

CS 5633 Syllabus – Spring 2007

Analysis of Algorithms

Models of computation, design techniques such as divide-and-conquer and dynamic programming, graph algorithms, and sets and union-find. Additional topics chosen from pattern matching, integer and polynomial arithmetic, and the fast Fourier transform. Prerequisites: CS 3343 or equivalent. The objectives of this course are to give you an understanding of the basic techniques for analyzing computer algorithms and data structures and to give you practice applying these techniques.

Instructor

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Office Hours: Monday 10-11am, Wednesday 9am-10am, Friday 11am-12, or by appointment

Books

Required: T. Cormen, C. Leiserson, R. Rivest, and C. Stein, *Introduction to Algorithms*, MIT Press, Second Edition, 2001.

Grading

Homework	30%
Midterm	20%
Final Exam	30%
Project	20%

Homeworks (except for PS 3 and PS 6) can be submitted one lecture late with a 10% penalty.

Assignments

6 problem sets will be assigned over the semester. You will have about 2 weeks for each problem set. You will given credit for those problems solved correctly. There will be no partial credit for incorrect solutions; however, you will be given an opportunity to fix your mistakes, and you will get full credit for a problem if your new solution is correct.

In an experiment this semester, the amount of credit you receive for a given homework problem will be based on a system of “inverse proportion grading.” The idea is that you get more credit for solving harder problems. Suppose that m of n students solve problem i . Then each student with the correct answer receives n/m points for that problem. One property of this system is the following. If a homework has 10 problems, each of which is solved by at least one student, then the class average will be 10.

There will be one project in this course. Tentatively, the project will be on balanced binary tree algorithms. Details will be provided during the semester.

All homeworks and projects will be submitted and graded using WebCT.

Attendance and Participation

Regular class attendance per se is not required, but note that the homeworks, labs, and exams will be partly based on the lectures. Make-up exams are permitted as long as it's a reasonable excuse, you inform me in a timely fashion, and you document the excuse.

Tentative Schedule

<u>Day</u>	<u>Topic</u>	<u>Readings and Assignments</u>
Jan. 22	Introduction	§1,§2,§28.2, Problem Set 1 Assigned
24	Order Notation	§3
29	Recurrences	§4
31	Probabilistic Analysis	§5, PS 1 Due, PS 2 Assigned
Feb. 5	Heapsort	§6
7	Quicksort	§7, PS 1 Second Chance
12	Sorting Bounds and Linear Time Sorting	§8
14	Median Algorithms	§9, PS 2 Due, PS 3 Assigned
19	Basic Data Structures	§10
21	Hash Tables	§11, PS 2 Second Chance
26	Binary Search Trees	§12
28	Balanced Search Trees	§13, PS 3 Due
Mar. 5	Review for Midterm	PS 3 Second Chance
7	Midterm	
19	Midterm Results	PS 4 Assigned
21	B-Trees	§18
26	Dynamic Programming	§15
28	Greedy Algorithms	§16
Apr. 2	Amortized Analysis	§17, PS 4 Due, PS 5 Assigned
4	Union-Find Problem	§21
9	Basic Graph Algorithms	§22, PS 4 Second Chance
11	Minimum Spanning Trees	§23
16	Single-Source Shortest Path	§24, PS 5 Due, PS 6 Assigned
18	All-Pairs Shortest Path	§25
23	Flow Networks	§26, PS 5 Second Chance
25	NP-Completeness	§34
30	NP-Completeness	§34, PS 6 Due
May 2	Review	PS 6 Second Chance
May 8	Final Exam: 8pm to 10:45pm	