Network Programming

Design and Analysis

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Content

Application Introduction

Application Introduction

Our Application is about chatting program:

- Application require login and logout
- Allow users to chat with each other
- Allow users to create a group
- Allow user to chat in a group
- Allow user to send pictures to others

- Transport protocol TCP
- Server - Client Architecture

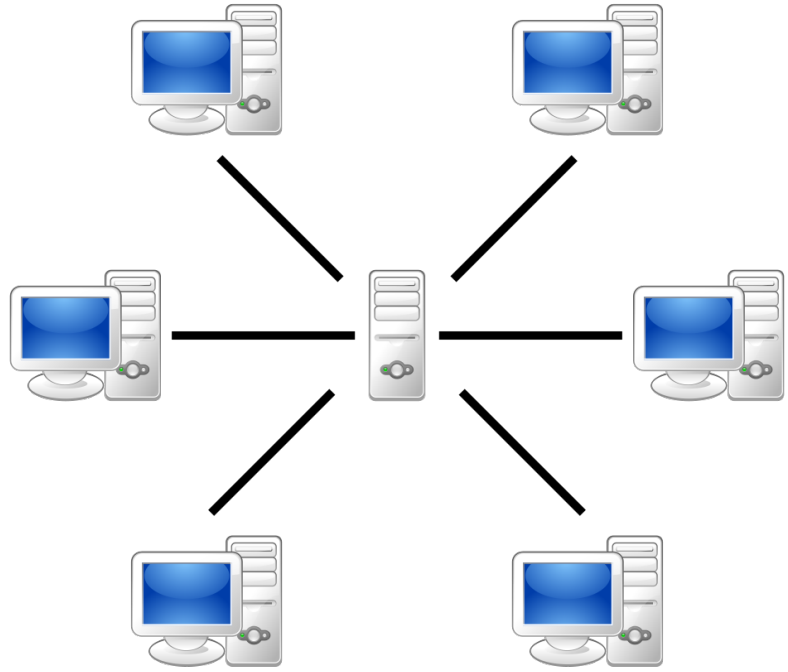

Figure 1: Model

Design

Design

1. **Message Format**
2. **Modules**
3. **Protocol**

Message Format

1. Using JSON Format
2. Client message
3. Server Message

Client Message

1. Method
2. User name
3. Password
4. Sender
5. Receiver

Server Message

1. Method
2. Code
3. Sender name
4. Receiver ID
