Assignment 2: Chat Application

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Answers for Extension

- **For unregistering a user**, we can simply ask the user to type an "UNREGISTER" message, and design the client to send an unregister response to the server, by which the server will remove this Username-Port key from the global hash-map and close the socket for the corresponding port.

- **For handling the case when the user arbitrarily disconnects by pressing CTRL+C**, an exception will be thrown (when some other user tries to send a message to the disconnected user) since it's entry is registered with the server but it is not able to forward the message. We can handle this exception by removing the username entry in the global hash-map in the server which is used to register the user (same as UNREGISTER in the above case).

- **For incorporating the double tick and offline messaging system like Whatsapp**, we will also add a queue corresponding to the username in a hashmap in the server while registering the user.
  - Whenever a user is offline the messages couldn't be forwarded and henceforth stored in the corresponding queue.
  - Whenever a user becomes online, as soon as the connection is established we will check the corresponding queue for messages and empty the queue showing all the messages in order to the user.
  - This will also solve the problem of double ticks and blue ticks. We can show double ticks to the sender, and not blue ticks, whenever the queue corresponding to the receiving user is not empty and can show blue ticks if the queue is empty.