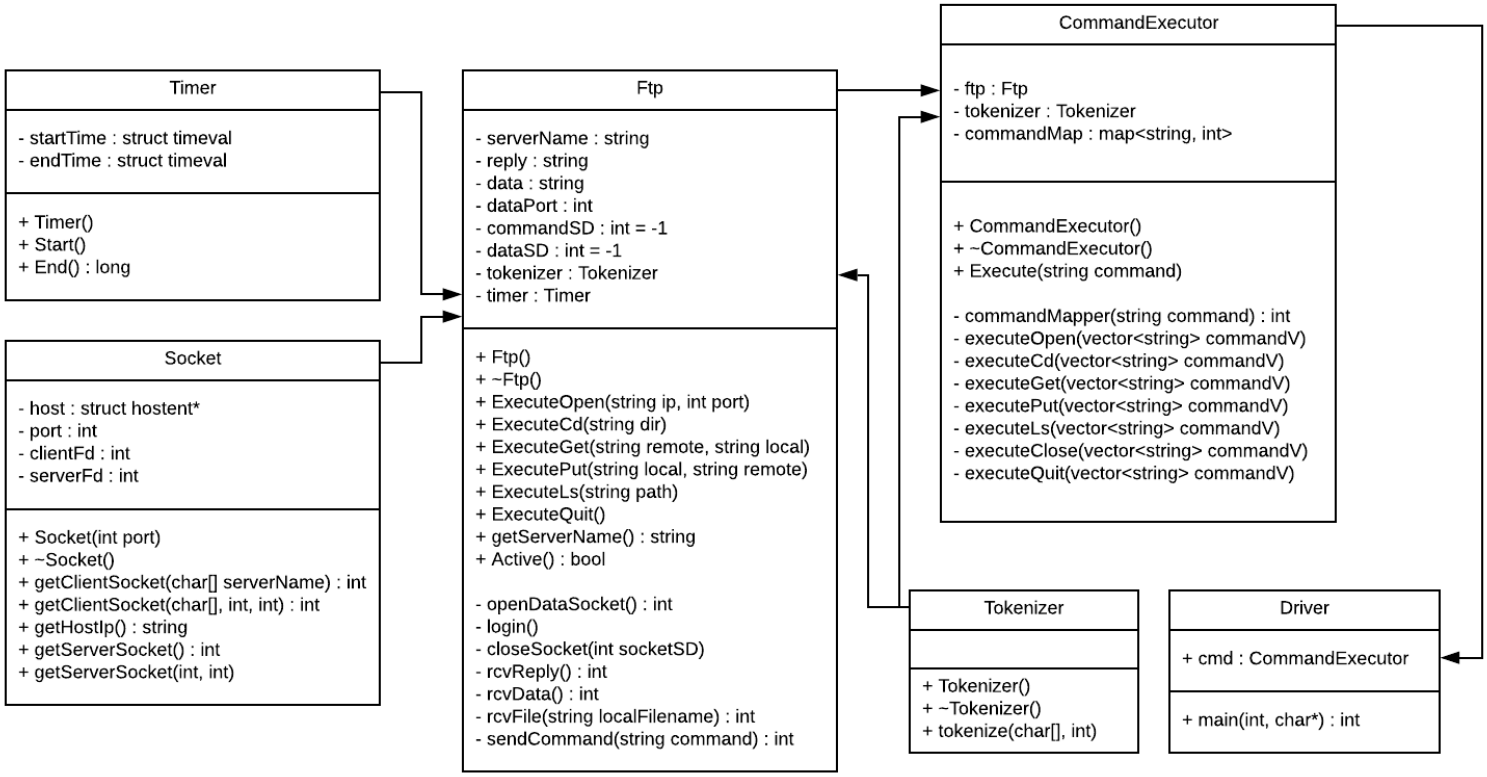
Design



Classes Description

Timer:

Timer class to keep track of time of execution (I took it from former program), used when get and put are executed in the Ftp class.

Socket:

This is a class to create socket (I took it from former program), used when creating the sockets for command (port 21) and data (passive) socket connection.

Tokenizer:

This is a class used to tokenize a string with a given divider and put into vector<string>, used in Ftp class to tokenize the server replies, and in the CommandExecutor class to tokenize use command input.

