CSS 432 Networking
Final Project (FTP Client)
Winter Quarter 2017

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Documentation:

FTP (File Transfer Protocol) is a way to send files from one computer to another using a TCP/IP connection. In this project I created a FTP client that is designed to mimic some of the functionality of the linux ftp client. It works by establishing a TCP connection between the client and the server over port 21 (standard port for FTP). This connection handles sending of control information (commands) from the client to the server and acknowledgments from the server to the client.

For commands such as ls, get, and put, a second connection needs to be established to the server with passive mode. First, the client requests a passive connection to the server. Then, the server responds with another hostname and port number for the client to connect to. When the data transfer is complete over this channel, the connection is terminated. This ftp client only supports passive mode connection in which the client has to establish this data channel instead of the server (active mode).

Usage:

Usage instructions are found in the corresponding README file in this project.

Commands Supported:
cd, ls, get, put, close, quit, open

Execution Output

raghut2@uw1-320-03:~/Documents/CSS432/Program5$ ./ftp ftp.tripod.com

ftp> open
220 Welcome to Tripod us FTP.
Name(ftp.tripod.com:raghut2): css432w17
331 Username set to css432w17. Now enter your password.
Password: UWB0th3ll
230- ==
230-   IMPORTANT NOTICE
230- ==
230-
230- Powerful building tools. Traffic-generating, money-making
230- programs. It's all waiting for you at Tripod.
230-
230-   http://www.tripod.lycos.com/
230-
230- ==
230-
230- Got a great idea for a website? Then don't
230- wait, get your own web address today!
230-
230-   http://www.tripod.lycos.com/domains/
230-
230- ==
230-
230- We heard you loud and clear! You love your site, but
230- you don't like the ads. Remove those pesky popups
230- forever!
230-
230-   http://www.tripod.lycos.com/web-hosting/compare_plans.pl
230-
230- ==
230 User 'css432w17' logged on.
ftp> close
221 Goodbye...
ftp> open
220 Welcome to Tripod us FTP.
Name(ftp.tripod.com:raghut2): css432w17
331 Username set to css432w17. Now enter your password.
Password: UWB0th3ll
230- ==
230-   IMPORTANT NOTICE
230- ==
230-
230- Powerful building tools. Traffic-generating, money-making
230- programs. It's all waiting for you at Tripod.
230-
230-   http://www.tripod.lycos.com/

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230-
230- ================================================================
230-
230- Got a great idea for a website?  Then don't
230- wait, get your own web address today!
230-
230-   http://www.tripod.lycos.com/domains/
230-
230- ================================================================
230-
230- We heard you loud and clear! You love your site, but
230- you don't like the ads.  Remove those pesky popups
230- forever!
230-
230-   http://www.tripod.lycos.com/web-hosting/compare_plans.pl
230-
230- ================================================================
230 User 'css432w17' logged on.
ftp> ls
227 Entering Passive Mode (209,202,252,54,235,171)
150 Opening ASCII mode data connection for LIST.
226 Transfer complete.
-rw-r--r--   1 css432w17 Tripod        52 Mar 12 20:47 README.md
drwxr-xr-x   1 css432w17 Tripod         0 Feb 10 17:38 cgi-bin
drwxr-xr-x   1 css432w17 Tripod         0 Mar 13 22:22 project
-rw-r--r--   1 css432w17 Tripod         6 Mar 12 20:50 Testing.txt
-rw-r--r--   1 css432w17 Tripod     11960 Mar 13 01:52 testfile.txt
-rw-r--r--   1 css432w17 Tripod      1457 Mar 13 15:26 SampleFile.txt
-rw-r--r--   1 css432w17 Tripod        15 Mar 13 15:30 Hello.txt
-rw-r--r--   1 css432w17 Tripod        83 Mar 13 19:27 PleaseWork.txt
-rw-r--r--   1 css432w17 Tripod         4 Mar 13 19:48 oldold.txt

