GEBZE
TECHNICAL UNIVERSITY

GTU Department of Computer Engineering

CSE 344 - Spring 2024

Midterm Project Report

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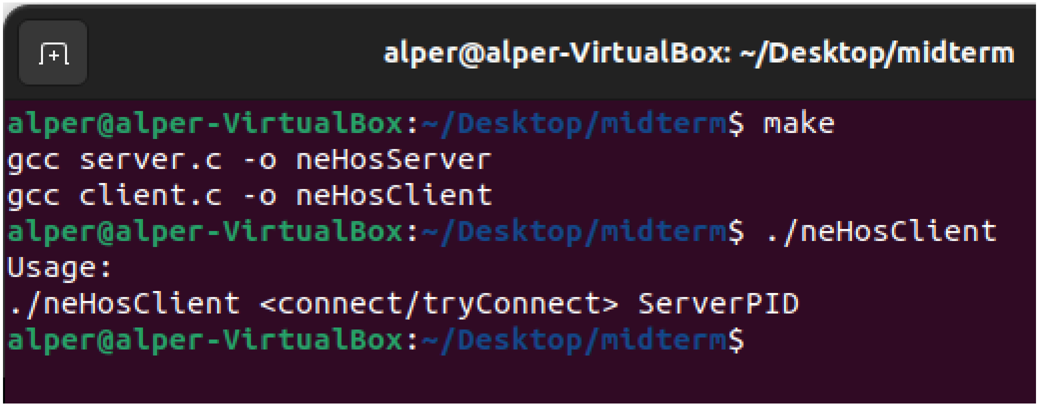
A Concurrent File Access System

In this project, I implement a file server that enables multiple clients to connect, access, modify and archive the files in a specific directory located at the server side. The communication between client and server is handled via FIFOs. The system consists of two main codes: client.c for client-side functions and server.c for server-side operations. The system uses a client-server model where multiple clients can connect to a server to perform file operations like read, write, upload, download, and archive. Inter-process communication (IPC) is achieved through FIFOs, with semaphore and shared memory used for synchronization and mutual exclusion. Critical region handling is done by semaphores.

In client.c:

Client makes a connection request with <connect/tryConnect>. If the queue is not full, Client can connect with both command until que is full. If the queue is full and Client try to connect with "tryConnect" command, then it directly terminates without connecting to the server. On other hand if Client try to connect with "connect" option, then it waits for the empty slot. Waiting process is done by a semaphore created for the client, communicates with a server via FIFOs. And handling Unix signals.



```
alper@alper-VirtualBox:~/Desktop/midterm$ make
gcc server.c -o neHosServer
gcc client.c -o neHosClient
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient
Usage:
./neHosClient <connect/tryConnect> ServerPID
alper@alper-VirtualBox:~/Desktop/midterm$
```

Signal Handling Function: sig_handler(int signum)

This function manages signal handling for SIGINT and SIGTERM. It sets a global flag to 1, which is used throughout the program to handle shutdown on signal reception.

Error Handling Function: errExit(char *errMessage)

A helper function to output errors and exit the program. It simplifies error handling throughout the client code. Exits the program with a failure status to indicate an error condition.

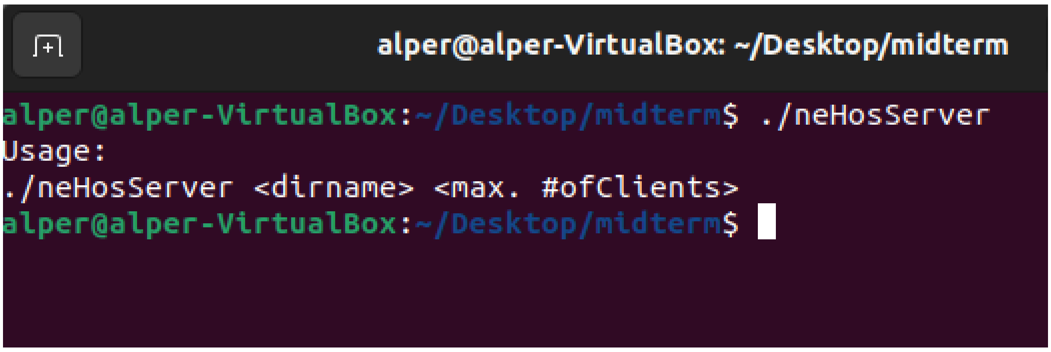
Main Client Function: client_func(const char sv_no[], int cond)

Handles the connection operations. It sets up FIFO for communication, writes connection requests, and enters a loop to handle user commands. Manages connection attempts and re-attempts based on server capacity. Processes commands entered by the user and communicates these to the server, handling responses.

And main function: Sets up signal handling and invokes client_func with user parameters. SIGINT(Ctrl-C) and SIGTERM are handling. When SIGINT is caught, it terminates the program using the flag and quit from server and removed from the server's clients.

In server.c:

This part designed as part of a concurrent file access system that handles multiple client connections, allowing clients to execute file operations in a controlled and synchronized environment. The server-side application of the concurrent file access system manages client requests using multiple processes and Inter-Process Communication (IPC) techniques. It uses FIFOs for messaging, semaphores for synchronization, and shared memory for managing shared data structures.



```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer
Usage:
./neHosServer <dirname> <max. #ofClients>
alper@alper-VirtualBox:~/Desktop/midterm$
```

Request Processing Functionality: void request(char miss_comment[], char user_in[])

Processes and executes commands received from clients based on the parsed input. The core function that executes the server's responses to client requests, parses the command and executes corresponding operations such as listing files, reading or writing files, and handling uploads/downloads.

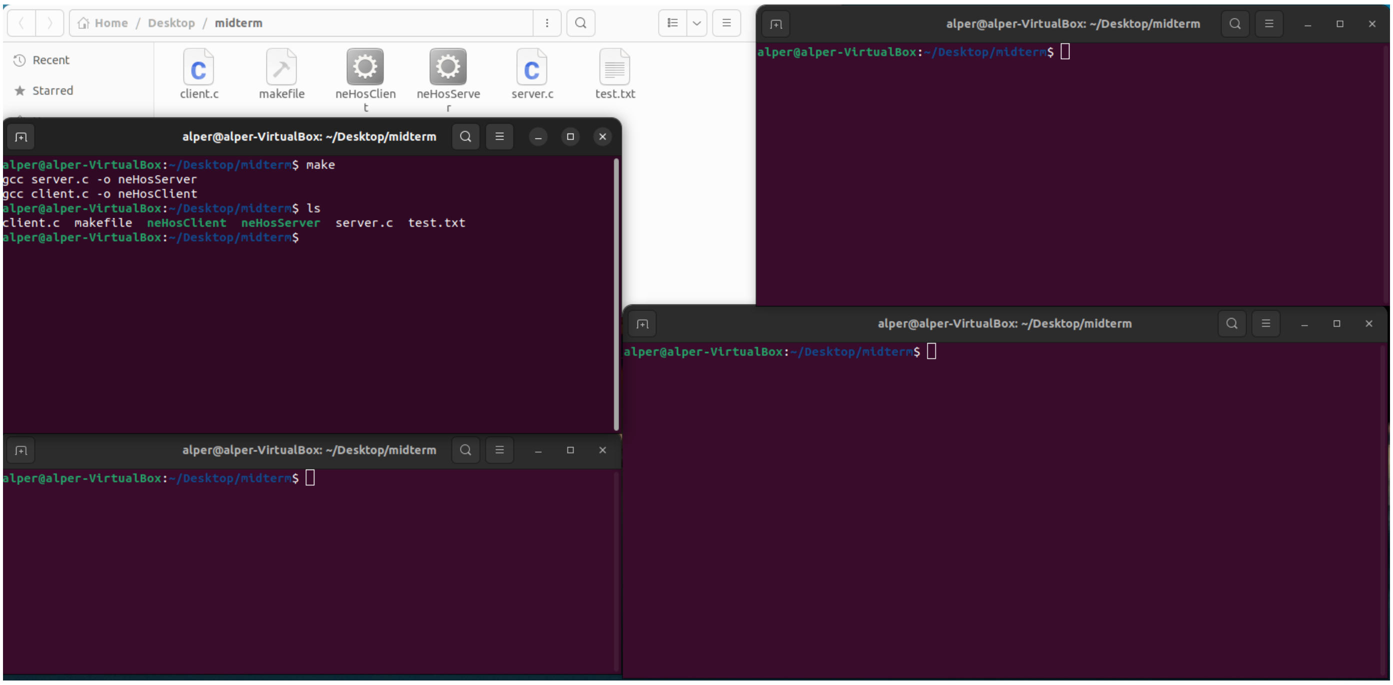
File Operation Helpers (helper_upload, helper_download, helper_archive)
Facilitates critical file operations between the server and clients, ensuring data integrity during transfers. In helper_archive, Archives the server's current contents into a specified tar file. Forks a process to execute the tar command using system. Checks if the child process exits successfully.

