CSE 632: Analysis of Algorithms II: Randomized Algorithms (Fall 2019)

Administrivia

Lecturer: Shi Li

Department of Computer Science and Engineering
University at Buffalo

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- Course Webpage (contains schedule, policies, homeworks and slides):
  http://www.cse.buffalo.edu/~shil/courses/CSE632/

- Please sign up course on Piazza via link on course webpage
  - announcements,
  - polls
  - asking/answering questions
  - posting solutions

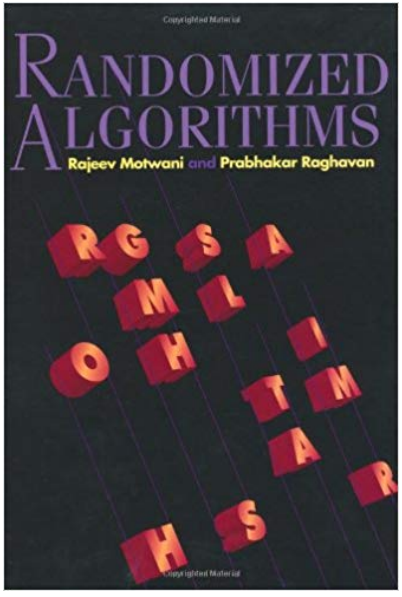
CSE 431/531: Algorithm Analysis and Design

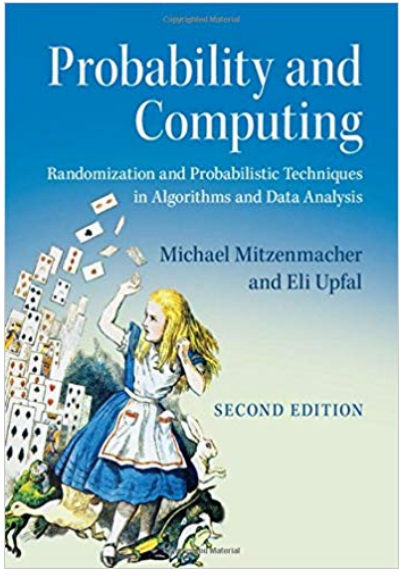
- Time and location:
  - WeFr 11:00am-12:20pm
  - Talbert 103
- Instructor:
  - Shi Li, shil@buffalo.edu
  - Office hours: Wednesdays 2:00pm-3:00pm (and by appointments), Davis 328,

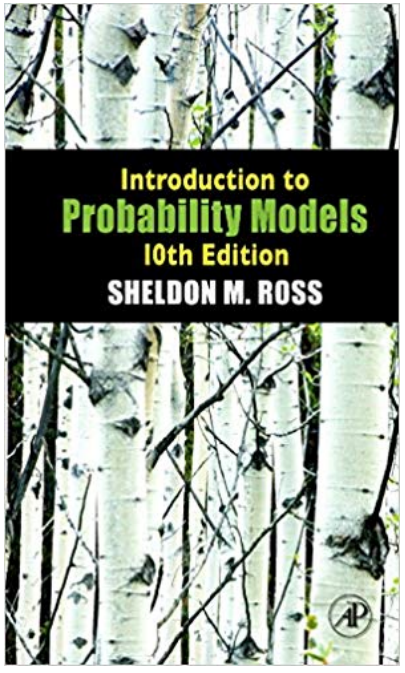
Prerequisites

- CSE431/531: Analysis of Algorithm I.
  - Asymptotic Notations
  - Algorithms for classic problems such as sorting, shortest paths, minimum spanning trees, etc.
  - Meta techniques to design algorithms such as greedy algorithms, divide and conquer and dynamic programming
  - How to analyze algorithms: correctness, running time
- Some knowledge of probability theory

Recommended Textbooks







- Rajeev Motwani and Prabhakar Raghavan. Randomized Algorithms. Cambridge University Press, Cambridg England, June 1995.
- Michael Mitzenmacher and Eli Upfal. Probability and Computing. Cambridge University Press, 2nd edition, 2017.
- Sheldon M. Ross. Introduction to Probability Models. Academic Press, Inc., 10th edition, 2009.

Tentative Schedule (28 Lectures)

- Introduction (5 lectures)
  - logistics, introduction
  - a sample of randomized algorithms
  - basic probability theory, balls and bins
- More Classic Randomized Algorithms (4 lectures)
  - universal hashing, randomized quicksort
  - ...
- Tail Bounds and Applications (6 lectures)
- Markov Chains (5 lectures)
- Advanced Topics (6 lectures)
- Final Review + Final Exam (Friday, December 6)

Grading

- Participation: 20%
- Scribe notes: 20%
  - each one of you will need to take notes for 2 lectures
  - type using Latex (template will be provided)
- Homeworks: 30%
  - 5 homeworks, each worth 6%
  - due in 2 weeks after post date, except for the last homework
- In Class Final Exam: 30%
  - closed-book

For Homeworks, You Are Allowed to

- Use course materials (textbooks, lecture notes)
- Post questions on Piazza
- Ask me for hints during office hours or on Piazza
- Discuss with classmates
  - Think about each problem for enough time before discussions
  - Try to get the ideas, instead of solutions, from discussions
  - Must write down solutions on your own, in your own words
  - Write down names of students you discussed with

For Homeworks, You Are Not Allowed to

- google or ask questions online for solutions
- read posted solutions from online forums or other course webpages
- copy solutions from other students

Questions?

Remember to sign up on Piazza.