

The purpose of this program is to transfer a file from a client, through a server, and back to the client, or rather, replicating an “Echo.” Before I explain the core components of the program, I will provide starting commands.

```
./myserver server_port  
./myclient server_ip server_port MTU in_file_path out_file_path
```

“myserver” starts the server. You need to do this *before* running the other command. In addition, *server_port* must be the same for both commands, as they need to connect across the same port.

Moving on to “myclient”, the *server_ip* must ALWAYS match the hardcoded IP in myserver.c. This can be changed manually, but otherwise, must be 127.0.0.1.

MTU is the maximum bytes that can be transferred across one **packet**. The program works by sending up to 8 packets at a time, and re-orders them upon return. The **maximum MTU value** is **32768**, while the minimum is 2.

in_file_path is the path to the first file, the one that will be duplicated.

out_file_path is the name that the new, copied file will be given.

Finally, a **disclaimer**. I based my code off the textbook we were assigned for our class, “UNIX Network Programming Volume 1, Third Edition: The Sockets Networking API”, and as such, the server code is mostly unchanged from the examples given in Chapter 8. We were permitted to do this.

Shortcoming: If an MTU of greater than 32768 is entered, 32768 is used instead. I thought it would be better to do this than to kill the program.

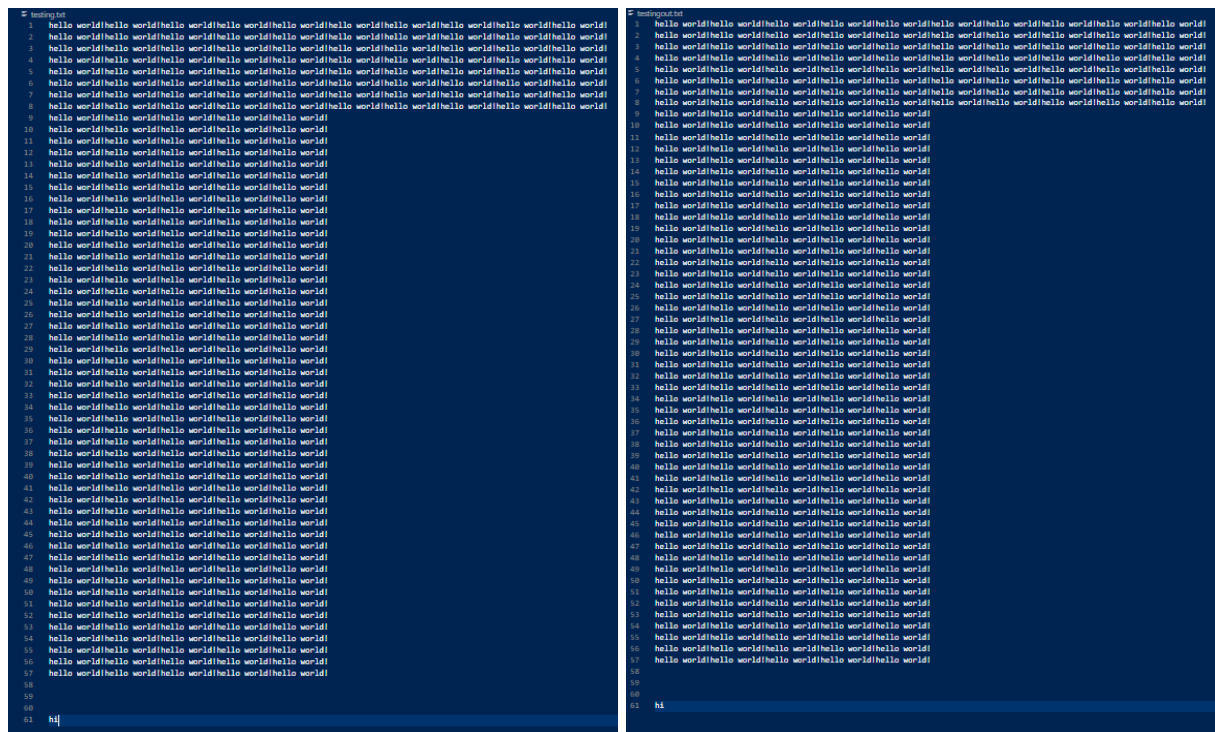
Tests (I learned about the **diff** command in Bash, so I no longer need to show images to prove that two files are the same. The diff command doesn't return anything if two files are equal to each other.):

After Test 1, assume the same IP and Port is used until Test 5, which will be used for intentional errors. As such, the server command may not be shown again until then.

