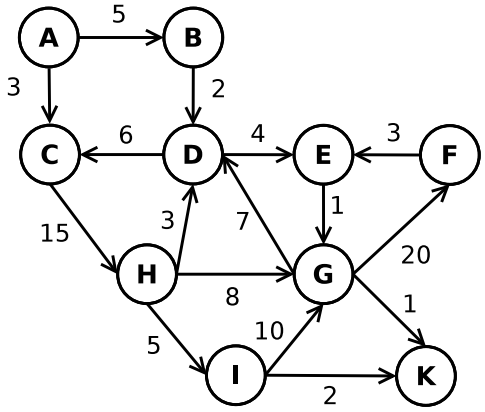
COS212 (Data Structures and Algorithms)

Tutorial 9 Exercise
2021/06/08

Question 1 Graphs ..... (17 marks)

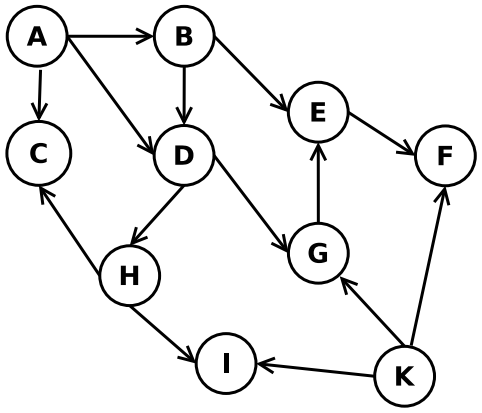
1.1 Consider the following graph:



a) [2 points] Can topological sorting be applied to the given graph? Explain your answer.

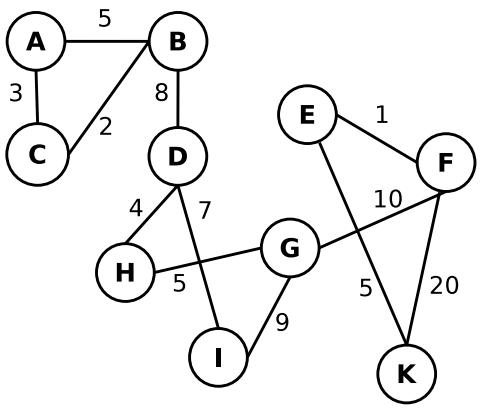
b) [5 points] Assume that the graph is **undirected**, and apply Dijkstra's minimal spanning tree algorithm to the graph. Draw the minimal spanning tree, and calculate the **total cost** of the discovered spanning tee.

1.2 [5 points] Consider the following graph:



Perform the topological sort algorithm on the graph, and complete the following table by filling in the **final** values for *num* and *TSnum* variables for each of the listed vertices.

1.3 [5 points] Consider the following graph:



Perform the Breláz colouring algorithm on the graph, assuming that the following colour labels are used: $C_1, C_2, C_3, \ldots$. Complete the following table by filling in the **final** values for `saturation degree`, `uncoloured degree`, and the `colour` variables for each of the listed vertices.