

## SERVER PROGRAM

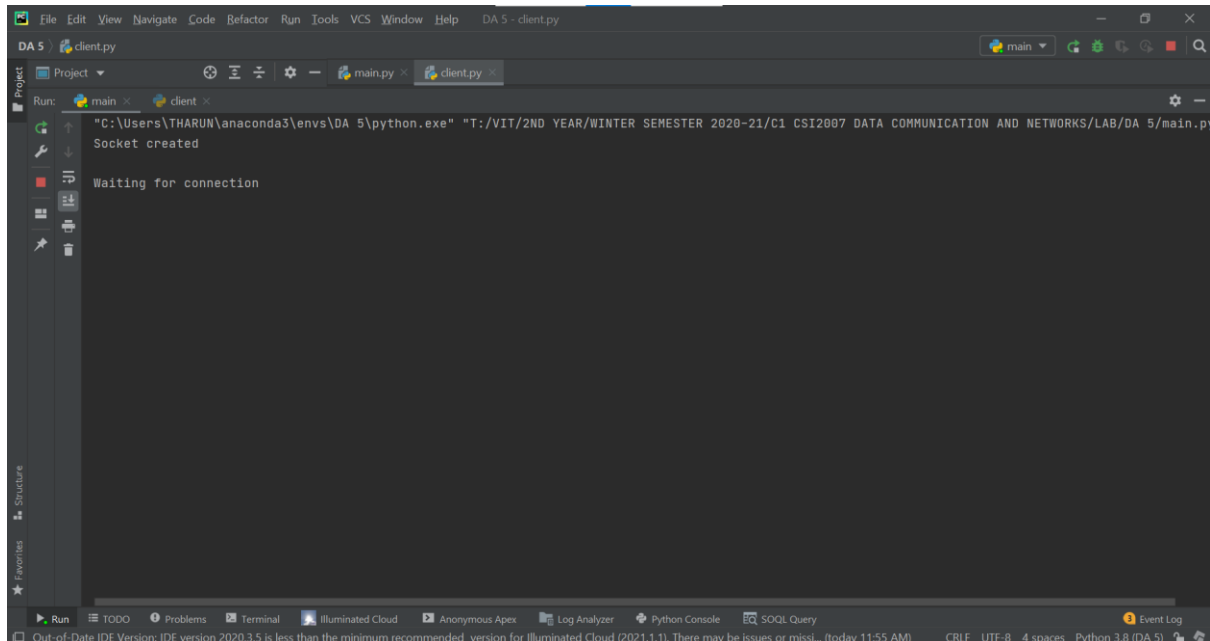
```
1  import socket
2  import threading
3
4
5  def client_conn(client, address):
6      client_name = client.recv(1024).decode()
7      print("\nconnected with", client_name, address)
8      print(f"Active Connections : {threading.activeCount()-1}")
9      client.send(bytes(f"Data sent from server to {client_name}", "utf-8"))
10     if client.recv(1024).decode() == 'X' or 'x':
11         print(f"\n{address} {client_name} Disconnected")
12         print(f"Active Connections : {threading.activeCount()-2}")
13         client.close()
14
15
16 def start():
17     s.listen(3) # can connect utmost to 3 clients
18     while True:
19         c, add = s.accept()
20         thread = threading.Thread(target=client_conn, args=(c, add))
21         thread.start()
22
23
24 s = socket.socket() # by default ipv4 and TCP
25 print("Socket created\n")
26 s.bind(('localhost', 9999)) # socket = ip + port_no
27 print("Waiting for connection\n")
28 start()
```

## CLIENT PROGRAM

```
1  import socket
2
3  c = socket.socket()
4  c.connect(('localhost', 9999))
5  name = input("Enter name of the client : ")
6  c.send(bytes(name, 'utf-8'))
7
8  print("\nData received from server ==> ", end="")
9  print(c.recv(1024).decode())
10 print("Press X to disconnect : ", end='')
11 if input() == 'X' or 'x':
12     c.send(bytes(f"{name} Disconnected", 'utf-8'))
```

## OUTPUT

Initially server doesn't have any active client connections



Three clients will be connecting to the server. The corresponding output in the consoles of server as well as client will be shown in each step.

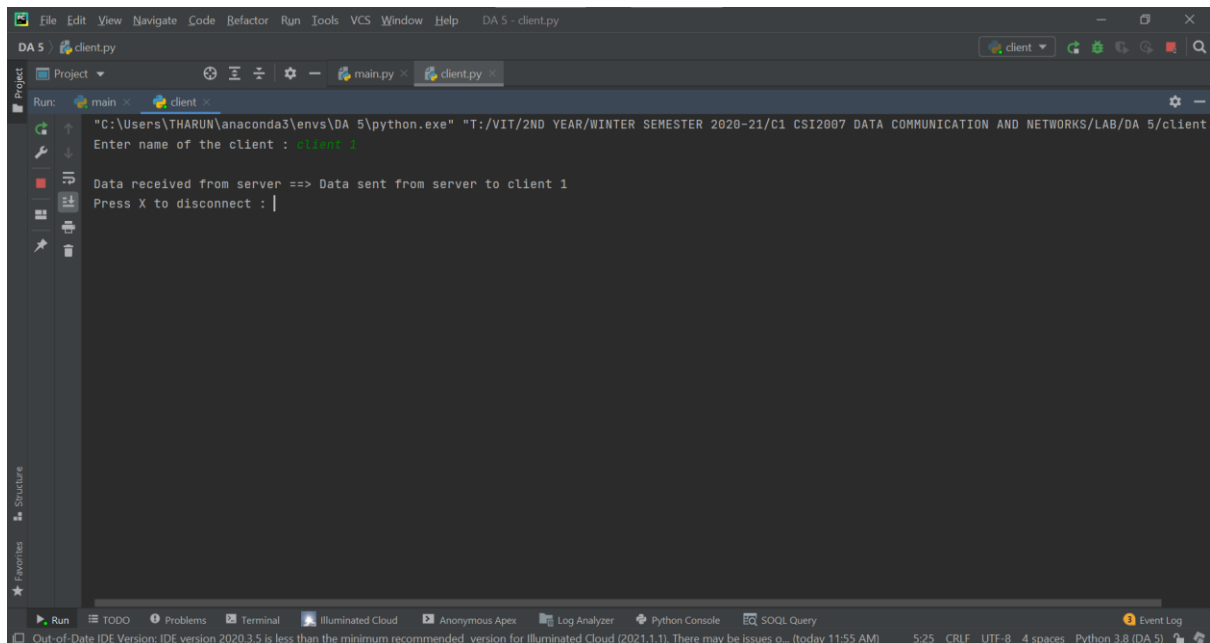
All the three clients have been manipulated as localhost. And server has also been manipulated as localhost. So, in a single machine all the three clients have been connected to server which itself is running in the same machine.

