Welcome!

CMPSCI 187

Programming With Data Structures

About

Introducing and developing methods for using, designing, and implementing abstract data types using the Java programming language.

Overview

- Part 1: Overview & Abstract Data Types
- Part 2: Stacks, Recursion, & Queues
- Part 3: Lists & Binary Search Trees
- Part 4: Priority Queues, Heaps, Graphs, Sorting, & Searching

Part 1

- Java Overview
- Software Engineering
- Abstraction
- Arrays
- Linked Lists
- Algorithmic Analysis: Big-O Notation

Part 2

- Stacks
  - Operations
  - Exceptional Situations
  - Formal Specifications
  - Array-based implementations
  - Lists-based implementations
  - Applications
- Recursion
  - Recursive Definitions
  - Recursive Algorithms
  - Recursive Programs
- Queues
  - Operations
  - Formal Specifications
  - Array-based implementations
  - Lists-based implementations
  - Applications

Part 3

- Lists
  - Operations
  - Object Comparisons
  - Formal Specifications
  - Array-based implementations
  - Binary Search
  - Circular Linked Lists
  - Doubly Linked Lists
- Binary Search Trees
  - Operations
  - Logical Level
  - Implementation Level
  - Iterative vs. Recursive

Part 4

- Priority Queues
  - Logical Level
  - Application Level
  - Implementation Level
- Heaps
  - Operations
  - Implementations
- Graphs
  - Operations
  - Formal Specification
  - Logical Level
  - Implementation Level
  - Array vs. List Implementations
  - Applications
- Sorting & Searching
  - Standard Sorts
    - Selection Sort
    - Bubble Sort
    - Insertion Sort
  - $O(N \log_2 N)$ Sorts
    - Merge Sort
    - Quick Sort
    - Heap Sort
  - Sorting Considerations
  - Searching
  - Hashing

Academic Dishonesty

- I take this **very** seriously.
- I will be using moss to check your submissions http://theory.stanford.edu/~aiken/moss
- Don't do it!
- Don't do it!
- Don't do it!
- Don't do it!

http://library.austincc.edu/gen-info/facplagiarism.htm

Lastly…

- Have fun.
- Learn a lot.
- This material is foundational for any computer science course you might take – very important!