Instructions: See previous homeworks for instructions.

For all of these problems, please state explicitly each of the following: (1) What your subproblems are, and what they mean (for example, “L[i]” is the length of the shortest path ending at i” is fine, while “L[i] is optimum at i” does not mean anything). (2) Your recurrence and algorithm (a few lines of pseudocode should suffice here). (3) One or two sentences explaining why your recurrence is correct (no need to give a formal proof here).

(1) DPV Problem 6.2. Your algorithm should run in time at most $O(n^2)$.

(2) DPV Problem 6.3. Your algorithm should run in time at most $O(n^2)$ (although a better running time is also possible).

(3) DPV Problem 6.8.

(4) You are given a string of yarn of length $n$ meters, and your goal is to cut this yarn into integer-length pieces. For every integer 1..n you know the selling price of a piece of yarn of that length. Call the selling price of a string of yarn of length $i$ by $p_i \geq 0$. Give an algorithm to compute the maximum amount of money that you could make by cutting the string into integer-length pieces. Your algorithm must run in time $O(n^2)$. 