FTP Server Functional Requirements

Group-3 (Sprint 2)

# Customize File Transfer Protocol

## Table of content

# Chapter 1: Introduction.

The introduction of the software requirement specification provides an overview of the entire Software. The entire SRS with overview description purpose, scope, tools used and basic description. The aim of this document is to gather, analyse and give an in- depth insight into the FTP Server Functional Requirements by defining the problem statement in detail. The detailed requirements of the application are provided in this document.

1. **Intended Audience**

This document is intended to be read by the User.

2. **Project Purpose:**

The purpose of this project is to build and server client application which handles multiple clients. Where authorised clients can browse, update and download the files from server and anonymous clients can only upload the file to server.

3. **Key project Objectives:**

a. Server initialization message is displayed after starting server
b. Client connects message is displayed after clients connects to server
c. Authenticated and Anonymous user logins
d. Multiple clients connected to a single server
e. Client will have multiple options to browse, upload and download files from server
f. Clients show the successful and unsuccessful message after performing a particular operation

4. **Project Scope:**

The main aim of the project is to login a authenticated and anonymous users and do the required operations such as browse, list, upload, download and view present directory of the user, whereas the anonymous user will not be having download privilege and whereas all the operations performed by anonymous user will only be effective in public directory.

## 2. Design Overview: -

- **Customize File transfer Protocols comprises of the following function in maintaindatabase:**

| | |
|---|---|
| Name of the Module | Browse choice |
| Handled by | |
| Description | The function is used to list the contents of the directory. |

| | |
|---|---|
| Name of the Module | Read choice |
| Handled by | |
| Description | This function is used to print the contents insidethe file. |

| | |
|---|---|
| Name of the Module | PWD command |
| Handled by | |
| Description | The function is used to know present workingdirectory |

| | |
|---|---|
| Name of the Module | Upload |
| Handled by | |
| Description | This function is used to upload file on the server |

| | |
|---|---|
| Name of the Module | Download |
| Handled by | |
| Description | This function is used to download file from server |

| | |
|---|---|
| Name of the Module | Bye command |
| Handled by | |
| Description | This command is used to exit the client from theserver. |

1. **Design Objectives:**

   1. Start the connection
   2. Accept the connection
   3. Check for black list IP
   4. Different choices should be able to get excepted output.
   5. Customize file transfer protocol able to send file.

2. **Design Alternative: -**

We have used fork instead of thread for independent multiple client handling.

**2.3 User Interface Paradigms: -**

The Customize file transfer protocol should be able to allow the client to upload, download, read the contents file and browse directory. Multiple clients should be able to connect one server.

1. **Validation: -**

- The server first check for IP of incoming client check in black list IP file accordinglyconnects to client
- The server and Client should be able to establish a connection successfully.

- There are two types of users Anonymous and Authenticated User. For anonymous users 'username is any value other than valid username. But for authenticated users username and password credentials should match with the valid_user.txt file.

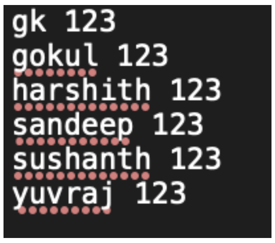
- Authenticate function load the user details from the valid_user.txt file give the user access accordingly.

## 3. SYSTEM ARCHITECTURE: -

### 3.1. Database Architecture

The database used inside our program is the user.txt file. The user.txt file contains username and password separated by space. We have used strtok with a delimiter as space to store username and password. Also, for the present directory we can use username for the purpose.

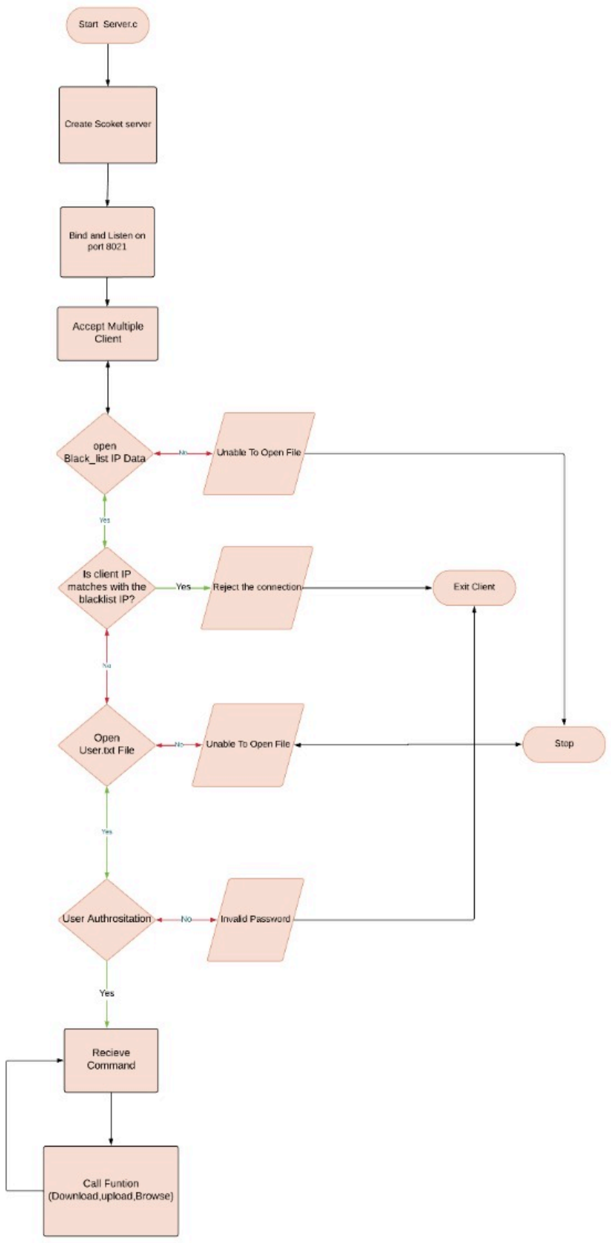
The architecture used in this system is like that we store all the users inside a data folder in the home directory. And all the information of the authenticated and anonymoususer stored in user.txt files.



```
gk 123
gokul 123
harshith 123
sandeep 123
sushanth 123
yuvraj 123
```

