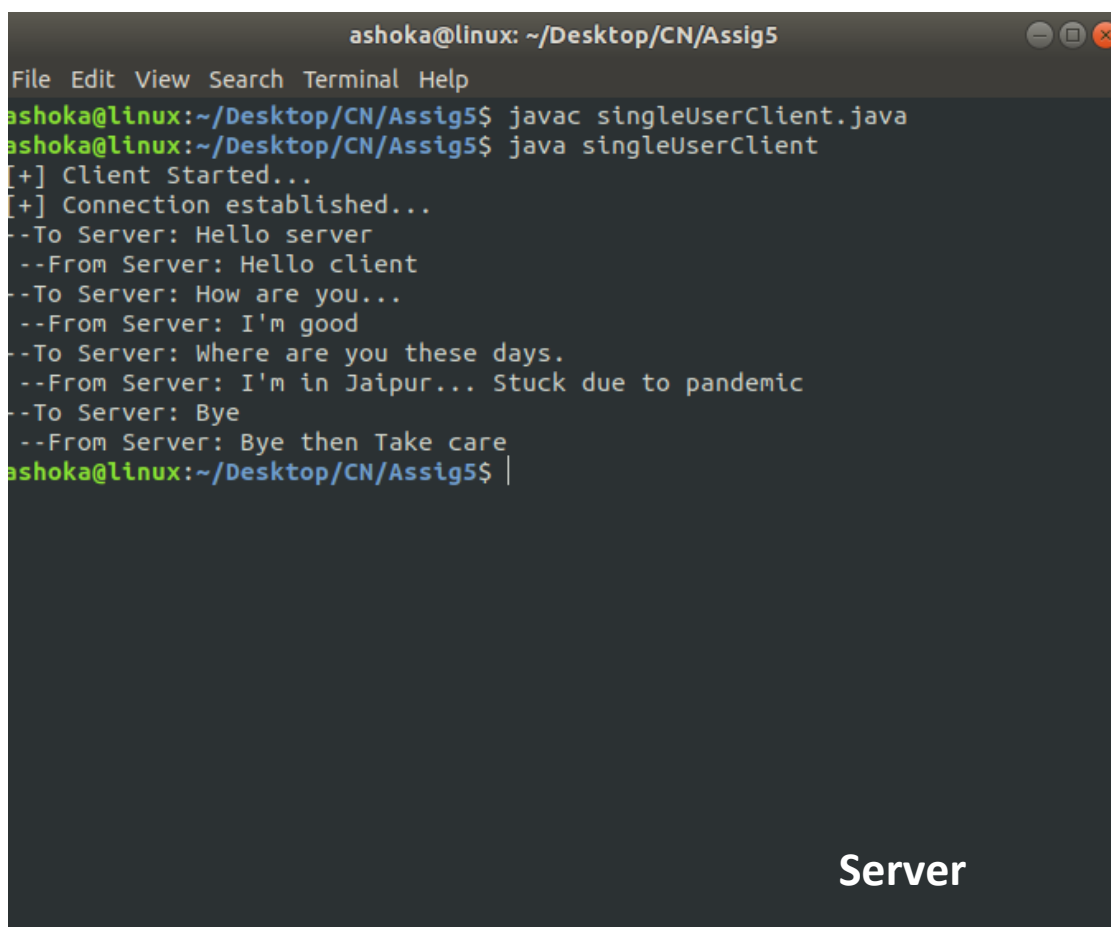


Department of Computer Engineering
TE Computer-A (2020-21 Sem I)
Computer Networks
Practical Assignment B1

- Q1. Write a program using TCP sockets for wired network to implement**
- a. Peer to Peer Chat**
 - b. Multiuser Chat.**

a. Peer to Peer Chat

Terminal output window



```
ashoka@linux: ~/Desktop/CN/Assig5
File Edit View Search Terminal Help
ashoka@linux:~/Desktop/CN/Assig5$ javac singleUserClient.java
ashoka@linux:~/Desktop/CN/Assig5$ java singleUserClient
[+] Client Started...
[+] Connection established...
--To Server: Hello server
--From Server: Hello client
--To Server: How are you...
--From Server: I'm good
--To Server: Where are you these days.
--From Server: I'm in Jaipur... Stuck due to pandemic
--To Server: Bye
--From Server: Bye then Take care
ashoka@linux:~/Desktop/CN/Assig5$ |
```