One client is running in terminal of PyCharm IDE itself and the other two clients are made to run in two instances of Command Prompt. Client is running in terminal of PyCharm IDE.

All the host and server will have same ip address as all are running in a local host. In case of different machine, the host must connect to the ip address of the server. Here clients got connected to the sever by specifying 'localhost' instead of specifying the ip address of the server.

Server-Host connection has been established. Now the protocol exchanges the message. Client communicates the "client name" to the sever and the server communicates "Data sent from server to {client name}" to the client.

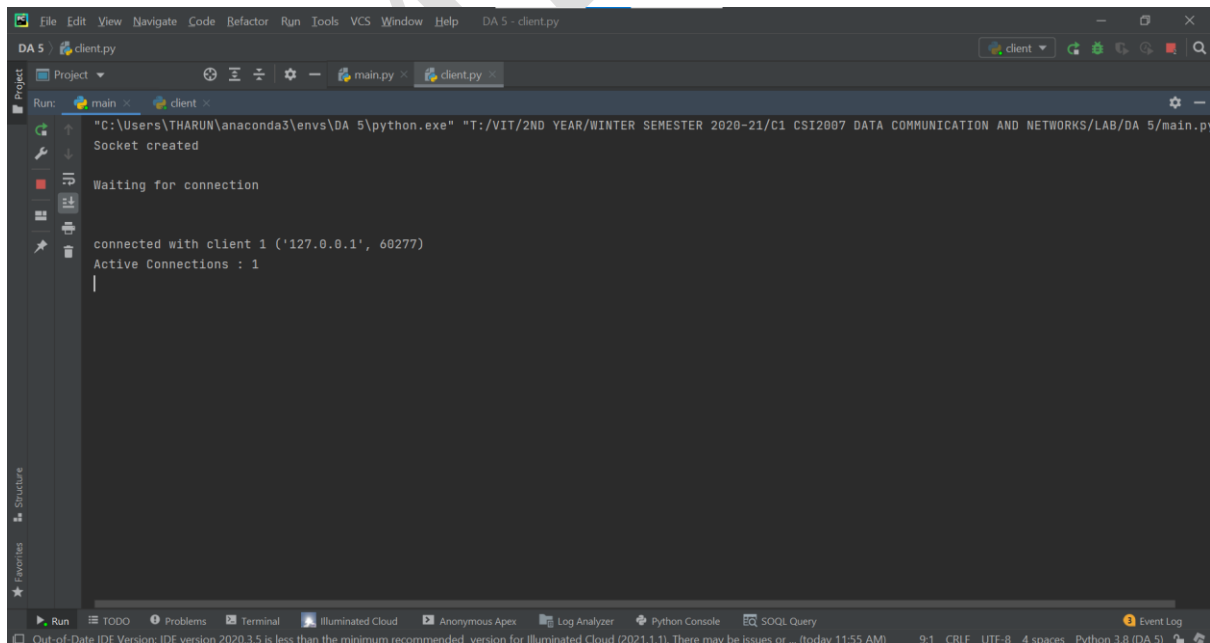
Now “client 1” gets connected. It does not wish to disconnect. So, it’ll remain connected unless client presses ‘X’ or ‘x’ to close the connection



The screenshot shows an IDE window titled "client.py" with the following output in the Run console:

```
"C:\Users\THARUN\anaconda3\envs\DA 5\python.exe" "T:/VIT/2ND YEAR/WINTER SEMESTER 2020-21/C1 CSI2007 DATA COMMUNICATION AND NETWORKS/LAB/DA 5/client.py"
Enter name of the client : client 1
Data received from server ==> Data sent from server to client 1
Press X to disconnect : |
```

