

CLRS for Dummies

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Preface

This is a book for dummies who want to read but cannot understand Introduction to Algorithms by CLRS.

Everything is taken directly from that book or paraphrased.

All the details that you are not going to remember even if you read the original book are omitted.

Chapter 1

The Role of Algorithms

1.1 Definitions

Algorithms

Algorithm is a procedure used to solve a computational problem. An algorithm takes some value as **input** and produce some value as **output**.

Example: the **sorting problem**

input : A sequence of n numbers $\langle a_1, a_2 \dots a_n \rangle$

Output : The sequence ordered from lowest to highest $\langle a'_1, a'_2 \dots a_n \rangle$

Such sequence of inputs is called **instance** of the problem.

An algorithm is **correct** and **solve** the problem if for every input instance it ends with the correct output.

Sorting is the only computational problem we can solve with algorithms, every problem we see is some sort of sorting.

Data Structures

A **data structure** is a way to store and organize data that facilitate access and modification.

Complexity

When we talk about the complexity of an algorithm. There are two types.

Time Complexity : How long the algorithm takes to produce the results.

Space Complexity : How much storage space an algorithm needs.

If not specified, complexity usually means time complexity.

Complexities are defined by a polynomial function of n , the number of inputs.

Hard Problem

Hard problems are problems that we have no known efficient algorithms yet. They are also called NP-complete problems.

What we learn in this book are all efficient algorithms **efficient algorithms** which has polynomial time complexities.

Chapter 2

Getting Started

2.1 Pseudocode conventions

2.2 Insertion Sort

2.3 Loop Invariant

Chapter 3

Growth of Functions

Chapter 4

Divide and Conquer

Chapter 5

Probabilistic Analysis and Randomized Algorithms