Server

File Edit View Search Terminal Help

ashoka@linux:~/Desktop/CN/Assig5\$ javac singleUserServer.java

ashoka@linux:~/Desktop/CN/Assig5\$ java singleUserServer

Waiting for clients...

--From Client: Hello server

--To Client: Hello client

--From Client: How are you...

--To Client: I'm good

--From Client: Where are you these days.

--To Client: I'm in Jaipur... Stuck due to pandemic

--From Client: Bye

--To Client: Bye then Take care

ashoka@linux:~/Desktop/CN/Assig5\$ |

Client

Wireshark windows

The image shows the Wireshark interface with a packet capture on interface `lo`. The packet list shows a series of TCP packets between `127.0.0.1` and `127.0.0.1`. The packet details pane shows the selected packet (No. 3) as a `Transmission Control Protocol` packet with `Seq=0`, `Ack=1`, `Win=65536`, and `Len=0`. The packet bytes pane shows the raw data in hexadecimal and ASCII.

No.	Time	Source	Destination	Protocol	Length	Info
3	20.303128640	127.0.0.1	127.0.0.1	TCP	74	34960 → 9999 [SYN] Seq=0 Win=65495 Len=0 MSS=65495 SACK_PERM=1 TSval=1...
4	20.303139807	127.0.0.1	127.0.0.1	TCP	74	9999 → 34960 [SYN, ACK] Seq=0 Ack=1 Win=65483 Len=0 MSS=65495 SACK_PER...
5	20.303148675	127.0.0.1	127.0.0.1	TCP	66	34960 → 9999 [ACK] Seq=1 Ack=1 Win=65536 Len=0 TSval=1734143269 TSecr=...
7	24.455312905	127.0.0.1	127.0.0.1	TCP	79	34960 → 9999 [PSH, ACK] Seq=1 Ack=1 Win=65536 Len=13 TSval=1734147421 ...
8	24.455355634	127.0.0.1	127.0.0.1	TCP	66	9999 → 34960 [ACK] Seq=1 Ack=14 Win=65536 Len=0 TSval=1734147421 TSecr=...
9	30.277913542	127.0.0.1	127.0.0.1	TCP	79	9999 → 34960 [PSH, ACK] Seq=1 Ack=14 Win=65536 Len=13 TSval=1734153244...
10	30.277964870	127.0.0.1	127.0.0.1	TCP	66	34960 → 9999 [ACK] Seq=14 Ack=14 Win=65536 Len=0 TSval=1734153244 TSecr=...
11	38.987929017	127.0.0.1	127.0.0.1	TCP	81	34960 → 9999 [PSH, ACK] Seq=14 Ack=14 Win=65536 Len=15 TSval=173416195...
12	38.987967414	127.0.0.1	127.0.0.1	TCP	66	9999 → 34960 [ACK] Seq=14 Ack=29 Win=65536 Len=0 TSval=1734161954 TSecr=...
13	48.017313821	127.0.0.1	127.0.0.1	TCP	75	9999 → 34960 [PSH, ACK] Seq=14 Ack=29 Win=65536 Len=9 TSval=1734170983...
14	48.017346538	127.0.0.1	127.0.0.1	TCP	66	34960 → 9999 [ACK] Seq=29 Ack=23 Win=65536 Len=0 TSval=1734170983 TSecr=...
16	59.284928432	127.0.0.1	127.0.0.1	TCP	92	34960 → 9999 [PSH, ACK] Seq=29 Ack=23 Win=65536 Len=26 TSval=173418225...
17	59.284967664	127.0.0.1	127.0.0.1	TCP	66	9999 → 34960 [ACK] Seq=23 Ack=55 Win=65536 Len=0 TSval=1734182251 TSecr=...
18	91.705264364	127.0.0.1	127.0.0.1	TCP	105	9999 → 34960 [PSH, ACK] Seq=23 Ack=55 Win=65536 Len=39 TSval=173421467...
19	91.705314388	127.0.0.1	127.0.0.1	TCP	66	34960 → 9999 [ACK] Seq=55 Ack=62 Win=65536 Len=0 TSval=1734214671 TSecr=...
24	94.541820880	127.0.0.1	127.0.0.1	TCP	70	34960 → 9999 [PSH, ACK] Seq=55 Ack=62 Win=65536 Len=4 TSval=1734217508...
25	94.541839259	127.0.0.1	127.0.0.1	TCP	66	9999 → 34960 [ACK] Seq=62 Ack=59 Win=65536 Len=0 TSval=1734217508 TSecr=...
26	102.200578109	127.0.0.1	127.0.0.1	TCP	85	9999 → 34960 [PSH, ACK] Seq=62 Ack=59 Win=65536 Len=19 TSval=173422516...
27	102.200614758	127.0.0.1	127.0.0.1	TCP	66	34960 → 9999 [ACK] Seq=59 Ack=81 Win=65536 Len=0 TSval=1734225167 TSecr=...
28	102.202503612	127.0.0.1	127.0.0.1	TCP	66	9999 → 34960 [FIN, ACK] Seq=81 Ack=59 Win=65536 Len=0 TSval=1734225168...
29	102.203212785	127.0.0.1	127.0.0.1	TCP	66	34960 → 9999 [FIN, ACK] Seq=59 Ack=82 Win=65536 Len=0 TSval=1734225169...
30	102.203238484	127.0.0.1	127.0.0.1	TCP	66	9999 → 34960 [ACK] Seq=82 Ack=60 Win=65536 Len=0 TSval=1734225169 TSecr=...

