Every tree is a graph. But every graph is not a tree

Graphs may or may not have cycles. But trees will NEVER have any cycles

Spanning tree refers to a tree that can be created from a graph, has no cycles and removes some edges of the graph that create the cycles

Minimum Spanning Tree (MST) refers to a spanning tree that has (node -1) number of edges and has the lowest total cost.

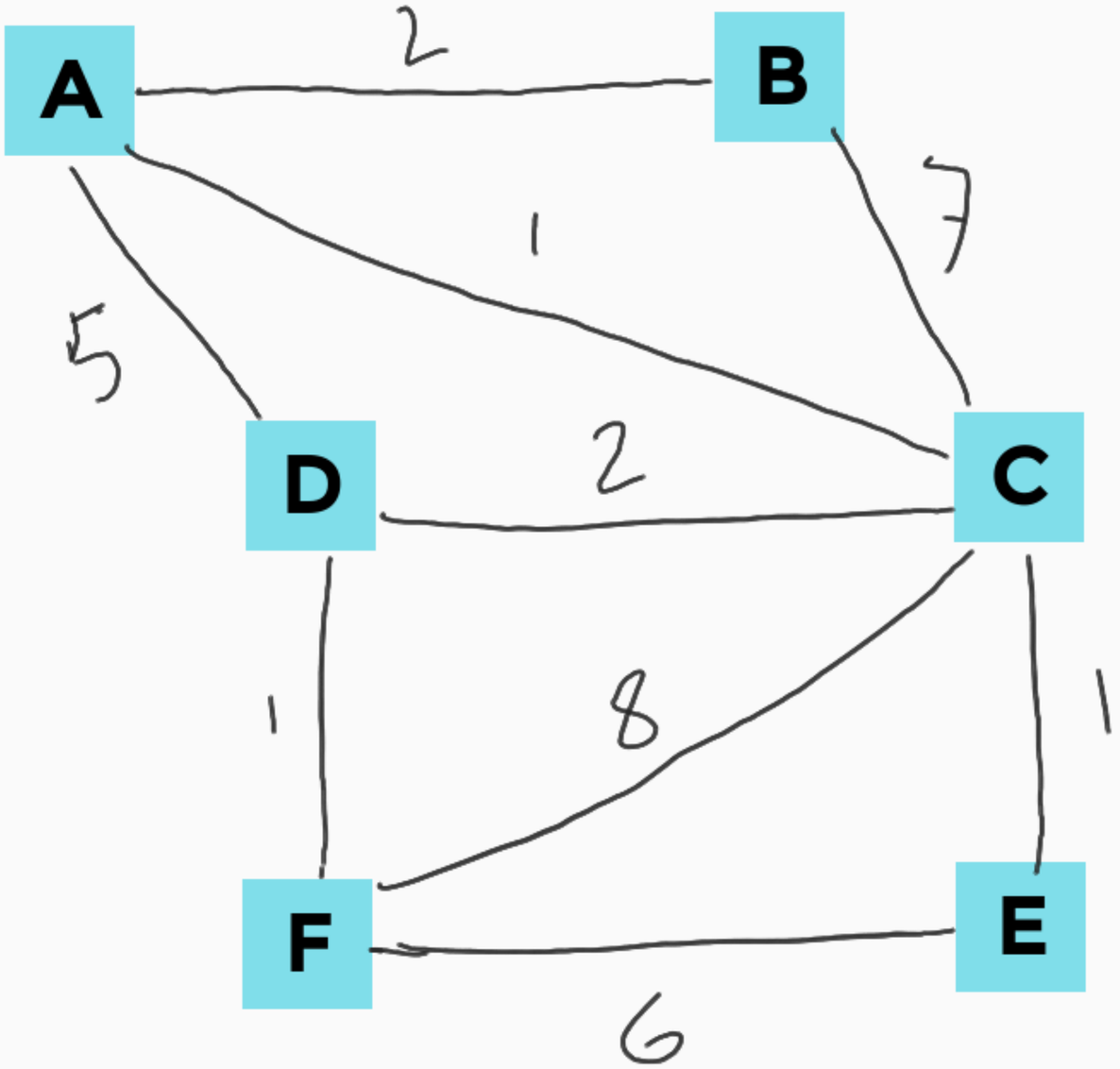
All the graphs we had seen so far had one thing in common -> They were unweighted

Now, we solve for MSTs in a weighted graph

We can solve MSTs using two algorithms.