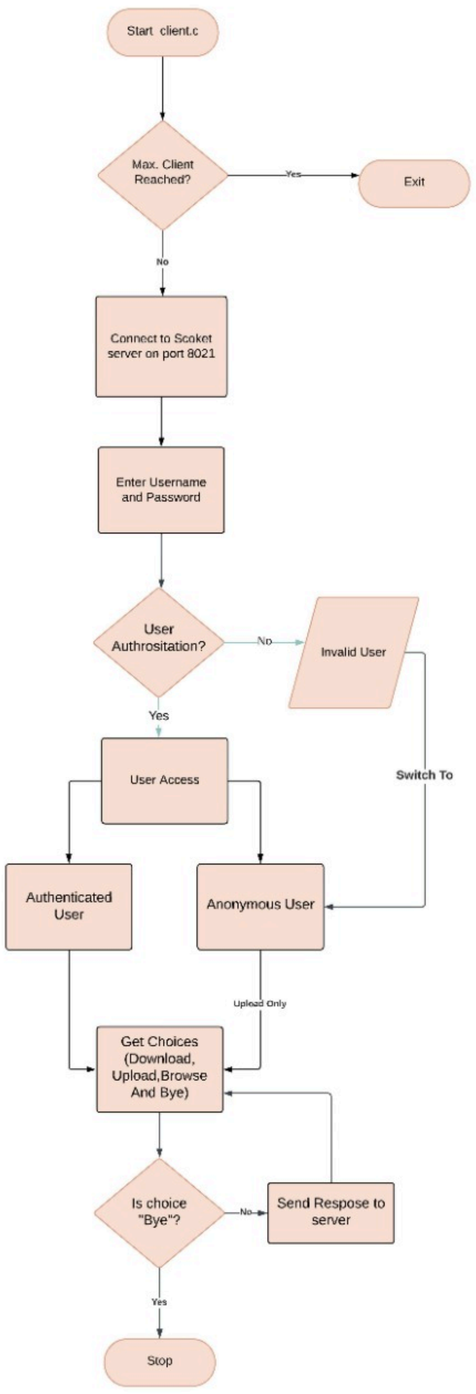
### 3.2 Server Architecture:

Server socket is created on the local host(127.0.0.1) and is bind to port 8021 as per requirement. Server listens on that port in an infinite loop and waits for the client to connect. For each connected client Ip is verified and user is validated and then each client is dealt with independently.


Start Server.c
Create Scoket server
Bind and Listen on port 8021
Accept Multiple Client
open Black_list IP Data
No
Unable To Open File
Yes
Is client IP matches with the blacklist IP?
Yes
Reject the connection
Exit Client
No
Open User.txt File
No
Unable To Open File
Stop
Yes
User Authrositation
No
Invalid Password
Yes
Recieve Command
Call Funtion (Download,upload,Browse)

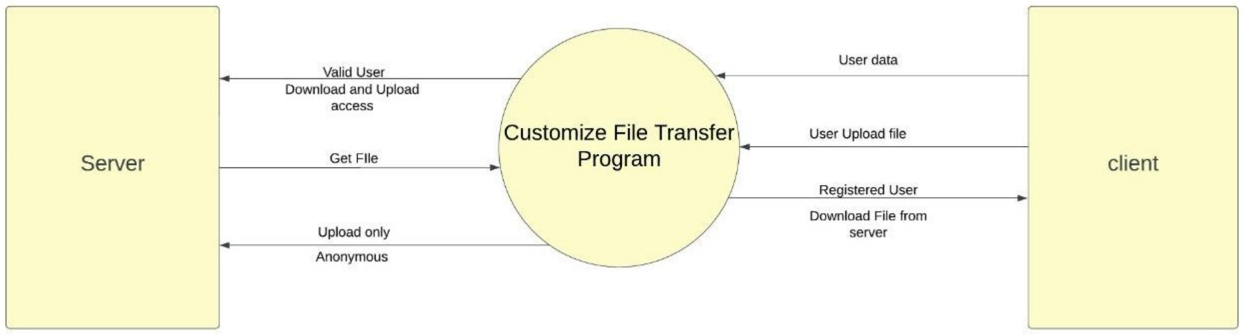
## 3.3 Client Architecture

In client side after successful connection to Server on port 8021 as per requirement. Our program give user to choice according to user access. Where  user wants to read file from the server, browse their directory ,download file from server, upload file on the server and at last exit.

