

Algorithms - Assignment-2 (Dynamic Programming)

Due by 30 August

August 23, 2017

- Try to solve the problems using the dynamic programming(DP) strategy.
- Understand the recursion involved in your solution and express it as a recurrence relation; remember to set the base conditions.
- Trace your recurrence relation on a small example.
- Submit a hand-written document clearly indicating your roll number.

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1. Given a set of integers, to find how to divide it into two sets S_1 and S_2 such that the absolute difference between their sums is minimum.
 2. Given two text strings A of length n and B of length m, to transform A into B using a minimum number of operations of the following types: delete a character from A, insert a character into A, or change some character in A into a new character. The minimal number of such operations required to transform A into B is called the edit distance between A and B. For example, the edit distance(abbc, xbbacd) = 3 (change a to x; insert a after bb; insert d after c)

Find a recurrence relation that is useful to find the edit distance of two strings A and B. Take an example of two strings of which one is your own name, and using this relation, fill the table for the minimum number of operations.

3. Suppose there are three symbols $\{a, b, c\}$ on which there is a multiplication table given as below:

	a	b	c
a	c	c	b
b	a	c	b
c	b	a	a

How do you find a parenthesization of a given string $x = x_1x_2 \dots x_n$, $x_i = a, b$, or c such that it evaluates to a. For example, if $x = abbca$, then the value of $(ab)((bc)a)$ is equal to b, whereas $(a(bb))(ca) = a$. Write an algorithm that computes the parenthesization and trace it on an example.