Final Review
About that exam

- Saturday, April 20, 8:30-11:00am in B9201
- Similar in style to written midterm exam
  - May include (a little) coding on paper
  - About 1.5 times as long as midterm
  - See sample final via email
- Final exam is cumulative
  - More weight on latter half
- Closed-book, etc.
Exam Content

- Exam will cover almost all material in assignments and labs
  - Except templates, operator overloads
- Exam will cover almost all material in lecture slides
  - Details of exceptions to follow
Abstract Data Types
Data Structures
Stacks
Queues
  - Array and Linked List implementations
  - Dynamic (heap) versus Static (stack) memory
Object-oriented design principles
  - Basics of classes

Pointers

Memory management
  - Dangling pointers
  - Memory leaks
O-notation and Sorting

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- Methods for analyzing time efficiency
  - O-notation
  - And others
- Best, worst, average case
- Sorting
  - Insertion sort
  - Selection sort
  - Quicksort
Recursion cmpt225recursive

- Thinking recursively
- Formulating recursive solutions to problems
- Writing recursive functions
- Efficiency of recursive functions
- MergeSort
Definitions
- Trees, perfect trees, complete trees

Tree traversals
- In-order, pre-order, post-order

Binary search tree
- Insertion, deletion, search algorithms
Red-black trees

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- Balanced trees
  - Definition of red-black tree
  - Properties of red-black trees
    - No proofs, but you should have intuitive understanding
- Tree rotations
- Red-black tree algorithms
  - Don’t need full algorithm in your head, but you should be able to follow the examples in the slides
Hashing cmpt225_7hash

- Hash tables
- Hash functions
- Resolving collisions
  - Open addressing
    - Linear probing, quadratic probing, double hashing
  - Separate chaining
Heaps and Priority Queues

- ADT priority queue
- Heap data structure
- Heap algorithms
  - Insertion, removal
  - BubbleUp and BubbleDown
  - Heap implementation using an array
- Heapsort
External Storage

- Disk access versus memory access
- Algorithms focus on minimizing disk accesses
  - NOT: M-way trees, B-trees
- External sorting
  - Mergesort
  - Why are other algorithms slow?
THE END

- Thanks for all your hard work this term!
- Good luck on the exam