5. Error list
6. Object list

Modules

1. **Library**
2. **Log In**
3. **Register**
4. **Send Message**
5. **Room**

Module Design

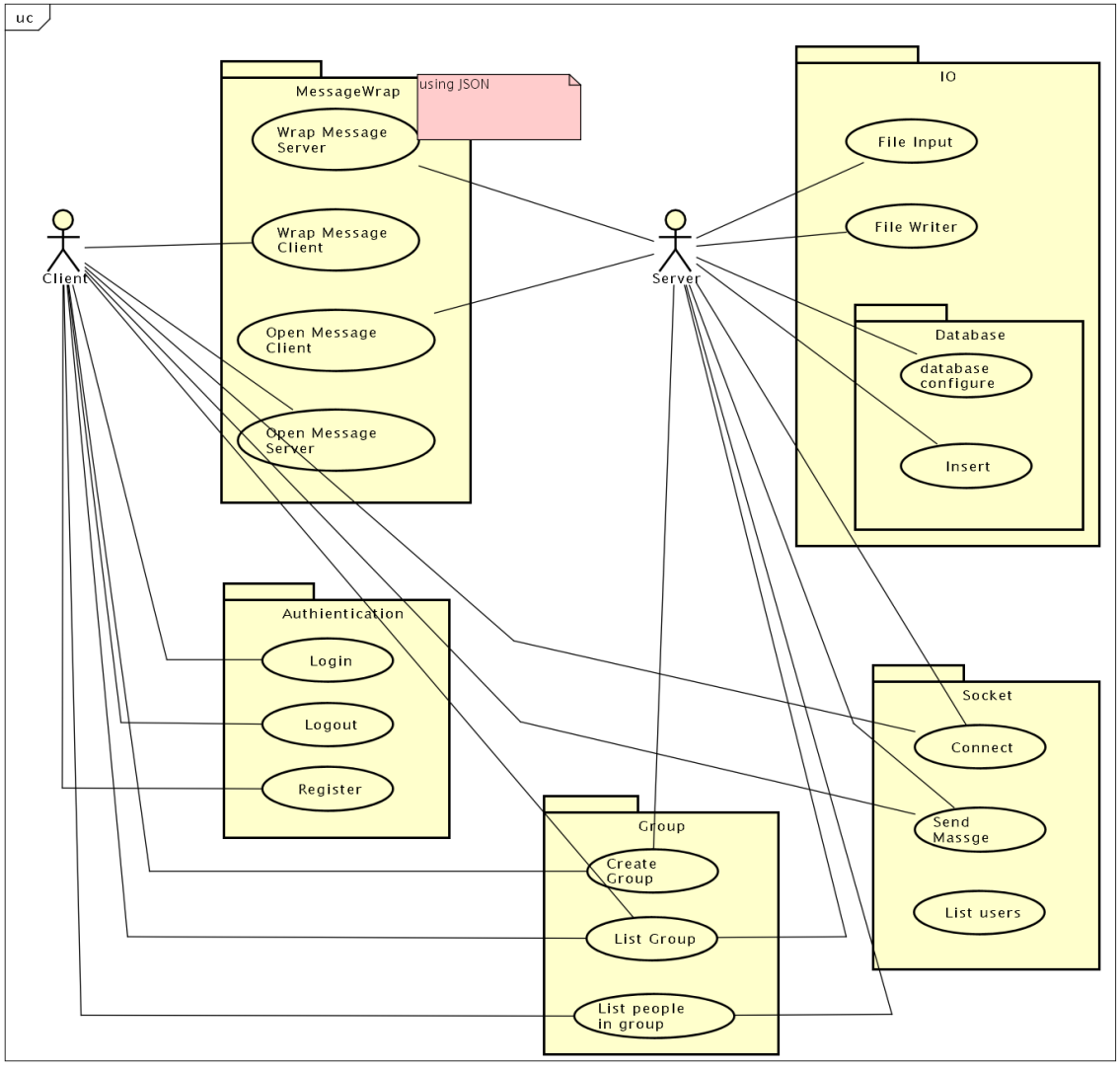

Figure 2: Module Design - Use Case diagram

Log In

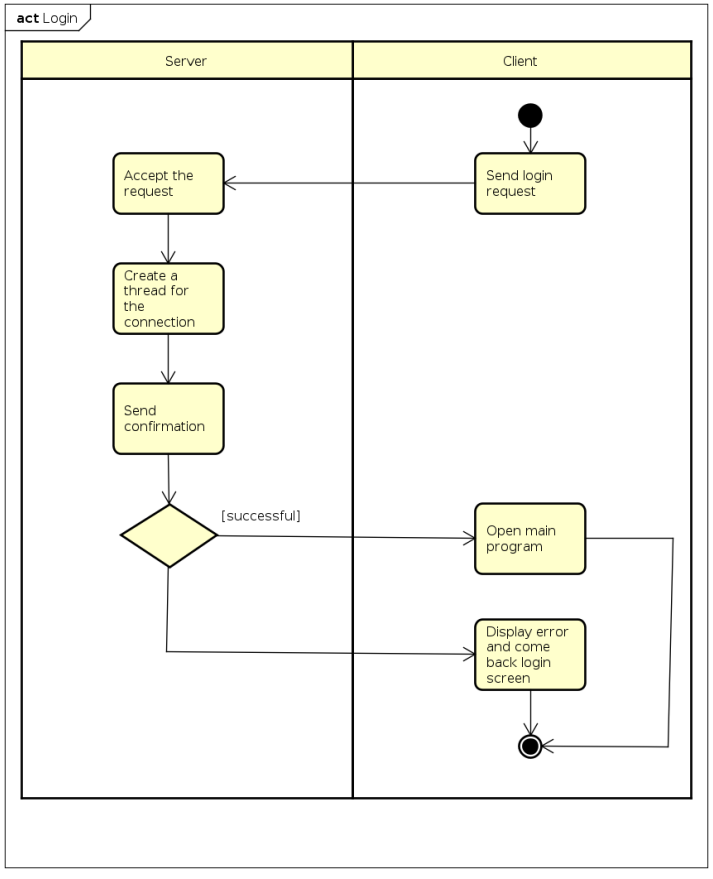

Figure 3: Log In - Activity diagram

Register

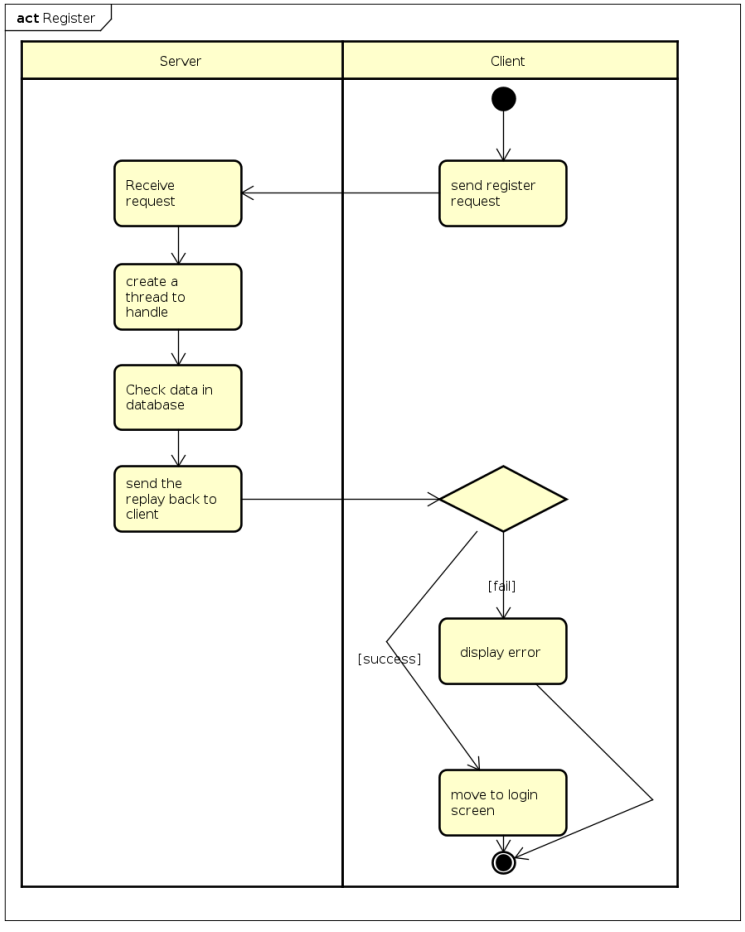

Figure 4: Register - Activity diagram

