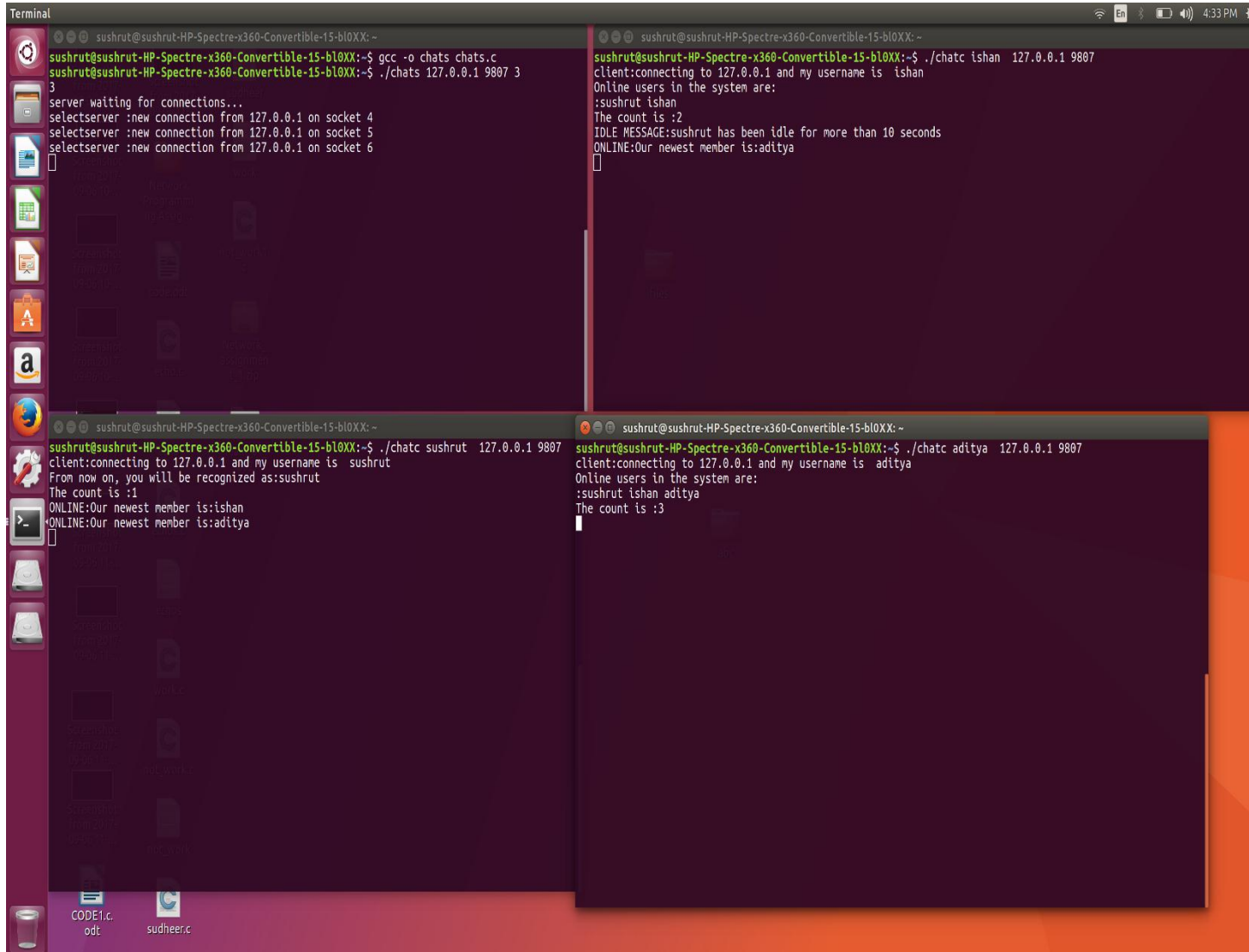


TEST CASES

TEST CASE-1

A).

