

Assignment 1 Report

We did error checking throughout different phases of the program. During error checking we had written print statement throughout different functions. Hence, screenshots in this report also contain those print statement used for error checking. We particularly checked for errors and edge cases during,

1. User Authentication
2. Handling of Concurrent Connections and Simultaneous Users
3. Execution of FTP commands and its Reply/Responses
4. Transferring Different File Sizes/Types (txt, jpg, png, pdf, py, zip, jar, mp3, mp4)
5. Multiple File Transfers by Concurrent Clients

A. User Authentication Error / Edge Case Testing

To validate user authentication, we created a function `userAuth ()`, that returns either true or false when the user is validated. We tested edge cases such as entering other commands before user authentication, entering USER command followed by other commands and lastly PASS command, entering partially correct username/password and entering username for one user and password for the other.

```
krisemaskey@LAPTOP-LSM2EHTP:/mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main$
gcc client.c -o client; ./client
ftp> STOR asdf
530 Not logged in
ftp> USER Tom
331 Username OK, need password
ftp> PASS asdf
530 Not logged in
ftp> PASS 1234
503 Bad sequence of commands
ftp> USER Tom
331 Username OK, need password
ftp> LIST
530 Not logged in
ftp> asd
202 Command not implemented
ftp> USER Tom
331 Username OK, need password
ftp> PASS 1234
230 User logged in, please proceed.
ftp>
```

B. Handling Concurrent Connections and Simultaneous Users

To validate our server could handle concurrent connections we opened multiple terminals and connected to the server as clients. We entered different commands such as CWD, PWD, LIST, STOR, and RETR on different clients to see if our server could handle the requests and check if command entered by a client would affect others (in cases such as directory changes) and file transfer.

```
krisemaskey@LAPTOP-LSM2EHTP: /mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main
gcc server.c -o server; ./server
LISTENING on PORT 9007...
Command: USER
Command: PASS
Command: USER
Command: PASS
Command: PWD
Command: CWD
Command: PWD
Command: PWD
Command: CWD
Command: PWD
Command: LIST
Command: LIST

krisemaskey@LAPTOP-LSM2EHTP: /mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main
gcc client.c -o client; ./client
ftp> USER Brad
331 Username OK, need password
ftp> PASS qwerty
230 User logged in, please proceed.
ftp> PWD
Current server working directory is: /mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main
ftp> CWD ..
Current server working directory is: /mnt/c/users/Krises Maskey/Desktop
ftp> PWD
Current server working directory is: /mnt/c/users/Krises Maskey/Desktop
ftp> LIST
150 File status okay; about to open data connection.
sts: 150
ftp> LISTENING on PORT 9090...
F  A1_Report.docx
D  Aus_Visa
D  computer-networks-summer-22-main
D  CR&F
D  cs-test
F  desktop.ini
D  ECA
D  Extras
D  Fall 2022
F  Flight Itinerary for Krises Maskey 2022-04-07.pdf
F  Grammarly Editor.lnk
D  Internship_Funding
F  Krises_Maskey.pdf
F  LICCap.lnk
D  Networks Project1
F  portfolio.py
F  PortfolioOptimization.ipynb
F  Project 1 File Transfer Protocol (FTP).pdf
F  Report.pdf
F  scribd.txt
D  Spring 2022
D  Summer 2022
D  Travel Docs
F  Updated_CV.docx
D  US_Visa
F  Zoom.lnk
F  Zotero.lnk
F  ~$EP_2021.docx
F  ~$million.txt

krisemaskey@LAPTOP-LSM2EHTP: /mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main
gcc client.c -o client; ./client
ftp> USER Tom
331 Username OK, need password
ftp> PASS 1234
230 User logged in, please proceed.
ftp> PWD
Current server working directory is: /mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main
ftp> CWD client_dir
Current server working directory is: /mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main/client_dir
ftp> PWD
Current server working directory is: /mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main/client_dir
ftp> LIST
150 File status okay; about to open data connection.
sts: 150
ftp> LISTENING on PORT 9090...
F  picture.png
F  scribd.txt
F  users.txt
```

C. Execution of FTP commands and its Reply / Responses

To validate if FTP commands were properly executed and correct response messages were displayed, we entered different commands and tried to fix errors sequentially.

```
krisemaskey@LAPTOP-LSM2EHTP: /mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main$
gcc client.c -o client; ./client
ftp> SDFS
202 Command not implemented
ftp> PASS 123
503 Bad sequence of commands
ftp> USER Tom
331 Username OK, need password ...
ftp> PASS 1234
230 User logged in, please proceed ...
ftp> PWD
257 /mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main
sts: 257
ftp> CWD ..
200 Directory Changed to /mnt/c/users/Krises Maskey/Desktop
sts: 200
ftp> CWD cs-test
200 Directory Changed to /mnt/c/users/Krises Maskey/Desktop/cs-test
sts: 200
ftp> LIST
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
F  client
F  client.c
D  Client_Dir
F  Picture1.png
D  Root
F  server
F  server.c
F  users.txt
QUIT
221 Service closing control connection.
krisemaskey@LAPTOP-LSM2EHTP: /mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main$
```

```

230 User logged in, please proceed ...
ftp> PWD
257 /mnt/c/users/Krises Maskey/Desktop/cs-test
sts: 257
ftp> CWD Client_Dir
200 Directory Changed to /mnt/c/users/Krises Maskey/Desktop/cs-test/Client_Dir
sts: 200
ftp> LIST
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
F      Picture1.png
RETR Picture1.png
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
Picture1.png
Total data received for Picture1.png = 161126 bytes.
226 Transfer completed
!LIST
F      .gitignore
F      asd
F      client
F      client.c
D      client_dir
F      Picture1.png
F      README.md
F      server
F      server.c
D      server_dir
F      users.txt
ftp> STOR README.md
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
README.md size is 26 bytes.
226 Transfer completed
LIST
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
F      Picture1.png
F      README.md
ftp> CWD asd
550 No such file or directory
sts: 550

