Week 5

Algorithmic Toolbox

Week 5

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Dynamic Programming 1

In this final module of the course you will learn about the powerful algorithmic technique for solving many optimization problems called Dynamic Programming. It turned out that dynamic programming can solve many problems that evade all attempts to solve them using greedy or divide-and-conquer strategy. There are countless applications of dynamic programming in practice: from maximizing the advertisement revenue of a TV station, to search for similar Internet pages, to gene finding (the problem where biologists need to find the minimum number of mutations to transform one gene into another). You will learn how the same idea helps to automatically make spelling corrections and to show the differences between two versions of the same text.

Less

Learning Objectives

- apply dynamic programming technique to implement efficient programs
- compute the edit distance between to files
- practice applying the most popular algorithmic technique: dynamic programming

Less

Change Problem

Video: Change Problem 10 min — Resume

Practice Quiz: Change Money 4 questions

Reading: Resources 5 min

Practice Quiz: Puzzle: Number of Paths 4 questions

Practice Quiz: Puzzle: Two Rocks Game 1 question

Practice Quiz: Puzzle: Three Rocks Game 1 question

String Comparison

Video: The Alignment Game 8 min

Video: Computing Edit Distance 6 min

Video: Reconstructing an Optimal Alignment 4 min

Practice Quiz: Edit Distance 4 questions

Reading: Resources 5 min

Additional Slides

Reading: Additional Slides 10 min

Programming Assignment 5

Practice Quiz: Puzzle: Primitive Calculator 5 questions

Programming Assignment: Programming Assignment 5: Dynamic Programming 1 4h Due Aug 23, 1:59 AM CDT