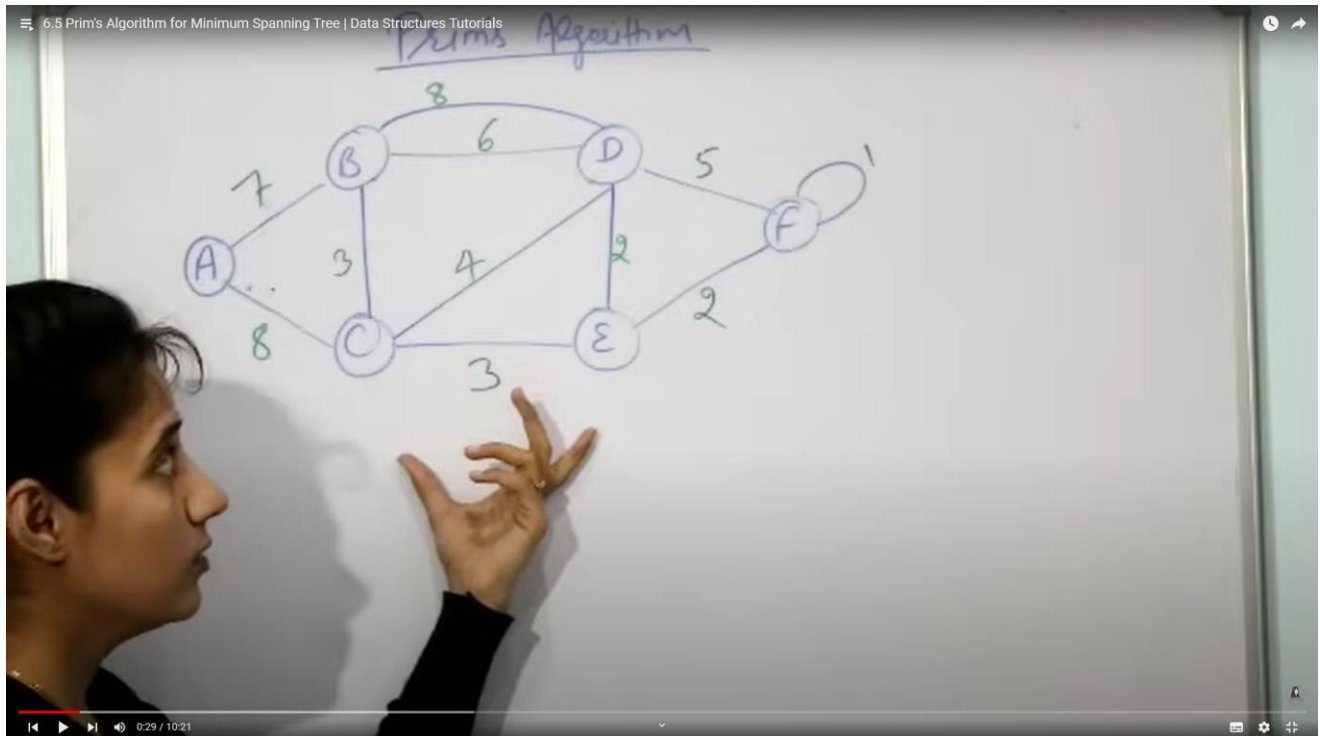
