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CSS 432

Term Project: Implementing and Testing TFTP

A. Completed Steps: Steps 1 through 6 have been completed.

B. Incomplete Steps: All steps have been completed.

C. Known bugs:

D. Screenshots:

**Reading a small file:**

Server:

```
huangk12@csslal1h:~/css432KevinGabriel/server$ ./tftpserver 519709
Starting tftpserver Program
Ready To Accept A Client RRQ or WRQ
Received Packet:1ServerTest.txt octet
Ready To Accept A Client RRQ or WRQ
File size:26 Bytes
File requires 1 packet
Sending Data Packet(s)
ACK received. Transaction complete for block:1
Request Operation Complete
```

█

Client:

```
huangk12@csslal10h:~/css432KevinGabriel/client$ ./tftpclient -r ServerTest.txt 5
19709
Creating RRQ packet
PRINTING CONTENT OF PACKET:
1ServerTest.txt octet
END OF PACKET PRINT
Request Operation Complete
huangk12@csslal10h:~/css432KevinGabriel/client$ █
```

**Writing a small file:**

Server:

```
Received Packet:2ClientTest.txt octet
Ready To Accept A Client RRQ or WRQ
Request Operation Complete
```

█

Client:

```
huangk12@csslal10h:~/css432KevinGabriel/client$ ./tftpclient -w ClientTest.txt 5
19709
Creating WRQ packet
PRINTING CONTENT OF PACKET:
2ClientTest.txt octet
END OF PACKET PRINT
ACK received. transaction complete for block:0
File size:26 Bytes
File requires 1 packet
Sending Data Packet(s)
ACK received. Transaction complete for block:1
Request Operation Complete
huangk12@csslal10h:~/css432KevinGabriel/client$ █
```

### Reading a large file:

Server:

```
Received Packet:1ExtraBigServerTest.txt octet
Ready To Accept A Client RRQ or WRQ
File size:1621 Bytes
File requires: 4 number of packets
Sending Data Packet(s)
ACK received. Transaction complete for block:1
ACK received. Transaction complete for block:2
ACK received. Transaction complete for block:3
ACK received. Transaction complete for block:4
Request Operation Complete
```

█

Client:

```
huangk12@csslal0h:~/css432KevinGabriel/client$ ./tftpclient -r ExtraBigServerTe
st.txt 519709
Creating RRQ packet
PRINTING CONTENT OF PACKET:
1ExtraBigServerTest.txt octet
END OF PACKET PRINT
Request Operation Complete
huangk12@csslal0h:~/css432KevinGabriel/client$ █
```

### Writing a large file:

Server:

```
Received Packet:1ExtraBigServerTest.txt octet
Ready To Accept A Client RRQ or WRQ
File size:1621 Bytes
File requires: 4 number of packets
Sending Data Packet(s)
ACK received. Transaction complete for block:1
ACK received. Transaction complete for block:2
ACK received. Transaction complete for block:3
ACK received. Transaction complete for block:4
Request Operation Complete
Received Packet:2ExtraBigClientTest.txt octet
Ready To Accept A Client RRQ or WRQ
Request Operation Complete
```

█

Client:

```
huangk12@csslal0h:~/css432KevinGabriel/client$ ./tftpclient -w ExtraBigClientTe
st.txt 519709
Creating WRQ packet
PRINTING CONTENT OF PACKET:
2ExtraBigClientTest.txt octet
END OF PACKET PRINT
ACK received. transaction complete for block:0
File size:1621 Bytes
File requires: 4 number of packets
Sending Data Packet(s)
ACK received. Transaction complete for block:1
ACK received. Transaction complete for block:2
ACK received. Transaction complete for block:3
ACK received. Transaction complete for block:4
Request Operation Complete
huangk12@csslal0h:~/css432KevinGabriel/client$ █
```

- E. Additional screenshots – timeouts, errors, and multiple requests:

