

COSC229 Assignment No. 2

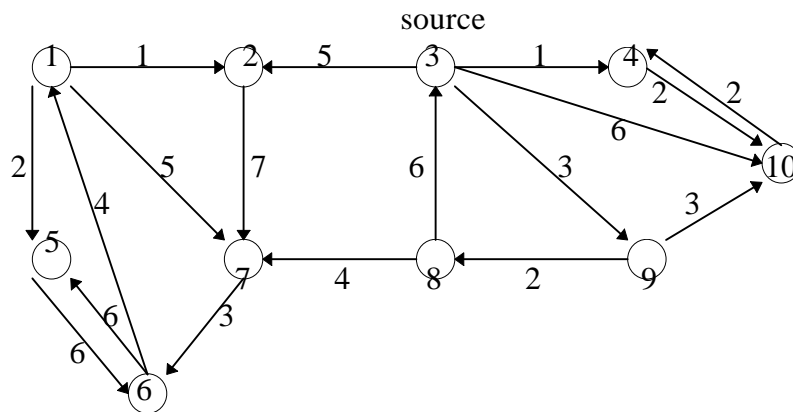
(1) Insert the list of numbers A into an AVL tree. Give a picture of the tree after each insertion and rotation.

A = 36 71 14 65 49 25 92 51 9 54 60 4 83 30 78 18

(2) Insert the above list into a 2-3 tree. Give a picture of the tree after each insertion and splitting.

(3) Insert the first eight in the above list into a splay tree. Give a picture of the tree after each rotation.

(4) Trace Dijkstra's algorithm with the following graph.



(5) Trace Floyd's algorithm with the above graph.

(6) Trace Tarjan's algorithm for sc-components with the above graph, ignoring edge costs. The graph is very similar to the one in the notes except for the edge from vertex 10. You follow the order in the notes in which you examine edges from each vertex. For the trace, give a depth-first spanning tree and the low-link numbers. Also give sc-components in the order in which the algorithm outputs them.

(7) Trace Kruskal's algorithm with the above graph with directions removed.

(8) Trace Prim's algorithm with the above graph.

(9) Write a program for the single source shortest path problem that implements the idea in the middle of page 39 of the notes.

(10) Trace the KMP algorithm for the array h and matching with the following pattern and text.

pat = a b c a b c a b b text = a b c a b a b c a b c a b c a b b a c

Note: Pictures can be hand drawn as long as they are neat.

Unless otherwise specified, follow the style in the lecture notes for the trace of an algorithm.

Due: June 7, 2001, 5:00 pm