CSCI 220 OUTLINE

DATA STRUCTURES I

TEXT: A Practical Introcution to Data Structures and Algorithm Analysis
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Approved: OCTOBER 2012 **Effective: SPRING 2013**

MATERIAL TO BE COVERED	SECTIONS FROM TEXT	TIME LINE
Data structures and algorithm: the need for data structures, costs and benefits, abstract data types, problems vs. algorithms vs. programs, OOP and class templates, design patterns	1.1 - 1.4	2.5 Hours
Mathematical preliminaries: sets and relations, miscellaneous notation, recursion, summations and recurrences, mathematical proof techniques - proof by contradicition and proof by mathematical induction, estimating	2.1 - 237	5 Hours
Algorithm analysis: best, worst, and average cases, asymptotic analysis - upper bounds (big-Oh), lower bounds (big-Omega), and big-Theta, calculating running time, analyzing problems, time vs. space tradeoffs, empirical analysis	3.1 - 3.11	5 Hours
Lists, stacks and queues: lists--array-based list implementation, linked lists, header node, comparision of list implementations, doubly linked lists, circular linked lists; the dictionary ADT; stacks--array-based stacked, linked stacks, comparison of array-based and linked stacks, implementing recursion; queues - array-based queues, linked queues, comparision of array-based and linked queues.	4.1 - 4.4	10 Hours
Binary trees: definitions and properties, the binary tree node ADT, binary tree traversals (pre-order, in-order, post-order, and level-order), pointer-based node implementations, array implementation for complete binary trees, binary search trees (search, insert, and delete), heaps and priority queues, Huffman coding trees and data compression	5.1 - 5.7	10 Hours
Non-binary trees: general tree definitions and terminology, an ADT for general tree nodes, general tree traversals, the parent pointer implementation, general tree implementations (list of children, the left-child/right sibling, dynamic node, and dynamic left-child/right-sibling implementations), K-ary trees, sequential implementations	6.1 - 6.5	5 Hours
Advance tree structures: tries, balance trees (AVL trees and splay trees), spatial data structures -- the K-D tree and the PR quad-tree (optional)	13.1 - 13.3	2.5 Hours

*** 1 Hours = 1 hour of face time. ****This outline allows for 3 hours review and exams.

16 Week Term: 1 week = 2.8333 hours (face time) 6 Week Term: 1 week = 7.5 hours (face time)

Submitted by: Pop