**Transmission terminated after 10 timeouts due to server was killed:**

Server:

```
huangkl2@csslabb1h:~/css432KevinGabriel/server$ ./tftpserver 519709
Starting tftpserver Program
Ready To Accept A Client RRQ or WRQ
Received Packet:1PrideAndPrejudice.txt octet
Ready To Accept A Client RRQ or WRQ
File size:798774 Bytes
File requires: 1561 number of packets
Sending Data Packet(s)
ACK received. Transaction complete for block:1
ACK received. Transaction complete for block:2
ACK received. Transaction complete for block:3
ACK received. Transaction complete for block:4
ACK received. Transaction complete for block:5
ACK received. Transaction complete for block:6
ACK received. Transaction complete for block:7
ACK received. Transaction complete for block:8
ACK received. Transaction complete for block:9
ACK received. Transaction complete for block:10
ACK received. Transaction complete for block:11
ACK received. Transaction complete for block:12
ACK received. Transaction complete for block:13
ACK received. Transaction complete for block:14
ACK received. Transaction complete for block:15
ACK received. Transaction complete for block:16
ACK received. Transaction complete for block:17
ACK received. Transaction complete for block:18
ACK received. Transaction complete for block:19
ACK received. Transaction complete for block:20
ACK received. Transaction complete for block:21
ACK received. Transaction complete for block:22
ACK received. Transaction complete for block:23
ACK received. Transaction complete for block:24
ACK received. Transaction complete for block:25
ACK received. Transaction complete for block:26
ACK received. Transaction complete for block:27
ACK received. Transaction complete for block:28
ACK received. Transaction complete for block:29
ACK received. Transaction complete for block:30
```

\*Screenshots for blocks 31 – 839 not provided \*

```
ACK received. Transaction complete for block:840
ACK received. Transaction complete for block:841
ACK received. Transaction complete for block:842
ACK received. Transaction complete for block: ^C
huangkl2@csslabb1h:~/css432KevinGabriel/server$
```



Client:

```
huangk12@csslal0h:~/css432KevinGabriel/client$ ./tftpclient -r PrideAndPrejudice.txt 519709
Creating RRQ packet
PRINTING CONTENT OF PACKET:
1PrideAndPrejudice.txt octet
END OF PACKET PRINT
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 1
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 2
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 3
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 4
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 5
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 6
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 7
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 8
resending last data packet
inside sig_handler
timeoutCounter incremented
```

```
recvfrom value is -1
errno == EINTR
timeout count: 9
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 10
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
./tftpclient: recvfrom error
huangkl2@csslab10h:~/css432KevinGabriel/client$
```

Transmission terminated after 10 timeouts due to client was killed:

Server:

```
huangkl2@csslab11h:~/css432KevinGabriel/server$ ./tftpserver 519709
Starting tftpserver Program
Ready To Accept A Client RRQ or WRQ
Received Packet:1PrideAndPrejudice.txt octet
Ready To Accept A Client RRQ or WRQ
File size:798774 Bytes
File requires: 1561 number of packets
Sending Data Packet(s)
ACK received. Transaction complete for block:1
ACK received. Transaction complete for block:2
ACK received. Transaction complete for block:3
ACK received. Transaction complete for block:4
ACK received. Transaction complete for block:5
ACK received. Transaction complete for block:6
ACK received. Transaction complete for block:7
ACK received. Transaction complete for block:8
ACK received. Transaction complete for block:9
ACK received. Transaction complete for block:10
```

\*Screenshots for blocks 11 – 994 not provided \*

```
ACK received. Transaction complete for block:995
ACK received. Transaction complete for block:996
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 1
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 2
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 3
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 4
resending last data packet
inside sig_handler
timeoutCounter incremented
```

```
recvfrom value is -1
errno == EINTR
timeout count: 5
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 6
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 7
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 8
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 9
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
errno == EINTR
timeout count: 10
resending last data packet
inside sig_handler
timeoutCounter incremented
recvfrom value is -1
./tftpserver: recvfrom error
```

Client:

```
huangkl2@csslal0h:~/css432KevinGabriel/client$ ./tftpclient -r PrideAndPrejudice.txt 519709
Creating RRQ packet
PRINTING CONTENT OF PACKET:
1PrideAndPrejudice.txt octet
END OF PACKET PRINT
^C
huangkl2@csslal0h:~/css432KevinGabriel/client$
```

### Error cases:

#### File does not exist:

Server:

```
huangkl2@csslabb1h:~/css432KevinGabriel/server$ ./tftpserver 519709
Starting tftpserver Program
Ready To Accept A Client RRQ or WRQ
Received Packet:1DoesNotExist.txt octet
Ready To Accept A Client RRQ or WRQ
File size:-1 Bytes
File requires 1 packet
creating ERROR packet
sending ERROR packet
█
```

