Design and Analysis of Algorithms (CS:5350)
Spring 2018

Class Schedule

The course meets 9:30–10:45 am Tuesday and Thursday at 221 MLH (MacLean Hall).

Instructor and Office Hours

Kasturi Varadarajan: 101D MacLean Hall, 335-0732, kasturi-varadarajan@uiowa.edu
Office hours: Monday 3:00–4:30, Wednesday 1:30–3:00.

Teaching Assistant

Tanmay Inamdar: tanmay-inamdar@uiowa.edu
Office hours: To be announced at course webpage.

Course Web Page

`www.cs.uiowa.edu/~kvaradar/sp2018/daa.html`. I will publish this url on ICON as well. This page is where the homeworks will be posted. Use ICON to look up grades, homework solutions, etc.

What this Course is About

We will practice 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

- Network Flow

- NP-completeness

Topics like Divide-and-Conquer and Dynamic Programming are also covered in most undergraduate algorithms courses. Our treatment of such topics will therefore be at a faster pace, and aim to cover more material. We may 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.

Throughout the course, we will focus on developing algorithmic intuition and learning to communicate algorithms effectively.

The above course description is preliminary, and the actual course may have small variations.

We will rely on lecture notes, mostly the ones from Jeff Erickson at
`http://www.cs.illinois.edu/~jeffe/teaching/algorithms/`.

Prerequisites

Undergraduate Algorithms is the official prerequisite.

More specifically, 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 and algorithms courses.

From undergraduate data structures and algorithms courses, we will assume familiarity with basic data structures, topics such as sorting, graph exploration (breadth first search, depth first search), and shortest path algorithms. Beyond this, we won't assume familiarity with specific topics, but will instead assume a certain (grad-level) maturity.

Grading

The grading will be based on (approximately) six homework assignments (35 percent), a midterm (25 percent), a final (35 percent), and class participation (5 percent). One or two of the homework assignments will be based on programming.

The policy on late homework 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 homework assignment 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 29, 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, assuming each of you has first spent some time (about 30 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.

Departmental Information

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

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 at
https://clas.uiowa.edu/students/handbook.

Electronic Communication

University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences (Operations Manual, III.15.2, k.11).

Accomodations for Disabilities

The University of Iowa is committed to providing an educational experience that is accessible to all students. A student may request academic accommodations for a disability (which includes but is not limited to mental health, attention, learning, vision, and physical or health-related conditions). A student seeking academic accommodations should first register with Student Disability Services and then meet with the course instructor privately in the instructor's office to make particular arrangements. Reasonable accommodations are established through an interactive process between the student, instructor, and SDS. See https://sds.studentlife.uiowa.edu/ for information.

Nondiscrimination in the Classroom

The University of Iowa is committed to making the classroom a respectful and inclusive space for all people irrespective of their gender, sexual, racial, religious or other identities. Toward this goal, students are invited to optionally share their preferred names and pronouns with their instructors and classmates. The University of Iowa prohibits discrimination and harassment against individuals on the basis of race, class, gender, sexual orientation, national origin, and other identity categories set forth in the University?s Human Rights policy. For more information, contact the Office of Equal Opportunity and Diversity, diversity@uiowa.edu, or visit diversity.uiowa.edu.

Academic Honesty

All CLAS students or students taking classes offered by CLAS have, in essence, agreed to the College's Code of Academic Honesty: "I pledge to do my own academic work and to excel to the best of my abilities, upholding the IOWA Challenge. I promise not to lie about my academic work, to cheat, or to steal the words or ideas of others; nor will I help fellow students to violate the Code of Academic Honesty." Any student committing academic misconduct is reported to the College and placed on disciplinary probation or may be suspended or expelled (CLAS Academic Policies Handbook).

CLAS Final Examination Policies

The final examination schedule for each class is announced by the Registrar generally by the fifth week of classes. Final exams are offered only during the official final examination period. No exams of any kind are allowed during the last week of classes. All students should plan on being at the UI through the final examination period. Once the Registrar has announced the date, time, and location of each final exam, the complete schedule will be published on the Registrar's web site and will be shared with instructors and students. It is the student's responsibility to know the date, time, and place of a final exam.

Making a Suggestion or a Complaint

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

Understanding Sexual Harassment

Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Office of the Sexual Misconduct Response Coordinator for assistance, definitions, and the full University policy.

Reacting Safely to Severe Weather

In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Department of Public Safety website.

Other Accommodations

For accommodations required as a consequence of illness, religious obligations, or other unavoidable circumstances, the students are directed to contact the instructor.