Main Client Function: server_func()

Manages server operations including client connections, request processing, and synchronization.Handles incoming client requests, forks processes for handling each request, manages semaphores for resource access, and logs client activities.

And main function: Entry point of the server program, sets up signal handling, initializes the server environment, and starts server operations. Sets up signal handlers, checks command-line arguments, prepares the server directory and log file, and calls server_func to start the server.

Test Cases and Results



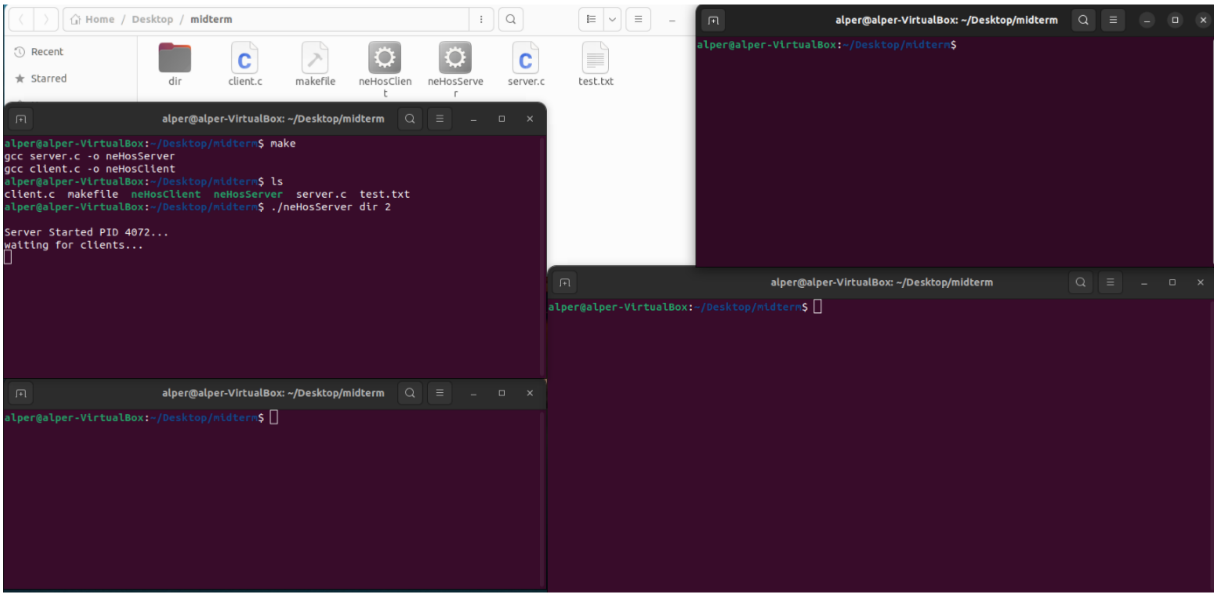
```
alper@alper-VirtualBox:~/Desktop/midterm$ make
gcc server.c -o neHosServer
gcc client.c -o neHosClient
alper@alper-VirtualBox:~/Desktop/midterm$ ls
client.c  makefile  neHosClient  neHosServer  server.c  test.txt
alper@alper-VirtualBox:~/Desktop/midterm$
```

```
alper@alper-VirtualBox:~/Desktop/midterm$
```

```
alper@alper-VirtualBox:~/Desktop/midterm$
```

```
alper@alper-VirtualBox:~/Desktop/midterm$
```

When i run meHosServer with directory name and number of clients, it is creating new file directory.



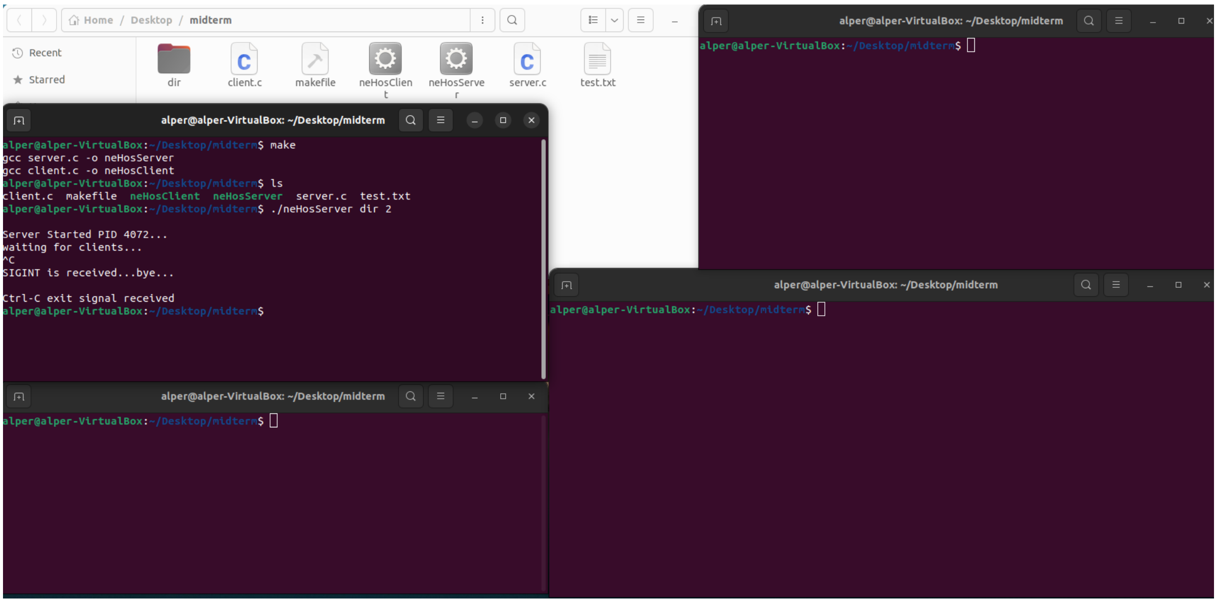
```
alper@alper-VirtualBox:~/Desktop/midterm$ make
gcc server.c -o neHosServer
gcc client.c -o neHosClient
alper@alper-VirtualBox:~/Desktop/midterm$ ls
client.c  makefile  neHosClient  neHosServer  server.c  test.txt
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4072...
waiting for clients...
```

```
alper@alper-VirtualBox:~/Desktop/midterm$
```

```
alper@alper-VirtualBox:~/Desktop/midterm$
```

```
alper@alper-VirtualBox:~/Desktop/midterm$
```

SIGINT/SIGTERM and Connection/Que in Server

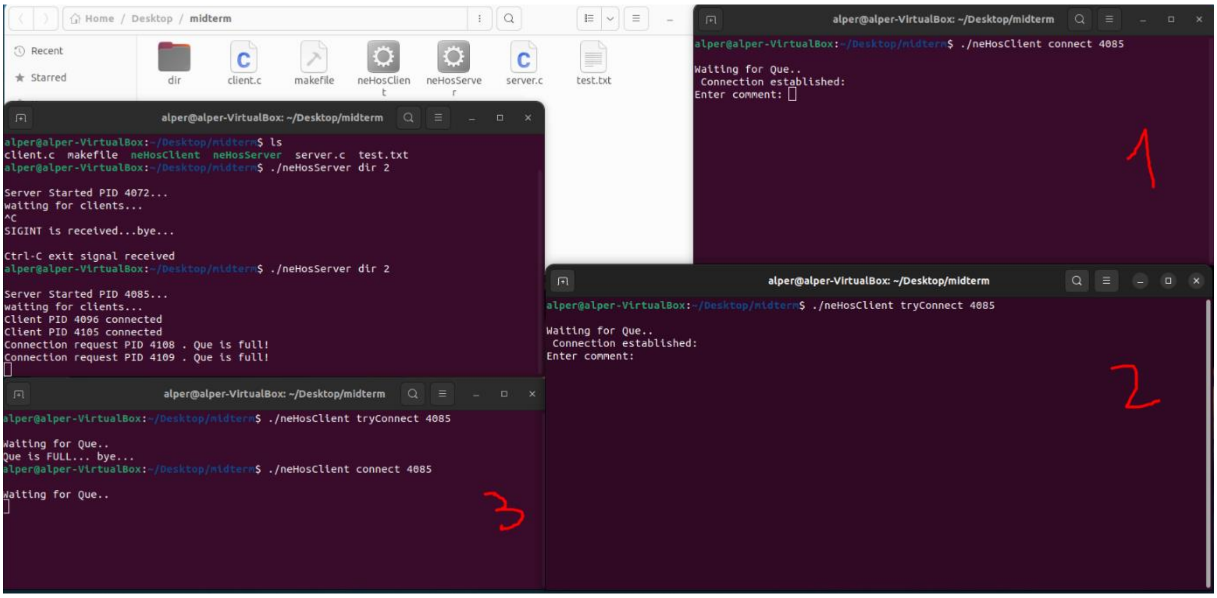


```
alper@alper-VirtualBox:~/Desktop/midterm$ make
gcc server.c -o neHosServer
gcc client.c -o neHosClient
alper@alper-VirtualBox:~/Desktop/midterm$ ls
client.c  makefile  neHosClient  neHosServer  server.c  test.txt
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4072...
waiting for clients...
^C
SIGINT is received...bye...

Ctrl-C exit signal received
alper@alper-VirtualBox:~/Desktop/midterm$
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ 
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ 
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ 
```

