Module 12: Overview

Overview

Dynamic programming is a very important algorithm paradigm. It has four major steps. In step 1, we characterize the structure of an optimal solution. In step 2, we define the value of the optimal solution. In step 3, we compute the value of an optimal solution bottom-up. In Step 4, we construct an optimal solution from computed information. Both dynamic programming and divide and conquer breaks a large instance into smaller instances. A key difference is that the smaller instances in divide and conquer are disjoint, while the smaller instances in dynamic programming may have overlap. We demonstrate these steps by solving the problem of computing a longest common subsequence of two sequences.

Learning Objectives

By the end of this module, you will be able to:

1. Study the principles and basic steps of dynamic programming
2. Apply DP to compute a longest common subsequence of two sequences

Readings

Read the following:

- Section 14.1
- Section 14.2
- Section 14.3
- Section 14.4