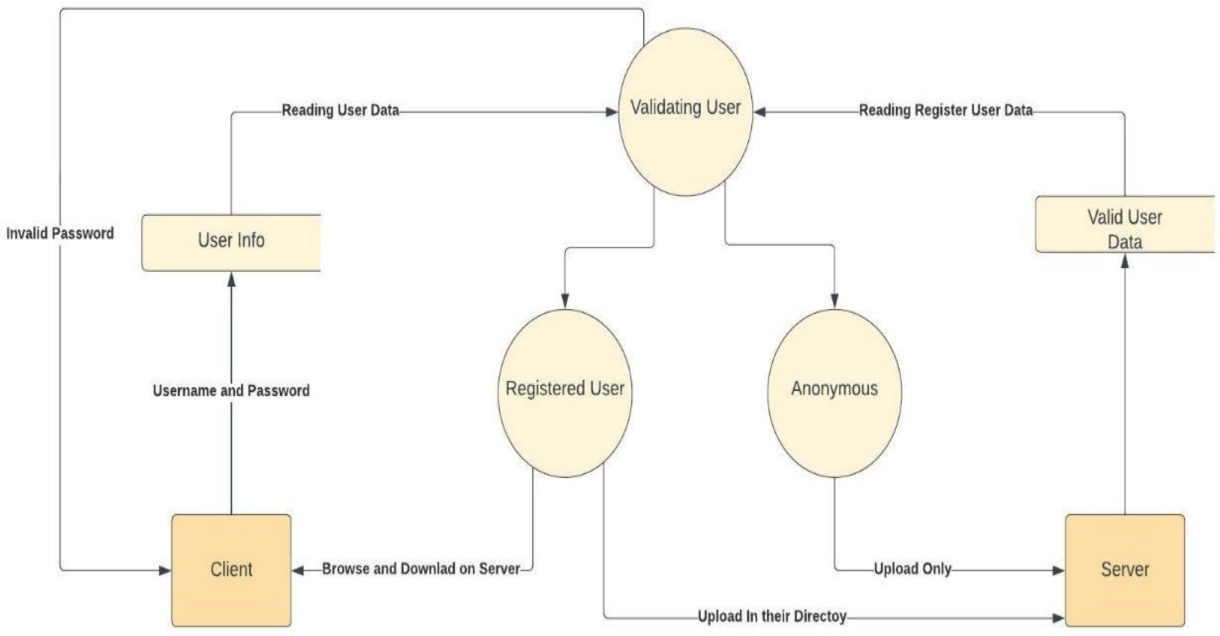


## 4. Detailed System Design:

### 4.1 DFD-0:

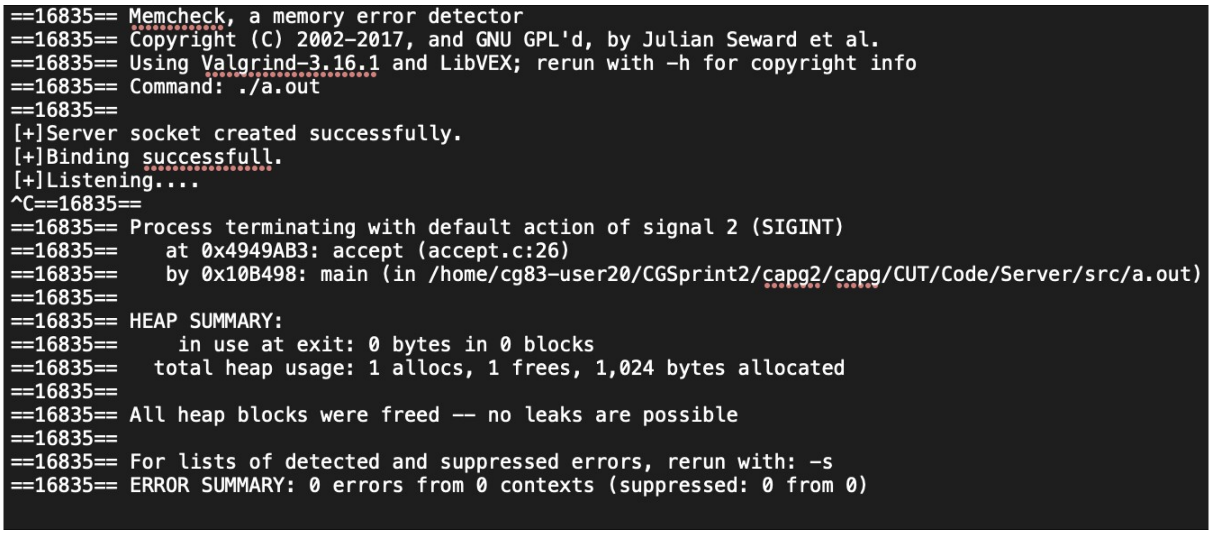


### 4.2: DFD-1:



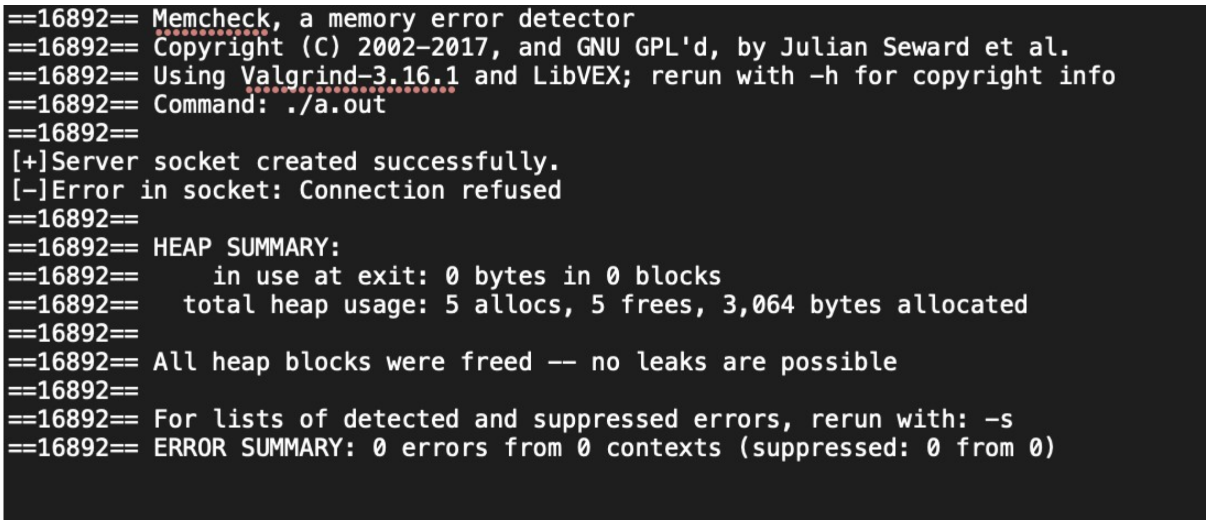
## 5. Tools report

### 1. Valgrind tool



```
==16835== Memcheck, a memory error detector
==16835== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==16835== Using Valgrind-3.16.1 and LibVEX; rerun with -h for copyright info
==16835== Command: ./a.out
==16835==
[+]Server socket created successfully.
[+]Binding successfull.
[+]Listening....
^C==16835==
==16835== Process terminating with default action of signal 2 (SIGINT)
==16835==    at 0x4949AB3: accept (accept.c:26)
==16835==    by 0x10B498: main (in /home/cg83-user20/CGSprint2/capg2/capg/CUT/Code/Server/src/a.out)
==16835==
==16835== HEAP SUMMARY:
==16835==     in use at exit: 0 bytes in 0 blocks
==16835==   total heap usage: 1 allocs, 1 frees, 1,024 bytes allocated
==16835==
==16835== All heap blocks were freed -- no leaks are possible
==16835==
==16835== For lists of detected and suppressed errors, rerun with: -s
==16835== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
```

Server report

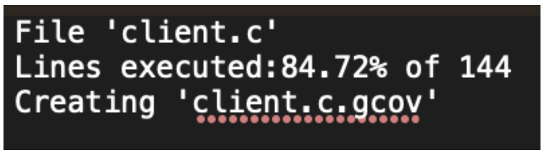


```
==16892== Memcheck, a memory error detector
==16892== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==16892== Using Valgrind-3.16.1 and LibVEX; rerun with -h for copyright info
==16892== Command: ./a.out
==16892==
[+]Server socket created successfully.
[-]Error in socket: Connection refused
==16892==
==16892== HEAP SUMMARY:
==16892==     in use at exit: 0 bytes in 0 blocks
==16892==   total heap usage: 5 allocs, 5 frees, 3,064 bytes allocated
==16892==
==16892== All heap blocks were freed -- no leaks are possible
==16892==
==16892== For lists of detected and suppressed errors, rerun with: -s
==16892== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
```

Client report:

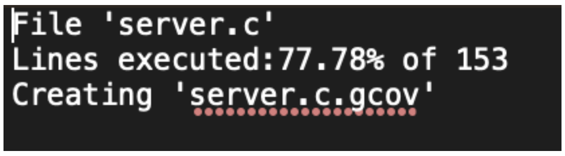
### 2. Gcov report

Server Report for Authenticated user:



```
File 'client.c'
Lines executed:84.72% of 144
Creating 'client.c.gcov'
```

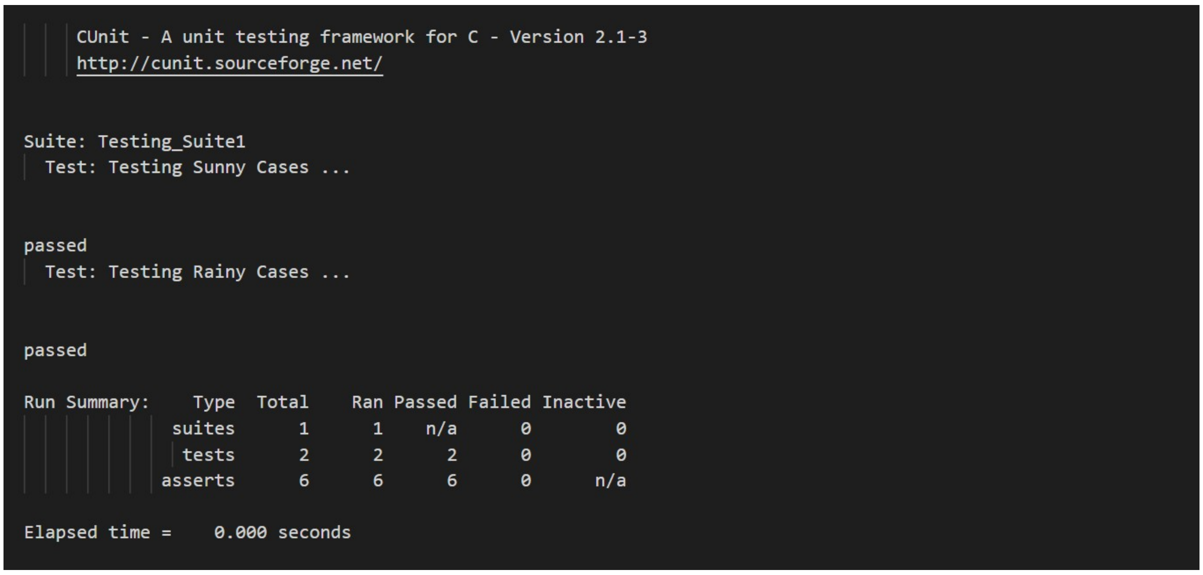
Client report for authenticated user:



```
File 'server.c'
Lines executed:77.78% of 153
Creating 'server.c.gcov'
```

