

Final Review

Announcement

- Final Exam
 - Wednesday, February 25, 2004
 - 8:00am – 10:00 am
 - 70-3435

What we covered this quarter

- Inheritance
- Exceptions
- Java I/O
- Recursion
- Analysis of Algorithms
- Searching
- Sorting
- Trees
- Hashing
- Linked Lists
- Intellectual Property and Ethics

Exam 1 Started Here

Inheritance

- Subclasses
- Protected Data/Methods
- Abstract Classes / Methods
- Interfaces
- Polymorphism

Exceptions

- Indicate when something goes wrong.
- Exceptions are objects
 - Subclasses indicate specific type of exceptions.
- try/catch/finally
- Throwing vs. passing up the stack

Exam 2 Starts Here

Java I/O

- 4 Base I/O Classes
 - Reader, Writer, InputStream, OutputStream
- Subclasses
 - Define sources and sinks
- Wrapper Classes
 - Add additional functionality to base classes
 - BufferedReader, InputStreamReader
- Multitude of IOExceptions

Recursion

- Test, Stop, Continue
- Tracing recursion on the call stack



Analysis of Algorithms

- Complexity
 - What happens to running time as data set gets larger
 - Big O = upper bounds
 - Big Theta = tight bounds
 - Calculating Complexity
 - Consecutive operations
 - Use largest complexity of all tasks
 - Looping
 - Must multiply complexity of inner loop by complexity of outer loop.

Searching

- Linear Search
 - $O(n)$
- Binary Search
 - $O(\log n)$

Sorting

- Simple Sorts ($O(n^2)$)
 - Insertion Sort
 - Bubble Sort
 - Selection Sort
- Divide and Conquer Sorts ($O(\log n)$)
 - Mergesort
 - Quicksort
- Special Sorts
 - Countsort

Untested Material

Trees

- Terminology
 - Node, Root, Leaf, Depth, Level, Parent, Child, Sibling
- Traversals
 - Breadth first, inorder, postorder, preorder
- Binary Trees
 - Full, Complete
- Trees and Recursion

Trees

- Examples of Trees
 - Expression Trees
 - Binary Search Trees
 - Huffman Trees

Hashing

- Hashing Function converts object into index into array (hashtable)
- Collision
 - When two objects hash to same value
 - Collision strategies
 - Open hashing
 - Linear Probing
 - Double Hashing
 - Closed (Chained) Hashing

Linked Lists

- Single Linked List
- Double Linked List
- List Operations
 - Find
 - Add/Insert
 - Remove
- Lists vs. Arrays

Intellectual Property

- IP Protection
 - Trade Secrets
 - Trademarks
 - Copyright
 - Patents
- Free Software
- Ethics

Remember

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Questions?

- Will get project back at final exam
- All the best during exam week.
- Hope to see you again in future classes