CS 6380: Distributed Computing
Section 001
Project 2

Instructor: Neeraj Mittal

Assigned on: Wednesday, March 1, 2023
Due date: Friday, March 31, 2023 at midnight

You can work on this programming project either individually or in a group. A group can contain up to three students. *Code sharing among group 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

This project consists of two parts: (a) build a message-passing synchronous distributed system in which nodes are arranged in a certain topology (given in a configuration file), and (b) implement SynchGHS algorithm as described in the textbook for constructing a minimum spanning tree (MST).

You can assume that all links are bidirectional. As in the first project, you will need to use a synchronizer to simulate a synchronous system.

Input: Your program should accept two command line arguments. The first argument specifies the location of a configuration file that contains information about the network (nodes and links). More details are given in section 3. The second argument identifies the node uniquely in the file, which can be either its unique identifier (UID) or its index (*e.g.*, i with $i = 0, 1, \ldots, n-1$, where n denotes the number of nodes).

Output: Upon termination, each node should print the following to the screen: the subset of its edges that are part of the MST.

2 Submission Information

All the submissions 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 as well as the names of *all your team members.*

3   Sample Configuration File

```
#
# Configuration file for CS 6380 Project 2 (Spring 2023)
#
# As per the "shell" convention, anything following a hash sign is
# a comment and should be ignored by the parser.
#

# Number of nodes
7

# Here we list the individual nodes
#
# Format is:
#   UID          Hostname            Port
    5            dc02.utdallas.edu   5234
    200          dc03.utdallas.edu   6213
    8            dc04.utdallas.edu   4223
    184          dc05.utdallas.edu   3262
    9            dc02.utdallas.edu   4293
    37           dc07.utdallas.edu   7245
    78           dc08.utdallas.edu   9286

# List of edges and their weight, one per line. An edge is denoted
# by (smaller uid, larger uid)

    (5,200)     5
    (5,8)       3
    (5,37)      10
    (8,184)     1
    (8,78)      3
    (184,200)   3
    (37,78)     1
    (9,78)      2
    (9,200)     5
```