CptS 223 – Advanced Data Structures

Homework 5

Due: 5:00pm, April 4, 2008

Total Points: 40

1. (5 points) Find a topological ordering for the graph in Figure 9.79.

2. (5 points) Find the shortest unweighted paths from vertex A to all other vertices in Figure 9.80.

3. (5 points) Find the shortest weighted paths from vertex A to all other vertices in Figure 9.80.

4. (5 points) Exercise 9.10(b). Hint: Use an array numEdges such that for any vertex u, numEdges[u] is the shortest number of edges on a path of distance d_u from s to u known so far.

5. (8 points) Find the maximum flow in the following network. Specifically, show the flow graph and the residual graph initially and after each selected augmenting path. Augmenting paths should be the shortest paths in the residual graph. Be sure to state the final maximum flow.

6. (5 points) Exercise 9.53(a). Describe the graph representation of the problem and how the shortest-path algorithm can solve it. You do not need to write code to implement your solution.

7. (7 points) Exercise 9.44.