Networks Lab: CS39006

Assignment 8: Implement a Peer-to-Peer Chat Application

Design Document

Group Details

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1. Data-structures used

1.1 Structure user_info

```
struct user_info{

        int port;                  /* client's port number */
        char *IPaddr;              /* client's IP address */
        char *clientname;          /* client's name */
};

struct user_info PeerUserInfo[MAXPEERS];
```

Every participating user maintains a user_info structure that contains - name of the friend, IP address of the machine where the chat application is running, & port number at which the peer-chat server is running. This table is static. The program supports peer to peer chatting between *5 users*.

Shared User Info Table

PORT Number	IP Address	Peer Name
30001	192.168.18.144	User1
30002	192.168.18.144	User2
30003	192.168.18.144	User3
30004	192.168.18.144	User4
30005	192.168.18.144	User5

The above table is also printed by the program for convenience of user.

1.2 How to add new users/change current peers?

- *The Macro MAXPEERS denotes maximum number of peers that can chat. To add new users, simple increase the count of macro MAXPEERS as required. Then add peer name to* char *clientnames in setup_user_info(void) function.
- *To change current peers, modify the names in char *clientnames in setup_user_info(void) function.*

2.User-defined Functions used

2.1.**void setup_user_info() :** Initialises user_info data structure

```
void setup_user_info(){

char *clientnames[MAXPEERS+1]={"Abhinav","Animesh","Bohra","Jain","Anonymous"};
        int base_port = 30001;
        char *IPaddr = "192.168.18.144";

        for(int i=0;i<MAXPEERS;i++){

                PeerUserInfo[i].port = base_port + i;
                PeerUserInfo[i].IPaddr = IPaddr;
                PeerUserInfo[i].clientname = clientnames[i];
        }
}
```

2.2 **getIndex(char *clientName):** Returns the index of client name by looking up in user_info table

```
int getIndex(char *clientName){

        for(int i=0; i< MAXPEERS;i++)
                if(strcmp(PeerUserInfo[i].clientname, clientName) == 0 ) return i;

        return -1;
}
```

2.3 ParseMessage(char *buffer,char *clientName, char *message): Splits a string into two parts using '/' as delimeter.

```
void ParseMessage(char *buffer,char *clientName, char *message){

    int index =0;
    while(buffer[index]!='/') {
            clientName[index] = buffer[index];
            index++;
    }
    clientName[index] = '\0';
    index++; //Skip '/'

    for(int j=index; j<MAXSIZE; j++) message[j-index]=buffer[j];
}
```

3. Compilation and Running Procedure

1. Change char *IPaddr = "192.168.18.144" to your IP address (Line 54)

2. Change Directory to the directory containing the file p2p-chat-app.c

3. Create two instances of terminal

4. In 1st Instance Run the command: `gcc p2p-chat-app.c && ./a.out User1`

5. In 2nd Instance Run the command: `gcc p2p-chat-app.c && ./a.out User2`

6. Create more such instances (upto 5) with peer names mentioned in user_info (if needed)

Note that the program takes peer name (should be present in user_info data structure) from command line as the only argument.

