Due Wednesday, 11/09/16

CSCI 48400
Assignment 12-14

Chapter 12

Pencil and paper (for the Instructor)
Section 12.1 #5

Additional problem (5 points): Go to http://www.contextfreeart.org/index.html. This is a website for software that uses context-free grammar rules to generate artwork. Download and install the software. There is not a lot in the way of documentation, so it is not easy to get started. At the same web page where you download the software, there is a link for "AboutContext Free" that is a good starting point. In the IDE you will find a number of example programs that you can look at. Under Examples, there are two "lessons."

Create one interesting and original image, save it with your name, and submit the CFDG file along with a file that has a picture of your image (to make this simple, paste your image in a Word document). Submit both of these files via Canvas.

Chapter 14 (10 points)
Each of you has been assigned (based on the "lottery" in class – or an arbitrary assignment if you were not in class on 10/26/16) to a team with an NP-complete problem to research. Write a 1-2 page Word document covering the following points (list your references - try to look somewhere besides Wikipedia); submit via Canvas, one submission per team with all team members' names. On the due date, be prepared to give a brief (5 minutes) presentation on these same points:

- an explanation of what the problem is, that is, what is to be solved or answered
- a deterministic ("brute force") method to solve the problem and why it seems "exponential" (or non-polynomial)
- a method to verify the correct solution (that was nondeterministically guessed) and why it seems polynomially-bounded

Note that the below problems are all decision (yes/no) problems, none are optimization problems. Some have optimization versions that ask for a solution that maximizes (or minimizes) some quantity Q, but the decision problem version asks, for a given integer value k, is there a solution (yes or no) where Q is ≥ (or ≤) k. So don't talk about an algorithm for optimization (although we will discuss optimization problems later).

1. the 3-SAT Problem (Curic, Hodge, Kloke, Ravindra, Yesmunt)
2. the traveling salesman problem (Albalawi, Barron, Horne, Huynh, Mauk)
3. the partition problem (LaTulippe, Fetsko, Neal, Neil,Wessel)
4. the graph coloring problem (Brown, Beaman, Carnagua, Paulson, Rollins)
5. the graph clique problem (Dowell, Conrad, Emery, Kasacheuski)
6. the exact cover problem (Alhazzani, Greer, Kudo, Ladd, Whitfield)
7. the set packing problem (Baker, Carillo, Elliott, Raymond, Tang)
8. this is a slightly different assignment that explores the SAT problem from an empirical standpoint. I will be sending you instructions via Canvas Inbox (Allaei, Foster, Hubbard, Jansen)

I expect the written work and the presentation to be **done jointly by all team members**. If that is not the case, so note on your written report.