```

- D. To validate our program could transfer different file types of different sizes we checked a variety of file types of different sizes.

```
krisesmaskey@LAPTOP-LSM2EHTP:/mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main$
gcc client.c -o client; ./client
ftp> USER Brad
331 Username OK, need password ...
ftp> PASS qwerty
230 User logged in, please proceed ...
ftp> !CWD ..
Current working directory is: /mnt/c/users/Krises Maskey/Desktop
ftp> !CWD Test_Files
Current working directory is: /mnt/c/users/Krises Maskey/Desktop/Test_Files
ftp> CWD server_dir
200 Directory Changed to /mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main/server_dir
sts: 200
ftp> !LIST
F      dc.jar
F      Krises_Maskey.pdf
F      pic.png
F      portfolio.py
F      portfolio.zip
F      scribd.txt
F      sound.mp3
F      test.JPG
F      Video.mp4
ftp> STOR dc.jar
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
dc.jar size is 470438 bytes.
226 Transfer completed
STOR Krises_Maskey.pdf
200 PORT command successful
150 File status pkav: about to open data connection
STOR Video.mp4
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
Video.mp4 size is 3114374 bytes.
226 Transfer completed
STOR sound.mp3
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
sound.mp3 size is 2113939 bytes.
226 Transfer completed
STOR test.JPG
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
test.JPG size is 5944549 bytes.
226 Transfer completed
STOR portfolio.zip
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
portfolio.zip size is 1807640 bytes.
226 Transfer completed
STOR portfolio.py
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
portfolio.py size is 2452 bytes.
226 Transfer completed
STOR scribd.txt
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
scribd.txt size is 19 bytes.
226 Transfer completed
QUIT
221 Service closing control connection.
```



```
ftp> RETR Video.mp4
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
Video.mp4
Total data received for Video.mp4 = 3114374 bytes.
226 Transfer completed
!PWD
Current working directory is: /mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main
ftp> !CWD client_dir
Current working directory is: /mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main/
client_dir
ftp> LIST
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
F      dc.jar
F      Krises_Maskey.pdf
F      pic.png
F      portfolio.py
F      portfolio.zip
F      scribd.txt
F      sound.mp3
F      test.JPG
F      Video.mp4
RETR dc.jar
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
dc.jar
Total data received for dc.jar = 470438 bytes.
226 Transfer completed
RETR pic.png
200 PORT command successful
150 File status okay; about to open data connection
RETR portfolio.zip
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
portfolio.zip
Total data received for portfolio.zip = 1807640 bytes.
226 Transfer completed
RETR scribd.txt
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
scribd.txt
Total data received for scribd.txt = 19 bytes.
226 Transfer completed
RETR sound.mp3
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
sound.mp3
Total data received for sound.mp3 = 2113939 bytes.
226 Transfer completed
RETR test.JPG
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
test.JPG
Total data received for test.JPG = 5944549 bytes.
226 Transfer completed
QUIT
```

E. Multiple File Transfers / Concurrent Connections

To check if our program worked correctly when multiple users transferred the same/different file we ran two clients and checked for the results. For this we already knew different files transferred into same/different directory would work from previous testing. Hence, we further tested if same files transferred to same directory would work.

```

krisesmaskey@LAPTOP-LSM2EHTP: /mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main
gcc client.c -o client; ./client
ftp> USER Brad
331 Username OK, need password ...
ftp> PASS qwerty
230 User logged in, please proceed ...
ftp> CWD ..
200 Directory Changed to /mnt/c/users/Krises Maskey/Desktop
sts: 200
ftp> CWD Test_Files
200 Directory Changed to /mnt/c/users/Krises Maskey/Desktop/Test_Files
sts: 200
ftp> LCMD server_dir
Current working directory is: /mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main/
server_dir
ftp> RETR sound.mp3
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
sound.mp3
Total data received for sound.mp3 = 2113939 bytes.
226 Transfer completed
STOR Video.mp3
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
Can't open Video.mp3
226 Transfer completed
STOR Video.mp4
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
Video.mp4 size is 3115008 bytes.
226 Transfer completed

krisesmaskey@LAPTOP-LSM2EHTP: /mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main
gcc client.c -o client; ./client
ftp> USER Tom
331 Username OK, need password ...
ftp> PASS 1234
230 User logged in, please proceed ...
ftp> CWD ..
200 Directory Changed to /mnt/c/users/Krises Maskey/Desktop
sts: 200
ftp> CWD Test_Files
200 Directory Changed to /mnt/c/users/Krises Maskey/Desktop/Test_Files
sts: 200
ftp> LCMD client_dir
Current working directory is: /mnt/c/users/Krises Maskey/Desktop/computer-networks-summer-22-main/
client_dir
ftp> RETR sound.mp3
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
sound.mp3
Total data received for sound.mp3 = 2113939 bytes.
226 Transfer completed
STOR Video.mp3
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
Can't open Video.mp3
226 Transfer completed
STOR Video.mp4
200 PORT command successful
150 File status okay; about to open data connection
sts: 150
ftp> LISTENING on PORT 9090...
Video.mp4 size is 3115008 bytes.
226 Transfer completed

```