1. Kruskal's Algorithm (Edge Approach)

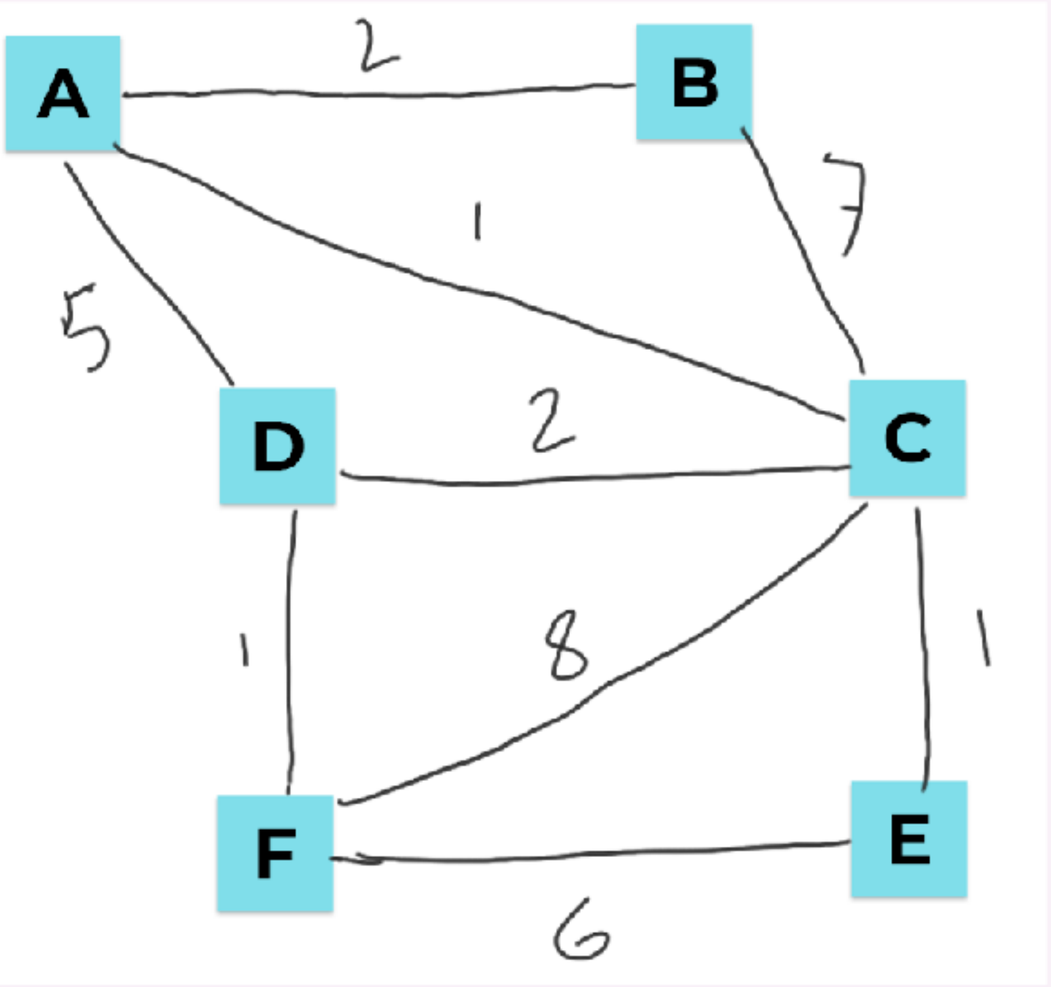
1. Prim's Algorithm (Vertex Approach)