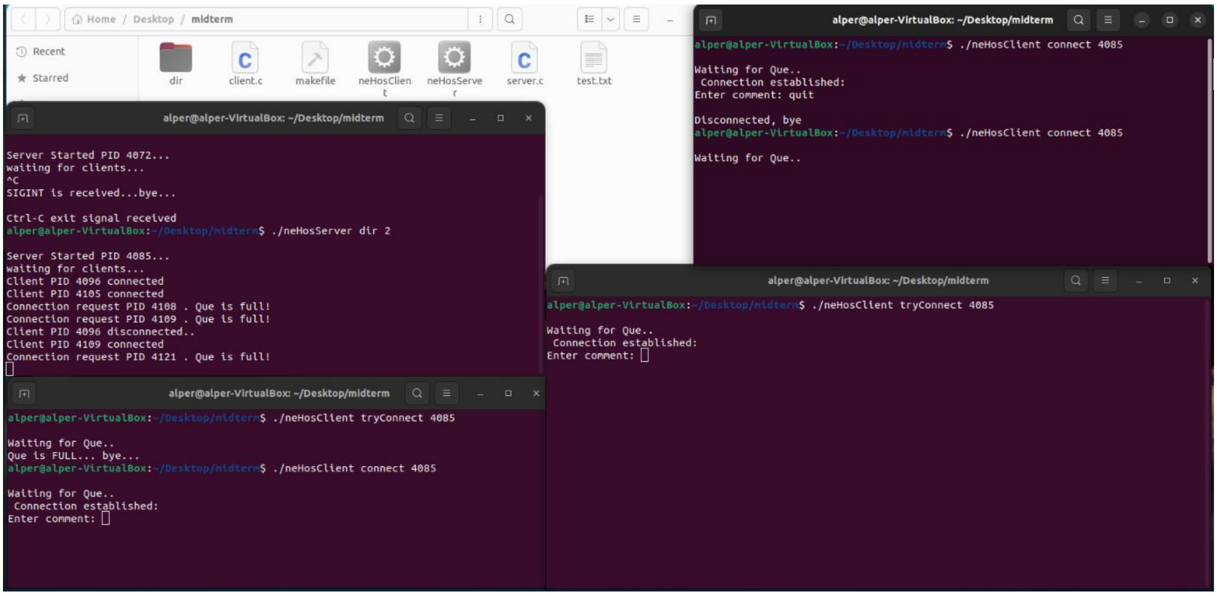


```
alper@alper-VirtualBox:~/Desktop/midterm$ ls
client.c  makefile  neHosClient  neHosServer  server.c  test.txt
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4072...
waiting for clients...
^C
SIGINT is received...bye...

Ctrl-C exit signal received
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4085...
waiting for clients...
Client PID 4096 connected
Client PID 4105 connected
Connection request PID 4108 . Que is full!
Connection request PID 4109 . Que is full!
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4085

Waiting for Que..
 Connection established:
Enter comment: 
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient tryConnect 4085

Waiting for Que..
 Connection established:
Enter comment:
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient tryConnect 4085

Waiting for Que..
Que is FULL... bye...
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4085

Waiting for Que..
```



<- Disconnected

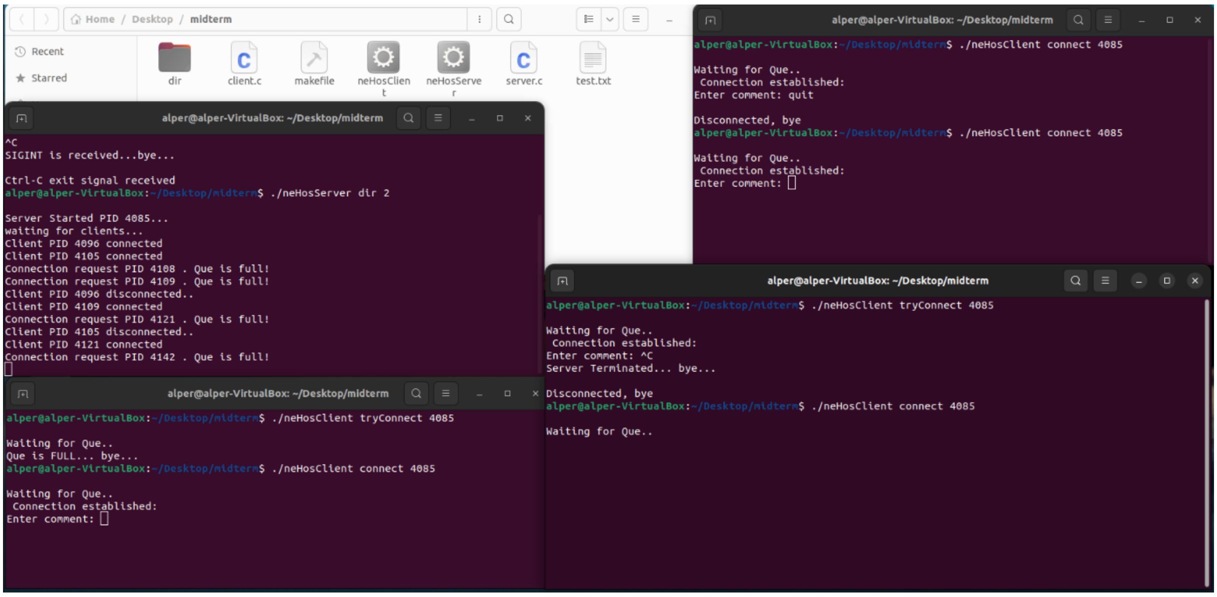
```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4085

Waiting for Que..
 Connection established:
Enter comment: quit

Disconnected, bye
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4085

Waiting for Que..
```

```
Server Started PID 4072...
waiting for clients...
^C
SIGINT is received...bye...

Ctrl-C exit signal received
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4085...
waiting for clients...
Client PID 4096 connected
Client PID 4105 connected
Connection request PID 4108 . Que is full!
Connection request PID 4109 . Que is full!
Client PID 4096 disconnected..
Client PID 4109 connected
Connection request PID 4121 . Que is full!
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient tryConnect 4085

Waiting for Que..
 Connection established:
Enter comment: 
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient tryConnect 4085

Waiting for Que..
Que is FULL... bye...
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4085

Waiting for Que..
 Connection established:
Enter comment: 
```

-> Connected



```
^C
SIGINT is received...bye...

Ctrl-C exit signal received
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4085...
waiting for clients...
Client PID 4096 connected
Client PID 4105 connected
Connection request PID 4108 . Que is full!
Connection request PID 4109 . Que is full!
Client PID 4096 disconnected..
Client PID 4109 connected
Connection request PID 4121 . Que is full!
Client PID 4105 disconnected..
Client PID 4121 connected
Connection request PID 4142 . Que is full!
```

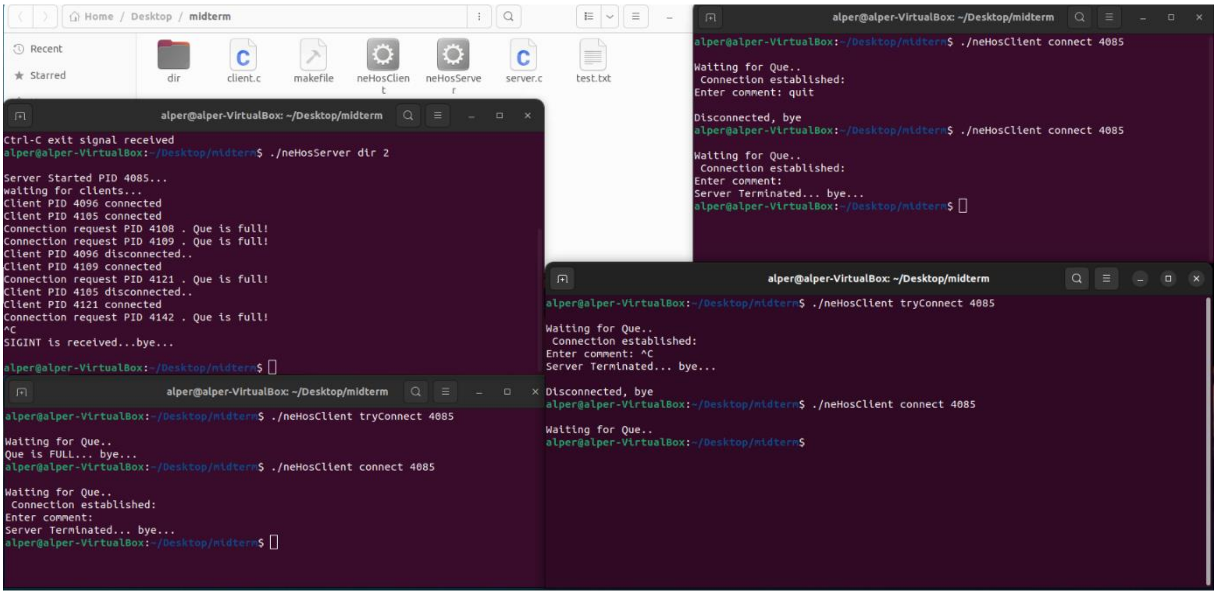
```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient tryConnect 4085

Waiting for Que..
Que is FULL... bye...
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4085

Waiting for Que..
 Connection established:
Enter comment: 
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4085

Waiting for Que..
 Connection established:
Enter comment: quit

Disconnected, bye
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4085

Waiting for Que..
 Connection established:
Enter comment: 
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient tryConnect 4085

Waiting for Que..
 Connection established:
Enter comment: ^C
Server Terminated... bye...

Disconnected, bye
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4085

Waiting for Que..
```

