CS 758/858: Algorithms

Summary

http://www.cs.unh.edu/~ruml/cs758

Summary

What We've Covered

			sorting		
1	1	Aug 27	big-O, sorting	2, 3	
	2	Aug 29	more sorting	8	
2	3	Sep 3	heaps	7, 6	asst 1 (radix sort)
			searching		
	4	Sep 5	hashing	11, 16	asst 2 (quicksort) due Sep 7
3	5	Sep 10	binary trees	12	
	6	Sep 12	red-black trees	13	asst 3 (babbler)
4	7	Sep 17	red-black deletion		
	8	Sep 19	tries		asst 4 (I/O scheduling)
			optimization		
5	9	Sep 24	dynamic programming	14	
	10	Sep 26	knapsack		asst 5 (spelling correction)
6	11	Oct 1	more DP		
	12	Oct 3	parsing		asst 6 (sequence alignment)
7	13	Oct 8	greedy	15	
			graphs		
	14	Oct 10	graph traversal	20	asst 7 (parsing)
8	[no lecture Oct 15: Monday schedule]				
		Oct 17	Midterm Exam (in class)		
9	15	Oct 22	union-find, components	19	asst 8 (algorithm design)
	16	Oct 24	spanning trees	21	
10	17	Oct 29	shortest paths	22	asst 9 (MST halftoning)
	18	Oct 31	all pairs paths	23	
11	19	Nov 5	network flow	24	asst 10 (route planning)
	20	Nov 7	matching, LPs	24.3, 29	
			NP-completeness		
12	21	Nov 12	NP-completeness	34	asst 11 (flow)
	22	Nov 14	satisfiability		
13	23	Nov 19	clique		asst 12 (NP proof)
	24	Nov 21	undecidability		
			coping with NP-completeness		
14	25	Nov 26	approximation	35	asst 13 (NP proof)
	[no lecture Nov 28 or recitation Nov 29: Thanksgiving]				
15	26	Dec 3	backtracking		
	27	Dec 5	wildcard slot		asst 14 (algorithm design)
		Dec 11	Final Exam, 3:30pm–5:30pm? (finalized by registrar in Nov)		

How to Choose an Algorithm

- running time
- memory use
- solution quality (for optimization problems)
- guarantees on time, memory, or cost
- implementation complexity
  - correctness of algorithm & implementation
  - ease of testing
  - time to write
  - ease of maintenance
- generality
- popularity
  - ease of maintenance
  - correctness
- input required

Everything Else

- topics
  - geometry
  - strings
  - cryptography
  - numerical analysis
  - FFT
- approaches
  - randomized algorithms
  - on-line algorithms
  - parallel, distributed
  - cache-oblivious
  - external memory
  - models: quantum, DNA

Break

- final exam: Wed Dec 11, 3:30-5:30pm, Kingsbury N121
- no books, notes, gadgets, ...
- covers entire class with emphasis since midterm

Feedback

We do read these.
They are anonymous and public.

There should be one for me and one for the TA — please fill out both!

Assignment most in need of revision?

Wildcard

Time for the wildcard topic!