

Review of the book
”*Algorithms and Data Structures : The Basic Toolbox*”
by Mehlhorn and Sanders
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1 Summary of the review

I appreciate the way in which at the end of each chapter two paramount topics integrated i.e. *Implementation Notes* and *Historical Notes and Further Findings*. In addition, every chapter starts with the requirements or importance of respective topic. This is helpful from the view of an undergraduate student to study the topic. Also, the appendix at the end is very helpful for reading and understanding the topics in this book.

2 Summary of the book

Chapter 1 Like light snacks served before meal in order to prepare for it, this chapter serves as preparing the undergraduate student or reader for beginning the journey through data structures and algorithms. One can not require to go through all stuff, but need to reminder so that refresher can be easier to understand the topic.

Chapter 2 I can see this chapter as *A bird eye view* of the book for the readers. Authors had carefully explained the insights of respective topic and detailed to be taken in respective chapter. As said earlier, one can only read enough to acquire the knowledge for understanding the topic.

Chapter 3 The *array* and *link list* will be the backbone for most of the data structures. Therefore, in this chapter authors had explained the basics of with what to use when and how.

Chapter 4 This chapter discusses the basics in hash function and how it can be useful in different areas. The example of the library of *University of Karlsruhe* is an eye catching to understand the importance of hash tables.

Chapter 5 This chapter deals with sorting and searching techniques that used in real time scenarios and for other data structures. The exercise on unix spell-checking gives the insight of usefulness of sorting and searching.

Chapter 6 This chapter discusses about priority queues. It starts with example from TMG company who requires a way to assign orders to the subcontractor worldwide. This chapter discusses the types and way to achieve with known data structures and finally ends with implementation and further studies.

Chapter 7 This chapter discusses about how the sorted sequence is taken care by binary tree, red-black tree and so on. This is useful when the dataset is dynamic i.e. one can add/update/delete the data. There are several operation like insert, remove, locate, min, max, range, build, concate, spitting and so on is discussed with its analysis.

Chapter 8 This chapter discusses the graph and its representation. Also, it gives glimpse about graph and way to implement it through different ways.

Chapter 9 This chapter is in continuous of previous chapter of graph. After acquiring knowledge of what is graph and how to make it, one interested to traverse it too. Thus, this chapter shows the techniques to traverse the respective graph.

Chapter 10 In our daily routine, we always want to reach by shortest route from one place to another. This can save the fuel as well as time. This chapter starts with introduction to genetic algorithms and followed by different techniques for shortest path algorithms.

Chapter 11 This chapter also belongs to graph theory. This chapter discusses the minimum spanning tree (MST). It starts with motivation for using MST based on problem at *atoll of Taka-Tuka-Land*. It gives the different way to get minimum spanning tree of a given graph.

Chapter 12 This chapter discusses the optimization and way to achieve it through different technique like greedy, dynamic and so on. The detailed discussion of this topic can lead to a separate chapter.

Appendix A Maths is playing the key role in each chapter for analyzing the respective algorithms. The appendix gives the glimpse of different terms that might unaware to novice users.

3 Comments and Recommendations

As a practitioner, should I have to evaluate the book, I would pinpoint the following. For each chapter, there is motivation given to support the importance of it. Like similar can be helpful for subtopics. For example, we can explain the importance of sorting to students. Afterwards, we explain them about 4 to 5 sorting algorithms. Possibly, students could be confused on which algorithm to use in which scenario. I can visually perceive that the conception in this book to integrate motivation for each chapter can further be extended for each sub-topic.

On an average, this book gives the undergraduate students to motivate and also to study further in the topics. Surely, I suggest this book as reference for data structure and for algorithm courses.

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