CSC222 Fall 2010
Data Structures & Algorithms II

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Office Hours: Monday and Wednesday 3:00 to 4:00 and by appointment.


Goals:

1. Analysis of algorithms, asymptotic complexity measures

2. Algorithm design strategies: common ideas used in a variety of algorithms
   (a) Divide and conquer / Balancing
   (b) Backtracking
   (c) Greedy algorithms
   (d) Dynamic Programming
   (e) Randomized algorithms: Monte Carlo & Las Vegas

3. Review of Data Structures
   (a) Heaps, heapsort
   (b) Modular arithmetic and hash tables
   (c) Binary search trees, AVL trees
   (d) 2-3 trees
   (e) Boundary tag and buddy system memory management

4. Commonly used algorithms for important problems.
   (a) Finding $k^{th}$ largest element of a set
   (b) Pattern matching (finite automata)
   (c) Graph Algorithms, minimal spanning tree, shortest paths, etc
   (d) The Fast Fourier Transform and the convolution theorem
   (e) Matrix multiplication (Strassen’s algorithm)
   (f) Numerical algorithms: Newton’s method
   (g) Fast (large) integer multiplication (if time)
   (h) RSA encryption

5. The Classes $\mathcal{P}$ and $\mathcal{NP}$, $\mathcal{NP}$-complete problems

6. Correctness proofs and proof by induction

7. Proficiency in using Solaris/Linux/Unix, the Unix development environment(s), vi, emacs, CC, make, dbx, etc.
Expectations:

1. Class participation.
2. Communicate if things get complicated.
3. Your best effort.

Grading:
Three exams (70%), programming assignments and take home problem sets (30%). Expected exam dates are Monday Sept. 27, Monday, Nov. 1, and Wednesday, December 8. Programming assignment(s) must be submitted ready to compile and run under Linux or Solaris.

Disability Notice:
If you have a disability that may require an accommodation for taking this course, then please contact the Learning Assistance Center (758-5929) within the first two weeks of the semester.

Pandemic Planning Notice:
The University has requested that faculty collect personal contact information as part of emergency planning and preparation. The information you provide is strictly confidential.