CST 428/528

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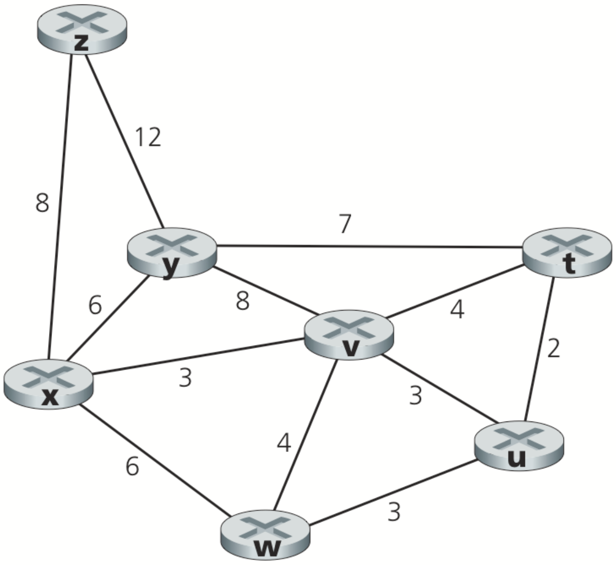
Programming Assignment 3: Dijkstra's Algorithm

In this programming assignment, you will implement Dijkstra's algorithm in C++ to compute the least-cost path from one source to all destinations. For this assignment, you can refer to the pseudo code give in Page 367 of Kurose- Ross textbook.

Consider the abstract graph model of a computer network (e.g., Figure 4.27 of the textbook). One standard way to input a graph is to use an adjacency matrix. Assume that there are N nodes in your network/graph. The matrix is of size N*N. The value of the (i,j)th entry (i.e., ith row and jth column) denotes the edge weight between nodes i and j. If two nodes have no edges between them, then assign the edge weight to a large number. For this topology, your program should be able to print out a table (e.g., Table 4.3) demonstrating the running of Dijkstra's algorithm. The program should be able to take as input (i.e., source) any node in the network and then output the above table.

a) Test that you code works correctly by testing it against Figure 4.27.
b) Test your program for the topology given below.



c) Test your program for other edge weights for the same topology (use the interactive version of the book) http://gaia.cs.umass.edu/kurose_ross/interactive/dij.php

What to hand in?

1. Submit code in C++ with inline documentation

2. A design document describing how to compile your code, how to execute it and what design decisions you made.
3. Tables for parts a), b) and c) printed out from your program which demonstrates that your program runs correctly.
4. Execute the code to me/TA to demonstrate that it works correctly

Grading Criteria (100 points)

In-line documentaton – 15 points
Code compiles and executes correctly – 70 points
Design document – 15 points