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

cmpt225_2stack

- Abstract Data Types
- Data Structures
- Stacks
- Queues
  - Array and Linked List implementations
- Dynamic (heap) versus Static (stack) memory

cmpt225objects, cmpt225_pointers

- Object-oriented design principles
  - Basics of classes
- Pointers
- Memory management
  - Dangling pointers
  - Memory leaks

O-notation and Sorting cmpt225_4onotation

- 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

Trees cmpt225trees

- Definitions
  - Trees, perfect trees, complete trees
- Tree traversals
  - In-order, pre-order, post-order
- Binary search tree
  - Insertion, deletion, search algorithms

Red-black trees cmpt225_6red_black

- 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 cmpt225_8heaps

- 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