Test Cases

1. 2048 Bytes

The file gets transmitted by 5 blocks. (512B block * 4 and one 0B block)

```
RRQ received, filename: Test1.txt mode: netascii
1: Result is 512
Sent first block successfully.
ACK 1 received
Expected ACK has arrived
ACK 2 received
Expected ACK has arrived
ACK 3 received
Expected ACK has arrived
ACK 4 received
Expected ACK has arrived
ACK 5 received
Expected ACK has arrived
SERVER: Full file is sent and connection is closed.
kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/new_files> (22:24:35 10/14/23)
:: tftp 127.0.0.1 2222
tftp> get Test1.txt
trtp>
```

2. 2047 Bytes

The file gets transmitted by 4 blocks. (512B block * 3 and one 511B block)

```
RRQ received, filename: Test2.txt mode: netascii

1: Result is 512

Sent first block successfully.

ACK 1 received

Expected ACK has arrived

ACK 2 received

Expected ACK has arrived

ACK 3 received

Expected ACK has arrived

ACK 4 received

Expected ACK has arrived

SERVER: Full file is sent and connection is closed.

[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/new_files> (22:30:00 10/14/23)

:: tftp 127.0.0.1 2222

tftp> get Test2.txt
```

Netascii with two CR included

We created a Test3.txt file on the server side, with two "CR" included. The received file is valid.

<Original file>

```
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3> (22:21:21 10/14/23)
:: cat Test3.txt
input_CR_by_ctrl_M
ctrl_M
12345
```

<Client Window>

```
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/new_files> (21:49:53 10/14/23)
:: tftp 127.0.0.1 2222
tftp> get WRQ_data.txt
tftp> get Test3.txt
tftp>
```

<Received Result>

```
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/new_files> (22:33:45 10/14/23)
:: ls -al
total 89024
drwx----. 2 kdu1113 1001409
                                   157 Oct 14 22:33 .
drwx----. 3 kdu1113 1001409
                                   300 Oct 14 22:28 ...
-rwxrw-r--. 1 kdu1113 1001409 35651584 Oct 14 20:29 34MB.txt
-rwx-----. 1 kdu1113 1001409
-rwx-----. 1 kdu1113 1001409
                                  2048 Oct 14 22:27 Test1.txt
                                  2047 Oct 14 22:30 Test2.txt
-rwx----. 1 kdu1113 1001409 0 Oct 14 22:33 Test3
-rwx----. 1 kdull13 1001409 33 Oct 14 22:33 Test3.txt
-rwx-----. 1 kdull13 1001409 35651584 Oct 14 22:19 Test4.bin
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/new_files> (22:34:00 10/14/23)
:: cat Test3.txt
input_CR_by_ctrl_M
ctrl_M
12345
```

4. 34MB binary file

We create a 32MB bin file on the server side. The RRQ request with binary mode works as expected.

<Server, Client Window>

```
2: Result is 512
ACK 4089 received
Expected ACK has arrived
2: Result is 512
ACK 4090 received
Expected ACK has arrived
2: Result is 512
ACK 4091 received
Expected ACK has arrived
2: Result is 512
ACK 4092 received
Expected ACK has arrived
2: Result is 512
ACK 4093 received
Expected ACK has arrived
2: Result is 512
ACK 4094 received
Expected ACK has arrived
2: Result is 512
ACK 4095 received
Expected ACK has arrived
2: Result is 512
ACK 4096 received
Expected ACK has arrived
2: Result is 0
ACK 4097 received
Expected ACK has arrived
SERVER: Full file is sent and connection is closed.
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/new_files> (00:25:44 10/15/23)
:: tftp 127.0.0.1 2222
tftp> mode binary
tftp> get Test4.bin
tftp>
```

