

Homework 11 (Posted 20th April, Due during or before class 30th April)

Problem 1: 10 pts Does Prim's and Kruskal's algorithms work if some edges have negative weights. Justify (prove or give counter example) in each case. You may assume distinct edge weights.

Problem 2: 15 pts Let the weight of a spanning tree be the weight of the maximum weight edge in the tree (now the weight is not the sum of all weights of all edges in the tree). Give an algorithm to compute a minimum weight spanning tree under this definition of weight of a spanning tree. Analyze its complexity.

Problem 3: 5 pts Give an algorithm to compute MST in a graph where all edges have equal weights. Analyze its complexity. The algorithm should be more efficient than Prim's and Kruskal's. You may assume positive weights.

Problem 4: 5 pts Let e be the edge with minimum weight in a graph. Show that it belongs to some MST.

Problem 5: 10 pts Consider a cycle C in a connected graph. Let e be the edge with the maximum weight in the cycle. Remove e from the graph G . Prove that the new graph is connected. Consider a MST T in the new graph. Is it a MST in the original graph G as well? Justify your answer.