**CS 2420 Final Study Guide**

I have tried to create a comprehensive but short list. There might be questions from the chapters that don’t appear here, so the book and lectures or your notes from those lectures are also things to study.

Also, I think we should just focus on what happened after the midterm, so I will use questions from Chapter 5 and above.

* Chapter 5
  + Growth rates of algorithms
  + The ability to judge an algorithm and determine the Big-Oh running time
  + Some basic math, like if an algorithm is linear and it takes 100 ms for 100 items, how log would it take for 200 items?
  + The ability to determines the Big-Oh for problems written similarly to
    - log (N) + N\*N\*N+N\*N+N+1 + log(N)
  + Worst/best/average case times for
    - Binary search
    - Interpolation search
    - Sequential search
* Chapter 7
  + The main rules of recursion
  + Big-Oh running time of recursion
  + Binary Search runtime using recursion
* Chapter 8
  + runtimes based on the following inputs: random, sorted, equal, worst case for
    - Insertion sort
    - Quick sort
    - Merge sort
    - Shell sort
  + Quicksort techniques
    - Pivot
    - Median of 3 partitioning
* Chapter 16
  + Stacks
    - Array based vs linked list based
    - Why are they used
    - Inserts/removals
  + Queues
    - Array based vs linked list based
    - Why are they used
    - What is wraparound
    - Double ended
    - Inserts/removals
* Chapter 17
  + adding/removing/runtimes/iterators/searching
    - Linked Lists
    - Doubly Linked Lists
    - Circularly Linked Lists
    - Sorted Linked Lists
* Chapter 18
  + Traversals
    - In-order, pre-order, post-order, and level order
  + Adding/removing items
  + Calculating height if a single node tree has a height of 0
  + Leaves, roots, branches, siblings
  + Big-oh for the operations like traversing, adding, removing
  + searching
* Chapter 19
  + Likely all the stuff from Chapter 18 as it applies to
    - Binary Search Trees
    - AVL trees
  + The difference between Binary Search Trees and AVL trees
  + AVL trees, the difference between single and double rotations and when each should be used, and how to perform them when inserting items into a tree