<Received Result>

```
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/new_files> (00:27:24 10/15/23)
:: ls
2047.txt 2048.txt 34MB.txt Test3.txt WRQ_data.txt
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/new_files> (00:27:28 10/15/23)
:: ls
2047.txt 2048.txt 34MB.txt Test3.txt Test4.bin WRQ_data.txt
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/new_files> (00:27:38 10/15/23)
:: ls -al
total 135736
drwx----. 2 kdu1113 1001409
                                  162 Oct 15 00:27 .
drwx-----. 3 kdu1113 1001409
                                  246 Oct 14 23:55 ...
-rwxrw-r--. 1 kdu1113 1001409
                                   0 Oct 14 23:34 2047.txt
-rwxrw-r--. 1 kdu1113 1001409
                                 2048 Oct 14 23:34 2048.txt
-rwxrw-r--. 1 kdu1113 1001409 35651584 Oct 14 20:29 34MB.txt
-rwx-----. 1 kdu1113 1001409
                                   33 Oct 14 23:55 Test3.txt
     ----. 1 kdu1113 1001409 35651584 Oct 15 00:27 Test4.bin
-rwx-
      ---. 1 kdu1113 1001409 35651584 Oct 15 00:08 WRQ_data.txt
```

5. Trying to get file that doesn't exist (Server, client)
The client closes with an error message as expected.

```
:: ./server 127.0.0.1 2222
SERVER: Ready for association with clients...
RRQ received, filename: WRQ_data.txt mode: netascii
1: Result is 0
Sent first block successfully.
ACK 1 received
Expected ACK has arrived
SERVER: Full file is sent and connection is closed.
SERVER: WRQ received from client.
SERVER: Received data block #1
SERVER: Expected data block received.
SERVER: Sent ACK #1
SERVER: Received data block #2
SERVER: Expected data block received.
SERVER: Sent ACK #2
SERVER: Received data block #3
SERVER: Expected data block received.
SERVER: Sent ACK #3
SERVER: Received data block #4
SERVER: Expected data block received.
SERVER: Sent ACK #4
Last data block has arrived. Closing client connection and cleaning resources.
RRQ received, filename: 2047.txt mode: netascii
Server clean up as filename doesn't match.
RRQ received, filename: WRQ_data.txt mode: netascii
1: Result is 512
Sent first block successfully.
ACK 1 received
Expected ACK has arrived
ACK 2 received
Expected ACK has arrived
ACK 3 received
Expected ACK has arrived
ACK 4 received
Expected ACK has arrived
SERVER: Full file is sent and connection is closed.
```

```
[kdu1113]@hera3 ~> (18:41:17 10/14/23)
:: cd ECEN602_Network/ECEN602_Team07/MP3/test_files/
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/test_files> (18:42:15 10/14
:: tftp 127.0.0.1 2222
tftp> get 2047.txt
Error code 1: File not found
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/test_files> (18:43:52 10/14
:: tftp 127.0.0.1 2222
tftp> get WRQ_data.txt
tftp>
```

6. Three clients (Server, Client 1,2, and 3)

```
SERVER: Sent ACK #42060
SERVER: Received data block #42061
SERVER: Expected data block received.
SERVER: Sent ACK #42061
SERVER: Received data block #42062
SERVER: Expected data block received.
SERVER: Sent ACK #42062
SERVER: Received data block #42063
SERVER: Expected data block received.
SERVER: Sent ACK #42063
SERVER: Received data block #42064
SERVER: Expected data block received.
SERVER: Sent ACK #42064
SERVER: Received data block #42065
SERVER: Expected data block received.
SERVER: Sent ACK #42065
SERVER: Received data block #42066
SERVER: Expected data block received.
SERVER: Sent ACK #42066
SERVER: Received data block #42067
SERVER: Expected data block received.
SERVER: Sent ACK #42067
SERVER: Received data block #42068
SERVER: Expected data block received.
SERVER: Sent ACK #42068
SERVER: Received data block #42069
SERVER: Expected data block received.
SERVER: Sent ACK #42069
SERVER: Received data block #42070
SERVER: Expected data block received.
```

```
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/test_files> (18:43:52 10/14/23)
:: tftp 127.0.0.1 2222
tftp> get WRQ_data.txt
tftp> put 32MB.txt
tftp: 32MB.txt: No such file or directory
tftp> put 34MB.txt
tftp> put 32MB.txt
tftp: 32MB.txt: No such file or directory
tftp> put 34MB.txt
tftp: 32MB.txt: No such file or directory
tftp> put 34MB.txt
tftp> put 34MB.txt
```

```
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/test_files> (18:42:22 10/14/23)
:: tftp 127.0.0.1 2222
tftp> get WRQ_data.txt
tftp> put 34MB.txt
```

```
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/test_files> (18:46:49 10/14/23) :: tftp 127.0.0.1 2222 tftp> put 32MB.txt tftp: 32MB.txt: No such file or directory tftp> put 34MB.txt tftp> put 34MB.txt tftp> put 34MB.txt
```