Frame 3: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface lo, id 0
Ethernet II, Src: 00:00:00:00:00:00 (00:00:00:00:00:00), Dst: 00:00:00:00:00:00 (00:00:00:00:00:00)
Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 34960, Dst Port: 9999, Seq: 0, Len: 0

0000 00 00 00 00 00 00 00 00 00 00 00 00 08 00 45 00E.
0010 00 3c 5e 63 40 00 00 00 de 56 7f 00 00 01 7f 00 .<^c@.0. V.....
0020 00 01 88 90 27 0f bd 48 2c 3f 00 00 00 00 a0 02H,?.....

Transmission Control Protocol: Protocol Packets: 30 · Displayed: 22 (73.3%) · Dropped: 0 (0.0%) Profile: Default

TCP STREAM

The image shows the Wireshark TCP Stream window for the selected TCP stream (tcp.stream eq 0). The window displays the raw data in ASCII, showing a conversation between a client and a server. The client sends a greeting, and the server responds. The window also shows the number of client and server packets, the total size of the conversation, and buttons for finding, filtering, and saving the stream.

Wireshark · Follow TCP Stream (tcp.stream eq 0) · Loopback: lo

Hello server
Hello client
How are you...
I'm good
Where are you these days.
I'm in Jaipur... Stuck due to pandemic
Bye
Bye then Take care

4 client pkts, 4 server pkts, 7 turns.

Entire conversation (138 bytes) Show and save data as ASCII Stream 0

Find: Find Next

Help Filter Out This Stream Print Save as... Back Close

a. Multiuser Chat

Terminal output window

```
ashoka@linux: ~/Desktop/CN/Assig5
File Edit View Search Terminal Help
ashoka@linux:~/Desktop/CN/Assig5$ javac Server_3317.java
ashoka@linux:~/Desktop/CN/Assig5$ java Server_3317
[+] Waiting for Clients...
[+] Waiting for Clients...
[+] Waiting for Clients...
[+] Waiting for Clients...
```

