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| **Data Structures to Master:**   1. Linked List - Single and Doubly 2. Stacks 3. Queues 4. Hashing and Hash Tables 5. Vectors 6. Basic Graphs for traversal and shortest paths 7. Advance Graphs like flow and min-cut etc. 8. Bit Manipulation 9. Binary Trees and Binary Search Trees 10. Heaps 11. Tries 12. AVL Trees 13. B Trees 14. B+ Trees 15. Red Black Trees |
| 1. **Algorithms to Master:** 2. Divide and Conquer Algorithms 3. Greedy Algorithms 4. Dynamic Programming, Memoization 5. Breadth First Search, Depth First Search and A-Star Search (Manhattan) 6. Mini-max, Alpha Beta Pruning algorithm 7. Linear Search, Binary Search (Iterative and Recursive) 8. Using Binary Search trees and hash tables to search. 9. Bubble Sort 10. Insertion Sort 11. Selection Sort 12. Merge Sort 13. Quick Sort 14. Radix Sort 15. Heap Sort 16. Djikstra’s Algorithm |

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| **Theory to Master:**   * 1. Memory Management   2. OS Theory - Threads, Processes and Locks using Mutex, Semaphores   3. Java Concurrency – Threads, Locks, Deadlocks, Synchronized statements, etc.   4. System Design, Scalability Issues, RPCs, Rate limiter   5. Software Engineering & Object Oriented Design Principles   6. Databases and SQL   7. Linux Commands   8. Probability, Statistics and Basic Math Theories   9. Java Language & JVM Questions   10. C/C++ Questions   11. Testing   12. Discrete Mathematics and Topological Sort   13. Hash Table Collision Resolution   14. Robin-Karp Substring Search |

**Summary:** The key is to be able to master *15 data structures, 15 algorithms and CTCI chapters 1 – 15.* Most of the content in the theory section are either in CTCI or is school notes on our email. That should all take one month.

**Definition of Master:**

* Implement it from scratch in optimal space, time and readability on a whiteboard, in 10 minutes or less, without looking anything up online, never making any errors, while being able to teach its implementation, time and space complexity as if it were an example problem in front of 100 students and they all are going to ask a lot of questions all without much stress.