

ALGORITHM-NOTES

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1 INTRODUCTION

1.1 What is an Algorithm

In mathematics and computer science, an algorithm is a finite sequence of well-defined, computer-implementable instructions, typically to solve a class of problems or to perform a computation. Algorithms are always unambiguous and are used as specifications for performing calculations, data processing, automated reasoning, and other tasks.

Definition 1.1 – Algorithm An algorithm is a finite sequence of well-defined, computer-implementable instructions, typically to solve a class of problems

Hence there are some key points of an algorithm:

- An algorithm needs an **input** and an **output**.
- An algorithm is a sequence of computational steps that transfer input to output.

Example 1.1 Sorting problem

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

OUTPUT: A permutation (reordering) $\langle a'_1, a'_2, \dots, a'_n \rangle$ of the input sequence such that $a'_1 \leq a'_2 \leq \dots \leq a'_n$.

Therefore this algorithm provides a way to reorder the sequence in a descending order. The input sequence is called an **instance** of the sorting problem, and the output sequence is called a **solution** to the instance.