NORTH SOUTH UNIVERSITY
Center of Excellence in Higher Education

Department of Electrical and Computer Engineering
CSE215: Programming Language II

Assignment 02

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Course Title   : Programming Language II

Course Code   : CSE215

Section   : 13

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Assignment Topic : Design and Implement of a Chat System using Synchronized
                    Multithreaded Programming

Code

```java
package chat;
import java.util.*;

public class ChatProgram {
    private static Object lock = new Object();
    private static  List<String> activeUsers = new ArrayList<>();
    public static void users(){
        activeUsers.add("user1");
        activeUsers.add("user2");
        activeUsers.add("user3");
    }

    public static void main(String[] args) {
        users();
        startChat();
    }
    private static int writer = 0;
    private static void startChat() {
        for (int i = 0; i < activeUsers.size(); i++) {
            String USER = activeUsers.get(i);
            Scanner sc = new Scanner(System.in);

            Thread thread = new Thread(new Runnable() {
                @Override
                public void run() {
                    while (true) {
                        synchronized (lock) {
                            while (!USER.equals(activeUsers.get(writer))) {
                                try {
                                    lock.wait();
                                } catch (InterruptedException e) {
                                    System.out.println(e);
                                }
                            }
                            System.out.print(USER + ": ");
                            String message = sc.nextLine();

                            if (message.indexOf("bye") != -1) {
                                activeUsers.remove(USER);
                                System.out.println(USER + " left the chat.");
                                if (activeUsers.size() <= 1) {
                                    System.out.println("End of Conversation.");
                                    stopChat();
                                }
                            }
                            int bye = -1;
                            if (bye == -1) {
                                writer = (writer + 1) % activeUsers.size();
                            } else {
                                writer = bye;
                                bye = -1;
                            }
                            lock.notifyAll();
                        }
                    }
                }
            });
            thread.start();
        }
    }
    private static void stopChat(){
        System.exit(0);
    }
}
```

Output

Project ∨   © ChatProgram.java ✕

Run   ☐ ChatProgram ✕

```
/Users/misbahkhan/Library/Java/JavaVirtualMachines/openjdk-20.0.1/Con
user1: hi
user2: hello
user3: hey
user1: how are you all?
user2: fine
user3: fine
user1: where do you live
user2: Dhaka
user3: Mymensingh
user1: Shylet
user2: okay bye
user2 left the chat.
user1: bye
user1 left the chat.
End of Conversation.

Process finished with exit code 0
```

☐ assign2 > src > chat > © ChatProgram > ⓜ startChat > ◎ anonymous Runnable > ⓜ run

Flow Chart

Start Program

↓

Enter user1 message

↓

Is message == "bye"?
&& User din't said bye previously ———— Yes ——→

No
↓

Enter user2 message

↓

Is message == "bye"?
&& User din't said bye previously ———— Yes ——→

No
↓

Enter user3 message

↓

Is message == "bye"?
&& User din't said bye previously ———— Yes ——→

No

↓

Count user

User == 1
↓

End Program