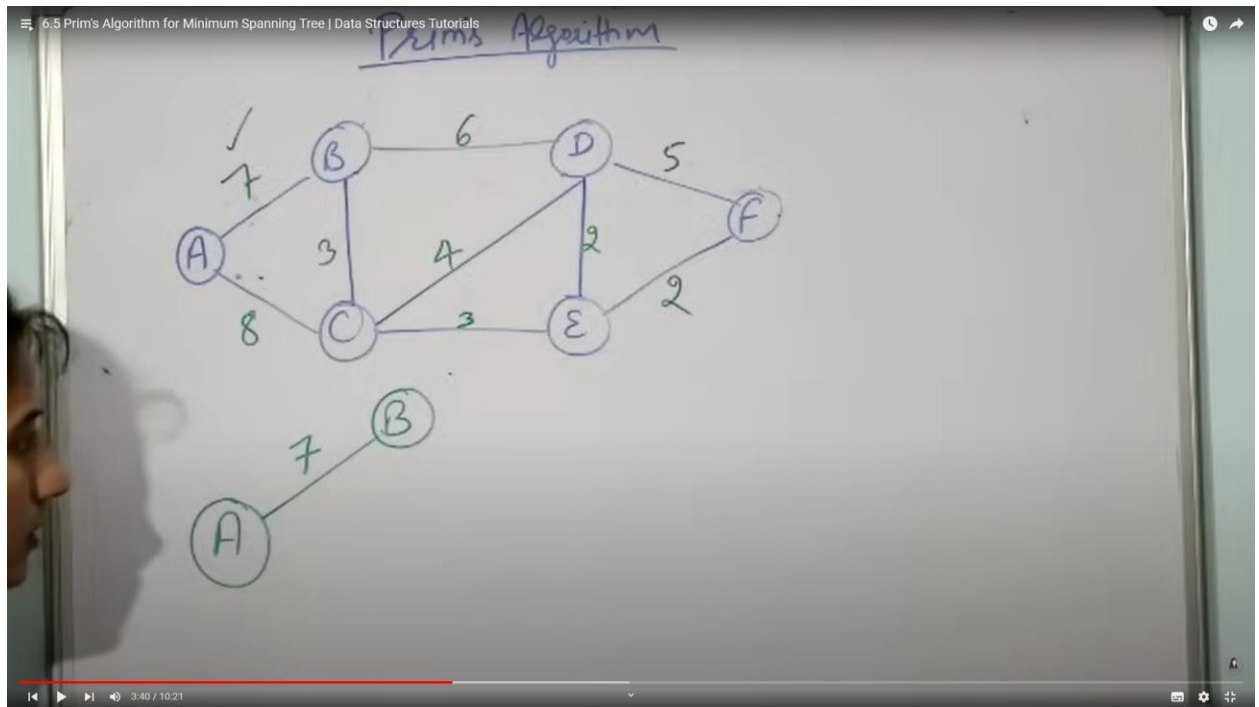


