Homework Assignment 7

Given: April 24, 2023   **Due:** May 5, 2023

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1. Chapter 6, Exercise 3 (page 314) from the text.

2. Chapter 6, Exercise 5 (page 316) from the text.

3. Chapter 6, Exercise 9 (page 319) from the text.

4. Chapter 6, Exercise 12 (page 323) from the text.

5. Professor Stewart is consulting for the president of a corporation that is planning a company party. The party has a hierarchical structure; that is, the supervisor relation forms a tree rooted at the president. The personnel office has ranked each employee with a convivality rating, which is a real number. In order to make the party fun for all attendees, the president does not want both an employee and his or her immediate supervisor to attend.

Professor Stewart is given the tree that describes the structure of the corporation. Each node of the tree holds in addition to the pointers, the name of an employee and that employee's convivality ranking.

(a) Describe an algorithm to make up a guest list that maximizes the sum of the convivality ratings of the guests. Analyze the running time of your algorithm.

(b) How can the professor ensure that the president gets invited to his own party?

6. Suppose we are given a set $S = \{s_1, s_2, \ldots, s_n\}$ of positive integers such that $\sum_{i=1}^{n} s_i = T$. Give an $O(nT)$-time algorithm that determines whether there exists a subset $U \subset S$ such that $\sum_{s_i \in U} s_i = \sum_{s_i \in S \setminus U} s_i$.