-> Connected

-> Disconnected



-> Terminated Server

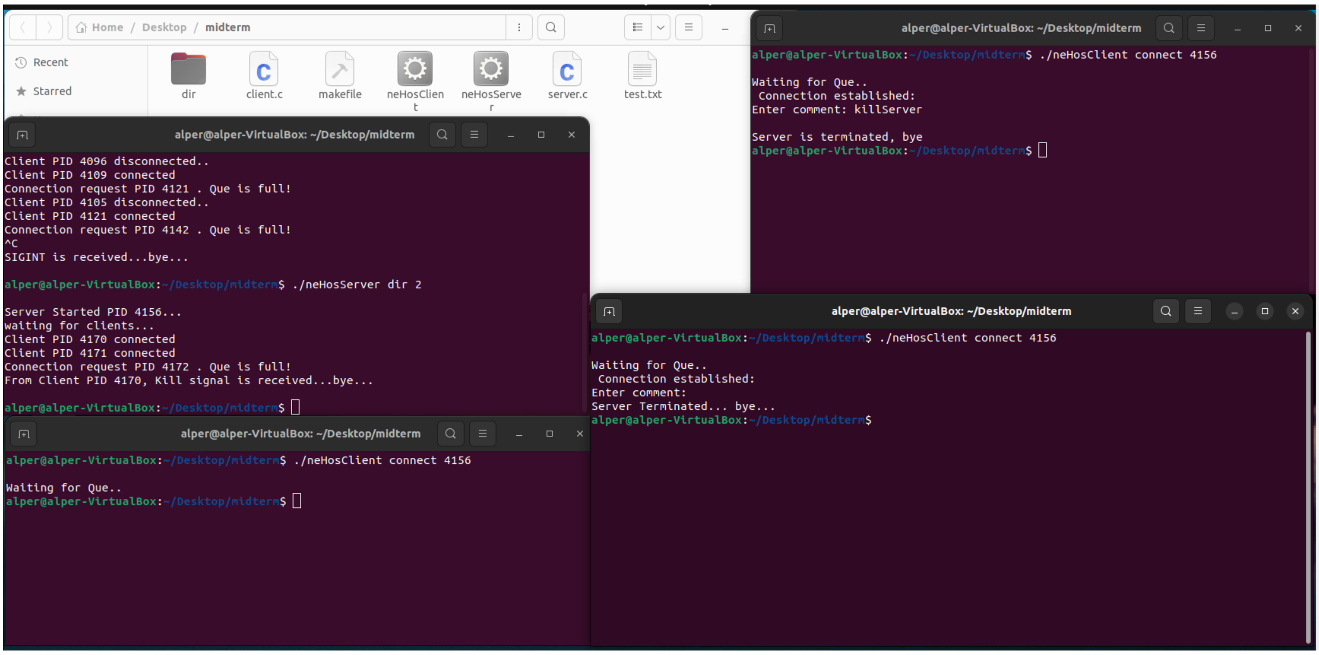
```
Ctrl-C exit signal received
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4085...
waiting for clients...
Client PID 4096 connected
Client PID 4105 connected
Connection request PID 4108 . Que is full!
Connection request PID 4109 . Que is full!
Client PID 4096 disconnected..
Client PID 4109 connected
Connection request PID 4121 . Que is full!
Client PID 4105 disconnected..
Client PID 4121 connected
Connection request PID 4142 . Que is full!
^C
SIGINT is received...bye...

alper@alper-VirtualBox:~/Desktop/midterm$ 
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient tryConnect 4085

Waiting for Que..
Que is FULL... bye...
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4085

Waiting for Que..
 Connection established:
Enter comment:
Server Terminated... bye...
alper@alper-VirtualBox:~/Desktop/midterm$ 
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4085

Waiting for Que..
 Connection established:
Enter comment: quit

Disconnected, bye
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4085

Waiting for Que..
 Connection established:
Enter comment:
Server Terminated... bye...
alper@alper-VirtualBox:~/Desktop/midterm$ 
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient tryConnect 4085

Waiting for Que..
 Connection established:
Enter comment: ^C
Server Terminated... bye...

Disconnected, bye
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4085

Waiting for Que..
alper@alper-VirtualBox:~/Desktop/midterm$
```

User Commands

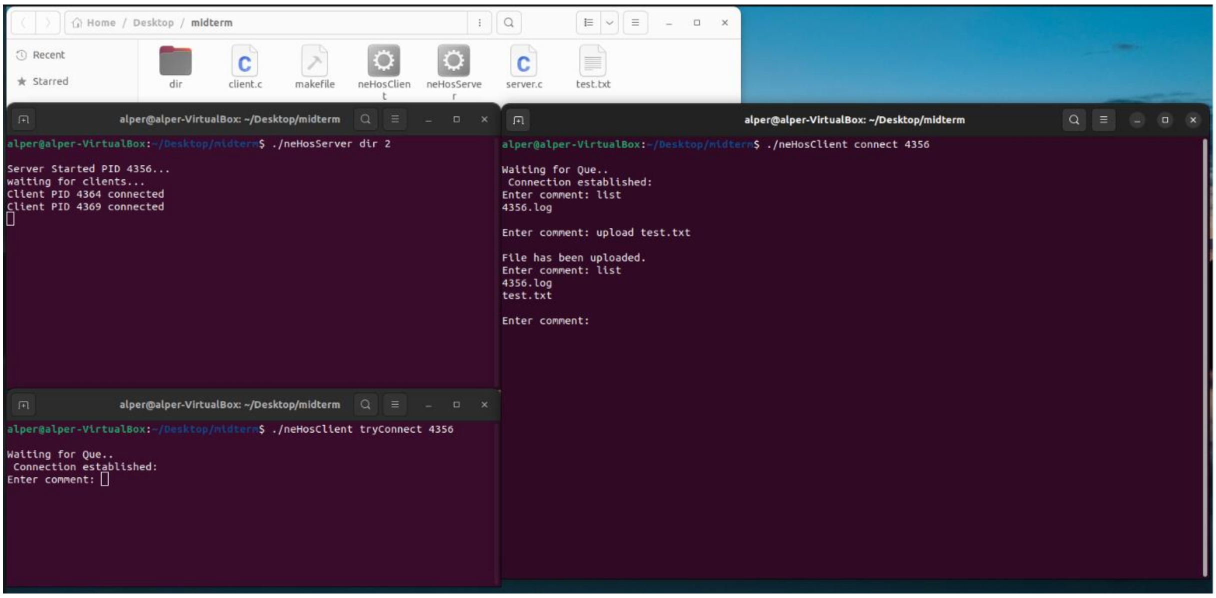


```
Client PID 4096 disconnected..
Client PID 4109 connected
Connection request PID 4121 . Que is full!
Client PID 4105 disconnected..
Client PID 4121 connected
Connection request PID 4142 . Que is full!
^C
SIGINT is received...bye...

alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4156...
waiting for clients...
Client PID 4170 connected
Client PID 4171 connected
Connection request PID 4172 . Que is full!
From Client PID 4170, Kill signal is received...bye...

alper@alper-VirtualBox:~/Desktop/midterm$ 
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4156

Waiting for Que..
alper@alper-VirtualBox:~/Desktop/midterm$ 
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4156

Waiting for Que..
 Connection established:
Enter comment: killServer

Server is terminated, bye
alper@alper-VirtualBox:~/Desktop/midterm$ 
```

