Introduction to Computer Networks

Assignment 2: File Sharing Service

1. Goal

- Develop Client and RelayServer programs using TCP socket programming.

2. Development environments

- You can use both C and Python (3.x) on Linux and Windows
- You have to describe your development environment information in detail in the report.

3. Functionalities to implement

- **Client**
  - When starting Client, a user enters UserID and RelayServer IP address.
  - After connected to RelayServer, Client sends the User ID to RelayServer, and receives a welcome message from RelayServer.

    Enter UserID: User1
    Enter RelayServer IP address: 115.179.145.x

    [Notice] Welcome User1
  - Whenever a user enters **0 (zero)**, display the following menu.

    0
    ########################
    1. Register a file
    2. Get the global file list
    3. Download a file
    4. Exit
    ########################
  - Whenever you select 1, Client registers a file name to RelayServer.
    * This example assumes that “fileA” and “fileB” exist in the directory where Client is located.

    0
    ########################
    1. Register a file
    2. Get the global file list

3. Download a file
4. Exit
########################
1
which file to register? fileA
[Notice] The global file list is updated

1
which file to register? fileB
[Notice] The global file list is updated

- Whenever you select 2, Client retrieve the global file list from RelayServer, and show the list as following; (the global file list includes all filenames for all Clients.)

  0
  ########################
  1. Register a file
  2. Get the global file list
  3. Download a file
  4. Exit
  ########################
  2
  The global file list is as follows:
  User1/fileA
  User1/fileB
  User2/fileC
  User2/fileD

  * we assume that User1 and User2 have been connected to RelayServer.

- Whenever you select 3, allow Client to ask a specific file to RelayServer, and store the downloaded file (from RelayServer) in the directory where Client is located. If the file download is completed, display "**file_name has been downloaded**".

  0
  ########################
  1. Register a file
  2. Get the global file list
  3. Download a file
  4. Exit
  ########################
  3
  which file to download? User2/fileC
  fileC has been downloaded.

  [Notice] The global file list is updated

- Whenever you select 4, Client notifies RelayServer that it is terminating and then exits.

########################
1. Report my local file list
2. Get the global file list
3. Download a file
4. Exit
########################
4
Notified RelayServer
Goodbye!

- **RelayServer**
  - After running, wait a new TCP connection request with the port number **10080**.
  - Whenever Client is connected, RelayServer receives User_ID (e.g. 'User1') from the Client, displays "**User1 is connected**", and sends a welcome message to all Clients such as: **"[Notice] Welcome User1"**
  - Whenever receiving "file registration request" from any Client, RelayServer updates the global file list, displays it, and notifies all Clients "**[Notice] The global file list is updated**".
    (Each list entry consists of "user_ID" + "/" + "filename")

    The global file list is as follows:
    User1/fileA
    User1/fileB
    User2/fileC
    User2/fileD

    * we assume there are two Clients (User1 and User2) are connected.
  - Whenever receiving "a file download request", RelayServer notifies the destination Client, and retrieves the file and relays to the original requester Client.

    After the relay, RelayServer updates the global file list, displays it, and notifies all Clients "**[Notice] The global file list is updated**"

    Received the file download request from User1 for User2/fileC
    Retrieved fileC from User2
    The transfer of fileC to User1 has been completed

    The global file list is as follows:
    User1/fileA
    User1/fileB
    User1/fileC
    User2/fileC
    User2/fileD
  - Whenever receiving "exit notification" from any Client, RelayServer displays who has left and notifies all Clients "**[Notice] UserID has left**". After that, RelayServer need to update the global file list. If the list is changed, display it and notify all Clients "**[Notice] The global file list is updated**"

    User1 has left
    The global file list is as follows:
    User2/fileC
    User2/fileD

4. Submission

- The deadline is 4.17(Tue) 23:59.
  - For delayed submissions, a penalty of -15 points applies every 24 hours. After 72 hours, you get zero points.
  - In the case of plagiarism, you will receive 0 points for the first time and ***F*** for the second.
- Submit a zip file including a **report** and two (Client and RelayServer) program sources to iCampus
  - Name the zip file as follows ***StudentID_Name.zip*** (ex: 2018001_홍길동.zip)
  - The report file format should be PDF.
  - The report have to include the following things;
    1) Describe your development environment information in detail
       (versions of operating systems, languages, compilers/interpreter versions, compile options)
    2) Explain how to run both sender and receiver programs including the screen capture.
    3) Present how to design your assignment such as data structures and algorithms.

5. 채점 기준

- Total 100 points
  - 10 points: Report
  - 10 points : when a new Client is connected, RelayServer notifies all Clients a welcome message
  - 20 points: for "**Register a file"**
  - 20 points: for "**Get the global file list"**
  - 20 points: for "**Download a file"**
  - 20 points: for "**Exit"**

6. Q&A

- Leave your questions on the google sheet