Introduction to Network Programming

Final Exam

Date: 2020/06/01 Time: 15:30-18:30

Problems:

1) (50%) Implement a UDP Server and UDP Client. Your client should be able to send a file to the server and your server should be able to receive multiple files simultaneously.

Command format:

- Server
  - ./server {number-of-client-connections} {port}
- Client
  - ./client {server-ip} {server-port} {file-name}

Notes:

- The specified file will locate on the same directory as client program
- Clients will use ordered port to send multiple files:
  - ./client {server-ip} {server-port} {file-name}
  - ./client {server-ip} {server-port + 1} {file-name}
  - ./client {server-ip} {server-port + 2} {file-name}
  - ./client {server-ip} {server-port + 3} {file-name}
  - ./client {server-ip} {server-port + 4} {file-name}

2) (50%) Implement a TCP server. The server does the following functions:

- Server will give client a name by connection order. For example, the first client connects to the server, it will be named user1, the second client will be user2, the third client will be user3. **When user2 disconnect and connect to the server again, it will be named user4.**
- When client connect/disconnect to the server, server should output message: **New connection from ip:port (user#) / (user#) ip:port disconnected**

The client does the following functions:

- Every user has his own group and only the user himself can manage his group.
- The service accepts the following commands and at least 10 clients:
  When client enter command incompletely E.g., missing parameters, the server should show command format for client.

Command	**Description**	**Output**	
list-users	List all online users.	Success	user1 user2 ...
group-add <username>	Add <username> into a group.	Success	Add <username> successfully.
		Fail	<username> does not exist.
group-remove <username>	Remove <username> from the group.	Success	Remove <username> successfully.
		Fail	<username> does not exist.
group-send <message>	Send<message>to the user's group, only the group members can see the message.	Success	Online group members received the message.
exit	Disconnect from the server.		

Set up:

Download **np_final_exam.zip** from new E3. After extracting this file, you will see the following directory structure:

np_final_exam/

└── **setup.sh** --- This script is used to set up directories of your submission.

Submission:

Change directory to **np_final_exam**. Type **./setup.sh <your_student_id>** to set up the directories. Then, you will see the following directories.

<your_student_id>/

├── P1/ --- This directory is for storing your answer to the problem 1.

├── server/

Put your **server codes** and a readme file that describes how to compile your program (Makefile is better) here.

└── client/

Put your **client codes** and a readme file that describes how to compile your program (Makefile is better) here.

└── P2/ --- This directory is for storing your answer to the problem 2.

Put your **codes** here and a readme file that describes how to compile your program (Makefile is better) here.

Type **zip –r <your_student_id> <your_student_id>** and upload the **<your_student_id>.zip** to new E3.