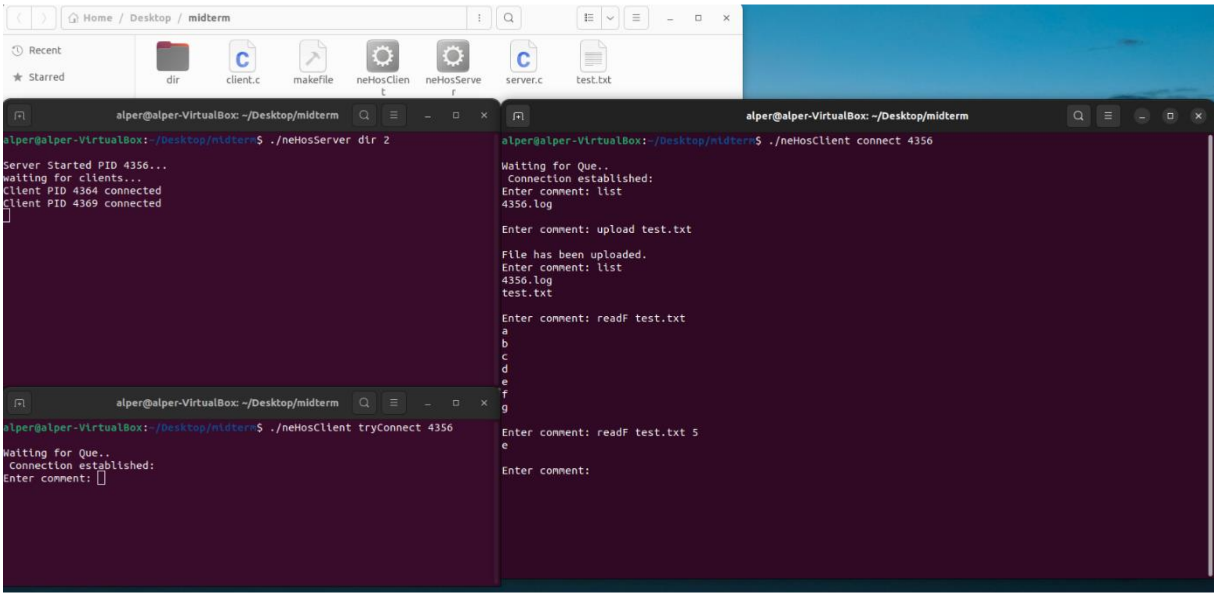
```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4156

Waiting for Que..
 Connection established:
Enter comment:
Server Terminated... bye...
alper@alper-VirtualBox:~/Desktop/midterm$
```



```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4356...
waiting for clients...
Client PID 4364 connected
Client PID 4369 connected
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient tryConnect 4356

Waiting for Que..
 Connection established:
Enter comment:
```

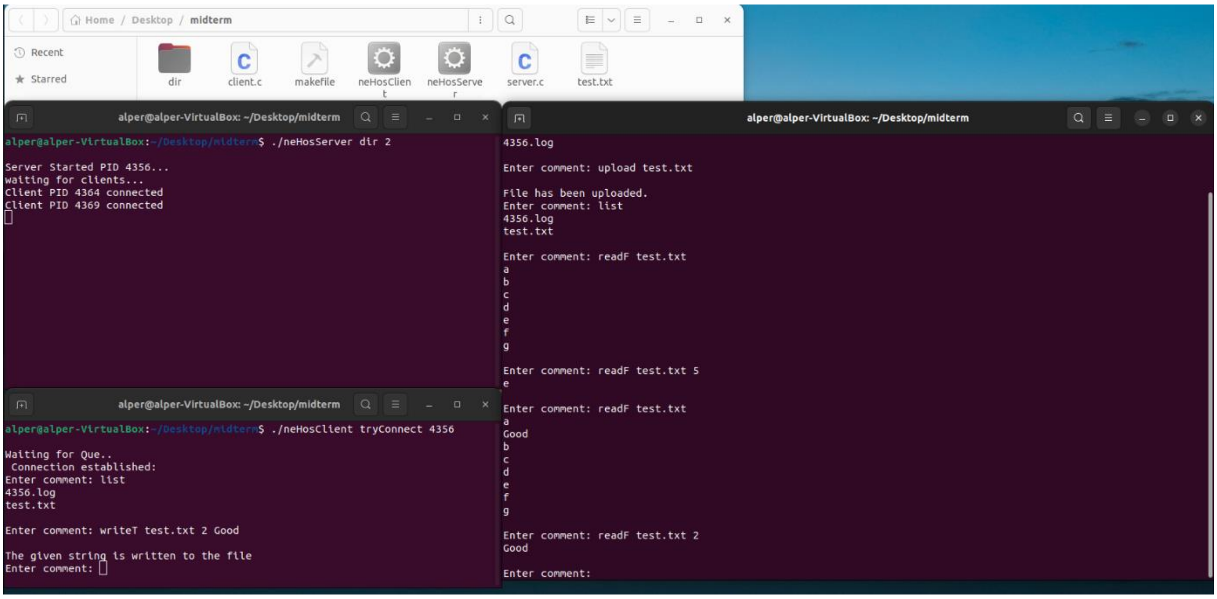
```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4356

Waiting for Que..
 Connection established:
Enter comment: list
4356.log

Enter comment: upload test.txt

File has been uploaded.
Enter comment: list
4356.log
test.txt

Enter comment:
```



```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4356...
waiting for clients...
Client PID 4364 connected
Client PID 4369 connected
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient tryConnect 4356

Waiting for Que..
 Connection established:
Enter comment:
```

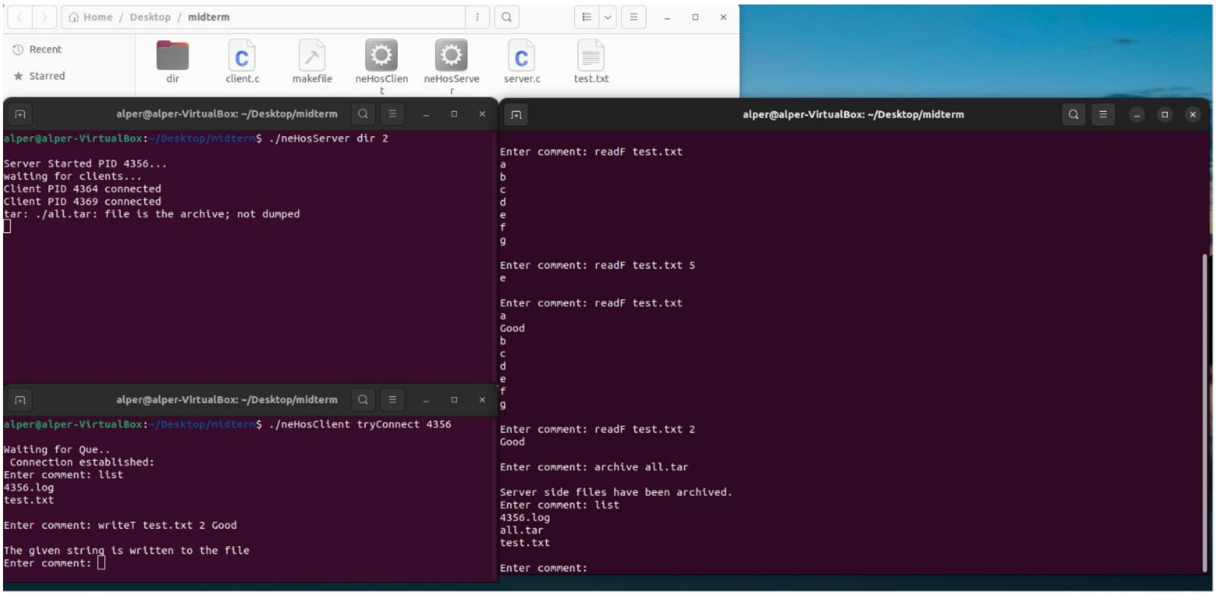
```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4356

Waiting for Que..
 Connection established:
Enter comment: list
4356.log

Enter comment: upload test.txt

File has been uploaded.
Enter comment: list
4356.log
test.txt

Enter comment: readF test.txt
a
b
c
d
e
f
g

Enter comment: readF test.txt 5
e

Enter comment:
```



```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4356...
waiting for clients...
Client PID 4364 connected
Client PID 4369 connected
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient tryConnect 4356

Waiting for Que..
 Connection established:
Enter comment: list
4356.log
test.txt

Enter comment: writeT test.txt 2 Good

The given string is written to the file
Enter comment:
```

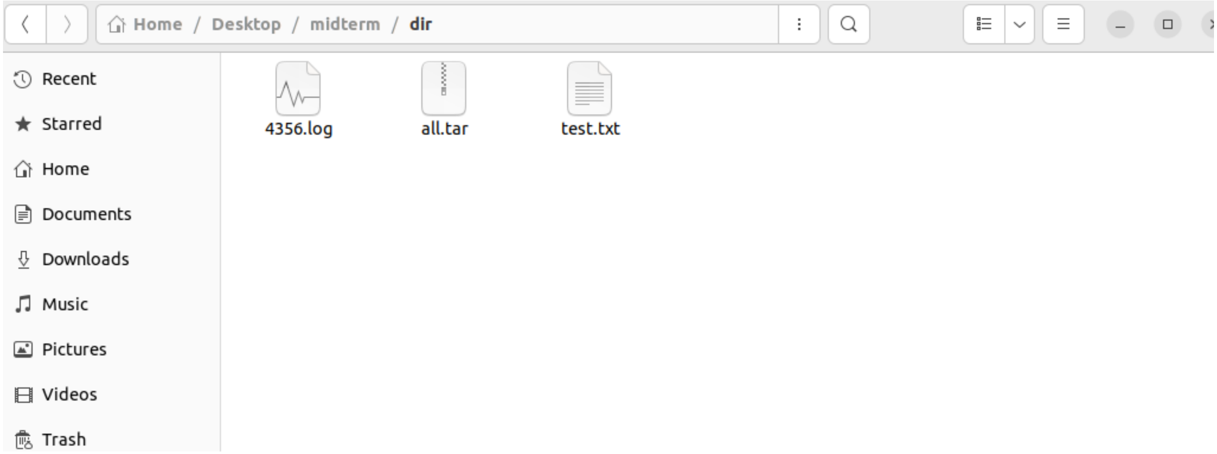
```
4356.log

Enter comment: upload test.txt

File has been uploaded.
Enter comment: list
4356.log
test.txt

Enter comment: readF test.txt
a
b
c
d
e
f
g

Enter comment: readF test.txt 5
e

Enter comment: readF test.txt
a
Good
b
c
d
e
f
g

Enter comment: readF test.txt 2
Good

Enter comment:
```

