Homework 2: Writing Component

SCALABLE SERVER DESIGN: USING THREAD POOLS & MICRO BATCHING TO MANAGE AND LOAD BALANCE ACTIVE NETWORK CONNECTIONS
VERSION 1.0

DUE DATE: Friday March 15th, 2019 @ 5:00 pm

Please answer the questions below briefly.

Q1. What was the biggest challenge that you encountered in this assignment?
[300-350 words]

Q2. If you had an opportunity to redesign your implementation, how would you go about doing this and why?
[300-350 words]

Q3. How well did your program cope with increases in the number of clients? Did the throughput increase, decrease, or stay steady? What do you think is the primary reason for this?
[300-350 words]

Q4. Consider the case where the server is required to send each client the number of messages it has received from that particular client so far. It sends this message at fixed intervals of 3 seconds. However, since each client has joined the system at different times, the times at which these messages are sent by the server would be different. For example, if client **A** joins the system at time `T0` it will receive these messages at {`T0 +3`, `T0 +6`, `T0 + 9`, …} and if client **B** joins the system at time `T1` it will receive these messages at {`T1 + 3`, `T1 + 6`, `T1 + 9`, …}

How will you change your design so that you can achieve this?
[300-400 words]

Q5. Suppose you are planning to upgrade (or completely redesign) the overlay that you designed in the previous assignment. This new overlay must support 10,000 clients and the requirement is also that the maximum number of hops (a link in the overlay corresponds to a hop) that a packet traverses is not more than 4. Assume that you are upgrading your overlay messaging nodes using the knowledge that you have accrued in the current programming assignment; however, you are still restricted to a maximum of 10 threads in your thread-pool and 100 concurrent connections. What this means is that your messaging nodes are now servers (with thread pools) to which clients can connect. Also, the messaging nodes will now route packets produced by the clients.

Describe how you will configure your overlay to cope with the scenario of managing 10,000 clients. How many messaging nodes will you have? What is the topology that you will use to organize these nodes?
[300-400 words]

1 Grading

Homework 2 accounts for 20 points towards your final course grade. This written component accounts for 20% of the points set aside for HW2 i.e. this assignment accounts for 4% of your cumulative course grade. This assignment is graded on a 20 point scale with each question accounting for 4 points.

Restrictions: There should be NO DISCUSSIONS on Piazza relating to this assignment.

2 What to Submit

You should submit a PDF document. Please use the following naming convention:
Firstname-Lastname-HW2-WC.pdf.

The folder set aside for this assignment's submission using checkin is **HW2-WC**