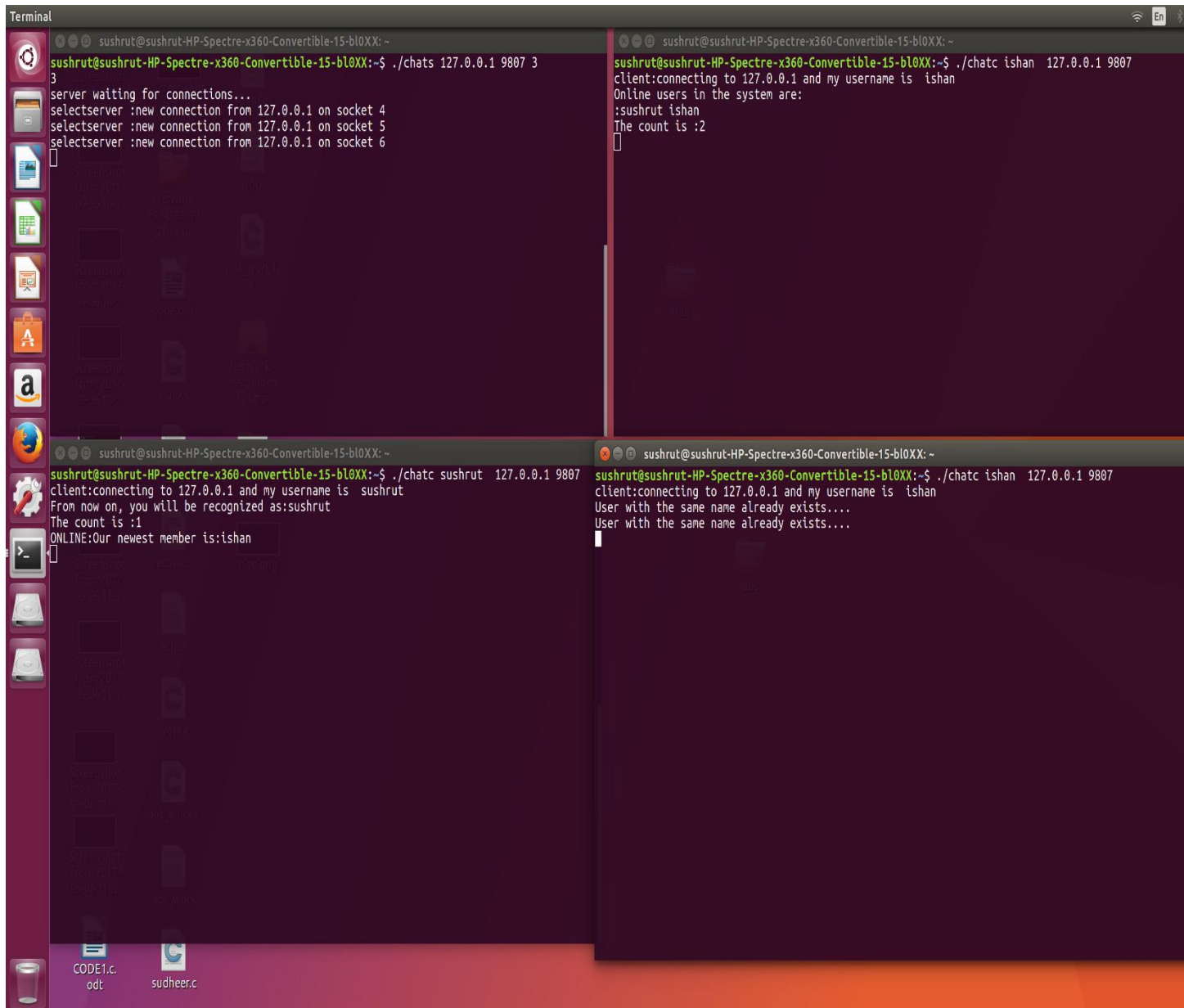


```
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX: ~  
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ gcc -o chats chats.c  
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chats 127.0.0.1 9807 3  
3  
server waiting for connections...  
selectserver :new connection from 127.0.0.1 on socket 4  
selectserver :new connection from 127.0.0.1 on socket 5  
selectserver :new connection from 127.0.0.1 on socket 6  
  
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chatc ishan 127.0.0.1 9807  
client:connecting to 127.0.0.1 and my username is ishan  
Online users in the system are:  
:sushrut ishan  
The count is :2  
IDLE MESSAGE:sushrut has been idle for more than 10 seconds  
ONLINE:Our newest member is:aditya  
  
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chatc sushrut 127.0.0.1 9807  
client:connecting to 127.0.0.1 and my username is sushrut  
From now on, you will be recognized as:sushrut  
The count is :1  
ONLINE:Our newest member is:ishan  
ONLINE:Our newest member is:aditya  
  
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chatc aditya 127.0.0.1 9807  
client:connecting to 127.0.0.1 and my username is aditya  
Online users in the system are:  
:sushrut ishan aditya  
The count is :3
```

