CS5800 Homework 06

Subham Panda

017314921

GitHub link

```java
import java.util.ArrayList;
import java.util.Iterator;
import java.util.List;


public class ChatHistory implements Iterable<Message>{
    private List<Message> sentMessages;
    private List<Message> receivedMessages;

    public ChatHistory(){
        sentMessages = new ArrayList<>();
        receivedMessages = new ArrayList<>();
    }

    public void addSentMessage(Message message){
        sentMessages.add(message);
    }

    public void addReceivedMessage(Message message){
        receivedMessages.add(message);
    }

    public Message getLastSentMessages(){
        if (sentMessages.size() > 0){
            return sentMessages.get(sentMessages.size() - 1);
        } else{
            return null;
        }
    }

    public List<Message> getSentMessages(){
        return sentMessages;
    }

    public void removeLastSentMessage(Message message){
        sentMessages.remove(message);
    }

    public void removeLastReceivedMessage(Message message){
        receivedMessages.remove(message);
    }

    public List<Message> combineMessages(){
        List<Message> combinedMessages = new ArrayList<>();
        combinedMessages.addAll(receivedMessages);
        combinedMessages.addAll(sentMessages);
        return combinedMessages;
    }

    @Override
    public Iterator<Message> iterator() {
        return combineMessages().iterator();
    }

    public Iterator<Message> iterator(User userToSearchWith) {
        return new SearchMessagesByUser(combineMessages().iterator(),
userToSearchWith);
    }

}
```

```
import java.util.ArrayList;
import java.util.List;

public class ChatServer {
    private List<User> users;

    public ChatServer(){
        users = new ArrayList<>();
    }


    public void sendMessage(Message message){
        User sender = message.getSender();
        List<User> receivers = new ArrayList<>(message.getReceivers());
        if(!users.contains(sender)){
            System.out.printf("Cannot send message as user %s is not
registered\n", sender.getUsername());
            return;
        }
        List<User> validReceivers = new ArrayList<>();
        for (User user : receivers){
            if (!users.contains(user)){
                System.out.printf("Cannot send message from %s to %s as user
%s is not registered\n", sender.getUsername(), user.getUsername(),
user.getUsername());
            }
            else {
                validReceivers.add(user);
            }
        }
        for (User receiver : validReceivers){
            List<User> blockedAccounts = receiver.getBlockedUsers();
            if (blockedAccounts != null && blockedAccounts.contains(sender)){
                System.out.println("Cannot send message from " +
sender.getUsername() + " to " + receiver.getUsername() +
                        " since " + sender.getUsername() + " is blocked by "
+ receiver.getUsername());
            } else{
                sender.sendMessage(message);
                System.out.printf("Successfully sent message from %s to
%s\n", sender.getUsername(), receiver.getUsername());
```

```
                receiver.receiveMessage(message);
                System.out.printf("%s: %s received message from %s: '%s'\n",
message.getTimestamp(),
                        receiver.getUsername(), sender.getUsername(),
message.getTextMessage());
            }
        }
    }

    public void registerUser(User user) {
        users.add(user);
        System.out.printf("Successfully registered user %s\n",
user.getUsername());
    }

    public void unregisterUser(User user) {
        users.remove(user);
        System.out.printf("Unregistered user %s\n", user.getUsername());
    }

    public void undoLastMessage(User user){
        List<Message> sentMessages = user.getChatHistory().getSentMessages();
        if (sentMessages.size() == 0){
