Exercises 9

Task 9.1. Protocols and Ports v2

What is the purpose of the following protocols and which ports do they use?

1. SSH
2. HTTPS
3. Telnet
4. DNS

Task 9.2. A Quick Quiz

Answer the following questions and explain your answers:

1. Can you use sockets to build a P2P system?
2. Can a computer have several associated IP addresses?
3. Can a computer maintain several socket connections established via the same port number?
4. Suppose you have sent three UDP packets: p1, then p2, then p3. Will they arrive in the same order?

Task 9.3. Word Guessing Game

Write a simple client-server Word Guessing Game that works as follows: The server waits for the incoming client connection. When such a connection is established, the server begins the game. It selects a random word `W` from the file `w09_words.txt` and sends to the client a string that consists of `length(W)` “star” symbols (`*`). The client shows the received string, reads one character from the keyboard and sends it to the server. If the given character is found in the word, the server shows its position(s). The characters guessed during the previous steps are also shown.

The game ends when the client has guessed the whole word. The client shuts down, and the server waits for the next incoming connection.

Example game session:

```
server> ****
client> a
server> ****
client> o
server> *oo*
client> k
server> *ook
client> l
server> *ook
```

```
client> b
server> book
```

Note that such a game server can play only one game at time (i.e., it cannot handle several players simultaneously). Think how we can improve it to overcome this drawback.

Task 9.4. Improved Chat

The example socket chat program w09_socketChat.java has two shortcomings:

1. The users have no assigned nicknames, so it is not clear who is sending a message.
2. The clients cannot close the connection and leave the chat.

Improve the program as follows:

Add nicknames. The client should receive its nickname as a command line argument:

```
java w09_socketChat client 127.0.0.1 MegaMan
```

Now the system should prefix all messages of this client with the string `MegaMan>`.

Next, let the client send a special command `*quit`. If the user says `*quit`, the client should close the connection, and the server should remove this user from the list of clients and shut down its `Broadcast()` thread.