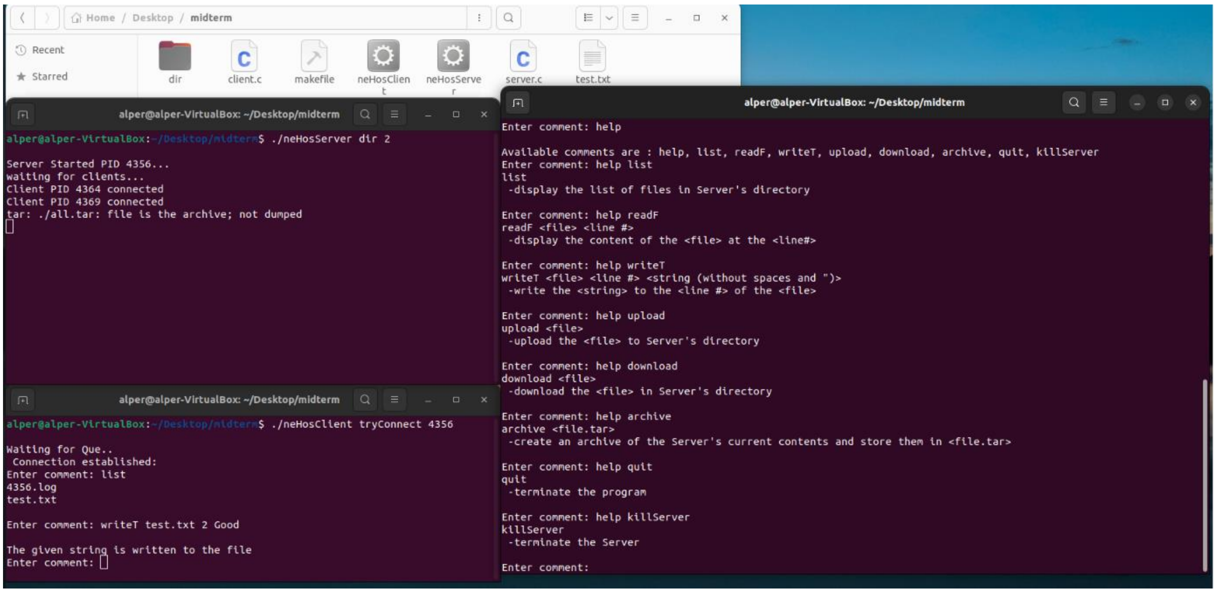


```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4356...
waiting for clients...
Client PID 4364 connected
Client PID 4369 connected
tar: ./all.tar: file is the archive; not dumped
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient tryConnect 4356

Waiting for Que..
 Connection established:
Enter comment: list
4356.log
test.txt

Enter comment: writeT test.txt 2 Good

The given string is written to the file
Enter comment: 
```

```
Enter comment: readF test.txt
a
b
c
d
e
f
g

Enter comment: readF test.txt 5
e

Enter comment: readF test.txt
a
Good
b
c
d
e
f
g

Enter comment: readF test.txt 2
Good

Enter comment: archive all.tar

Server side files have been archived.
Enter comment: list
4356.log
all.tar
test.txt

Enter comment:
```

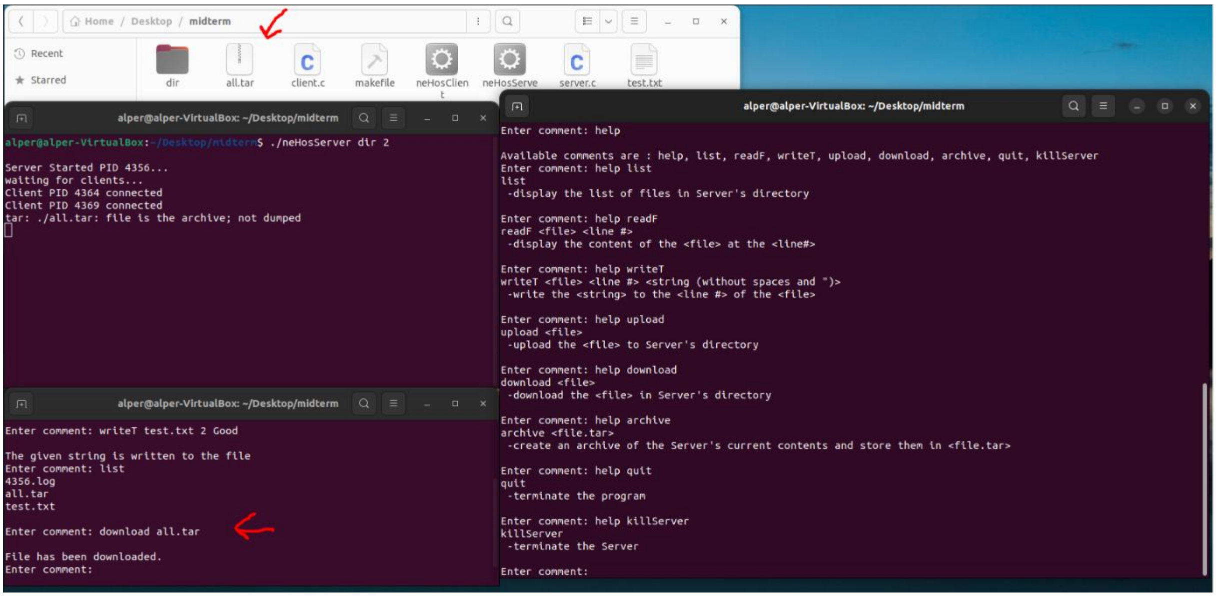




```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4356...
waiting for clients...
Client PID 4364 connected
Client PID 4369 connected
tar: ./all.tar: file is the archive; not dumped
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient tryConnect 4356

Waiting for Que..
 Connection established:
Enter comment: list
4356.log
test.txt

Enter comment: writeT test.txt 2 Good

The given string is written to the file
Enter comment: 
```