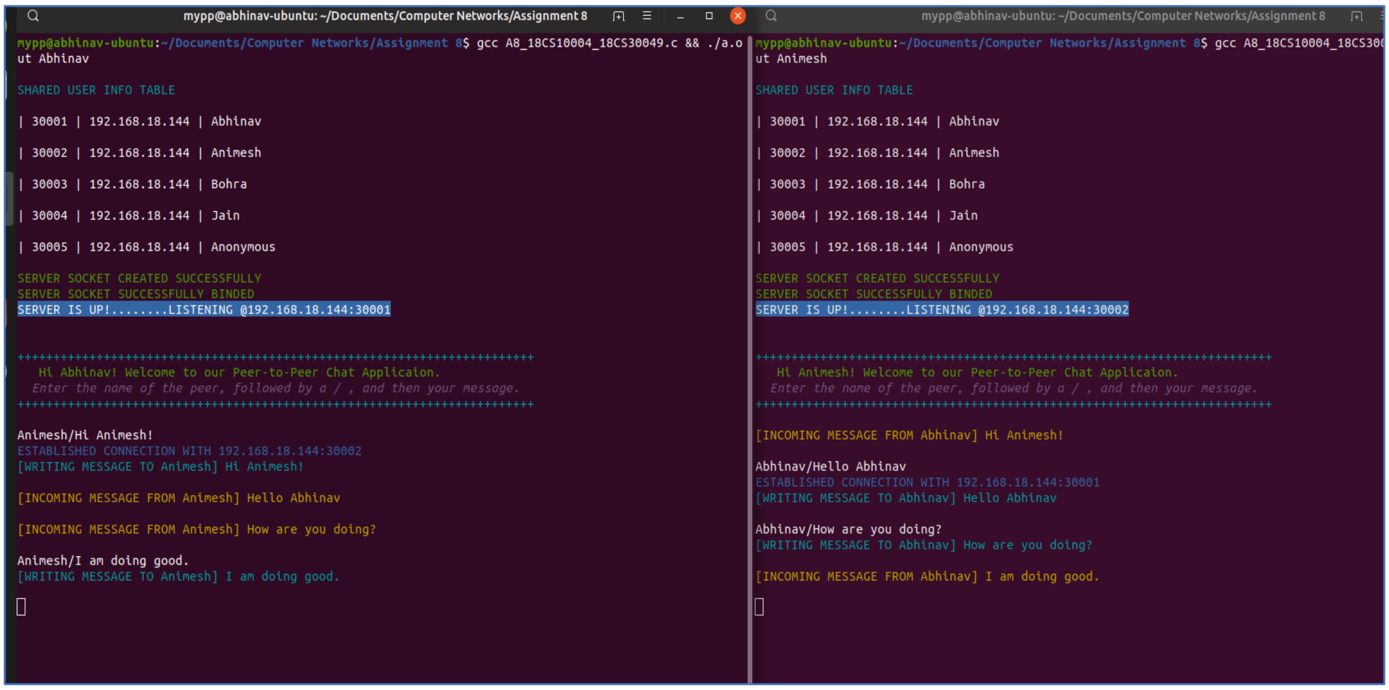
4. Sample Inputs & Outputs

Case 1: Messages from one peer to another peer

Sample Input 1:

On Terminal 1 – User2/Hi User2!
On Terminal 2 – User1/Hello User1!
On Terminal 2 – User1/How are you doing?
On Terminal 1 – User2/I am doing good.

Sample Output 1:



```
mypp@abhinav-ubuntu: ~/Documents/Computer Networks/Assignment 8
mypp@abhinav-ubuntu:~/Documents/Computer Networks/Assignment 8$ gcc A8_18CS10004_18CS30049.c && ./a.o
ut Abhinav

SHARED USER INFO TABLE

| 30001 | 192.168.18.144 | Abhinav

| 30002 | 192.168.18.144 | Animesh

| 30003 | 192.168.18.144 | Bohra

| 30004 | 192.168.18.144 | Jain

| 30005 | 192.168.18.144 | Anonymous

SERVER SOCKET CREATED SUCCESSFULLY
SERVER SOCKET SUCCESSFULLY BINDED
SERVER IS UP!........LISTENING @192.168.18.144:30001


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Hi Abhinav! Welcome to our Peer-to-Peer Chat Applicaion.
  Enter the name of the peer, followed by a / , and then your message.
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Animesh/Hi Animesh!
ESTABLISHED CONNECTION WITH 192.168.18.144:30002
[WRITING MESSAGE TO Animesh] Hi Animesh!

[INCOMING MESSAGE FROM Animesh] Hello Abhinav

[INCOMING MESSAGE FROM Animesh] How are you doing?

Animesh/I am doing good.
[WRITING MESSAGE TO Animesh] I am doing good.

▯
```