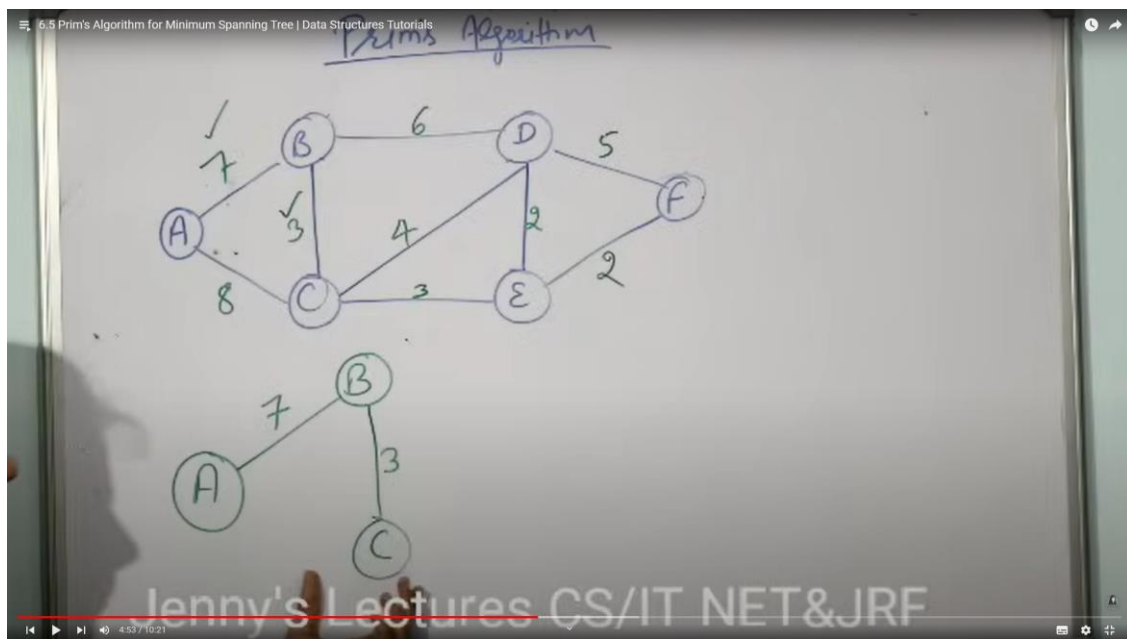
Prim's Algorithm for Minimum Spanning Tree