            System.out.printf("Cannot unsend last message as user %s has not
sent any messages.\n", user.getUsername());
            return;
        }
        Message message = user.getChatHistory().getLastSentMessages();
        user.undoLastSentMessage();
        List<User> receivers = message.getReceivers();
        for (User receiver : receivers){
            receiver.getChatHistory().removeLastReceivedMessage(message);
        }
    }

    public List<User> getUsers(){
        return users;
    }
}
```

```
import java.util.Iterator;

public interface IterableByUser {
    Iterator iterator(User userToSearchWith);
}
```

```
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Date;
import java.util.List;

/*
* should have the sender,recipient(s), timestamp, and message content
* */
public class Message {
    private User sender;
```

```java
    private List<User> receivers;
    private String textMessage;
    private Date timestamp;

    public Message(User sender, List<User> receivers, String textMessage) {
        this.sender = sender;
        this.receivers = receivers;
        this.textMessage = textMessage;
        this.timestamp = new Date();
    }

    public MessageMememto saveToMememto(){
        return new MessageMememto(this);
    }

    public void restoreFromMememto(MessageMememto messageMememto){
        Message previousMessage = messageMememto.getPreviousMessage();
        this.sender = previousMessage.getSender();
        this.receivers = previousMessage.getReceivers();
        this.textMessage = previousMessage.getTextMessage();
        this.timestamp = previousMessage.getTimestamp();
    }

    public List<User> getReceivers(){
        return receivers;
    }

    public User getSender(){
        return sender;
    }

    public String getTextMessage(){
        return textMessage;
    }

    public String toString(){
        return String.format("%s: Message content: '%s'",
                timestamp.toString(), textMessage);
    }

    public Date getTimestamp(){
        return timestamp;
    }
}
```

```java
public class MessageMememto {
    private Message message;

    public MessageMememto(Message message){
        this.message = message;
    }

    public Message getPreviousMessage(){
        return message;
    }
}
```

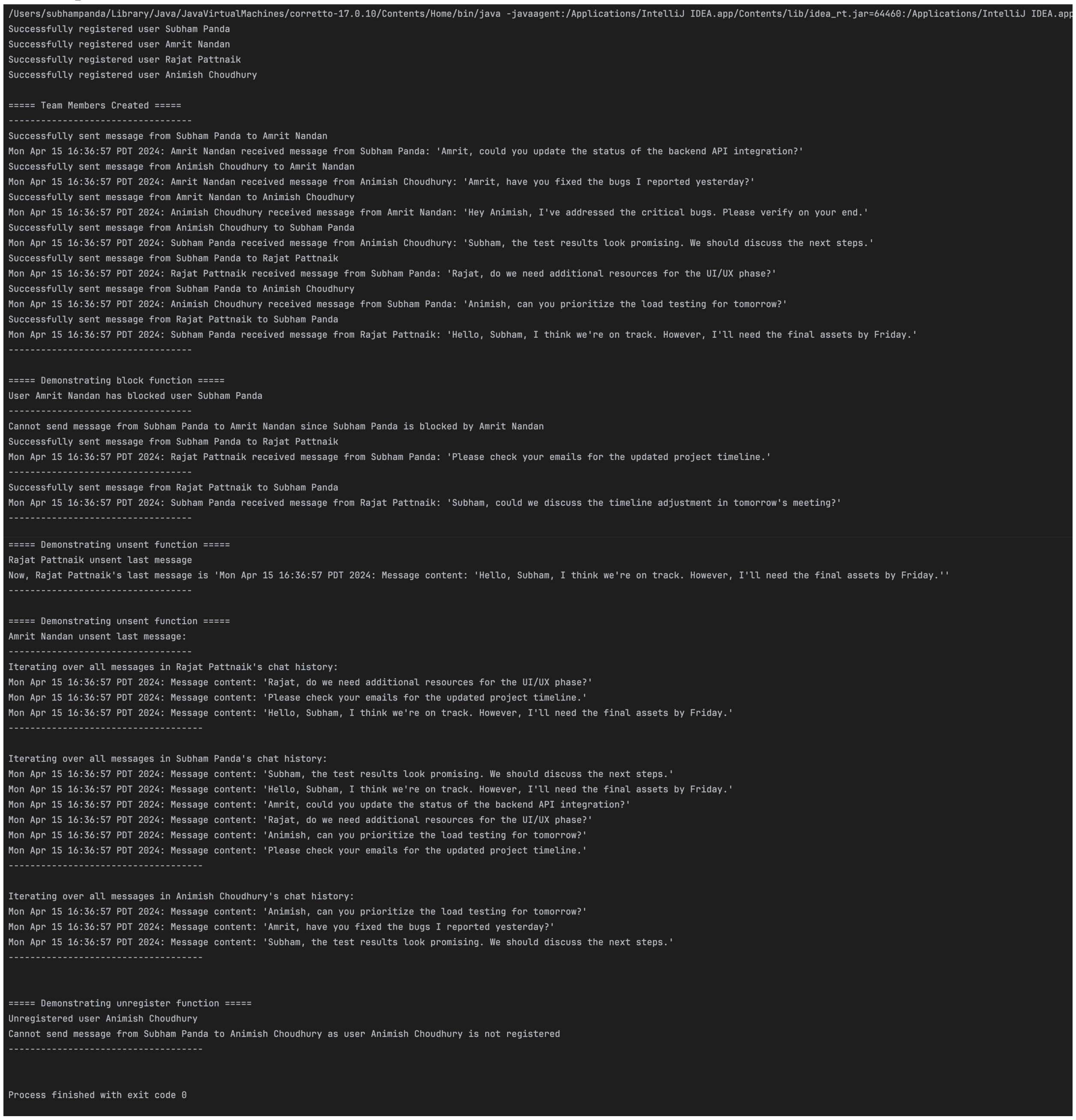
```java
import java.util.Iterator;

public class SearchMessagesByUser implements Iterator<Message> {
    private Iterator<Message> messageIterator;
    private User userToSearchWith;

    public SearchMessagesByUser(Iterator<Message> messageIterator, User
userToSearchWith) {
        this.messageIterator = messageIterator;
        this.userToSearchWith = userToSearchWith;
    }

    @Override
    public boolean hasNext() {
        while (messageIterator.hasNext()) {
            Message message = messageIterator.next();
            if (message.getSender().equals(userToSearchWith) ||
                    message.getReceivers().contains(userToSearchWith)) {
                messageIterator = userToSearchWith.iterator();
                return true;
            }
        }
        return false;
    }

    @Override
    public Message next() {
        while (messageIterator.hasNext()) {
            Message message = messageIterator.next();
            if (message.getSender().equals(userToSearchWith) ||
                    message.getReceivers().contains(userToSearchWith)) {
                return message;
            }
        }
        return null;
    }

    @Override
    public void remove() {
        throw new UnsupportedOperationException();
    }
}
```

```java
import java.util.ArrayList;
import java.util.Iterator;
import java.util.List;

public class User implements Iterable<Message>, IterableByUser{
    private String username;
    private ChatServer chatServer;
    private ChatHistory chatHistory;
    private List<MessageMememto> messageMememtos;
