CSE 2331 - Foundations II: Data Structures and Algorithms

Lectures: MoWeFr 12:40PM–1:35PM, BO0313
Instructor: Luis Rademacher
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Web page: Go to `http://www.cse.ohio-state.edu/~lrademac/`, then "Teaching", then "Au13".
Office hours: W 3:00pm–4:00pm or by appointment.
Grader: to be announced.

Textbook: Introduction to Algorithms, Second or Third Edition by Cormen, Leiserson, Rivest and Stein

Other optional books:

- Algorithms by S. Dasgupta, C.H. Papadimitriou, and U.V. Vazirani (free draft available).
- Course notes by Rephael Wenger. Order from SBX (or directly from `www.zippublishing.com`.)

Prerequisites

2231 (Software II: Software Development and Design) or 321, and 2321 (Foundations I: Discrete Structures) or Math 566, and Stat 3460 (Principles of Statistics for Engineers), 3470 (Introduction to Probability and Statistics for Engineers), or 427. Concur: Math 3345. Not open to students with credit for 5331 (680).

About the course

The course is not superficial: The course demands basic mathematical maturity and will involve some proofs.

Topics (tentative)

1. Asymptotic notation review (CLRS, Chapter 3).
2. Analyzing algorithms review (CLRS, Chapters 1, 2).
3. Recurrence relations (CLRS, Sections 4.1, 4.2).
4. Probabilistic analysis (CLRS, Chapter 5).
5. Quicksort (CLRS, Chapter 7).
6. Median find (CLRS, Chapter 9).
7. Hashing (CLRS, Chapter 11).
8. Heaps (CLRS, Sections 6.1-6.4).
9. Binary Search Trees (CLRS, Chapter 12).
10. Red Black Trees (CLRS, Chapter 13).
11. Topological sort (CLRS, Section 22.5).
12. Minimum spanning trees (CLRS, Chapter 23).
13. Shortest paths (CLRS, Section 24.3).
14. Maximum Flow (CLRS, Sections 26.1-26.3).
15. Table doubling (CLRS, Sections 17.4).
16. Union-find data structures (CLRS, Chapter 21).
17. NP-completeness (CLRS, Chapter 34).

Grading (tentative)

Homework every one to two weeks. May include some programming. No late homework will be accepted. For homework, collaboration is allowed, but every student must write and submit his or her own solutions, and include an explanation of any such collaboration. Looking for solutions from external sources (books, the web, etc.) is prohibited.

Two midterms (9/27 and 11/1) and one final exam.

Formula (tentative): 20% homework, 20% each midterm, 40% exam.