Send Messages To A Group

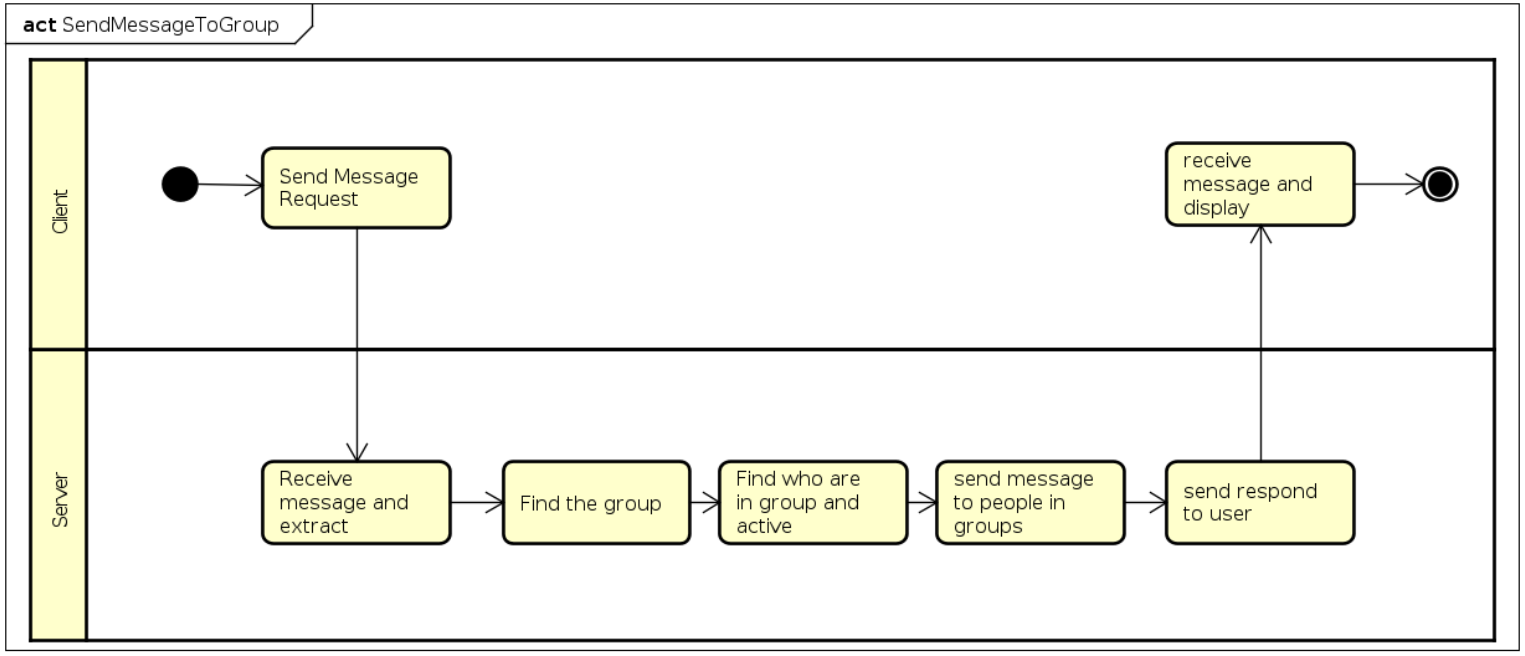

Figure 5: Send message to group - Activity

Send Message To A Person

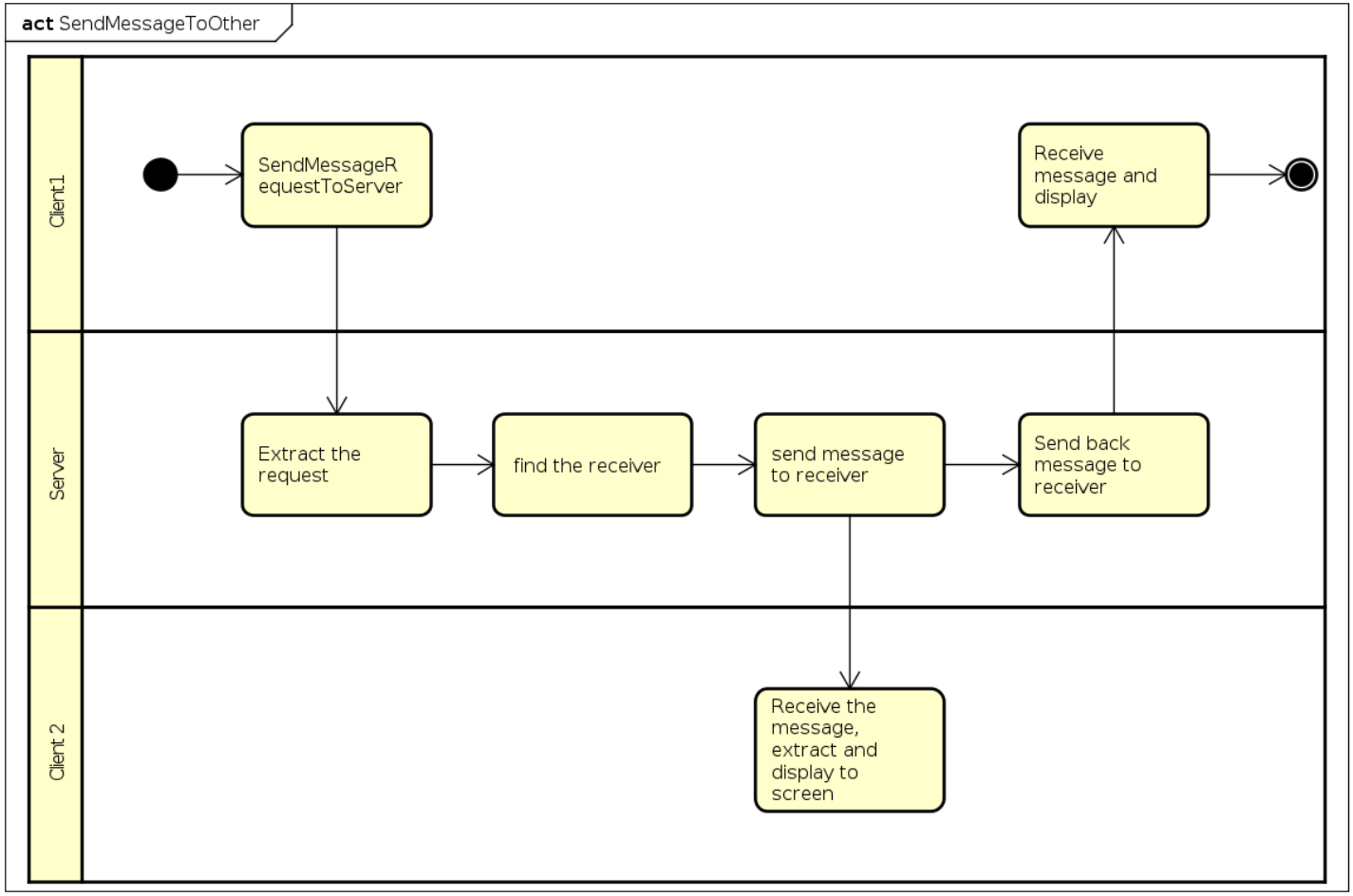

Figure 6: Send Message to an user

Implementation Details

Data Structure - Individual Chat

- Online Tree Represenation
  - The online tree is a binary search tree
  - Each online user will have a node on the tree