Client:

```
huangkl2@csslabb10h:~/css432KevinGabriel/client$ ./tftpclient -r DoesNotExist.txt 519709
Creating RRQ packet
PRINTING CONTENT OF PACKET:
1DoesNotExist.txt octet
END OF PACKET PRINT
./tftpclient: Error Code 1 - File not found.
huangkl2@csslabb10h:~/css432KevinGabriel/client$ █
```

#### File already exists (overwrite warning):

Server:

```
Received Packet:2ClientTest.txt octet
Ready To Accept A Client RRQ or WRQ
sending ERROR packet
█
```

Client:

```
huangkl2@csslabb10h:~/css432KevinGabriel/client$ ./tftpclient -w ClientTest.txt 519709
Creating WRQ packet
PRINTING CONTENT OF PACKET:
2ClientTest.txt octet
END OF PACKET PRINT
File already exists../tftpclient: Error Code 6 - File already exists.
huangkl2@csslabb10h:~/css432KevinGabriel/client$ █
```



**No permission to access the requested file:**

Server:

```
Received Packet:1NoAccess.txt octet
Ready To Accept A Client RRQ or WRQ
File size:-1 Bytes
File requires 1 packet
creating ERROR packet
sending ERROR packet
```

█

Client:

```
huangk12@csslal0h:~/css432KevinGabriel/client$ ./tftpclient -r NoAccess.txt 519
709
Creating RRQ packet
PRINTING CONTENT OF PACKET:
1NoAccess.txt octet
END OF PACKET PRINT
./tftpclient: Error Code 2 - Access violation.
huangk12@csslal0h:~/css432KevinGabriel/client$ █
```

Simultaneously read a file and write a different file:

Server:

```
huangk12@csslabb1h:~/css432KevinGabriel/server$ ./tftpserver 519709
Starting tftpserver Program
Ready To Accept A Client RRQ or WRQ
Received Packet:1PrideAndPrejudice.txt octet
Ready To Accept A Client RRQ or WRQ
File size:798774 Bytes
File requires: 1561 number of packets
Sending Data Packet(s)
ACK received. Transaction complete for block:1
ACK received. Transaction complete for block:2
ACK received. Transaction complete for block:3
ACK received. Transaction complete for block:4
ACK received. Transaction complete for block:5
ACK received. Transaction complete for block:6
ACK received. Transaction complete for block:7
ACK received. Transaction complete for block:8
ACK received. Transaction complete for block:9
ACK received. Transaction complete for block:10
```

\*Screenshots for blocks 11 – 548 not provided \*

```
ACK received. Transaction complete for block:549
Received Packet:2Frankenstein.txt octet
Ready To Accept A Client RRQ or WRQ
ACK received. Transaction complete for block:550
ACK received. Transaction complete for block:551
```

\*Screenshots for blocks 551 – 1559 not provided \*

```
ACK received. Transaction complete for block:1560
ACK received. Transaction complete for block:1561
Request Operation Complete
Request Operation Complete
```

Client 1 (RRQ):

```
huangk12@csslabb10h:~/css432KevinGabriel/client$ ./tftpclient -r PrideAndPrejudice.txt 519709
Creating RRQ packet
PRINTING CONTENT OF PACKET:
1PrideAndPrejudice.txt octet
END OF PACKET PRINT
Request Operation Complete
huangk12@csslabb10h:~/css432KevinGabriel/client$
```

Client 2 (WRQ):

```
huangkl2@csslalab9h:~/css432KevinGabriel/client$ ./tftpclient -w Frankenstein.txt
519709
Creating WRQ packet
PRINTING CONTENT OF PACKET:
2Frankenstein.txt octet
END OF PACKET PRINT
ACK received. transaction complete for block:0
File size:448821 Bytes
File requires: 877 number of packets
Sending Data Packet(s)
ACK received. Transaction complete for block:1
ACK received. Transaction complete for block:2
ACK received. Transaction complete for block:3
ACK received. Transaction complete for block:4
ACK received. Transaction complete for block:5
```

\*Screenshots for blocks 6 – 874 not provided \*

```
ACK received. Transaction complete for block:875
ACK received. Transaction complete for block:876
ACK received. Transaction complete for block:877
Request Operation Complete
huangkl2@csslalab9h:~/css432KevinGabriel/client$ █
```

F. Additional test cases: