

KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION

**A Capstone Project Proposal
Presented to the Faculty of the
Information and Communications Technology Program
STI College Koronadal**

**In Partial Fulfilment
of the Requirements for the Degree
Bachelor of Science in Information Technology**

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May 3, 2025

ENDORSEMENT FORM FOR PROPOSAL DEFENSE

TITLE OF RESEARCH: **KORONADAL CITY LIBRARY:
MODERNIZING ACCESS AND PRESERVING
HISTORY THROUGH DIGITIZATION**

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for the degree Bachelor of Science in Information Technology
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INTRODUCTION

Project Context

In today's digital-driven environment, efficient archival management is crucial for organizations handling vast amounts of historical and administrative records. The public sector, particularly libraries and government offices, faces the challenge of modernizing record-keeping processes to enhance operational efficiency and service delivery. While physical print publications remain widely available, they pose significant challenges in terms of storage and retrieval, especially for individuals, academic institutions, and non-academic organizations. The most effective way to manage these materials is through archives, which are created, received, used, and preserved by individuals, families, organizations, and government entities as part of their daily activities, serving as authentic records of events and operations. However, as the volume of documents archived continues to grow, the limitations of traditional paper-based systems become more evident.

Archives refer not only to the documents themselves but also to the institutions responsible for maintaining them and the physical repositories where they are housed. As modern institutions grapple with increasing volumes of records, structured and automated solutions are necessary to store, track, retrieve, and preserve essential documents for long-term accessibility. By embracing digital solutions, organizations can overcome the inefficiencies of manual record-keeping, ensuring that critical documents remain organized, secure, and readily available when needed.

The Koronadal City Public Library marks its role as the central hub for knowledge, historical records, and public information. It plays a crucial role in supporting government offices, students, and researchers by providing access to educational materials, official documents, and archived city records. As a resource center for local government offices, the City Library stores past ordinances, census data, and economic reports that aid decision-making in various departments. It also serves as an information hub for the community, research materials, and digital resources for students and professionals. The library is located at the Old City Hall Building, Gensan Drive corner Morales Avenue (Roundball), Poblacion Zone II, Koronadal City, Philippines, and operates Monday to Friday, from 8:00

AM to 5:00 PM. It is staffed by three registered librarians and one administrator, who are responsible for archiving, managing document requests, and maintaining records for multiple government offices.

The library stores a wide range of government and public documents, categorized into three storage sections: the Historical Archives Sections, Government Records Sections, and Public Resource Sections. The library maintains 1,000 archived files along with a collection of books. Each section stores files, some dating back several years, and Retrieval time for both documents and books depends on their age, condition, and storage location.

The Historical Archives Sections contain old city ordinances, land ownership documents, old books, and past census records. Many of these records date back to ten (10) years and are stored in aging cabinets with faded labels. Some documents have become fragile due to paper deterioration and exposure to humidity, requiring careful handling during retrieval.

The Government Records Section stores both recent and older documents such as financial reports, business permits, tax declarations, urban development plans, and infrastructure blueprints. These records are regularly used by various city departments to support their daily operations—for example, during audits to verify financial accuracy, to ensure compliance with local laws and regulations, and to guide decision-making in planning new projects and developments within the city. Since these records are used more often than historical archives, they are generally easier to locate.

The Public Resource Room contains newspapers, research studies, educational materials, books, statistical reports, and non-classified government documents that are open for public access. These government documents are not confidential and may include public reports, ordinances, budget summaries, development plans, and other materials that provide information on government programs and services. Students, researchers, and local officials frequently use these resources for academic studies, project proposals, and research related to governance and public policy.

The Koronadal City Library also carries out the process of storing and archiving books. The library follows a structured procedure to ensure proper documentation, preservation, and controlled access to these materials. Priority is given to old books, especially those with historical significance or research value, for archiving purposes.

Before archiving, each book undergoes inspection by the librarian to assess its condition, relevance, and usability. Selected books are cataloged with important details such as title, author, publication year, edition, condition, and assigned storage location. Preservation measures are then applied, including cleaning, repairing damaged pages, reinforcing bindings, and storing fragile books in acid-free folders or climate-controlled storage areas to maintain their quality over time.

Once properly preserved, the archived books are classified and stored in their location, organized based on their category—such as historical archives, research materials, or restricted collections. The details of archived books are recorded in logbooks for tracking and inventory purposes.

The next process is archiving submitted documents, Government offices submit documents to the Koronadal City Library for archival storage. Each submission typically includes a formal transmittal request indicating the department name, document type, date range, and purpose of storage associated with the records. Documents may arrive in batches, often tied to quarterly audits, legal compliance requirements, or historical recordkeeping needs.

For example, The City Assessor's Office of Koronadal City regularly submits tax declaration records for archival storage at the Koronadal City Library to comply with government retention policies. On March 15, 2025, the office prepared a formal transmittal letter addressed to the library's records section, requesting storage of tax declaration records from January 1, 2019, to December 31, 2019. The letter includes essential details such as the department name, document type, date range, purpose of storage, confidentiality level, and the total number of records being submitted. These records, totaling 50 tax declarations, are organized into 20 labeled folders and securely packed in archive boxes.

Upon arrival at the Koronadal City Library, a designated librarian verifies the submission by checking the document count, classification, and completeness against the transmittal letter. After confirming accuracy, the officer signs an acknowledgment receipt, officially accepting the documents into the archive. Since tax declarations are classified as legal and financial records, they are stored in a restricted-access government file section within storage cabinets, ensuring confidentiality and compliance with data protection protocols. Each document is assigned a unique reference code for systematic filing and easier retrieval.

Upon receiving a submission, the assigned librarian or records officer cross-checks the documents against the provided transmittal list to ensure completeness and accuracy. This process involves verifying that all listed files are present, correctly labeled, and match the details in the submission letter. If there are missing pages, discrepancies, or unauthorized submissions, the department is immediately contacted for clarification or correction. For confidential documents, an extra layer of verification is required, ensuring that only designated officials authorize their submission before acceptance. This strict validation process helps maintain the integrity, security, and reliability of archived records, preventing errors, misfiling, or unauthorized access.

After verification, documents are appraised based on their significance, retention period, frequency of access, and storage priority. Fragile historical records receive special handling, while frequently accessed files are stored for easy retrieval. Documents are then classified into three sections: Historical Archives (old government files, land records, ordinances, census data), Government Records (business permits, tax records, urban planning blueprints, financial reports), and Public Resources (research materials, statistical reports, publicly available government documents).

Once classified, document details are recorded in logbooks and index cards, noting the document title, department of origin, submission year, reference code, and storage location. Since the system is entirely paper-based, tracking relies on handwritten records before storage, preservation procedures are applied, such as removing staples to prevent rust damage, reinforcing fragile papers with acid-free folders, and storing maps and blueprints properly to prevent creasing. Documents are stored based on accessibility needs, frequently

accessed files are placed in easily reachable cabinets, older records are moved to back storage rooms, and sensitive files like legal records are locked in restricted-access cabinets.

Once stored, documents are logged into a logbook list for traceability. Access to these records requires a formal request, and the librarian verifies authorization levels before granting retrieval, which may take from a few hours to several weeks depending on the document's age and location.

The Koronadal City Library receives fifty (50) to one hundred (100) document requests per week and two hundred (200) to four hundred (400) requests per month. The number of books borrowed per week is thirty (30) books, while in a month it is 120 books. Researchers typically request both documents and books that offer in-depth insight into the city's development. Commonly requested materials from the Public Resource Section include census data, economic reports, and other non-confidential materials that are accessible to the public. In addition, they often seek academic journals, research papers, theses, and other archived publications that support their studies and research projects. Books, including history books, educational textbooks, and other academic materials, are also frequently requested. These books, whether related to local history, urban development, or specific academic subjects, are accessed by researchers to assist in completing research assignments, and academic projects. Meanwhile, the government agencies include the City Health Office, Business Permit and Licensing Office, Civil Registrar's Office, and City Treasurer's Office, among others. Commonly requested documents include business permit records, land and property assessments, civil registry documents such as birth and marriage certificates, tax records, city blueprints, and legal resolutions from the Sangguniang Panlungsod Office.

In a month, thirteen (13) government offices submit requests to the Koronadal City Library for archived documents. The City Health Office requests past health reports, vaccination records, and health inspection certificates for medical research and disease tracking, while the City Assessor's Office retrieves property assessment records and land valuation documents, property tax histories, and land title assessments for tax assessments and real estate transactions. The Business Permit and Licensing Office requests business registration documents, tax clearance certificates, and compliance records to process

business permits, whereas the City Franchising Office retrieves vehicle registration histories, traffic violation records, and plate number logs for legal verification and ownership disputes.

The City Engineer's Office requests old building plans, infrastructure project documents, and construction permits, while the City Planning and Development Office requests urban development plans, zoning ordinances, and land use maps. The Civil Registrar's Office retrieves birth certificate records, marriage certificate records, and death records for verification purposes, while the City Treasurer's Office requests financial reports, tax collection records, and revenue statements. The City Legal Office requests legal documents, ordinances, and case records for legal proceedings, whereas the City Veterinary Office requests records on animal control, livestock permits, and disease monitoring. The City Social Welfare and Development Office retrieves past social assistance records, demographic reports, and program beneficiary lists, while the Human Resource Management Office accesses employee records, payroll archives, and personnel service reports. Lastly, the Sangguniang Panglungsod Office requests legislative records, resolutions, and ordinances for policymaking and review.

Additionally, The Koronadal City Public Library serves as the central repository for government records, historical documents, and public resources. With only three registered librarians and one administrator managing a collection of one thousand (1,000) archived documents, the staff must handle requests from thirteen (13) government offices while also assisting students and researchers. Each office submits document requests per month. The volume of requests can reach up to four hundred (400) per month, significantly straining the library's workforce. causing restriction in document access also, library staff rely on handwritten logs.

The researchers of Koronadal City library is required to register for library membership by submitting a valid government-issued ID or proof of residence (e.g., utility bill). Students must provide a current school ID or enrollment certificate, while minors must be accompanied by a parent or guardian with a valid ID. Upon successful registration, a Borrower's Card is issued, which is required for all borrowing transactions.

Once registered, researchers can borrow up to three books at a time. The borrowing period for general circulation books is seven days. Researchers are allowed to renew their books once, extending the borrowing period by an additional seven days. However, the renewal must be requested before the due date, and items that are on hold for another library user cannot be renewed.

Certain materials, such as reference materials, are for in-library use only and cannot be borrowed. Local History materials may have restricted borrowing policies, and library users should consult the library staff for more information. Public resources have varying borrowing policies, so library users are encouraged to inquire at the circulation desk for details.

Books must be returned on or before the due date to avoid penalties. An overdue fine of ₱5.00 per day per book will be charged for late returns. Any accumulated fines must be settled before borrowing additional materials. If an item is lost or damaged, researchers must report it immediately to library staff. The library user may be required to replace the item or pay its assessed value.

In addition to borrowing, when a researcher visits the library to borrow a book, they are required to fill out a Borrower's Form provided by the library staff. This form captures the borrower's full name, contact information, date of request, and specific details of the book being borrowed, such as title, author, and edition. The researcher must also indicate the purpose for borrowing the book, such as academic research, personal use, or professional reference.

After completing the Borrower's Form, the library staff checks the catalog and logbook to verify the availability of the requested book. If the book is not part of a restricted or fragile collection, the librarian approves the request and records the borrowing transaction in the Borrowing Logbook, noting the borrower's name, book title, date borrowed, and expected return date. The book is then handed to the borrower, with a reminder of the return policy.

Upon return, the librarian checks the book's condition, updates the logbook to reflect the return, and re-shelves the book in its proper storage location. If necessary, basic

preservation procedures, such as cleaning or minor repairs, are performed before the book is returned to circulation.

In terms of requesting a document, Librarians must follow a step-by-step process when fulfilling requests for documents. When a requester visits the library to request a document, they are required to fill out a Request Form provided by the library staff. This form captures the requester's full name, affiliation or department, contact information, date of request, and specific details of the document being requested, such as title, reference number, and classification. The requester must also indicate the purpose of the request, such as for research, legal reference, verification, or other official use.

Once the form is completed, the library staff logs the request in the library's handwritten logbook and index cards, which serve as the primary tracking tools for document requests. The staff consults the index cards and logs to identify the last known storage location of the file, then searches through the appropriate filing cabinets, labeled folders, or storage boxes. The time required for retrieval varies depending on the document's frequency of use, storage location, and accessibility; frequently used records are typically retrieved on a daily or weekly basis.

For government agencies, however, the requesting process follows a stricter protocol. Unlike individual researchers or students, government offices must submit an official request letter signed by an authorized representative. This letter must include the agency's letterhead, the specific purpose of the request, and any relevant supporting documents. In some cases, additional verification, such as a memorandum of agreement or an endorsement from a supervising office, may be required.

The library staff must then review the request for authenticity before proceeding with the retrieval process. Upon retrieval, the document is provided to the requester for the borrowing of the physical document. This added layer of formal verification ensures that sensitive government records are accessed only by authorized personnel, contributing to a more secure and regulated archival system.

The librarian sorts through filing cabinets and logbooks, checking for relevant files. Once a document is located, it is provided to the requester for borrowing the physical document. However, certain documents, typically non-sensitive records and frequently referenced materials are available for borrowing. These materials include items such as public ordinances, budget summaries, development plans, statistical reports, educational resources, archived newspapers, and research studies. Because they do not contain confidential or sensitive information, these resources are openly accessible and commonly used by students, researchers, and local officials for academic work, project proposals, and policy-related research.

The library staff records the document's removal from storage in a separate logbook, noting the requester's information, removal date, and expected return date. After the requester finishes examining or using the physical document, it must be returned to the librarian. The librarian then updates the logbook to indicate the document has been returned and re-files it in its proper storage location. This return process also requires updating the logbook to indicate the document has been returned to the archives.

Since these departments request a large volume of records, staff physically search through filing cabinets, labeled folders, and storage boxes to locate the requested document. This search process varies considerably in duration depending on the document's age, storage location, and filing condition. For documents in the Historical Archives Room, retrieval can take up to three weeks due to faded labels, fragile document conditions, and occasional misfiling over the years. Documents stored in the Government Records Room typically require three (3) to five (5) days for retrieval, while materials in the Public Resource Room, though more accessible, still demand substantial manual searching due to the paper-based cataloging system.

The current reporting and record-keeping processes at Koronadal City Library have resulted in several issues that affected overall operations:

- 1. Slow Document and Book Retrieval:** The library relies on logbooks, index cards, and searching through storage areas to locate requested materials. This process is inefficient, leading to long retrieval times and occasional misplacement of items.

2. **Inconsistent Tracking and Logging:** The borrower's information and the details of the document or book are recorded manually in logbooks and index cards. This approach makes it difficult to track borrowed items, leading to inconsistent logs, lost materials, and missing records. The manual recording process also increases the likelihood of errors and delays in locating specific items.
3. **Storage and Filing Issues:** When books or documents are returned, library staff manually place them in storage, but inconsistent filing methods lead to misplacement. Some materials, especially fragile books, require special handling, which is not always guaranteed. The search and re-filing process take time and often results in misfiled materials, increasing the chances of items being unavailable when requested.
4. **Risk of Paper Deterioration:** All records, whether books or documents, are kept in paper form and handled repeatedly. The frequent handling, combined with the condition of aging of some materials, increases the risk of deterioration. Fragile documents and old books are particularly vulnerable, and without proper handling and preservation mechanisms, their condition may worsen with each retrieval or return.
5. **Inefficient Report Generation:** Monthly reports on document usage, retrieval trends, and borrower activity are manually compiled from multiple logbooks. This process is error-prone, time-consuming, and inefficient. The manual nature of this process makes it difficult to generate detailed access statistics, which hinders the library's ability to make informed decisions about resource allocation, maintenance, and improvements.

To address these challenges, this study proposes a **KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION** to digitize record and book storage, streamline retrieval, and automate request management. By implementing digital cataloging and indexing, librarians can quickly locate both files and books, reducing retrieval times from weeks to minutes. The system will also enable real-time request monitoring to prevent backlogs and ensure fair prioritization of document and book requests. Additionally, it will introduce preservation

protocols for deteriorating records and books, securing historical documents and books in digital format. By replacing handwritten logs with automated tracking, the library can enhance workflow efficiency, maintain accurate records, and improve security. This system will help the Koronadal City Library eliminate inefficiencies, ensure faster document and book retrieval, and provide reliable information services to government offices and researchers.

Purpose and Description

This study proposes a **KORONADAL CIY LIBRARY: MODERNIZING ACCESSS AND PRESERVING HISTORY THROUGH DIGITIZATION** to enhance the storage, retrieval, and management of both government records and books in the Koronadal City Library. The proposed system will digitize documents and books, streamline retrieval processes, automate request tracking, and implement preservation protocols for historical materials. By introducing a centralized digital system, this project aims to improve accessibility, security, and efficiency in managing and handling archived records and books, making them more accessible to library patrons and government offices.

The following are the functions of the proposed system:

1. **The system will store and catalog records**, such as city ordinances, land titles, legal case files, census data, financial reports, books, educational textbooks, and other materials, eliminating reliance on logbooks and index cards for tracking. This will improve the organization of materials and make them more accessible.
2. **The system will allow government offices to request documents online**, eliminating manual request forms and enabling real-time status tracking, preventing lost or unaccounted-for requests for both types of materials.
3. **The system will provide a searchable digital index with metadata** such as book title, document title, category, department, date, and author for books, allowing users to quickly locate materials and significantly reducing retrieval times from weeks to minutes.

4. **The system will include role-based access control (RBAC)**, ensuring that sensitive documents and restricted books are only accessible to authorized personnel, reducing unauthorized handling and misplacements of both documents and books.
5. **The system will generate automated notifications for documents request**, including pending requests, preventing backlogs and ensuring proper tracking of requested materials without relying on handwritten logs.
6. **The system will generate automated notifications for book borrowings, including due date reminders and overdue alerts**, to prevent backlogs and ensure proper tracking of borrowed materials without relying on handwritten logs.
7. **The system will utilize a document scanner and integrate scanning using Optical Character Recognition (OCR)** to convert old physical documents into digital formats, making them searchable and readable, reducing the need for excessive handling of fragile records and books.
8. **The system will store files and books with automatic backups**, preventing loss due to physical deterioration, misplacement, or damage, ensuring that both types of materials are safely preserved for future access.
9. **The system will automate tracking of document and book status**, ensuring that returned materials are assigned to their correct storage locations in a structured digital system, reducing misplacement errors for both books and documents.
10. **The system allows registered borrowers to borrow** available books. It verifies borrower eligibility, checks the availability of the requested book, and updates the inventory accordingly. Upon successful borrowing, the system records the transaction details, including the borrow date and due date, and displays a confirmation message with relevant borrowing information.
11. **The system will automate monthly and annual reports**, reducing human errors in statistical calculations and improving efficiency in tracking document and book

borrowing, overdue items, pending requests, loss or damage incidents, and frequently accessed records.

- a. **Book Borrowing Report-** Summarizes borrowing trends, overdue cases, and popular books to support circulation and inventory decisions.
- b. **Document Retrieval Report-** Analyzes document request patterns by department and type, identifying access delays and high-demand materials.
- c. **Preservation Report-** Provides updates on the physical condition and digitization status of archival materials to guide preservation efforts.
- d. **Book Inventory Report-** Monitors real-time book availability, missing items, and condition for maintenance and audit tracking.
- e. **Pending Return and Overdue Summary-** Lists overdue or unreturned books with user details and fine status to support follow-up and enforcement.
- f. **Loss and Damage Accountability Report-** Tracks lost or damaged books, responsible users, and resolution outcomes for accountability and preservation monitoring.
- g. **Number of Request Report –** Identifies delayed or backlogged document requests.
- h. **Pending Request Summary-** Highlights unresolved or delayed requests needing follow upSystem

The proponents of the system have identified the beneficiaries that will yield the significance of the proposed study:

1. **Koronadal City Library Staff** – The system will reduce manual workload, allowing librarians to focus on archive organization, document preservation, and managing borrowing transactions instead of time-consuming searches. It will also

minimize errors, misfiling, and missing records, improving the overall efficiency of library operations.

2. **Government Offices** – The system will provide faster access to necessary records, ensuring that government offices can retrieve documents without long waiting times, improving administrative efficiency.
3. **Researchers and Students** – The system will provide easier access to non-confidential documents, such as historical reports, census data, and educational materials, helping researchers complete studies without delays caused by manual retrieval. Additionally, it will allow researchers to borrow permitted materials digitally or physically through a streamlined process, enhancing their research experience.
4. **City Officials** – By improving the efficiency of government record retrieval, the system will support better decision-making in urban planning, financial management, and policy development.
5. **Future Researchers** – This project can serve as a foundation for future studies on digital archiving, government record management, and document preservation technologies, providing insights into the impact of automation in public sector record-keeping

Objectives

The main objective of this study is to develop a **KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION**, focused on the digitization, requesting, borrowing, and retrieval of archived government records.

This project aims to design and implement these following objectives:

Backend Modules:

1. The following back-end modules are developed for the administrator:

1. **Admin Login and Authentication Module** - allow administrators full access to system settings, user management, and overall system monitoring. Through RBAC, MFA, and strict password policies, this module ensures that admins can perform high-level tasks securely and that unauthorized access is prevented by the account lockout mechanism.
2. **User Management Module** - Manages user account creation, role assignments (e.g., librarian, researcher, government staff), and access permissions. Ensures secure authentication and authorization processes, maintaining data integrity and compliance with organizational policies.
3. **System Configuration Module**- Handles system-wide settings, including document classification rules, request prioritization protocols, backup schedules, access control parameters, and notification preferences. Ensures that configurations align with organizational policies and operational requirements.
4. **Audit and Activity Logs Module** - Records all system events related to documents and books, such as access, uploads, borrows, and deletions. Maintains comprehensive logs for accountability, security, and integrity tracking within the system.
5. **Reports Generation Module**- Compiles data for automated report generation, providing insights into archival usage, borrowing trends, request backlogs, and

preservation efforts. Supports data-driven decision-making for library operations and planning.

- A. System Usage Report- The back-end logs user activity such as logins, module access, and session times, then summarizes this data by user role and time period to monitor usage trends and system performance.
 - B. Book Borrowing Report- It compiles borrowing records to analyze borrowing frequency, overdue cases, and popular titles, providing structured data for circulation insights.
 - C. Document Retrieval Report- The system processes document request logs by department, type, and duration to identify delays and frequently accessed documents.
 - D. Preservation Report- It pulls data from condition logs and digitization trackers to report on material preservation status and digital conversion progress.
 - E. Book Inventory Report- The system updates and summarizes book status in real time, tracking availability, damages, missing, and unreturned items for audits and maintenance.
 - F. Pending Return and Overdue Summary- It monitors due dates in the borrowing database, identifying overdue or unreturned books along with user and fine details.
 - G. Loss and Damage Accountability Report- Logs reports of lost or damaged books, linking them to users and resolution outcomes such as replacements or payments.
 - H. Number of Request Report- Analyzes request queues to detect delayed or backlogged document and book requests, helping streamline processing.
 - I. Pending Request Summary- Scans unresolved request records, flagging those needing staff attention due to inactivity or missed follow-ups.
6. **Request Tracking Module** - Monitors the full lifecycle of document and book requests. Manages real-time queues of submissions, including pending, approved, and completed statuses. Facilitates reassignment, prioritization, and follow-up actions to ensure timely processing and efficient task distribution.

7. **Digital Archiving and Catalogue Module** - Manages the uploading, categorization, and metadata tagging of scanned documents and book records. Supports bulk archiving operations and ensures entries are classified into appropriate archival sections. Integrates with OCR for searchability and automatically flags sensitive materials for access restriction based on classification.
8. **Dashboard Module** - Aggregates system performance and operational metrics, displaying key data such as request volume, user activity, backup status, and system uptime. Provides interactive widgets for role-specific customization, aiding in oversight and timely decision-making.
9. **Automated Notification System** -responsible for sending system-related alerts via email, SMS, and in-app notifications. Admins receive notifications regarding user activity, system updates, and security warnings. The system automatically notifies them about administrative actions such as user role changes, request approvals, or updates on overdue or pending requests. These alerts ensure that admins stay informed about critical system events and can act on them in a timely manner.

2.The following back-end modules are developed for the librarian:

1. **Librarian Login and Authentication Module** - ensure that librarians can securely access the system and manage library resources. This is achieved through the use of unique credentials, Role-Based Access Control (RBAC), and Multi-Factor Authentication (MFA). The module's primary goal is to protect sensitive actions and maintain security through password policies and account lockout features.
2. **Request Tracking Module**- Enables monitoring and management of document and book requests. Provides a real-time overview of request statuses—pending, approved, or completed—allowing for efficient task prioritization and resolution.
3. **Digital Archiving and Catalogue Module** - Supports uploading, categorization, and metadata tagging of scanned documents and book records. Ensures accurate classification into appropriate archival sections, aligning with the librarian's responsibility for organizing and maintaining the digital archive.
4. **Re-filing and Tracking Module** - Manages the re-filing process of returned physical documents and books. Tracks the movement of materials, ensuring they are returned

to their correct locations, maintaining an accurate inventory and facilitating efficient retrieval.

5. **Reports Generation Module** - Generates comprehensive reports on library operations, including borrowing trends, document access logs, overdue summaries, and preservation updates. Provides insights into user engagement and resource utilization, supporting informed decision-making and strategic planning.
6. **User Management Module (Limited Access)** - Allows for the management of user accounts, including creation, modification, and deactivation of profiles. Facilitates role and permission assignments, ensuring users have appropriate access to library resources and services within defined parameters.
7. **Dashboard Module** - Offers a visual representation of key library metrics, such as active user counts, request volumes, system uptime, and resource utilization. Provides real-time data, enabling quick assessments of library performance and facilitating proactive management.
8. **Overdue Tracking and Notification Module**- The system tracks overdue books by comparing the current date with the return date, automatically sending notifications to researchers via email or SMS when their books are approaching the due date or have become overdue. These notifications include details about any fines due. Researchers are prevented from making new borrowing requests until all overdue items are returned, and fines are settled.
9. **Automated Notification System** - Responsible for sending alerts via email, SMS, and in-app notifications related to document and book management. Librarians receive automatic notifications for new document or book requests that require processing, as well as reminders for overdue returns and upcoming due dates. The system ensures that librarians can take timely action on pending requests and overdue materials, improving the efficiency of library operations and maintaining proper record circulation.

3.The following Back-end modules are developed for government agencies:

1. **Government Staff Login and Authentication Module**- allow government personnel to securely access specific documents and records within the system. The

module uses RBAC to restrict access to relevant documents, while MFA ensures that sensitive government records are only accessible by authorized personnel. The password policies and account lockouts ensure security and prevent unauthorized access.

2. **Online Document Request Module-** The back-end module validates each request, checks completeness, and enforces access control policies based on the classification of requested materials. It logs all request data with timestamps and metadata, storing them in a secure, searchable database. The system applies role-based limits (e.g., 10 requests per day for government users) and triggers internal notifications for sensitive or high-priority requests requiring manual review. It integrates with the document archive to confirm item availability and maintains a request queue with automated status updates (e.g., pending, approved, completed). All requests are auditable to ensure accountability and policy compliance.
3. **Search and Retrieval Module** - Handles search queries using metadata filters and OCR-based full-text search. Tailors' results to user access levels and manage options to preview or request restricted items.
4. **Document Tracking Module** - Monitors the status of document requests in real-time. Updates statuses (e.g., pending, approved, completed) and ensures users can view their own requests without making changes, maintaining transparency and efficient task management.
5. **Automated Notification System-** Responsible to send notifications regarding the status of their document requests. Government staff are alerted via email, SMS, and in-app notifications when their requests are approved, pending, or require action. The system also notifies them of due dates for borrowed materials and provides alerts for any system updates related to the access of government records. These notifications ensure that government personnel can track their requests and respond promptly to any actions required.

4.The following Back-end modules are developed for researchers:

2. **Researcher Login and Authentication Module-** provide secure access for researchers to request academic and public documents. Through RBAC, researchers

are restricted to non-confidential materials, while MFA ensures secure access to sensitive documents. The module also enforces password policies and account lockouts to protect researcher accounts.

3. **Book Borrowing and Renewal Module-** Researchers log into their accounts and fill out a borrowing request form, entering the book title, author, edition, and purpose of borrowing. The system checks whether the book is available or restricted (e.g., for reference-only use). If the book is available, the request is processed, and the borrower's details are logged, including the due date for the return. The researcher is notified if the book is available or restricted. If the researcher wishes to renew the book, the system checks if the book is eligible for renewal, and the request is processed accordingly.
4. **Book Return and Fine Management Module-** Researchers can view the list of borrowed items along with their respective due dates and outstanding fines (if any). Upon returning a book to the library, the librarian or staff member is responsible for updating the system to confirm the return. The system then automatically updates the status of the returned item and, if applicable, calculates the corresponding fines for overdue materials. Researchers are notified of any outstanding balance, which must be settled before they can borrow additional items or make new requests. The module also provides a summary of return policies and fine guidelines to ensure compliance.
5. **Lost Books Management Module-** Researchers can report lost books by filling out a "Report Lost Book" form, which includes the book title, author, borrowing date, and a brief explanation of how the book was lost. The system marks the item as "lost" in the researcher's borrowing history and informs the researcher of their responsibilities regarding the book's replacement or payment. The system generates a report about the lost book, and the researcher is provided with the relevant financial details for reimbursement according to library policy.
6. **Automated Notification System-** ensures they are kept up-to-date on their document or book requests. Researchers receive automatic alerts via email, SMS, and in-app notifications about the status of their requests, including approvals, due dates, overdue returns, and system announcements. The system sends reminders of

when borrowed materials are due or overdue, helping researchers stay on top of their borrowing activities and ensuring smooth access to requested resources.

Frontend Modules:

The following front-end modules are developed for the administrator:

1. **User Management Module** - This component allows administrators to manage user accounts, assign system roles (e.g., librarian, researcher, government staff), and control access to restricted materials. It handles role definitions and permissions in the backend.
2. **System Configuration Module** - This module provides the capability to customize and optimize system operations. It allows for the adjustment of settings such as document classification rules, request prioritization protocols, backup schedules, access control parameters, and notification preferences. By enabling these configurations, the module ensures that the system aligns with organizational policies and operational requirements.
3. **Audit and Activity Logs Module** - This backend module logs all system events related to documents and books—such as access, uploads, borrows, and deletions—to maintain accountability, security, and integrity tracking within the system.
4. **Reports Generation Module** - This module generates automated reports that provide insights into archival usage, borrowing trends, request backlogs, and preservation efforts. It enables data-driven decision-making for library operations and planning.
 - A. **System Usage Report** - Summarizes login frequency, module usage, and peak activity hours across user roles. Useful for evaluating system performance and identifying user behavior trends.
 - B. **Book Borrowing Report** - Summarizes borrowing trends, overdue cases, and popular books to support circulation and inventory decisions.
 - C. **Document Retrieval Report** - Analyzes document request patterns by department and type, identifying access delays and high-demand materials.

- D. **Preservation Report-** Provides updates on the physical condition and digitization status of archival materials to guide preservation efforts.
 - E. **Book Inventory Report-** Monitors real-time book availability, missing items, and condition for maintenance and audit tracking.
 - F. **Pending Return and Overdue Summary-** Lists overdue or unreturned books with user details and fine status to support follow-up and enforcement.
 - G. **Loss and Damage Accountability Report-** Tracks lost or damaged books, responsible users, and resolution outcomes for accountability and preservation monitoring.
 - H. **Number of Request Report** – Identifies delayed or backlogged document requests.
 - I. **Pending Request Summary-** Highlights unresolved or delayed requests needing follow up
5. **Request Tracking Module** - module monitors the full lifecycle of document and book requests. It provides a real-time queue of all submissions, including pending, approved, and completed statuses. Requests can be reassigned, prioritized, or flagged for follow-up, ensuring timely processing and efficient task distribution across the system.
6. **Digital Archiving and Catalogue Module** - This module handles the uploading, categorization, and metadata tagging of scanned documents and book records. It supports bulk archiving operations and ensures that all entries are classified into appropriate archival sections. Integration with OCR enables searchability, while sensitive materials are automatically flagged for access restriction based on classification. Document conditions, digitization progress, and metadata completeness. Assists in prioritizing preservation and restoration efforts.
7. **Dashboard Module** - The dashboard provides a comprehensive view of system performance and operational metrics. It displays key data such as request volume, user activity, backup status, and system uptime. Interactive widgets allow customization based on role-specific needs, helping streamline oversight and support timely decision-making.

2.The following front-end modules are developed for the librarian:

1. **Request Tracking Module** - This module enables monitoring and management of documents and books. It provides a real-time overview of request statuses—pending, approved, or completed—allowing for efficient task prioritization and resolution. This aligns with the librarian's role in overseeing user requests and ensuring timely processing.
2. **Digital Archiving and Catalogue Module** - This module supports uploading, categorization, and metadata tagging of scanned documents and book records. It ensures that all entries are accurately classified into appropriate archival sections. This corresponds with the librarian's responsibility for organizing and maintaining the digital archive.
3. **Re-filling and Tracking Module** - This module manages the re-filing process of returned physical documents and books. It tracks the movement of materials, ensuring they are returned to their correct locations. This reflects the librarian's duty to maintain an accurate inventory and facilitate efficient retrieval.
4. **Reports Generation Module** - This module generates comprehensive reports on library operations, including borrowing trends, document access logs, overdue summaries, and preservation updates. These reports provide insights into user engagement and resource utilization, supporting the librarian's role in informed decision-making and strategic planning.
5. **User Management Module (Limited Access)** - This module allows for the management of user accounts, including the creation, modification, and deactivation of profiles. It provides the ability to assign roles and permissions, ensuring users have appropriate access to library resources and services. This aligns with the librarian's responsibility for overseeing user access within defined parameters.
6. **Dashboard Module** - This module offers a visual representation of key library metrics, such as active user counts, request volumes, system uptime, and resource utilization. The dashboard provides real-time data, enabling quick assessments of library performance and facilitating proactive management, which is a key aspect of the librarian's role.

7. Overdue Tracking and Notification Module - The system tracks overdue books by comparing the current date with the return date, allowing the librarian to view overdue items in real-time. The librarian can send notifications to researchers via email or SMS when their books are approaching the due date or have become overdue. These notifications will include details of any fines due. The librarian can block new borrowing requests for researchers who have overdue items until those items are returned and any fines are paid.

3. The following front-end modules are developed for government agencies:

1. **Online Document Request Module** - This module enables government agency users to submit requests for physical or digital documents directly through the platform. Users will fill out an online request form, including essential details such as document title, classification, author/department, date, and the specific purpose of use (e.g., legal review, administrative task). The system allows users to attach supporting documents or letters, particularly when requesting sensitive or confidential records. Each request is assigned a unique tracking ID to monitor its status in real time. The system also offers search filters to help users find the right document quickly. For urgent requests, government users may be required to provide justification for priority handling.
2. **Search and Retrieval Module** - Allows government agencies to Search and Retrieval Module that allows users to find documents using metadata filters and OCR-based full-text search, with results tailored to their access level and options to preview or request restricted items.
3. **Document Tracking Module** – This module allows users to view and track the status of their document requests in real-time. They can see the status of their requests (e.g., pending, approved, completed). However, users can only view their own requests and cannot make any changes to their status. This system ensures transparency, providing users with clear updates on the progress of their requests while maintaining efficient task management across the system.
4. **Manage Accessible and Book Collection Module** - This module allows users to browse and access a carefully selected repository of publicly available documents

and books. Users can search by title, department, category, or date, and directly download materials without the need for additional approvals. The system ensures that only non-restricted, approved materials are available, maintaining compliance with access policies.

4. The following front-end modules are developed for researchers:

1. **Book Borrowing and Renewal Module** - Researchers log into their account to access a borrowing request form where they input the book title, author, edition, and the purpose of borrowing (e.g., academic research, professional use). The system informs the researcher if the book is available or restricted (e.g., reference-only). A renewal option is available for eligible books, provided the request is made before the due date and no other researcher has placed a hold on the item.
2. **Book Return and Fine Management Module** - Researchers can view their borrowed items and mark a return once they bring the book to the library. The system displays due dates, outstanding fines (if any), and provides a summary of return instructions. If fines are applicable due to late returns, the system calculates and displays the amount due before new transactions can proceed.
3. **Lost Books Management Module** - Researchers can report lost books directly through the system by accessing a designated “Report Lost Book” form. This form captures essential details such as the book title, author, borrowing date, and a short explanation of the incident. Once submitted, the system flags the item as “lost” under the researcher's borrowing history. The researcher is also shown a notice regarding possible replacement or payment responsibilities based on the library's policy.

5. To evaluate the system based on the following requirements:

- A. Functional – Evaluate whether the system performs the required functions effectively to support the management of digital records. It should allow users to upload, categorize, search, view, and download documents without issues. The system must function accurately for various user roles, such as Admin,

Librarian, Researchers, and Government Agencies. Each role should have access to specific features based on their responsibilities—for instance, allowing Admins to manage user accounts and system settings, Records Officers to handle document uploads and metadata assignment, and Staff to retrieve needed files.

- B. Operational - The system should be easy to use for both technical and non-technical users. The interface needs to be intuitive and logically organized, allowing users to navigate through the system with minimal effort. Accessing different modules such as the Dashboard, Document Library, and Metadata Editing sections should be straightforward. Tasks such as uploading documents, assigning metadata, filtering records, and locating files must be executable without the need for extensive training. Users should be able to complete their work efficiently, with little to no confusion or technical barriers.
- C. Performance – The system must demonstrate speed and efficiency, especially during key operations like searching for documents, uploading files, and generating reports. The response time for search queries should be minimal, ideally within a couple of seconds, even when the document repository grows significantly. Uploading documents along with their metadata should also be processed promptly to avoid bottlenecks. Moreover, the system should maintain high performance levels during peak usage, such as office hours, and should be capable of handling multiple concurrent users without experiencing lag or system crashes. Background processes such as auto-backup and system monitoring should not interfere with frontend user operations.
- D. Security - Security is a critical component of the system. It should implement robust user access controls, ensuring that each user only sees and interacts with data relevant to their role. All user activities must be tracked through audit logs. The system should support secure login procedures, including features such as two-factor authentication and automatic session timeouts. Furthermore, the system should comply with legal standards, particularly the Philippine Data Privacy Act, to ensure that all archived personal or confidential data is protected throughout the reservation, storage, and retrieval processes.

E. Cultural requirement - Cultural sensitivity and relevance must also be considered in the system's design. The system should accommodate document tagging or classification that aligns with the local context, such as using native languages or classifying records based on local governance structures like barangays or municipal departments. Additionally, fields should be adaptable to include culturally specific data types, such as ethnic affiliations or community-based documentation. The user interface should also consider the local language preferences of staff and provide options to ensure clear understanding. Feedback and help features should be designed in a culturally appropriate way, supporting ease of communication and system familiarity among diverse users.

Scope and Limitations

Scope

This study focuses on developing a KORONADAL CITY LIBRARY; MODERNZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION.

It was conducted from the second semester of the school year 2024–2025 until the first semester of 2025–2026.

The scope of the project is limited to the following processes:

Modules for Administrators

1. Admin Login and Authentication Module- provides administrators with unrestricted access to all functions of the system. Admins log in using unique credentials, and their access is governed by Role-Based Access Control (RBAC), granting them full control over system settings, user management, and overall monitoring of the system. Multi-Factor Authentication (MFA) is mandatory for admins to access critical system configurations, ensuring high security for sensitive tasks. Strict password policies and an account lockout mechanism after multiple failed login attempts are implemented to protect the system from unauthorized access and ensure that only authorized admins can manage the platform.
2. User Management Module - This module allows administrators to manage all user accounts for the system, including those handling documents and books. Admins can create, update, deactivate, or delete user profiles while assigning them roles such as librarian, researcher, government personnel, or administrator. The interface includes bulk user upload via CSV, password reset tools, and account status management. Administrators can also enforce access permissions, assuring, for example, that researchers only access non-restricted digital books and documents. All account-related activities are logged in the audit module for traceability.
1. **Audit and Activity Logs Module** - This centralized log viewer allows administrators to monitor all user actions across both the book and document

workflows. Activities such as login attempts, borrowing records, uploads, role changes, metadata edits, and request approvals are recorded here. Admins can filter logs by user, module, or date and export them for compliance or investigations. Any suspicious behavior—such as repeated unauthorized access attempts or mass file deletions—is automatically flagged and can trigger system alerts.

2. **Reports Generation Module** - The administrator dashboard includes tools to generate reports on document access, book borrowings, pending requests, system usage, and archive/book trends. Common reports include:

- a. System Usage Report: Total login, request activity
- b. Book Borrowing Report: Titles most borrowed, overdue rates.
- c. Document Retrieval Report: Top accessed ordinances or reports.
- d. Preservation Report: Digitization and condition status for both books and records
- e. Book Inventory Report: Real-time availability, missing items, condition status.
- f. Pending Return and Overdue Summary: Overdue books, user info, fine status.
- g. Loss and Damage Accountability Report: Lost/damaged books, responsible users, resolution details.
- h. Number of Request Report: Count of delayed or backlogged requests.
- i. Pending Request Summary: Unresolved requests, follow-up needed.

Reports can be generated monthly, quarterly, or on-demand in PDF, Excel, or CSV format to support administrative reviews and performance tracking.

3. **Request Tracking Module** - Administrators can monitor all document and book requests submitted by users, overseeing their flow from submission to approval or rejection. A live queue displays requests based on urgency or aging, and administrators can reassign tasks to librarians or intervene if requests are pending for too long. Duplicate or bulk requests are flagged for review. Each action taken is recorded in the audit logs, ensuring that document and book tracking remains fully transparent and organized.

4. **Digital Archiving and Cataloging Module** - This module enables administrators to manage bulk uploads of scanned documents and digital books. It supports file tagging by metadata such as document type, author, classification, department, date, and access level. Admins can add or edit categories (e.g., Legal Files, Public Ordinances, Reference Books), define whether a file is publicly accessible, and ensure it included in the OCR process for full text searchability. Sensitive files are automatically flagged and restricted from general access.
5. **Dashboard Module** - The administrator dashboard offers a high-level overview of real-time system performance across both book and document systems. It displays:
 - a. Active users by role
 - b. Total document and book requests
 - c. System uptime and backup status
 - d. Most borrowed books and most accessed records
 - e. Notifications for system alerts, overdue items, and pending approvalsThe dashboard is dynamic and customizable. Admins can prioritize widgets relevant to their operational role. Auto-refresh occurs every 5 minutes or can be triggered manually.
6. **Automated Notification System** - sends real-time alerts and reminders regarding user activity, system updates, and security issues. Admins receive notifications about important actions, such as request approvals, user role changes, overdue requests, and system issues. While admins may customize their notification preferences, critical alerts, like security issues or system failures, are mandatory to ensure timely intervention.

Modules for Librarians

1. **Librarian Login and Authentication Module**- The Librarian Login and Authentication Module is designed to ensure secure access for librarians managing the library's resources. Librarians log in using unique credentials, and their access is controlled through Role-Based Access Control (RBAC), which limits them to relevant library management tasks, such as cataloging books, processing returns, and managing borrower records. To further protect sensitive actions like modifying

book records, Multi-Factor Authentication (MFA) is required. Additionally, strong password policies are enforced to ensure that login credentials are secure, and account lockouts are triggered after multiple failed logins attempts to prevent unauthorized access to the system.

2. **Request Tracking Module** - This module allows librarians to view and manage all incoming requests for both government records and library books. Requests appear in a dynamic queue, showing details such as request type, urgency, requester identity, and status. Librarians can approve, decline, or forward requests, update progress (e.g., "In Process," "Ready for Pickup"), and monitor overdue or unfulfilled tasks. Reminders are triggered automatically if a request is left pending for too long. This unified view simplifies workload management, regardless of whether the user requested a tax document or a history book.
3. **Digital Archiving and Cataloging Module** - Librarians use this module to digitize, upload, and tag both scanned documents and books. During upload, files are tagged with required metadata such as title, category, department, author (for books), classification (e.g., historical, legal, reference), and access level. The system validates metadata completeness before saving entries. Librarians can also mark items as sensitive or fragile, flagging them for limited access or preservation. OCR integration ensures uploaded materials are indexed for full-text searching. This module enables easy digital organization of physical materials and expands public access to both types of content.
4. **Re-filing and Tracking Module** - Once physical books or documents are returned, librarians use this module to update the system with their return status and assign them back to their designated storage location (e.g., shelf, cabinet, archive box). A "Return Pending" list shows items that haven't been refiled, and visual indicators help staff locate the original storage category. All returns must be reconciled within 48 hours to maintain collection integrity. This reduces errors like misplacement and supports accurate inventory tracking.
5. **Reports Generation Module** - Librarians can generate operational reports based on real-time data. These reports may include:
 - a. Daily/Monthly Book Borrowing Logs

- b. Departmental Document Access Summary
- c. Overdue and Unreturned Materials
- d. Most Requested Titles (both documents and books)
- e. Fragile Item Tracking Reports

Reports can be exported in multiple formats (PDF, Excel, CSV) and are archived for audit or performance assessment purposes. A monthly summary is automatically generated and must be reviewed by each librarian.

6. **User Management Module (Limited Access)** - Librarians can perform specific user-related tasks such as registering walk-in researchers, resetting passwords, assigning temporary access to books or non-sensitive records, and managing user lookups. However, they cannot change roles or access levels for restricted content. All actions taken through this module are logged and reviewed by administrators weekly. This allows librarians to assist with daily service needs while maintaining proper access boundaries.

7. **Dashboard Module** - The librarian dashboard serves as the control panel for managing everyday activities related to both books and archived records. It displays:

- a. - Number of pending and overdue requests
- b. - Recently uploaded materials
- c. - "Return Pending" items for re-filing
- d. - Reminders for unprocessed feedback or scheduled backups

Quick links are provided for uploading files, tracking borrowings, and running reports. Dashboards are auto-refresh every 5 minutes and flag overdue actions that require acknowledgment before new tasks can be taken on.

This front-end structure gives librarians a balanced, intuitive, and role-specific interface to manage the entire lifecycle of both documents and books.

8. **Overdue Tracking and Notification Module** -This module tracks overdue books and notifies researchers of approaching due dates and overdue items. Researchers receive timely email or SMS reminders about their borrowed items' due dates and any overdue books or documents. The system provides an overview of fines owed and overdue items, ensuring transparency and encouraging timely returns.

Additionally, the module blocks borrowing until overdue items are returned and all fines are cleared, enforcing borrowing policies and ensuring proper management of library resources.

9. **Automated Notification System** -provides real-time alerts for document and book requests, overdue items, and return deadlines. Librarians receive reminders for upcoming due dates and overdue returns to take appropriate actions. Critical alerts, such as overdue returns or system failures, are non-optional, while librarians can customize notifications related to request processing and system updates to suit their workflow.

Modules for Government Agencies

1. **Government Staff Login and Authentication Module**- The Government Staff Login and Authentication Module is tailored for government personnel who need access to specific government-related records stored within the library system. Each staff member logs in with unique credentials, and their access is determined by their Role-Based Access Control (RBAC), ensuring they can only view or request documents relevant to their department. For added security, Multi-Factor Authentication (MFA) is implemented to ensure that only authorized government personnel can access sensitive government records. In addition, the system enforces password policies to maintain security and includes account lockouts after repeated failed login attempts to prevent unauthorized users from accessing the system.
2. **Online Request Module** - This module enables both researchers and government agency users to submit requests for physical or digital documents and books directly through the platform. Users fill out an online form that includes search filters such as title, classification, author/department, date, and purpose of use (e.g., academic research, legal review, administrative task). Each request receives a unique tracking ID for real-time monitoring. Government agencies may be allowed a higher request limit (e.g., 10 per day), while researchers may have a lower cap (e.g., 5 per day) to manage traffic. Urgent requests, especially for sensitive files, require proper justification and are subject to review by librarians or administrators.

3. **Search and Retrieval Module** - A robust and intuitive search tool allows users to locate both documents and books using a combination of metadata filters and full-text search (enabled via OCR). Filters include document or book title, author, year, department, classification, and type (e.g., ordinance, legal book, census record). Results are displayed based on the user's access level. Researchers and agency users will only see items within their clearance; restricted content remains hidden unless special permission is granted. Users can also preview entries and request access directly from the results page if an item isn't immediately available.
4. **Document Tracking Module**- This module enables users to monitor the real-time status of their own document requests. Status updates include stages such as pending, approved, and completed. Users are restricted to viewing their personal submissions only and cannot make edits, cancellations, or reassignments. The module ensures transparency by providing clear and timely updates. It does not allow access to requests made by other users, preserving confidentiality and data security. Overall, this feature supports efficient communication and accountability while maintaining controlled access to request information.
5. **Automated Notification System** - sends out real-time alerts about the status of document requests, due dates, and access permissions. Government staff are notified when their requests are approved or pending, as well as when their borrowed materials are due for return. Critical notifications, such as overdue returns, system issues, or urgent updates, are mandatory. Government staff can also customize preferences for request tracking and access-related updates.

Modules for Researchers

1. **Researcher Login and Authentication Module**- The Researcher Login and Authentication Module allows researchers to access and request academic and public documents within the library. Researchers log in using their unique credentials, and their access is restricted based on Role-Based Access Control (RBAC), allowing them to view only non-confidential materials like historical reports and academic journals. Multi-Factor Authentication (MFA) is used to secure access, especially when requesting sensitive documents. The system also enforces password policies to ensure strong credentials and implements account lockouts

after multiple failed logins attempts to protect researchers' accounts from unauthorized access.

2. **Book Borrowing and Renewal Module**- This module enables researchers to borrow books from the library by logging into their accounts and submitting a borrowing request form. The form collects essential details, such as the book's title, author, edition, and the purpose of borrowing (e.g., academic research, professional use). The system checks the availability of the book and notifies the researcher if the item is restricted (e.g., reference-only). Researchers are allowed to request a renewal for eligible books, provided they do so before the due date, and no other researchers have placed a hold on the item. The module ensures that borrowing and renewal policies are enforced efficiently, maintaining real-time book availability and access.
3. **Book Return and Fine Management Module** - This module allows researchers to manage the return of borrowed books and resolve any outstanding fines. Researchers can view their borrowed items, check due dates, and initiate a return once they bring the books back to the library. If the return is late, the system automatically calculates the fines based on the overdue period. The system displays the fine amount owed, along with return instructions, and prevents further borrowing until the fines are paid in full. This module ensures seamless fine management, automatically updating records when fines are settled and clearing borrowing restrictions.
4. **Lost Books Management Module** -This module allows researchers to report lost books directly through the system. Researchers access a designated "Report Lost Book" form, which requires essential details such as the book's title, author, borrowing date, and a brief explanation of the loss. Upon submission, the system flags the lost item in the researcher's borrowing history and notifies library staff. The system also provides information on the researcher's responsibilities, including possible replacement or payment requirements, based on the library's policy for lost materials. This module ensures a streamlined process for handling lost items, maintaining accurate records, and enforcing accountability.
5. **Automated Notification System**- sends alerts and reminders related to document or book request statuses, return deadlines, and system announcements. Researchers are automatically notified about approvals, due dates, and overdue returns. Critical

alerts, like overdue items or system issues, are non-optional, while researchers have the option to customize notifications related to their account activity and requested materials.

Limitations of the Study

The study focuses solely on the Koronadal City Library's needs, excluding national or private records. Only select documents will be digitized due to time and preservation challenges. The system cannot integrate with external databases, requiring manual handling of unarchived records. Physical preservation remains unchanged.

Delimitation of the Study

The project intentionally excludes features like mobile apps or real-time editing, as they're unnecessary for current operations. It prioritizes local government records and restricts access to authorized users only.

Definition of Terms

1. **React.js**- A JavaScript library used to build fast and dynamic user interfaces, especially for single-page applications. It helps in creating interactive and highly responsive front-end experiences.
2. **Flask framework**- A lightweight Python web framework used to develop backend server applications and APIs (Application Programming Interfaces). Flask is minimalistic and allows developers to build web applications quickly with less overhead.
3. **API development**- Refers to the creation of Application Programming Interfaces (APIs), which allow different software systems or applications to communicate and share data with one another.
4. **Server-side processing** -The execution of operations and logic on the web server rather than on the user's device. This helps in centralizing computing resources and improving the performance and security of web applications.
5. **Hybrid database approach**- The combination of both relational (structured) databases and non-relational (unstructured) databases in one system. It allows for the flexibility to store and manage both types of data efficiently.
6. **MariaDB (MySQL)**- An open-source relational database management system (RDBMS) that uses structured data stored in tables. It is widely used for managing large datasets with predefined schemas and supporting SQL-based queries.
7. **Structured metadata** - Organized information that describes, explains, or categorizes data to assist with the efficient retrieval and use of that data in a system. It could include details such as the document title, author, creation date, and document type.
8. **Query performance**- The speed and efficiency at which a database can process search or retrieval commands. High query performance ensures that data is accessed quickly, improving user experience in a system.
9. **Scalability**- The ability of a system to handle increasing workloads, such as growing amounts of data or users, without experiencing significant performance degradation. Scale systems are essential for handling future growth.

10. **Ubuntu 22.04 LTS**- A stable and secure Linux-based operating system for hosting the server backend.
11. **Redux**- A library used with React.js to manage the state and ensure smooth data flow between different components of the application.
12. **Visual Studio Code**- A development tool used for coding, debugging, and managing system files during development.
13. **Postman**- A tool used for testing APIs to ensure smooth communication between the frontend and backend systems.
14. **Flask-JWT**- An extension of Flask for secure user authentication, ensuring authorized access to sensitive government records.
15. **Public Resource Room** – Section of the library with open-access materials like newspapers, government reports, and research studies.
16. **Government Records Section** – Area for storing city government documents like business permits and financial reports.
17. **Historical Archives Section** – Dedicated section for preserving old records like ordinances and census data.
18. **Digital Preservation** – Strategy ensuring long-term access to digital files without data loss or degradation.
19. **Role-Based Access Control (RBAC)** – A system for restricting access to information based on user roles.
20. **Optical Character Recognition (OCR)** – A tool for converting scanned text into searchable digital content.
21. **Presentation tier**- handles the user interface, enabling easy interaction between users such as librarians, administrators, government officials, and researchers.
22. **Application tier**- executes core functions like processing document requests, managing metadata, facilitating document retrieval, and automating notifications. It also handles user authentication and role-based access control.
23. **Database tier**- manages the storage and retrieval of archived documents and metadata, ensuring data security and integrity.

24. **RBAC**- Role-Based Access Control
25. **OCR**- Optical Character Recognition
26. **MFA**- Multi-Factor Authentication
27. **IDE**- Integrated Development Environment
28. **PDF**- Portable Document Format
29. **API**- Application Programming Interface
30. **UI**- User Interface
31. **KPI**- Key Performance Indicator
32. **DB**- Database
33. **OS**- Operating System
34. **JWT** - JSON Web Token.

Review of Related Literature/Studies/Systems

Review of Related Literature

This chapter contains the ideas, completed studies, generalizations, conclusions, and others included with relevant and similar information to the current study.

