CSE 373
Winter 2009

Looking Back,
Looking Forward

Today's Outline

- **Announcements**
  - Final Exam – next Tues March 17th, 2:30-4:20
  - Ruth's Office Hours: (if these don't work send me email)
    - Monday March 9h 4-5pm
    - Tuesday March 17th 1-2pm
- **Sorting**
- **Review**
- **Course Evaluations**

Final Exam

- **Final Exam, Tuesday March 17, 2009.**
- 2:30 - 4:20pm in MUE 153 (Our regular lecture room)
- Exam policies
  - Closed book, closed notes. No Calculators allowed.
  - The exam begins promptly at 2:30pm and ends at 4:20pm.
- The Final exam is cumulative, although a bit more weight will be given to topics covered since the second midterm.

More Computer Science Courses!!

- CSE 410 Computer Systems (Spring 2009) (Operating Systems & Architecture)
- CSE 413 Programming Languages and their Implementation
- CSE 415 Artificial Intelligence
- CSE 417 Algorithms and Complexity

Overview and Goals

(From first day handout)

Achieve an understanding of fundamental data structures and algorithms and the tradeoffs between different implementations of these abstractions. Theoretical analysis, implementation, and application. Lists, stacks, queues, heaps, dictionaries, maps, hashing, trees and balanced trees, sets, and graphs. Searching and sorting algorithms.

Midterm #1

- Stacks and Queues, array and list implementations.
- Asymptotic analysis, Big-O. Worst case, upper bound, lower bound, analyzing loops, recurrences, amortized complexity.
- Trees – definitions
- Dictionary ADT
- Binary search trees – Inorder, preorder, postorder traversals, insert, delete, find.
- AVL trees - Single and double rotations, insert, find.

Midterm #2

- Binary Heaps - Findmin, Deletemin, Insert. Additional operations of increase, decrease, buildheap.
- D-heaps - Findmin, Deletemin, Insert. Additional operations of increase, decrease, buildheap.
- Leftist Heaps and Skew Heaps - Findmin, Deletemin, Insert. Additional operations of merge, increase, decrease
- Disjoint Union/Find. Up-trees. Weighted union (union by size) and path compression.
- The memory hierarchy. Temporal and spatial locality. Data structure choice and the memory hierarchy.
- B-trees. Motivation, choice of M and L, Insert (no delete).
- Hashing. Properties of good hash functions. Selecting hash table size. Separate chaining and open addressing. Linear Probing, Quadratic Probing, & Double Hashing to resolve collisions. Rehashing.

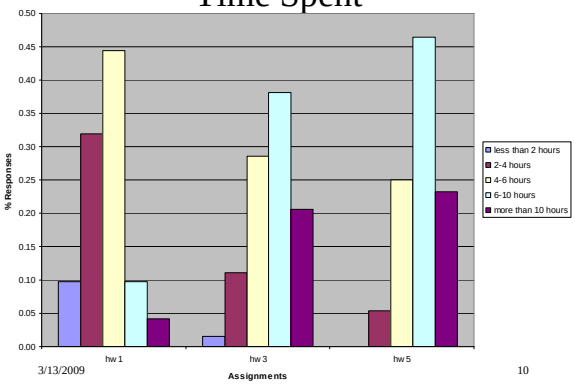
Since Midterm #2

- Graphs. Directed and undirected. Adjacency list and adjacency matrix representations.
- Topological sorting.
- Graph searching. Depth-first, breadth-first search.
- Shortest paths. Dijkstra's algorithm. Greedy Algorithms.
- Minimum spanning tree, Prim's and Kruskal's algorithms.
- Sorting. Insertion sort, Selection sort, Heap sort, Merge sort, Quicksort.
- Bucket sort, Radix sort. Lower bound on comparison sorting. In-place sorting. Stable sorting.

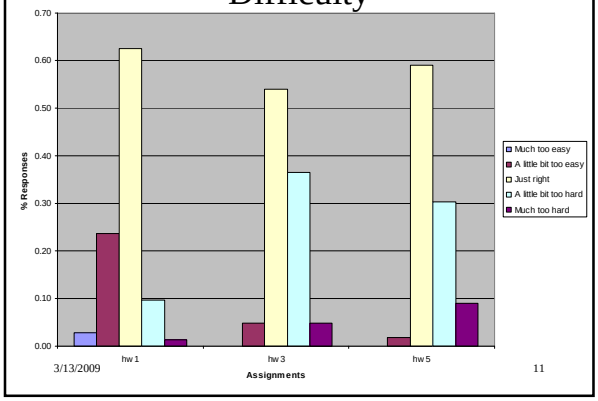
Overview

- ADT – what it is, why we have them, how to compare implementations
- Comparisons – Running time, Space, Big-O, Data Locality
- Tradeoffs – Pointers, Arrays
- Algorithm Design – Iteration, Recursion, Greedy Algorithms

Time Spent



Difficulty



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