**After lecture15 & lecture16 -** Answer any questions on HW4 (due today)

Practice Problems (all taken from previous exams)

1. In dynamic programming, the technique of storing the previously calculated values is called \_\_\_\_\_\_\_\_\_\_\_

a) Saving value property

b) Storing value property

c) Memoization

d) Mapping

2. What is the time complexity of the brute force algorithm used to find the longest common subsequence for sequence length m and sequence length n (m<n)?

a) O(m\*n)

b) O((m\*n)^2)

c) O(n \* 2^m)

d) O(2^m \* 2^n)

3. When dynamic programming is used, it takes less time compared to algorithmic methods that don’t utilize overlapping subproblems.

a) True

b) False

4. Using the dynamic programming solution, determine an LCS of {1, 0, 0, 1, 0, 1, 0, 1} and {0, 1, 0, 1, 1, 0, 1, 1, 0}. Show all your work.

5. Given a sequence of n numbers a1, a2, a3, . . . , an (some of them might be negative) stored in an array, we want to find two indicies i <= j such that the sum of the numbers from ai to aj is maximum, among all possible i j pairs 1 <= i <= j <= n.

5a) Write pseudocode to sum each contiguous subsequence (from ai to aj) and keep track of the maximum one. What is the runtime of your algorithm?

5b) Now find an O(n) algorithm. Give pseudocode.

6. Prove that a binary tree that is not full (every node 0 or 2 children) cannot correspond to an optimal prefix code.