# University of Texas at Dallas—Department of Computer Science
# CS 6380.001 Distributed Computing—Spring 2019
# Project 3 Description

Extend the simulator you developed in Project 1 to simulate asynchronous networks. The message transmission time for each link for each message is to be randomly chosen using a uniform distribution in the range 1 to 15 "time units." All links are bidirectional and FIFO. (FIFO: If I send two messages m1 and then m2 to you, then you receive m1 first and then m2.)

Implement the Asynchronous Bellman-Ford algorithm. Compute the total number of messages sent for the run and output the result.

Extend the Asynchronous Bellman-Ford algorithm to have a simple synchronizer: In every "round," if a process has no message to send to a neighbor, it will send a "dummy" message to a neighbor. With this modification, compute the total number of messages sent, including the "dummy" messages and output the result.

Your program will read in the following information in this order from an input file called connectivity.txt:

The first line has a single integer and it represents the total number of processes in the system. The ids are 0, 1, 2,…n-1 where n is the total number of processes in the system.

The second line indicates the id of the root of the shortest paths tree to be built.
Lines 3 to n+2 represent the weight matrix (floating point numbers represented in decimal form) with each line representing the weights of all links connected to a single process. Thus, line i+3 has n numbers representing the weight of the edges incident on the ith process. The jth component of line i+3 represents the edge weight of link (i,j).

n
id of root (which is a number in the range 0..n-1)
weight matrix (which is symmetric).

A weight of -1 signifies no link.

The weights are non-negative, except for -1 for no link.

Upload one tar file containing your source code, a README file that tells us how to compile and run, the sample input file (input.dat) and the result of running your program (script file output) on your sample input file.

Due date: April 30, 2019 11:55 pm.