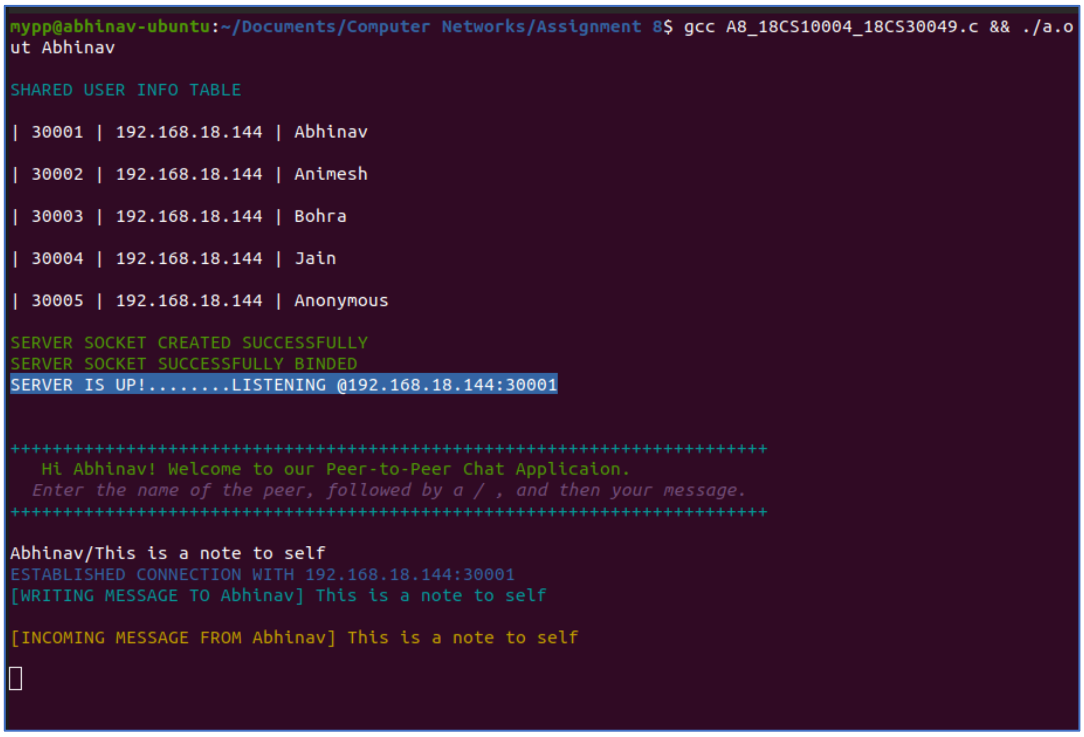
```
mypp@abhinav-ubuntu: ~/Documents/Computer Networks/Assignment 8
mypp@abhinav-ubuntu:~/Documents/Computer Networks/Assignment 8$ gcc A8_18CS10004_18CS30
ut Animesh

SHARED USER INFO TABLE

| 30001 | 192.168.18.144 | Abhinav

| 30002 | 192.168.18.144 | Animesh

| 30003 | 192.168.18.144 | Bohra

| 30004 | 192.168.18.144 | Jain

| 30005 | 192.168.18.144 | Anonymous

SERVER SOCKET CREATED SUCCESSFULLY
SERVER SOCKET SUCCESSFULLY BINDED
SERVER IS UP!........LISTENING @192.168.18.144:30002


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Hi Animesh! Welcome to our Peer-to-Peer Chat Applicaion.
  Enter the name of the peer, followed by a / , and then your message.
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

[INCOMING MESSAGE FROM Abhinav] Hi Animesh!

Abhinav/Hello Abhinav
ESTABLISHED CONNECTION WITH 192.168.18.144:30001
[WRITING MESSAGE TO Abhinav] Hello Abhinav

Abhinav/How are you doing?
[WRITING MESSAGE TO Abhinav] How are you doing?

[INCOMING MESSAGE FROM Abhinav] I am doing good.

▯
```

Case 2: Messages from a user to himself/herself

Sample Input 2:

On Terminal 1 – User1/This is a note to self

Sample Output 2:



