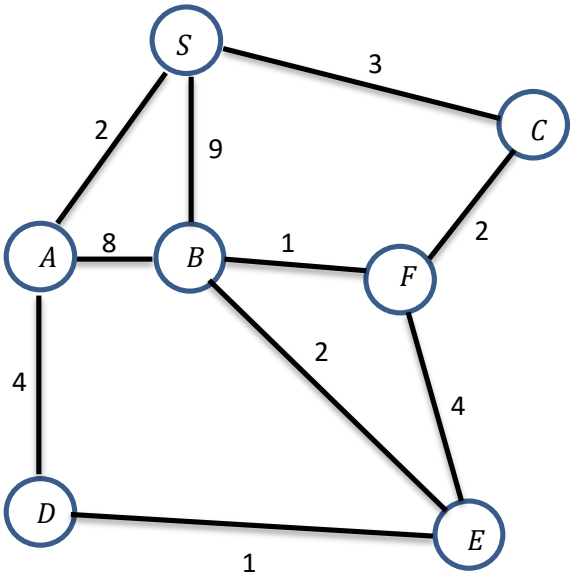
CSC 226 FALL 2016
ALGORITHMS AND DATA STRUCTURES II
ASSIGNMENT 4 - WRITTEN
UNIVERSITY OF VICTORIA

1. Write a pseudocode description of the `printLCS()` algorithm, which prints the longest common subsequence of two strings x and y. Your algorithm takes as input the completed `llcs[][]` integer array of longest common subsequence lengths, and the two strings x and y. (So, you do not have the `path[][]` array - see Lecture 17, slides 98 and 99.) Your algorithm should start at `llcs[n][m]` and work its way down to `llcs[i][j]` where either `i = 0` or `j = 0` and it should run in $O(n + m)$ time where n is the length of x and m is the length of y.

2. Let N be a flow network, and let f be a flow for N. Prove that for any cut, χ, of N, the value of f is equal to the flow across cut χ, that is, $|f| = f(\chi)$.

3. Consider the following graph G. The edges have costs and are undirected. There are 7 vertices and 10 edges. The edge list E is as follows:

$$(A,B)\ (A,D)\ (A,S)\ (B,E)\ (B,F)\ (B,S)\ (C,F)\ (C,S)\ (D,E)\ (E,F)$$



The Bellman-Ford algorithm makes $|V| - 1 = 7 - 1 = 6$ passes through the edge list E. Each pass relaxes the edges in the order they appear in the edge list. As with Dijkstra's algorithm, we record the current best known cost $D[V]$ to reach each vertex V from the start vertex S. Initially $D[S] = 0$ and $D[V] = +\infty$ for all the other vertices $V \neq S$. Run Bellman-Ford on the given graph, starting at vertex S, and using the order of set E above, show me the contents of array $D[]$ after each iteration (6 arrays in all.)