Electronic records archival systems represent the systematic process of capturing, storing, managing, and preserving digital documents over their lifecycle to ensure accessibility, authenticity, and usability for as long as needed. Modern libraries face unprecedented challenges in managing expanding volumes of digital information while meeting compliance requirements and ensuring long-term accessibility. According to Zhang and Li (2023), effective electronic archiving systems have become critical infrastructure for libraries seeking to transition from paper-based processes to fully digital workflows. These systems not only facilitate document preservation but also enhance searchability, security, and operational efficiency across diverse institutional contexts. For public libraries like the City Library of Koronadal, implementing robust archival systems ensures the preservation of local cultural heritage while improving service delivery to community members.

The evolution of electronic archiving systems in libraries has progressed significantly from basic file storage solutions to sophisticated content management platforms. Early digital archives in the late 20th century primarily focused on document digitization and basic metadata tagging, with limited search capabilities and preservation strategies. Johnson et al. (2020) identified that the transition toward modern electronic archiving began with the development of standardized formats like PDF/A and the implementation of more robust digital preservation frameworks. The period between 2020-2025 has witnessed accelerated development driven by cloud computing, artificial intelligence, and blockchain technologies that have revolutionized how libraries approach digital preservation and archival management.

Contemporary electronic archiving systems have evolved from these foundations to incorporate advanced features such as automated metadata extraction, format migration

capabilities, and comprehensive audit trails that ensure documentary evidence remains trustworthy and accessible. Chen and Park (2022) noted that current systems now integrate advanced security protocols, compliance frameworks, and interoperability standards that were largely absent in earlier iterations of digital archive technology. This evolution reflects growing recognition of digital archives as strategic assets rather than merely technological solutions, particularly for public institutions serving diverse community needs.

Current electronic archiving systems for libraries can be categorized into several distinct types, each addressing specific institutional needs and preservation challenges. Integrated Library Systems (ILS) with archival components provide comprehensive document lifecycle management with advanced workflow capabilities. According to a study by Martínez-Ávila and Rodríguez-Bravo (2021), these systems typically integrate with other library applications and support complex metadata schemas for enhanced searchability and information governance. Dedicated Records Management Systems (RMS) focus specifically on maintaining the authenticity and integrity of official records, implementing retention schedules and disposition workflows essential for public institutions.

Digital preservation platforms represent another category, designed specifically for long-term preservation of digital assets in library settings. Kumar and Thompson (2024) explained that these systems implement specialized preservation strategies such as format migration, emulation, and normalization to combat technological obsolescence. Additionally, specialized archival management systems designed for historical collections incorporate descriptive standards like ISAD(G) and EAD, focusing on contextual relationships and archival arrangement principles. For city libraries like Koronadal, these diverse system types demonstrate how electronic archiving has evolved to address specific use cases while maintaining core principles of information governance and public access.

Software Development Methodologies

The development of electronic archiving systems for libraries increasingly follows Agile and DevOps methodologies that enable adaptive responses to changing preservation

requirements and technical environments. García-González et al. (2021) reported that iterative development approaches have proven particularly effective for archiving systems in public libraries, allowing for continuous refinement of preservation capabilities based on stakeholder feedback and emerging standards. User-centered design principles have become central to modern archiving system development, ensuring that systems align with librarian workflows and researcher expectations in community-focused institutions.

Theoretical Considerations

Digital Preservation

The Digital Preservation Theory, Masenya and Ngulube (2020) focuses on ensuring the long-term maintenance of digital information's authenticity, integrity, and accessibility. A central concept within this theory is the identification and preservation of "significant properties"—the essential characteristics of digital objects that must remain intact to retain their meaning and functionality over time. These properties can include aspects such as content, context, appearance, behavior, and structure. Understanding and documenting these properties enable archivists and information professionals to implement effective preservation strategies that mitigate risks associated with technological obsolescence and data degradation. Recent studies have emphasized the importance of collaboration, technological infrastructure, and policy development in achieving sustainable digital preservation practices.

Role-Based Access Control (RBAC)

Role-Based Access Control (RBAC) is a security model that assigns system access permissions to users based on their organizational roles, thereby streamlining permission management and enhancing data security. Recent academic studies have expanded the theoretical foundations of RBAC, addressing its application in contemporary organizational contexts. Nyame and Qin (2020) proposed a conceptual framework for RBAC design in Knowledge Management Systems (KMS), emphasizing the importance of considering sociological factors—specifically, role strain, role ambiguity, and role conflict—in RBAC design. Their work suggests that addressing these precursors can lead

to more effective role mining and engineering, thereby improving knowledge security within organizations.

Marquis (2024) investigated RBAC's effectiveness in mitigating insider threats across various industries. The study highlighted challenges such as the complexity of defining roles and adapting to dynamic access needs. It recommended integrating technologies like machine learning to enhance RBAC's adaptability and effectiveness in safeguarding organizational databases.

Optical Character Recognition (OCR)

Optical Character Recognition (OCR) is a technology that converts various types of documents, such as scanned paper documents, PDFs, or images captured by a digital camera, into editable and searchable data. It leverages machine learning, image processing, and pattern recognition algorithms to interpret and extract text from visual content. Over the years, OCR systems have evolved to handle various fonts, handwriting styles, and languages, offering high accuracy in text recognition. Recent advancements in deep learning, especially convolutional neural networks (CNNs) and recurrent neural networks (RNNs), have significantly improved the performance of OCR systems in terms of speed, accuracy, and adaptability to diverse inputs. Despite its progress, challenges remain, such as recognizing distorted or handwritten text and processing documents with complex layouts or noisy backgrounds. Research continues to address these limitations, improving robustness, accuracy, and real-time performance (Biradar et al., 2024).

Identified Gaps in Existing Systems

Despite significant advancements, electronic archiving systems for libraries continue to face substantial challenges. Interoperability remains a persistent issue, with many systems functioning as isolated repositories rather than components in broader information ecosystems. Williams and Khanna (2023) identified that limited standardization in metadata schemas and export formats creates barriers to seamless information exchange between systems, compromising long-term preservation strategies. Additionally, many systems struggle with handling complex digital objects such as multimedia content,

interactive exhibits, and community-generated materials that resist traditional document-centric preservation approaches.

The scalability of existing solutions presents another significant gap, particularly for growing institutions like the City Library of Koronadal. As data volumes expand exponentially, many libraries find their archiving systems unable to accommodate growing storage requirements while maintaining performance. Li and Castro (2021) noted that while cloud-based solutions offer potentially unlimited storage capacity, they introduce new concerns regarding data sovereignty, privacy, and long-term economic sustainability for public institutions with limited budgets. Furthermore, current systems often provide insufficient support for automated quality assurance, leaving libraries vulnerable to corrupted files, incomplete migrations, and metadata inconsistencies that may compromise future access to archived materials.

Justification for the Proposed System

The identified limitations in existing electronic archiving systems clearly justify the development of the KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION. This system specifically addresses the persistent challenges faced by public libraries in preserving and providing access to community records and resources. An effective solution must prioritize open standards and interoperability frameworks to ensure long-term preservation regardless of vendor viability. According to Martínez-Torres and González-Rodríguez (2024), successful systems will incorporate format identification, and content analysis to manage increasing document volumes efficiently—features particularly relevant for the growing collection at the Koronadal City Library.

The proposed KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIAZTION will implement distributed architecture for enhanced scalability and resilience, avoiding single points of failure that threaten long-term preservation efforts. Peterson and Liu (2023) emphasized that modern

archiving systems must balance immediate accessibility with secure long-term storage through tiered preservation approaches that match storage costs with access requirements—particularly important for public institutions with budget constraints. User-centered interfaces that accommodate diverse stakeholders—from library staff to researchers and community members—will ensure that preserved information remains discoverable and usable across its lifecycle. These design principles directly address the fundamental weaknesses identified in current solutions while establishing a framework for continuous improvement that meets the specific needs of the Koronadal community.

Conclusion

This chapter presented relevant theories, existing literature, and academic studies that support the development of an KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION. The reviewed literature highlighted the evolution of digital archiving systems—from basic storage solutions to advanced platforms that support document preservation, searchability, and compliance with institutional requirements (Zhang & Li, 2023; Johnson et al., 2020). These systems play a crucial role in preserving cultural heritage and streamlining library services in modern public institutions.

Digital Preservation Theory has been central to this discussion, emphasizing the need to preserve the "significant properties" of digital objects to ensure their long-term authenticity and usability (Masenya & Ngulube, 2020). Alongside technological advances, methodologies such as Agile and user-centered development have made archival systems more adaptable, secure, and efficient (García-González et al., 2021).

Role-Based Access Control (RBAC) is another essential theoretical consideration in the design of secure digital archiving systems. RBAC assigns access permissions based on organizational roles, thereby enhancing data protection and simplifying system administration. Nyame and Qin (2020) proposed an RBAC design framework that accounts for sociological factors such as role strain, ambiguity, and conflict—factors that can directly impact access control efficiency in knowledge systems. Similarly, Marquis (2024)

explored RBAC's potential in minimizing insider threats, recommending the integration of adaptive technologies like machine learning to improve system security and flexibility in access rights management.

Furthermore, Optical Character Recognition (OCR) plays a critical role in digitizing and making archived documents searchable and editable. OCR technology applies machine learning, image processing, and pattern recognition techniques to convert scanned images and PDFs into usable text. With the adoption of deep learning models like CNNs and RNNs, OCR performance has significantly improved in terms of accuracy and speed, despite ongoing challenges in recognizing complex or distorted text (Biradar et al., 2024).

In conclusion, the development of an effective KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION requires a multi-theoretical approach. By combining principles from Digital Preservation Theory, RBAC, and OCR technology, the proposed system can address the key challenges of long-term accessibility, security, and efficient information retrieval. These frameworks not only ensure that the City Library of Koronadal can manage its growing digital records effectively but also establish a foundation for continuous improvement in public information services.

Review of Related Systems

This chapter reviews literature, studies, records archival management systems to identify key concepts, trends, and technological advancements, providing a foundation for developing an improved system.

This section examines specific electronic archiving system implementations analyzing their design approaches, technological foundations, and organizational impacts within library contexts. The selected studies represent diverse settings including public libraries, academic institutions, and cultural heritage organizations. According to Santiago and Williams (2023), examining actual system implementations provides valuable insights into practical challenges and successful strategies that complement theoretical frameworks. The following review focuses on three significant electronic archiving implementations relevant to the City Library of Koronadal's needs, followed by comparative analysis identifying common patterns, distinctive approaches, and lessons applicable to the proposed system development

Preservica

Preservica has demonstrated significant success in national archive implementations, as evidenced by Taylor and Nguyen's (2022) comprehensive study of its deployment at the UK National Archives. The implementation focused on preserving born-digital government records with complex dependencies and strict authenticity requirements. The system successfully implemented automated fixity checking using SHA-256 algorithms that detected bit-level corruption in 0.03% of preserved objects, enabling early intervention before information loss occurred.

The study revealed that Preservica's workflow automation capabilities reduced processing time for standard record transfers by 62% compared to previous manual procedures. However, researchers also documented challenges with initial system configuration, noting that institutions required approximately 6-8 months to fully customize preservation

workflows to match organizational requirements. According to Howard and Kim (2023), integration with existing catalog systems required custom API development that exceeded initial resource allocations by approximately 40%, highlighting the importance of detailed integration planning before implementation.

User acceptance testing revealed high satisfaction among archival staff (86% approval rating) for routine preservation tasks but identified limitations in handling complex multimedia objects requiring specialized preservation approaches. The system's implementation of PREMIS metadata standards ensured comprehensive provenance documentation, supporting the legal admissibility requirements for government records. Overall, the Preservica implementation demonstrated strong capabilities for standardized records while revealing opportunities for improvement in specialized content handling.

ABBYY Digital Document Archiving

ABBYY's Digital Document Archiving solution was implemented across a consortium of research libraries as studied by Martínez and Johnson (2023). This implementation focused particularly on processing and preserving large volumes of scientific research outputs including preprints, datasets, and supplementary materials. The system's machine learning capabilities successfully extracted structured metadata from unstructured documents with 93.7% accuracy after initial training periods, significantly outperforming previous manual approaches.

The implementation leveraged ABBYY's intelligent document recognition to automatically classify incoming materials according to standardized taxonomies, reducing classification errors by 78% compared to manual processing. Integration with institutional repositories required significant customization, with engineers developing specialized connectors to maintain metadata consistency across platforms. User studies conducted 12 months post-implementation showed that researchers located relevant materials 2.3 times faster than with previous systems, primarily due to improved full-text search capabilities.

Performance metrics collected by Chang et al. (2024) demonstrated that the system successfully processed approximately 25,000 documents monthly while maintaining sub-second retrieval times for standard queries. However, the study also identified challenges with processing highly specialized scientific notation and complex formulas in certain disciplines, requiring supplemental processing modules. Cost analysis revealed that while implementation required significant upfront investment, operational costs decreased by approximately 32% compared to previous manual processing approaches once the system reached steady-state operation.

ArchivesSpace

Zhang and Roberts (2022) conducted a detailed analysis of ArchivesSpace implementations across a consortium of university libraries focusing on special collections and institutional archives. Their multi-institutional study revealed that ArchivesSpace successfully standardized archival description practices across previously disparate systems, improving collection discoverability through implementation of consistent EAD encoding standards. The open-source nature of the platform allowed institutions to develop specialized plugins addressing unique collection needs while maintaining core interoperability.

Implementation timelines averaged 14 months from initial planning to full production deployment, with staff training representing approximately 35% of total implementation effort. Libraries reported significant improvements in processing efficiency, with finding aid creation time reduced by approximately 40% through templated description tools and controlled vocabulary integration. However, smaller institutions within the consortium reported challenges with technical maintenance requirements, often necessitating shared technical support arrangements to sustain operations.

User experience research conducted by Davidson and Singh (2023) revealed that researchers rated ArchivesSpace discovery interfaces 27% higher than previous systems for locating relevant collections, primarily due to improved hierarchical navigation and relationship mapping between collections. Staff reported high satisfaction with the system's

public user interface (85% approval) but identified opportunities for improvement in administrative workflows (68% approval). The study concluded that ArchivesSpace provided strong capabilities for traditional archival description while requiring supplemental systems for digital asset management.

Study	Technologies Used	Features	Problems Addressed	Key Innovations
Preservica	OAIS reference model, PRONOM registry integration, SHA-256 algorithms	Automated file format identification and validation, active preservation technology (format migration), workflow automation, PREMIS metadata standards, comprehensive audit trails.	Long-term preservation of diverse collection types, format obsolescence, authenticity and legal admissibility of records, manual processing time, metadata consistency.	Implementation of the OAIS reference model for standardized workflows, workflow automation capabilities, scalable architecture.
ABBYY Digital Document Archiving	AI, Machine learning algorithms, Optical Character Recognition (OCR)	Intelligent document processing, automated metadata extraction, intelligent classification,	Manual classification efforts, document processing time, retrieval accuracy, processing	AI-powered approach, machine learning algorithms, intelligent classification capabilities.

		transforming scanned documents into searchable text, automatic document categorization.	large volumes of forms.	
ArchivesSpace	Open-source, DACS, EAD, EAC-CPF	Comprehensive archival description, series, and items, supporting complex provenance documentation, standardized APIs for interoperability.	Descriptive consistency, researcher discovery experiences, maintaining contextual relationships between collections, series, and items.	Open-source nature, comprehensive approach to archival description, community-driven development.

Table 1. Review of Related Systems

Comparative Analysis

Preservica has set a high standard in the field of digital preservation, particularly for government archives and large institutions that require extensive authenticity and fixity checking measures. Its automated SHA-256 fixity checking ensures early detection of bit-level corruption, preserving records with minimal data loss. Additionally, its workflow automation reduces processing time significantly, making it a powerful tool for large-scale digital record management. However, its complexity, lengthy implementation process, and the need for extensive API integrations make it less accessible to smaller institutions with limited technical resources. In contrast, the KOROADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION,

while not as advanced in automated integrity checking, offers a more accessible and streamlined approach to digital archiving. It provides a user-friendly interface and a secure repository for electronic records without the extensive technical demands of Preservica, making it a practical alternative for organizations that prioritize usability and efficiency over highly specialized preservation mechanisms.

ABBYY's Digital Document Archiving system is a powerful solution that leverages artificial intelligence and machine learning to classify documents and extract structured metadata with high accuracy. This capability significantly improves search and retrieval efficiency, allowing users to locate documents faster and with fewer errors. Additionally, ABBYY processes large volumes of data at a rapid pace, making it ideal for institutions that deal with extensive digital archives. However, this system requires considerable customization for integration with institutional repositories, and its reliance on machine learning means that it requires continuous training for optimal performance. While the KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION does not incorporate ABBYY's advanced AI-driven classification, it offers a structured and secure storage solution that ensures organized record-keeping and easy retrieval. Its focus on controlled access and regulatory compliance provides a reliable alternative for institutions that may not require the high processing power and automation of ABBYY but still need an effective digital archiving system.

ArchivesSpace is a leading solution for managing special collections and institutional archives, particularly due to its structured metadata organization and hierarchical navigation capabilities. Its open-source framework allows institutions to develop custom plugins, improving its adaptability to specific archival needs. However, its long implementation timeline and the need for technical expertise to maintain and customize the system can be challenging for smaller organizations. Compared to ArchivesSpace, the KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION a simpler, more accessible solution that does not require extensive customization or technical support. While it may not provide the same level of detailed archival description as ArchivesSpace, it ensures that electronic records

are systematically stored, easily searchable, and securely managed. This makes it a strong alternative for organizations seeking a functional and efficient archiving system without the technical complexities of more advanced platforms.

Conclusion

The review of related studies provides valuable insights into practical implementation experiences with leading electronic records archival systems. Each system demonstrates particular strengths aligned with specific institutional contexts and collection types. Preservica excels in standardized government records with strict compliance requirements; ABBYY provides superior automated processing for high-volume document collections; and ArchivesSpace offers excellent archival description capabilities for special collections requiring detailed contextual documentation.

Common success factors across implementations include thorough needs assessment, realistic resource allocation, phased deployment approaches, and comprehensive staff training programs. Common challenges include integration complexity with existing systems, specialized format handling, and balancing immediate access needs with long-term preservation requirements. As noted by Ramirez and Chen (2024), institutions achieving the greatest implementation success typically selected systems based on close alignment with their specific collection types and organizational workflows rather than general market position.

These findings suggest that successful electronic records archival system development requires careful consideration of institutional context, collection characteristics, and specific preservation requirements rather than adopting a one-size-fits-all approach. By incorporating lessons from these implementation experiences, new system development can anticipate and address common challenges while building upon proven approaches to electronic records management.

METHODOLOGY

Technical Background

Technologies to Be Used

This chapter provides an overview of the technologies used in developing the **KORONADAL CITY LIBRARY SYSTEM: DIGITIZATION OF OLD PUBLIC DOCUMENTS AND BOOKS**. It covers the technical background, hardware and software requirements, development team, and network design. These technologies were carefully selected to ensure efficiency, scalability, and security in handling the archival and retrieval of government documents.

