**Master of Science in information Systems**

**BIS- 698**

**Information Systems Project**

**Smart Library Application**

**Client - Greenfield Public Library**

**Submitted by**

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### 1. Introduction

Greenfield Public Library, a medium-sized institution catering to students, faculty, and the public, has been facing operational inefficiencies due to its manual processes. Managing book transactions, tracking borrowed items, and ensuring timely returns has become increasingly challenging. The library seeks an automated solution to enhance efficiency and improve user satisfaction.

### 2. Challenges

Currently, the library faces several issues:

* Time-intensive book search and cataloging.
* Inaccurate tracking of due dates and fines.
* Lack of automated due date reminders, resulting in high overdue rates.
* Limited reporting capabilities, restricting data-driven decision-making.

### 3. Project Overview

#### 3.1 Objective

The goal of the SmartLibrary Automation System is to modernize library operations through a digitized approach, automating catalog management, book transactions, and fine calculations while improving overall efficiency.

#### 3.2 Key Features

* **Book Catalog Management**: Add, remove, and update book records.
* **User Management**: Assign roles for students, faculty, and public users.
* **Borrow & Return Management**: Monitor book transactions and update statuses.
* **Request Approval:** Accept or reject book borrowing requests from students.
* **Report Generation**: Generate reports on book transactions and user activity.

**User Features:**

* **Search & Browse Books:** Users can look up books based on title, author, or category.
* **Book Borrowing & Return**: Members can request and return books with a due date tracking system.
* **Account Management**: Users can view their borrowed books, due dates, and request approvals.
* **Logout Functionality:** Securely log out from the system.

#### 3.3 Exclusions

* Integration with third-party eBook platforms.
* Mobile application development.
* AI-powered book recommendations.
* Automated fine calculation and online payment processing.

#### 3.3 Exclusions

* Integration with third-party eBook platforms.
* Advanced report generation on borrowing patterns and overdue fines.
* Automated Alerts: Timely reminders for due dates via email or SMS.

### 4. Feasibility Analysis

#### 4.1 Financial Viability

**Estimated Costs:**

* Software Development: **$5,000** - Covers backend and frontend development, database setup, and system integration.
* Database Setup & Licensing**: $2,000** - Includes MySQL or SQLite implementation and licensing fees if applicable.
* Hosting & Infrastructure: **$1,500** - Covers server hosting, storage, and cloud service expenses.
* Testing & Quality Assurance: **$1,000** - For testing functionalities, bug fixes, and system optimization.
* Training & Deployment: **$1,500** - Staff training sessions and deployment assistance.
* Maintenance & Support: **$2,000** - Covers ongoing support, updates, and troubleshooting for six months.
* Total Estimated Cost: **$13,000** (approximate)
* **ROI:** Decreases overdue instances while optimizing fine collection.
* **Revenue Opportunities:** Potential for premium memberships or services.

#### 4.2 Technical Implementation

* **Frontend:** Tkinter/Custom Tkinter-based GUI for user interaction.
* **Backend:** MySQL database for managing records.

#### 4.3 Timeline

* **Phase 1:** Requirement analysis & design (2 weeks)
* **Phase 2:** System development & database configuration (4 weeks)
* **Phase 3:** Testing & debugging (2 weeks)
* **Phase 4:** Deployment & staff training (2 weeks)

#### 4.4 Operational Feasibility

* **Ease of Use:** Intuitive interface requiring minimal training.
* **Scalability:** Supports expansion as the library collection grows.
* **Reliability:** Ensures seamless book tracking and secure transactions.

### 5. Use Cases

#### 5.1 User Registration

|  |
| --- |
| **Use Case Name:** User Registration **ID:** UC-1 **Priority:** High |
| **Actor:** Student, Faculty, Public User |
| **Description:** Allows users to register and access the system. |
| **Trigger:** A new user wants to create an account. |
| **Preconditions:**   * The system must be accessible online. |
| **Normal Flow:**   1. User navigates to the registration page. 2. Fill in the registration form with name, email, password, and user role. 3. Submits the form. 4. The system validates email and stores user data. 5. The system confirms registration. |
| **Postconditions:**   * The user is registered and can log in. |

