Course COMP-8567
Project
Winter 2024
Due Date: Apr/15/2024
100 Marks
Plagiarism Detection Tool: MOSS

- The project work can be carried out alone or in teams of two students.
- Only students from the same section can form a team.
- In case of a team, each team member is expected to contribute evenly (in reasonable terms) towards the development of the project.
- Along with the file submission, the working of the project must be demonstrated during the scheduled slot (TBA) which will be followed by a **viva**.
    - In case of a team, the working of the project must be demonstrated individually by team members as per the stipulated schedule.
    - Demo slots can be scheduled anytime on **Apr 17th ,18th and 19th** and will be announced suitably ahead of time.

Introduction

In this client-server project, a client can request a file or a set of files from the server. The server searches for the file/s in its file directory rooted at its ~ and returns the file/files requested to the client (or an appropriate message otherwise). Multiple clients can connect to the serverw from different machines and can request file/s as per the commands listed in section 2

- **The server, mirror1 and mirror2 and the client processes** must run on different machines/terminals and must communicate using sockets only.

Section 1-Server (serverw24)

- **serverw24** and two identical copies of the serverw24 called the **mirror1 and mirror2** [see section 3] must run before any of the client (s) run and they must wait for request/s from client/s
- Upon receiving a connection request from a client, serverw24 forks a child process that services the client request exclusively in a function called crequest() and (serverw24) returns to listening to requests from other clients.
    - The crequest() function enters an infinite loop waiting for the client to send a command

    - Upon the receipt of a command from the client, crequest() performs the action required to process the command as per the requirements listed in section 2 and returns the result to the client
- Upon the receipt of **quitc** from the client, crequest() exits.
- **Note:** for each client request, serverw24 must fork a separate process with the crequest() function to service the request and then go back to listening to requests from other clients

Section 2 (clientw24)

The client process runs an infinite loop waiting for the user to enter one of the commands.

Note: The commands **are not** Linux commands and are defined(in this project) to denote the action to be performed by the serverw24.

Once the command is entered, the client verifies the **syntax of the command** and if it is okay, sends the command to the serverw24, else it prints an appropriate error message.

List of Client Commands:

- **dirlist -a** the serverw24 must return the list of subdirectories/folders(only) under its home directory in the alphabetical order and the client must print the same
    - **ex: clientw24$** dirlist -a

- **dirlist -t** the serverw24 must return the list of subdirectories/folders(only) under its home directories in the order in which they were created (with the oldest created directory listed first) and the client must print the same
    - **ex: clientw24$** dirlist -t

- **w24fn** *filename*
    - If the file *filename* is found in its file directory tree rooted at ~, the serverw24 must return **the filename, size(in bytes), date created and file permissions** to the client and the client prints the received information on its terminal.

        - Note: if the file with the same name exists in multiple folders in the directory tree rooted at ~, the serverw24 sends information pertaining to the first successful search/match of *filename*
        - Else the client prints "File not found"
    - **Ex: client24$ w24fs sample.txt**

- **w24fz** *size1 size2*
    - The serverw24 must return to the client **temp.tar.gz** that contains all the files in the directory tree rooted at its ~ whose file-size in bytes is >=*size1* and <=*size2*
        - *size1 < = size2 (size1>= 0 and size2>=0)*
    - If none of the files of the specified size are present, the serverw24 sends "No file found" to the client (which is then printed on the client terminal by the client)
    - **Ex: client24$ w24fz 1240 12450**

- **w24ft** <extension list> //up to 3 different file types
    - the serverw24 must return temp.tar.gz that contains all the files in its directory tree rooted at ~ belonging to the file type/s listed in the extension list, else the serverw24 sends the message "No file found" to the client (which is printed on the client terminal by the client)
    - The extension list **must have at least one file type** and can have up to 3 different file types
    - **Ex: client24$ w24ft c txt**
    - **client24$ w24ft jpg bmp pdf**

- **w24fdb** *date*
    - The serverw24 must return to the client temp.tar.gz that contains all the files in the directory tree rooted at ~ whose date of creation is <=*date*
    - **Ex: client24$ w24fdb 2023-01-01**

- **w24fda** *date*
    - The serverw24 must return to the client temp.tar.gz that contains all the files in the directory tree rooted at ~ whose date of creation is >=*date*
    - **Ex: client24$ w24fda 2023-03-31**

- **quitc** The command is transferred to the serverw24 and the client process is terminated

Note: All files returned from the serverw24 must be stored in a folder named **w24project** in the home directory of the client.

Note:

- It is the responsibility of the client process to **verify** the syntax of the command entered by the user (as per the rules in Section 3) before processing it.
    - Appropriate messages must be printed when the syntax of the command is incorrect.

Section 3 Alternating Between the serverw24, mirror1 and mirror2

- The serverw24, mirror1 and mirror2 (mirror1 and mirror2 are serverw24's copies possibly with a few additions/changes) are to run on three different machines/terminals.
- The first 3 client connections are to be handled by the serverw24.
- The next 3 connections (4-6) are to be handled by the mirror1.
- The next 3 connections (7-9) are to be handled by mirror2
- The remaining client connections are to be handled by the serverw24, mirror1 and mirror2 in an alternating manner- (ex: connection 10 is to be handled by the serverw24, connection 11 by the mirror, connection 12 by mirror2 and so on…)

Submission:

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You are required to **submit 4 files** with **adequate and pertinent comments** briefly explaining/describing various parts of the programs.

1. serverw24.c
2. clientw24.c
3. mirror1.c
4. mirror2.c