CSE 373 -- Spring 1999 -- Midterm Concepts

- Basic Concepts
  - ADTs
  - logarithmic math

- Recursion/Induction
  - understanding of recursion
  - ability to implement recursive functions
  - understanding of benefits/overheads of recursion
  - understanding of inductive proof technique

- Asymptotic Analysis
  - understanding of concept
  - ability to manipulate/compare functions asymptotically
  - ability to evaluate an algorithm's asymptotic behavior (space & time)
  - best case, worst case, average case analysis
  - understanding of O(), Omega(), Theta()

- Data Structures -- for each of the following: list, stack, queue, tree, binary search tree, hash table...
  - understand what it is
  - be familiar with its major operations
  - know how it is implemented
  - be able to give its operations' running times
  - have a sense for when it is useful

- Lists
  - array-based, link-based, doubly-linked, dummy head/tail nodes
  - normal vs. sorted
  - (in)appropriateness of recursion

- Stacks & Queues
  - array-based vs. link-based

- Trees
  - terminology (root, leaf, ancestor, etc.)
  - fixed-degree implementation vs. first child/sibling implementation
  - pre-order, post-order traversals

- Binary Search Trees
  - numerical properties (depth vs. number of nodes vs. leaves, etc.)
  - binary search tree structure & ordering
  - pre-order, post-order, in-order traversals
  - lazy deletion
  - rotations
  - AVL Tree balance condition
  - Splay Trees' notion of amortized analysis
  - Red-Black Tree properties

- Hash Tables
  - properties of good hash function
  - concept of string hashing
  - load factor
  - separate chaining
  - rehashing
  - open addressing (linear probing, quadratic probing, double hashing)
  - primary clustering