Programação em Rede

Servidor simples

Crie uma aplicação cliente servidor em que :

1. o servidor escreve para a consola todas as mensagens enviadas pelo cliente;
2. altere o servidor e o cliente de modo a devolver ao cliente as mensagens recebidas;
3. altere o servidor de modo a poder responder a vários clientes simultaneamente.

Use streams de caracteres para comunicar:

```
BufferedReader in = new BufferedReader(new InputStreamReader
(socket.getInputStream()));
PrintWriter out = new PrintWriter(new BufferedWriter(new
OutputStreamWriter(socket.getOutputStream())), true);
```

Servidor de Eco

Crie uma aplicação cliente servidor em que o servidor devolve aos clientes as mensagens que os clientes lhe enviam.

1. Altere o cliente de modo a ter uma thread dedicada a receber as mensagens que são enviadas pelo servidor.
2. Altere o servidor de modo a que todas as mensagens recebidas pelo servidor sejam enviadas para todos os clientes.
3. Altere a aplicação de modo a usar streams de Objectos.

Chat application

Create a chat application that consists of a server and one to several clients. The server and the client(s) should each be independent applications. When a client is started, it should prompt the user for a username. The client should then display a JFrame with a JTextField on top and a JTextArea in the center. The user should be able to type a message in the text field. Whenever the user presses enter, the content of the text field should be sent to the server along with the user name (username + ": " + textField.getText()). When the server receives a message from a client, it should relay that message to all the connected clients. The server does not need a graphical user interface, but it may be useful to print out all received messages and new connections to the Console.

In the first version of the application, send strings using a PrinterWriter and BufferedReader. Then change your application so that it serializes Strings and uses ObjectInputStream and ObjectOutputStream instead.

Hint: The server should create a new thread each time a client connects.
Hint: The client should create a thread that listens to messages from the server and updates the JTextArea accordingly.

Second version: add list of active users on the system. Broadcast messages to add new user when a client is connected and remove user when a client leaves.
Third version: add the possibility of private messages. First the client selects te user from the list then sends a private message.

Time of Day Server

Online servers need to have their clocks synchronized. For this they use other servers that are connected to atomic clocks that keep correct time. This challenge is to create a Client-Server application where the Server is responsible for keeping track of time and clients connect to update their own clocks.

Adapt the “Multi-Client Echo Server” that you developed based on course materials in a way that the Server tells the user the time of day. The server should only give the time of day as an answer to a request according a certain protocol.

You should define the protocol that the server and the clients use to get the time of day.

Outros exercícios