## 6. Testing

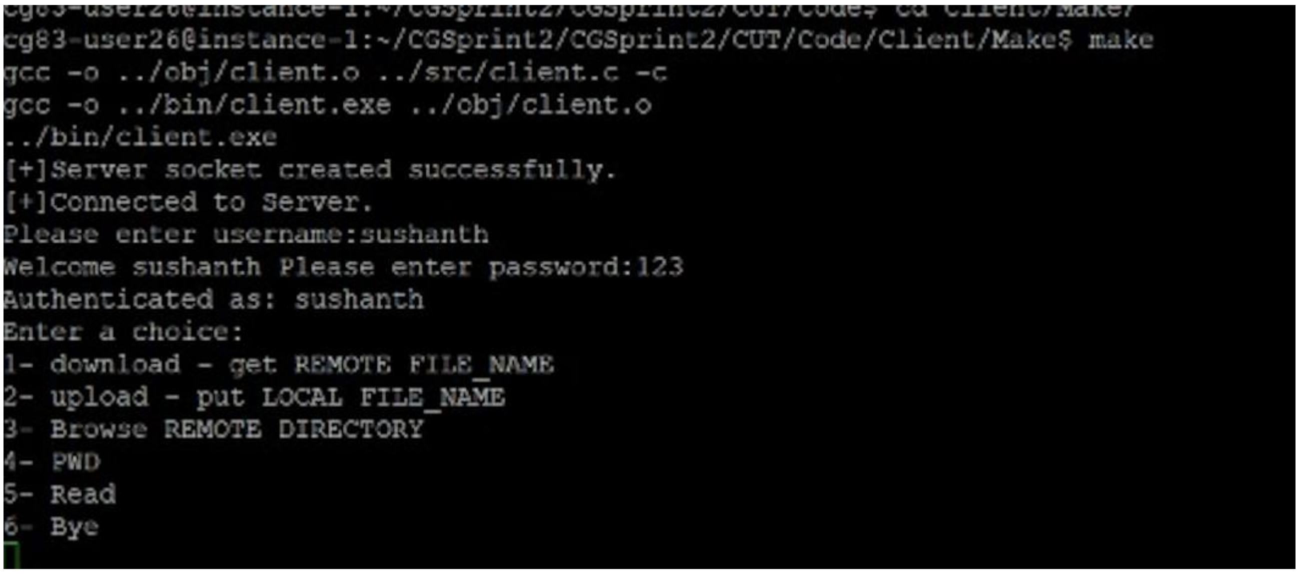
### 1. Unit Testing(CUnit):



```
     CUnit - A unit testing framework for C - Version 2.1-3
     http://cunit.sourceforge.net/


Suite: Testing_Suite1
  Test: Testing Sunny Cases ...


passed
  Test: Testing Rainy Cases ...


passed

Run Summary:    Type  Total    Ran Passed Failed Inactive
              suites      1      1    n/a      0        0
               tests      2      2      2      0        0
             asserts      6      6      6      0      n/a

Elapsed time =    0.000 seconds
```

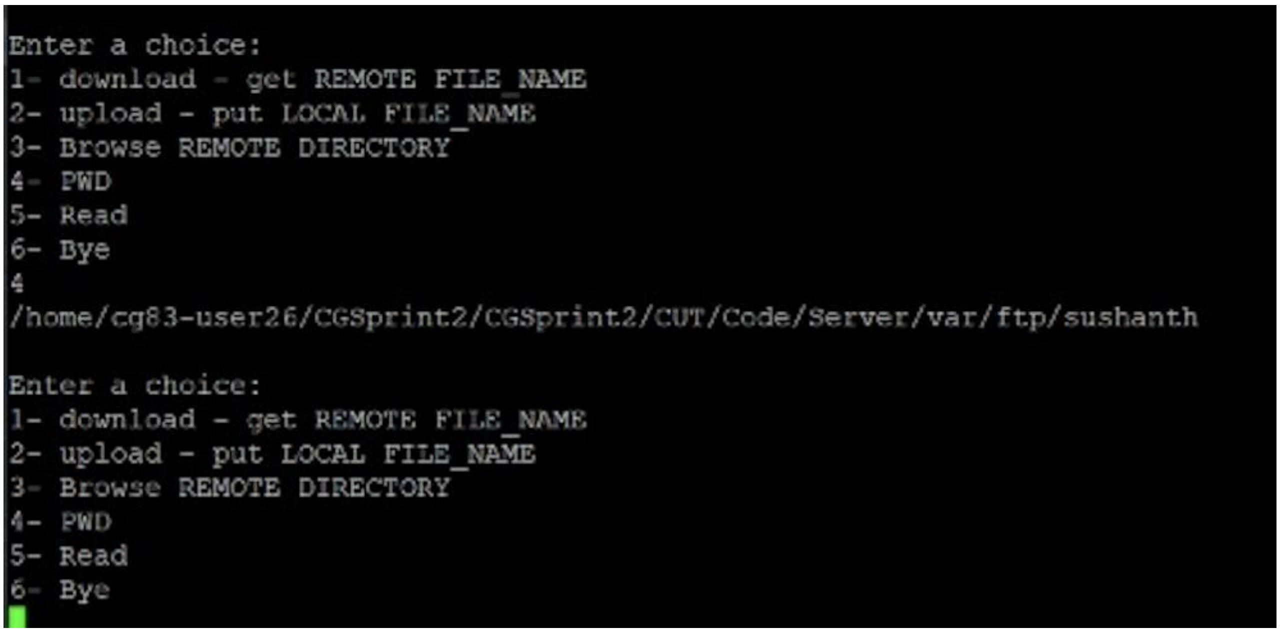
## 2. Integration Testing:

