**Programming Assignment #4**

CSCE 3530 Spring 2016

Introduction to Computer Networks

**100 Points**

**Due: 12/04/2015, 11:55 PM**

**Late Due: 12/06/2015, 11:55 PM**

**Objective:**

To find the least cost routing path using Dijkstra’s and distance vector algorithm.

(You can use a programming language of your choice! Your ReadMe file becomes even more important. Please include detailed steps of your work.)

**Requirements:**

1. Write a program to find the least cost path between any two routers from a given set of six routers
2. Use Dijkstra’s algorithm and Distance Vector (DV) algorithm to find the least cost path. Each algorithm will generate its own least cost routing paths
3. The program should be able to read a file (router.txt) for the cost information
4. The program should be able to find the least cost link for at least six routers
5. The least cost link details should be written to a file and to the console.

**Procedure:**

1. The program runs on the cse server
2. Open the router.txt file and read the cost between the routers. Your code should be able to support at least six routers
3. Use the Dijkstra’s algorithm to find the least cost path between the routers
4. Use the same router cost information and compute the least cost path between routers using the Distance Vector algorithm (using Bellman-Ford equation)
5. The format of the input file is

s d c

Where s is the source, d is the destination, and c is the cost between source and destination.

1. Write to a file (LS.txt) and print to the console the forwarding table for all the routers that were computed using Dijkstra’s algorithm. The output file will have the destination router and least cost link connecting it
2. Also write to a file (DV.txt) and print to the console the forwarding table for all the routers that were computed using Distance-Vector algorithm. The output file will have the destination router and least cost link connecting it
3. The input and output file formats are shown below for the network shown in Figure 1. The output file format shows only the output for two routers u and v. An example input file - router.txt is available on Blackboard for the network shown in Figure 1.

**Input File Format: Output File Format:**

u v 2 v (u, v)

u w 5 w (u, x)

u x 1 x (u, x)

v x 2 y (u, x)

v w 3 z (u, x)

x w 3 --------

x y 1 u (v, u)

w y 1 w (v, w)

w z 5 x (v, x)

y z 2 y (v, x)

z (v, x)

--------

:

u

y

x

w

v

z

2

2

1

3

1

1

2

5

3

5

:

Figure 1. Graph model of the network connection

**Instructions:** Compile the program and make sure it’s working. Comment your code and add a readme file. Please create a zip archive of your assignment folder (code, readme file, and header files) and upload the zip file.