

CSC222 **Fall 2010**
Data Structures & Algorithms II

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

Text: Algorithms by S. Dasgupta, C. Papadimitriou, and U. Vazirani

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.