

CS 161: Recitation 7 (Fall 2016)

Question 1

Given a set of n cities, we would like to build a transportation system such that there is some path from any city i to any other city j . There are two ways to travel: by driving or by flying. Initially all of the cities are disconnected. It costs r_{ij} to build a road between city i and city j . It costs a_i to build an airport in city i . For any two cities i and j , we can fly directly from i to j if there is an airport in both cities. Give an efficient algorithm for determining which roads and airports to build to minimize the cost of connecting the cities.

Question 2

Recall that in the Minimum Spanning Tree (MST) problem, we are given an undirected graph $G = (V, E)$ in which each edge e has an associated weight $w(e)$, and we want to compute a tree $T = (V, E_T)$, having minimum total edge weight, such that T spans G .

Show how to solve the Maximum Spanning Tree problem, in which we want a spanning tree of G having maximum total edge weight.