List of questions for the Algorithms and Data Structures exam

1. What is a data structure?
2. What is an algorithm?
3. On average, how many items must be moved to insert a new item into an unsorted array with N items?
4. Why is an ordered array better than an unordered array?
5. What is the maximum number of comparisons necessary when performing a binary search of 100000 items?
6. What's an invariant?
7. Define the term stable as applied to sorting.
8. Name two ways stacks and queues differ from arrays.
9. What's the difference between a queue and a priority queue?
10. What one piece of data must be included in a link class?
11. What is an ADT?
12. What is the advantage of a doubly linked list over a singly linked list?
13. What is a base case?
14. What's the advantage of the recursive approach to binary searches, as opposed to the loop approach?
15. Briefly describe the mergesort.
16. Briefly describe the operation of the quicksort algorithm.
17. The tree class stores the location of only one node. Which node is it?
18. What is the name for a node with no children?
19. What does it mean to traverse a tree?
20. In a tree with N nodes, how many nodes must be examined to find a given node?
21. What three tasks should a recursive function execute to perform an inorder traversal?

22. Describe how to find the node with the maximum key value in a binary search tree.
23. Why is a balanced tree desirable?
24. Name the red-black rules.
25. What is the maximum number of data items per node in a 2-3-4 tree?
26. When should a node be split in a 2-3-4 tree?
27. What is hashing?
28. What is a collision?
29. What is linear probing?
30. What is clustering?
31. Why do we need quadratic probing and double hashing?
32. What determines the step size in quadratic probing?
33. In separate chaining with unsorted lists, which is faster, a successful search or an unsuccessful search?