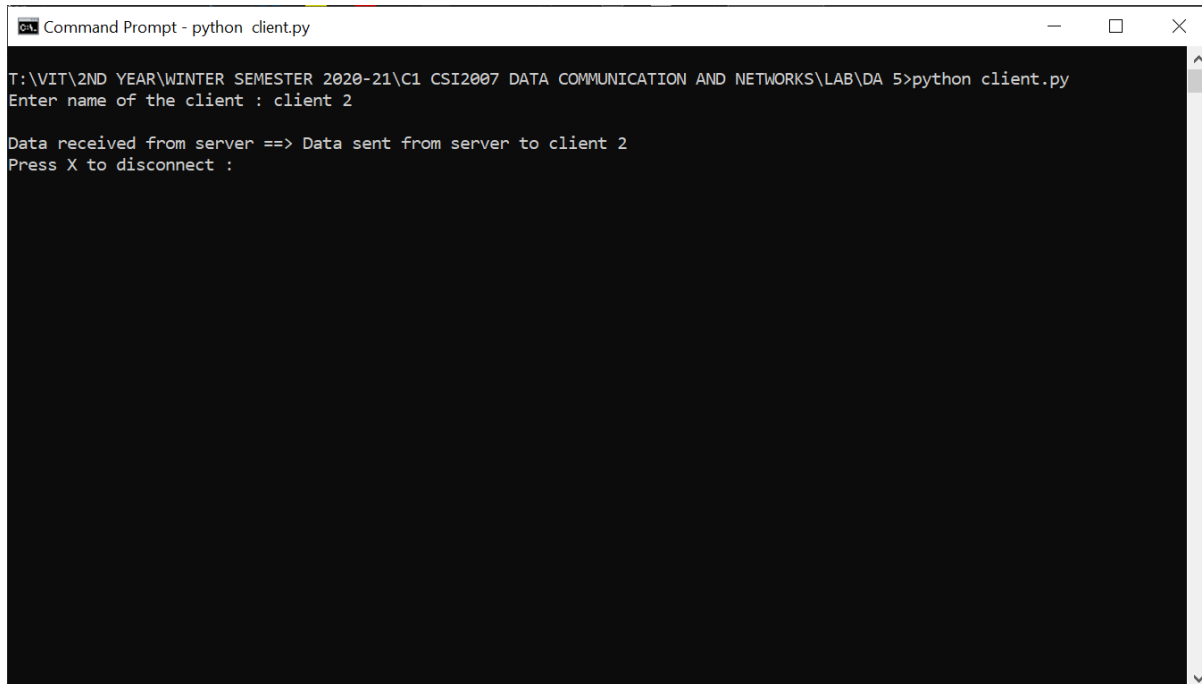
Now the server output is



The screenshot shows an IDE window titled "client.py" (though the code is for a server) with the following output in the Run console:

```
"C:\Users\THARUN\anaconda3\envs\DA 5\python.exe" "T:/VIT/2ND YEAR/WINTER SEMESTER 2020-21/C1 CSI2007 DATA COMMUNICATION AND NETWORKS/LAB/DA 5/main.py"
Socket created
Waiting for connection
connected with client 1 ('127.0.0.1', 60277)
