(1) Your program uses IP Addresses to sort files from clients. What are the limitations and potential problems with this system? How would you improve upon it?

ans)

Using IP addresses to sort files from clients is problematic because an IP address does not reliably identify a single user or device. Multiple users can share one IP address, or a single user can have many different IP addresses over time. These inconsistencies and security issues make IP addresses an unsuitable metric for sorting files accurately

Potential Limitations include,

Inaccurate user identification: An IP address is a geographical and network identifier, not a personal one.

- **Shared connections**: All devices on a corporate network, university campus, or public Wi-Fi hotspot often appear to use the same public IP address. As a result, files from dozens or hundreds of different people could be incorrectly sorted into the same client's folder.
- **Proxy servers and VPNs**: A client can easily mask their true IP address by using a Virtual Private Network (VPN) or proxy, which would make it appear as if their file came from a different location.
- **Dynamic IP addresses**: Most residential and mobile internet connections use dynamic IP addresses, which are temporary and change regularly

To improve this , we can add a different way to authenticate users.

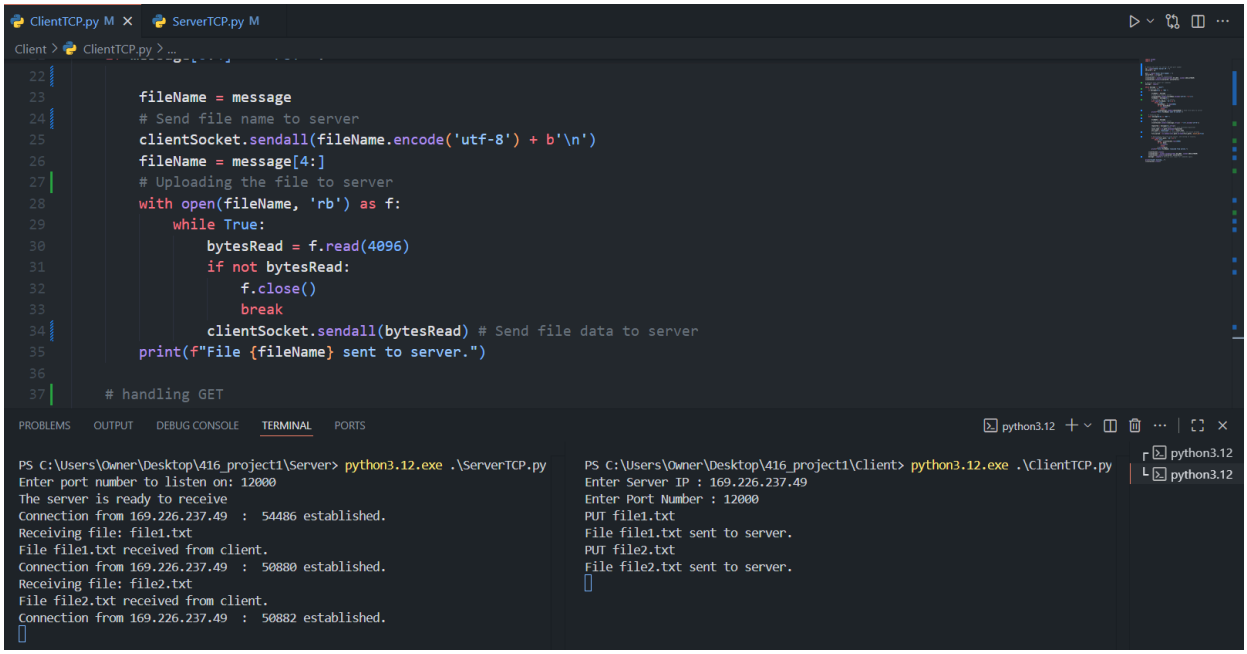
1. Require user accounts: Create a system where every client has their own user account, authenticated with a username and password. This is a standard and secure way to identify individuals.
2. Generate a user ID: Assign a unique, persistent User ID to each account. This ID is permanent and does not change, making it a reliable key for sorting files