    private List<User> blockedUsers;

    public User(String username, ChatServer chatServer){
        this.username = username;
        this.chatServer = chatServer;
        chatServer.registerUser(this);
        this.chatHistory = new ChatHistory();
        this.messageMemento s = new ArrayList<>();
        this.blockedUsers = new ArrayList<>();
    }

    public void sendMessage(Message message){
        this.chatHistory.addSentMessage(message);
    }


    public void receiveMessage(Message message){
        this.chatHistory.addReceivedMessage(message);
    }

    public String getUsername(){
        return username;
    }

    public void undoLastSentMessage(){
        List<Message> sentMessages = chatHistory.getSentMessages();
        Message lastMessage = sentMessages.get(sentMessages.size() - 1);
        chatHistory.removeLastSentMessage(lastMessage);
        MessageMememto messageMememto = lastMessage.saveToMememto();
        lastMessage.restoreFromMememto(messageMememto);
        sentMessages.remove(lastMessage);
    }

    public void blockerUsers(User blockedUser){
        List<User> users = chatServer.getUsers();
        if (!users.contains(this)){
            System.out.printf("User %s is not registered\n", username);
            return;
        } else if (!users.contains(blockedUser)){
            System.out.printf("User %s is not registered\n",
blockedUser.getUsername());
            return;
        }
        setBlockUsers(blockedUser);
    }

    public void setBlockUsers(User blockedUser){
        if (blockedUsers != null && blockedUsers.contains(blockedUser)){
            System.out.println("User " + blockedUser.getUsername() + " has
already blocked user " + blockedUser.getUsername());
        } else {
            blockedUsers.add(blockedUser);
            System.out.println("User " + username + " has blocked user " +
blockedUser.getUsername());
        }
    }

    public List<User> getBlockedUsers(){
        return blockedUsers;
    }
```

```java
    public ChatHistory getChatHistory() {
        return chatHistory;
    }

    @Override
    public Iterator<Message> iterator() {
        return chatHistory.iterator();
    }

    @Override
    public Iterator<Message> iterator(User userToSearchWith) {
        return chatHistory.iterator(userToSearchWith);
    }
}
```

```java
import java.util.Iterator;
import java.util.List;

public class Driver {
    private static final ChatServer chatServer = new ChatServer();

    public static void main(String[] args) {
        // Creating 4 users and adding them to system
        User projectLead = new User("Subham Panda", chatServer);
        User backendDev = new User("Amrit Nandan", chatServer);
        User frontendDev = new User("Rajat Pattnaik", chatServer);
        User qaEngineer = new User("Animish Choudhury", chatServer);

        System.out.println("\n===== Team Members Created =====");

        System.out.println("------------------------------------");
        chatServer.sendMessage(new Message(projectLead, List.of(backendDev),
"Amrit, could you update the status of the backend API integration?"));
        chatServer.sendMessage(new Message(qaEngineer, List.of(backendDev),
"Amrit, have you fixed the bugs I reported yesterday?"));
        chatServer.sendMessage(new Message(backendDev, List.of(qaEngineer),
"Hey Animish, I've addressed the critical bugs. Please verify on your
end."));
        chatServer.sendMessage(new Message(qaEngineer, List.of(projectLead),
"Subham, the test results look promising. We should discuss the next
steps."));
        chatServer.sendMessage(new Message(projectLead, List.of(frontendDev),
"Rajat, do we need additional resources for the UI/UX phase?"));
        chatServer.sendMessage(new Message(projectLead, List.of(qaEngineer),
"Animish, can you prioritize the load testing for tomorrow?"));
