Study guide for CS165 final exam (Comprehensive)

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

2) Inheritance
   a. Inheritance
   b. Polymorphism and Dynamic binding

3) Data Structures
   a. Collections hierarchy
   b. Collection interface
   c. List Interface
   d. ArrayList and LinkedList
   e. Queue and Stack Interfaces
   f. Collections class
   g. Comparable and Comparator
   h. Iterators

4) Sorting Algorithms
   a. MergeSort
   b. QuickSort

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

6) Trees
   a. Binary and Ternary Trees
   b. Binary Search Trees (BST)
   c. Huffman Encoding and Decoding
   d. AVL Trees

7) Hashing
   a. Hashmaps
   b. Hashing functions
   c. Collisions
   d. Linear and Quadratic Probing
   e. Separate Chaining (Hash Buckets)

8) Parallel Programming
   a. Thread Class: start(), join(), sleep()
   b. Runnable Interface
   c. synchronized keyword
   d. Synchronized Collections

9) Unweighted Graphs
   a. Data Structures
   b. Adjacency Matrices
   c. Depth-First Traversal (DFS)
   d. Breadth-First Traversal (BFS)

10) Weighted Graphs
    a. Data Structures
    b. Minimum Spanning Trees (MST)
       ✓ Prim's Algorithm
    c. Shortest Path (SP)
       ✓ Dijkstra's Algorithm