

**University of Texas at Dallas—Department of Computer Science**  
**CS 6380.001 Distributed Computing—Spring 2022**  
**Project 2 - 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 12 “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 LayeredBFS algorithm for leader election. Compute the total number of messages sent for the run and output the result.

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

The first line has a single integer and it represents the total number of processes in the system.  
The second third line is the index (1..n) of the root of the BFS tree to be created.

Lines 3 to n+2 represent the connectivity matrix as a set of n 0's and 1.s: Line 3+i represents the neighbors of process i: the jth component of this line is a 1 if i and j are neighbors and is 0 if i and j are not neighbors.

Output: When the tree has been built, each process should output, on the screen, one line of data containing its index and its list of children (as indices, again) separated by one space.

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 26, 11:55 pm