Overview

Complete the following problems from the textbook. For every *programming exercise* (indicated with an asterisk), do it by writing a short program that calculates the answer for you, and turn in both your code and your answer. I recommend that you use a programming environment that does the matrix multiplication for you. `numpy` within Python or the language R are both great choices.

For every non-programming exercise, you should turn in a carefully written solution showing your work and explaining your answer. Specifically, I very highly recommend using LaTeX, which is the standard tool in theoretical computer science for communicating technical material, and it is valuable to get the practice with it. If you have no experience with LaTeX at all, Getting Something out of LaTeX is a fine place to start. LaTeX Tutorials — A Primer is a more detailed tutorial. Text Processing using LaTeX is a great reference for the language. I generally prepare my LaTeX documents using the Emacs text editor and a locally installed LaTeXdistribution, but I've also sometimes been using ShareLaTeX some as well (especially when I'm writing collaborative research papers). Other word processors do have equation editors that you can use if you prefer that approach. Do *not* submit a raw text submission where you "fake" the equations by using normal ASCII characters.

If you have diagrams that you would like to submit, hand-drawn supplements are acceptable (but they too must be submitted electronically). You may find it easiest to print your solution, draw in your diagrams, scan the printout, and submit the resulting PDF. The better approach, of course, is to generate the diagrams electronically. The native LaTeX solution TikZ produces lovely pictures, though it has something of a learning curve associated with it. There's also Graphviz, which is a specialized tool for generating pretty graphs. Finally, you can also use any standard GUI drawing tool such as Dia, and save what you create as a PDF. All of the above are installed on the department systems.

Collaboration policy: You may collaborate on the homework assignments to the extent of formulating ideas as a group, but you may not collaborate in the actual writing of solutions. *In particular, you may not work from notes taken during collaborative sessions.* You *must* cite all sources, including others in the class from whom you obtained ideas. You may not consult any materials from any previous offerings of this course or from any other similar course offered elsewhere. You are required to completely understand any solution that you submit, and, in case of any doubt, you must be prepared to orally explain your solution to me. *If you have submitted a solution that you cannot verbally explain to me, then you have violated this policy.*

Part 1

- Exercise 5.1.1*
- Exercise 5.1.2*
- Exercise 5.1.3
- Exercise 5.1.6
- Exercise 5.1.7

Part 2

- Exercise 5.3.1*
- Exercise 5.4.1(a)
- Exercise 5.4.1(b)
- Exercise 5.4.1(c)
- Exercise 5.5.1*