Active Connections : 1
|
```

Now “client 2” gets connected.

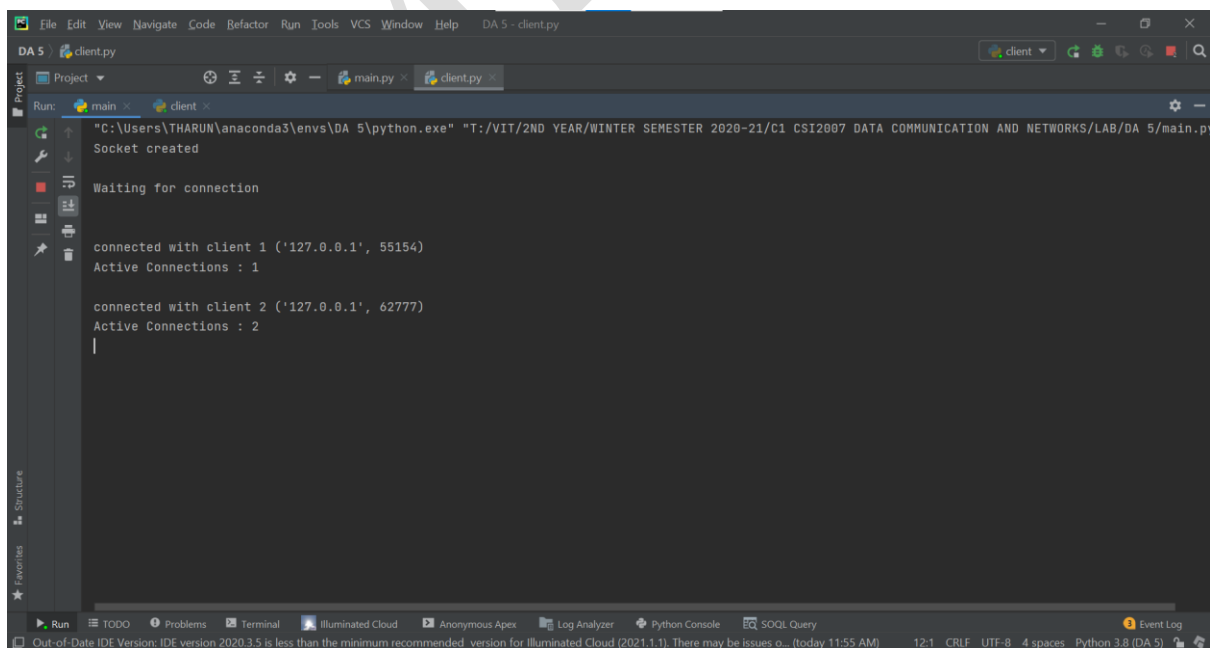


```
Command Prompt - python client.py

T:\VIT\2ND YEAR\WINTER SEMESTER 2020-21\C1 CSI2007 DATA COMMUNICATION AND NETWORKS\LAB\DA 5>python client.py
Enter name of the client : client 2

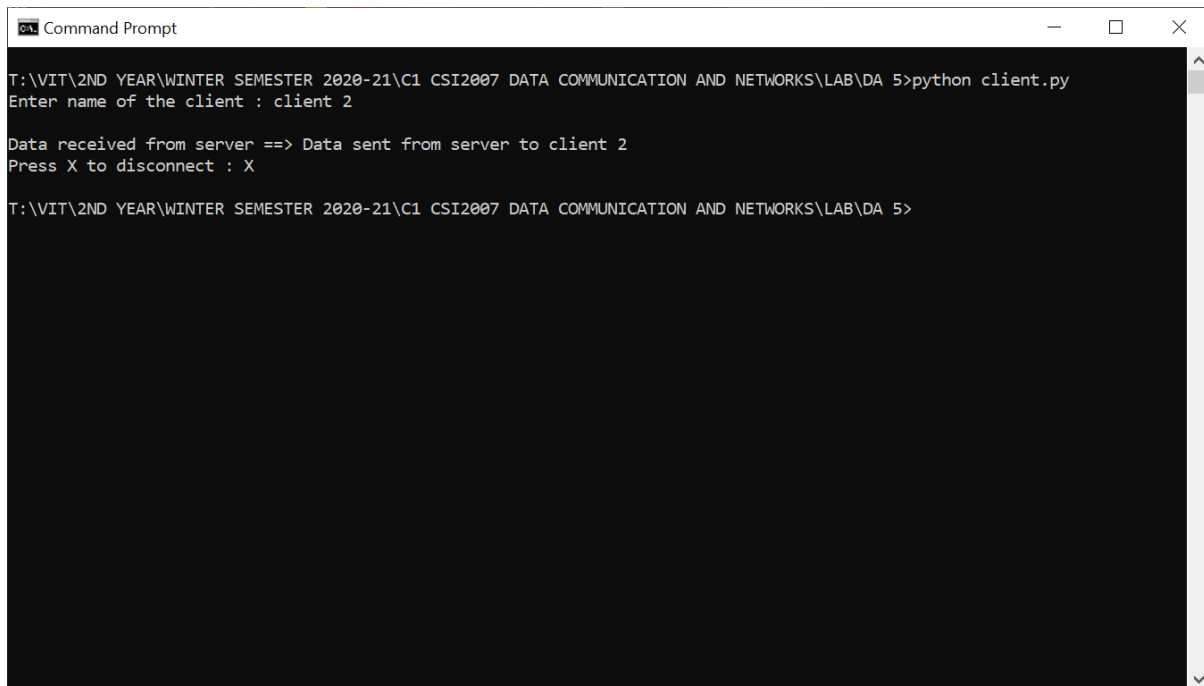
Data received from server ==> Data sent from server to client 2
Press X to disconnect :
```

