CS4032: Distributed File System Report

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Introduction

This report outlines the functionalities and challenges when building my file system.

What can my system do

Logging or signing in

The system starts with a prompt to the user over the terminal to sign up or log in.

Log in
If the user selects log in, they are prompted for their username and password which is checked against the database to see if they match. If they do not match, they are prompted to enter their details again.

Sign up
If they choose to sign up, they are prompted for their username and password. They are asked for their password twice. This is in order to see if these passwords match, to ensure the user knows the password they entered. If so, a user is created and added to the database. If the passwords do not match, the user is prompted to enter their details again.

If the command entered by the user was not recognised, they are prompted to enter ‘signup’ or ‘login’ again.

Using the file system

From there the user has the option to upload, download, delete, or lock a file.

Upload
The user enters the name of the file. The system checks if the filename already exists in the database. If it does, the user is prompted to rename the file they wish to upload. Once a valid filename has been entered, it is uploaded to the database.

Download
The user enters the name of the file they wish to download. The system checks if the filename is present in the database. If so, the selected file is downloaded and stored in the user's Documents folder.

Delete
If the user wishes to remove a file from the database, they send a delete request. If a file in the database matches the name of the file the user entered, the file is removed from the database.

Locking
The locking mechanism is a boolean value. If the file is locked, it has the value of True, correspondingly if it is not locked, its value is false.

Uploading
When a user uploads a file, it is automatically set as not locked. The user has the option of locking the file, if they so wish.

Downloading
An unlocked file can be downloaded and the user has the full functionality of actions on the file. However, if a file is locked they can view the file, but they will not be able to upload changes until the holder of the lock removes the lock.

Encryption and decryption
To encrypt a file or user, the data is fed into a function which shifts each character forward by a given integer. To decrypt, the corresponding function shifts the characters back by the given integer.

Challenges

Learning Haskell and Functional Programming

The main aspect of the project I found challenging was having no prior experience in Haskell. I had to learn the language and understand the concepts of functional programming before I could start. This delayed my starting of the assignment.

My primitive knowledge of Haskell was also an issue throughout my work on the assignment. While I understood the basics of the language, there were times when fairly simple errors would take quite a while to fix.

Conclusion

While the breadth of the project was a little daunting for a complete beginner in functional programming and Haskell, I found this project worthwhile, interesting, and educational.