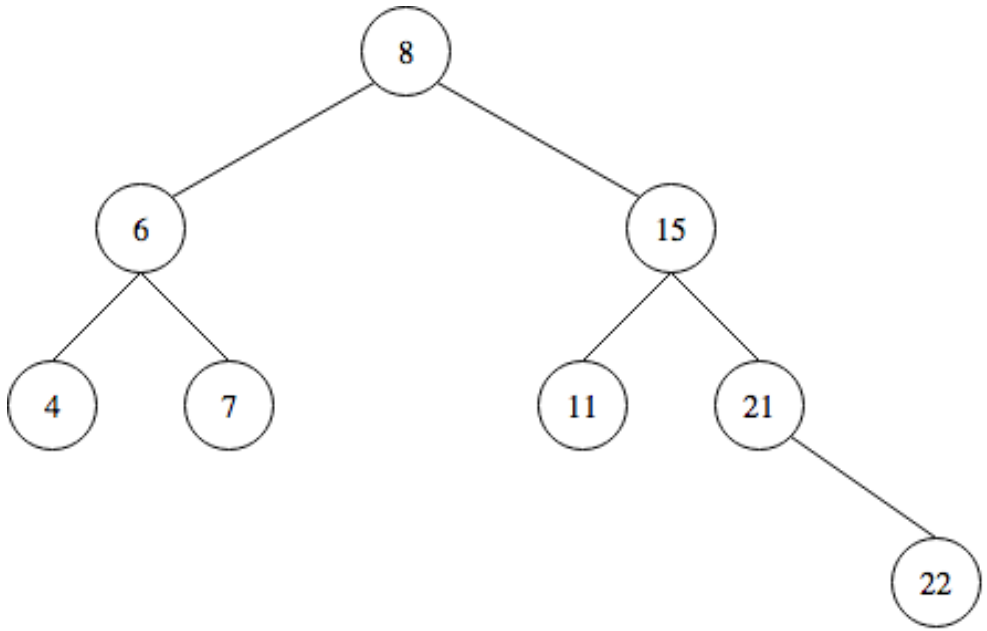

Figure 7: Online Tree Representation

Data Structure - Individual Chat

- Online node representation

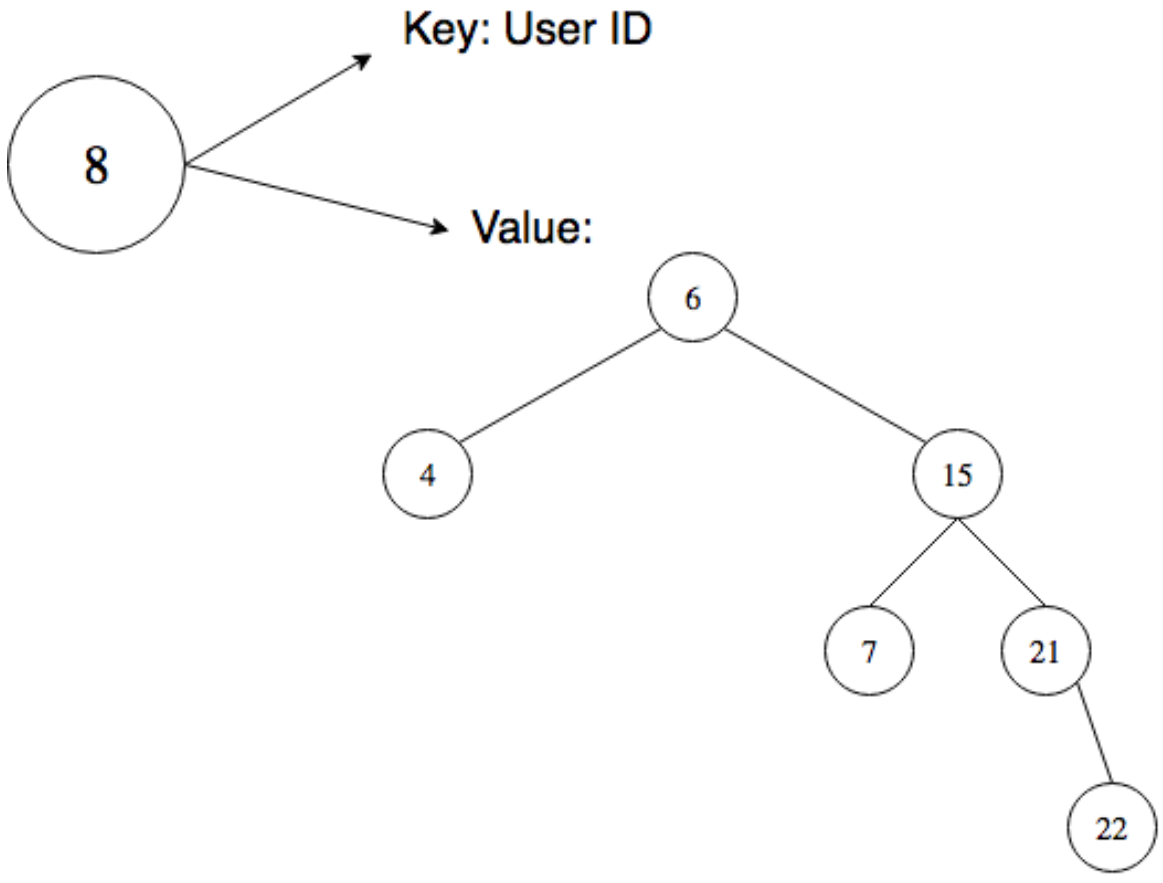

Figure 8: Online Node representation

Data Structure - Individual Chat

- Between 2 online nodes
