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

A = 36 71 14 65 49 25 92 51 9 54 17 4 83 30 78 18

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

(3) Insert the above list into a splay tree.

(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. You must specify the order 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 way how the algorithm output 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 that computes shortest paths as well as shortest distances from a specified source.

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

pat = a b c a b c a b b

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 2, 2000, 5:00 pm