

Homework 9, CPSC 4100-01, Winter 2017

1) How can we use the output of the Floyd-Warshall algorithm to detect the presence of a negative-weight cycle? [CLRS 25.2-6]

15 points

2) Diameter of a graph is the longest distance (in terms of number of hops) between any two vertices. Propose an efficient algorithm to determine the diameter of a given graph.

15 points

3) Professor Gaedel has written a program that he claims implements Dijkstra's algorithm. The program produces $v.d$ and $v.\pi$ for each vertex $v \in V$. Give an $O(|V| + |E|)$ -time algorithm to check the output of the professor's program. It should determine whether the d and π attributes match those of some shortest-paths tree. You may assume that all edge weights are nonnegative. [CLRS 24.3-4]

20 points