

Advanced Computer Networks Lab



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Assignment -2

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**DSSRG: Decentralized
Smart Systems Research
Group**

<https://sites.google.com/iitbbs.ac.in/dssrg>
Or Google dssrg iitbbs



About

- P2P network
- Distributed systems
- Collaborative computation using multiple-peers



ASSIGNMENT 2.1

100 Marks

A peer-to-peer (P2P) network is a decentralized communication infrastructure where individual nodes act as both **clients and servers**, sharing resources directly with one another without a **central authority**. This structure allows for efficient data distribution and increased resilience, as the network remains functional even if several participants disconnect.

PROBLEM STATEMENT

Design and implement a decentralized, *single-threaded (not multi-threaded, simple)* P2P chat application where each peer can maintain multiple concurrent connections without using blocking I/O or multi-threading. The system must support both "Global" (i.e., broadcast to all peers) and "Private" (i.e., direct to a given peer) messaging.



ASSIGNMENT 2.1 (Cont....)

PROBLEM STATEMENT

You can implement following commands in the app

Command: Description

/help: Display all available commands.

/list: List all currently connected peers (Index, Username, IP, and Port).

/connect <IP> <PORT>: Initiate a TCP connection to a remote peer.

/msg <ID> <message>: Send a private message to a specific peer.

/broadcast <message>: Send a message to every connected peer.

/quit or /exit: Terminate all connections and exit the program.



ASSIGNMENT 2.1

Expected Outcome:

User 1

```
server started on port 8882
P2P Chat Started on port 8882
Commands:
Available commands:
/help           - Show this help message
/list            - List connected peers
/connect <IP> <PORT> - Connect to a peer
/msg <ID> <message> - Send private message to peer
/broadcast      - Broadcast message to all peers
/quit or /exit   - Exit the chat
```

To send a public message, just type and press enter

```
[Nitin]: /connect 127.0.0.1 8883
[+] Connected to peer: Satwik (127.0.0.1:8883)
[Nitin]: [Nitin]: hello
[You -> All]: hello
[Nitin]:
[+] New peer connected: Anwesha (127.0.0.1:46506)
[Nitin]:
[Anwesha]: hello
[Nitin]:
```

```
P2P Chat Started on port 8883
Commands:
Available commands:
/help           - Show this help message
/list            - List connected peers
/connect <IP> <PORT> - Connect to a peer
/msg <ID> <message> - Send private message to peer
/broadcast      - Broadcast message to all peers
/quit or /exit   - Exit the chat
```

To send a public message, just type and press enter

```
[Satwik]:
[+] New peer connected: Nitin (127.0.0.1:58178)
[Satwik]:
[Nitin]: hello
[Satwik]:
```

User 2

User 3

```
server started on port 8882
P2P Chat Started on port 8882
Commands:
Available commands:
/help           - Show this help message
/list            - List connected peers
/connect <IP> <PORT> - Connect to a peer
/msg <ID> <message> - Send private message to peer
/broadcast      - Broadcast message to all peers
/quit or /exit   - Exit the chat
```

To send a public message, just type and press enter

```
[Nitin]: /connect 127.0.0.1 8883
[+] Connected to peer: Satwik (127.0.0.1:8883)
[Nitin]: [Nitin]: hello
[You -> All]: hello
[Nitin]:
[+] New peer connected: Anwesha (127.0.0.1:46506)
[Nitin]:
[Anwesha]: hello
[Nitin]:
```

