22C : 231 (CS : 5350) Design and Analysis of Algorithms
Spring 2014

Class Schedule

The course meets 12.30–1.45 pm Tuesday and Thursday at E264 CB (Chemistry Building).

Instructor and Office Hours

Kasturi Varadarajan: 101D MacLean Hall, 335-0732, kasturi-varadarajan@uiowa.edu
Office hours: To be announced at course webpage.

Teaching Assistants

To be announced.

Course Web Page

`www.cs.uiowa.edu/~kvaradar/sp2014/daa.html`. I will also set the ICON page for this course to point to this. Note, however, that some browsers will have issues displaying the page. It is best if you use a direct link to the course page, where homeworks will be posted. Use ICON to look up grades, homework solutions, etc.

Departmental Information

Department of Computer Science, 14 Maclean Hall. The office of the DEO, Prof. Alberto Segre, is located here.

What this Course is About

The course is about developing algorithmic intuition, and learning to communicate algorithms effectively. See Section 0.6 (Lecture 0, Section 6) of Jeff Erickson's notes for an elaboration.

A course description follows, and it is almost identical to last year's. I expect the actual course to differ somewhat, so please take this only as a preliminary course description.

We will practise the precise statement of various computational problems, think about different strategies or algorithms to solve them, reason about their correctness, evaluate these algorithms from the point of view of efficiency (usually running time), and develop a feel for the difficulty of problems and the applicability of various techniques we will learn. It is convenient to organize the course in terms of the following topics:

- Divide-and-Conquer
- Randomized Algorithms
- Dynamic programming

- Greedy Algorithms
- Network Flow
- NP-completeness

We will cover *one or two* other topics, possibly from the following list: exact algorithms for hard problems, approximation algorithms, more of probabilistic algorithms, basic computational geometry algorithms, introduction to linear programming.

We will rely on lecture notes. For starters, we will use the notes from Jeff Erickson at `http://www.cs.uiuc.edu/~jeffe/teaching/algorithms/`.

Prerequisites

We will assume some comfort with counting and estimating things (the kind we learn in discrete structures), some experience with writing programs, and some experience with estimating and communicating running time (for example, what it means to say "this algorithm's worst case running time is $O(n^2)$"). We will also assume that when we talk about algorithms, you are comfortable at seeing how they might translate into programs. Computer science undergrads typically pick these skills up in their data structures course.

It helps helps to have also been exposed to an undergraduate algorithms course, in particular, to topics such as graph exploration (breadth first search, depth first search), and shortest path algorithms. Beyond this, we won't assume familiarity with specific topics, but rather hope for a certain maturity.

Grading

The grading will be based on about seven homeworks (35 percent), a midterm (25 percent), and a final (40 percent). One or two of the homeworks will be based on programming

The policy on late homeworks is that you have a quota of three days for the entire semester that you may use for late submissions. So for example, there will be no penalty if you submit the third homework a day late, the fifth two days late, and the rest of the homeworks on time. Once you use up your quota of three days, any homework submitted late will not be accepted and you will get 0 points for that homework.

When you submit a homework X days late, your quota gets decreased by X irrevocably. You can only be late by an integer number of days – if you submit 10 hours after the deadline, for example, your quote is depleted by one day.

Exam Dates

The midterm will be on Thursday, March 13, in class. The final will be during finals week; the time and place will be announced after the Registrar's office determines it.

Collaboration

No collaboration is allowed on the exams. For homework problems, collaboration is alright. We even encourage it, assuming each of you has first spent some time (about 45 minutes) working on the problem yourself. However, no written transcript (electronic or otherwise) of the collaborative discussion should be taken from the discussion by any participant. It will be assumed that each of you is capable of orally explaining the solution that you turn in, so do not turn in something you don't understand.

Administrative Home

The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS Student Academic Handbook.

Accomodations for Disabilities

A student seeking academic accommodations should first register with Student Disability Services and then meet privately with the course instructor to make particular arrangements.

Academic Fraud

Plagiarism and any other activities when students present work that is not their own are academic fraud. Academic fraud is a serious matter and is reported to the departmental DEO and to the Associate Dean for Undergraduate Programs and Curriculum. Instructors and DEOs decide on appropriate consequences at the departmental level while the Associate Dean enforces additional consequences at the collegiate level. See the CLAS Academic Fraud section of the Student Academic Handbook.

Making a Suggestion or a Complaint

Students with a suggestion or complaint should first visit the instructor, then the course supervisor, and then the departmental DEO. Complaints must be made within six months of the incident. See the CLAS Student Academic Handbook.