

CSCI 610 Homework 2

Due: April 6, 2020

Points: 45

Problem C (20 Points):

The textbook discusses distributed hash tables in Section 5.2 of the textbook. You are to write a program in C or C++ that will assign correct values to finger tables of any node given the following:

- m : the number of bits used for identifiers; specifically, 2^m is the maximum number of identifiers.
- A list of node identifiers to be used in computing the finger tables is in file nodeIDs in the courseInfo directory under the course files for this class.
- A command line argument to your program is to be accepted. It will specify the node for which the finger table is to be displayed.

Leave a copy of your program and executable under your CSCI 610 coursework folder in a folder labeled HW2_C. Turn in a listing of your program as indicated below to D2L. With m set to 19, provide output on D2L of the finger tables for the following identifiers: 377847 and 514068.

Note that the grading of your program might be done using different identifiers.

Problem D (25 Points):

The textbook discusses gossiping on page 231 of the textbook. Assuming a very large number of nodes, an equation is given expressing a relationship between parameters p_{stop} and s ; where p_{stop} is the probability that an infected node will stop trying to spread the infection after it tries to infect a node that is already infected. s is the fraction of nodes that do not become infected. Do the following:

- Simulate the gossiping process for a large number of nodes (start with at least 1000000) and for at least 1000 “rounds” – or time steps. Figure out what attributes each node must maintain in order to do the simulation. Note: you must use random numbers for: selecting nodes to infect and for making the decision involving the p_{stop} probability. Your results are expected to be accurate to at least 3 significant digits. Obtain results for the following p_{stop} values: 0.20, 0.40, 0.60, 0.80, 1.00. Present these results in a table. Leave a copy of your C or C++ program and executable under your CSCI 610 coursework folder in a folder labeled HW2_D. Turn in your table and a listing of your program as indicated below to D2L.
- Obtain solutions to the equation on page 231 for the same p_{stop} values as for part a. Present these results in a table.
- Plot a graph of s vs. p_{stop} for the results of parts a and b. The graph must be well-labeled and accurate.

Turn in your Homework 2 results (program listings, output, tables, graph) in a single Word or PDF document with the results identified by the associated problem (Problem C, D) to the D2L Assignment Folder for this class.