Test 1, a simple file of hello worlds:

```
bash-4.2$ make
make: Nothing to be done for 'all'.
bash-4.2$ bin/myserver 9091
```

```
bash-4.2$ bin/myclient 127.0.0.1 9091 512 testing.txt testingout.txt
bash-4.2$ diff testing.txt testingout.txt
bash-4.2$
```



Test 2, the entirety of William Shakespeare's "Hamlet", located at <https://gist.githubusercontent.com/provpup/2fc41686eab7400b796b/raw/b575bd01a58494dfddc1d6429ef0167e709abf9b/hamlet.txt> :

```
bash-4.2$ bin/myclient 127.0.0.1 9091 512 hamlet.txt hamletout.txt
bash-4.2$ diff hamlet.txt hamletout.txt
bash-4.2$
```

```
≡ hamletout.txt
1  THE TRAGEDY OF HAMLET, PRINCE OF DENMARK
2
3
4  by William Shakespeare
5
6
7
8  Dramatis Personae
9
10 Claudius, King of Denmark.
11 Marcellus, Officer.
12 Hamlet, son to the former, and nephew to the present king.
13 Polonius, Lord Chamberlain.
14 Horatio, friend to Hamlet.
15 Laertes, son to Polonius.
16 Voltemand, courtier.
17 Cornelius, courtier.
18 Rosencrantz, courtier.
19 Guildenstern, courtier.
20 Osric, courtier.
21 A Gentleman, courtier.
22 A Priest.
23 Marcellus, officer.
24 Bernardo, officer.
25 Francisco, a soldier
26 Reynaldo, servant to Polonius.
27 Players.
28 Two Clowns, gravediggers.
29 Fortinbras, Prince of Norway.
30 A Norwegian Captain.
31 English Ambassadors.
32
33 Getrude, Queen of Denmark, mother to Hamlet.
34 Ophelia, daughter to Polonius.
35
36 Ghost of Hamlet's Father
```

Test 3, a 5mb file that consists solely of 0s, located at
<https://raw.githubusercontent.com/BitDoctor/speed-test-file/master/5mb.txt> :

```
bash-4.2$ bin/myclient 127.0.0.1 9091 16000 5mb.txt 5mbout.txt
bash-4.2$ diff 5mb.txt 5mbout.txt
bash-4.2$ █
```



Test 4, the binary file used for the server, myserver:

```
bash-4.2$ bin/myclient 127.0.0.1 9091 1024 myserver myserveralt  
bash-4.2$ diff myserver myserveralt  
bash-4.2$ █
```

(The proof is a binary file... there's not much point in displaying it.)

Test 5: Intentional errors.

Test 5.1, incorrect client port.

```
bash-4.2$ bin/myserver 9095
```

```
bash-4.2$ bin/myclient 127.0.0.1 9090 1024 5mb.txt 5mbout.txt
Cannot detect server
bash-4.2$
```

Test 5.2, incorrect number of arguments into client.

```
bash-4.2$ bin/myclient 127.0.0.1 9095 1024 5mb.txt 5mbout.txt extra
Not enough/too many initial parameters.
```

Test 5.3, MTU size of 1.

```
bash-4.2$ bin/myclient 127.0.0.1 9090 1 5mb.txt 5mbout.txt
The MTU is invalid!
bash-4.2$
```

Test 5.4 incorrect IP address.

```
bash-4.2$ bin/myclient 127.0.0.2 9095 1024 5mb.txt 5mbout.txt
Cannot detect server
```