Ftp:

This class puts together the ftp client to perform open, cd, get, put, ls, close, and quit commands. There are many private helper functions that make this happen. Let me explain how it does each command:

- open: when commanded to open, Ftp creates socket on a given port or the default port 21, and connects to the given ftp server. After successful connection to the ftp server, prompts the user to login by sending “USER ” + username and “PASS “ and password, and authenticate user. After that send “SYST” command to get the information about the host system.
- get: when commanded to get a remote file, checks first if connected to ftp server, then open a passive connection for the data by sending “PASV” command, if successful the send “TYPE I” to open binary mode, after that sends “RETR” and remoteFilename to the ftp server via the command port, if the file exists it starts receiving data and overwrite/writes to local file opened/created with permission mode “w r - r- - r - -“, when done close the local file and close the data connection, and reports how many bytes are received, the time it took for the transfer, and the throughput.
- put: when commanded to put a local file to the ftp serer, it first checks if the file exists in local directory, if it exists, then creates a passive connection for data transfer by sending “PASV”, then sends “TYPE I” to open binary mode, after that sends the “STOR ” + localFilename to the ftp server via the command port, on a success status return, it opens local file using read only file mode, then it writes the content from the file if any to the remote server using the data connection, when done closes the local file and closes the data connection socket which will tell the server that writing is finished, and finally reports how many bytes are transferred (written), the time it took for the transfer, and the throughput.
- cd: when commanded to change directory, it first checks if there is connection, if there is connection then it sends “CWD ” + dirPath, then prints the servers reply.
- ls: when commanded to list current directory or given path for directory, first checks for connection to the ftp server, then creates passive connection to receive the list report by sending “PASV” command to the server, then sends LIST and the path for directory (if any, otherwise the current directory) to the ftp server via the command connection (port 21), depending on the server reply status code starts reading from the server via the data connection and display the reading, when done it closes the data connection, finally displays the completion status sent via the command connection.
- close: when commanded to close, it checks if there is a connection to ftp server, if there is connection it closes the socket.
- quit: if there is connection it closes the socket and exit from ftp, otherwise just exit from ftp.

CommandExecutor:

This class takes user command, interpret the command, and ask ftp class to execute. This mostly parsing the command and parsing the reply after that just execute the appropriate action based on the command and reply.

Driver:

This is where the main resides, creates an instance of the CommandExecutor and have a loop that prompts for command and send it to the CommandExecutor for execution.

Building and Running Instruction

- I have included make file (Makefile) (please let me know it doesn't work
- To build the code, use "make"

```
[temeatuw@csslab3 finalProjectProgram5]$ make
g++ -c Socket.h Socket.cpp
g++ -c Tokenizer.h Tokenizer.cpp
g++ -c Timer.h Timer.cpp
g++ -c Ftp.h Ftp.cpp
g++ -c CommandExecutor.h CommandExecutor.cpp
g++ Ftp.o Socket.o Tokenizer.o Timer.o CommandExecutor.o Driver.cpp -o ftp
[temeatuw@csslab3 finalProjectProgram5]$
```

- To run,
  - use "./ftp"

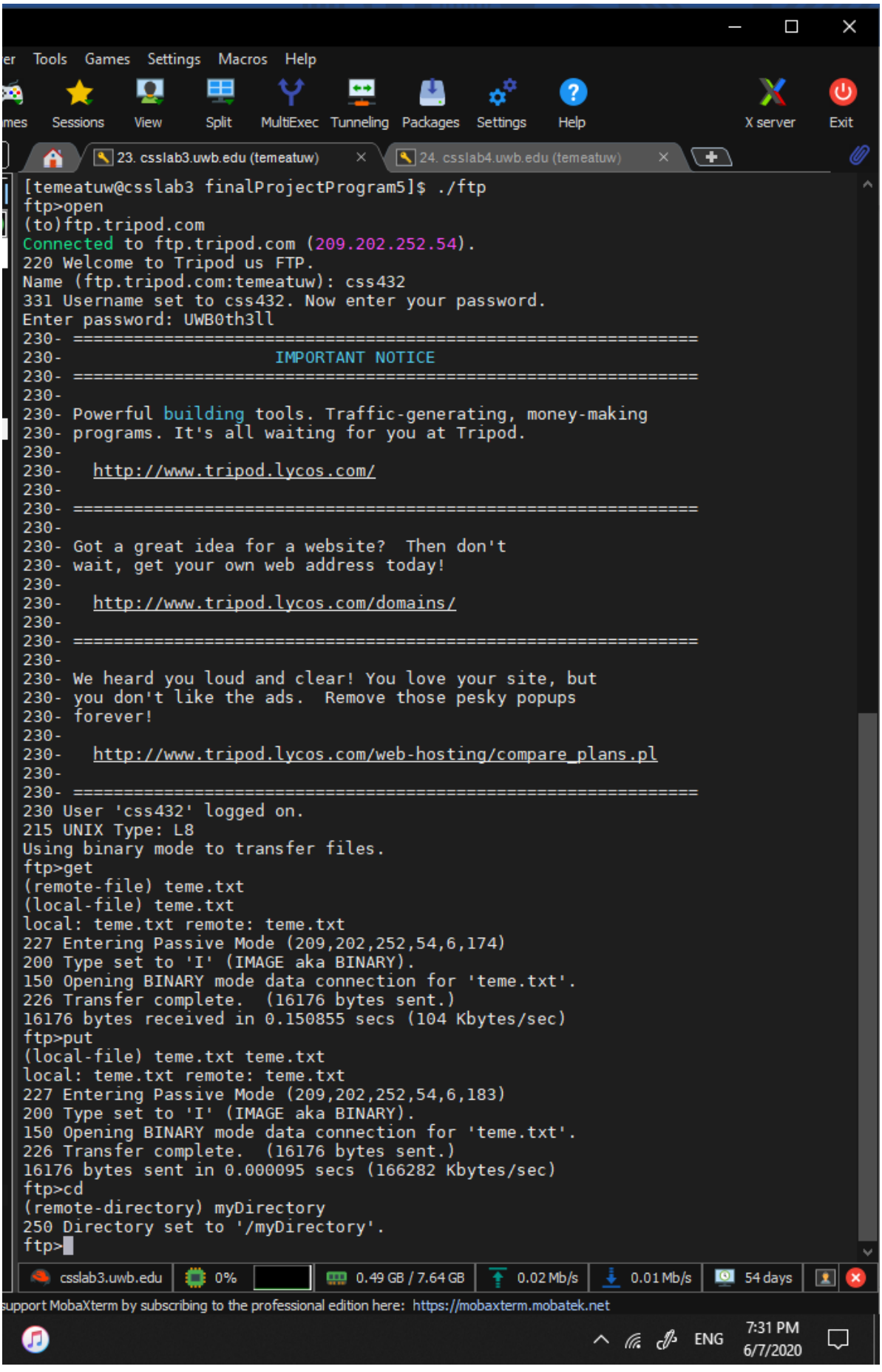
```
[temeatuw@csslab3 finalProjectProgram5]$ ./ftp
ftp>
```

