

CMPT 706, Spring 2020
Quiz 3 - March 5

Name _____

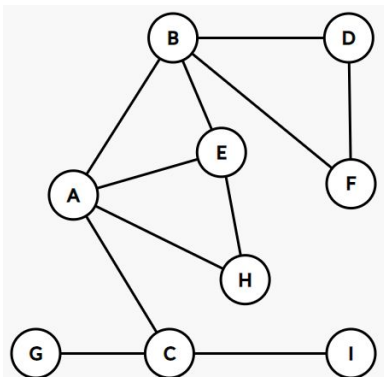
SFU ID: |_|_|_|_|_|_|_|_|_|_|

Instructions:

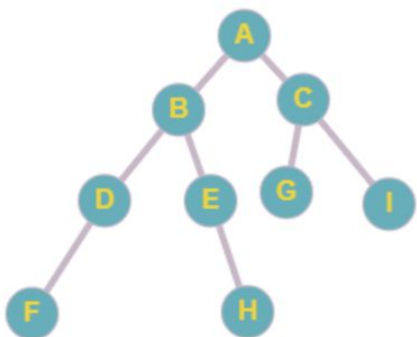
1. Write your name and SFU ID ****clearly****.
2. No calculators, no cell phones, or any other material.
3. Write your answers in the provided space.
4. Explain all your answers.

Question 1 (10 points)

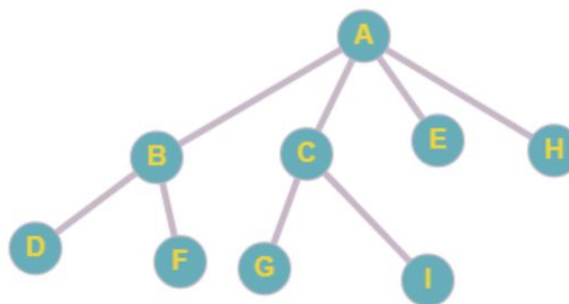
For the following graph construct DFS and BFS trees starting from the vertex A. Use the alphabetical order when you need to enumerate neighbours of a vertex.



DFS



BFS



Question 2 (10 points)

[5 points] (a) Give a brief description of Dijkstra's algorithm.

[5 points] (b) Suppose a graph contains a negative cycle. Does Dijkstra's algorithm compute correctly all distances from the starting vertex.

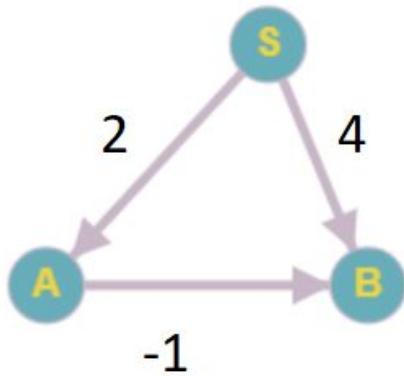
If the answer is YES, explain why.

If not, provide a counterexample.

a) For Dijkstra algorithm see lecture 12

b) No for example, consider the graph below.

The distance from S to B is $2 + (-1) = 1$, but the algorithm will set $\text{dist}(B) = 4$



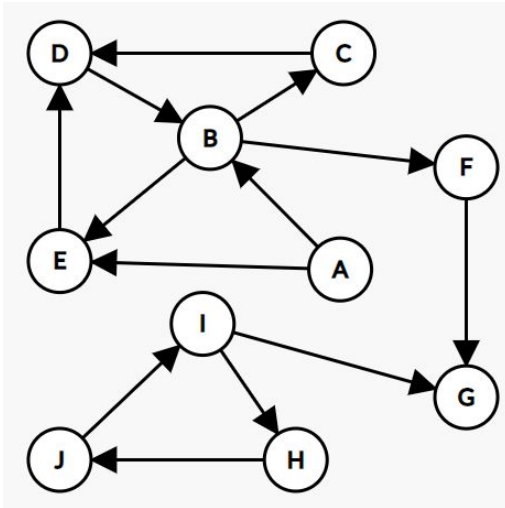
Question 3 (10 points)

For the following directed graph

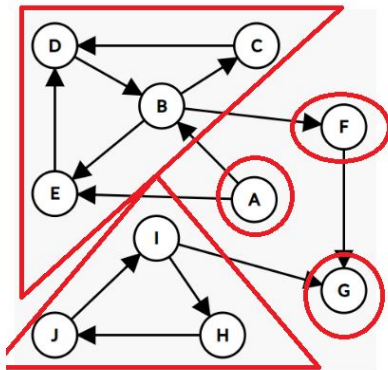
[4 points] (a) Enumerate all its strongly connected components.

[4 points] (b) Draw a topological order of the meta-graph.

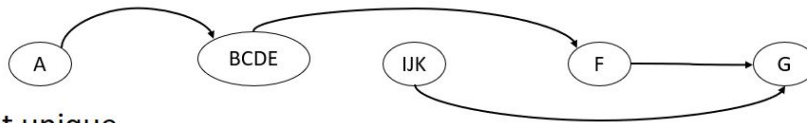
[2 points] (c) Is the topological order of the meta-graph from (b) unique? Explain.



a)



b)



c) it is not unique.

here is another one

