Library Management System

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Contents

1 Introduction

Introduction

This document provides a sci-fi inspired look at the Library Management System implemented in C++. The system enables futuristic features for users and administrators to manage library functions, including account creation, book borrowing, and more.

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2 Classes and Methods

The program is built with two primary classes, optimized for interstellar library use:

- `Account`: Controls user accounts and their credentials.
- `Library`: Manages the galactic collection of books and provides essential library functions.

2.1 Account Class

The `Account` class represents a library user account, storing the user's unique `id`, `name`, and `password`.

```
class Account {
    string password;
    static int id_counter;

public:
    int id;
    string name;
    set<string> books;

    Account() : id(0), name(""), password("") {}

    Account(string name, string password) {
        this->id = ++id_counter;
        this->name = name;
        this->password = password;
    }

    bool authenticate(string password) {
        return this->password == password;
    }
};
```

Listing 1: Account Class

- `Account(string name, string password)`: Initializes an account with a unique ID, `name`, and `password`.
- `authenticate(string password)`: Authenticates the user's password.

2.2 Library Class

The `Library` class handles the essential functions for managing books and user accounts.

```
class Library {
public:
    set<string> books;
    unordered_map<string, Account> accounts;
    string adminPassword = "admin123";

    void addBook(string book);
    void addAccount(const Account &account);
    void deleteAccount(const string &account_name);
    void borrow_books(string book, string account_name);
    void return_books(string book, string account_name);
    void display_books();
    void displayBorrowedBooks(const string &account_name);
    void searchBook(const string &partial_name);
    void adminPanel();
};
```

Listing 2: Library Class

3 Program Execution Flow

The user journey through the sci-fi system:

1. User can either create an account, log in, or enter the admin portal.
2. In the admin portal, books can be added, removed, and users managed.
3. Users can borrow or return books, search by title, and view borrowed items.

4 Detailed Function Descriptions

4.1 addBook

Adds a new book to the library's extensive collection.

```
void Library::addBook(string book) {
    books.insert(book);
}
```

Listing 3: addBook Function

4.2 borrow_books

Allows a user to borrow a book if it is currently in the library's collection.

```
void Library::borrow_books(string book, string account_name) {
    if (accounts.find(account_name) != accounts.end() && books.
       find(book) != books.end()) {
        accounts[account_name].books.insert(book);
        books.erase(book);
    }
}
```

Listing 4: $\text{borrow}_{b}ooksFunction$

Important Note

Only available books can be borrowed by registered users. The system prevents unauthorized borrowing.

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5 Conclusion

This sci-fi themed documentation provides a detailed overview of the Library Management System developed in C++. The system provides essential functionalities for account management, book borrowing and returning, along with an admin panel for overseeing library operations.