In the first case, the server's IP address is 127.0.0.1 and port number is 9807. The maximum no. of clients possible is 3. The clients here are ishan, sushrut and aditya. All can send and receive messages to and from the client. The screen also shows the status of various clients in the chat room.

TEST CASE-2

B).



The screenshot shows a Linux desktop environment with four terminal windows. The desktop background is dark purple with various application icons on the left and bottom. The terminal windows are titled 'Terminal' and show the following output:

```
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX: ~  
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chats 127.0.0.1 9807 3  
server waiting for connections...  
selectserver :new connection from 127.0.0.1 on socket 4  
selectserver :new connection from 127.0.0.1 on socket 5  
selectserver :new connection from 127.0.0.1 on socket 6  
[]
```

```
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chatc ishan 127.0.0.1 9807  
client:connecting to 127.0.0.1 and my username is ishan  
Online users in the system are:  
:sushrut ishan  
The count is :2  
[]
```

```
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chatc sushrut 127.0.0.1 9807  
client:connecting to 127.0.0.1 and my username is sushrut  
From now on, you will be recognized as:sushrut  
The count is :1  
ONLINE:Our newest member is:ishan  
[]
```

```
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chatc ishan 127.0.0.1 9807  
client:connecting to 127.0.0.1 and my username is ishan  
User with the same name already exists....  
User with the same name already exists....  
[]
```

Here we can observe that there are already two users connected to the server- ishan, sushrut, and when the third user tries to connect with the chat room with the same username as one of the already existing users (ishan in this case), then that user shall get a negative acknowledgement from the server and shall eventually get rejected.

C).

The screenshot displays a Kali Linux desktop environment with a dark purple theme. The desktop is cluttered with numerous application icons on the left sidebar and various files and folders on the desktop surface. Four terminal windows are open, showing the following content:

- Top Left Terminal:**

```
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX: ~
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chats 127.0.0.1 9807 3
server waiting for connections...
selectserver :new connection from 127.0.0.1 on socket 4
selectserver :new connection from 127.0.0.1 on socket 5
selectserver :new connection from 127.0.0.1 on socket 5
```
- Top Right Terminal:**

```
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX: ~
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chatc ishan 127.0.0.1 9807
client:connecting to 127.0.0.1 and my username is ishan
Online users in the system are:
:sushrut ishan
The count is :2
^C
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$
```
- Bottom Left Terminal:**

```
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX: ~
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chatc sushrut 127.0.0.1 9807
client:connecting to 127.0.0.1 and my username is sushrut
From now on, you will be recognized as:sushrut
The count is :1
ONLINE:Our newest member is:ishan
OFFLINE:The following user has left us unceremoniously:ishan
ONLINE:Our newest member is:ishan
```
- Bottom Right Terminal:**