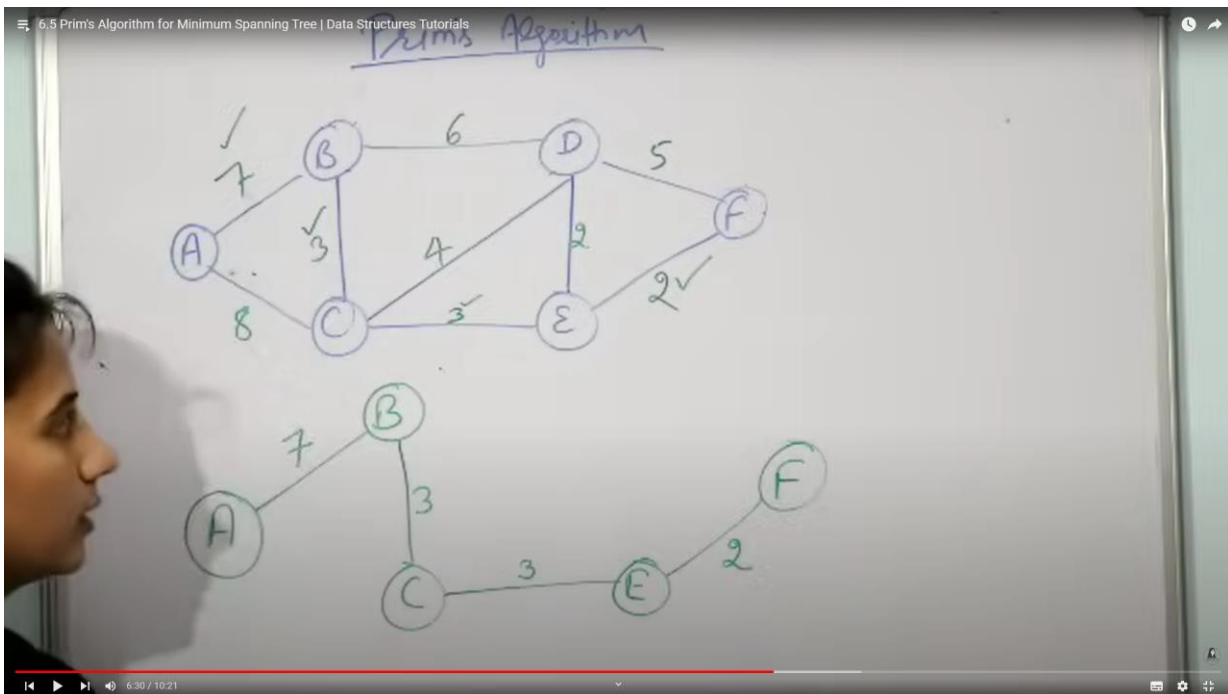
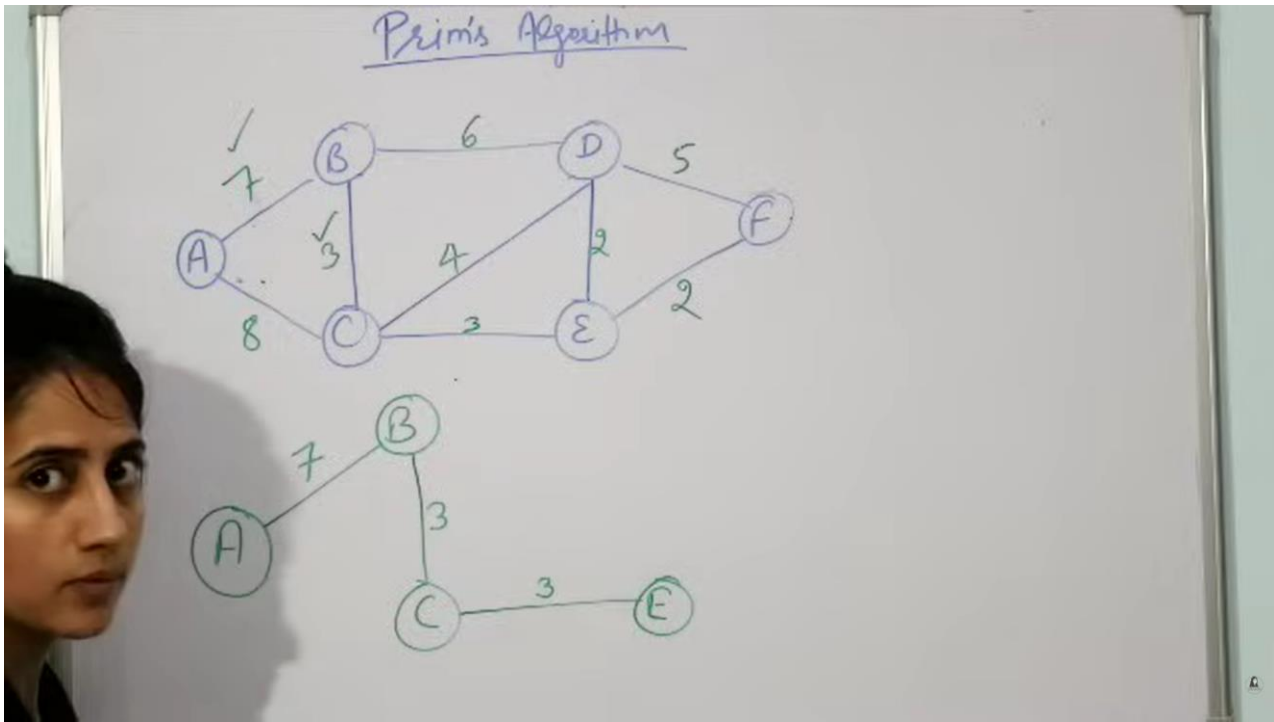
- First we need to remove all the loops
- Next remove parallel edges-in this graph there are 8 and 6 weighted edges. we remove the higher weighted edge. then 8 removed.
- Then we need to choose root node
- Suppose we have take A for root node. now choose one edge that have minimum weight.