And the server output is



```
File Edit View Navigate Code Refactor Run Tools VCS Window Help DA 5 - client.py
DA 5 client.py
Project
Run: main client
"C:\Users\THARUN\anaconda3\envs\DA 5\python.exe" "T:\VIT\2ND YEAR\WINTER SEMESTER 2020-21\C1 CSI2007 DATA COMMUNICATION AND NETWORKS\LAB\DA 5\main.py"
Socket created
Waiting for connection
connected with client 1 ('127.0.0.1', 55154)
Active Connections : 1
connected with client 2 ('127.0.0.1', 62777)
Active Connections : 2
|
```

Now “client 2” wishes to get disconnected and presses ‘X’ in its console. The continuation of its output is shown below

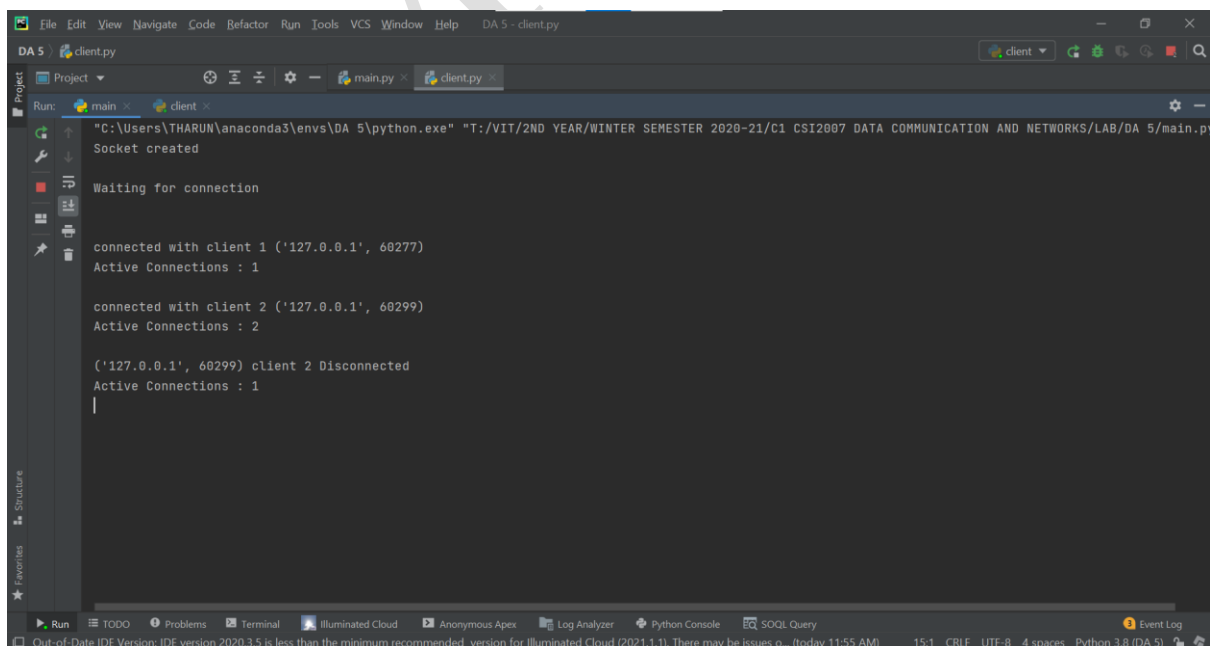


```
Command Prompt
T:\VIT\2ND YEAR\WINTER SEMESTER 2020-21\C1 CSI2007 DATA COMMUNICATION AND NETWORKS\LAB\DA 5>python client.py
Enter name of the client : client 2

Data received from server ==> Data sent from server to client 2
Press X to disconnect : X

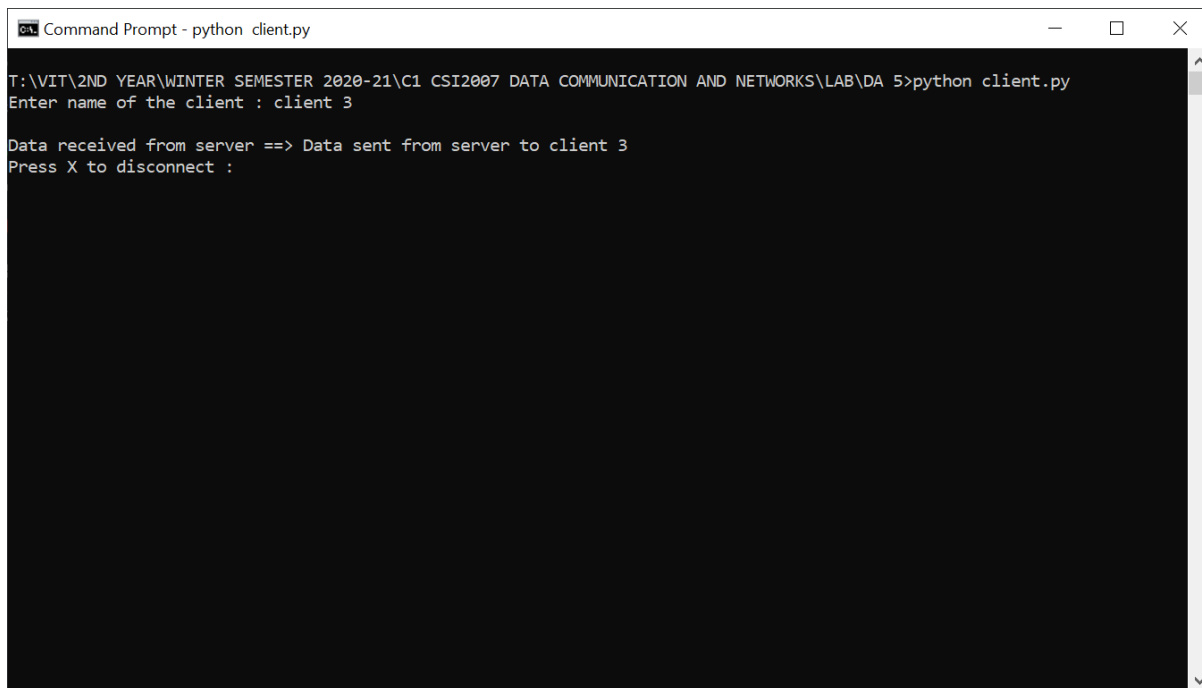
T:\VIT\2ND YEAR\WINTER SEMESTER 2020-21\C1 CSI2007 DATA COMMUNICATION AND NETWORKS\LAB\DA 5>
```

Now the server output console is updated as shown below



```
File Edit View Navigate Code Refactor Run Tools VCS Window Help DA 5 - client.py
client.py
Run: main.py client.py
"C:\Users\THARUN\anaconda3\envs\DA 5\python.exe" "T:\VIT\2ND YEAR\WINTER SEMESTER 2020-21\C1 CSI2007 DATA COMMUNICATION AND NETWORKS\LAB\DA 5\main.py"
Socket created
Waiting for connection
connected with client 1 ('127.0.0.1', 60277)
Active Connections : 1
connected with client 2 ('127.0.0.1', 60299)
Active Connections : 2
('127.0.0.1', 60299) client 2 Disconnected
Active Connections : 1
```

Now “client 3” gets connected to server and the client console output is shown below

