ALGORITHMS, FALL 2019, HOMEWORK 10

1. You are given a graph $G = \{V, E\}$ and its minimum spanning tree, MST(G), both in adjacency list representation. Suppose that we wish to add a vertex v to G, along with some weighted edges from v to other vertices in G. In other words we create a new graph, G'. Let MST(G') be the minimum spanning tree of G'. You may assume that all edge weights are distinct.

   (a) Can any edge of G that is not in MST(G) end up in MST(G')? Provide a clear proof.

   (b) Your job is to produce MST(G'), given that G and MST(G) are already available. Outline an algorithm, in English. Justify the time-complexity of your algorithm.