  - The message queue representative for the messages sending from node 1 to node 2.

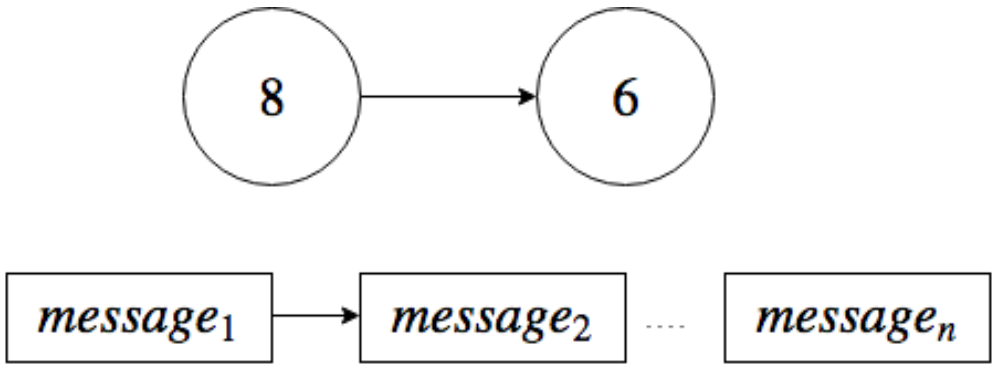

Figure 9: Message Queue between 2 online nodes

Data Structure - Group Chat

- Group Tree Representation
  - Every group has 1 node on tree.