  - or use"./ftp ftpServerIp(ftpServerName)"

```
[temeatuw@csslab3 finalProjectProgram5]$ ./ftp ftp.tripod.com
Connected to ftp.tripod.com (209.202.252.54).
220 Welcome to Tripod us FTP.
Name (ftp.tripod.com:temeatuw):
```

Sample runs of my program

```
[temeatuw@csslab3 finalProjectProgram5]$ ./ftp ftp.tripod.com
Connected to ftp.tripod.com (209.202.252.54).
220 Welcome to Tripod us FTP.
Name (ftp.tripod.com:temeatuw): css432
331 Username set to css432. Now enter your password.
Enter 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 'css432' logged on.
215 UNIX Type: L8
Using binary mode to transfer files.
ftp>get teme.txt
local: teme.txt remote: teme.txt
227 Entering Passive Mode (209,202,252,54,250,76)
200 Type set to 'I' (IMAGE aka BINARY).
150 Opening BINARY mode data connection for 'teme.txt'.
226 Transfer complete.  (16176 bytes sent.)
16176 bytes received in 0.159244 secs (99 Kbytes/sec)
ftp>close
221 Goodbye...
ftp>exit
[temeatuw@csslab3 finalProjectProgram5]$
```


er Tools Games Settings Macros Help
mes Sessions View Split MultiExec Tunneling Packages Settings Help X server Exit
23. csslab3.uwb.edu (temeatuw)
24. csslab4.uwb.edu (temeatuw)
[temeatuw@csslab3 finalProjectProgram5]$ ./ftp
ftp>open
(to)ftp.tripod.com
Connected to ftp.tripod.com (209.202.252.54).
220 Welcome to Tripod us FTP.
Name (ftp.tripod.com:temeatuw): css432
331 Username set to css432. Now enter your password.
Enter 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 'css432' logged on.
215 UNIX Type: L8
Using binary mode to transfer files.
ftp>get
(remote-file) teme.txt
(local-file) teme.txt
local: teme.txt remote: teme.txt
227 Entering Passive Mode (209,202,252,54,6,174)
200 Type set to 'I' (IMAGE aka BINARY).
150 Opening BINARY mode data connection for 'teme.txt'.
226 Transfer complete. (16176 bytes sent.)
16176 bytes received in 0.150855 secs (104 Kbytes/sec)
ftp>put
(local-file) teme.txt teme.txt
local: teme.txt remote: teme.txt
227 Entering Passive Mode (209,202,252,54,6,183)
200 Type set to 'I' (IMAGE aka BINARY).
150 Opening BINARY mode data connection for 'teme.txt'.
226 Transfer complete. (16176 bytes sent.)
16176 bytes sent in 0.000095 secs (166282 Kbytes/sec)
ftp>cd
(remote-directory) myDirectory
250 Directory set to '/myDirectory'.
ftp>
csslab3.uwb.edu 0% 0.49 GB / 7.64 GB 0.02 Mb/s 0.01 Mb/s 54 days
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