### 2.1. : Authenticated User Login



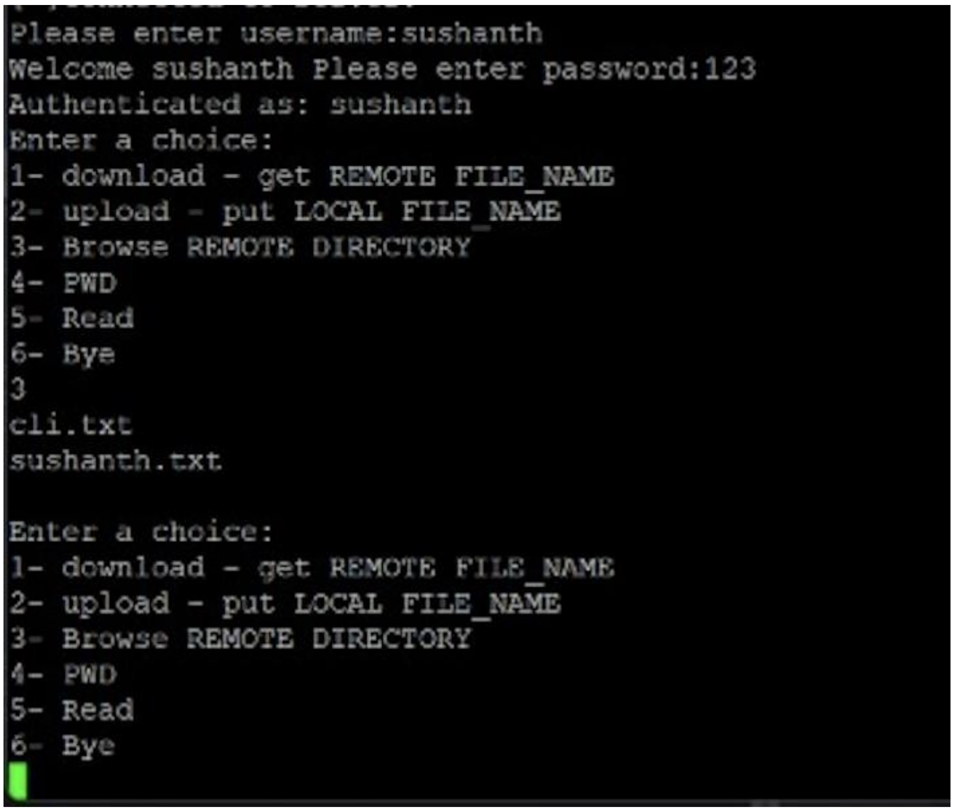
```
cg83-user26@instance-1:~/CGSprint2/CGSprint2/CUT/Code$ cd Client/Make/
cg83-user26@instance-1:~/CGSprint2/CGSprint2/CUT/Code/Client/Make$ make
gcc -o ../obj/client.o ../src/client.c -c
gcc -o ../bin/client.exe ../obj/client.o
../bin/client.exe
[+]Server socket created successfully.
[+]Connected to Server.
Please enter username:sushanth
Welcome sushanth Please enter password:123
Authenticated as: sushanth
Enter a choice:
1- download - get REMOTE FILE_NAME
2- upload - put LOCAL FILE_NAME
3- Browse REMOTE DIRECTORY
4- PWD
5- Read
6- Bye
```

### 2.2. : Authenticated User pwd:



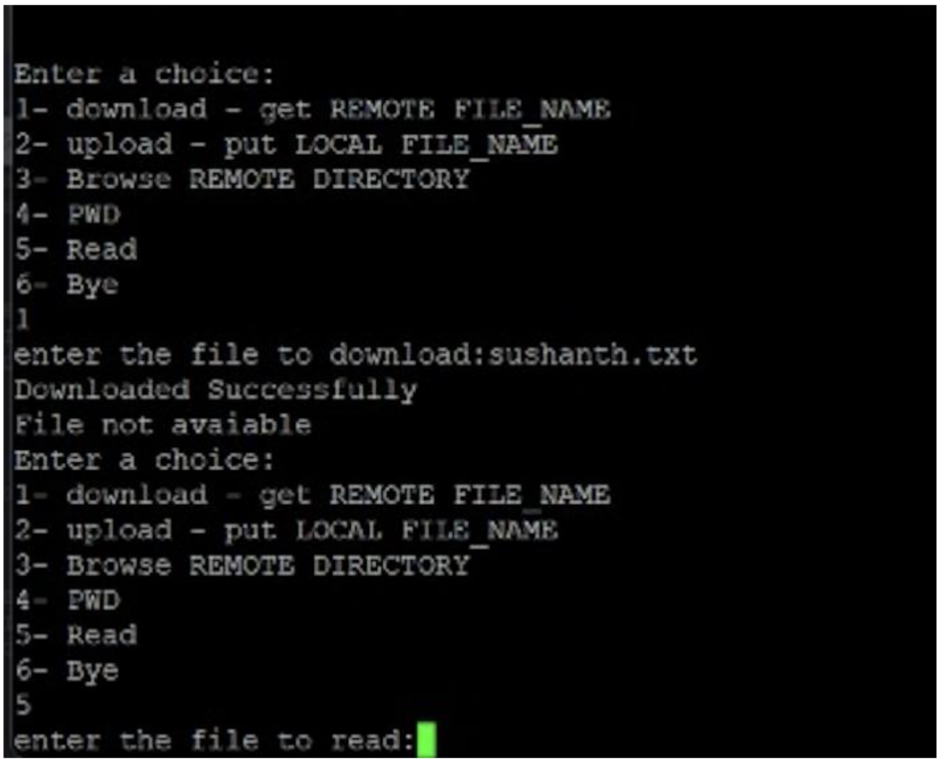
```
Enter a choice:
1- download - get REMOTE FILE_NAME
2- upload - put LOCAL FILE_NAME
3- Browse REMOTE DIRECTORY
4- PWD
5- Read
6- Bye
4
/home/cg83-user26/CGSprint2/CGSprint2/CUT/Code/Server/var/ftp/sushanth

Enter a choice:
1- download - get REMOTE FILE_NAME
2- upload - put LOCAL FILE_NAME
3- Browse REMOTE DIRECTORY
4- PWD
5- Read
6- Bye
```

