

Kruskal's Algorithm:

- Start from edges with lowest weight.
- Kruskal's Algorithm is used to find the minimum spanning tree for a connected weighted graph.
- The main target of the algorithm is to find the subset of edges by using which we can traverse every vertex of the graph.
- It follows the greedy approach that finds an optimum solution at every stage instead of focusing on a global optimum.
- In Kruskal's algorithm we start from edges with lowest weight and keep adding the edges until the goal is reached.
- The steps to implement ~~the~~ Kruskal's algorithm are listed as follows
 - ↳ first sort all the edges from low weight to high.

* Now, take the edge with lowest weight and add it to the spanning tree. If the edge to be added creates a cycle, then reject the edge.

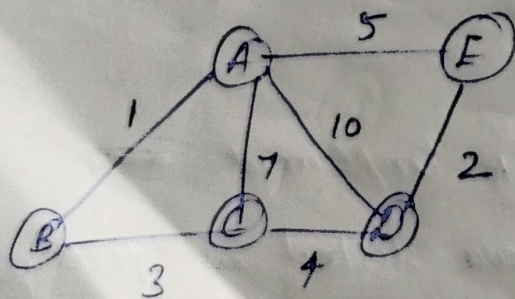
* continue to add the edges until we reach all vertices and a minimum spanning tree is created.

Applications:

→ It is used to layout electrical wiring among cities.

→ It can be used to lay down LAN connections.

Example:



→ The weight of the edges of the above graph is given in the below table

Edge	AB	AC	AD	AE	BC	CD	DE
Weight	1	7	10	5	3	4	2

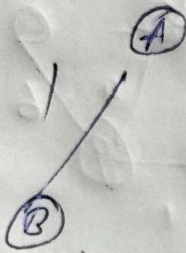
→ Now sort the edges given above in the ascending order of their weights

Edge	AB	DE	BC	CD	AE	AC	AD
Weight	1	2	3	4	5	7	10

Step 1 :

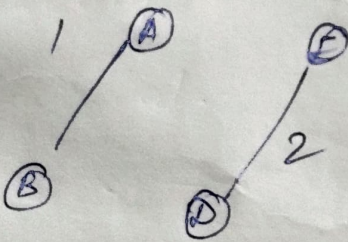
⇒ first add the edge AB with weight

1.



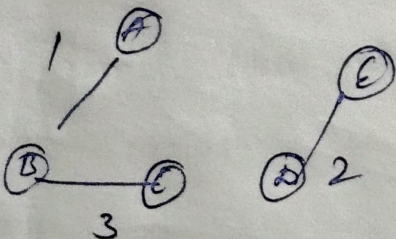
Step 2 :

⇒ Add DE



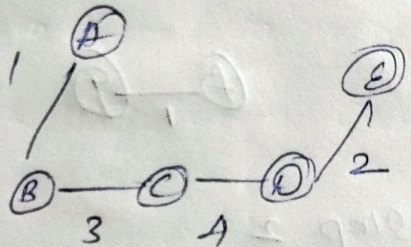
Step 3

⇒ Add BC



Step 4

⇒ Add CD



Step 5 :

* Discard AE

Step 6

* Discard AC

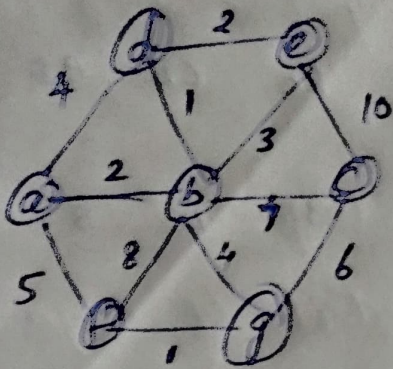
Step 7

* Discard AD

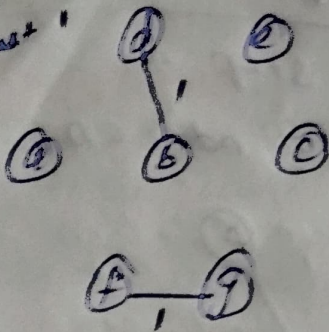
The cost of the Minimum Spanning tree

is $1 + 3 + 4 + 2 = 10$.

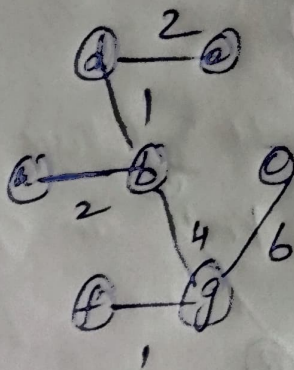
Example 2



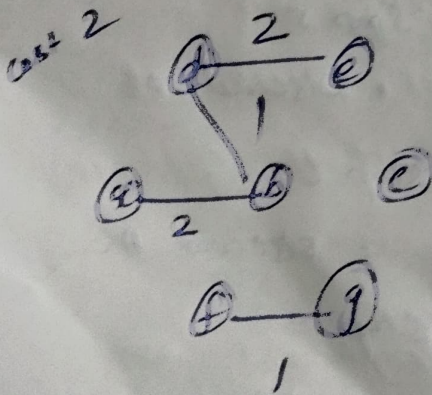
Step 1
Minimum cost 1



Step 4



Step 2



Weight of MST

$$\Rightarrow 2 + 1 + 2 + 4 + 1 + 6$$

$$\Rightarrow 16.$$

Step 3

