Data Structures and Algorithms – (COMP SCI 2C03)
Winter 2021
Tutorial - 8

March 29, 2021

1. Draw the SPT for source 0 of the edge-weighted digraph shown in Figure 1, and give the parent-link representation of the Shortest path tree (SPT) using the below algorithms:

   (a) Dijkstra's algorithm

   (b) Queue Bellman-Ford algorithm

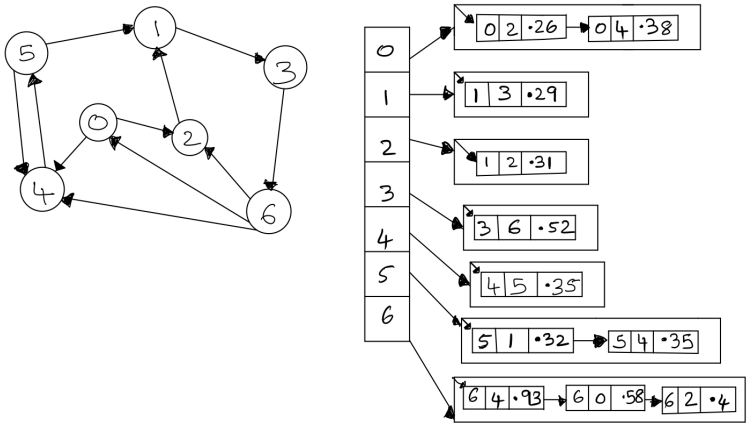

Figure 1: Undirected weighted edge graph

2. Draw the SPT for source 0 of the edge-weighted DAG shown in Figure 2, and give the parent-link representation of the Shortest path tree (SPT) using the topological sort shortest path algorithm.

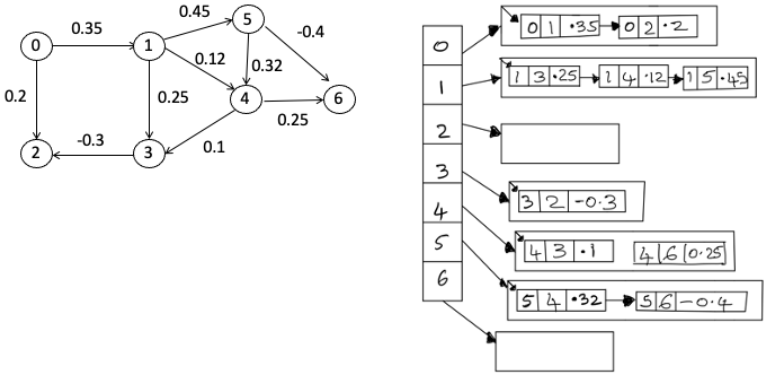

Figure 2: Undirected weighted edge graph

3. What happens to Bellman-Ford if there is a negative cycle on the path from s to v?

4. What happens if you allow a vertex to be enqueued more than once in the same pass in the Bellman-Ford algorithm?

5. The key-indexed counting sorts the input array of length n in ascending order. Present an algorithm for a version of key-indexed counting on an input array of length n which sorts the array in descending order.

6. Give a trace for LSD string sort for the keys
   no
   is
   th
   ti
   fo
   al
   go
   pe
   to
   co
   to
   th
   ai
   of

th
pa

7. Give a trace for MSD string sort for the keys
   no
   is
   th
   ti
   fo
   al
   go
   pe
   to
   co
   to
   th
   ai
   of
   th
   pa