Indian Institute of Engineering Science and Technology, Shibpur

Department of Information Technology

6^{th} Semester (HX & HY)

Assignment 3: Dynamic Programming

1. Matrix Chain Multiplication:

Given a sequence of matrices A1, A2, …, An, write a program to find the most efficient way to multiply these matrices together, if possible. Dimensions of matrices may be taken arbitrarily. The problem is not actually to perform the multiplications, but merely to decide in which order to perform the multiplications. That is, the output is fully parenthesized chain of matrices. Then, observe the time taken by your program for different values of n. Is the time complexity polynomial? Discuss. What is the space complexity of the algorithm?

2. Longest Common Subsequence (LCS) Problem:

The LCS is the longest subsequence which is common to a set of given sequences (often just two sequences). Unlike substrings, subsequences are not required to occupy consecutive positions within the original sequences. Write a program to find the LCS of a set of given subsequences. Comment on the time complexity of the algorithm.