Assignment #1 - INFO-6016 Network Programming

/ 42 Marks

Create a chat server and client that can handle multiple connections simultaneously. The server must be done in C++ and must use BSD sockets. The client can be a simple text based interface, or you can use a GUI. The client must also use BSD sockets. This assignment can be done in a group of 3.

Buffer Class (9 marks):

1. Initialize with size N (**1 mark**)
2. Should grow when serializing past the write index (**2 marks**)
3. Serialize, Deserialize int (**2 marks**)
4. Serialize, Deserialize short **(2 marks**)
5. Serialize, Deserialize string (**2 marks**)

Protocol (4 marks):

1. Must be binary (**1 mark**)
2. Must use length prefix message framing (**2 marks**)
3. Big Endian must be used for the protocol (**1 mark**)

Protocol Example:

Header

int int

[packet_length][message_id]

Send message

? int string int string

[header] [length]][room_name][length][message]

Receive message

? int string int string int string

[header][length][name][length][message][length][room_name]

Join Room:

? int string

[header][length][room_name]

Leave Room:

? int string

[header][length][room_name]

Server Requirements (22 marks):

1. Handle connections and messages without blocking, must be concurrent. (**5 marks**)
   - Concurrency can be done in the following ways:
     - 1 Thread per connection
     - Non-blocking using select()
2. Deserialize messages properly (**10 marks**)
3. Ability for connections to join a room (**1 mark**)
4. Ability for connections to leave a room (**1 mark**)
5. Ability for connections to send a message to a room and broadcast to peers (**2 mark**)

6. Ability for connections to join multiple rooms (**1 mark**)
7. When a connection joins a room, the server should broadcast [name] has joined the room. (**1 mark**)
8. When a connection leaves a room, the server should broadcast [name] has left the room. (**1 mark**)

Client Requirements (4 marks):

1. Able to join a room (**1 mark**)
2. Able to leave a room (**1 mark**)
3. Able to send a message to a room (**1 mark**)
4. Able to receive messages from a room (**1 mark**)

Assignment must be done in Git. Commit messages should be small and sweet. (**3 marks**)

Due Date: Friday, October 13th, 2017