**CS 315: Example Questions for Final Exam**

**Trees:**

* Why is it important that a search tree be balanced?
* What is the most significant difference between B-trees and balanced binary trees?

**Sparse Arrays:**

* What is the motivation for having special techniques to store sparse arrays?

**Pattern Matching:**

* Describe three kinds of problems that can be done using pattern matching.
* Describe the rules for matching a pattern variable.

**Java API's:**

* Suppose that data items are stored in a HashMap and that the items need to be sorted. How would this be done using the Java libraries?
* Suppose that we would like to sort a set of students, first by age in years, and within the same age, by GPA. How would this be done using the Java libraries?

**Hashing:**

* How does the Big O of hashing compare with that of AVL trees?
* Describe how hashing with buckets simplifies the code required.

**Priority Queues:**

* Describe three uses of priority queues.

**Sorting:**

* What is the Big O of Insertion Sort? Is it stable? In-place? What would be an appropriate use of Insertion Sort, and why?
* Give an advantage and a disadvantage of Merge Sort of an array.

**Graphs:**

* Give examples of problems whose representations are graphs.
* Depth-first search of a tree is easily done using a recursive function. How is search of a graph different?

**MapReduce:**

* How do the computer systems on which MapReduce runs differ from ordinary computers?
* Describe how MapReduce provides fault tolerance.

**Vocabulary:**

Briefly and clearly define the following terms: ... terms chosen from the vocabulary lists on both study guides.