Number of Nodes -> 6

Number of edges -> 9

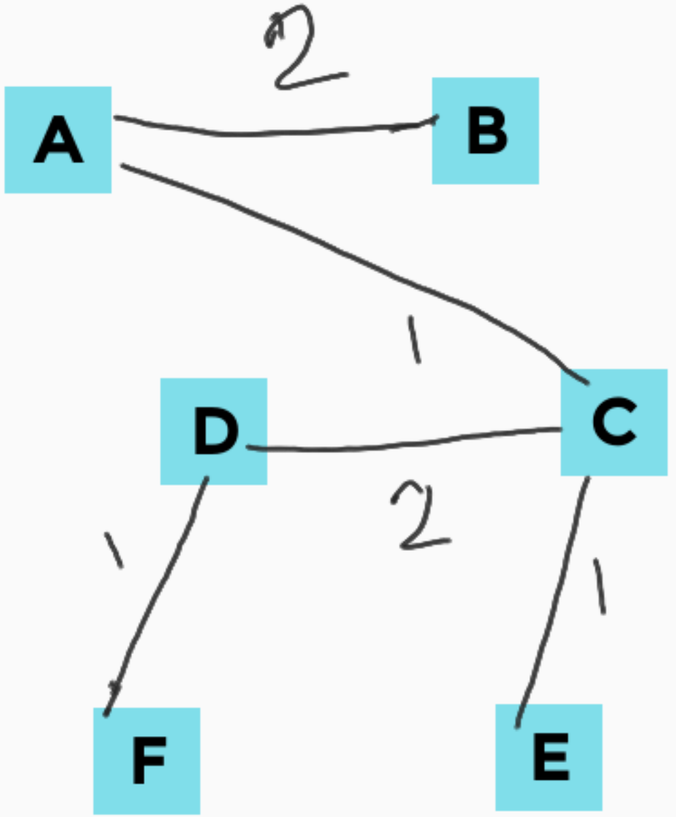
MST will have 5 edges here



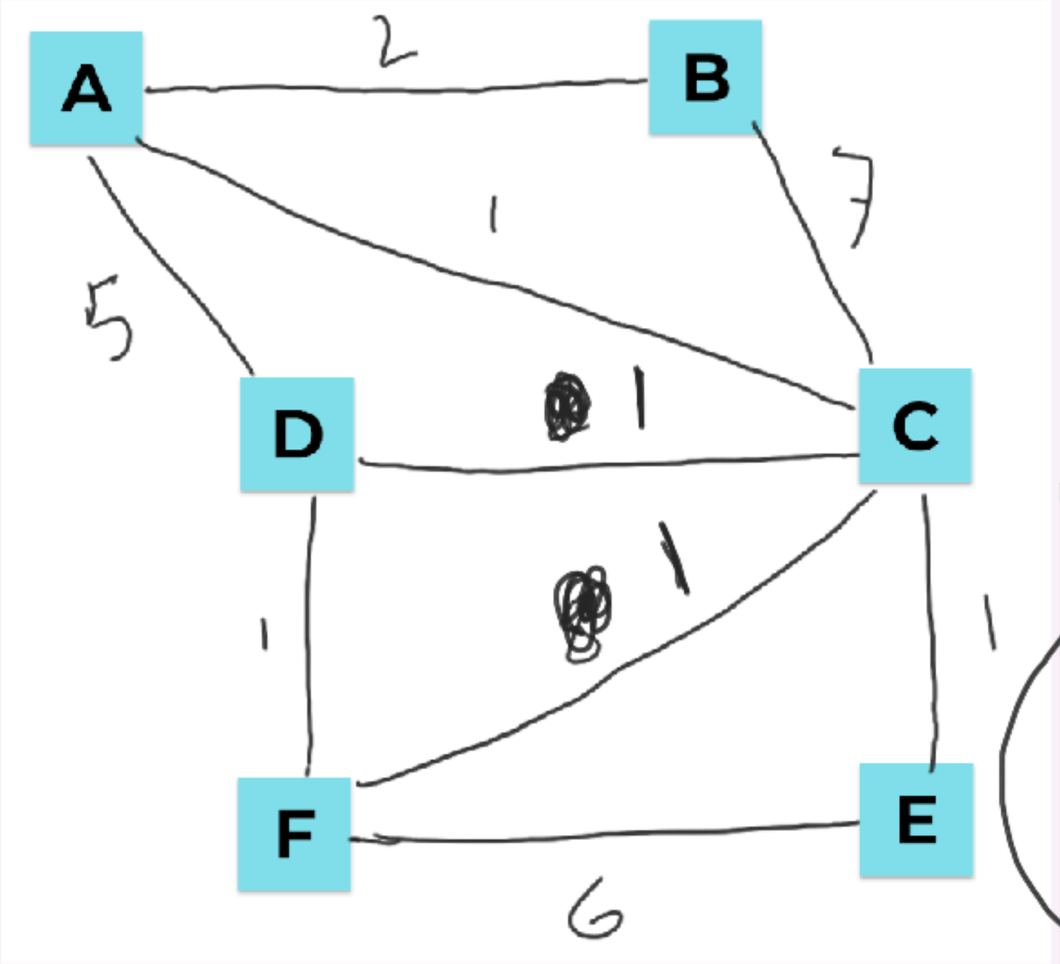
1. {A - B} = 2
   {A - C} = 1
   {A - D} = 5
   {B - C} = 7
   {C - D} = 2
   {C - E} = 1
   {C - F} = 8
   {E - F} = 6
   {D - F} = 1