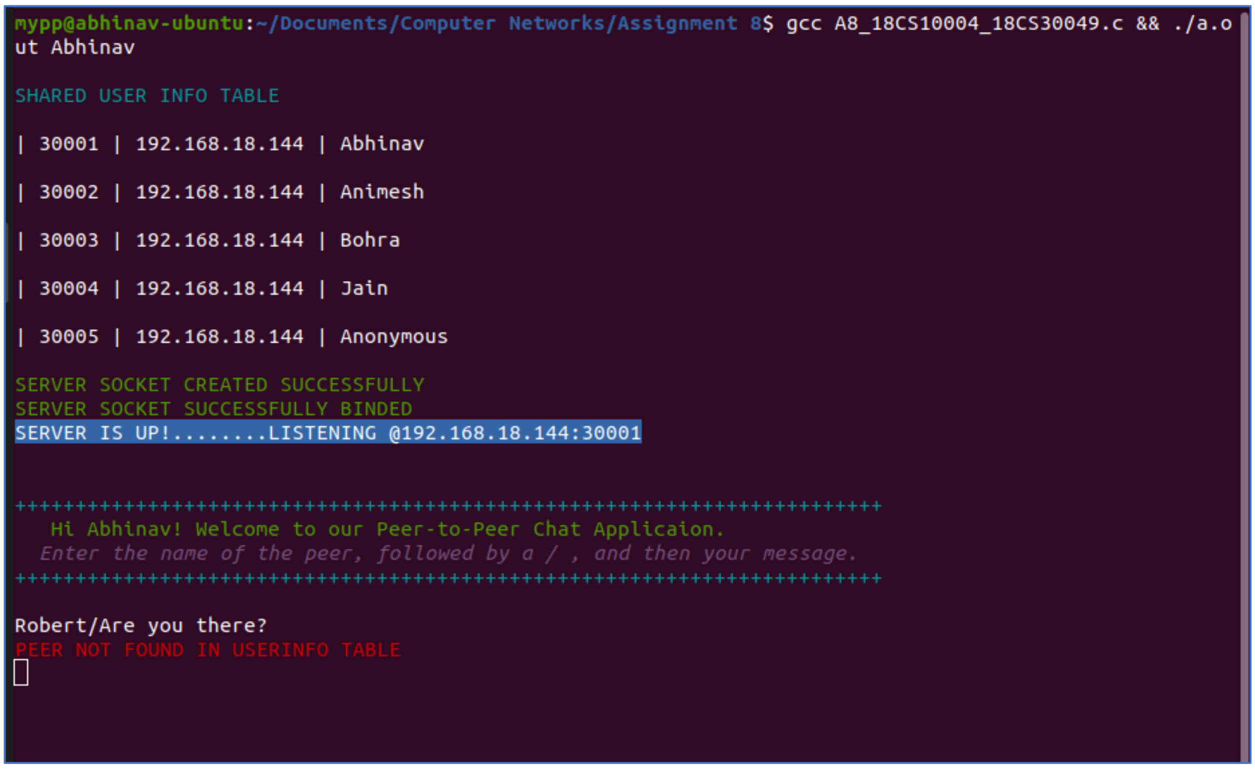
```
mypp@abhinav-ubuntu:~/Documents/Computer Networks/Assignment 8$ gcc A8_18CS10004_18CS30049.c && ./a.o
ut Abhinav

SHARED USER INFO TABLE

| 30001 | 192.168.18.144 | Abhinav

| 30002 | 192.168.18.144 | Animesh

| 30003 | 192.168.18.144 | Bohra

| 30004 | 192.168.18.144 | Jain

| 30005 | 192.168.18.144 | Anonymous

SERVER SOCKET CREATED SUCCESSFULLY
SERVER SOCKET SUCCESSFULLY BINDED
SERVER IS UP!........LISTENING @192.168.18.144:30001


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Hi Abhinav! Welcome to our Peer-to-Peer Chat Applicaion.
  Enter the name of the peer, followed by a / , and then your message.
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Abhinav/This is a note to self
ESTABLISHED CONNECTION WITH 192.168.18.144:30001
[WRITING MESSAGE TO Abhinav] This is a note to self

[INCOMING MESSAGE FROM Abhinav] This is a note to self

▯
```

Case 3: Message to an unknown peer

Sample Input 3:

On Terminal 1 – Robert/Are you there Robert?