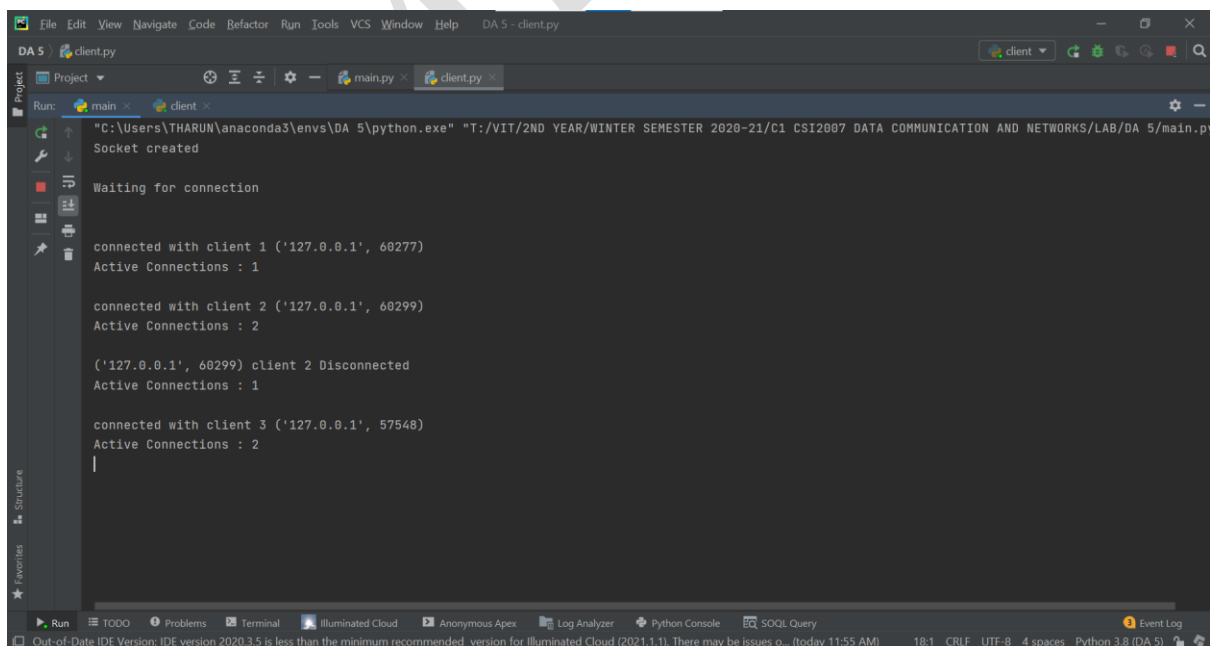


```
Command Prompt - python client.py

T:\VIT\2ND YEAR\WINTER SEMESTER 2020-21\C1 CSI2007 DATA COMMUNICATION AND NETWORKS\LAB\DA 5>python client.py
Enter name of the client : client 3

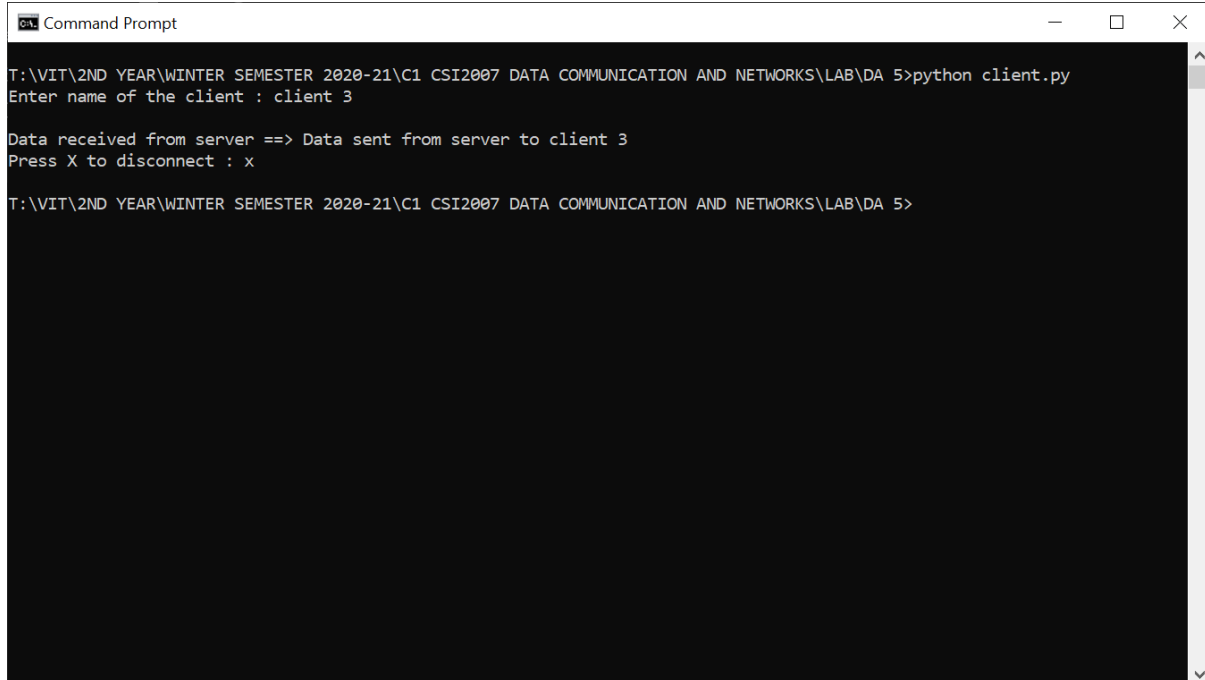
Data received from server ==> Data sent from server to client 3
Press X to disconnect :
```

The server output window after “client 3” gets connected



```
File Edit View Navigate Code Refactor Run Tools VCS Window Help DA 5 - client.py
DA 5 client.py
Project
Run: main client
"C:\Users\THARUN\anaconda3\envs\DA 5\python.exe" "T:\VIT\2ND YEAR\WINTER SEMESTER 2020-21\C1 CSI2007 DATA COMMUNICATION AND NETWORKS\LAB\DA 5\main.py"
Socket created
Waiting for connection
connected with client 1 ('127.0.0.1', 60277)
Active Connections : 1
connected with client 2 ('127.0.0.1', 60299)
Active Connections : 2
('127.0.0.1', 60299) client 2 Disconnected
Active Connections : 1
connected with client 3 ('127.0.0.1', 57548)
Active Connections : 2
|
Run TODO Problems Terminal Illuminated Cloud Anonymous Apex Log Analyzer Python Console EQ SQL Query
Out-of-Date IDE Version: IDE version 2020.3.5 is less than the minimum recommended version for Illuminated Cloud (2021.1.1). There may be issues o... (today 11:55 AM) 18:1 CRLF UTF-8 4 spaces Python 3.8 (DA 5)
```

Now “client 3” gets disconnected as the client presses ‘x’ in its console to close the connection.



