

Lecture #1: Tuesday, 4 January 2000
Topics: Course Outline

Course Outline

January

- Tue 4 Administrivia. Introduction: models of computation, O -notation.
Reading: Section 1.1, Chapter 2.
- Thu 6 Insertion sort and mergesort, divide and conquer, recurrences.
Reading: Sections 1.2-3. Section 4.1
- Tue 11 Quicksort, Strassens' algorithm, more on summations and recurrences.
Reading: Sections 8.1-2, 31.2. Sections 4.2-3, (Chapter 3 should be read as needed during the quarter.)
- Thu 13 Randomized algorithms: randomized quicksort, probability.
Reading: Sections 6.1-3, 8.3-4, (Chapter 5 should be read as needed during the quarter.)
- Tue 18 Sorting: median, order statistics.
Reading: Chapter 10.
- Thu 20 Sorting: heapsort, priority queues, set manipulation.
Reading: Chapter 7.
- Tue 25 Sorting: lower bounds, counting sort, radix sort.
Reading: Chapter 9.
- Thu 27 Data structures: hashing, collision resolution, chaining, universal hashing, open addressing.
Reading: Chapter 12.

February

- Tue 1 Data structures: binary search trees, tree walks, relation to quicksort.
Reading: Chapter 13.

- Thu 3 Data structures: red-black trees, rotations, insertion, deletion.
Reading: Chapter 14.
- Tue 8 Mid-term examination, in class, closed book.
- Thu 10 Augmenting data structures: dynamic order statistics, interval trees.
Programming Problem handed out.
Reading: Chapter 15.
- Tue 15 Dynamic programming: optimal binary search trees, longest common subsequence.
Reading: Chapter 16.
- Thu 17 Greedy algorithms: activity selection. Introduction to graph algorithms: representation, breadth-first search.
Reading: Section 17.1-3, 23.1-2.
- Tue 22 Graph algorithms: minimum-spanning tree algorithms, Prim's algorithm, Kruskal's algorithm.
Reading: Chapter 24.
- Thu 24 Graph algorithms: depth-first search, topological sort.
Reading: Section 23.3-4.
- Tue 29 Graph algorithms: Single-source shortest paths, Dijkstra's algorithm, Bellman-Ford algorithm, difference constraints.
Reading: Chapter 25.

March

- Thu 2 Graph algorithms: all-pairs shortest paths, matrix multiplication, Floyd-Warshall algorithm.
Reading: Chapter 26.
- Tue 7 Flow networks; the Ford-Fulkerson Algorithm; Bipartite matching.
Reading: Chapter 27.
Programming Problem due.
All homeworks due by this date.
- Thu 9 Special end-of-class lecture.
Reading: None.