**LEBANESE AMERICAN UNIVERSITY**

**Department of Computer Science and Mathematics**

**CSC 310: Algorithms and Data Structures**

Fall 2013

**Lab VI**

**Dynamic Programming**

**Input:**

All inputs are read from a file labeled “**n**.in” were **n** is the problem number. In the file, You read an integer **k** the number of test cases then **k test** cases follow.

**Output:**

Output should be consistent with the output specified in each problem as specified.

**Note:**

- We always Label nodes from 0 -> n - 1.

- the first node is 0 which always the starting vertex.

- Graphs are undirected unless specified

- Graphs may contain Connected Component

**Good Luck!**

**Problem 1: [Longest Increasing Subsequence]**

Write a program that computes the longest increasing subsequence length.

**Sample Input: Sample Output:**

2 5

6 10 67 30 45 61 62 2

6 68 93 40 47 42 5

**Problem 2: [Longest Increasing Subsequence]**

Write a program that computes the longest increasing subsequence and prints the sequence in reverse.

**Sample Input: Sample Output:**

2 62 61 45 30 10

6 10 67 30 45 61 62 42 40

6 68 93 40 47 42 5

**Problem 3: [Apple]**

A table composed of **N x M** cells, each having a certain quantity of apples, is given. You start from the upper-left corner. At each step you can go down or right one cell. Find the maximum number of apples you can collect.

**Sample Input: Sample Output:**

2 192

2 7 170

7 12 29 27 31 34 30

18 5 21 18 32 9 22

2 7

28 24 12 27 7 5 23

6 7 20 14 6 30 29

**Problem 4: [Longest Common Subsequence]**

Find the longest common subsequence between two strings.

**Sample Input: Sample Output:**

3 2

karim 2

yassine 1

karim

omar

omar

yassine