CS/CE/TE 6378: Advanced Operating Systems
Section 002
Project 1

Instructor: Neeraj Mittal

Assigned on: Thursday, September 1, 2016
Due date: Thursday September 22, 2016

This is an individual project. *Code sharing among students 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

Implement a distributed system consisting of n nodes. The value of n and the location of each of the n node is specified in a configuration file. Every node selects a label value (basically an integer) uniformly at random from the interval $[1, 10]$ in the beginning. Every node then circulates a token through the system that visits each node in the system in certain order and computes the *sum* of all the label values along the way. The path taken by the token of each node is again specified in the configuration file. This path is *piggybacked* on the token by the node that generated the token. At the end, each node prints its label value and the sum of all the label values computed by its token. Note that the path may contain cycles and/or may not contain all the nodes. The token should simply traverse the nodes in the order specified in the path even if it means visiting a node (and adding its number) more than once.

You can assume that each node generates exactly one token. Also, once a node's token has finished its traversal, the node writes its label value and the final sum computed by its token to its own output file.

Termination: After writing the output, a node broadcasts a COMPLETE message to all other nodes, waits to receive COMPLETE message from all other nodes and then halts.

Bonus Points: You can earn 10% bonus points by using SCTP rather than TCP sockets for communication.

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.