7. Terminate in the middle of the operation (Server, Client)
The server picks up the disconnection and closes the socket as expected.

```
ACK 12192 received
Expected ACK has arrived
ACK 12193 received
Expected ACK has arrived
ACK 12194 received
Expected ACK has arrived
ACK 12195 received
Expected ACK has arrived
ACK 12196 received
Expected ACK has arrived
ACK 12197 received
Expected ACK has arrived
ACK 12198 received
Expected ACK has arrived
ACK 12199 received
Expected ACK has arrived
Timeout occurred.
Retransmitting Data with BlockNo: 12200
Timeout occurred.
Timeout occurred 10 times. Closing socket connection with client.
tftp> put 32MB.txt
tftp: 32MB.txt: No such file or directory
tftp> put 34MB.txt
tftp> put 34MB.txt
^[tftp> [A
?Invalid command
tftp> [A
?Invalid command
tftp> put 34MB.txt
tftp> get WRQ_data.txt
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/test_files> (18:50:32 10/14/23)
:: tftp 127.0.0.1 2222
tftp> get WRQ_data.txt
tftp> quit
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/test_files> (20:07:10 10/14/23)
:: tftp 127.0.0.1 2222
tftp> ^C
tftp> quit
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/test_files> (20:07:18 10/14/23)
:: cd ../new_files/
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/new_files> (20:07:23 10/14/23)
2047.txt 2048.txt 34MB.txt
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/new_files> (20:07:23 10/14/23) :: tftp 127.0.0.1 2222
tftp> put 34MB.txt
tftp> put 34MB.txt
tftp> get WRQ_data.txt
^C
tftp>
```

8. WRQ example

First, from client to server, send a WRQ request for 34MB.txt. (The file gets saved as WRQ_data.txt on the server side)

Next, from client to server, send a RRQ request for WRQ data.txt file.

We were able to see the WRQ data.txt file.

```
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/new_files> (23:55:26 10/14/23)
:: tftp 127.0.0.1 2222
tftp> get Test3.txt
tftp> get Test4.bin
tftp> get WRQ_data.txt
tftp> get WRQ_data.txt
tftp> put 34MB.txt
tftp> get WRQ_data.txt
```

```
ACK 4090 received
Expected ACK has arrived
2: Result is 512
ACK 4091 received
Expected ACK has arrived
2: Result is 512
ACK 4092 received
Expected ACK has arrived
2: Result is 512
ACK 4093 received
Expected ACK has arrived
2: Result is 512
ACK 4094 received
Expected ACK has arrived
2: Result is 512
ACK 4095 received
Expected ACK has arrived
2: Result is 512
ACK 4096 received
Expected ACK has arrived
2: Result is 0
ACK 4097 received
Expected ACK has arrived
SERVER: Full file is sent and connection is closed.
```

```
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/new_files> (00:08:17 10/15/23)
:: ls
2047.txt 2048.txt 34MB.txt Test3.txt Test4.bin
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/new_files> (00:08:18 10/15/23)
2047.txt 2048.txt 34MB.txt Test3.txt Test4.bin WRQ_data.txt
[kdu1113]@hera3 ~/ECEN602_Network/ECEN602_Team07/MP3/new_files> (00:08:49 10/15/23)
:: ls -al
total 135712
drwx-----. 2 kdu1113 1001409
                                  162 Oct 15 00:08 .
drwx----. 3 kdu1113 1001409
                                  246 Oct 14 23:55 ...
-rwxrw-r--. 1 kdu1113 1001409
                                    0 Oct 14 23:34 2047.txt
-rwxrw-r--. 1 kdu1113 1001409
                                 2048 Oct 14 23:34 2048.txt
-rwxrw-r--. 1 kdu1113 1001409 35651584 Oct 14 20:29 34MB.txt
-rwx-----. 1 kdu1113 1001409
                                   33 Oct 14 23:55 Test3.txt
-rwx----. 1 kdu1113 1001409 35651584 Oct 14 23:55 Test4.bin
-rwx-----. 1 kdu1113 1001409 35651584 Oct 15 00:08 WRQ_data.txt
```