

Question #1 – A tic-tac-toe server

We have set up a very basic client server interaction that allows two processes to communicate, but nothing interesting is happening yet. You must complete the server portion so that it implements a tic-tac-toe game system following this protocol:

Client messages consist of a comma separated list of fields used to interact with the game. Each message starts with one of 6 COMMANDs that you must complete and associated arguments:

- LOGIN,USER,PASS which logs an existing user in if the password matches, creates a user for the first time if they did not exist, or returns error if the password is wrong. All following commands must be run with a valid user/pass, so logging in is required as a first step to play.
- CREATE,USER,PASS,GAMENAME which creates a new game with a blank board and the specified user listed as creator.
- JOIN,USER,PASS,GAMENAME,SQUARE which allows the user to join a game that has just been created, as challenger, and lets them play a first move (must be a move on the board, between a1 and c3). Only 2 users can play, so trying to join a game that already has 2 players should fail.
- MOVE,USER,PASS,GAMENAME,SQUARE which allows the user to make a subsequent move. The server should check if it is the users turn (challenger plays all odd numbered moves as “x” and creator all even moves as “o”). Check the outcome of the game after the move. Has someone won or is it a draw?
- LIST,USER,PASS which allows all the games on the server to be listed. This should include both “live” games that are in play, as well as completed games.
- SHOW,USER,PASS,GAMENAME shows the current gameboard requested as well as the game status (who won, or who’s turn comes next)

The server replies with a plain text output that will be printed for the user. For the precise outputs to every case, run “daves_compiled_ttt_server_example”, provided in the zip file. I compiled that on mimi, so it should work there and on other compatible machines, but may fail elsewhere.

Example Runs:

To test in a single window:

```
hedge@DESKTOP-CDQ6CT7:~/COMP200_Fall2018_A4_dev$ make PORT=30101 test
./server 30101 &
sleep 1
Game server ready on port 30101.
echo LOGIN,dave,1234 | ./client 127.0.0.1 30101
Enter message : LOGIN,dave,1234
Server response: NEW USER CREATED OK
Enter message : MOVE,dave,1234,newgame,b2
Server response: GAME newgame DOES NOT EXIST
Enter message : CREATE,dave,1234,newgame
Server response: GAME newgame CREATED. WAITING FOR OPPONENT TO JOIN.
a
b
c
1 2 3
Enter message : Failed to get input from stdin.
echo LOGIN,dave2,4321 | ./client 127.0.0.1 30101
Enter message : LOGIN,dave2,4321
Server response: NEW USER CREATED OK
Enter message : Failed to get input from stdin.
echo JOIN,dave,dave2,newgame,b1 | ./client 127.0.0.1 30101
Enter message : JOIN,dave,dave2,newgame,b1
Server response: GAME newgame BETWEEN dave AND dave2.
IN PROGRESS: dave TO MOVE NEXT AS o
a
b
c
1 2 3
Enter message : Failed to get input from stdin.
echo MOVE,dave,1234,newgame,b1 | ./client 127.0.0.1 30101
Enter message : MOVE,dave,1234,newgame,b1
Server response: GAME newgame BETWEEN dave AND dave2.
IN PROGRESS: dave2 TO MOVE NEXT AS x
a
b
c
1 2 3
Enter message : Failed to get input from stdin.
echo MOVE,dave2,4321,newgame,b1 | ./client 127.0.0.1 30101
Enter message : MOVE,dave2,4321,newgame,b1
Server response: GAME newgame BETWEEN dave AND dave2.
IN PROGRESS: dave TO MOVE NEXT AS o
a
b
c
1 2 3
Enter message : Failed to get input from stdin.
echo MOVE,dave2,4321,newgame,b1 | ./client 127.0.0.1 30101
Enter message : MOVE,dave2,4321,newgame,b1
Server response: GAME newgame BETWEEN dave AND dave2.
IN PROGRESS: dave TO MOVE NEXT AS o
a
b
c
1 2 3
Enter message : Failed to get input from stdin.
```

To test with two terminals competing:

```
hedge@DESKTOP-CDQ6CT7:~/COMP200_Fall2018_A4_dev$ ./client 127.0.0.1 4242
0.1 4242
Enter message : LOGIN,dave,1234
Server response: NEW USER CREATED OK
Enter message : MOVE,dave,1234,newgame,b2
Server response: GAME newgame DOES NOT EXIST
Enter message : CREATE,dave,1234,newgame
Server response: GAME newgame CREATED. WAITING FOR OPPONENT TO JOIN.
a
b
c
1 2 3
Enter message : Failed to get input from stdin.
hedge@DESKTOP-CDQ6CT7:~/COMP200_Fall2018_A4_dev$ ./client 127.0.0.1 4242
0.1 4242
Enter message : LIST
Server response: MUST ENTER A VALID COMMAND WITH ARGUMENTS FROM THE LIST:
LOGIN,USER,PASS
CREATE,USER,PASS,GAMENAME
JOIN,USER,PASS,GAMENAME,SQUARE
MOVE,USER,PASS,GAMENAME,SQUARE
LIST,USER,PASS
SHOW,USER,PASS,GAMENAME
Enter message : LIST,dave,friend,4321
Server response: USER NOT FOUND
Enter message : LOGIN,dave,friend,4321
Server response: NEW USER CREATED OK
Enter message : LIST,dave,friend,4321
Server response: LIST OF GAMES:
GAME newgame: CREATED BY dave, CHALLENGED BY: (null), IN PROGRESS: (null) TO MOVE
NEXT AS x
Enter message : JOIN,dave,friend,4321,newgame,b2
Server response: GAME newgame BETWEEN dave AND dave_friend.
IN PROGRESS: dave TO MOVE NEXT AS o
a
b
c
1 2 3
Enter message : MOVE,dave,1234,newgame,a3
Server response: GAME newgame BETWEEN dave AND dave_friend.
IN PROGRESS: dave TO MOVE NEXT AS x
a
b
c
1 2 3
Enter message : MOVE,dave,1234,newgame,a3
Server response: GAME newgame BETWEEN dave AND dave_friend.
IN PROGRESS: dave TO MOVE NEXT AS x
a
b
c
1 2 3
Enter message :
```