

CIS 675, Summer 2009: Prof. Howard Blair

Formulated by: Prof. Kishan Mehrotra - August, 2008

Modified by: Prof. Howard Blair - May, 2009

Prerequisite: We expect that

- You have taken an introductory course in Design and Analysis of Algorithms equivalent to CIS 575.
- You have knowledge of basic mathematics essential for analysis of algorithms, including the concepts of big-O notation and its correct use. For review, consult:

Cormen, Leiserson, Rivest, and Stein: **Introduction to Algorithms**, chapters 1 through 5.

- Other book chapters and sections that you may find helpful for mathematical review:
 - Appendix A (Review of Necessary Mathematics) and Appendix B (Solving Recurrence Equations: With applications to analysis of recursive algorithms) in Foundations of Algorithms by Richard Neapolitan and Kumarss Naimipour)
 - Chapter 1, sections 4, 5,6,7, Chapter 3 all sections, and Chapter 4 section 7 in Fundamentals of Algorithmics by Gilles Brassard and Paul Bratley
- You have introductory knowledge of Divide and Conquer, Dynamic Programming, Greedy algorithms, and basic data structures such as queues, stacks, binary search trees, hashing. You have read and analyzed basic search and sort algorithms, basic greedy algorithms and some dynamic programming algorithms.
- You have introductory knowledge of complexity theory. We expect you to know NP-complete, NP-hard set and the basic concepts behind problem transformation in polynomial time.

Course Coverage: In this course I plan to cover

- Stable-Marriage problem,
- Divide and Conquer examples of Mergesort, Quicksort, Discrete Fourier Transformation, Closest pair of points in a plane, and Convex-hull in a plane,
- Dynamic Programming examples such as 0-1 knapsack in general setting and other possible example(s),
- Some advanced data structures,
- String Matching problem,
- Randomized Algorithms,
- Approximate Algorithms: TSP revisited.

Course grade will depend on: Two in-class exams and a final exam $[E_1, E_2, FE]$. Your minimum course grade is determined by:

$$\max\{(E_1 + E_2 + FE)/3, FE\}$$

Every part of every question is graded on a 4.00 grade scale:

minimum A: 3.67
minimum A-: 3.34
minimum B+: 3.00
minimum B: 2.67
minimum B-: 2.34
minimum C+: 2.00
minimum C: 1.67
minimum C-: 1.64 F: below 1.64