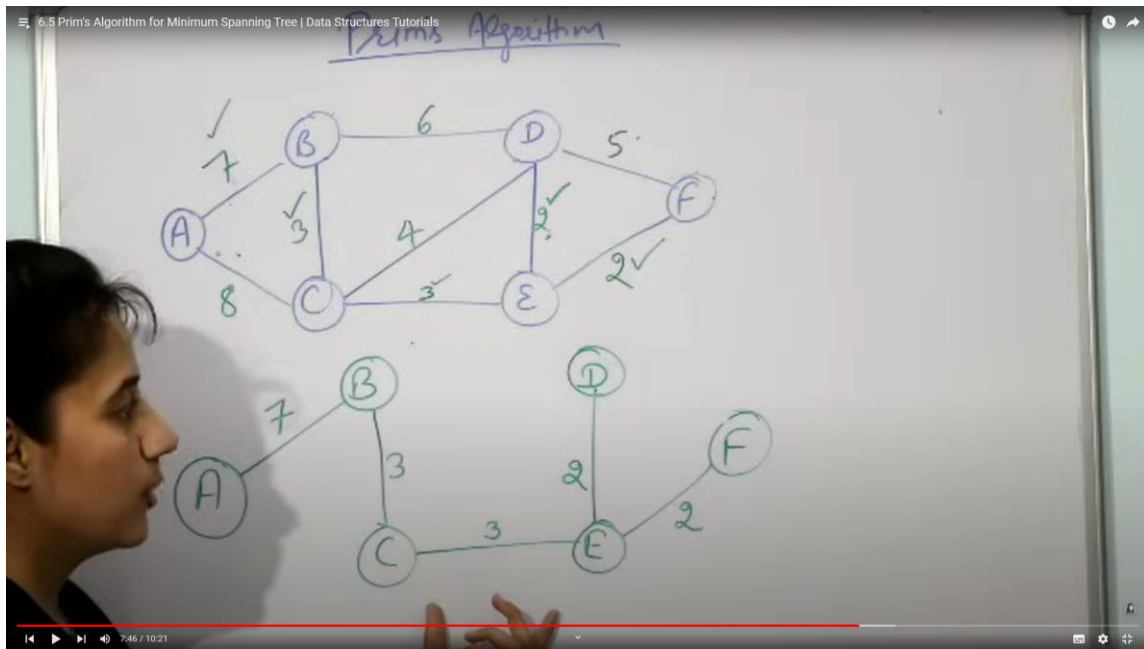


- Now B have 6,3 and A's 8. in these three we choose 3

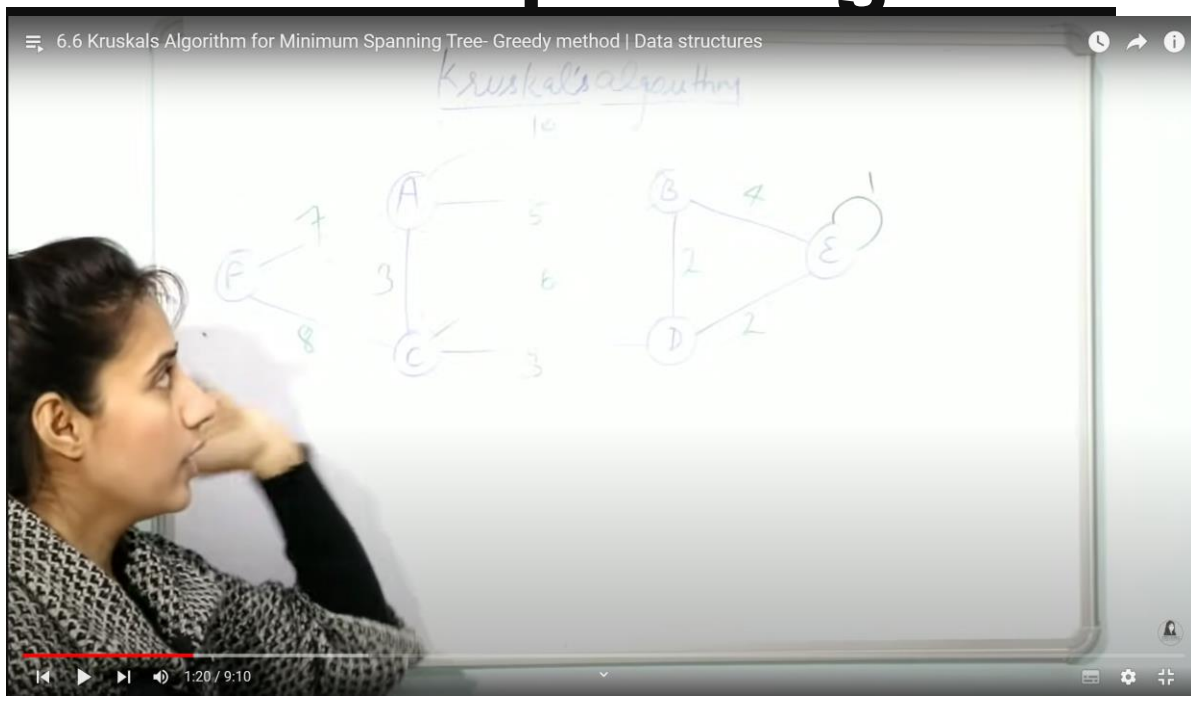


- In that way we can build MST





Kruskals Algorithm for Minimum Spanning Tree



- First we need to remove all loops and parallel edges

6.6 Kruskal's Algorithm for Minimum Spanning Tree- Greedy method | Data structures

Kruskal's algorithm

The whiteboard shows a graph with 6 vertices labeled A, B, C, D, E, and F. The edges and their weights are: A-B (5), A-C (3), A-F (7), B-D (2), B-E (4), C-D (3), C-F (8), D-E (2), and D-F (2). The graph is drawn with vertices A, B, C, D, E forming a pentagon and F connected to A, C, D, and F. The edges are: A-B (5), A-C (3), A-F (7), B-D (2), B-E (4), C-D (3), C-F (8), D-E (2), and D-F (2).

