Problem Set 3 (due Monday, October 6)

Instructions:

- The assignment is due at the beginning of class on the due date specified. Late assignments will not be accepted.

- We encourage you to attempt and work out all of the problems on your own. You are permitted to study with friends and discuss the problems; however, *you must write up you own solutions, in your own words.*

- If you do collaborate with any of the other students on any problem, please list all your collaborators in your submission for each problem.

- Finding solutions to homework problems on the web, or by asking students not enrolled in the class is prohibited.

- We require that all homework submissions be neat, organized, and *typeset.* You may use plain text or a word processor like Microsoft Word or LaTeX for your submissions.

1. (10 points) Matroids

Exercise 16.4-4 of text.

2. (5 + 5 = 10 points) Minimizing average completion time

Problem 16-2 of text.

3. (10 points) Minimum-length encoding

This is a continuation of Problem 4 of PS2. Recall that Alice and Bob are using an encoding scheme based on a set S of m *code words* that they both share. Alice wants to send a data string D of length n to Bob. In this exercise, we assume that S is an *arbitrary* set of m code words.

Design a polynomial-time algorithm to determine a minimum-length encoding of a given string D using code words from S. If no such encoding exists, then the algorithm must indicate so. Analyze the worst-case running time of your algorithm. Make your algorithm as efficient as you can, in terms of its worst-case running time.