Sample Output 3:



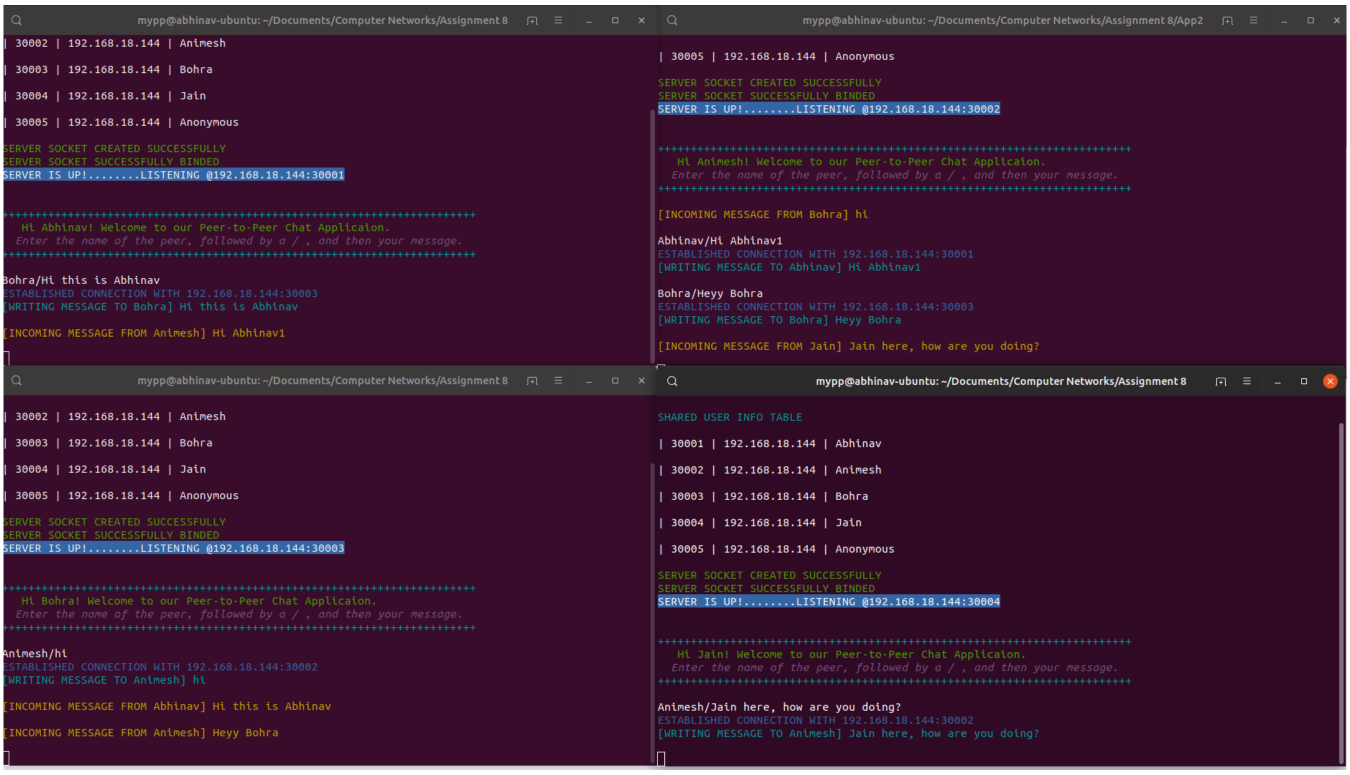
```
mypp@abhinav-ubuntu:~/Documents/Computer Networks/Assignment 8$ gcc A8_18CS10004_18CS30049.c && ./a.o
ut Abhinav

SHARED USER INFO TABLE

| 30001 | 192.168.18.144 | Abhinav

| 30002 | 192.168.18.144 | Animesh

| 30003 | 192.168.18.144 | Bohra

| 30004 | 192.168.18.144 | Jain

| 30005 | 192.168.18.144 | Anonymous

SERVER SOCKET CREATED SUCCESSFULLY
SERVER SOCKET SUCCESSFULLY BINDED
SERVER IS UP!........LISTENING @192.168.18.144:30001


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Hi Abhinav! Welcome to our Peer-to-Peer Chat Applicaion.
  Enter the name of the peer, followed by a / , and then your message.
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Robert/Are you there?
PEER NOT FOUND IN USERINFO TABLE
```

Case 4: Cross Messaging between 4 Users at a time

Sample Input 4:

On Terminal 1 – User3/This is User1
On Terminal 3 – User2/hi
On Terminal 2 – User1/Hi User1!
On Terminal 2 – User3/Heyy User3
On Terminal 4 – User2/User4 here, how are you doing?

