CS/CE 6378: Advanced Operating Systems
Section 001
Project 2

Instructor: Neeraj Mittal

Assigned on: Thursday, September 27, 2018
Due date: Thursday, October 25, 2018

This is a group project. A group may consist of two to three students. *Code sharing among groups is strictly prohibited and will result in disciplinary action being taken.*

You can do this project in C, C++ or Java. Each student is expected to demonstrate the operation of this project to the instructor or the TA. Since the project involves socket programming, you can only use machines dcXX.utdallas.edu, where XX $\in$ {01, 02, .., 45}, for running the program. Although you may develop the project on any platform, the demonstration has to be on dcXX machines; otherwise, you will be assessed a penalty of 20%.

1 Project Description

In this project, you have to design and implement a *broadcast service* in a distributed system.

Assume a distributed system in which nodes are arranged in a certain topology (specified in a configuration file). Build a spanning tree using a *distributed* algorithm of your choice. (Feel free to design your own algorithm.) Once the spanning tree construction completes, each node should know which subset of its neighbors are also its *tree neighbors*.

Use the spanning tree constructed above to implement a broadcast service that allows any node to send a message to all nodes in the system. The broadcast service should inform the source node of the completion of the broadcast operation. Note that, at any given time, there may be multiple broadcast operations in progress concurrently. However, you can assume that two concurrent broadcast operations have distinct source nodes.

Output: Each node should print its set of tree neighbors. Each node should also output any broadcast message it sends or receives.

2 Submission Information

All the submission will be through eLearning. Submit all the source files necessary to compile the program and run it. Also, submit a README file that contains instructions to compile and run your program.

3 Sample Configuration File

```
#
# Configuration file for CS/CE 6378 Project 2
# (Fall 2018)
#
# As per the "shell" convention, anything following a hash sign is
# a comment and should be ignored by the parser.


# Number of nodes
5

# Here we list the individual nodes
# The node numbers are implicitly designated by order in the file.
# i.e., the first node listed is node 1, etc.
#

# Format is:
# Hostname Port Neighbor List
dc01        3332      2 4 5
dc33        5678      1 3
dc21        5231      2 4 5
dc33        2311      1 3 5
dc22        3124      1 3 4
```