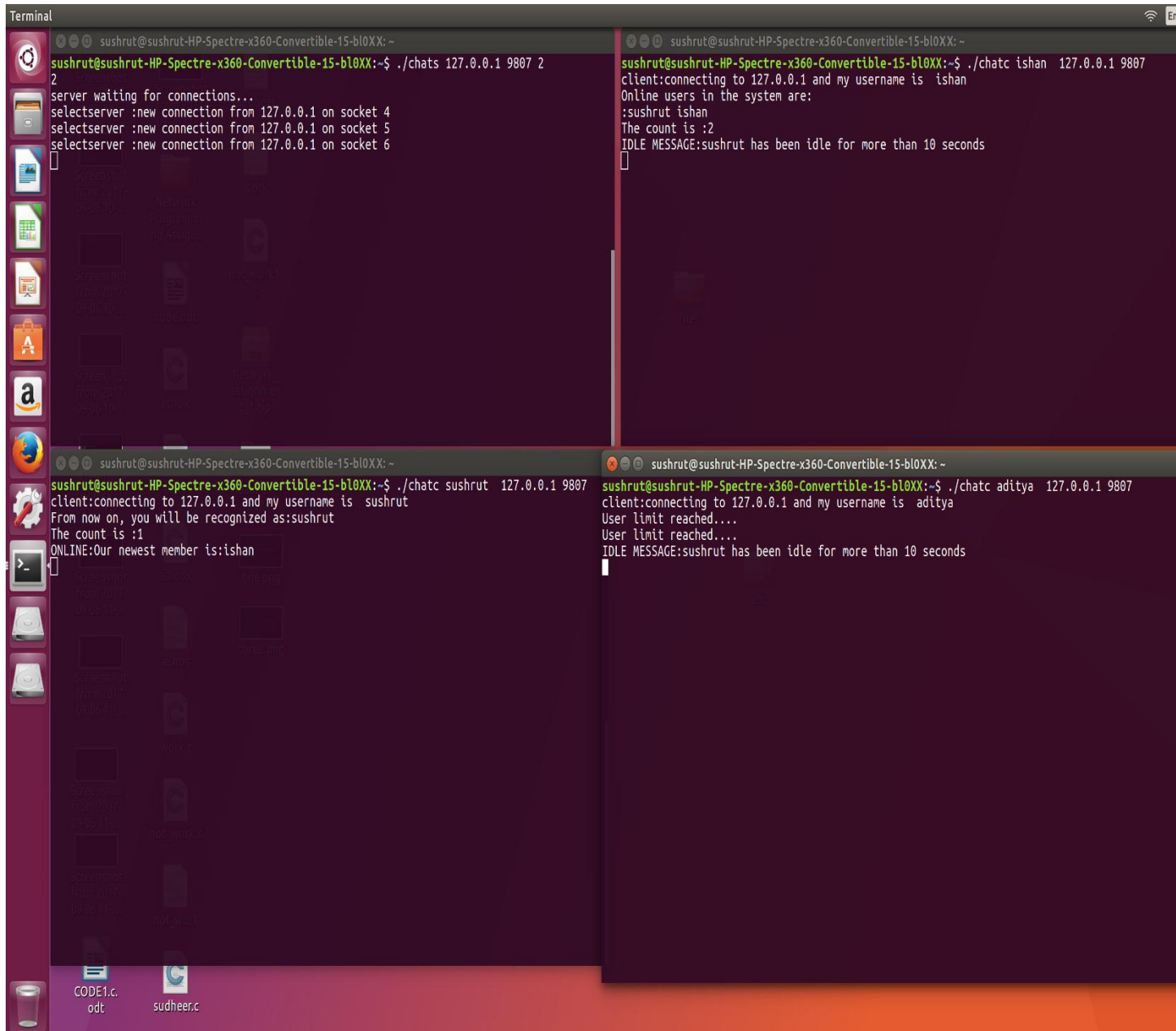
```
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX: ~
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chatc ishan 127.0.0.1 9807
client:connecting to 127.0.0.1 and my username is ishan
Online users in the system are:
:sushrut ishan
The count is :2
```

The desktop background is a dark purple gradient. The left sidebar contains icons for various applications including a web browser, file manager, and terminal. The desktop surface shows several files and folders, including a folder named 'CODE1.c' and a file named 'odt'.

