

# Library Management System - Individual Report

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## Assigned Tasks:

1. CheckOut.java - Implementation of book check-in/check-out system
2. Search.java - Implementation of book search functionality using BST
3. Report Documentation

## Data Structures Used:

- Linked List: For managing books and patrons.
- Binary Search Tree (BST): For efficient searching and sorting of books.
- Queue: For handling book checkouts and returns in FIFO order.
- Stack: For allowing undo functionality in book checkouts.

## Challenges Faced:

- Implementing a proper binary search tree structure to allow searching by title, author, and ISBN.
- Managing book availability status correctly in the check-out system.
- Handling edge cases such as checking out already borrowed books or searching for non-existent books.

## Solutions:

- Added validation to prevent duplicate checkouts and incorrect return dates.
- Ensured BST supports searching for books by different attributes.
- Implemented a stack-based undo feature for checkouts.

## Conclusion:

The system successfully implements all required functionalities and ensures efficient management of books and patrons using appropriate data structures.