CHAPTER 0: HOW TO USE THIS BOOK

What this book is about

This book introduces you to the world of data structures and algorithms. Data structures defines the way in which data is arranged in memory for fast and efficient access while algorithms are a set of instruction to solve problems by manipulating these data structures.

Designing an efficient algorithm is a very important skill that all software companies, e.g. Microsoft, Google, Facebook etc. pursues. Most of the interviews for these companies are focused on knowledge of data-structures and algorithms. They look for how candidates use concepts of data structures and algorithms to solve complex problems efficiently. Apart from knowing, a programming language you also need to have good command of these key computer fundamentals to not only qualify the interview but also excel in you jobs as a software engineer.

This book assumes that you are a JavaScript language developer. You are not an expert in JavaScript language, but you are well familiar with concepts of classes, functions, arrays, pointers and recursion. At the start of this book, we will be looking into Complexity Analysis followed by the various data structures and their algorithms. We will be looking into a Linked-List, Stack, Queue, Trees, Heap, Hash-Table and Graphs. We will also be looking into Sorting, Searching techniques.

In last few chapters, we will be looking into various algorithmic techniques. Such as, Brute-Force algorithms, Greedy algorithms, Divide and Conquer algorithms, Dynamic Programming, Reduction and Backtracking.

Preparation Plans

Generally, you have few months time before appearing for a next interview, so it is important to have a solid preparation plan. The preparation plan depends upon the preparation duration and companies that you are planning to target. Below are the three-preparation plan for 1 Month, 3 Month and 5 Month durations.

1 Month Preparation Plans

This preparation plan is for someone who is well familiar with the concepts of data structures and algorithms and just want to revisit these concepts and appear for an interview in a month. Below is the list of topics that we need to study and approximate time to finish them to complete preparation in a month. These are the most important chapters that must be prepared before appearing for an interview.

Time	Chapters	Explanation
Week 1	Chapter 1: Algorithms Analysis Chapter 2: Approach to Solve Algorithm Design Problems Chapter 3: Abstract Data Type	You will get a basic understanding of how to find complexity of a solution. You will come to know how to handle new problems. You will read about a variety of datatypes and their uses.
Week 2	Chapter 4: Sorting Chapter 5: Searching Chapter 13: String Algorithms	Searching, Sorting and String algorithm consists of a major portion of the interviews.

Week 3	Chapter 6: Linked List Chapter 7: Stack Chapter 8: Queue	Linked list, Stack and Queue are some of the favourites in an interview.
Week 4	Chapter 9: Tree	In this portion, you will read about Trees. Now you are well versed to go for interviews. Best of luck.

3 Month Preparation Plan

This plan should be used when you have at least three months' time to prepare for an interview. This preparation plan includes nearly everything in this book except algorithm techniques like "dynamic programming", "divide & conquer" etc. Which are asked by specific companies like Google, Facebook, etc. Therefore, until you are planning to face interview with these companies you can withhold these chapters for some time and should focus on the rest of the chapters.

Time	**Chapters**	**Explanation**
Week 1	Chapter 1: Algorithms Analysis Chapter 2: Approach to Solve Algorithm Design Problems Chapter 3: Abstract Data Type	You will get a basic understanding of how to find complexity of a solution. You will know how to handle new problems. You will read about a variety of datatypes and their uses.
Week 2 Week 3	Chapter 4: Sorting Chapter 5: Searching Chapter 13: String Algorithms	Searching, sorting and string algorithm consists of a major portion of the interviews.
Week 4 Week 5	Chapter 6: Linked List Chapter 7: Stack Chapter 8: Queue	Linked list, Stack and Queue are some of the favourites in an interview.
Week 6 Week 7	Chapter 9: Tree Chapter 10: Priority Queue / Heap	In this portion, you will read about trees and heap data structures.
Week 8 Week 9	Chapter 11: Hash-Table Chapter 12: Graphs	Hash-Tables are used throughout this book in various places, but now it is time to understand how Hash-Tables are implemented. Graphs are used to propose a solution many real-life problems.
Week 10 Week 11 Week 12	Revision of the chapters listed above.	At this time, you need to revise all the chapters that we have gone through in this book. Whatever remains needs to be completed and the exercise that remain unsolved need to be solved at this time

5 Month Preparation Plan

This plan should be used when we have at least 5 months of time. In this plan, we are going to study the whole book. In addition to this, we need to practice more and more from www.topcoder.com and other resources. If you are targeting for google, Facebook, etc., Then it is highly recommended to join topcoder and make practice as much as possible.

Time	Chapters	Explanation
Week 1 Week 2	Chapter 1: Algorithms Analysis Chapter 2: Approach to Solve Algorithm Design Problems Chapter 3: Abstract Data Type	You will get a basic understanding of how to find complexity of a solution. You will know how to handle unseen problems. You will read about a variety of datatypes and their uses.
Week 3 Week 4 Week 5	Chapter 4: Sorting Chapter 5: Searching Chapter 13: String Algorithms	Searching, sorting and string algorithm consists of a major portion of the interviews.
Week 6 Week 7 Week 8	Chapter 6: Linked List Chapter 7: Stack Chapter 8: Queue	Linked list, Stack and Queue are some of the favourites in an interview.
Week 9 Week 10	Chapter 9: Tree Chapter 10: Heap	This portion you will read about trees and priority queue.
Week 11 Week 12	Chapter 11: Hash-Table Chapter 12: Graphs	Hash-Table is used throughout this book in various places, but now it is time to understand how Hash-Tables are implemented. Graphs are used to propose a solution in many real-life problems.
Week 13 Week 14 Week 15 Week 16	Chapter 14: Algorithm Design Techniques Chapter 15: Brute Force Chapter 16: Greedy Algorithm Chapter 17: Divide-And-Conquer, Decrease-And-Conquer Chapter 18: Dynamic Programming Chapter 19: Backtracking and Branch-And-Bound Chapter 20: Complexity Theory and Np Completeness	These chapters contain various algorithms types and their usage. Once the user is familiar with most of these algorithms. Then the next step is to start solving topcoder problems from topcoder.
Week 17 Week 18 Week 19 Week 20	Revision of the chapters listed above.	At this time, you need to revise all the chapters that we have gone through in this book. Whatever remains needs to be completed and the exercise that may remain needs to be solved at this time

Code downloads

You can download the code of solved Examples in the book from author's GitHub repositories at https://github.com/Hemant-Jain-Author/. At this location the author had solved Examples in various programming languages like Java, GoLang, C#, C++, C, Swift, Python, JavaScript ES5, JavaScript ES6, VB.net, PHP and Ruby.

Summary

These are few preparation plans that can be followed to complete this book while preparing for the interview. It is highly recommended that you should read the problem statement, try to solve the problems by yourself and then only you should investigate the solution to find the approach of this book. Practising more and more problems will increase your thinking power and you will be able to handle unseen problems in an interview. We recommend you to make practising all the problems given in this book, then solve more and more problems from online resources like www.topcoder.com, www.careercup.com etc.