Algorithms Report4

Problem solving (Refer to the 3rd Edition of the text book)

Exercise

1. Draw the red-black tree that results after RIGHT-ROTATE(T, y) on Figure 13.3 instead of LEFT-ROTATE(T, x).

2. Determine a LCS of (a d c b a b) and (d a c c a b).

3. Construct the table as shown in Figure for exercise 6.

4. Show the d and π values that result form running breath-first search on the directed graph of Figure 22.2(a), using vertex 3 as the source.

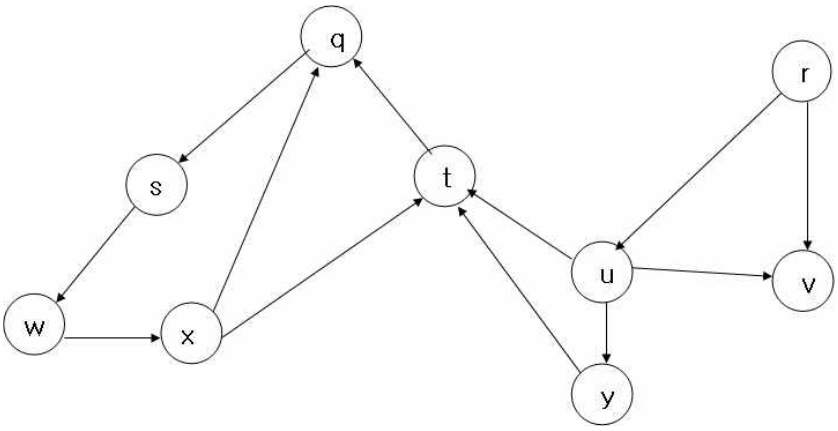
5. Show the d and π values that result from running breath-first search on the undirected graph of Figure 22.3, using vertex u as the source.

6. Show how depth-first search works on the graph shown below. Assume that the for loop of lines 5-7 of the DFS procedure considers the vertices in alphabetical order, and assume that each adjacency list is ordered alphabetically. Show the discovery and finishing times for each vertex, and show the classification of each edge.

7. Show the parenthesis structure of the depth-first search shown in Figure 22.4.

8. Show the ordering of vertices produced by TOPOLOGICAL-SORT when it is run on the dag of Figure 22.8, under the assumption of Excercise 10.

9. Show how the procedure STRONGLY-CONNECTED-COMPONENT works on the graph shown below. Specifically, show the finishing times computed in line 1 and the forest produced in line 3. Assume that the loop of lines 5-7 of DFS considers vertices in alphabetical order and that the adjacency lists are in alphabetical order.



(Graph for exercises 10 and 13)

10. Run the Bellman-Ford algorithm on the directed graph of Figure 24.4, using vertex z as the source. In each pass, relax edges in the same order as in the figure, and show the d an π values after each pass. Now, change the weight of edge (z, x) to 4 and run the algorthm again, using s as the source.

11. Run Dijkstra's algorithm on the directed graph of Figure 24.2, first using vertex s as the source and then using vertex z as the source. In the style of Figure 24.6, show the d and π values and the vertices in set S after each iteration of the while loop.