Overview of Current Technologies to be used in the System

The proposed system will be a **KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION** designed to digitize, organize, and manage government and public documents stored in the City Library of Koronadal. The front-end will be developed using React.js, a modern JavaScript library known for its fast rendering and interactive user interface. This will ensure that users experience a smooth and responsive interface when searching, retrieving, and managing records.

The backend will be built using Python's Flask framework, a lightweight yet powerful web framework that enables efficient API development and server-side processing. Flask will handle user authentication, document requests, retrieval operations, and business logic while ensuring secure communication between the frontend and database.

For data storage, the system will implement a hybrid database approach, using MariaDB (MySQL). MariaDB will be responsible for managing structured metadata, including document descriptions, request records, and user information, ensuring efficient relational data organization.

The development process will be conducted using Visual Studio Code as the primary integrated development environment (IDE), offering advanced debugging and code management features. The system will initially be deployed locally during development and testing, with the potential for cloud-based deployment for broader accessibility and scalability.

Hardware

The system requires specific hardware components to ensure smooth and efficient operation across all functions. The server computer will be the core component responsible for hosting the system, managing database transactions, and storing archived documents. It will require at least an Intel Core i7 processor, 16GB RAM, and 1TB SSD storage, ensuring fast data access and high processing capacity. The server will run on Ubuntu 22.04 LTS or Windows Server OS, depending on the final deployment setup.

Workstation computers will be used by librarians, administrators, and staff to manage document requests, process archival operations, and monitor system activities. These workstations must have at least an Intel Core i5 processor, 8GB RAM, and 512GB SSD storage to provide sufficient speed and multitasking capabilities. The system will also require a high-quality document scanner to digitize physical records and upload them into the system for archival.

To ensure stable connectivity, the system will utilize a network router and modem with high-speed internet access. This will allow multiple users to connect and interact with the system simultaneously, ensuring seamless communication between frontend, backend, and database servers.

Software

The system will run on Windows 10 or later for all workstation computers, ensuring compatibility with library staff and government offices using the platform. The backend

server will be deployed on Ubuntu 22.04 LTS or Windows Server OS, providing a secure and stable environment for hosting the Flask-based application.

The front end of the system will be developed using React.js, a popular JavaScript library for building modern web applications. React will be used to create a dynamic and responsive user interface, ensuring an intuitive experience for users searching for documents, submitting requests, and managing records. Additional libraries such as Redux will be implemented to handle state management, ensuring smooth data flow between different components.

For the backend, Flask (Python) will handle server-side logic, authentication, and API requests. Flask's lightweight and modular architecture will allow the system to efficiently process document requests, enforce user permissions, and facilitate communication with the database. Flask-JWT will be used for secure user authentication, ensuring that only authorized personnel can access sensitive government records.

The system will implement a hybrid database structure using MariaDB. MariaDB will store structured data such as user credentials, document metadata, and request logs, enabling fast and reliable relational queries. This approach ensures that the system can efficiently handle both structured and unstructured data.

Development tools such as Visual Studio Code will be used for coding, debugging, and managing system files. Postman will be utilized for API testing, ensuring smooth communication between the frontend and backend. Version control will be managed using GitHub, allowing the development team to track changes and collaborate effectively.

Peopleware

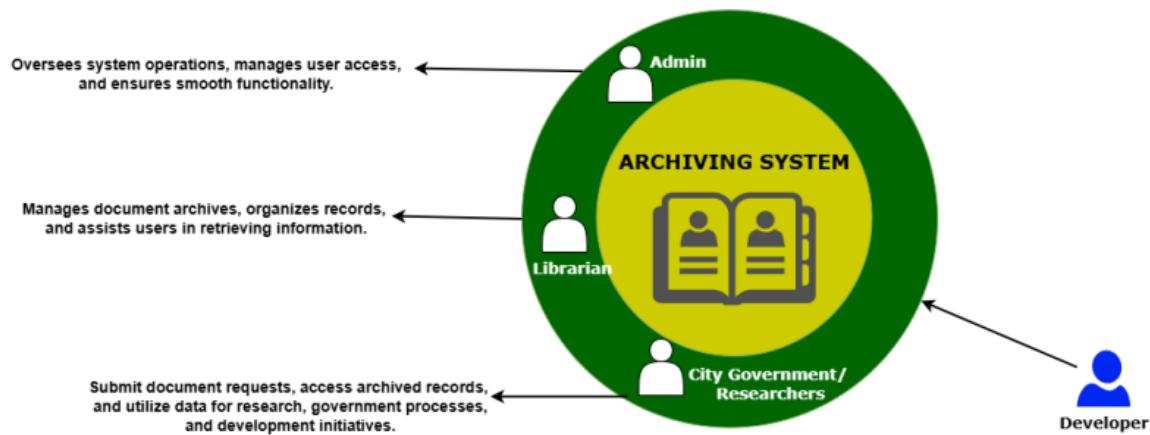


Figure 1. Illustration of Peopleware

The successful implementation and operation of the **KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION** will require the involvement of various stakeholders, each playing a vital role in **development, maintenance, and usage**. Below are the key personnel and their respective responsibilities:

1. Librarians

Librarians will be the primary users responsible for document archiving, retrieval management, and request processing. Their specific duties include:

- 1.1 **Document Scanning and Uploading** – Librarians will be responsible for scanning physical records and uploading them to the system. They will ensure that each document is properly categorized and tagged with metadata such as title, department, date, and document type to facilitate easy retrieval.
- 1.2 **Verifying and Organizing Archived Documents** – After scanning and uploading, librarians will review the documents to ensure they are clear, properly formatted, and correctly classified within the system.
- 1.3 **Retrieval and Record Monitoring** – Librarians will assist users in finding specific documents and monitor how often records are accessed. They will track which users have accessed or requested documents to maintain proper usage logs.

1.4 Document Request Processing – They will process incoming document requests, verifying if a request should be approved or denied based on confidentiality levels and user authorization.

1.5 Ensuring Data Integrity – Librarians will regularly check for duplicate, outdated, or misclassified records and ensure that documents remain accessible and intact over time.

1.6 Handling Document Returns and Borrowing Logs – They will update records when documents are retrieved, borrowed, or returned, ensuring that documents are always accounted for and not misplaced.

1.7 Book Archiving and Storage Management- Librarians are responsible for inspecting, cataloging, and preserving old and valuable books. These books are stored in the Public Resource Room, with their availability recorded in the system. Access requires a formal request to ensure secure and proper handling.

2. Administrators

Administrators will oversee the **user management, system security, and report generation** functions of the system. Their responsibilities include:

2.1 User Account Management – Administrators will create, update, and deactivate user accounts, ensuring that only authorized personnel have access to specific documents. They will also assist users with password resets and account recovery.

2.2 Access Control and Permissions – They will configure role-based access control (RBAC) to ensure that sensitive records are accessible only to approved users, departments, or researchers.

2.3 System Activity Monitoring – Administrators will monitor system activity logs to track user behavior, identify suspicious access patterns, and ensure compliance with data security policies.

2.4 Approval and Prioritization of Requests – For high-priority or restricted documents, administrators will review and approve or deny requests before documents can be accessed.

2.5 Generating Reports and Analytics – Administrators will use the system to generate reports on document usage, retrieval times, pending requests, and system activity to help optimize library operations.

2.6 Coordinating with IT Support – Administrators will work with developers and system administrators to resolve technical issues, request system enhancements, and ensure system stability.

3. City Government Staff and Researchers

City government offices and researchers will use the system for **document retrieval, archival research, and request processing**. Their primary responsibilities include:

3.1 Searching for Archived Documents – Users will utilize the system's search and filtering functions to find relevant records based on keywords, document type, department, or date.

3.2 Submitting Document Requests – If a document requires approval for access, users must submit a request through the system, specifying the reason for use.

3.3 View Approved Documents – Once a request is approved, users will have limited-time access to View the document while maintaining compliance with library data retention policies.

3.4 Providing Feedback and Inquiries – Researchers and government staff can report issues with document clarity, missing records, or request system improvements, ensuring better user experience.

3.5 Following Data Confidentiality Rules – Users must adhere to the library's document access policies, ensuring that restricted records are not shared, misused, or altered.

By integrating these technologies, hardware, and personnel, the KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION will provide a secure, scalable, and efficient solution for managing archived government records in the City Library of Koronadal. Each stakeholder plays a critical role in ensuring that the system functions effectively, providing fast, reliable, and secure access to historical and administrative documents.

Network

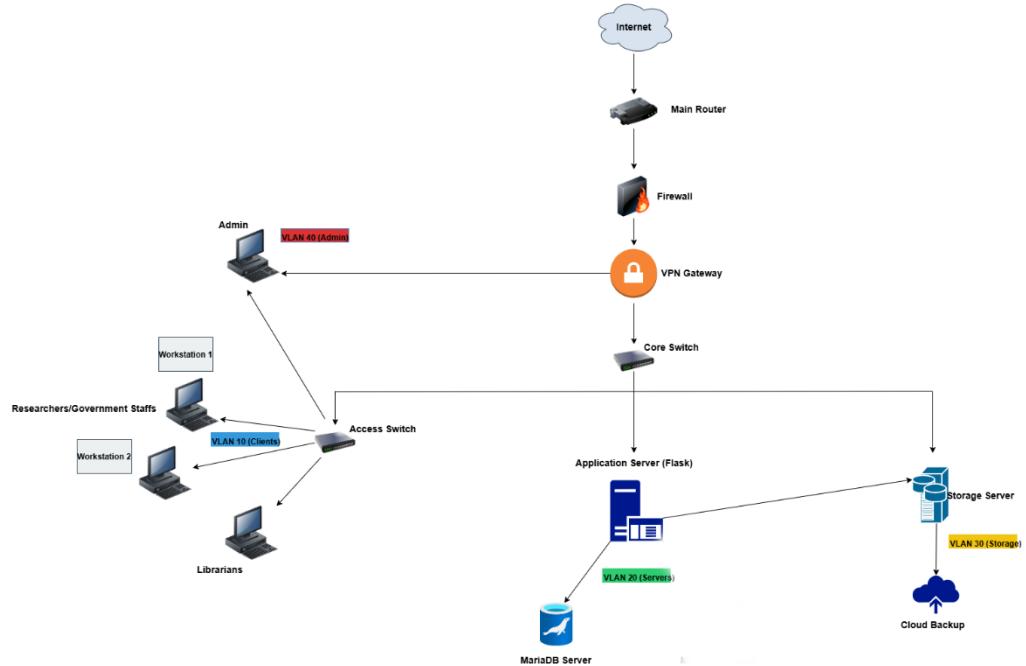


Figure 2. Network Design

The KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION network design ensures a secure, efficient, and role-based structure for different user groups, including Librarians, Administrators, Researchers, and Government Staff. VLAN segmentation isolates network traffic, enhancing security and performance. Librarians and researchers (VLAN 10) access the system via an access switch, with librarians managing document uploads and researchers retrieving public records through the Flask backend. Administrators (VLAN 40) have full control over the system, including database and storage management, and can securely connect remotely via the VPN Gateway. The Application Server (VLAN 20) processes requests, while MariaDB store metadata and scanned documents. The Storage Server (VLAN 30) ensures archival reliability, backed by cloud backups for redundancy.

The infrastructure includes a Main Router, Firewall, Core Switch, and Access Switch to enable secure and segmented communication. The Firewall and VPN Gateway protect the system, ensuring that only authorized users access critical resources. The Flask backend manages user authentication and document handling, while the Storage Server provides access to archived records. This design enhances security, scalability, and reliability, while protecting sensitive government and library records from unauthorized access.

Calendar of Activities

Activity: Project context, Purpose and Description, Objectives of the Study

Objectives of the Activity:

- a. To identify the system's clients and stakeholders in the City Library of Koronadal.
- b. To secure client approval from the City Library administration.
- c. To document the project context and current archival challenges.
- d. To define the proposed system's purpose and objectives.
- e. To determine the resources required for system development.
- f. To outline the project timeline using a Gantt chart.
- g. To present the proposed project to stakeholders.

Description:

In this activity, the researchers identified the City Library of Koronadal as the client and submitted a formal request letter for project approval. The researchers conducted interviews with the library staff including three registered librarians and one administrator to gather essential information about the problems with the current manual archiving system and document retrieval processes. The researchers observed the three storage sections (Historical Archives Section, Government Records Section, and Public Resource Section) to understand document organization and retrieval workflows. The data gathered was used to define the project context, purpose, and objectives, highlighting the inefficiencies of the current paper-based system and the benefits of the proposed KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING

HISTORY THROUGH DIGITIZATION. The researchers then presented the proposed project to faculty advisers during consultations for further refinement and improvement of the project proposal.

Persons Involved: Researchers, Stakeholders, Project Adviser

Resources: Request Letter, Questionnaire, Notebooks

Timeline: Week 1 – 6

Activity Name: Scope and Limitation

Objectives of the Activity:

- a. To clearly define the boundaries of the Electronic Records Archival System.
- b. To identify which document types and processes will be included in the system.
- c. To determine which functions are beyond the scope of the current project.
- d. To establish technical limitations of the proposed system.
- e. To document accessibility parameters for different user types.
- f. To outline hardware and software constraints.
- g. To define security and privacy boundaries of the archival system.

Description:

Researchers will meet with library staff to define system boundaries and determine which document types and administrative processes will be included in the KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION. The team will establish technical limitations, accessibility parameters, and security boundaries before presenting the finalized scope document to stakeholders for approval.

Persons Involved: Researchers, Library Staff, Library Administrator, Project Adviser

Resources: Request Letter, Questionnaire, Notes, Internet Connections

Timeline: Week 6 – 8

Activity Name: Review Related System (RRS) and Review Related Literature (RRL)

Objectives of the Activity:

- a. To research existing archival systems implemented in similar institutions.
- b. To analyze current scholarly literature on electronic records management.
- c. To identify best practices in document digitization and preservation.
- d. To evaluate technological approaches used in successful archival systems.
- e. To document findings about security protocols for sensitive government records.
- f. To compile relevant theories and frameworks for archival management.
- g. To identify gaps in existing systems that our proposal can address.

Description:

Researchers will examine existing archival systems in similar institutions and review scholarly literature on digital preservation, metadata standards, and modern archival practices. The team will analyze case studies of successful implementations and identify technological approaches that could benefit the City Library's archival system, with findings organized by themes to inform the project's technical approach.

Persons Involved: Researchers

Resources: Academic Databases, Library Resources, Online Journals, Case Studies, Technical Documentation of Existing Systems, Internet Connection

Timeline: Week 7 – 9

Activity Name: Technical Background and Calendar of Activities

Objectives of the Activity:

- a. To document the technical foundation for the proposed system.
- b. To identify programming languages and frameworks suitable for implementation.
- c. To outline database technologies appropriate for archival management.

- d. To establish hardware specifications required for system deployment.
- e. To create a comprehensive project timeline with milestones.
- f. To allocate appropriate time frames for each project phase.
- g. To document dependencies between different project activities.

Description:

Researchers will document technical components required for implementation, including development frameworks, database systems, and document management technologies. Based on these considerations, a detailed project calendar will be developed with specific timeframes, dependencies, and buffer periods to ensure realistic delivery timelines.

Persons Involved: Researchers, Project Adviser

Resources: Technical Documentation, Project Management Software, Timeline Templates

Timeline: Week 7 – 9

Activity Name: Requirement Analysis and Documentation

Objectives of the Activity:

- a. To identify functional requirements for the archival system.
- b. To establish non-functional requirements including performance and security.
- c. To document user requirements for different stakeholder groups.
- d. To prioritize system features based on stakeholder needs.
- e. To create detailed requirement specifications for development.
- f. To validate requirements with library staff and government users.
- g. To establish measurement criteria for requirement fulfillment.

Description:

Researchers will conduct interviews with library staff and government department representatives to identify functional and non-functional requirements. Requirements will be categorized, prioritized, and documented in a formal specification that will serve as the foundation for system design after stakeholder validation.

Persons Involved: Researchers, Library Staff, Project Adviser

Resources: Interview Guides, Requirement Documentation Templates, Process Flow Diagrams, Prioritization Matrix

Timeline: Week 8 – 9

Activity Name: System Architecture and Database Design

Objectives of the Activity:

- a. To design the overall system architecture for the archival system.
- b. To create database models for document metadata storage.
- c. To establish system modules and their interactions.
- d. To define data flow diagrams showing system processes.
- e. To design security architecture and access control systems.
- f. To create database schema with appropriate relationships.
- g. To establish infrastructure requirements for system deployment.

Description:

Researchers will design a multi-tier system architecture and develop database models for document metadata storage. The team will create entity-relationship diagrams, data flow diagrams, and establish security protocols with role-based access controls aligned with library confidentiality requirements.

Persons Involved: Researchers, Project Adviser

Resources: Modeling Software, Architecture Templates, Database Design Tools, Security Framework Documents

Timeline: Week 9 – 10

Activity Name: Use Case and Activity Diagrams

Objectives of the Activity:

- a. To create comprehensive use case diagrams for all system actors.

- b. To develop detailed activity diagrams showing system workflows.
- c. To document user interactions with the archival system.
- d. To illustrate document request and retrieval processes.
- e. To create sequence diagrams for critical system functions.
- f. To model administrative processes for system management.
- g. To validate diagrams with stakeholders for accuracy.

Description:

Researchers will create UML diagrams illustrating system interactions for all user types. The team will develop activity and sequence diagrams for key workflows including document digitization, cataloging, search operations, and request management, validating all models with library staff before finalization.

Persons Involved: Researchers, Project Adviser

Resources: Documentation Style Guide, Reference Management Software, Technical Editing Tools, Feedback Notes

Timeline: Week 9 – 10

Activity Name: Documentation Revisions and Polishing

Objectives of the Activity:

- a. To compile all project documentation into a cohesive proposal.
- b. To review documents for completeness and accuracy.
- c. To ensure consistent formatting and terminology throughout.
- d. To incorporate feedback from stakeholders and advisers.
- e. To refine technical specifications and design documents.
- f. To finalize project timelines and resource allocations.
- g. To prepare comprehensive appendices with supporting materials.

Description:

Researchers will compile all documentation into a cohesive proposal, standardizing terminology and formatting throughout. The team will incorporate stakeholder feedback, verify citations, and organize supporting materials into appendices before final proofreading.