#### 5.2User Login

|  |
| --- |
| **Use Case Name:** U**ser Login ID:** UC-2 **Priority:** High |
| **Actor:** Student, Faculty, Public User |
| **Description:** Allows users to log into the system. |
| **Trigger:** A registered user attempts to log in. |
| **Preconditions:**   * The user must be registered. |
| **Normal Flow:**   1. User navigates to the login page. 2. Enters login credentials. 3. System validates credentials. 4. If valid, access is granted; otherwise, an error message is displayed. |
| **Postconditions:**   * The user gains access to their account. |

#### 5.3 Book Borrowing

|  |
| --- |
| **Use Case Name:** Book Borrowing **ID:** UC-3 **Priority:** High |
| **Actor:** Student, Faculty, Public User |
| **Description:** Allows users to borrow books from the library. |
| **Trigger:** A user selects a book to borrow. |
| **Preconditions:**   * The user is logged in. * The book is available. |
| **Normal Flow:**   1. User navigates the book catalog. 2. Selects a book and clicks on the borrow option. 3. The system verifies user eligibility and book availability. 4. The system records the transaction and updates the due date. 5. User receives a confirmation message. |
| **Postconditions:**   * The book is assigned to the user with a due date. |

#### 5.4 Book Return

|  |
| --- |
| **Use Case Name:** Book Return **ID:** UC-4 **Priority:** High |
| **Actor:** Student, Faculty, Public User |
| **Description:** Allows users to return borrowed books. |
| **Trigger:** A user returns a borrowed book. |
| **Preconditions:**   * The user has an active borrowed book. |
| **Normal Flow:**   1. User navigates to their borrowed book section. 2. Select the book to return. 3. The system updates book status and removes it from the user's borrowed list. 4. If returned late, a fine notification is generated. |
| **Postconditions:**   * The book is marked as returned in the system. |

#### 5.5Request Approval

|  |
| --- |
| **Use Case Name: Request Approval** **ID:** UC-5 **Priority:** High |
| **Actor:** Admin |
| **Description:** Allows admins to approve or deny book borrowing requests. |
| **Trigger:** A user submits a borrow request. |
| **Preconditions:**   * The user must have an active membership. |
| **Normal Flow:**   1. Admin logs into the system. 2. Navigates to the request approval section. 3. Reviews pending borrow requests. 4. Approves or denies the request. 5. System updates book status accordingly |
| **Postconditions:**   * The book is either assigned or remains available |

#### 5.6 Report Generation

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| --- |
| **Use Case Name: Report Generation** **ID:** UC-6 **Priority:** Medium |
| **Actor:** Admin |
| **Description:** Generates reports on book borrowings and returns. |
| **Trigger:** Admin requests a report. |
| **Preconditions:**   * The system has sufficient data. |
| **Normal Flow:**   1. Admin logs into the system. 2. Selects the report type (borrowed books, overdue books, user activity). 3. The system fetches relevant data. 4. Report is generated and available for download. |
| **Postconditions:**   * Reports are generated and stored for reference. |

### 6. Context Level

A diagram of a library management system

AI-generated content may be incorrect.

#### 6.1 Level 0 DFD

A diagram of a software system

AI-generated content may be incorrect.

### 7. Task list

A screenshot of a computer

AI-generated content may be incorrect.A screenshot of a computer

AI-generated content may be incorrect.

### 8. Critical Path:

A screenshot of a computer

AI-generated content may be incorrect.A screenshot of a computer

AI-generated content may be incorrect.

### 9.0 ERD

A diagram of a diagram

AI-generated content may be incorrect.

### 10.0 Screen Designs

**Login Screen**

A screen shot of a computer screen

AI-generated content may be incorrect.

**Registration Screen**

A registration form in a library

AI-generated content may be incorrect.

**Book Browsing Screen**

A book catalog with a book shelf in the background

AI-generated content may be incorrect.

**Profile Screen**

A book flying in the air

AI-generated content may be incorrect.

**Admin Screen**

A screenshot of a library

AI-generated content may be incorrect.

**Add new Book**

A close-up of a book store

AI-generated content may be incorrect.

**Admin Approval for books screen**

A screenshot of a book request list

AI-generated content may be incorrect.

**Library Book Screen**

A screenshot of a library

AI-generated content may be incorrect.

**Conclusion:** The SmartLibrary Application is a practical and scalable solution to modernize Greenfield Public Library’s management processes. By automating key operations, the library can enhance user experience while reducing administrative overhead. The project is feasible in terms of technology, cost, and implementation timeline.