George Washington University
Department of Computer Science

Csci 6212 - Homework 8

Given: April 11, 2017
Due: 6pm, April 18, 2017

1. You are climbing a stair case. It takes n steps to reach the top. Each time you can either climb 1 or 2 steps. In how many distinct ways can you climb to the top? Give a dynamic programming algorithm to solve this problem. Note: n is a positive integer.

2. You are given an array $A = (a_1, a_2, ..., a_n)$ of n positive integers. The objective is to find a pair (a_i, a_j) such that $i < j$ and $d_j - d_i$ is maximum and positive. For example, for $A = (9, 2, 4, 3, 8)$, a solution is $(2, 8)$. For $A = (9, 6, 5, 3, 1)$, there is no such a pair. Find a dynamic programming algorithm to solve this problem.

3. Given two strings a and b, check if a is a subsequence (not necessarily consequent subsequence) of b.

   Example:

   a =aegis76

   b =evatookplanetohamburgonsomedayin1976

   Then a is a subsequence of b.

   Give a dynamic programming algorithm to solve this problem.

4. Given a string s, find the longest palindromic subsequence (LPS) length in s. Example: s =axbddb the LPS length is 4. Give a dynamic programming algorithm to solve this problem.