        chatServer.sendMessage(new Message(frontendDev, List.of(projectLead),
"Hello, Subham, I think we're on track. However, I'll need the final assets
by Friday."));
        System.out.println("------------------------------------");

        System.out.println("\n===== Demonstrating block function =====");
        backendDev.blockerUsers(projectLead);
        System.out.println("------------------------------------");
        chatServer.sendMessage(new Message(projectLead, List.of(backendDev,
frontendDev), "Please check your emails for the updated project timeline."));
        System.out.println("------------------------------------");
        chatServer.sendMessage(new Message(frontendDev, List.of(projectLead),
"Subham, could we discuss the timeline adjustment in tomorrow's meeting?"));
        System.out.println("----------------------------------");

        System.out.println("\n===== Demonstrating unsent function =====");
        System.out.println("Rajat Pattnaik unsent last message");
        chatServer.undoLastMessage(frontendDev);
        System.out.printf("Now, Rajat Pattnaik's last message is '%s'\n",
frontendDev.getChatHistory().getLastSentMessages());
        System.out.println("----------------------------------");

        System.out.println("\n===== Demonstrating unsent function =====");
        System.out.println("Amrit Nandan unsent last message:");
        chatServer.undoLastMessage(backendDev);
        System.out.println("----------------------------------");
        // Iterating over all messages in user3's chat history
        System.out.println("Iterating over all messages in Rajat Pattnaik's
chat history:");
        Iterator<Message> allMessagesIterator = frontendDev.iterator();
        while (allMessagesIterator.hasNext()) {
            System.out.println(allMessagesIterator.next());
        }
        System.out.println("------------------------------------\n");
        // Iterating over all messages in user1's chat history
        System.out.println("Iterating over all messages in Subham Panda's
chat history:");
        allMessagesIterator = projectLead.iterator();
        while (allMessagesIterator.hasNext()) {
            System.out.println(allMessagesIterator.next());
        }
        System.out.println("------------------------------------\n");
        // Iterating over all messages in user4's chat history
        System.out.println("Iterating over all messages in Animish
Choudhury's chat history:");
        allMessagesIterator = qaEngineer.iterator();
        while (allMessagesIterator.hasNext()) {
            System.out.println(allMessagesIterator.next());
        }
        System.out.println("------------------------------------\n");

        System.out.println("\n===== Demonstrating unregister function
=====");
        chatServer.unregisterUser(qaEngineer);
        chatServer.sendMessage(new Message(projectLead, List.of(qaEngineer),
"Lets catch up!"));
        System.out.println("------------------------------------\n");
    }
}
```

Output:



```
/Users/subhampanda/Library/Java/JavaVirtualMachines/corretto-17.0.10/Contents/Home/bin/java -javaagent:/Applications/IntelliJ IDEA.app/Contents/lib/idea_rt.jar=64460:/Applications/IntelliJ IDEA.app
Successfully registered user Subham Panda
Successfully registered user Amrit Nandan
Successfully registered user Rajat Pattnaik
Successfully registered user Animish Choudhury

===== Team Members Created =====
----------------------------------
Successfully sent message from Subham Panda to Amrit Nandan
Mon Apr 15 16:36:57 PDT 2024: Amrit Nandan received message from Subham Panda: 'Amrit, could you update the status of the backend API integration?'
Successfully sent message from Animish Choudhury to Amrit Nandan
Mon Apr 15 16:36:57 PDT 2024: Amrit Nandan received message from Animish Choudhury: 'Amrit, have you fixed the bugs I reported yesterday?'