Sample Output 4:


mypp@abhinav-ubuntu: ~/Documents/Computer Networks/Assignment 8
mypp@abhinav-ubuntu: ~/Documents/Computer Networks/Assignment 8/App2
mypp@abhinav-ubuntu: ~/Documents/Computer Networks/Assignment 8
mypp@abhinav-ubuntu: ~/Documents/Computer Networks/Assignment 8

```
| 30002 | 192.168.18.144 | Animesh

| 30003 | 192.168.18.144 | Bohra

| 30004 | 192.168.18.144 | Jain

| 30005 | 192.168.18.144 | Anonymous

SERVER SOCKET CREATED SUCCESSFULLY
SERVER SOCKET SUCCESSFULLY BINDED
SERVER IS UP!........LISTENING @192.168.18.144:30001


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Hi Abhinav! Welcome to our Peer-to-Peer Chat Applicaion.
  Enter the name of the peer, followed by a / , and then your message.
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Bohra/Hi this is Abhinav
ESTABLISHED CONNECTION WITH 192.168.18.144:30003
[WRITING MESSAGE TO Bohra] Hi this is Abhinav

[INCOMING MESSAGE FROM Animesh] Hi Abhinav1
```

```
| 30005 | 192.168.18.144 | Anonymous

SERVER SOCKET CREATED SUCCESSFULLY
SERVER SOCKET SUCCESSFULLY BINDED
SERVER IS UP!........LISTENING @192.168.18.144:30002


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Hi Animesh! Welcome to our Peer-to-Peer Chat Applicaion.
  Enter the name of the peer, followed by a / , and then your message.
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

[INCOMING MESSAGE FROM Bohra] hi

Abhinav/Hi Abhinav1
ESTABLISHED CONNECTION WITH 192.168.18.144:30001
[WRITING MESSAGE TO Abhinav] Hi Abhinav1

Bohra/Heyy Bohra
ESTABLISHED CONNECTION WITH 192.168.18.144:30003
[WRITING MESSAGE TO Bohra] Heyy Bohra

[INCOMING MESSAGE FROM Jain] Jain here, how are you doing?
```

```
| 30002 | 192.168.18.144 | Animesh

| 30003 | 192.168.18.144 | Bohra

| 30004 | 192.168.18.144 | Jain

| 30005 | 192.168.18.144 | Anonymous

SERVER SOCKET CREATED SUCCESSFULLY
SERVER SOCKET SUCCESSFULLY BINDED
SERVER IS UP!........LISTENING @192.168.18.144:30003


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Hi Bohra! Welcome to our Peer-to-Peer Chat Applicaion.
  Enter the name of the peer, followed by a / , and then your message.
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Animesh/hi
ESTABLISHED CONNECTION WITH 192.168.18.144:30002
[WRITING MESSAGE TO Animesh] hi

[INCOMING MESSAGE FROM Abhinav] Hi this is Abhinav

[INCOMING MESSAGE FROM Animesh] Heyy Bohra
```

```
SHARED USER INFO TABLE

| 30001 | 192.168.18.144 | Abhinav

| 30002 | 192.168.18.144 | Animesh

| 30003 | 192.168.18.144 | Bohra

| 30004 | 192.168.18.144 | Jain

| 30005 | 192.168.18.144 | Anonymous

SERVER SOCKET CREATED SUCCESSFULLY
SERVER SOCKET SUCCESSFULLY BINDED
SERVER IS UP!........LISTENING @192.168.18.144:30004


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Hi Jain! Welcome to our Peer-to-Peer Chat Applicaion.
  Enter the name of the peer, followed by a / , and then your message.
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Animesh/Jain here, how are you doing?
ESTABLISHED CONNECTION WITH 192.168.18.144:30002
[WRITING MESSAGE TO Animesh] Jain here, how are you doing?
```