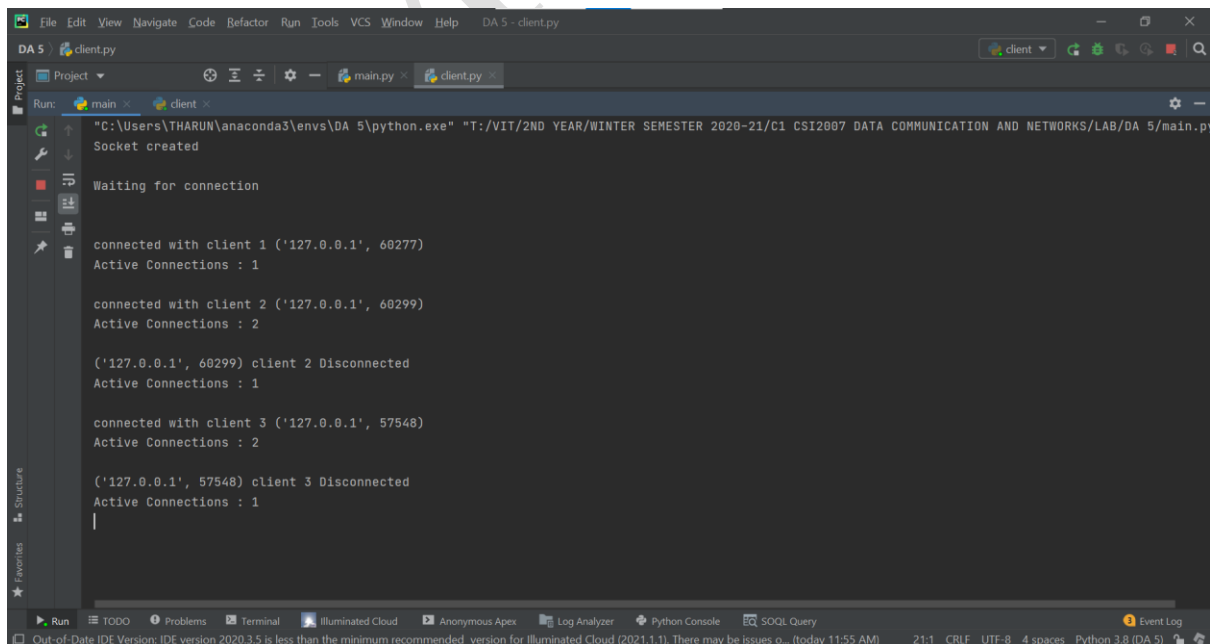
```
Command Prompt

T:\VIT\2ND YEAR\WINTER SEMESTER 2020-21\C1 CSI2007 DATA COMMUNICATION AND NETWORKS\LAB\DA 5>python client.py
Enter name of the client : client 3

Data received from server ==> Data sent from server to client 3
Press X to disconnect : x

T:\VIT\2ND YEAR\WINTER SEMESTER 2020-21\C1 CSI2007 DATA COMMUNICATION AND NETWORKS\LAB\DA 5>
```

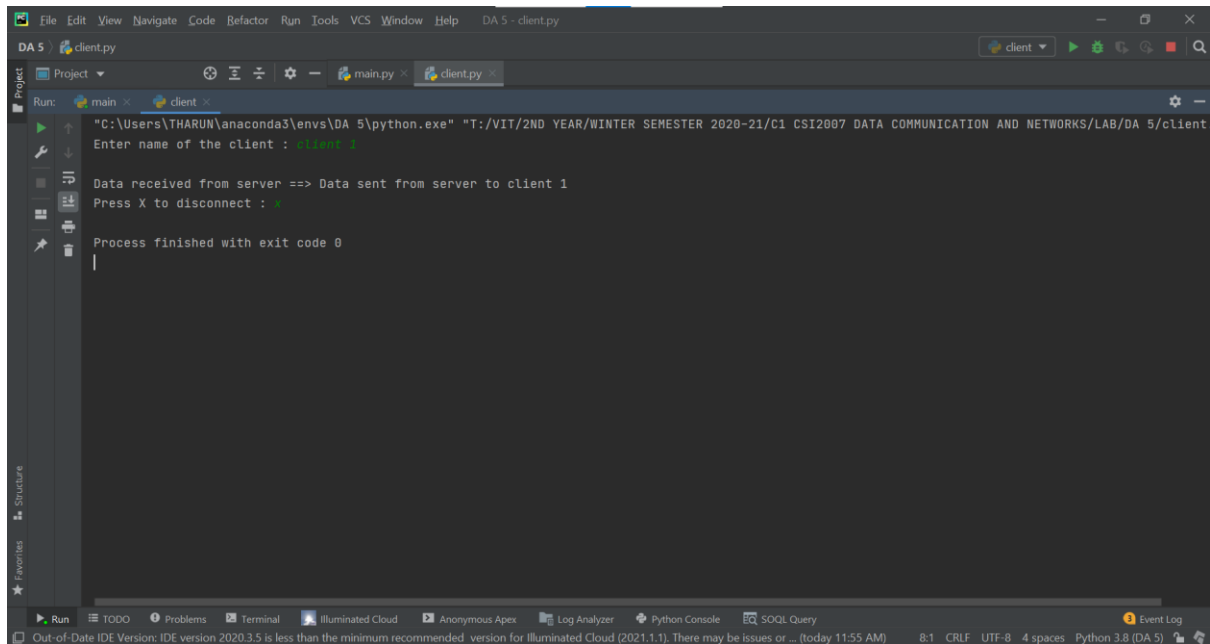
The sever program output



```
File Edit View Navigate Code Refactor Run Tools VCS Window Help DA 5 - client.py
client.py
main.py client.py
Run: main client
"C:\Users\THARUN\anaconda3\envs\DA 5\python.exe" "T:\VIT\2ND YEAR\WINTER SEMESTER 2020-21\C1 CSI2007 DATA COMMUNICATION AND NETWORKS\LAB\DA 5\main.py"
Socket created
Waiting for connection
connected with client 1 ('127.0.0.1', 60277)
Active Connections : 1
connected with client 2 ('127.0.0.1', 60299)
Active Connections : 2
('127.0.0.1', 60299) client 2 Disconnected
Active Connections : 1
connected with client 3 ('127.0.0.1', 57548)
Active Connections : 2
('127.0.0.1', 57548) client 3 Disconnected
Active Connections : 1
|
```