Successfully sent message from Amrit Nandan to Animish Choudhury
Mon Apr 15 16:36:57 PDT 2024: Animish Choudhury received message from Amrit Nandan: 'Hey Animish, I've addressed the critical bugs. Please verify on your end.'
Successfully sent message from Animish Choudhury to Subham Panda
Mon Apr 15 16:36:57 PDT 2024: Subham Panda received message from Animish Choudhury: 'Subham, the test results look promising. We should discuss the next steps.'
Successfully sent message from Subham Panda to Rajat Pattnaik
Mon Apr 15 16:36:57 PDT 2024: Rajat Pattnaik received message from Subham Panda: 'Rajat, do we need additional resources for the UI/UX phase?'
Successfully sent message from Subham Panda to Animish Choudhury
Mon Apr 15 16:36:57 PDT 2024: Animish Choudhury received message from Subham Panda: 'Animish, can you prioritize the load testing for tomorrow?'
Successfully sent message from Rajat Pattnaik to Subham Panda
Mon Apr 15 16:36:57 PDT 2024: Subham Panda received message from Rajat Pattnaik: 'Hello, Subham, I think we're on track. However, I'll need the final assets by Friday.'
----------------------------------

===== Demonstrating block function =====
User Amrit Nandan has blocked user Subham Panda
----------------------------------
Cannot send message from Subham Panda to Amrit Nandan since Subham Panda is blocked by Amrit Nandan
Successfully sent message from Subham Panda to Rajat Pattnaik
Mon Apr 15 16:36:57 PDT 2024: Rajat Pattnaik received message from Subham Panda: 'Please check your emails for the updated project timeline.'
----------------------------------
Successfully sent message from Rajat Pattnaik to Subham Panda
Mon Apr 15 16:36:57 PDT 2024: Subham Panda received message from Rajat Pattnaik: 'Subham, could we discuss the timeline adjustment in tomorrow's meeting?'
----------------------------------

===== Demonstrating unsent function =====
Rajat Pattnaik unsent last message
Now, Rajat Pattnaik's last message is 'Mon Apr 15 16:36:57 PDT 2024: Message content: 'Hello, Subham, I think we're on track. However, I'll need the final assets by Friday.''
----------------------------------

===== Demonstrating unsent function =====
Amrit Nandan unsent last message:
----------------------------------
Iterating over all messages in Rajat Pattnaik's chat history:
Mon Apr 15 16:36:57 PDT 2024: Message content: 'Rajat, do we need additional resources for the UI/UX phase?'
Mon Apr 15 16:36:57 PDT 2024: Message content: 'Please check your emails for the updated project timeline.'
Mon Apr 15 16:36:57 PDT 2024: Message content: 'Hello, Subham, I think we're on track. However, I'll need the final assets by Friday.'
------------------------------------

Iterating over all messages in Subham Panda's chat history:
Mon Apr 15 16:36:57 PDT 2024: Message content: 'Subham, the test results look promising. We should discuss the next steps.'
Mon Apr 15 16:36:57 PDT 2024: Message content: 'Hello, Subham, I think we're on track. However, I'll need the final assets by Friday.'
Mon Apr 15 16:36:57 PDT 2024: Message content: 'Amrit, could you update the status of the backend API integration?'
Mon Apr 15 16:36:57 PDT 2024: Message content: 'Rajat, do we need additional resources for the UI/UX phase?'
Mon Apr 15 16:36:57 PDT 2024: Message content: 'Animish, can you prioritize the load testing for tomorrow?'
Mon Apr 15 16:36:57 PDT 2024: Message content: 'Please check your emails for the updated project timeline.'
------------------------------------

Iterating over all messages in Animish Choudhury's chat history:
Mon Apr 15 16:36:57 PDT 2024: Message content: 'Animish, can you prioritize the load testing for tomorrow?'
Mon Apr 15 16:36:57 PDT 2024: Message content: 'Amrit, have you fixed the bugs I reported yesterday?'
Mon Apr 15 16:36:57 PDT 2024: Message content: 'Subham, the test results look promising. We should discuss the next steps.'
------------------------------------


===== Demonstrating unregister function =====
Unregistered user Animish Choudhury
Cannot send message from Subham Panda to Animish Choudhury as user Animish Choudhury is not registered
------------------------------------



Process finished with exit code 0
```