Study guide for CS165 second midterm exam

By now, you should be able to interpret or write a Java program that uses any of the items shown below.

1) **Review Topics**
   a. Basic Programming
   b. Classes versus Objects
   c. Object Instantiation
   d. Abstract Classes and Interfaces
   e. Recursion
   f. Software Testing
   g. Inheritance
   h. Polymorphism
   i. **Dynamic binding** *

2) **Data Structures**
   a. Collections hierarchy
   b. Collection interface
   c. List interface
   d. Queue interface
   e. Stack interface
   f. ArrayList class
   g. LinkedList class
   h. Vector class
   i. Stack class
   j. Collections class
   k. Comparable interface
   l. Comparator interface
   m. Iterators
   n. ArrayList implementation
   o. LinkedList implementation

3) **Sorting Algorithms**
   a. MergeSort
   b. QuickSort

4) **Grammars, Expressions, Parsing**
   a. Backus-Naur Form (BNF)
   b. Regular Expressions
   c. Infix, Prefix, Postfix
   d. Expression Trees
   e. Expression Evaluation

5) **Trees**
   a. Binary Trees
   b. Binary Search Trees (BST)
      ✓ Searching
      ✓ Inserting
      ✓ Deleting (Cases 1 and 2)
      ✓ Inorder, Preorder, Postorder Traversal
   c. Huffman Encoding and Decoding
   d. AVL Trees (only basic knowledge expected)
      ✓ Balance Factors
      ✓ Rebalancing (LL,LR,RR,RL)
      ✓ Complexity

6) **Hashing**
   a. Importance, performance, gist of how it works
   b. Types of data structures that can use hashing
   c. Strategies for handling collisions
      ✓ Linear, Quadratic probing
      ✓ Double hashing
      ✓ Separate Chaining
   d. Complexity and performance considerations