Persons Involved: Researchers, Library Staff, Project Adviser

Resources: UML Modeling Software, Workflow Documentation, Process Maps of Current System, Use Case Templates

Timeline: Week 9 – 1

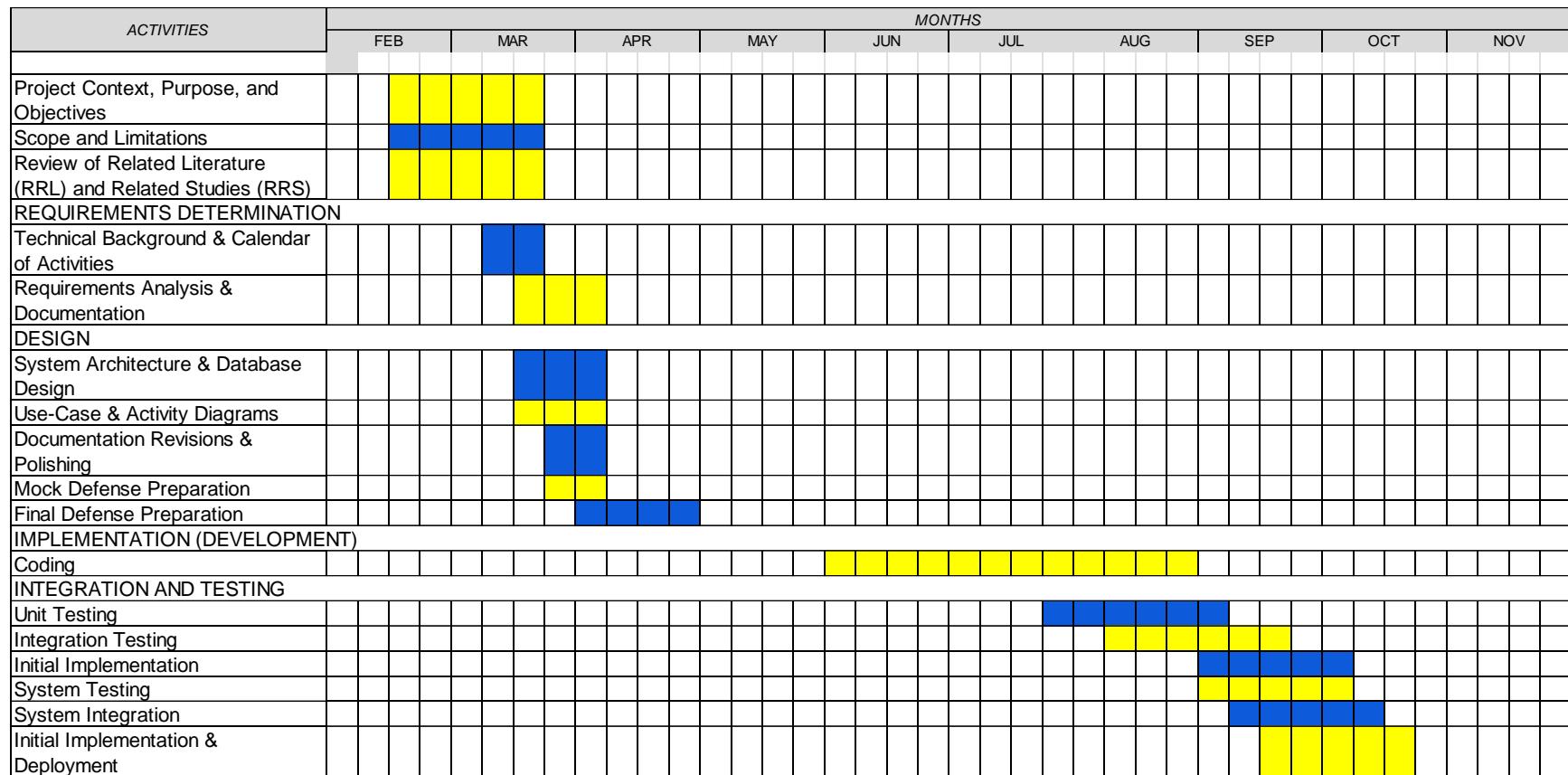


Figure 3. Gantt Chart

RESOURCES

The tables below present the minimum hardware and software requirements needed for developing and maintaining the **KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION.**

HARDWARE

Component	Minimum Requirement
Processor/CPU	11th Generation Intel or newer / AMD Ryzen 5 or higher
Monitor	Laptop or Desktop monitor (1080p resolution)
Keyboard	USB Keyboard / Wireless Keyboard
Mouse	USB Mouse / Wireless Mouse
Storage	256GB SSD (Recommended) Optional: 1TB HDD
Mobile Phone	Android Devices (Version 9 or later)
Network	50Mbps or higher (stable connection required)

Table 2. Minimum Hardware Requirements

SOFTWARE

Component	Minimum Requirement
Operating System	Windows 10 or Windows 11
Backend Framework	Python (Flask)
Database Server	MariaDB for metadata storage
Browser	Google Chrome, Mozilla Firefox, Microsoft Edge
Integrated Development Environment (IDE)	Visual Studio Code,
Local Server	Python Virtual Environment Server
Web Server	Apache or Nginx

Table 3. Minimum Software Requirements

Requirements Analysis

Current Technical Situation

Current Document Storing



Figure 4: Process for Document Storing

In figure 4, the document archiving process at the Koronadal City Library begins with the physical documents from government agencies, and organizations. These materials arrive at the library for long-term archival and public access purposes. Upon receipt, a librarian classifies the documents into one of three main categories: Historical Archives, Government Records, or Public Resources, based on the content and origin of each file. Once categorized, another librarian is responsible for manually recording document details into a handwritten logbook and an index card catalog system. This recording method serves as the library's primary tracking and retrieval reference for physical records. Following documentation, the materials are transferred to the physical storage area, where they are securely housed in labeled filing cabinets, folders, and storage boxes.

Current Book Archiving process

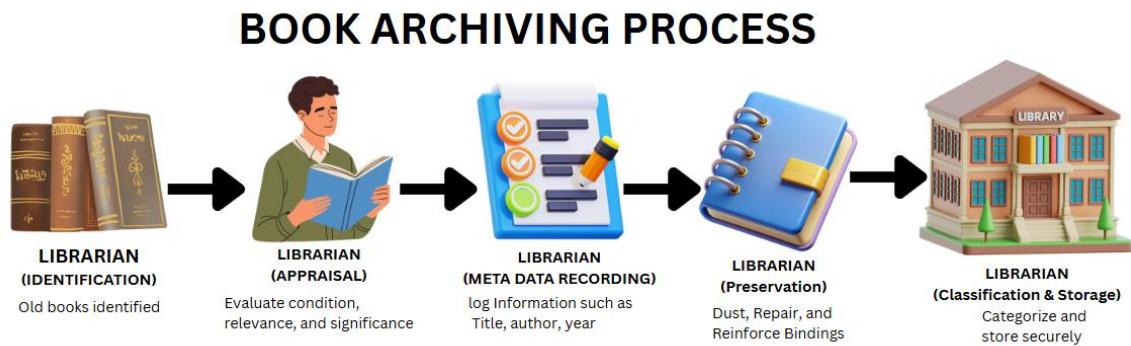


Figure 5: Process for Book archiving

In figure 5, Old books, especially those considered valuable for historical reference or research purposes, are prioritized for archiving in the Koronadal City Library. Once identified for archiving, the Library Staff assigned to Inspection & Appraisal examine each book, checking its physical condition, content relevance, and historical significance. The librarian evaluates whether the books qualify for archiving or can still be used for general circulation, while those that are damaged beyond repair are set aside for disposal. After the evaluation, Library Staff assigned to Preservation & Storage record the essential details or metadata of each book, including the title, author, publication year, condition, and designated storage location. Preservation procedures are then applied, such as dusting, repairing torn pages, reinforcing bindings, and placing fragile books in acid-free materials or climate-controlled storage to ensure their longevity. Once preserved, the archived books are classified accordingly into categories such as Historical Archives, Research Materials, or Restricted Collections. These books are then stored securely in its location. For tracking purposes, all archived books are recorded in a logbook.

Current researchers and Students request process

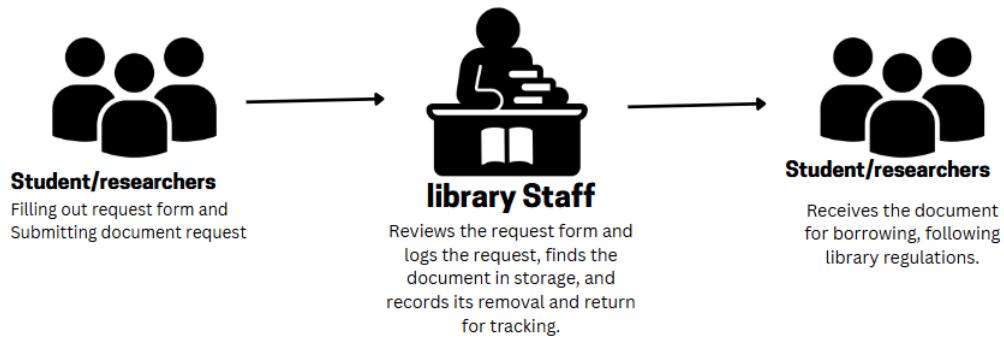


Figure 6: Researchers and Students Request Process

In figure 6, A requester visits the library and fills out a Document Request Form with their details, document information, purpose, and mode of access. The library staff logs the request and refers to index cards or handwritten logs to locate the document's last known storage location. They then search through filing cabinets, labeled folders, or storage boxes to retrieve them. Once found, the document is provided to the requester for borrowing, and with certain non-sensitive materials available for borrowing. The library staff records the document's removal and ensures it is returned to its proper storage location after use.

Current Government Agencies request process

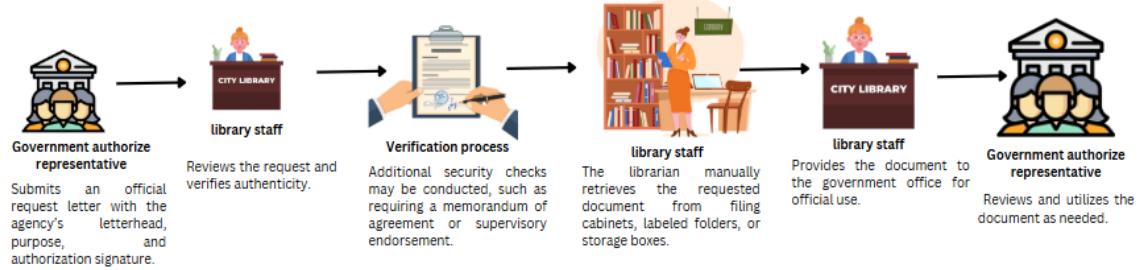


Figure 7: Government Agencies request process

In figure 7, an Authorized representative submits an official request letter along with a Document Request Form, detailing their information, document specifics, and purpose. The library staff reviews the request and verifies its authenticity before proceeding. additional verification steps, such as obtaining a memorandum of agreement or supervisory endorsement, may be conducted. Once approved, the librarian manually searches for the document in filing cabinets, labeled folders, or storage boxes. Upon retrieval, the document is provided to the requester for borrowing the document. The library staff records the document's removal and ensures its proper return to storage after use.

Current Document Submission Process

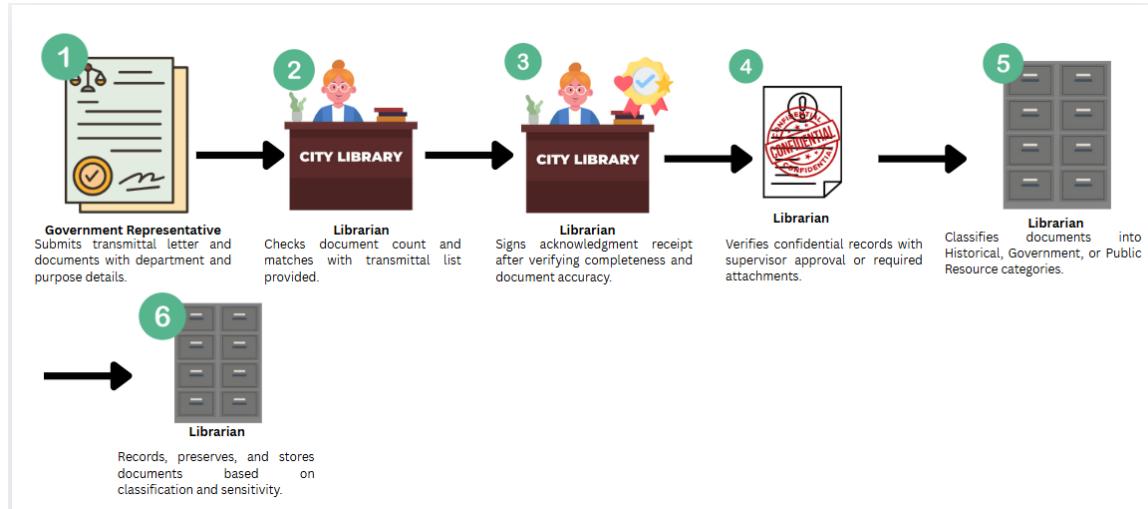


Figure 8: Document Submission Process

In figure 8, A government representative initiates the process by submitting a formal transmittal letter and documents to the Koronadal City Library, detailing the department name, document type, date range, purpose, and confidentiality level. Upon receipt, the librarian verifies the document count and checks for consistency with the transmittal list. If all items are complete and accurate, the librarian signs an acknowledgment receipt to confirm acceptance. For confidential submissions, additional verification is conducted, including supervisor approval. Once verified, the librarian appraises the documents based on their historical value, frequency of access, and required retention period. The records are then categorized into Historical Archives, Government Records, or Public Resources. After classification, each document's details are manually recorded into logbooks and index cards. Preservation procedures are applied as needed, such as staple removal and the use of acid-free materials for fragile documents. Documents are then placed into appropriate storage cabinets, with frequently accessed ones placed in front and sensitive records stored in restricted-access areas. This ensures that all archived materials are properly validated, preserved, and traceable for future use.

Current Book Borrowing Process

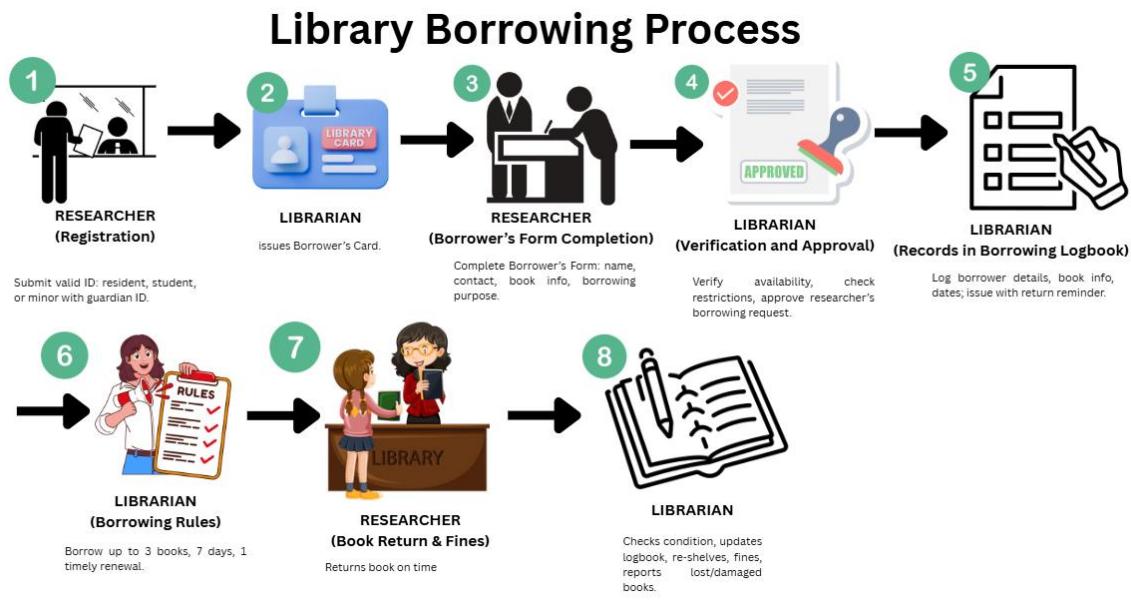


Figure 9: Borrowing Process

In figure 9, The researcher begins the process by submitting a valid ID, such as a student, resident, or minor ID with a guardian's ID, to register at the library. Upon registration, the librarian issues a Borrower's Card, which allows the researcher to borrow materials in the future. The researcher then completes a Borrower's Form, providing personal information, details of the book they wish to borrow, and the purpose for borrowing.

Next, the librarian verifies the borrower's information, checks the availability of the requested materials, and approves the borrowing request. The librarian records the borrower's details in the Borrowing Logbook, including the book information and the return date, and provides the researcher with a return reminder. The librarian also informs the researcher of the borrowing rules, such as the number of books allowed, the borrowing period, and the due dates.

When the researcher returns the borrowed book, they must do so on time. If the book is overdue, fines are applied. Upon return, the librarian checks the book's condition, updates the logbook, re-shelves the book, and reports any loss or damage.

