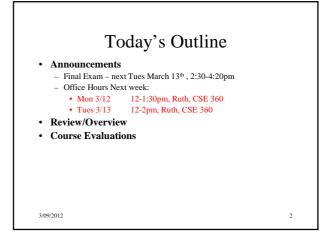
# **CSE 373** Winter 2012

Looking Forward, Looking Back

3/09/2012



## **Final Exam**

- Final Exam, Tuesday, March 13th, 2012
- 2:30 4:20pm in 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 more weight will be given to topics covered since the second midterm.

3/09/2012

# **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.

#### Topics

- 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.

3/09/2012

Topics (cont.)

- Binary Heaps Findmin, Deletemin, Insert. Additional operations of increase, decrease, buildheap.
- D-heaps Findmin, Deletemin, Insert. Additional operations of increase, decrease, buildheap.
- Disjoint Union/Find. Up-trees. Weighted union (union by size) and path compression.
- 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.
- The memory hierarchy. Temporal and spatial locality. Data structure choice and the memory hierarchy.

3/09/2012

3/09/2012

# Topics (cont.)

 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.
- Sorting. Insertion sort, Selection sort, Heap sort, Merge sort, Quicksort. Lower bound on comparison sorting. In-place sorting. Stable sorting. Bucket sort, Radix sort.
- B-trees. Motivation, choice of M and L, Insert & delete.

3/09/2012

### Concepts

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

3/09/2012