Server

```
ashoka@linux: ~/Desktop/CN/Assig5
File Edit View Search Terminal Help
ashoka@linux:~/Desktop/CN/Assig5$ javac Client_3317.java
ashoka@linux:~/Desktop/CN/Assig5$ java Client_3317
[+] Client Started...
[+] Connection established...
Enter username: Ashok
Hello everyone
-->Sorry, No other users online
Ram is online
Hello Ram
How are you
Ram
--> I'm good
Ram
--> Everything is fine
Syam is online
Syam
--> How are you Ashok and Ram
Syam Left the chat
Leave
ashoka@linux:~/Desktop/CN/Assig5$ |
```

User1(Ashok)

```
ashoka@linux: ~/Desktop/CN/Assig5
File Edit View Search Terminal Help
ashoka@linux:~/Desktop/CN/Assig5$ javac Client_3317.java
ashoka@linux:~/Desktop/CN/Assig5$ java Client_3317
[+] Client Started...
[+] Connection established...
Enter username: Ram
Ashok is already online
Ashok
--> Hello Ram
Ashok
--> How are you
I'm good
Everything is fine
Syam is online
Syam
--> How are you Ashok and Ram
Syam Left the chat
Ashok Left the chat
Leave
ashoka@linux:~/Desktop/CN/Assig5$ |
```

User2(Ram)

```
ashoka@linux: ~/Desktop/CN/Assig5
File Edit View Search Terminal Help
ashoka@linux:~/Desktop/CN/Assig5$ javac Client_3317.java
ashoka@linux:~/Desktop/CN/Assig5$ java Client_3317
[+] Client Started...
[+] Connection established...
Enter username: Syam
Ashok is already online
Ram is already online
How are you Ashok and Ram
Leave
ashoka@linux:~/Desktop/CN/Assig5$ |
```

User3(Syam)

Wireshark windows

The image shows the Wireshark interface with a packet capture on interface 'lo'. The packet list shows a series of TCP packets between 127.0.0.1. The packet details pane shows the selected packet (No. 26) as a TCP ACK packet. The packet bytes pane shows the raw data in hexadecimal and ASCII.