Logical Data Flow Diagram of the Proposed System

Context Diagram

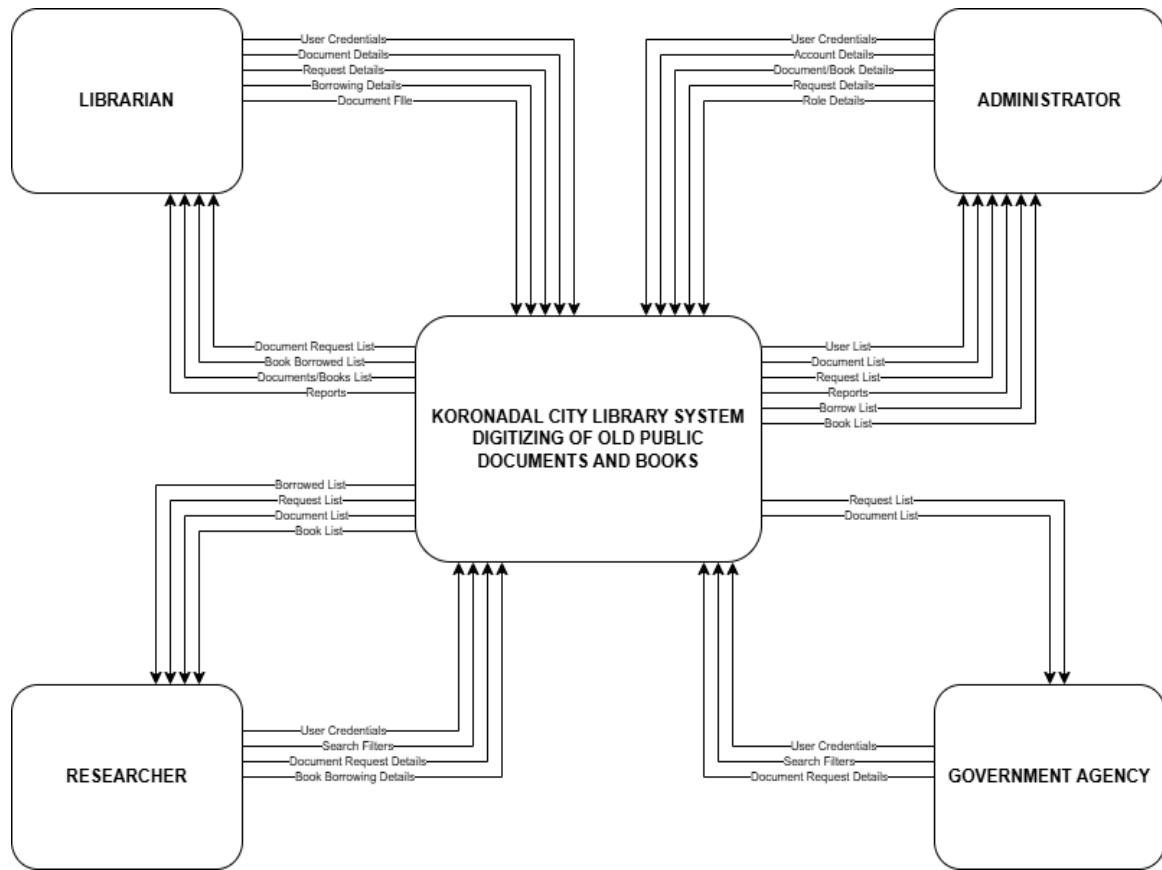


Figure 10: Context Diagram

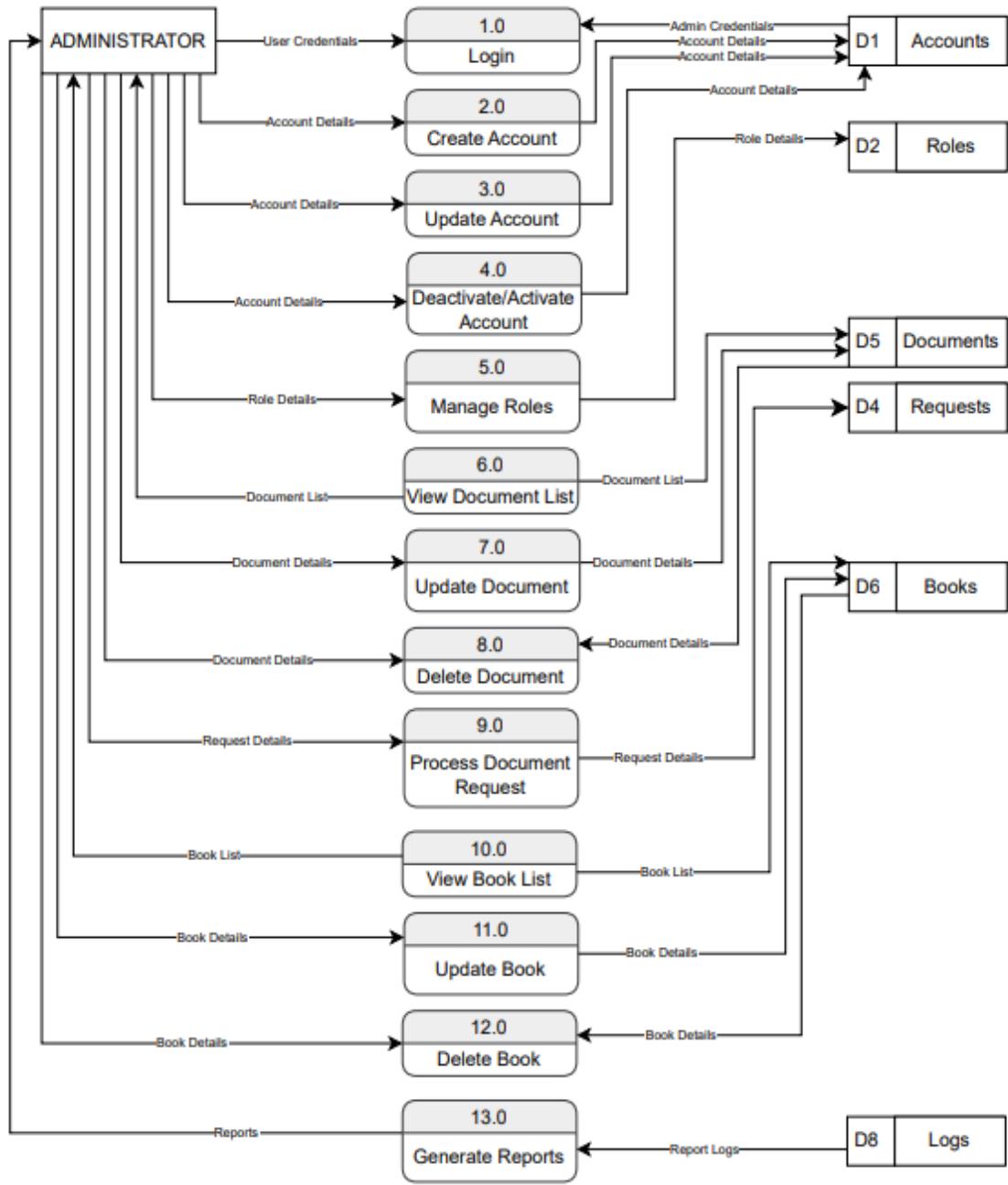


Figure 11: Level 0 - Dataflow Diagram for Administrator

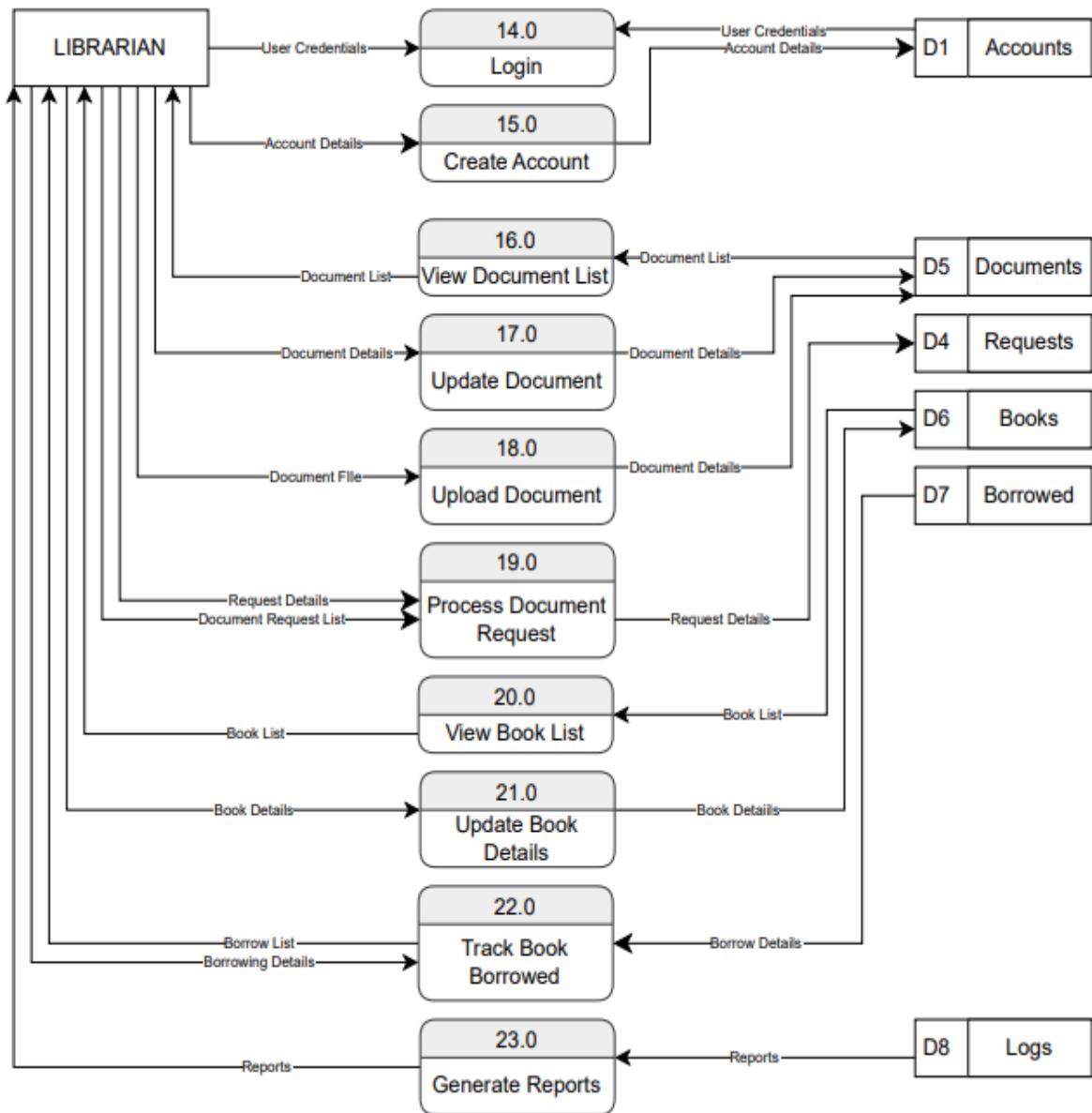


Figure 12: Level 0 - Dataflow Diagram for Librarian

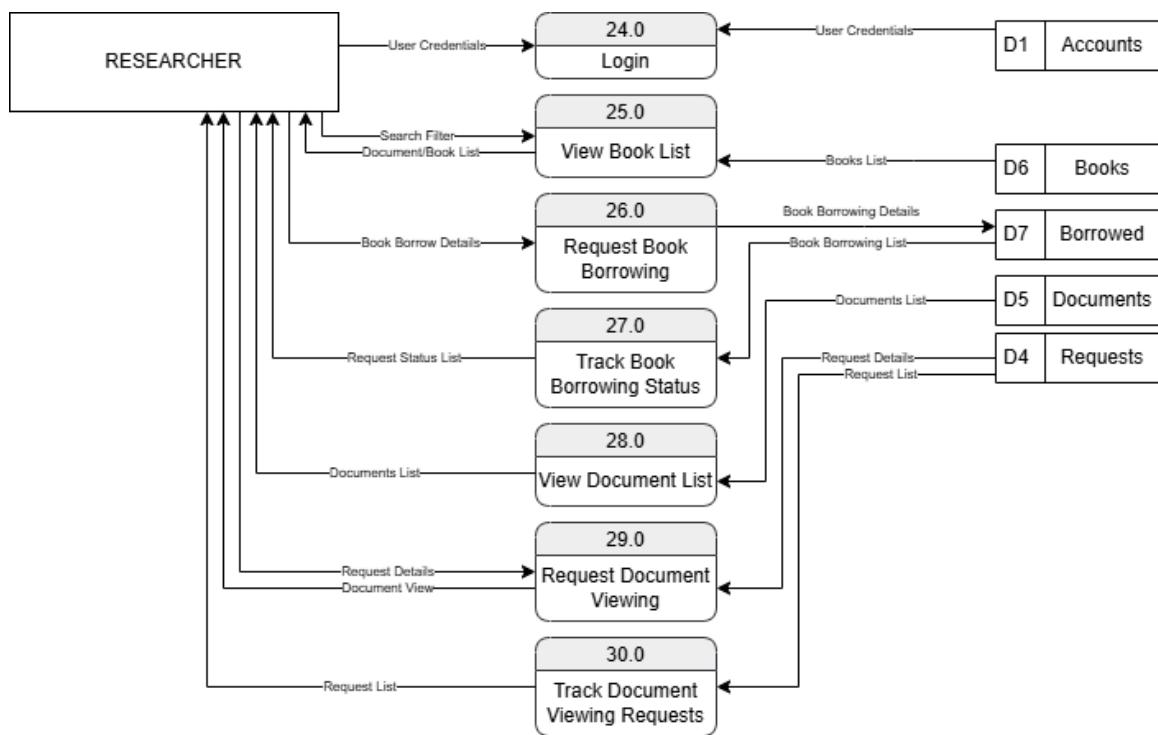


Figure 13: Level 0 - Dataflow Diagram for Researcher

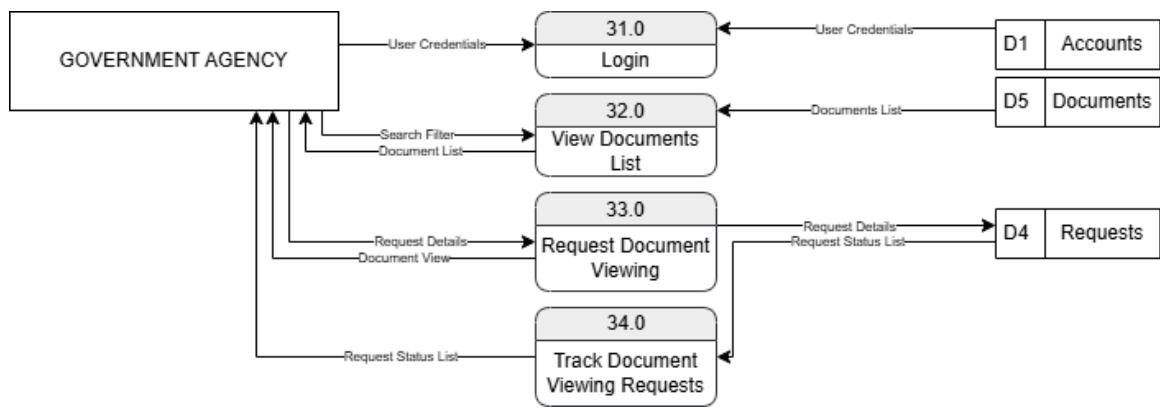


Figure 14: Level 0 - Dataflow Diagram for Government Agency

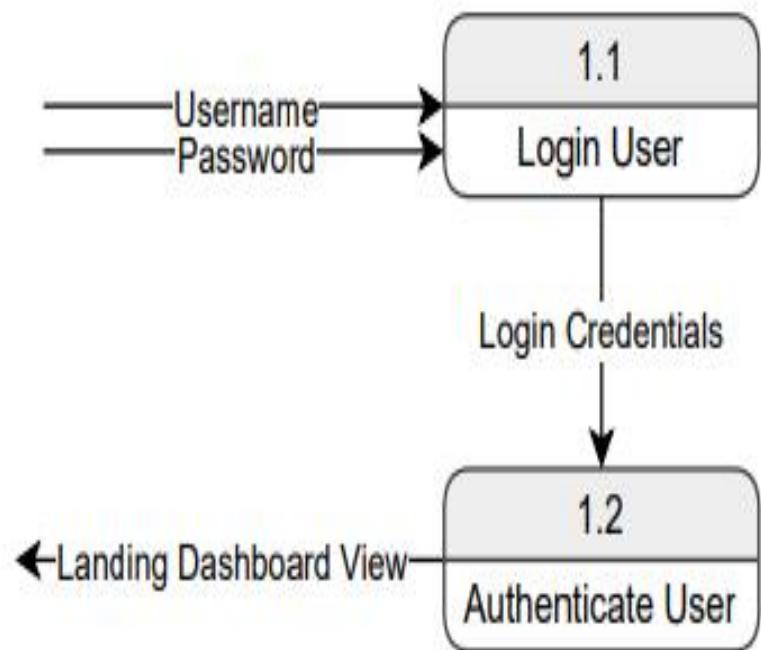


Figure 15: Level 1 - Dataflow Diagram for Login

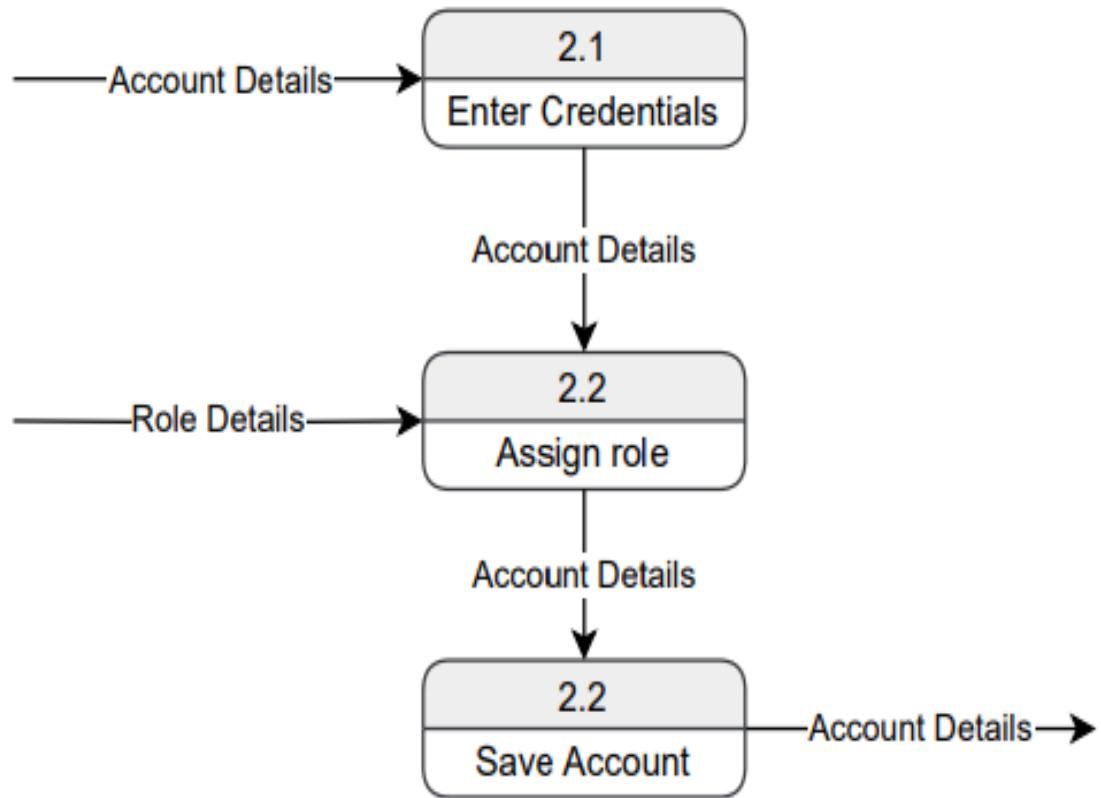


Figure 16: Level 1 - Dataflow Diagram for Create Account

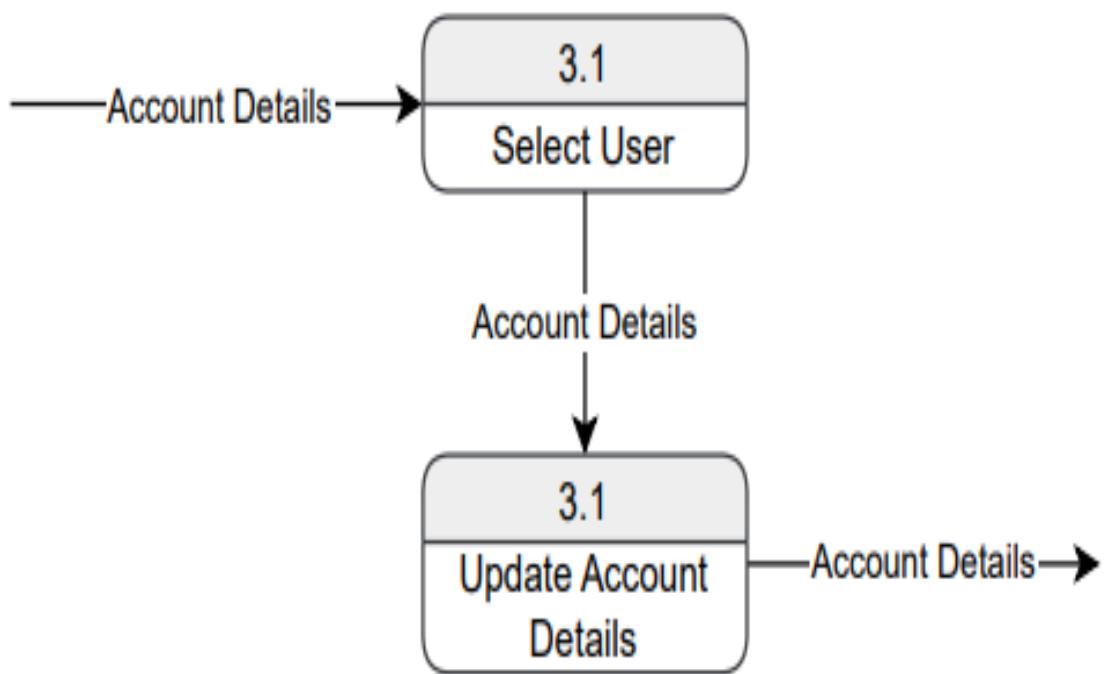


Figure 17: Level 1 - Dataflow Diagram for Update Account

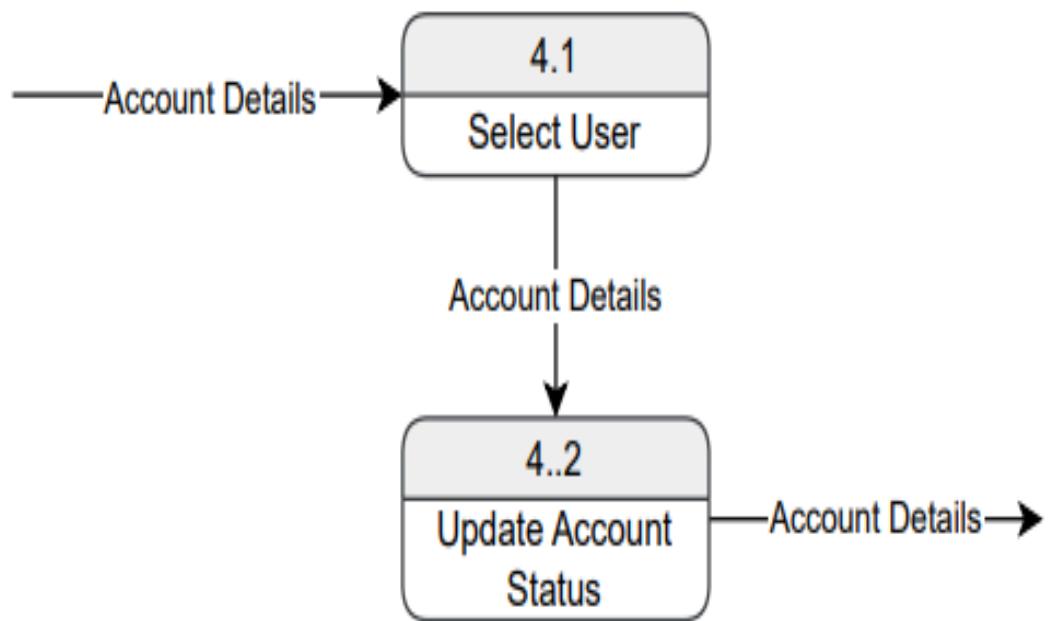


