Library Management System - Individual Report

Name: La-Tavia Pearce

Assigned Tasks:
- Main.java - The main entry point of the application.
- FileHandler.java - Manages reading and writing data to files.
- Password.java - Handles password hashing and verification.
- test_library.java - Automated test cases for functions.
- books.txt - Contains information about books.
- patrons.txt - Contains information about patrons.
- passwords.txt - Stores hashed passwords.
- test_cases.txt - List of test cases.
- User_Manual.pdf - User manual providing instructions on how to use the system.
- README.md - This file, providing an overview of the project.

Data Structures Used:
- ArrayList: Used for storing books and patrons for dynamic resizing and efficient retrieval in **FileHandler.java** and **main.java**.
- HashMap: Utilized in **Password.java** to store user credentials and validate access. Also used in **CheckOut.java** to track book availability by title.
- Stack: Implemented in **CheckOut.java** for managing the undo functionality of book checkouts.

Challenges Faced:
1. Integrating multiple classes to ensure smooth data flow and functionality.
2. Implementing file handling operations with proper exception handling.
3. Coordinating with group members to maintain consistency and meet deadlines.
4. Ensuring proper data persistence and state management for books and patrons.

Solution:
1. Implemented consistent data reading and writing operations in **FileHandler.java** to maintain data integrity.
2. Utilized appropriate data structures such as **ArrayList**, **HashMap**, and **Stack** to enhance functionality.
3. Applied robust exception handling techniques to ensure program stability.
4. Documented all files properly to ensure ease of understanding for group members.
5. Followed object-oriented principles for better code structure and maintainability.

Conclusion:
Completing my assigned tasks for the Library Management System project provided me with practical experience in Java programming, including file handling, data structures, and exception management. Collaborating with my team improved my communication and project management skills. Moving forward, I aim to further enhance the user interface and optimize the system's performance for better usability and efficiency.