No.	Time	Source	Destination	Protocol	Length	Info
10	15.954743866	127.0.0.1	127.0.0.1	TCP	74	34928 → 9999 [SYN] Seq=0 Win=65495 Len=0 MSS=65495 SACK_PERM=1 T...
11	15.954762970	127.0.0.1	127.0.0.1	TCP	74	9999 → 34928 [SYN, ACK] Seq=0 Ack=1 Win=65483 Len=0 MSS=65495 SA...
12	15.954777484	127.0.0.1	127.0.0.1	TCP	66	34928 → 9999 [ACK] Seq=1 Ack=1 Win=65536 Len=0 TSval=1733504163 ...
13	19.102361795	127.0.0.1	127.0.0.1	TCP	70	34928 → 9999 [PSH, ACK] Seq=1 Ack=1 Win=65536 Len=4 TSval=173350...
14	19.102383625	127.0.0.1	127.0.0.1	TCP	66	9999 → 34928 [ACK] Seq=1 Ack=5 Win=65536 Len=0 TSval=1733507310 ...
17	19.115710368	127.0.0.1	127.0.0.1	TCP	90	9999 → 34928 [PSH, ACK] Seq=1 Ack=5 Win=65536 Len=24 TSval=17335...
18	19.115716424	127.0.0.1	127.0.0.1	TCP	66	34928 → 9999 [ACK] Seq=5 Ack=25 Win=65536 Len=0 TSval=1733507324...
21	28.256520838	127.0.0.1	127.0.0.1	TCP	83	9999 → 34928 [PSH, ACK] Seq=25 Ack=5 Win=65536 Len=17 TSval=1733...
22	28.256536040	127.0.0.1	127.0.0.1	TCP	66	34928 → 9999 [ACK] Seq=5 Ack=42 Win=65536 Len=0 TSval=1733516464...
25	33.484524818	127.0.0.1	127.0.0.1	TCP	85	9999 → 34928 [PSH, ACK] Seq=42 Ack=5 Win=65536 Len=19 TSval=1733...
26	33.484528666	127.0.0.1	127.0.0.1	TCP	66	34928 → 9999 [ACK] Seq=5 Ack=61 Win=65536 Len=0 TSval=1733521692...
27	39.148953915	127.0.0.1	127.0.0.1	TCP	75	34928 → 9999 [PSH, ACK] Seq=5 Ack=61 Win=65536 Len=9 TSval=17335...
28	39.148968147	127.0.0.1	127.0.0.1	TCP	66	9999 → 34928 [ACK] Seq=61 Ack=14 Win=65536 Len=0 TSval=173352735...
31	45.409630924	127.0.0.1	127.0.0.1	TCP	85	34928 → 9999 [PSH, ACK] Seq=14 Ack=61 Win=65536 Len=19 TSval=173...
32	45.409640180	127.0.0.1	127.0.0.1	TCP	66	9999 → 34928 [ACK] Seq=61 Ack=33 Win=65536 Len=0 TSval=173353361...
42	58.315965833	127.0.0.1	127.0.0.1	TCP	81	9999 → 34928 [PSH, ACK] Seq=61 Ack=33 Win=65536 Len=15 TSval=173...
43	58.315971270	127.0.0.1	127.0.0.1	TCP	66	34928 → 9999 [ACK] Seq=33 Ack=76 Win=65536 Len=0 TSval=173354652...
52	75.607530998	127.0.0.1	127.0.0.1	TCP	98	9999 → 34928 [PSH, ACK] Seq=76 Ack=33 Win=65536 Len=32 TSval=173...
53	75.607536192	127.0.0.1	127.0.0.1	TCP	66	34928 → 9999 [ACK] Seq=33 Ack=108 Win=65536 Len=0 TSval=17335638...
58	81.776579873	127.0.0.1	127.0.0.1	TCP	85	9999 → 34928 [PSH, ACK] Seq=108 Ack=33 Win=65536 Len=19 TSval=17...
59	81.776585274	127.0.0.1	127.0.0.1	TCP	66	34928 → 9999 [ACK] Seq=33 Ack=127 Win=65536 Len=0 TSval=17335699...
66	88.650871960	127.0.0.1	127.0.0.1	TCP	86	9999 → 34928 [PSH, ACK] Seq=127 Ack=33 Win=65536 Len=20 TSval=17...

Frame 10: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface lo, id 0
Ethernet II, Src: 00:00:00:00:00:00 (00:00:00:00:00:00), Dst: 00:00:00:00:00:00 (00:00:00:00:00:00)
Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 34928, Dst Port: 9999, Seq: 0, Len: 0

0000 00 00 00 00 00 00 00 00 00 00 00 08 00 45 00E..
0010 00 3c 49 65 40 00 00 06 f3 54 7f 00 00 01 7f 00 .<Ie@.@.T..
0020 00 01 88 70 27 0f e1 2e 2f 5f 00 00 00 a0 02 ...p'.../_..
0030 ff d7 fe 30 00 00 02 04 ff d7 04 02 08 0a 67 53 ...0.....gS

wireshark_lo_20201001161054_PHgFki.pcapng Packets: 75 · Displayed: 27 (36.0%) · Dropped: 0 (0.0%) Profile: Default

TCP STREAM

The image shows the 'Follow TCP Stream' window in Wireshark, displaying a chat conversation. The text is color-coded: blue for client packets and red for server packets. The conversation includes greetings, status updates, and a final 'Leave' message.

Ram
Ashok is already online
Ashok: Hello Ram
Ashok: How are you
I'm good
Everything is fine
Syam is online
Syam: How are you Ashok and Ram
Syam Left the chat
Ashok Left the chat
Leave

4 client pkts, 7 server pkts, 4 turns.

Entire conversation (184 bytes) Show and save data as ASCII Stream 1

Find: Find Next

Help Filter Out This Stream Print Save as... Back Close