2.3. : ls command

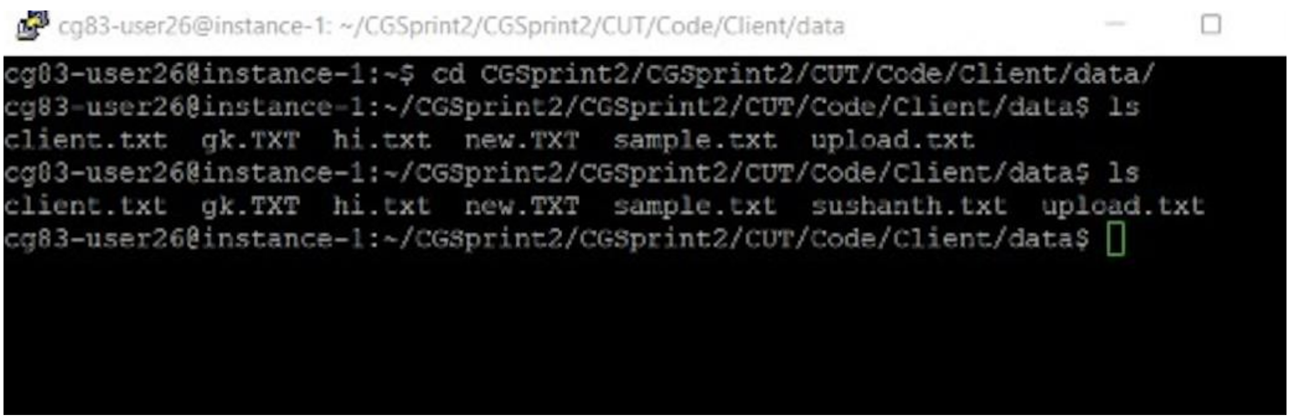


```
Please enter username:sushanth
Welcome sushanth Please enter password:123
Authenticated as: sushanth
Enter a choice:
1- download - get REMOTE FILE_NAME
2- upload - put LOCAL FILE_NAME
3- Browse REMOTE DIRECTORY
4- PWD
5- Read
6- Bye
3
cli.txt
sushanth.txt

Enter a choice:
1- download - get REMOTE FILE_NAME
2- upload - put LOCAL FILE_NAME
3- Browse REMOTE DIRECTORY
4- PWD
5- Read
6- Bye
```

2.4. : Download File from server:

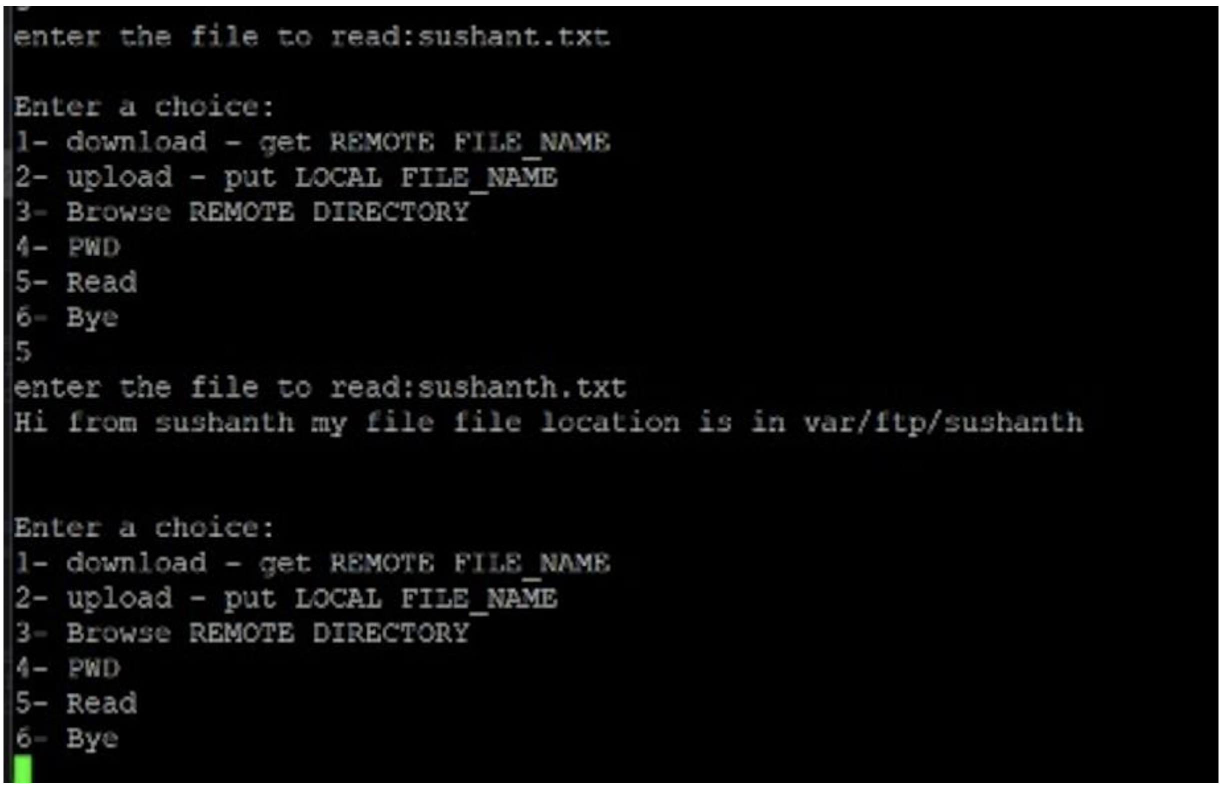


```
Enter a choice:
1- download - get REMOTE FILE_NAME
2- upload - put LOCAL FILE_NAME
3- Browse REMOTE DIRECTORY
4- PWD
5- Read
6- Bye
1
enter the file to download:sushanth.txt
Downloaded Successfully
File not avaiable
Enter a choice:
1- download - get REMOTE FILE_NAME
2- upload - put LOCAL FILE_NAME
3- Browse REMOTE DIRECTORY
4- PWD
5- Read
6- Bye
5
enter the file to read:
```



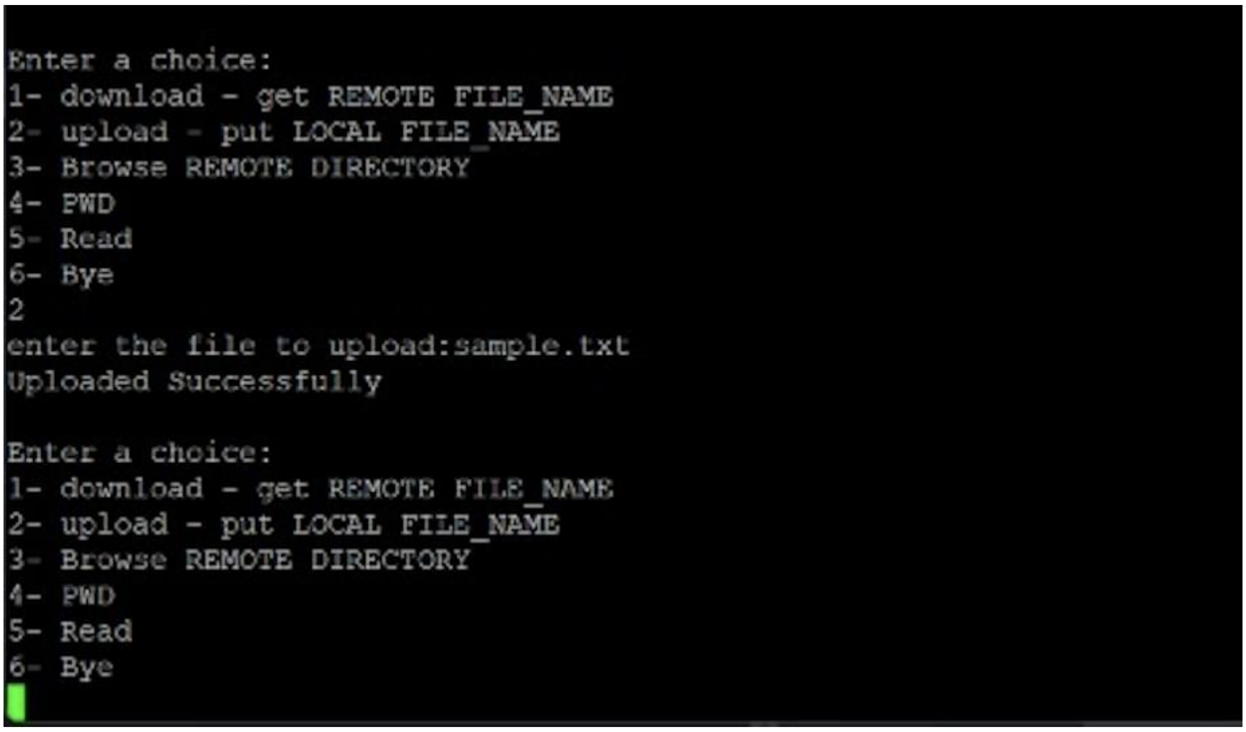
```
cg83-user26@instance-1: ~/CGSprint2/CGSprint2/CUT/Code/Client/data
cg83-user26@instance-1:~$ cd CGSprint2/CGSprint2/CUT/Code/Client/data/
cg83-user26@instance-1:~/CGSprint2/CGSprint2/CUT/Code/Client/data$ ls
client.txt  gk.TXT  hi.txt  new.TXT  sample.txt  upload.txt
cg83-user26@instance-1:~/CGSprint2/CGSprint2/CUT/Code/Client/data$ ls
client.txt  gk.TXT  hi.txt  new.TXT  sample.txt  sushanth.txt  upload.txt
cg83-user26@instance-1:~/CGSprint2/CGSprint2/CUT/Code/Client/data$
```