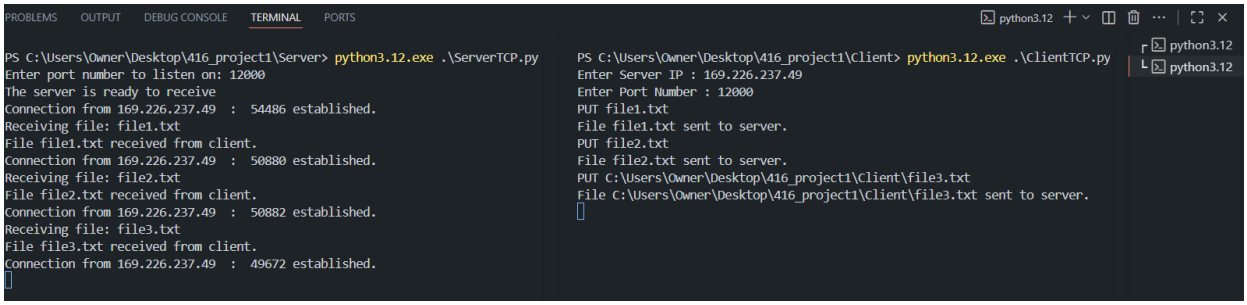
And we will then sort the files based on these UserID assigned to every user.

2) Asking for the port number on the server side , on which the server will run on.

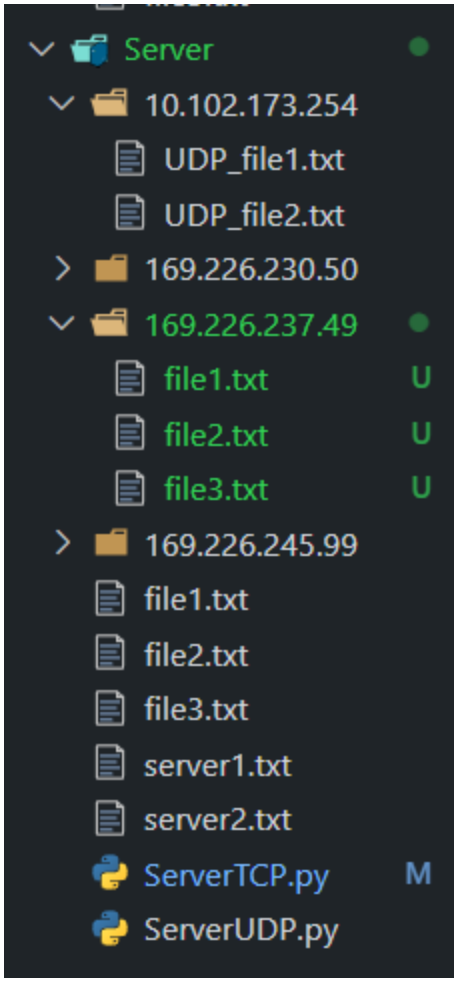
And, asking for the server IP , and server Port on client side to connect client to server.

Being able to upload the file on the server using “PUT<filename>” command. Able to handle both, filename and full path given to filename.

