Instructions: See previous homeworks for instructions.

For the first two 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 6.17.

(2) DPV Problem 6.19. Your algorithm should run in time at most $O(nvk)$.

(3) DPV Problem 7.18, parts (a) and (c). For part (a), show how to use the original max-flow problem to solve this variation; for part (c) show how to use linear programming to solve this.

(4) DPV Problem 7.27. An integer linear program is a linear program in which all the variables only take on integer values. In other words, it is a linear program, but with the extra (non-linear) constraints for each variable $y_i$ which state that $y_i$ is an integer.