CSC373: Algorithm Design, Analysis and Complexity, 2012S

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Lectures:	Tues and Thurs, 2:10-3:30pm, SS 2106, start Jan. 10
Tutorials:	Fri 3:10-4:00pm, SS 2106, start Jan. 20.
Course Homepage:	www.cs.toronto.edu/~jepson/csc373
CDF Bulletin Board:	https://csc.cdf.toronto.edu/bb/YaBB.pl
Prof's Office Hours:	Tues and Thurs, after class to 5pm, or by appointment.

Course Description

Brief introduction to NP-completeness: polynomial time reductions, examples of various NP-complete problems, self-reducibility. Standard algorithm design techniques: greedy strategies, dynamic programming, network flows, linear programming, randomization, approximation algorithms, and others (if time permits). Students will be expected to use appropriate algorithm design principles and to show adequate skills at reasoning about the correctness and complexity of algorithms.

Course Texts

- Kleinberg and Tardos, Algorithm Design, Addison Wesley, 2006.
- Lecture notes, posted on course website.
- Both the course homepage and bulletin board are required reading.

Required Background

A second year course in data structures, such as CSC263, is required, covering balanced trees, heaps, hashing, union-find, and runtime complexity. (The course textbook provides a brief review of much of this material.) A second year course in probability, such as STA247, is required for the section on randomized algorithms.

Grading

The mark weighting is 15% on each of four assignments, and 40% on the final exam.

Assignments

Assignments and tests involve theoretical problems and the precise description of algorithms, but no implementation of software.

Read about academic honesty on the links provided on the course homepage.

Late Penalty

Assignments are due at the beginning of the tutorial on the due date (i.e., Fri before 3:10pm). The lateness policy is:

- 7% per day, or any part therof, for up to seven days late.
- 100% after more than seven days late (i.e., after Fri at 3:10pm).

Late assignments must be converted to PDF (perhaps by scanning) and be submitted by email to the instructor. The lateness will be based on the time the assignment is received.

Course Schedule

A tentative schedule for this term is as follows.

Week	Dates	Topic
#1	Jan 10, 12	P, NP, Polynomial Reductions
#2	Jan 17, 19	NP-completeness
#3	Jan 24, 26	NP-completeness, co-NP
	Fri, Jan 27	Assignment #1 Posted.
#4	Jan 31, Feb 2	Greedy Algorithms
#5	Feb 7, Feb 9	Dynamic Programming
	Fri, Feb 10	Assignment #1 Due.
#6	Feb 14, 16	Dynamic Programming
	Fri, Feb 17	Assignment #2 Posted.
	Feb 20-24	Reading Week (no lectures).
#7	Feb 28, Mar 1	Network Flow
	Fri, Mar 2	Assignment #2 Due.
#8	Mar 6, 8	Network Flow
	Fri, Mar 9	Assignment #3 Posted.
#9	Mar 13, 15	Linear Programming
#10	Mar 20, 22	Approximation Algorithms
	Fri, Mar 23	Assignment #3 Due, #4 Posted.
#11	Mar 27, 29	Local Search
#12	Apr 3, Apr 5	Randomized Algorithms.
	Fri, Apr 6	Assignment #4 Due.

The lecture materials closely follows Chapters 4 through 8 and 11 through 13 of the text (we will begin with Chapter 8). In addition, we include extra material on Linear Programming.

What's with the "+" in Allan$_+$?

- First it says thank you to a wonderful soul who donated their kidney to me (Nov. 2008).
- Second it helps raise awareness of organ donation. It can be the gift of life.
- Third it is a reminder that I am immune compromised. Both you and I need to take all reasonable care to avoid contact when sick.