Computer networking

Programming test 13.11.2023

Implement a distributed quiz to assess your students' ability to perform simple arithmetical expressions, using both TCP and UDP for communication.

Don't focus on actually implementing the logic of solving the arithmetical expression on the client side. You can get a maximum grade even if you send random values as the student's answer.

Server (teacher)

Broadcasts port 7777, from 2 to 2 seconds, a list of simple arithmetical expressions as a string, in which the arithmetical expressions are separated by a semicolon (;).

For example, the server might send the string "10+2;4/2;3+1", and there are three questions: 10+2, 4/2 and 3 + 1.

The server will also handle TCP connections from each student to get the answers from the quiz. After a student sends the N answers (where N is the number of questions), the server computes the score and sends it to the student via TCP.

The quiz will end after 12 seconds. After this amount of time has passed, the server stops broadcasting the test and waits for all the answers from the students that are already connected to the test.

Clients (students):

The students listen on UDP on port 7777 to get the test from the server (teacher).

Upon receiving the test, the students connect to the server using a TCP connection on port 1234, and then send their answers to the server (teacher). First the student sends the question index and then the answer for that question (pay attention, these are numerical data!). For example, to send the answer for the first question, the student first sends the value 0 (the index of the question) and then 12 (the answer for that question).

A student can send at most N answers (where N is the number of questions)!

Rubric:

1p: Default

4p: Sending, through TCP a string and then a several numbers.

2.5p: Using both TCP and UDP for communication.

2.5p: Server (teacher) can handle multiple clients at once.

1p: Different programming languages for the server and the client. **[extra]**