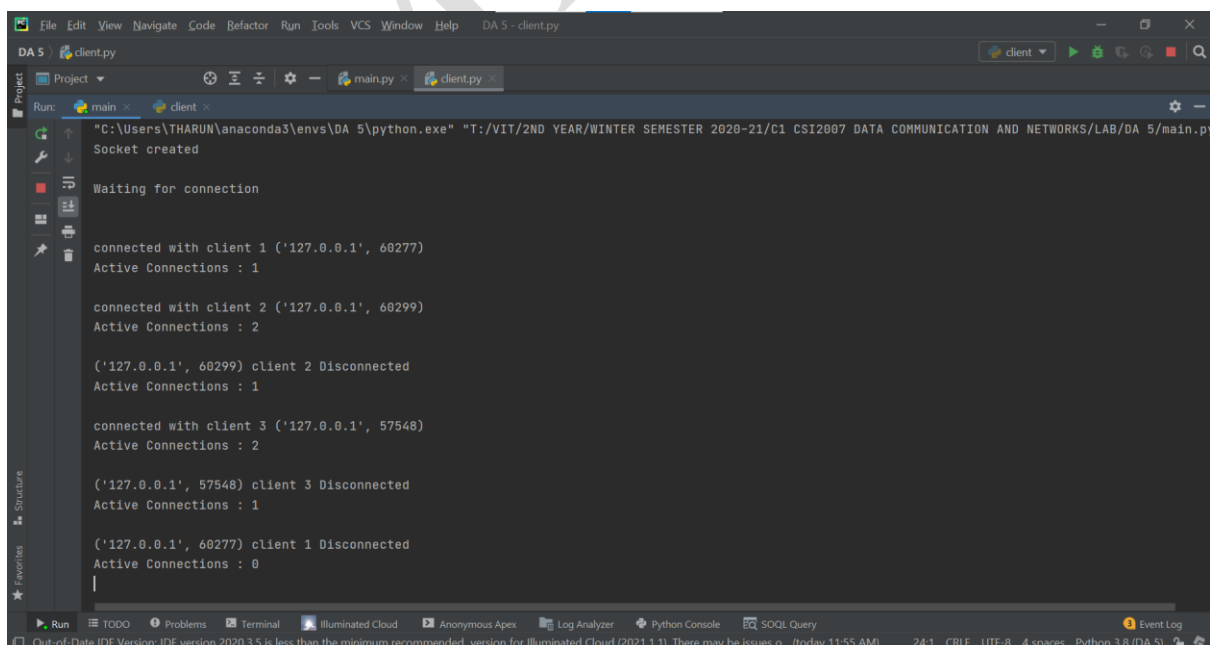
Now there is only 1 connection remaining and that is “client 1”.

So now “client 1” closes its connection and leaves the server



```
File Edit View Navigate Code Refactor Run Tools VCS Window Help DA 5 - client.py
client
main.py client.py
Run: "C:\Users\THARUN\anaconda3\envs\DA 5\python.exe" "T:/VIT/2ND YEAR/WINTER SEMESTER 2020-21/C1 CSI2007 DATA COMMUNICATION AND NETWORKS/LAB/DA 5/client.py"
Enter name of the client : client 1
Data received from server ==> Data sent from server to client 1
Press X to disconnect : X
Process finished with exit code 0
```

The server output



```
File Edit View Navigate Code Refactor Run Tools VCS Window Help DA 5 - client.py
DA 5 client.py
main.py client.py
Run: "C:\Users\THARUN\anaconda3\envs\DA 5\python.exe" "T:/VIT/2ND YEAR/WINTER SEMESTER 2020-21/C1 CSI2007 DATA COMMUNICATION AND NETWORKS/LAB/DA 5/main.py"
Socket created
Waiting for connection
connected with client 1 ('127.0.0.1', 60277)
Active Connections : 1
connected with client 2 ('127.0.0.1', 60299)
Active Connections : 2
('127.0.0.1', 60299) client 2 Disconnected
Active Connections : 1
connected with client 3 ('127.0.0.1', 57548)
Active Connections : 2
('127.0.0.1', 57548) client 3 Disconnected
Active Connections : 1
('127.0.0.1', 60277) client 1 Disconnected
Active Connections : 0
```