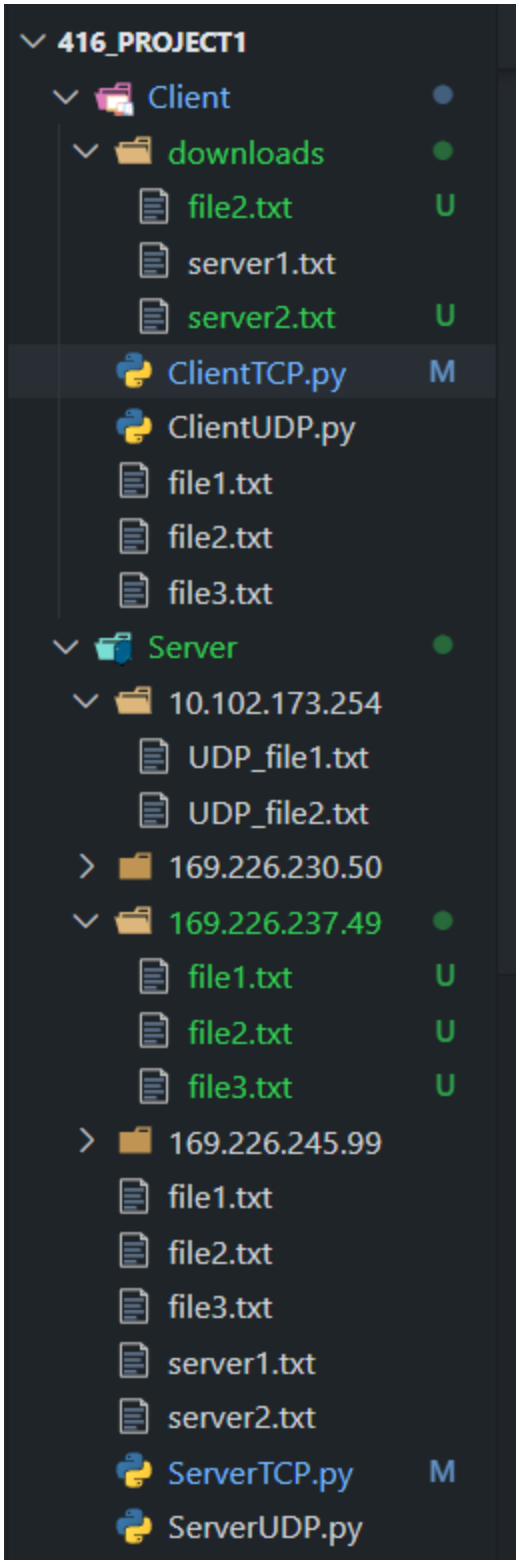


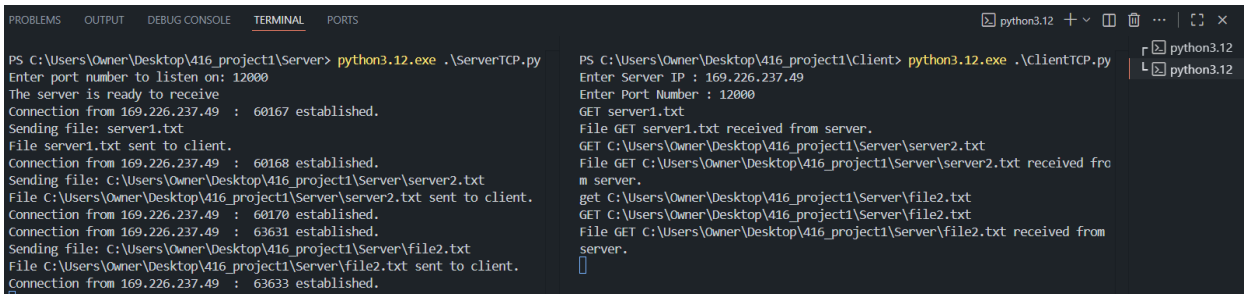


Sorting all the files based on the Client IP address. As we can see , just created a new directory for “169.226.237.49” and saved the given 3 files in that directory.



Also GET works correctly, I am able to get the desired files, by giving the full path as well as the file name.


416_PROJECT1
Client
downloads
file2.txt U
server1.txt
server2.txt U
ClientTCP.py M
ClientUDP.py
file1.txt
file2.txt
file3.txt
Server
10.102.173.254
UDP_file1.txt
UDP_file2.txt
169.226.230.50
169.226.237.49
file1.txt U
file2.txt U
file3.txt U
169.226.245.99
file1.txt
file2.txt
file3.txt
server1.txt
server2.txt
ServerTCP.py M
ServerUDP.py


PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
python3.12
PS C:\Users\Owner\Desktop\416_project1\Server> python3.12.exe .\ServerTCP.py
Enter port number to listen on: 12000
The server is ready to receive
Connection from 169.226.237.49 : 60167 established.
Sending file: server1.txt
File server1.txt sent to client.
Connection from 169.226.237.49 : 60168 established.
Sending file: C:\Users\Owner\Desktop\416_project1\Server\server2.txt
File C:\Users\Owner\Desktop\416_project1\Server\server2.txt sent to client.
Connection from 169.226.237.49 : 60170 established.
Connection from 169.226.237.49 : 63631 established.
Sending file: C:\Users\Owner\Desktop\416_project1\Server\file2.txt
File C:\Users\Owner\Desktop\416_project1\Server\file2.txt sent to client.
Connection from 169.226.237.49 : 63633 established.
PS C:\Users\Owner\Desktop\416_project1\Client> python3.12.exe .\ClientTCP.py
Enter Server IP : 169.226.237.49
Enter Port Number : 12000
GET server1.txt
File GET server1.txt received from server.
GET C:\Users\Owner\Desktop\416_project1\Server\server2.txt
File GET C:\Users\Owner\Desktop\416_project1\Server\server2.txt received fro
m server.
get C:\Users\Owner\Desktop\416_project1\Server\file2.txt
GET C:\Users\Owner\Desktop\416_project1\Server\file2.txt
File GET C:\Users\Owner\Desktop\416_project1\Server\file2.txt received from
server.
python3.12
python3.12