

Program Solving Approach – I went about looking through the echo socket program example and tried to understand what was happening with the inputs and outputs. I created the client program without any loops since it had only 2 user inputs and then wrote it to the server and after that I read back whatever the server sends to the client and displayed it, then closed the socket. On the server side, I listened to the client with the same port number and created a socket where it accepts the connection between the server and the client. Then I called the stock function which goes through the file and reads in info to check if it matches with the client send Username and Password and if it is not found, then sends client the appropriate message then closes the connection. Then the client Displays the appropriate message sent through the buffer.

Data Structures – I Data Structures I used is different character arrays which is also a string to hold buffer send from the server or client

Algorithm – Algorithms I used was a nested for loop to take be able to accept client connection and input and searching it in another while loop to go through a file of words and stock number to find the correct output and send the back to the client. I also used If Statements

Functions – I made the Stock function that takes in the socket file descriptor where it reads a data file to find the right stock depending on the username and password and send it back to client and close the socket.

I also used a timer function called `readable_timeout(int fd, int sec)` which takes in socket file descriptor and the seconds that I want it to check and it checks for the user input and if none was sent from the client, it closes the socket.

CLIENT

```
(base) jovyan@jupyter-dd5i:~/Project4$ ./c localhost 8180
WELCOME!
Enter UserName: cvs
Enter PassWord: rhkt187c
91.34
(base) jovyan@jupyter-dd5i:~/Project4$ ./c localhost 8180
WELCOME!
Enter UserName: bro
Enter PassWord: grnmds28z
56.43
(base) jovyan@jupyter-dd5i:~/Project4$ ./c localhost 8180
WELCOME!
Enter UserName: c11
Enter PassWord: rjwqe83f
85.09
(base) jovyan@jupyter-dd5i:~/Project4$ ./c localhost 8180
WELCOME!
Enter UserName: snap
Enter PassWord: tyjli14d
10.21
(base) jovyan@jupyter-dd5i:~/Project4$ ./c localhost 8180
WELCOME!
Enter UserName: mrv1
Enter PassWord: ghqwo31a
41.23
(base) jovyan@jupyter-dd5i:~/Project4$ ./c localhost 8180
WELCOME!
Enter UserName: lc1d
Enter PassWord: welpa23e
13.93
(base) jovyan@jupyter-dd5i:~/Project4$ ./c localhost 8180
WELCOME!
Enter UserName: TESTING
Enter PassWord: TEST
Incorrect User or Password
(base) jovyan@jupyter-dd5i:~/Project4$
```

SERVER

```
(base) jovyan@jupyter-dd5i:~/Project4$ ./s 8180
WAITING FOR CLIENT INPUT
Connected to (localhost, 50516)
USER FOUND
WAITING FOR CLIENT INPUT
Connected to (localhost, 60328)
USER FOUND
WAITING FOR CLIENT INPUT
Connected to (localhost, 42348)
USER FOUND
WAITING FOR CLIENT INPUT
Connected to (localhost, 34868)
USER FOUND
WAITING FOR CLIENT INPUT
Connected to (localhost, 41390)
USER FOUND
WAITING FOR CLIENT INPUT
Connected to (localhost, 39432)
USER FOUND
WAITING FOR CLIENT INPUT
Connected to (localhost, 43972)
WAITING FOR CLIENT INPUT
█
```