File Encryptor

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Problem Statement

The data and files that people have on their personal computers have become less and less safe within the modern age. The user's personal computer should be able to keep safe the information stored upon it without risk of possible data theft, leaks, or other means of said file tampering that should put the information on the terminal at risk. This of course is a dream rather than the actual case. The goal of this project is to develop an easily accessible way for people to protect files on one's computers by their choice with the goal of an easy-to-follow way of doing so.

Research and Background

File encryption has grown in use as more data and privacy breaches occur, with more and more files being susceptible to being. People work to improve these algorithms constantly, with the most widely popular being AES (Advanced Encryption Standard) due to its speed and security. This project attempts to take this algorithm and use it, an easy-to-use desktop application with the ability to encrypt and decrypt files using a password of the user's choosing.

Project Language, Software, Hardware

Language: Java

Software: Netbeans

Hardware: Macbook Pro Apple M1 Chip with 8 gbs of memory

Project Requirements

The requirements document is here: https://github.com/PJB02/CSU-Senior-Project/blob/master/docs/Braddock%20Requirements.pdf

Project Implementation Description and Explanation

When designing the project, I wanted a very simplistic model to not overwhelm the user. I wanted it to be straightforward and easy to understand upon a first glance of the application. This resulted in only the simplistic functions of the file search, password inclusion (for key cryptography), the destination folder, the encrypt and decrypt options, and the translation button. I chose to include this to include two of the most spoken languages within the world. The application also notifies the user if there is an error in encryption or decryption, to provide helpful feedback to the user should anything go wrong. The idea was to keep it simple and not overwhelm anyone

using the application, as the project was intended to its two functions and stick to said functions.

