**Client-Server Chat Application**

**Program Explanation**

1. **Server Class**  
   Handles incoming client connections and enables communication. It manages sending, receiving, displaying, searching, and deleting messages.
2. **Client Class**  
   Connects to the server and performs the same operations as the server, maintaining synchronization for message deletions.
3. **Functionalities Class**  
   Contains all shared methods for handling messages (send, display, search, delete).
4. **Message Class**

**Sample Client-Server Chat Interaction**

**Server Output**

plaintext

Copy code

Server started, waiting for Client on Port Number: 5000

Client connected!

Menu:

1. Send Message

2. Display Messages

3. Search Messages

4. Delete Message

0. Exit

Choose an option: 1

Server: Hello Client!

Client: Hi Server!

Menu:

1. Send Message

2. Display Messages

3. Search Messages

4. Delete Message

0. Exit

Choose an option: 2

List of Messages:

1. Receiver: Client

Message: Hello Client!

Status: Sent

Time: 2024-11-14T12:30:00

2. Receiver: Server

Message: Hi Server!

Status: Received

Time: 2024-11-14T12:30:05

Menu:

1. Send Message

2. Display Messages

3. Search Messages

4. Delete Message

0. Exit

Choose an option: 3

Enter keyword to search: Hi

Search Results:

Receiver: Server

Message: Hi Server!

Status: Received

Time: 2024-11-14T12:30:05

Menu:

1. Send Message

2. Display Messages

3. Search Messages

4. Delete Message

0. Exit

Choose an option: 4

List of Messages:

1. Receiver: Client

Message: Hello Client!

Status: Sent

Time: 2024-11-14T12:30:00

2. Receiver: Server

Message: Hi Server!

Status: Received

Time: 2024-11-14T12:30:05

Enter the number of the message to delete: 1

Message deleted: Hello Client!

Menu:

1. Send Message

2. Display Messages

3. Search Messages

4. Delete Message

0. Exit

Choose an option: 2

List of Messages:

1. Receiver: Server

Message: Hi Server!

Status: Received

Time: 2024-11-14T12:30:05

Menu:

1. Send Message

2. Display Messages

3. Search Messages

4. Delete Message

0. Exit

Choose an option: 0

Exiting...

Server stopped.

**Client Output**

plaintext

Copy code

Connected to the server at 127.0.0.1:5000

Menu:

1. Send Message

2. Display Messages

3. Search Messages

4. Delete Message

0. Exit

Choose an option: 1

Client: Hi Server!

Server: Hello Client!

Menu:

1. Send Message

2. Display Messages

3. Search Messages

4. Delete Message

0. Exit

Choose an option: 2

List of Messages:

1. Receiver: Server

Message: Hi Server!

Status: Sent

Time: 2024-11-14T12:30:05

2. Receiver: Client

Message: Hello Client!

Status: Received

Time: 2024-11-14T12:30:00

Menu:

1. Send Message

2. Display Messages

3. Search Messages

4. Delete Message

0. Exit

Choose an option: 3

Enter keyword to search: Hello

Search Results:

Receiver: Client

Message: Hello Client!

Status: Received

Time: 2024-11-14T12:30:00

Menu:

1. Send Message

2. Display Messages

3. Search Messages

4. Delete Message

0. Exit

Choose an option: 4

List of Messages:

1. Receiver: Server

Message: Hi Server!

Status: Sent

Time: 2024-11-14T12:30:05

2. Receiver: Client

Message: Hello Client!

Status: Received

Time: 2024-11-14T12:30:00

Enter the number of the message to delete: 2

Message deleted: Hello Client!

Menu:

1. Send Message

2. Display Messages

3. Search Messages

4. Delete Message

0. Exit

Choose an option: 2

List of Messages:

1. Receiver: Server

Message: Hi Server!

Status: Sent

Time: 2024-11-14T12:30:05

Menu:

1. Send Message

2. Display Messages

3. Search Messages

4. Delete Message

0. Exit

Choose an option: 0

Exiting...

Client stopped.