Problem Set #3 (Algorithms)

Department: _____

Student ID: _____

Student Name: _____

For the following problems, consider the longest common subsequence (LCS) of two sequences $x[1 \,..\, m]$ and $y[1 \,..\, n]$.

1. For a top-down memoized algorithm to compute the length of the LCS of x and y in $\Theta(mn)$ space,
   (a) Write your program with your comments.
   (b) Show the results when you run your program for at least one example.
   (c) Explain your program and the results at least four lines.

2. For a bottom-up dynamic-programming algorithm to compute the length of LCS of x and y in $\Theta(mn)$ space,
   (a) Write your pseudocode. Then, explain your pseudocode at least four lines.
   (b) Write your program with your comments.
   (c) Show the results when you run your program for at least one example.
   (d) Explain your program and the results at least four lines.

3. For an algorithm to print an LCS of x and y in $O(m+n)$ time by using the results of Problem 2,
   (a) Write your pseudocode. Then, explain your pseudocode at least four lines.
   (b) Write your program with your comments.
   (c) Show the results when you run your program for at least one example.
   (d) Explain your program and the results at least four lines.