

CS 584/684 Algorithm Analysis and Design - Spring 2017 - Syllabus

Course web page: <http://www.cs.pdx.edu/~apt/cs584>

Instructor:

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Description

An advanced in-depth study of the design and analysis of algorithms.

Topics (tentative)

Divide-and-conquer; Computational geometry; Parallel algorithms; Probabilistic algorithms and analysis; Dynamic programming; Greedy algorithms; Amortized analysis; Disjoint set algorithms; Graph algorithms; NP-completeness and approximation.

Texts

CLRS = Cormen, Leiserson, Rivest, and Stein, *Introduction to Algorithms*, 3rd ed., MIT Press, 2009.

Additional readings available from the web may be required from time to time.

Lectures notes will be made available on the course web page *after* the relevant lecture(s), on a roughly weekly basis.

Prerequisites

CS350 or equivalent, e.g. CLRS Chapters 1-4, 6-13, 22 (excluding starred sections). Students should have basic familiarity with asymptotic notation and mathematical techniques for computing asymptotic algorithm complexity, and with standard algorithms and data structures for sorting and searching. Also, students should be able to program fluently in at least one high-level language such as Python, Java, C, or Haskell.

Grading

Grading will be as follows:

- 5% on weekly quizzes;
- 40% on weekly homeworks;
- 25% on in-class midterm;
- 30% on final exam.

Homework

There will be weekly homework assignments, which will include exercises in algorithm design and analysis, and (often) at least one problem requiring programming. Programs can be written in the language of your choice (within reason; consult with the instructor and TA if in doubt). With the exception of the programs, all assignment submissions *must be type-set using L^AT_EX* and submitted (by email) in `.tex` and `.pdf` formats.

Schedule

The class meets each Monday and Wednesday from 2:00-3:40pm. Reading specified for each week should be done before the Monday meeting. There will be a quiz on the reading on most Mondays.

A typical reading assignment will be one or two chapters from CLRS. There will be a few additional assigned readings made available on the web.

Homework assignments will be issued on Wednesdays and due (by email) the following Wednesday at noon.

All dates, including assignment deadlines, are highly **subject to change** (especially the topics).

Date	Reading	Topics	
Apr	3 & 5	CLRS 9	introduction; divide-and-conquer; selection
	10 & 12	CLRS 33	computational geometry
	17 & 19	CLRS 27	multi-threaded algorithms
	24 & 26	CLRS 5, Skip Lists	probabilistic algorithms
May	1 & 3	CLRS 15	dynamic programming
	8		Midterm Exam (in class)
	10	CLRS 16,23	greedy algorithms; minimum spanning trees
	15 & 17	CLRS 17,21	amortized analysis; disjoint sets
	22 & 24	CLRS 25,26	shortest paths; max flow and min cut
	29		Memorial Day – No Class
	31	CLRS 34	NP-completeness
Jun	5 & 7	CLRS 35	approximation; review
	14		Final Exam (Wednesday starting at 12:30 pm)

Computing Facilities

Some of the homework problems will require writing and testing code in any of a variety of languages. Students who lack their own facilities for doing this may use the CS department's linuxlab machines. You should already have accounts on these machines; your account can be activated by taking your PSU id to FAB 82-01.

Staying In Touch

All students should subscribe to the course's mailing list cs584list@cs.pdx.edu; the subscription page for this list is accessible from the course web page. The instructor will use this list to communicate important announcements, homework hints, etc. Students may also use this list to alert the class to information of general interest (but see the next section).

Individual Work

All homework assignments, exams, and quizzes must represent your own, individual work. It is permissible to discuss assignments with other students, but the solutions must be recognizably your own. *Do not, under any circumstances, copy another person's work and submit it as your own.* Writing code for use by another or using another's code or solutions in any form (even with their permission) will be considered cheating. Also, please do not make your solutions publicly available (e.g. on a mailing list, on GitHub, etc.). Cheating on an assignment, exam, or quiz will result in an automatic zero grade for that piece of work, and the initiation of disciplinary action at the University level.

Disabilities

If you are a student with a disability in need of academic accommodations, you should register with Disability Services for Students and notify the instructor immediately to arrange for support services.