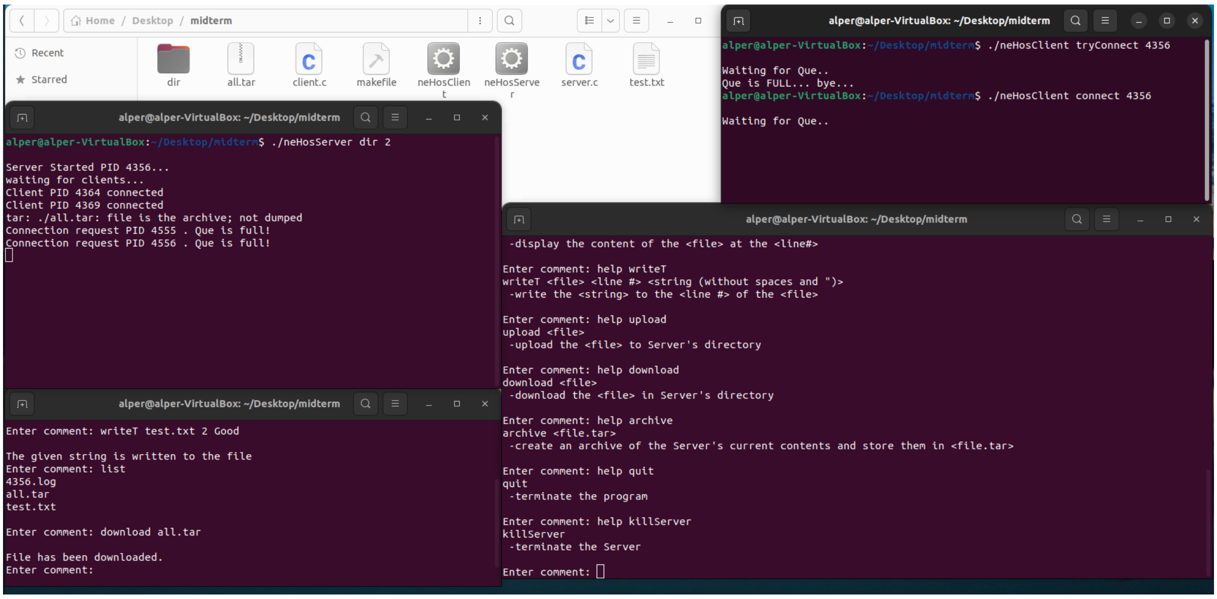
```
Enter comment: help

Available comments are : help, list, readF, writeT, upload, download, archive, quit, killServer
Enter comment: help list
list
 -display the list of files in Server's directory

Enter comment: help readF
readF <file> <line #>
 -display the content of the <file> at the <line#>

Enter comment: help writeT
writeT <file> <line #> <string (without spaces and ")>
 -write the <string> to the <line #> of the <file>

Enter comment: help upload
upload <file>
 -upload the <file> to Server's directory

Enter comment: help download
download <file>
 -download the <file> in Server's directory

Enter comment: help archive
archive <file.tar>
 -create an archive of the Server's current contents and store them in <file.tar>

Enter comment: help quit
quit
 -terminate the program

Enter comment: help killServer
killServer
 -terminate the Server

Enter comment:
```



```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4356...
waiting for clients...
Client PID 4364 connected
Client PID 4369 connected
tar: ./all.tar: file is the archive; not dumped
```

```
Enter comment: writeT test.txt 2 Good

The given string is written to the file
Enter comment: list
4356.log
all.tar
test.txt

Enter comment: download all.tar

File has been downloaded.
Enter comment:
```

```
Enter comment: help

Available comments are : help, list, readF, writeT, upload, download, archive, quit, killServer
Enter comment: help list
list
 -display the list of files in Server's directory

Enter comment: help readF
readF <file> <line #>
 -display the content of the <file> at the <line#>

Enter comment: help writeT
writeT <file> <line #> <string (without spaces and ")>
 -write the <string> to the <line #> of the <file>

Enter comment: help upload
upload <file>
 -upload the <file> to Server's directory

Enter comment: help download
download <file>
 -download the <file> in Server's directory

Enter comment: help archive
archive <file.tar>
 -create an archive of the Server's current contents and store them in <file.tar>

Enter comment: help quit
quit
 -terminate the program

Enter comment: help killServer
killServer
 -terminate the Server

Enter comment:
```

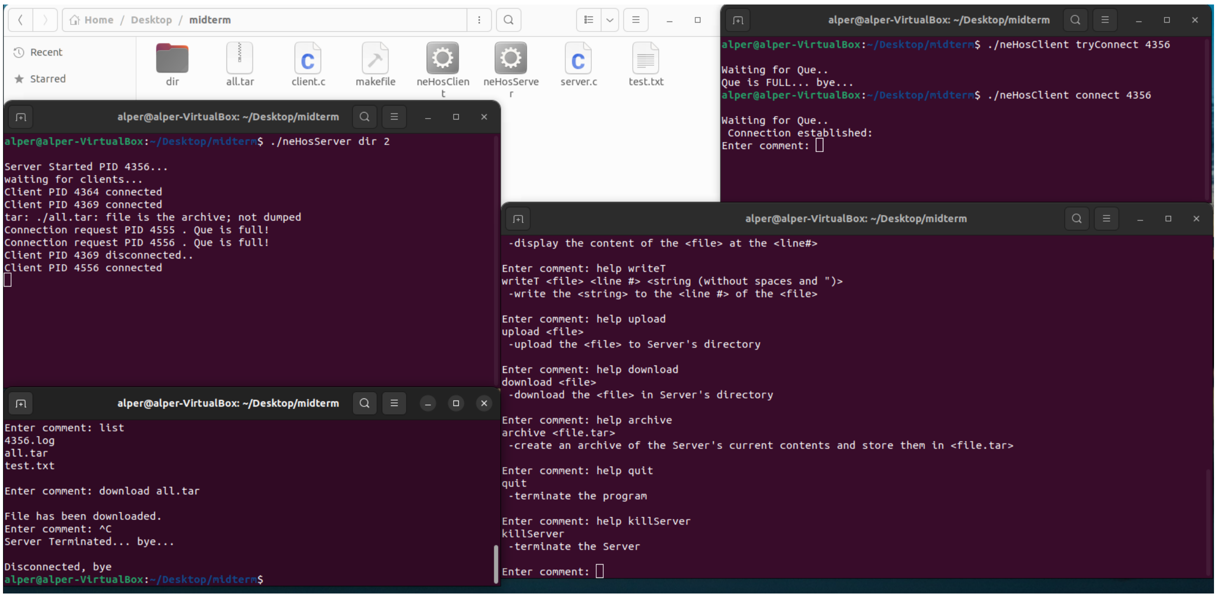


```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4356...
waiting for clients...
Client PID 4364 connected
Client PID 4369 connected
tar: ./all.tar: file is the archive; not dumped
Connection request PID 4555 . Que is full!
Connection request PID 4556 . Que is full!
```

```
Enter comment: writeT test.txt 2 Good

The given string is written to the file
Enter comment: list
4356.log
all.tar
test.txt

Enter comment: download all.tar

File has been downloaded.
Enter comment:
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient tryConnect 4356

Waiting for Que..
Que is FULL... bye...
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4356

Waiting for Que..
```

```
 -display the content of the <file> at the <line#>

Enter comment: help writeT
writeT <file> <line #> <string (without spaces and ")>
 -write the <string> to the <line #> of the <file>

Enter comment: help upload
upload <file>
 -upload the <file> to Server's directory

Enter comment: help download
download <file>
 -download the <file> in Server's directory

Enter comment: help archive
archive <file.tar>
 -create an archive of the Server's current contents and store them in <file.tar>

Enter comment: help quit
quit
 -terminate the program

Enter comment: help killServer
killServer
 -terminate the Server

Enter comment:
```

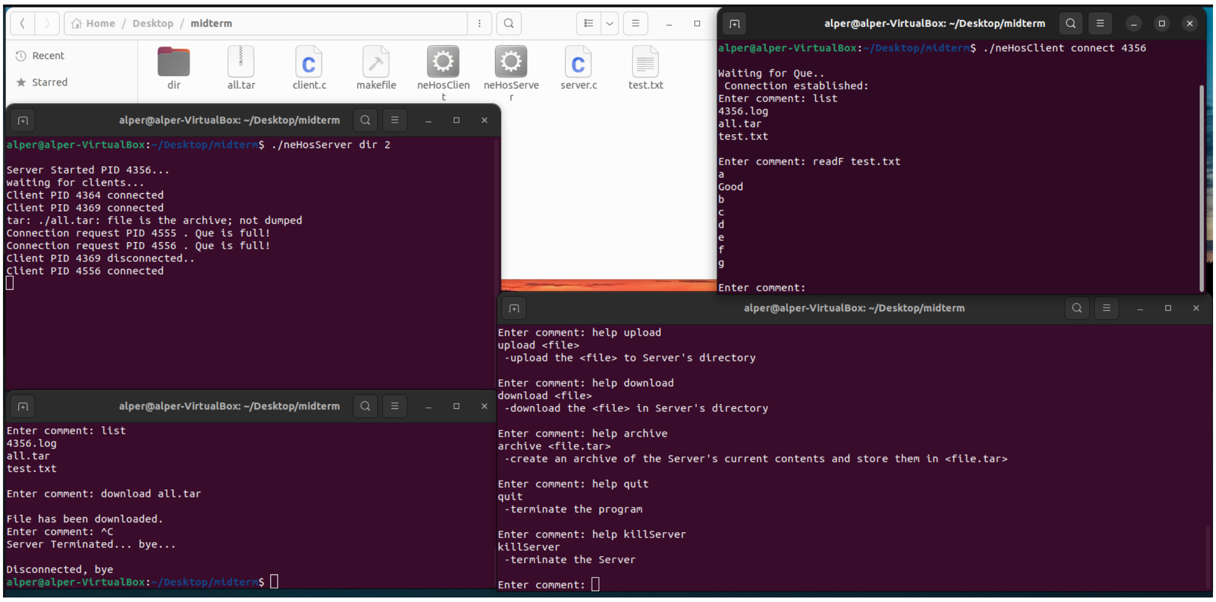


```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4356...
waiting for clients...
Client PID 4364 connected
Client PID 4369 connected
tar: ./all.tar: file is the archive; not dumped
Connection request PID 4555 . Que is full!
Connection request PID 4556 . Que is full!
Client PID 4369 disconnected..
Client PID 4556 connected
```

```
Enter comment: list
4356.log
all.tar
test.txt

Enter comment: download all.tar

File has been downloaded.
Enter comment: ^C
Server Terminated... bye...

Disconnected, bye
alper@alper-VirtualBox:~/Desktop/midterm$
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient tryConnect 4356

Waiting for Que..
Que is FULL... bye...
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4356

Waiting for Que..
 Connection established:
Enter comment:
```

```
 -display the content of the <file> at the <line#>

Enter comment: help writeT
writeT <file> <line #> <string (without spaces and ")>
 -write the <string> to the <line #> of the <file>

Enter comment: help upload
upload <file>
 -upload the <file> to Server's directory

Enter comment: help download
download <file>
 -download the <file> in Server's directory

Enter comment: help archive
archive <file.tar>
 -create an archive of the Server's current contents and store them in <file.tar>

Enter comment: help quit
quit
 -terminate the program

Enter comment: help killServer
killServer
 -terminate the Server

Enter comment:
```