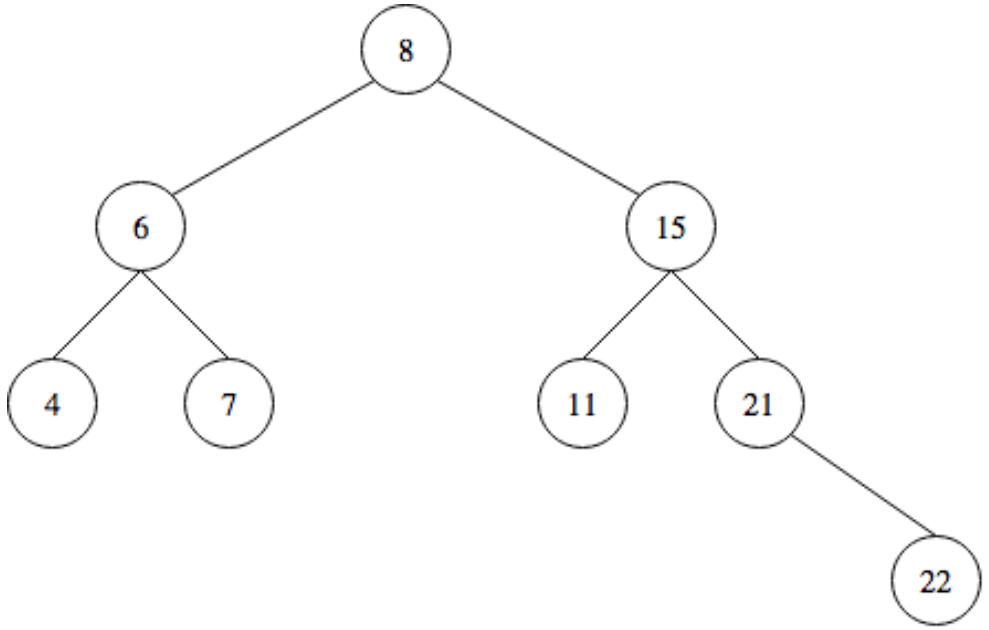

Figure 10: Group Representative Tree

Data Structure - Group Chat

- Between 2 a group node and an user node
  - The message queue representative for the messages sending from a person to a group

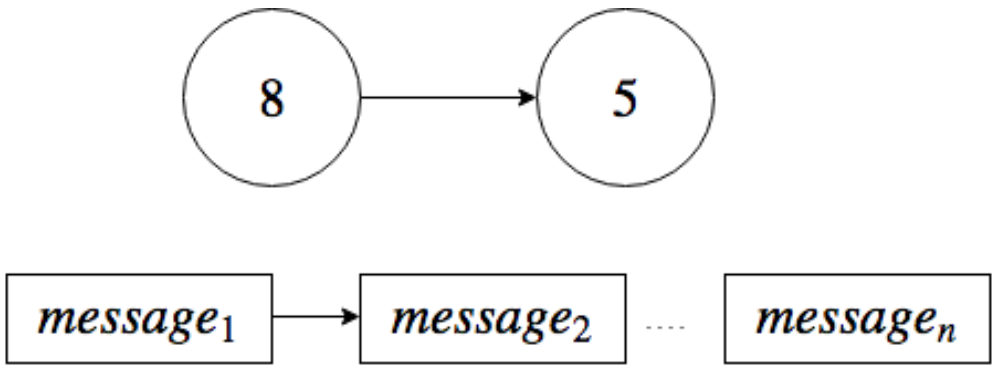

Figure 11: Message Queue for an user

Server

- main thread for connection request
- 2 threads for each client
  - 1 thread for listening message from client
  - 1 thread for interacting with logic in server

Client

- Client will hold 2 threads
  - 1 thread for receiving message from server
  - 1 thread for taking order from client and sending message.