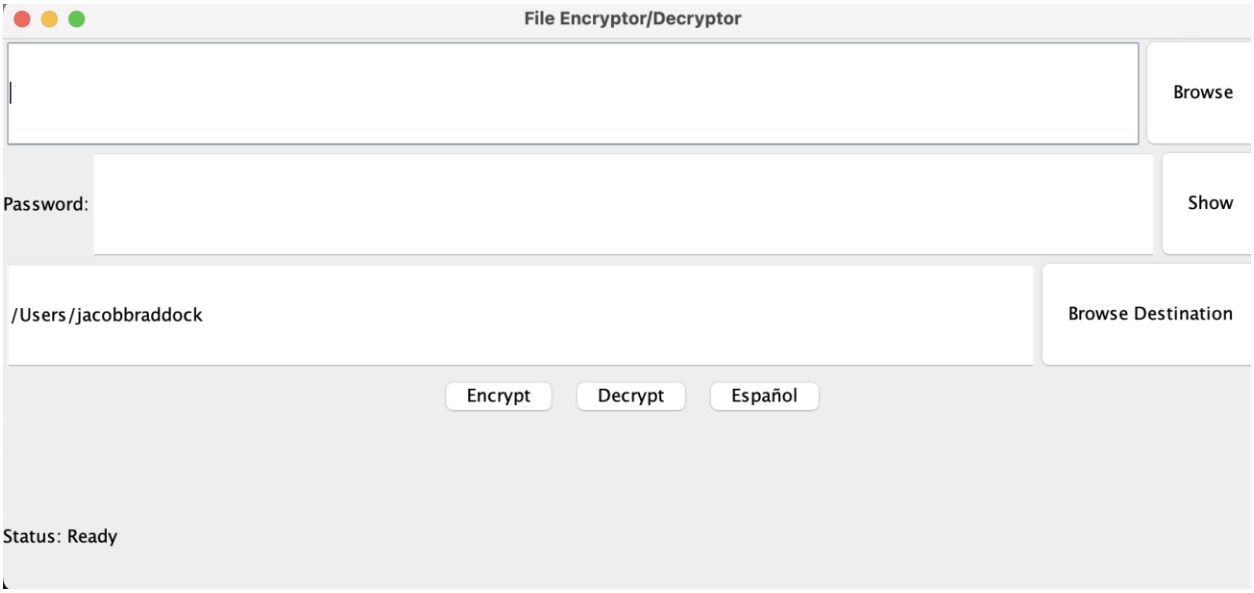

Figure 1: Default Layout

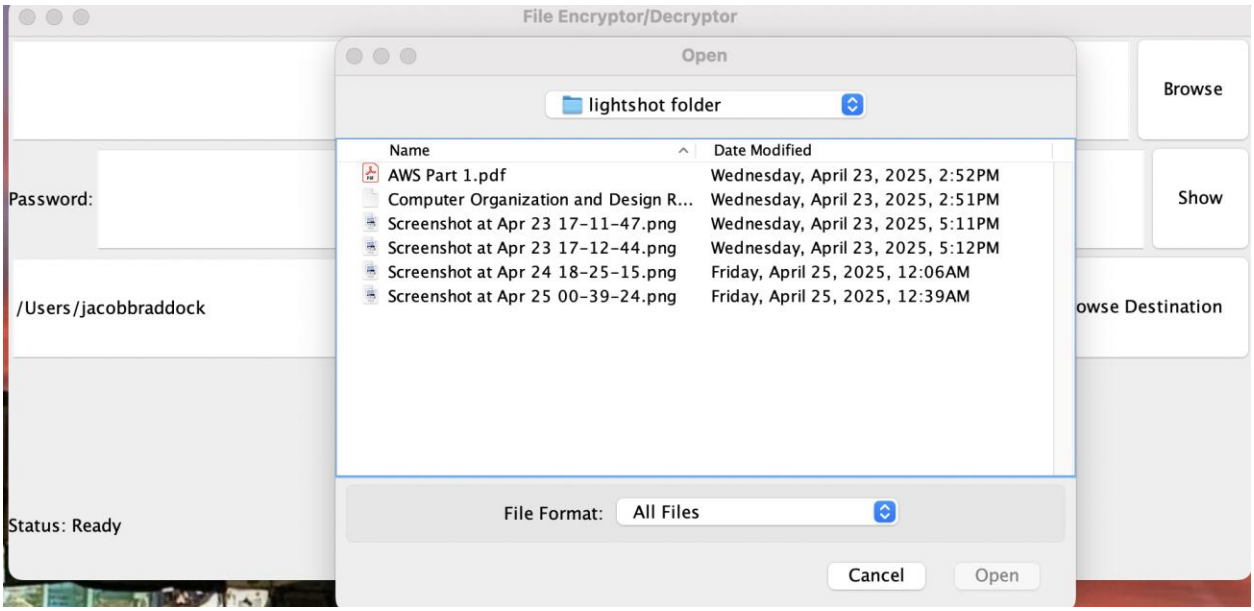

Figure 2: File Search

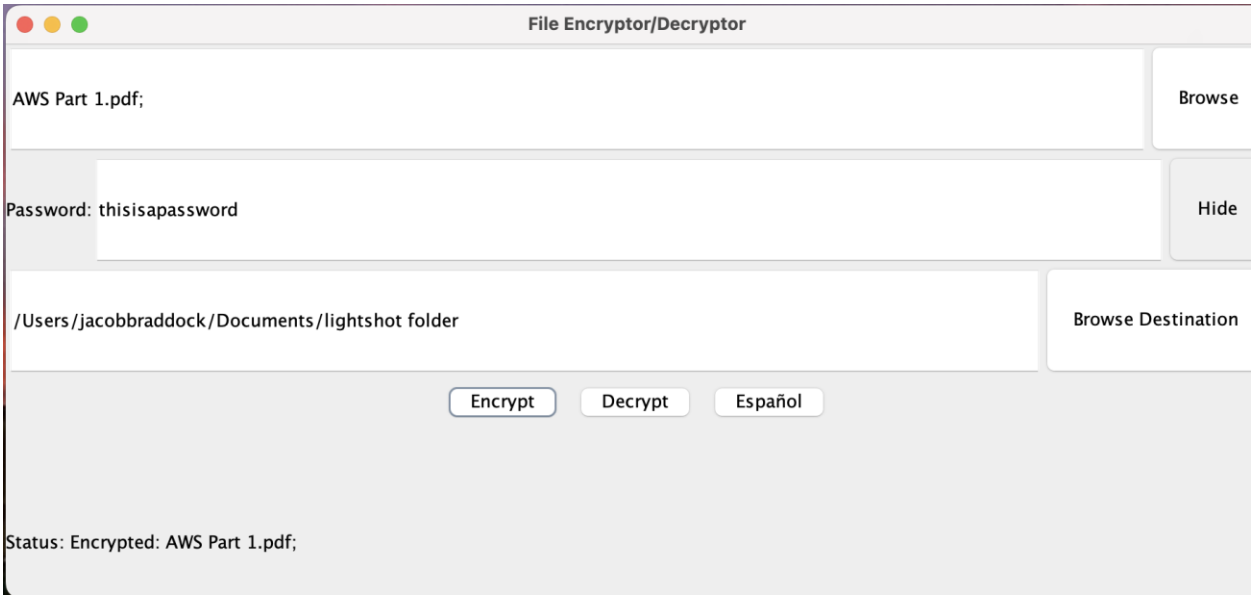

Figure 3: File Encrypted

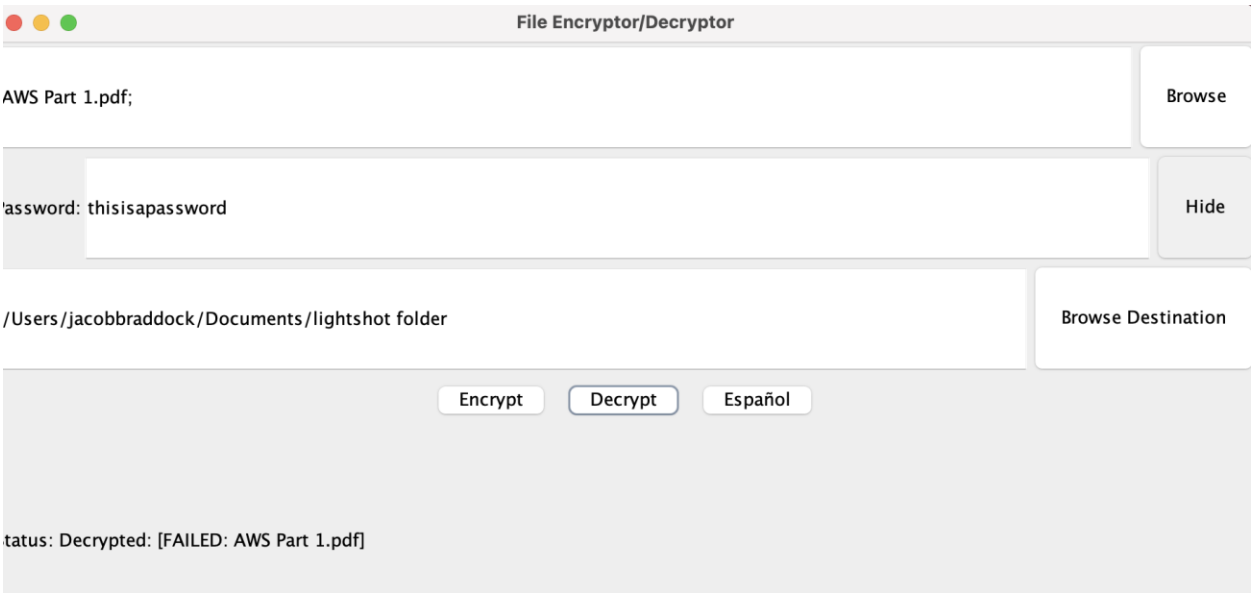

Figure 4: File Unsuccessfully Decrypted

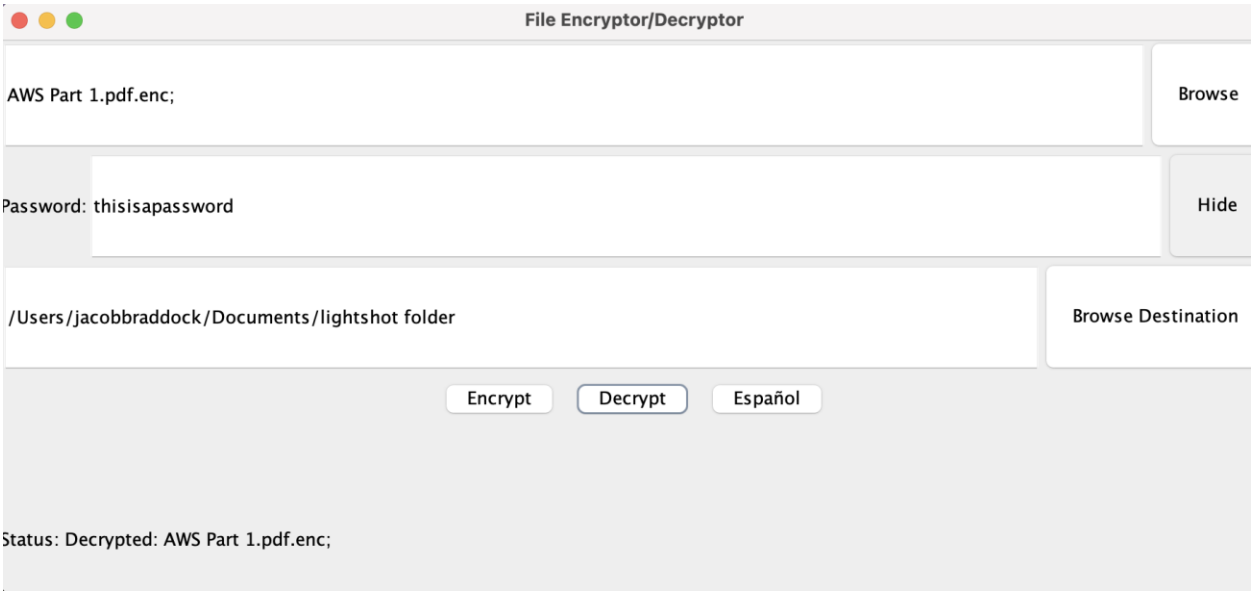

Figure 5: File Decrypted Successfully

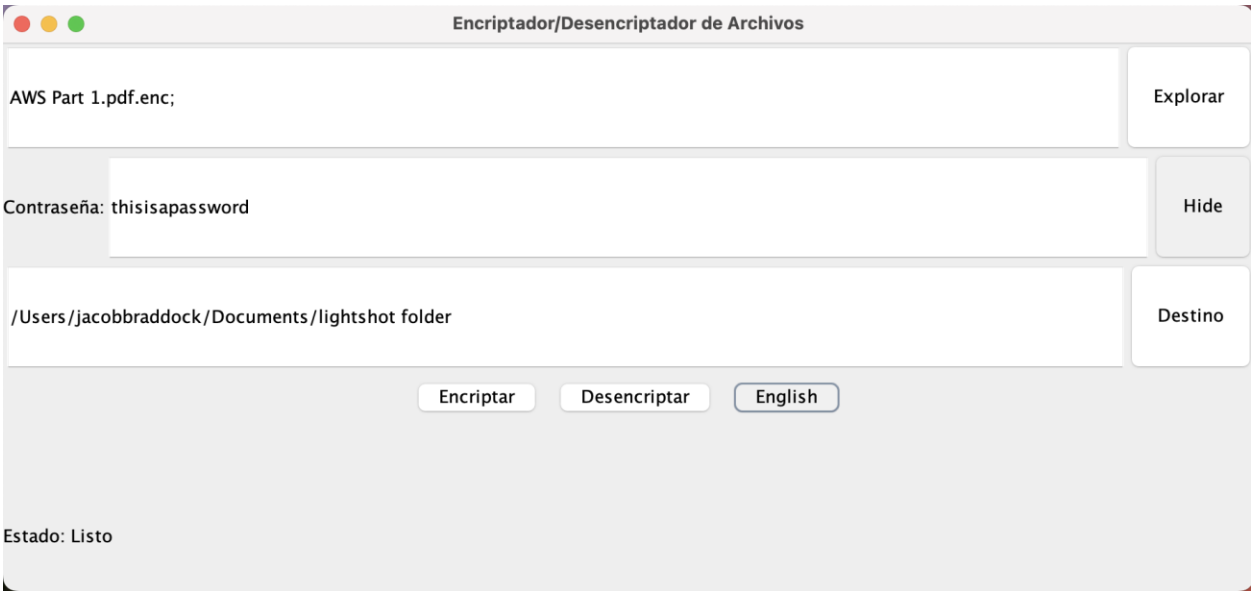

Figure 6: Translated into Spanish

Test Plan

Here is the basis for the Test Plan: https://github.com/PJB02/CSU-Senior-Project/blob/master/docs/Braddock%20Final%20Test%20Plan.pdf

Test Results

Here are the test cases for the functions of the application:

https://github.com/PJB02/CSU-Senior-Project/blob/master/docs/Test%20Cases%20Braddock.pdf

Challenges

Over the course of the project, I have had to overcome several things. The main one was my general lack of knowledge upon starting this project. Most of my knowledge of this course before entering the last semester of college at CSU I did not know full about encryption algorithms, hashing, or general knowledge of this field. I had told my advisor “Well this is in my field, and I wanted to try it”. I had to really push myself to learn what all these algorithms were, starting from what symmetric encryption was to what is the current best encryption algorithm to learning how to hash passwords and salt them. It was all very unique to me and having to crash course myself basically on all of this was definitely my challenge on all of this. This and stapling the GUI together on this project. I have coded in NetBeans before but working it in such a grandiose fashion, I had to really learn about everything I could do in Java Swing.

Future Enhancements

I really want to update the GUI in the future; I think that in its current state it is very primitive and can be made to look more presentable. I would also want the app to be more easily accessible on certain devices. I found the hard way that the app really needs java to run, so while it can work on some devices you have to jump through hoops on other devices to convert the app from .jar to .exe. I would like to eliminate this bridge entirely. I would also want to upgrade from using java possible and turn the app into a website, that way it would be more accessible to anyone and everyone who may want to use the service.

Defense Presentation Slides

https://github.com/PJB02/CSU-Senior-Project/blob/master/docs/Braddock%20Defense%20Presentation.pptx