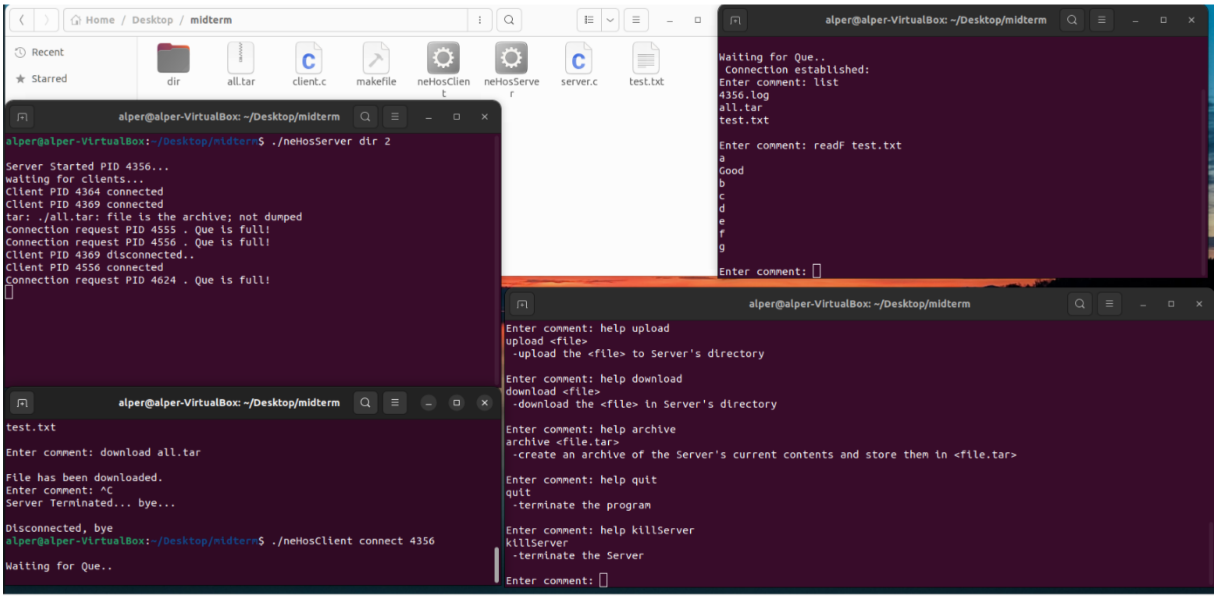


```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4356...
waiting for clients...
Client PID 4364 connected
Client PID 4369 connected
tar: ./all.tar: file is the archive; not dumped
Connection request PID 4555 . Que is full!
Connection request PID 4556 . Que is full!
Client PID 4369 disconnected..
Client PID 4556 connected
```

```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4356

Waiting for Que..
 Connection established:
Enter comment: list
4356.log
all.tar
test.txt

Enter comment: readF test.txt
a
Good
b
c
d
e
f
g

Enter comment:
```

```
Enter comment: help upload
upload <file>
 -upload the <file> to Server's directory

Enter comment: help download
download <file>
 -download the <file> in Server's directory

Enter comment: help archive
archive <file.tar>
 -create an archive of the Server's current contents and store them in <file.tar>

Enter comment: help quit
quit
 -terminate the program

Enter comment: help killServer
killServer
 -terminate the Server

Enter comment:
```

```
Enter comment: list
4356.log
all.tar
test.txt

Enter comment: download all.tar

File has been downloaded.
Enter comment: ^C
Server Terminated... bye...

Disconnected, bye
alper@alper-VirtualBox:~/Desktop/midterm$
```

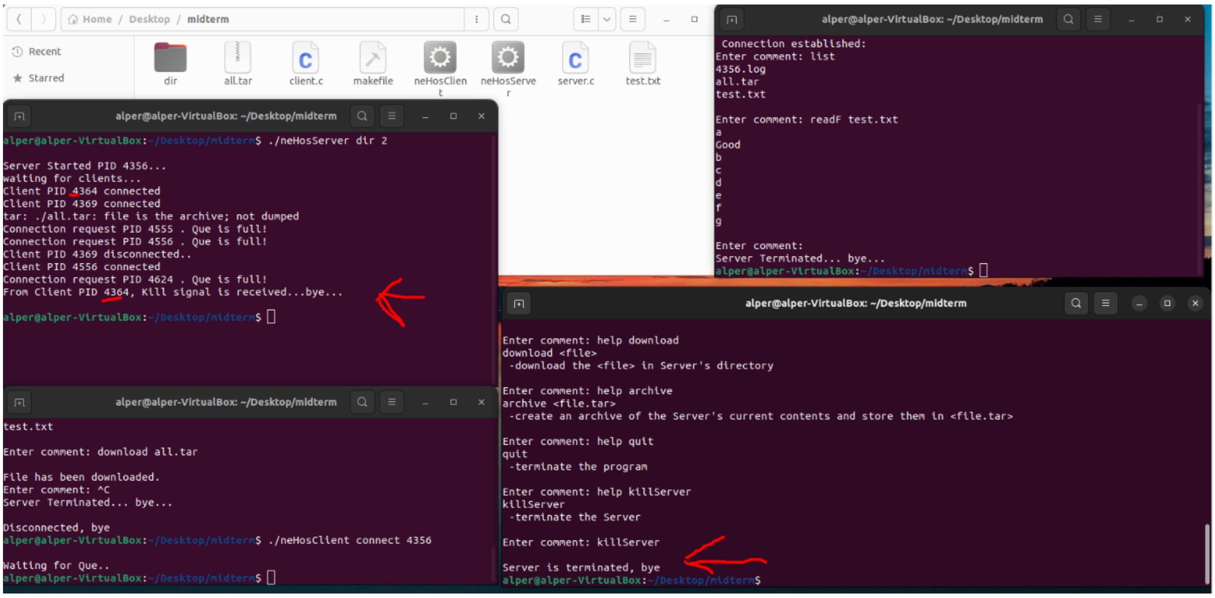


```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4356...
waiting for clients...
Client PID 4364 connected
Client PID 4369 connected
tar: ./all.tar: file is the archive; not dumped
Connection request PID 4555 . Que is full!
Connection request PID 4556 . Que is full!
Client PID 4369 disconnected..
Client PID 4556 connected
Connection request PID 4624 . Que is full!
```

```
Waiting for Que..
 Connection established:
Enter comment: list
4356.log
all.tar
test.txt

Enter comment: readF test.txt
a
Good
b
c
d
e
f
g

Enter comment:
```

```
Enter comment: help upload
upload <file>
 -upload the <file> to Server's directory

Enter comment: help download
download <file>
 -download the <file> in Server's directory

Enter comment: help archive
archive <file.tar>
 -create an archive of the Server's current contents and store them in <file.tar>

Enter comment: help quit
quit
 -terminate the program

Enter comment: help killServer
killServer
 -terminate the Server

Enter comment:
```

```
test.txt

Enter comment: download all.tar

File has been downloaded.
Enter comment: ^C
Server Terminated... bye...

Disconnected, bye
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4356

Waiting for Que..
```



```
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosServer dir 2

Server Started PID 4356...
waiting for clients...
Client PID 4364 connected
Client PID 4369 connected
tar: ./all.tar: file is the archive; not dumped
Connection request PID 4555 . Que is full!
Connection request PID 4556 . Que is full!
Client PID 4369 disconnected..
Client PID 4556 connected
Connection request PID 4624 . Que is full!
From Client PID 4364, Kill signal is received...bye...

alper@alper-VirtualBox:~/Desktop/midterm$
```

```
 Connection established:
Enter comment: list
4356.log
all.tar
test.txt

Enter comment: readF test.txt
a
Good
b
c
d
e
f
g

Enter comment:
Server Terminated... bye...
alper@alper-VirtualBox:~/Desktop/midterm$
```

```
Enter comment: help download
download <file>
 -download the <file> in Server's directory

Enter comment: help archive
archive <file.tar>
 -create an archive of the Server's current contents and store them in <file.tar>

Enter comment: help quit
quit
 -terminate the program

Enter comment: help killServer
killServer
 -terminate the Server

Enter comment: killServer

Server is terminated, bye
alper@alper-VirtualBox:~/Desktop/midterm$
```

```
test.txt

Enter comment: download all.tar

File has been downloaded.
Enter comment: ^C
Server Terminated... bye...

Disconnected, bye
alper@alper-VirtualBox:~/Desktop/midterm$ ./neHosClient connect 4356

Waiting for Que..
alper@alper-VirtualBox:~/Desktop/midterm$
```