

DSC40B: Theoretical Foundations of Data Science II

Lecture 16: *Minimum Spanning Tree,
properties, and general greedy algorithms*

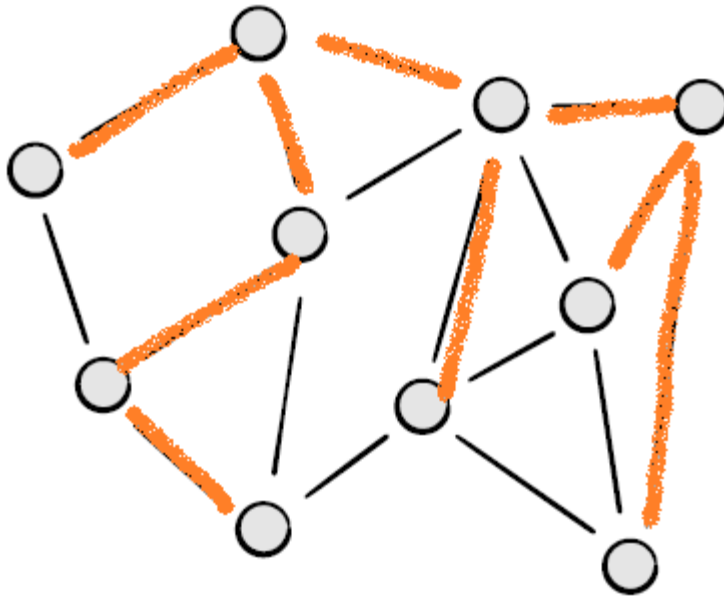
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Trees, spanning trees, and minimum spanning tree



Spanning Tree

- ▶ Given an undirected graph $G = (V, E)$, a **spanning tree of G** is any graph $T = (V, E' \subseteq E)$ that is a tree.



Example of spanning trees for the graph on the right.

Spanning Tree

- ▶ Given an undirected graph $G = (V, E)$, a **spanning tree of G** is any graph $T = (V, E' \subseteq E)$ that is a tree.
- ▶ Intuitively, a spanning tree of G contains smallest number of edges in E to connect all nodes in G .
- ▶ Note that if the input graph G is not connected, then there exists no spanning tree.
 - ▶ We can talk about spanning forest, consisting a set of spanning trees, one for each connected component in G .



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