

CSC 226 FALL 2020
ALGORITHMS AND DATA STRUCTURES II
ASSIGNMENT 4
UNIVERSITY OF VICTORIA

1. Show how to compute the shortest paths between all pairs of vertices in the graph attached using the Floyd-Warshall algorithm. It is enough to give the D matrix at the end of each iteration.
2. Show how to use the Edmonds-Karp algorithm to find a max flow on the graph in Lecture18, slide 3. Show for each step of the algorithm: the residual graph, the augmenting path chosen, and the additional flow.
3. Given a flow f for a graph G , give an algorithm for proving that the flow is maximal which runs in time $O(m)$. The edges are stored in adjacency list form, and with each edge is its capacity and flow across the edge. Explain why this is the correct running time.
4. The edge-connectivity of an undirected graph is the minimum number k of edges that must be removed to disconnect the graph. i.e., 1 for a tree, 2 for a cycle. Give an algorithm for determining the edge connectivity of an undirected graph $G = (V, E)$ which runs on $|V| - 1$ different flow networks, each with $|V|$ nodes and $|E|$ edges. What is its running time?