

Fall 08. CS513. HW 6, Due Oct 30.

1. If all edge weights are distinct, prove that the minimum spanning tree is unique.
2. Given a set of n points in the Euclidean plane, its k -clustering is a disjoint grouping of the points into k sets (also called *clusters*). We seek k -clustering such that the spacing between any two clusters is maximized; the spacing between two clusters is the minimum distance between two points of opposite clusters.

Hint. This can be computed from the Minimum Spanning Tree (MST), or using an MST algorithm.

3. Consider a undirected graph G . A node is called an *articulation point* if its removal (together with its incident edges) results in a disconnected graph. A graph is said to be *biconnected* if it has no articulation points. Design an efficient algorithm to determine if a given graph is biconnected.

Hint. Use Depth-First-Search and detect articulation points if any based on tracking for each vertex u , how far up the back edges from the subtree rooted at u go.