ftp> cd project
250 Directory set to '/project'.
ftp> ls
227 Entering Passive Mode (209,202,252,54,235,176)
150 Opening ASCII mode data connection for LIST.
226 Transfer complete.
-rw-r--r--   1 css432w17 Tripod       306 Mar 13 05:37 stopdeletingmyvirus.bat
drwxr-xr-x   1 css432w17 Tripod         0 Mar 13 16:24 Real_directory
-rw-r--r--   1 css432w17 Tripod        34 Mar 12 13:23 rfc0959.txt
-rw-r--r--   1 css432w17 Tripod        58 Mar 12 06:29 unique1.txt
-rw-r--r--   1 css432w17 Tripod         0 Mar 13 02:33 ls
-rw-r--r--   1 css432w17 Tripod        34 Mar 13 02:37 File001.txt
-rw-r--r--   1 css432w17 Tripod      5414 Mar 12 22:01 ttcp.cpp
-rw-r--r--   1 css432w17 Tripod      5414 Mar 11 22:33 ttcp732.cpp
-rw-r--r--   1 css432w17 Tripod         0 Mar 11 22:36 barftext
-rw-r--r--   1 css432w17 Tripod      5414 Mar 11 22:41 ttcp741.cpp
-rw-r--r--   1 css432w17 Tripod         0 Mar 11 22:54 rpb_test5.txt
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-rw-r--r--   1 css432w17 Tripod        34 Mar 12 13:21 rfc959.txt
-rw-r--r--   1 css432w17 Tripod       151 Mar 11 23:43 MyNameisMuchogusto.cpp
-rw-r--r--   1 css432w17 Tripod       151 Mar 11 23:48 symphony.php
-rw-r--r--   1 css432w17 Tripod       729 Mar 12 16:34 command.php
-rw-r--r--   1 css432w17 Tripod        16 Mar 12 22:16 dudeTest.txt
-rw-r--r--   1 css432w17 Tripod         7 Mar 12 10:15 peanuts2.txt
-rw-r--r--   1 css432w17 Tripod      1386 Mar 12 07:38 CSS432_final_answers_w17.txt
-rw-r--r--   1 css432w17 Tripod         5 Mar 13 02:34 kkkkkk
-rw-r--r--   1 css432w17 Tripod         0 Mar 12 21:18 asd.txt
-rw-r--r--   1 css432w17 Tripod         5 Mar 13 02:39 kk
-rw-r--r--   1 css432w17 Tripod     11960 Mar 13 21:58 testfile.txt
-rw-r--r--   1 css432w17 Tripod       764 Mar 13 03:47 z
-rw-r--r--   1 css432w17 Tripod        46 Mar 13 03:10 myText3.txt
-rw-r--r--   1 css432w17 Tripod       151 Mar 12 16:32 somePhpFile.php
-rw-r--r--   1 css432w17 Tripod       729 Mar 13 05:11 AnotherTestFile.h
-rw-r--r--   1 css432w17 Tripod        46 Mar 13 05:39 simpleText.txt
-rw-r--r--   1 css432w17 Tripod       151 Mar 12 17:51 testingNewMod.mov
-rw-r--r--   1 css432w17 Tripod       151 Mar 13 05:13 testtest123.txt
-rw-r--r--   1 css432w17 Tripod    147316 Mar 13 05:44 rfc.txt
-rw-r--r--   1 css432w17 Tripod      5414 Mar 12 19:28 test-file-4567.cpp
-rw-r--r--   1 css432w17 Tripod         5 Mar 12 22:20 Myfrient.txt
-rw-r--r--   1 css432w17 Tripod      3927 Mar 13 18:53 writetestfile.txt
-rw-r--r--   1 css432w17 Tripod         0 Mar 13 07:46 writefiletest.txt
-rw-r--r--   1 css432w17 Tripod      5414 Mar 12 20:52 cool-file-42.cpp
-rw-r--r--   1 css432w17 Tripod      3927 Mar 13 08:04 writetestfile2.txt
-rw-r--r--   1 css432w17 Tripod         2 Mar 13 22:06 raymondzhanglikescats.txt
-rw-r--r--   1 css432w17 Tripod      3927 Mar 13 09:45 writetestfile3.txt
-rw-r--r--   1 css432w17 Tripod      3927 Mar 13 09:50 writetestfile4.txt
-rw-r--r--   1 css432w17 Tripod      5621 Mar 13 17:48 ttcprj.cpp
-rw-r--r--   1 css432w17 Tripod         0 Mar 13 14:03 test
-rw-r--r--   1 css432w17 Tripod         0 Mar 13 13:13 test2
-rw-r--r--   1 css432w17 Tripod         0 Mar 13 13:20 test3
-rw-r--r--   1 css432w17 Tripod         9 Mar 13 14:15 8.txt
drwxr-xr-x   1 css432w17 Tripod         0 Mar 13 17:15 testdir
-rw-r--r--   1 css432w17 Tripod     11920 Mar 12 22:30 aaaaaaaaa
-rw-r--r--   1 css432w17 Tripod         0 Mar 12 22:34 no-a-file.cpp
-rw-r--r--   1 css432w17 Tripod    147316 Mar 13 15:44 4th_rfc.txt
