

Fundamentals of Algorithms
CS502-Fall2011
ASSIGNMENT #3

Deadline

Your assignment must be uploaded/submitted at or before **2nd Jan 2012**

Uploading instructions

Please view the **assignment submission process** document provided to you by the Virtual University to upload the assignment.

Rules for Marking

It should be clear that your assignment will not get any credit if:

- The assignment is submitted after due date.
- The submitted assignment does not compile or run.
- The assignment is copied.**

Objectives

This assignment will help you to understand the concepts of Knapsack Problem and edit distance problem in the paradigm of dynamic programming.

Guidelines

1. In order to attempt this assignment you should have full command on Lecture # 19 to Lecture # 26
2. In order to solve this assignment you have strong concepts about following topics
 - ✓ Edit distance Problem
 - ✓ Knapsack Problem

Recommended book for solving assignment

Cormen, Leiserson, Rivest, and Stein (CLRS) 2001, **Introduction to Algorithms**, (2nd ed.) McGraw Hill.

Estimated Time 4 hours

To understand the theme of both questions 90 minutes. Question 1 solution implementation maximum time is 90 minutes and for Question 2 solution implementation maximum time is one hour. It all depends upon your sheer concentration and devotion towards your lecture listening.

Question# 2 (10)

Use the following dynamic programming based recurrence edit distance to find the possible edit scripts while converting **PHYSICIAN** to **STATISICIAN**

$$E(i, j) = \min \begin{pmatrix} E(i-1, j) + 1 \\ E(i, j-1) + 1 \\ E(i-1, j-1) + 1 & \text{if } A[i] \neq B[j] \\ E(i-1, j-1) & \text{if } A[i] = B[j] \end{pmatrix}$$

Question# 2 (10)

You are the project manager in multi-national company and you are asked to deploy the project for the firm to get the optimal solution and maximum profit in the given constraints

There are six projects i.e. Tele -Communication Project (P1), Hardware Devices Production Plant (P2), Software services for the educational institutes (P3), Distance learning Software Development Centre (P4), Virtual cell phone development centre (P5) and Medical diagnoses devices enhancement centre (P6). Your organization has Rs.150 billions to invest. If the cost of P1 is Rs.50 billion and profit earned is Rs.38 Billion, the cost of P2 is Rs.35 billion and profit earned is Rs.22 Billion, the cost of P3 is Rs.40 billion and profit earned is Rs.25 Billion, the cost of P4 is Rs.65 billion and profit earned is Rs.58 Billion, cost of P5 is Rs.55 billion and profit earned is Rs.45 Billion and the cost of P6 is Rs.60 billion and profit earned is Rs.47 Billion. Your role is to maximize the profit in given amount to launch the projects. Determine the projects to be selected to earn the maximum profit using 0-1 Knapsack. Show complete process.