CS 2420 Study Guide

- The test will have a 10 minute survey about the interactive mode utilized in this course. These questions will not count toward your grade, and you have been given an extra 10 minutes onto the test time (total now 130 minutes).
- The test is cumulative, so it can cover any material given in the first half of the course. Refer to the prior study guide for those points. Some of the more specifics, such as how to write code for linked list methods, won't be covered.
- The basic search algorithms:
  - Sequential search
  - Binary search tree
  - Hash table searching
  - Know the Big-O notation of each of these above, including average and worst case.
- The various sort algorithms discussed in class.
  - Bubble
  - Selection
  - Insertion
  - Quick
  - Merge
  - Heap
  - You should be able to write code for the first three listed. You should know the average and worst case Big-O notation of each. You should know the Big-O notation of memory usage for these. Know what stability means with sorting.
  - You should also understand how the bucket sort works.
- How to work with binary trees.
  - How to traverse them in an in-order, pre-order, and post-order manner.
  - How to insert and search for items from a binary search tree.
  - Be able to write code for all these above scenarios.
  - How to delete items from a sorted binary tree.
- AVL Trees.
  - Why they are useful.
  - How to insert an item into an AVL Tree.
  - What AVL Tree balance factors are and how they are used to help balance.
  - When an AVL Tree will do single and double rotations and what the resulting tree will look like.
- How B Trees work.
  - Why they are useful.
  - What the order of a B Tree means.
  - How nodes are inserted into B Trees.
  - What the resulting tree will look like.
  - What B+ Trees are and how they differ from B Trees.
- Graphs.
  - Various ways to store graphs in a data structure: 2D array/matrix, adjacency list, flat file, and CSR arrays.
  - How to traverse a graph using breadth/queue and depth/stack first traversal.
  - What a minimum spanning tree is, and how to use Prim's algorithm to find one.
  - How to process data using the Dijkstra's shortest path algorithm.

- **Not covered –**
  - How to process using the Bellman-Ford (the distance vector) algorithm, including the count-to-infinity problem.)
  - How Red/Black Trees work. How they compare to AVL Trees and B Trees.