Chapter 1

Introduction

This book aims to present techniques for problem solving using today's computers, including both sequentially and in parallel. For example, you might want to find the shortest path from where you are now to the nearest café by using your computer. The primary concerns will likely include correctness (the path found indeed should end at the nearest café), efficiency (that your computer consumed a relatively small amount of energy), and performance (the answer was computed reasonable quickly).

This book covers different aspects of problem solving with computers such as

- defining precisely the problem you want to solve,

- learning the different algorithm-design techniques for solving problems,

- designing abstract data types and the data structures that implement them, and

- analyzing and comparing the cost of algorithms and data structures.

Remark. We are concerned both with parallel algorithms (algorithms that can perform multiple actions at the same time) and sequential algorithms (algorithms that perform a single action at a time). In our approach, however, sequential and parallel algorithms are not particularly different.