In this test case, we can observe that when a user, initially connected to the chat room, leaves the connection and then when that user or some other user with the same name comes to join the chat room (provided, in the meantime, no other user connects with that particular username) they are able to do it successfully.

TEST CASE-4

D).



The screenshot shows a Linux desktop environment with four terminal windows open, displaying the logs of a chat server. The desktop background is a dark purple color with various application icons on the left sidebar and bottom panel. The terminal windows are titled "Terminal" and show the following output:

```
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX: ~  
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chats 127.0.0.1 9807 2  
server waiting for connections...  
selectserver :new connection from 127.0.0.1 on socket 4  
selectserver :new connection from 127.0.0.1 on socket 5  
selectserver :new connection from 127.0.0.1 on socket 6  
[ ]
```

```
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX: ~  
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chatc ishan 127.0.0.1 9807  
client:connecting to 127.0.0.1 and my username is ishan  
Online users in the system are:  
:sushrut ishan  
The count is :2  
IDLE MESSAGE:sushrut has been idle for more than 10 seconds  
[ ]
```

```
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX: ~  
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chatc sushrut 127.0.0.1 9807  
client:connecting to 127.0.0.1 and my username is sushrut  
From now on, you will be recognized as:sushrut  
The count is :1  
ONLINE:Our newest member is:ishan  
[ ]
```

```
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX: ~  
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chatc aditya 127.0.0.1 9807  
client:connecting to 127.0.0.1 and my username is aditya  
User limit reached....  
User limit reached....  
IDLE MESSAGE:sushrut has been idle for more than 10 seconds  
[ ]
```

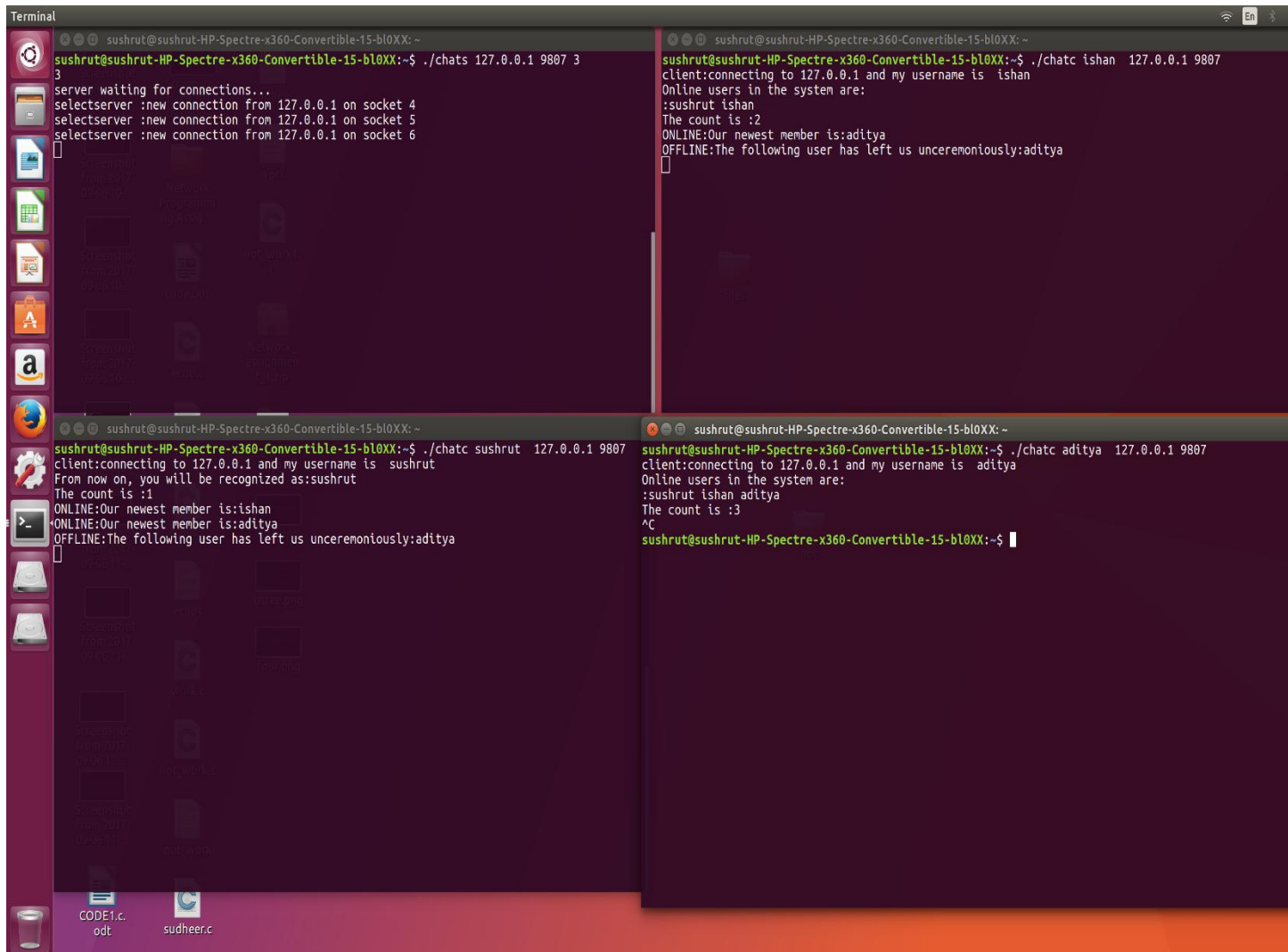
This test case deals with the number of clients exceeding the maximum possible number of clients (2 users in this case-ishan, sushrut) in the chat room. So when the third user(Aditya) comes to join the chat room, he gets message motioning about the number of client limit being exceeded.