2.5. : Cat Command

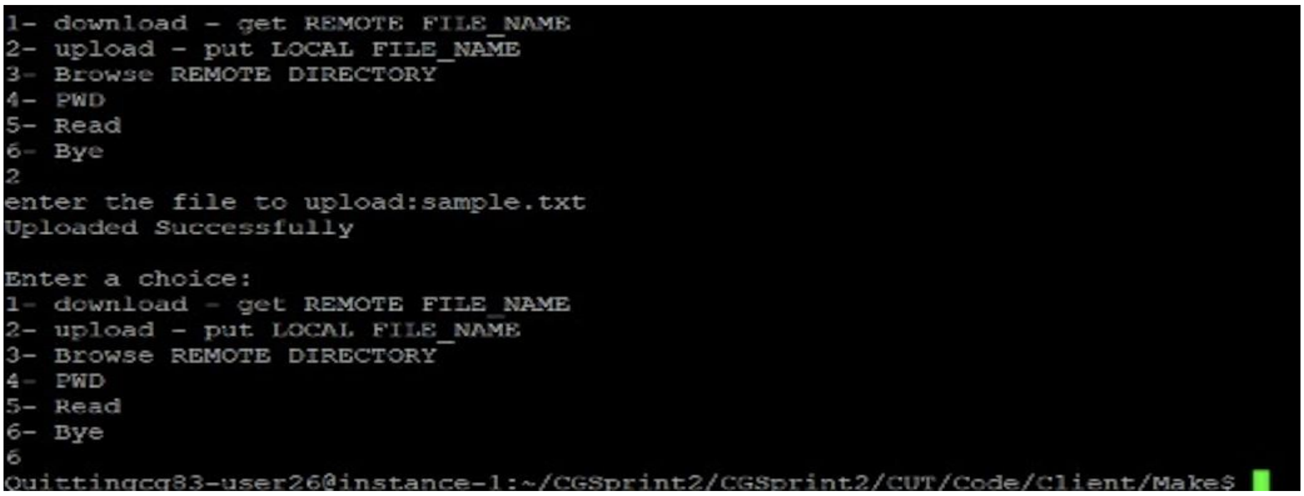


```
enter the file to read:sushant.txt

Enter a choice:
1- download - get REMOTE FILE_NAME
2- upload - put LOCAL FILE_NAME
3- Browse REMOTE DIRECTORY
4- PWD
5- Read
6- Bye
5
enter the file to read:sushanth.txt
Hi from sushanth my file file location is in var/ftp/sushanth


Enter a choice:
1- download - get REMOTE FILE_NAME
2- upload - put LOCAL FILE_NAME
3- Browse REMOTE DIRECTORY
4- PWD
5- Read
6- Bye
```

2.6. : Uplaod file from client to users directory on server

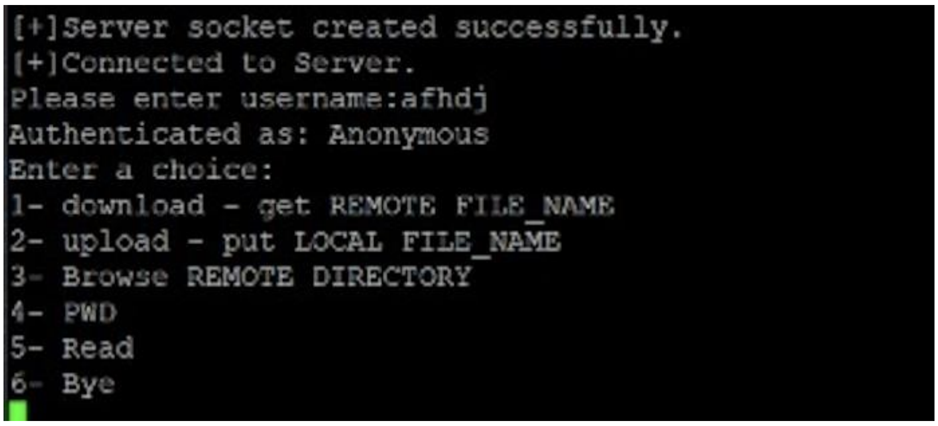

```
Enter a choice:
1- download - get REMOTE FILE_NAME
2- upload - put LOCAL FILE_NAME
3- Browse REMOTE DIRECTORY
4- PWD
5- Read
6- Bye
2
enter the file to upload:sample.txt
Uploaded Successfully

Enter a choice:
1- download - get REMOTE FILE_NAME
2- upload - put LOCAL FILE_NAME
3- Browse REMOTE DIRECTORY
4- PWD
5- Read
6- Bye
```

