

## Quiz 6

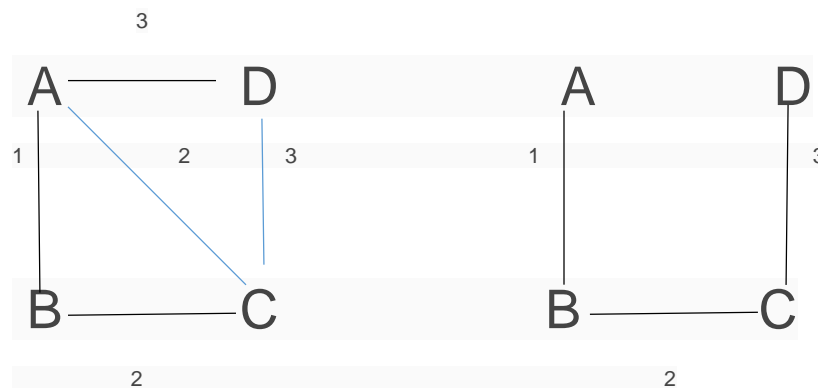
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For there to be the possibility of multiple MSTs, at least two edges in the graph must be equal. As a result the quiz problem is depends on comparator. If the comparator can compare the case where both edges are equal in cost and have the same max(source, target) character, then Prim's Algorithm and Kruskal's Algorithm will never declare any two edges equal and thus always give the same MST. However, if the comparator declares the same weighted edges equal, than there is a possibility that the algorithms will generate different MSTs, depending on which edge they consider first.

For example:

### Prim's Algorithm

Firstly, we will find the minimum edge between edge(A,B) and edge (A,C) and edge (A,D). Since their weight edge(A,B) is 1, we choose edge(A,B) to be the first remove from the priority queue and add it to the tree. Then we consider vertex B, we add edge(B,C) to the tree and finally we consider vertex C and add edge(C,D) to the tree. It form the MST as below.



### Kruskal's Algorithm

We add all edges to the set and we add edge(A,B) to the tree since it has the minimum weight. Then we add edge(A,C). we want to add edge(B,C) but it will conflict with the principle of MST so we don't add edge(B,C). Finally we add edge(A,D) to the tree and it form the MST as below.