2. {A - C} = 1 ✓
   {C - E} = 1 ✓
   {D - F} = 1 ✓
   {A - B} = 2 ✓
   {C - D} = 2 ✓
   {A - D} = 5
   {E - F} = 6
   {B - C} = 7
   {C - F} = 8

Step 3

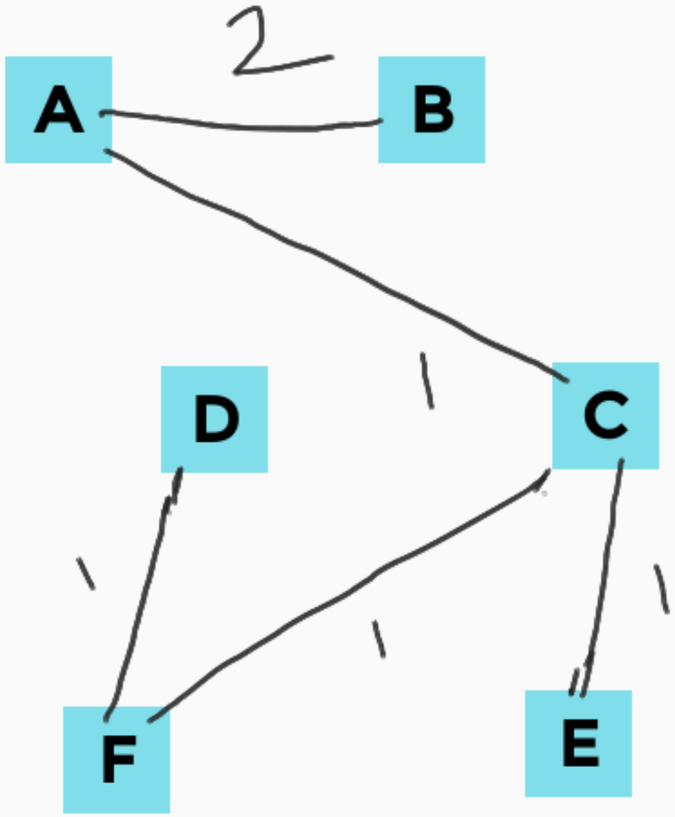


Step 4: Cost of MST: 7



1. {A - B} = 2
   {A - C} = 1
   {A - D} = 5
   {B - C} = 7
   {C - D} = 1
   {C - E} = 1
   {C - F} = 1
   {E - F} = 6
   {D - F} = 1

2. {A - C} = 1
   {C - E} = 1
   {D - F} = 1
   {A - B} = 2
   {C - D} = 1
   {A - D} = 5
   {E - F} = 6
   {B - C} = 7
   {C - F} = 1



MST cost: 6

Algorithm:

1. Make a set of all the edges in the graph with their costs.

2. Based on the cost of the edges, sort them in an ascending order.

3. Consider the edges with the lowest cost and check if they create a cycle or not. If they do not, then include them in your MST.

4. Calculate your MST cost