Final Overview

Basic Information

Midterm Information

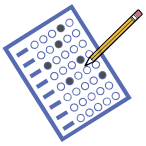
- 2 hours
- 500 points
- May contain multiple choice and short answer questions

Exam Time

- Since next Thursday is Independence Day, we will not have class
- Instead, the Final will be on July 2nd (Tuesday) at 9:00 am

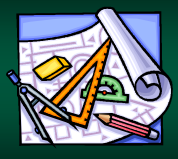
What you need to bring

- Exam booklets will be provided for the midterm
- So, you only need to bring a pen or pencil
- No electronics allowed
- No notes allowed



What Will Be Covered

- Exam will cover Parts 1 to 10
- No question will be asked that is not in the lecture notes
- Download from: *athena.csus.edu/~cookd/130*



Analysis of Algorithms

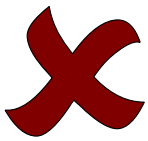
Part 1

Part 1 – Important to Understand

- Algorithmics
- Time complexity basics
- Big-O notation
- Big-O math

Part 1 – Don't Worry About

- Well Known Problems section
- Example time-complexities
- Big-Theta, Big-Omega
- Towers of Hanoi



Abstract Data Types

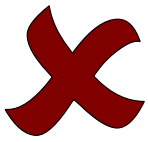
Part 2

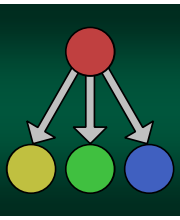
Part 2 – Important to Understand

- What a ADT specifies
- Bags
- Queues
- Stacks
- Deques
- Prefix, Postfix, Infix
- Shunting Yard Algorithm
- Cursors

Part 2 – Don't Worry About

- Cheese example
- Stacks and Queues in Practice section
- Implementing the Shunting-Yard Algorithm (we didn't have an assignment)





Trees

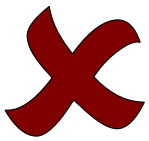
Part 3

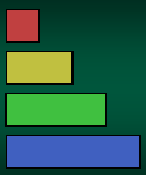
Part 3 – Important to Understand

- Tree terminology
- Tree are recursively defined
- Tree traversals
- Binary trees
- Binary tree properties

Part 3 – Don't Worry About

- Example trees
- Example of using trees from arithmetic equations *(still, this will come up later in CSC 135)*



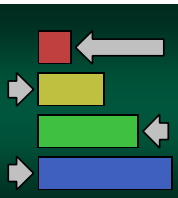


Basic Sorting

Part 4

Part 4 – Important to Understand

- Bubble Sort
- Selection Sort
- Insertion Sort
- Shell Sort
- …. and all their attributes



O(n log n) Sorting

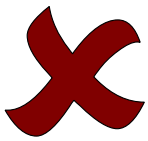
Part 5

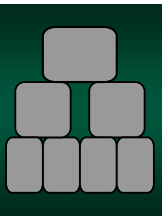
Part 5 – Important to Understand

- Merging arrays
- Merge Sort
- Quick Sort

Part 5 – Don't Worry About

- *Know it all*





Heaps & Priority Queues

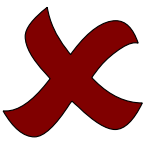
Part 6

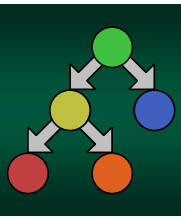
Part 6 – Important to Understand

- Heaps – both min-heaps and max-heaps
- Merging heaps
- Priority Queues
- Heaps in arrays (how the math works)
- Heap Sort

Part 6 – Don't Worry About

- All the various alternative names for upheap and downheap





Symbol Tables & Searching

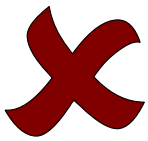
Part 7

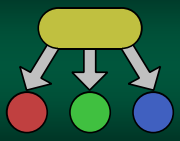
Part 7 – Important to Understand

- Binary Search
- Symbol Tables (aka Dictionaries)
- Binary Search Trees (BST)
- The dangers of a BST

Part 7 – Don't Worry About

- *Know it all*





Balanced Tree

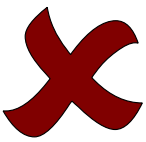
Part 8

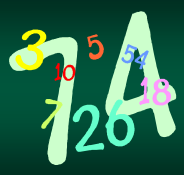
Part 8 – Important to Understand

- 2-3 Trees
- Red-Black Trees – what they really are
- AVL Trees

Part 8 – Don't Worry About

- The rotations of Red-Black trees – we didn't have time to cover them
- The rotations of AVL trees





Hashing

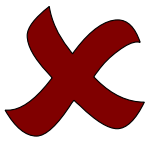
Part 9

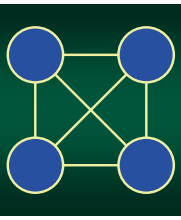
Part 9 – Important to Understand

- General approach of Hash Tables
- Hash functions
- Open Hashing
- Closed Hashing

Part 9 – Don't Worry About

- All the examples
- Sample hash function – MAD algorithm





Introduction to Graphs

Part 10

Part 10 – Important to Understand

- Graph terminology
- Directed/Undirected
- Weighted graphs
- Complete graphs (and the math)
- Dijkstra's Algorithm

Part 10 – Don't Worry About

- History of Graph Theory section
- Real World Examples section
- Background of Dijkstra (the scientist)