BD = 2
DE = 2
AC = 3
CD = 3
BE = 4
AB = 5
BC = 6
AF = 7
FC = 8

- We need to arrange edges in increasing order of it's weight.

- Then we can draw MST in step by step.

6.6 Kruskal's Algorithm for Minimum Spanning Tree- Greedy method | Data structures

Kruskal's algorithm

$BD = 2$
 $DE = 2$
 $AC = 3$
 $CD = 3$
 $BE = 4$
 $AB = 5$
 $BC = 6$
 $AF = 7$
 $FC = 8$

The partial MST shown below the graph consists of vertices B and D connected by an edge with weight 2.

4:24 / 9:10

6.6 Kruskal's Algorithm for Minimum Spanning Tree- Greedy method | Data structures

Kruskal's algorithm

$BD = 2$
 $DE = 2$
 $AC = 3$
 $CD = 3$
 $BE = 4$
 $AB = 5$
 $BC = 6$
 $AF = 7$
 $FC = 8$

The partial MST shown below the graph consists of vertices B, D, and E connected by edges with weights 2 and 2 respectively.

4:51 / 9:10

Kruskal's algorithm

Graph edges and weights:

- $AB = 5$
- $AC = 3$
- $AD = 6$
- $AE = 4$
- $BC = 3$
- $BD = 2$
- $CE = 8$
- $DE = 2$
- $EF = 7$
- $FD = 8$

Partial trees shown:

- Tree 1: $A-C$ (3)
- Tree 2: $B-D$ (2), $D-E$ (2)

Edge weights list:

- $\checkmark BD = 2$
- $\checkmark DE = 2$
- $AC = 3$
- $CD = 3$
- $BE = 4$
- $AB = 5$
- $BC = 6$
- $AF = 7$
- $FC = 8$

Kruskal's algorithm

Graph edges and weights:

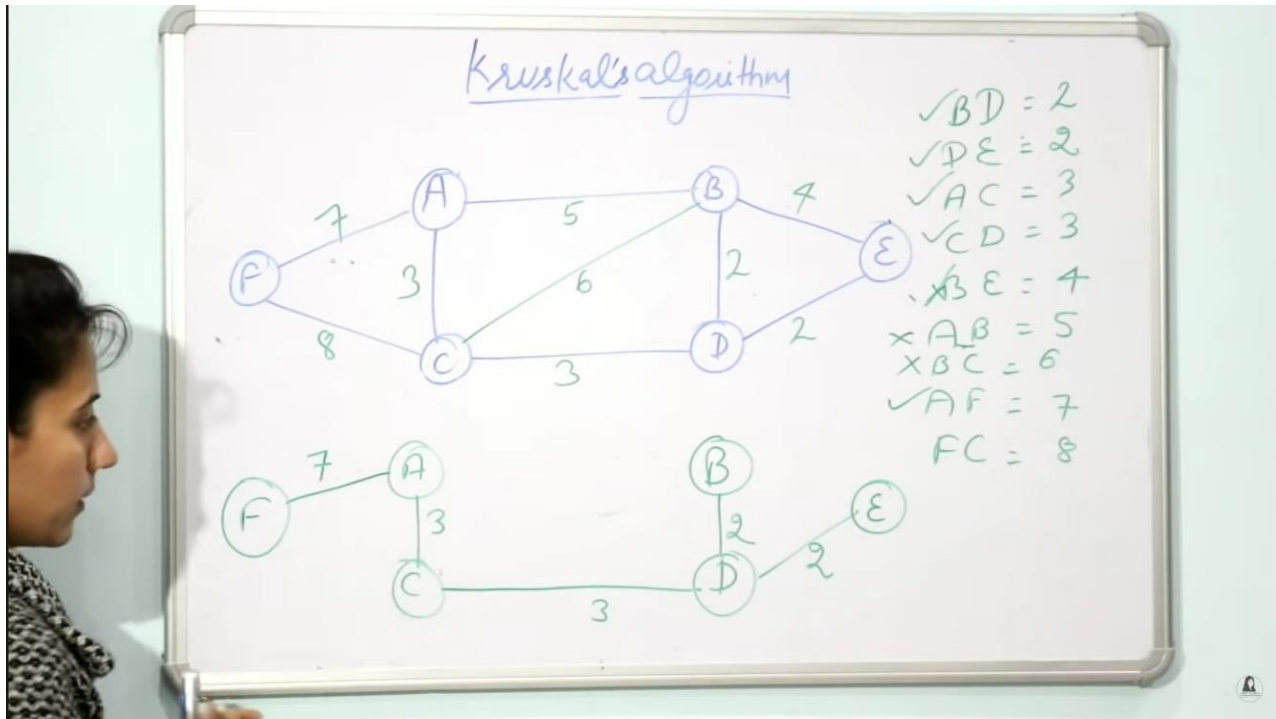
- $AB = 5$
- $AC = 3$
- $AD = 6$
- $AE = 4$
- $BC = 3$
- $BD = 2$
- $CE = 8$
- $DE = 2$
- $EF = 7$
- $FD = 8$

