CSC 551:Spring 2012

Homework 5:Dynamic Programming

Due at the start of class Thu, April 12. You are allowed to do this homework individually, or in groups of two. Each group will return a single homework and will get the same grade. But a group is NOT allowed to share anything written with another group. Remember that each group member has to fully participate in the solution.

Problem 1. Use the matrix multiplication algorithm to find the optimal way to compute $A_1A_2A_3A_4$ where p=[10,10,20,30,40].

Problem 2. Consider the following variation of the interval scheduling problem (we discussed in class). The input is a set of n activity requests $R = \{1, 2, ..., n\}$, where the i-th request starts at time s_i and ends at time f_i. Each request is associated with a numeric value v_i. Give a DP solutin to find a set of non-interfering requests such that the sum of their values is maximum.

Problem 3. Consider a test with n questions, numbered from 1 to n. Question number i has an integer point value, $v_i > 0$, and requires m_i minutes to solve. Suppose further that no partial credit is awarded. Given $v_i, 1 \leq i \leq n$ and $m_i, 1 \leq i \leq n$, and an integer V, provide a dynamic programming formulation that computes the minimum number of minutes required to earn V points on the test. Clearly state the dynamic programming formulation, provide a brief explanation of it and explain how you compute the table by giving a small example.