Assignment 3

March 26, 2022

Develop a Quiz application using a TCP socket client and a TCP socket server. The client and server use internet domain stream sockets.

The server will ask the client five questions, one after the other. The client is allowed only one attempt to answer a question. At the end of the quiz, the server sends the final score to the client.

The database of quiz questions and answers are provided in a file, *QuizDB.h*. The array of strings, *QuizQ*, contains the questions. The array of strings, *QuizA*, contains the answers. The answer to a question at index i in *QuizQ* is at the same index in *QuizA*.

You must include the file in the server program only. The server randomly selects five questions from the quiz database. The quiz is designed in such a way that there are only four possible answers:

- Y.
- N.
- An integer.
- A character string of maximum length 16 bytes and containing one word only.

1 TCP Server

Following are the main logical steps of the server program:

- The server program takes two arguments, an IPv4 address and a port number.
- The server will bind to the socket address created using the two input arguments.
- The server will print two lines to the standard output. Assuming the input arguments are 127.0.0.1 and 25555, the output lines are the following:

  <Listening on 127.0.0.1:25555>
  <Press ctrl-C to terminate>

- It will then wait for client connections.
- After successful connection establishment with a client, the server will start the quiz with the following preamble statement:

  Welcome to Unix Programming Quiz!
  The quiz comprises five questions posed to you one after the other.
  You have only one attempt to answer a question.
  Your final score will be sent to you after conclusion of the quiz.
  To start the quiz, press Y and <enter>.
  To quit the quiz, press q and <enter>.

- If the client sends Y, then the server starts the quiz.
- If the client sends q, then the server closes the connection and serves the next client.
- In a loop, the server issues the five quiz questions.
  - For each question, the server sends the following message to the client if the answer is right:

    Right Answer.

  - If the answer is wrong, then it sends the following message to the client:

    Wrong Answer. Right answer is <xxx>.

    where <xxx> is the right answer string.
  - It then sends the next question to the client.
- After the conclusion of the quiz, the server will send the following to the client:

  Your quiz score is x/5. Goodbye!

  where x is the number of right answers.
- It then closes the connection and serves the next client.

2 TCP Client

Following are the main logical steps of the client program:

- The client program takes two arguments, an IPv4 address and a port number, that contain the details of the server's listening endpoint.
- It connects to the server using the two input arguments.
- It then sends Y or q to the server to start the quiz or quit.
- For each question sent by the server,
  - The client must accept the answer from the standard input.
  - The answer is sent to the server.
- After the conclusion of the quiz, the client will close the connection to the server.

3 Implementation Requirements

- Make sure you check for return codes from the system calls and deal with them appropriately.
- The server will serve the clients iteratively.
- The implementation of how the server randomly selects five questions from the quiz database is left to you.