TEST CASE-5

E). BONUS CASE

IPv4 and IPv6- Our code efficiently implements and takes care of both types of functionalities.

FEATURE 1-



The screenshot shows a Linux desktop environment with four terminal windows open, demonstrating a chat server simulation. The desktop background is dark purple with various application icons on the left sidebar. The terminal windows are titled 'Terminal' and show the following interactions:

```
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX: ~  
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chats 127.0.0.1 9807 3  
3  
server waiting for connections...  
selectserver :new connection from 127.0.0.1 on socket 4  
selectserver :new connection from 127.0.0.1 on socket 5  
selectserver :new connection from 127.0.0.1 on socket 6  
[ ]
```

```
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX: ~  
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chatc ishan 127.0.0.1 9807  
client:connecting to 127.0.0.1 and my username is ishan  
Online users in the system are:  
:sushrut ishan  
The count is :2  
ONLINE:Our newest member is:aditya  
OFFLINE:The following user has left us unceremoniously:aditya  
[ ]
```

```
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX: ~  
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chatc sushrut 127.0.0.1 9807  
client:connecting to 127.0.0.1 and my username is sushrut  
From now on, you will be recognized as:sushrut  
The count is :1  
ONLINE:Our newest member is:ishan  
ONLINE:Our newest member is:aditya  
OFFLINE:The following user has left us unceremoniously:aditya  
[ ]
```

```
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX: ~  
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$ ./chatc aditya 127.0.0.1 9807  
client:connecting to 127.0.0.1 and my username is aditya  
Online users in the system are:  
:sushrut ishan aditya  
The count is :3  
^C  
sushrut@sushrut-HP-Spectre-x360-Convertible-15-b10XX:~$
```

ACK- Whenever a client connects, he receives an ACK (acknowledgement) message from the server, which consists of a statement of acknowledgement and a list and count of others users already online in the chat room.

NACK- This message is sent to the clients when they either join with the same username as that of the already online user in the system or they try to connect with the chat room when the number of client limit is already reached.

ONLINE- The server is sending a message to all the other users that such a client has joined the chat room.

OFFLINE- The server is sending a message to all the other users that one of the client has left the chat room.

IDLE- When a client is inactive in the chat session for more than ten seconds, the server send a message to the rest of the users that the respective client is inactive in the chat session.

IDLE-