2.7. : Quitting Server



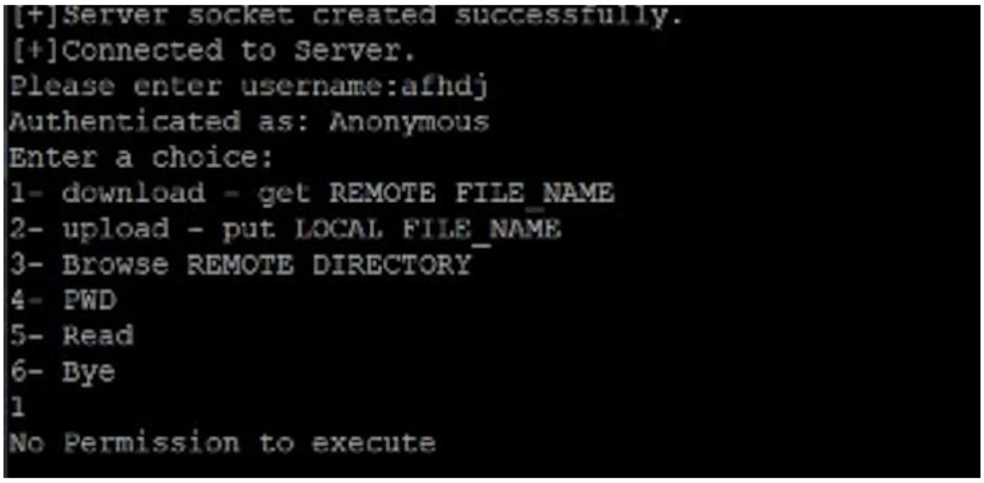
```
1- download - get REMOTE FILE_NAME
2- upload - put LOCAL FILE_NAME
3- Browse REMOTE DIRECTORY
4- PWD
5- Read
6- Bye
2
enter the file to upload:sample.txt
Uploaded Successfully

Enter a choice:
1- download - get REMOTE FILE_NAME
2- upload - put LOCAL FILE_NAME
3- Browse REMOTE DIRECTORY
4- PWD
5- Read
6- Bye
6
Quittingcg83-user26@instance-1:~/CGSprint2/CGSprint2/CUT/Code/Client/Make$
```

2.8. : Anonymous user login



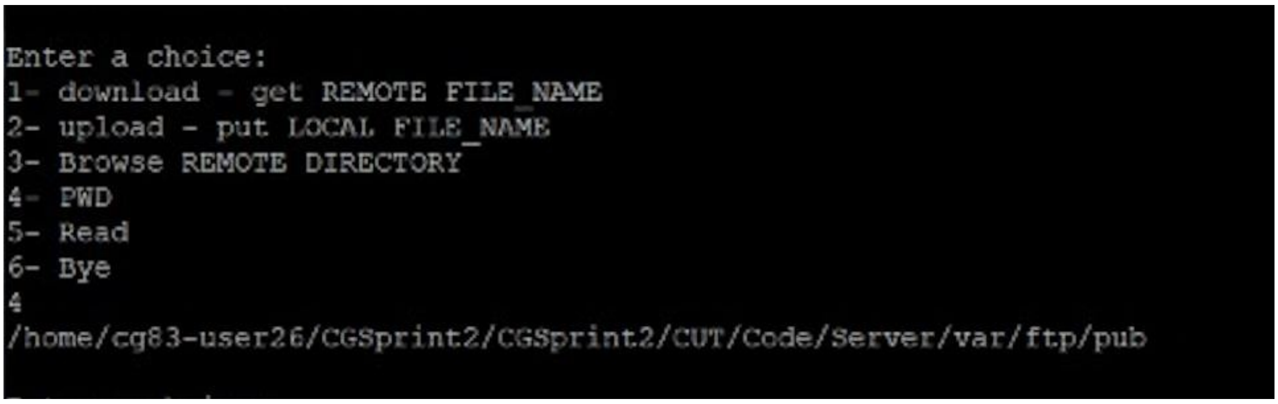
```
[+]Server socket created successfully.
[+]Connected to Server.
Please enter username:afhdj
Authenticated as: Anonymous
Enter a choice:
1- download - get REMOTE FILE_NAME
2- upload - put LOCAL FILE_NAME
3- Browse REMOTE DIRECTORY
4- PWD
5- Read
6- Bye
```

2.9. : Restricting download privilege for anonymous user



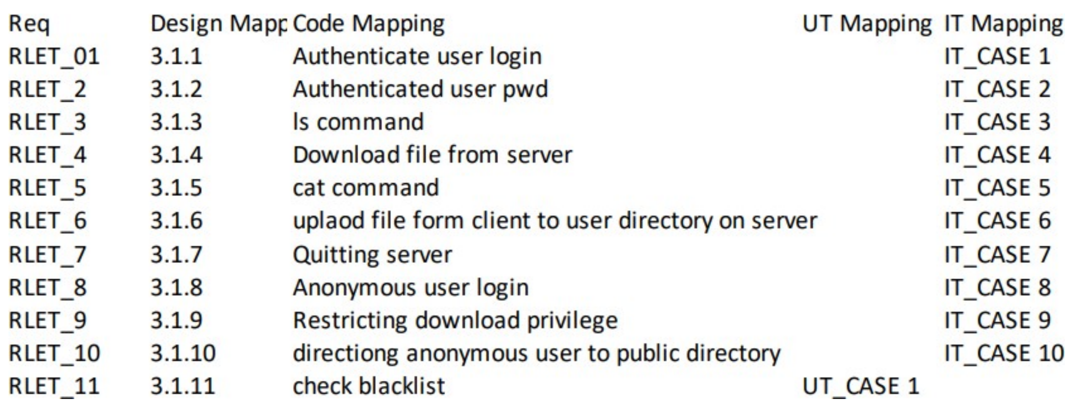
```
[+]Server socket created successfully.
[+]Connected to Server.
Please enter username:afhdj
Authenticated as: Anonymous
Enter a choice:
1- download - get REMOTE FILE_NAME
2- upload - put LOCAL FILE_NAME
3- Browse REMOTE DIRECTORY
4- PWD
5- Read
6- Bye
1
No Permission to execute
```

2.10. : directing anonymous user to public directory



```
Enter a choice:
1- download - get REMOTE FILE_NAME
2- upload - put LOCAL FILE_NAME
3- Browse REMOTE DIRECTORY
4- PWD
5- Read
6- Bye
4
/home/cg83-user26/CGSprint2/CGSprint2/CUT/Code/Server/var/ftp/pub
```

## 7. Requirements Traceability Matrix(RTM)



| Req | Design Mapp | Code Mapping | UT Mapping | IT Mapping |
|---|---|---|---|---|
| RLET_01 | 3.1.1 | Authenticate user login | | IT_CASE 1 |
| RLET_2 | 3.1.2 | Authenticated user pwd | | IT_CASE 2 |
| RLET_3 | 3.1.3 | ls command | | IT_CASE 3 |
| RLET_4 | 3.1.4 | Download file from server | | IT_CASE 4 |
| RLET_5 | 3.1.5 | cat command | | IT_CASE 5 |
| RLET_6 | 3.1.6 | uplaod file form client to user directory on server | | IT_CASE 6 |
| RLET_7 | 3.1.7 | Quitting server | | IT_CASE 7 |
| RLET_8 | 3.1.8 | Anonymous user login | | IT_CASE 8 |
| RLET_9 | 3.1.9 | Restricting download privilege | | IT_CASE 9 |
| RLET_10 | 3.1.10 | directiong anonymous user to public directory | | IT_CASE 10 |
| RLET_11 | 3.1.11 | check blacklist | UT_CASE 1 | |