Updated partial trees shown:

- Tree 1: $A-C$ (3), $C-D$ (3)
- Tree 2: $B-D$ (2), $D-E$ (2)


Edge weights list:

- $\checkmark BD = 2$
- $\checkmark DE = 2$
- $\checkmark AC = 3$
- $\checkmark CD = 3$
- $BE = 4$
- $AB = 5$
- $BC = 6$
- $AF = 7$
- $FC = 8$



- BE, AB, BC and FC are not drawn.
- Because cycles are not allowed in MST .


QUESTION

 Let x is cost of MST $G(V, E)$ & y is cost of MST $G(V, E^2)$
Here E^2 means:-
if $w(u, v) \in E$ then $w^2(u, v) \in E^2$
Find relationship between x & y . $w \in \text{Real no.}$
(i) $x \geq y$ (ii) $x \leq y$ (iii) $x = y$ (iv) None of these.

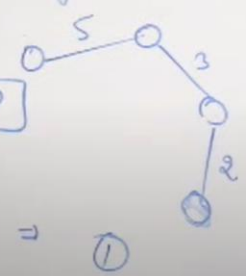
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Lets solve this

6.7 Minimum spanning Tree(MST) | UGC NET(Computer Science) Practice Question with Solution

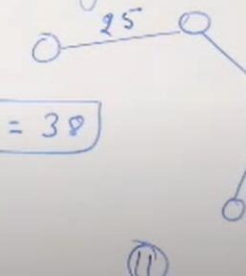
 Here E^2 means:-
if $w(u, v) \in E$ then $w^2(u, v) \in E^2$
Find relationship between x & y . $w \in \text{Real no.}$
(i) $x \geq y$ (ii) $x \leq y$ (iii) $x = y$ (iv) None of these.

$x = 10$



①

$y = 38$



②

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- In above way answer is (ii) because x cost is 10 and y cost is 38. Then $X \leq Y$.
- But edges weights have below values also

6.7 Minimum spanning Tree(MST) | UGC NET(Computer Science) Practice Question with Solution

where E^2 means:-
 if $w(u,v) \in E$ then $w^2(u,v) \in E^2$

Find relationship between x & y . $w \in \text{Real no.}$

(i) $x \geq y$ (ii) $x \leq y$ (iii) $x = y$ (iv) None of these.

$x = 10$
 $x = 1.0$

$y = 38$
 $y = 0.38$

⑪

- In above way answer is different.
- Therefore question true answer is (iv).