.
- Feasible Solution.
- Optimal Solution.

Applications -

1) Knapsack Algorithm
2) Job Sequencing
3) Minimum Spanning tree.
4) Optimal merge patterns
5) Huffman coding
6) Dijkstras Algorithm

- feasible Solution -

It is a set of values for the decision variables that satisfies all the constraints in an optimization problem.

- optimal Solution -

Optimal Solution is a feasible solution where the objective function reaches its maximum value.

for example

The most profit in the least cost.

Advantages -

① Greedy approach is easy to implement.
② Typically have less time complexities.
③ Greedy algorithm can be used for optimization purposes or finding close to optimization in case of NP Hard problems.

Disadvantages -

Sometimes greedy algorithm fail to find the globally optimal solution because they do not consider all the data.

* Introduction of prims MST.

- prim's algorithm is a famous greedy algorithm.
- It is used for finding the minimum spanning tree of given graph.
- To apply prims algorithm the given graph must be weighted connected & undirected.

Advantages -

Prims algorithm runs faster in dense graphs.

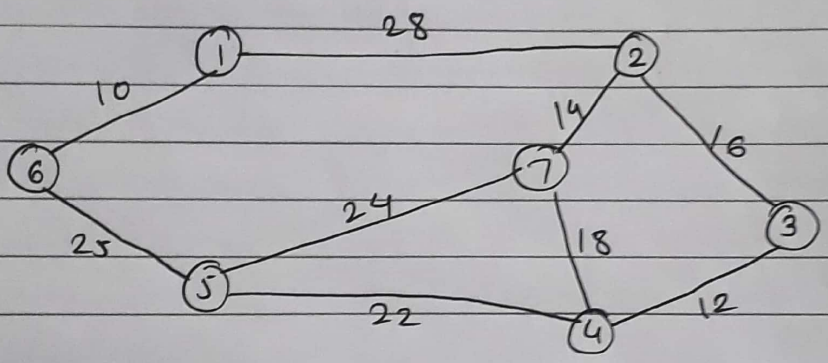
Disadvantages -

- List of edges has to be searched from beginning as new edge gets added.
- If there are more than an edge having some weight than all possible spanning trees are required to be found for final minimum tree.

solve one numerical example using prims MST.

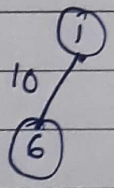
Problem -

construct the minimum spanning tree for the given graph using prims algorithm.

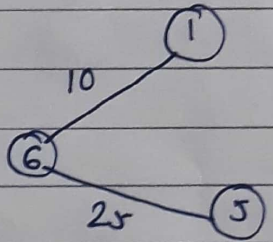


Solution -

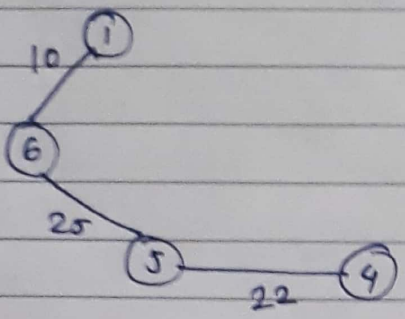
Step-1



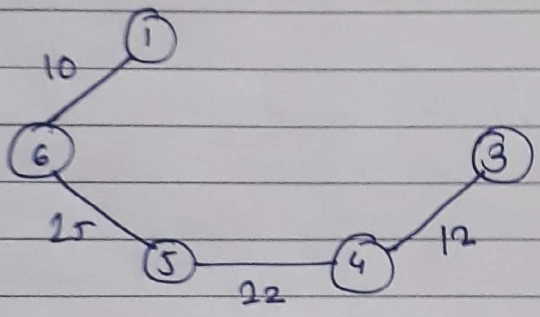
Step-2



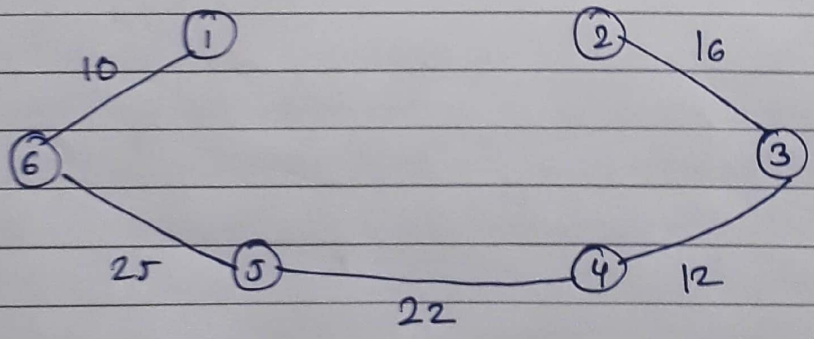
Step-3 -



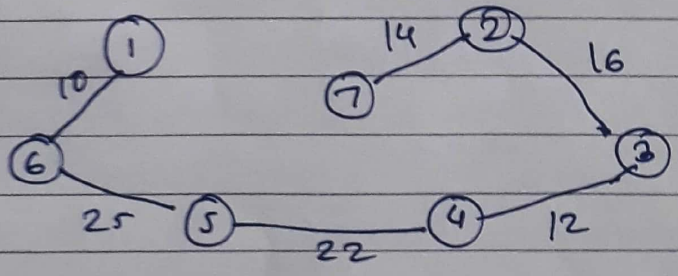
Step-4 -



Step-5 -



Step-6 -



Since all the vertices have been included in the mst so we stop.

Now cost of minimum spanning tree
= Sum of an edges weights
= 10 + 25 + 22 + 12 + 16 + 14
= 99 units.

Conclusion -