-rw-r--r--   1 css432w17 Tripod         7 Mar 13 16:40 peanuts3_thecopy.txt
-rw-r--r--   1 css432w17 Tripod         7 Mar 13 17:34 local_nuts.txt
-rw-r--r--   1 css432w17 Tripod        45 Mar 12 23:30 jjjjjjjjj
-rw-r--r--   1 css432w17 Tripod        12 Mar 12 23:51 Testing2.txt
-rw-r--r--   1 css432w17 Tripod     12026 Mar 12 23:51 testfile3.txt
-rw-r--r--   1 css432w17 Tripod        46 Mar 13 03:45 myText.txt
-rw-r--r--   1 css432w17 Tripod       831 Mar 13 16:48 Socket.h
-rw-r--r--   1 css432w17 Tripod    147316 Mar 13 17:58 copy3.txt
-rw-r--r--   1 css432w17 Tripod         7 Mar 13 17:18 ayylmao.txt
-rw-r--r--   1 css432w17 Tripod      5621 Mar 13 17:24 llllll
-rw-r--r--   1 css432w17 Tripod    151249 Mar 13 17:26 rfc-again.txt
-rw-r--r--   1 css432w17 Tripod       831 Mar 13 17:29 ssssss
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-rw-r--r--  1 css432w17 Tripod        0 Mar 13 17:31 tesssst.txt
-rw-r--r--  1 css432w17 Tripod     5621 Mar 13 17:39 fdasjfkdls
-rw-r--r--  1 css432w17 Tripod    11960 Mar 13 01:11 ahjgsajkasjk.txt
-rw-r--r--  1 css432w17 Tripod   147316 Mar 13 01:41 2nd_rfc0959.txt
-rw-r--r--  1 css432w17 Tripod   147316 Mar 13 01:43 3rd_rfc.txt
-rw-r--r--  1 css432w17 Tripod        5 Mar 13 01:50 lllllllllllllllll
-rw-r--r--  1 css432w17 Tripod     5621 Mar 13 17:41 jkdfjkfdkjfdkjfd
-rw-r--r--  1 css432w17 Tripod        0 Mar 13 17:44 lastminutetestingLOL.txt
-rw-r--r--  1 css432w17 Tripod   101728 Mar 13 17:53 bin
-rw-r--r--  1 css432w17 Tripod        0 Mar 13 17:58 s
drwxr-xr-x  1 css432w17 Tripod        0 Mar 13 20:26 myDir
-rw-r--r--  1 css432w17 Tripod   101728 Mar 13 18:09 binnnnnnnn
-rw-r--r--  1 css432w17 Tripod       41 Mar 13 18:04 qt.txt
-rw-r--r--  1 css432w17 Tripod       41 Mar 13 18:06 qt1.txt
-rw-r--r--  1 css432w17 Tripod       41 Mar 13 18:06 qt2.txt
-rw-r--r--  1 css432w17 Tripod    11960 Mar 13 18:14 newjkfnskj.txt
-rw-r--r--  1 css432w17 Tripod    23920 Mar 13 18:24 sdjnsf.txt
-rw-r--r--  1 css432w17 Tripod      365 Mar 13 19:49 MyTest.txt
-rw-r--r--  1 css432w17 Tripod        4 Mar 13 19:50 oldold.txt
drwxr-xr-x  1 css432w17 Tripod        0 Mar 13 20:49 ruby
-rw-r--r--  1 css432w17 Tripod     1386 Mar 13 22:12 c.txt
-rw-r--r--  1 css432w17 Tripod     1386 Mar 13 22:15 newData.txt
-rw-r--r--  1 css432w17 Tripod   147316 Mar 13 22:15 rfc2.txt
-rw-r--r--  1 css432w17 Tripod     1386 Mar 13 22:18 blah.txt
-rw-r--r--  1 css432w17 Tripod       41 Mar 13 22:22 qt5.txt

ftp> get blah.txt
200 Type set to 'I' (IMAGE aka BINARY).
227 Entering Passive Mode (209,202,252,54,235,180)
150 Opening BINARY mode data connection for 'blah.txt'.
226 Transfer complete.  (1386 bytes sent.)
ftp> put
(local file) data.txt
(remote file) data3.txt
200 Type set to 'I' (IMAGE aka BINARY).
227 Entering Passive Mode (209,202,252,54,235,201)
150 Opening BINARY mode data connection for 'data3.txt'.
226 Transfer complete.  (1386 bytes sent.)
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Performance Evaluation

When executing the get command the performance between the linux ftp client and this program was very similar, same amounts of bytes sent, and similar amount of time for the command to run.

Discussions

Since the entire ftp client functionality is written into one program, this program is not very extensible. It would be fairly simple to add additional commands and functionality but that would make this program (with the current design) very big and unwieldy. Overall the performance of this program and unix ftp is very similar for the functionality both clients implement.