

CS 126
 Analysis of Algorithms
 West Virginia University
 Department of Statistics and Computer Science
 Syllabus
 August 18, 1997

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Prerequisites

Computer Science 26 and Statistics 201

Text

Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest
 Introduction to Algorithms
 1990, MIT Press

You should plan to read each of chapters 1, 2, 3, 4, 7, 8, 9, 10, 17, 23, 24, 25, 26, and 27 of the text three times: once before the lecture on a particular section, once shortly after that lecture, and once before the test on that chapter.

Grading

4 tests at $16\frac{2}{3}\%$

1 final exam at $33\frac{1}{3}\%$

All tests and the final exam will be closed book, closed notes.

text	topic	date
1	Introduction	Tuesday, August 19 Thursday, August 21
2.1	Growth of functions: asymptotic notation	Tuesday, August 26
2.2	Growth of functions: standard notations and common functions	Thursday, August 28
3.1	Summation: formulas and properties	Tuesday, September 2
3.2	Summation: bounding summations	
	TEST 1 (chapters 1, 2, 3)	Thursday, September 4
4.1	Recurrences: the substitution method	Tuesday, September 9
4.2	Recurrences: the iteration method	
4.3	Recurrences: the master method	
7.1	Heapsort: heaps	Thursday, September 11
7.2	Heapsort: maintaining the heap property	
7.3	Heapsort: building a heap	
7.4	Heapsort: the algorithm	Tuesday, September 16
7.5	Heapsort: priority queues	
8.1	Quicksort: description	Thursday, September 18
8.2	Quicksort: performance	
8.3	Quicksort: randomized versions	
8.4	Quicksort: analysis	

9.1	Sorting in linear time: lower bounds for sorting	Tuesday, September 23
9.2	Sorting in linear time: counting sort	
	TEST 2 (chapters 4, 7, 8)	Thursday, September 25
9.3	Sorting in linear time: radix sort	Tuesday, September 30
9.4	Sorting in linear time: bucket sort	Thursday, October 2
10.1	Medians and order statistics	Tuesday, October 7
10.2	Medians and order statistics: selection in expected linear time	
10.3	Medians and order statistics: selection in worst-case linear time	
17.1	Greedy algorithms: an activity-selection problem	Thursday, October 9
17.2	Greedy algorithms: elements of the greedy strategy	
17.3	Greedy algorithms: Huffman codes	Tuesday, October 14
	TEST 3 (chapters 9, 10, 17)	Thursday, October 16
23.1	Elementary graph algorithms: representations of graphs	Tuesday, October 21
23.2	Elementary graph algorithms: breadth-first search	
23.3	Elementary graph algorithms: depth-first search	Thursday, October 23
23.4	Elementary graph algorithms: topological sort	
23.5	Elementary graph algorithms: strongly connected components	Tuesday, October 28
24.1	Minimum spanning trees: growing a minimum spanning tree	Thursday, October 30
24.2	Minimum spanning trees: the algorithms of Kruskal and Prim	
	TEST 4	Tuesday, November 4
25.1	Single-source shortest paths: shortest paths and relaxation	Thursday, November 6
25.2	Single-source shortest paths: Dijkstra's algorithm	Tuesday, November 11
25.3	Single-source shortest paths: the Bellman-Ford algorithm	Thursday, November 13
25.4	Single-source shortest paths in directed acyclic graphs	
25.5	Single-source shortest paths: difference constraints and shortest paths	
26.1	All-pairs shortest paths: shortest paths and matrix multiplication	Tuesday, November 18
26.2	All-pairs shortest paths: the Floyd-Warshall algorithm	
26.3	All-pairs shortest paths: Johnson's algorithm for sparse graphs	
	Test 4 chapters 24, 25, 26 (except 26.4)	Thursday, November 20
27.1	Maximum flow: flow networks	Tuesday, December 2
27.2	Maximum flow: the Ford-Fulkerson method	Thursday, December 4
27.3	Maximum flow: maximum bipartite matching	