

COT 5407 Introduction to Algorithms

Homework 5

Due on Thursday, November 29, 2018

This homework covers chapters 16,26

1. [15 points] You are going on a trip but unfortunately, your headlights are broken, and you can only drive during the daytime. On any given day you can drive up to d miles. You are given a map with n different hotels and also the distances from your start location each hotel $x_1 < x_2 < \dots < x_n$. Your final stop is the last hotel. Give an algorithm that outputs the hotels you should stay while minimizing the number of days to get to the destination.
2. [10 points] An online dating company has data from n men and n women. These data tell what pairs of men and women are mutually compatible. The revenue of the online dating service depends on the number of dates it sets up. The company needs to determine the maximum number of compatible couples possible. Each man or woman can be assigned to at most one date. Describe how to formulate this problem as a matching problem (Section 26.3 in Cormen).
3. [10 points] A group of several families is planning a shared car trip to Miami. They want to minimize the possibility of fights, so they will assign individuals to cars so that no two members of the same family are in the same vehicle. Show how to formulate this problem as a network flow problem.
4. [15 points] Solve exercise 16.1-1 from Cormen.
5. [10 points] Solve exercise 16.2-5 from Cormen.
6. [10 points] Solve exercise 16.3-3 from Cormen.
7. [10 points] Solve exercise 26.2-2 from Cormen.
8. [10 points] Solve exercise 26.2-3 from Cormen.
9. [10 points] Solve exercise 26.3-1 from Cormen.