Figure 18: Level 1 - Dataflow Diagram for Deactivate/Activate Account

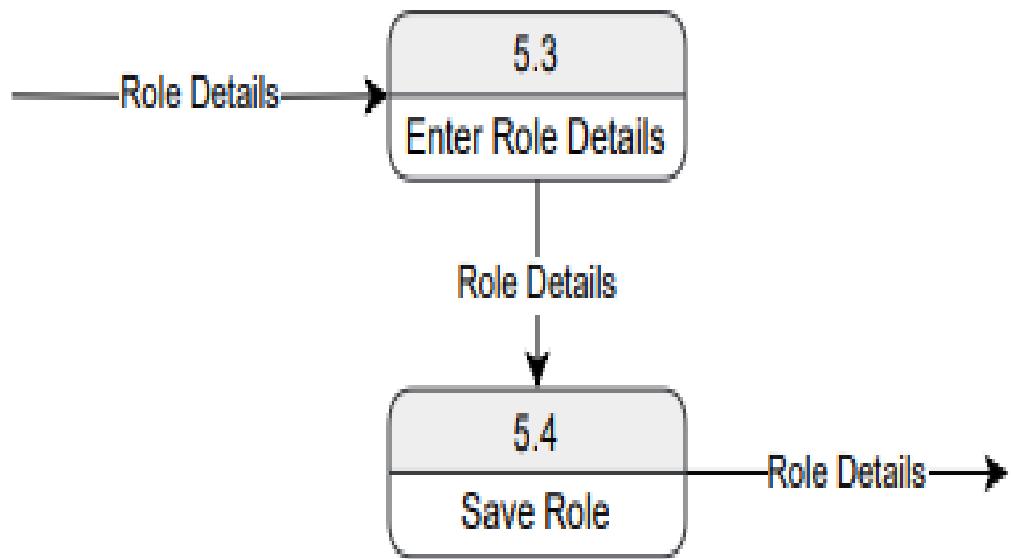


Figure 19: Level 1 - Dataflow Diagram for Manage User Roles

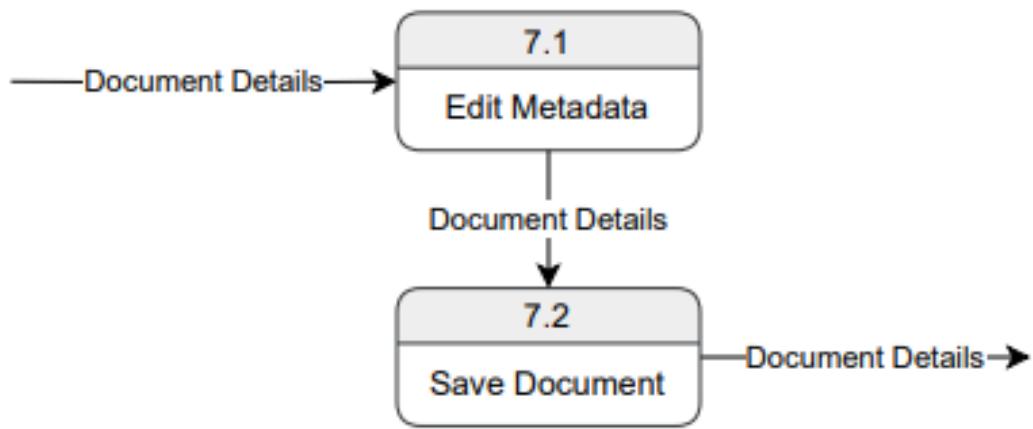


Figure 20: Level 1 - Dataflow Diagram for Update Document Details

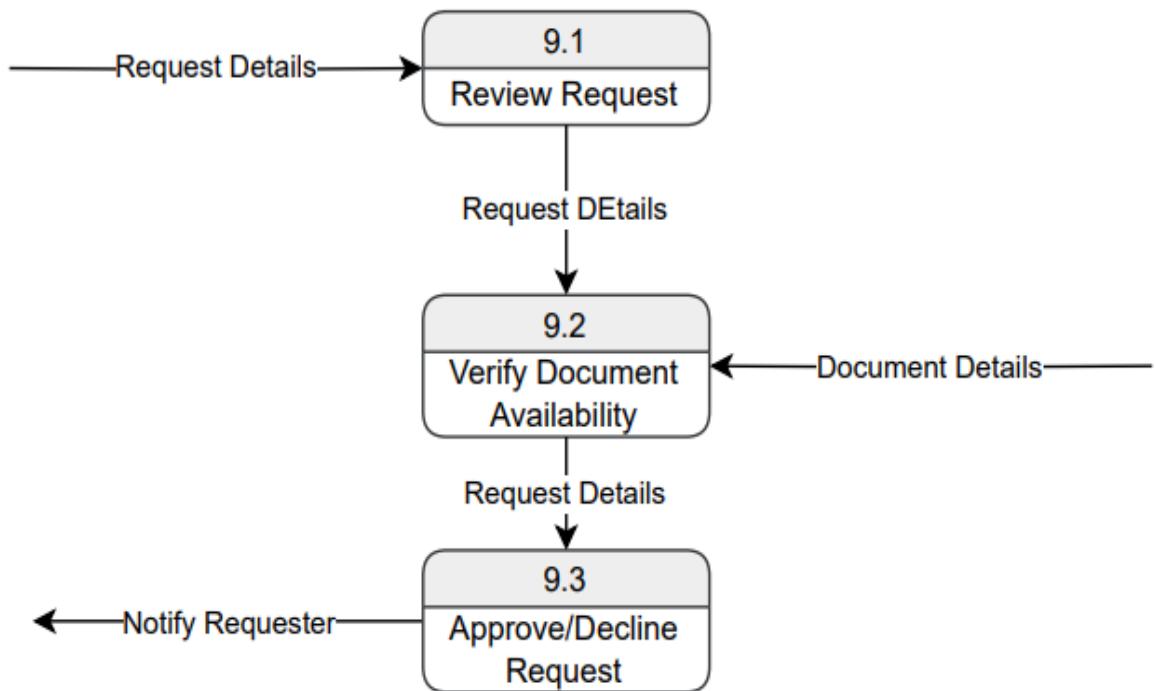


Figure 21: Level 1 - Dataflow Diagram for Process Document Requests

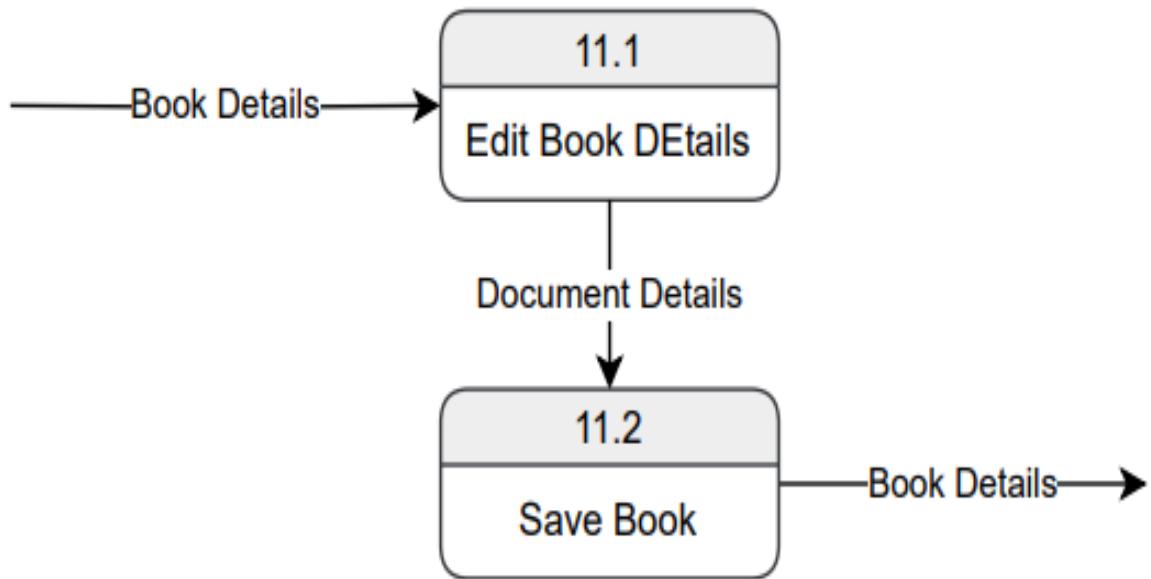


Figure 22: Level 1 - Dataflow Diagram for Update Books Details.

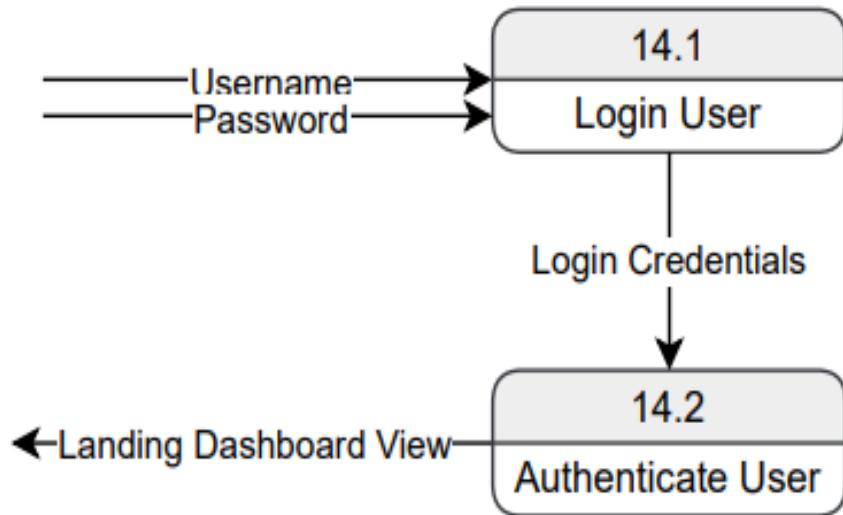


Figure 23: Level 1 - Dataflow Diagram for Librarian Login

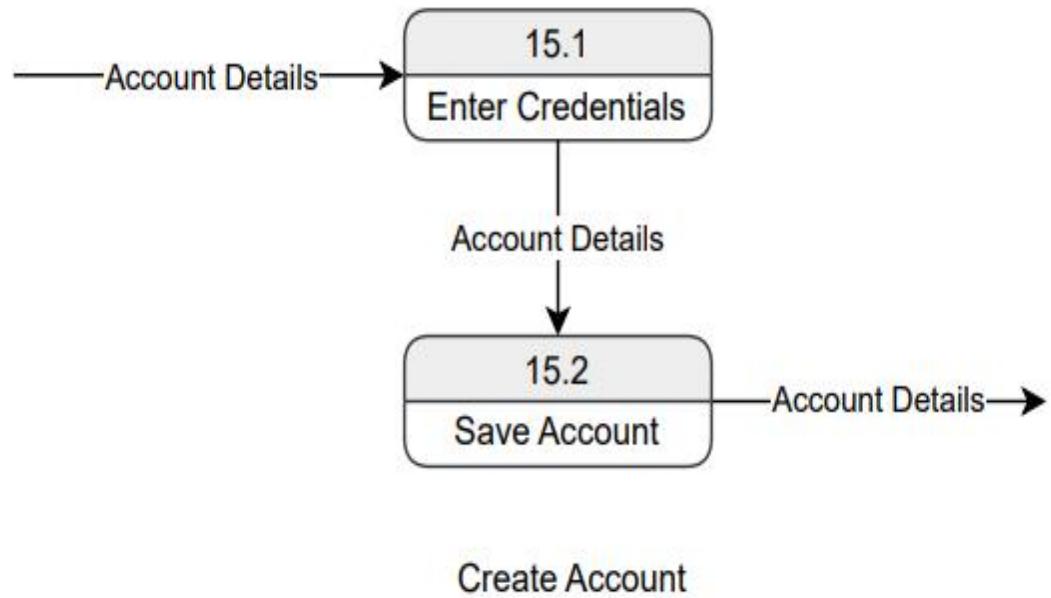


Figure 24: Level 1 - Dataflow Diagram for Librarian Create Account

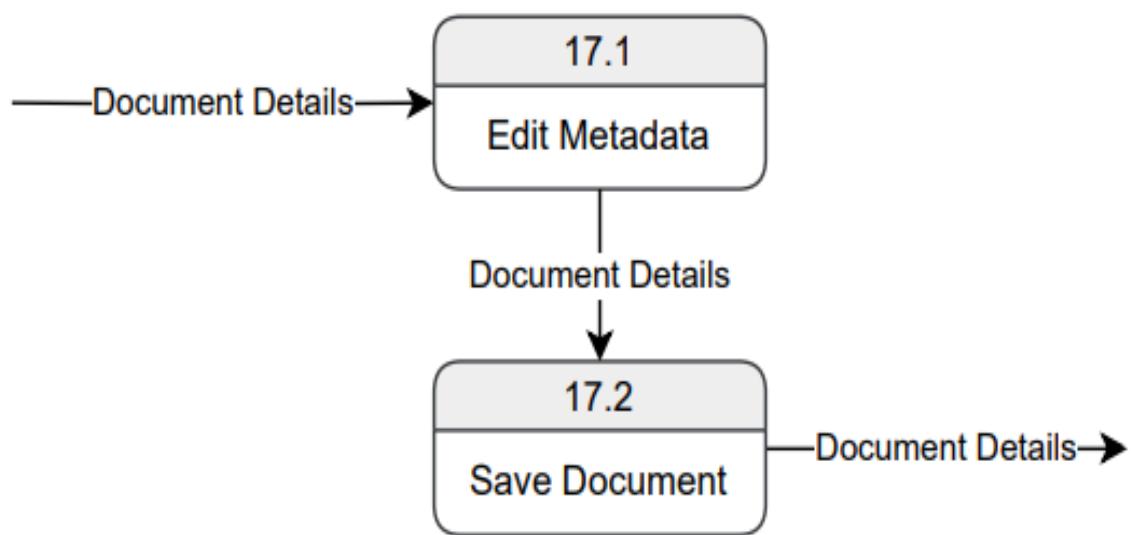


Figure 25. Level 1 - Dataflow Diagram for Librarian Update Document Details

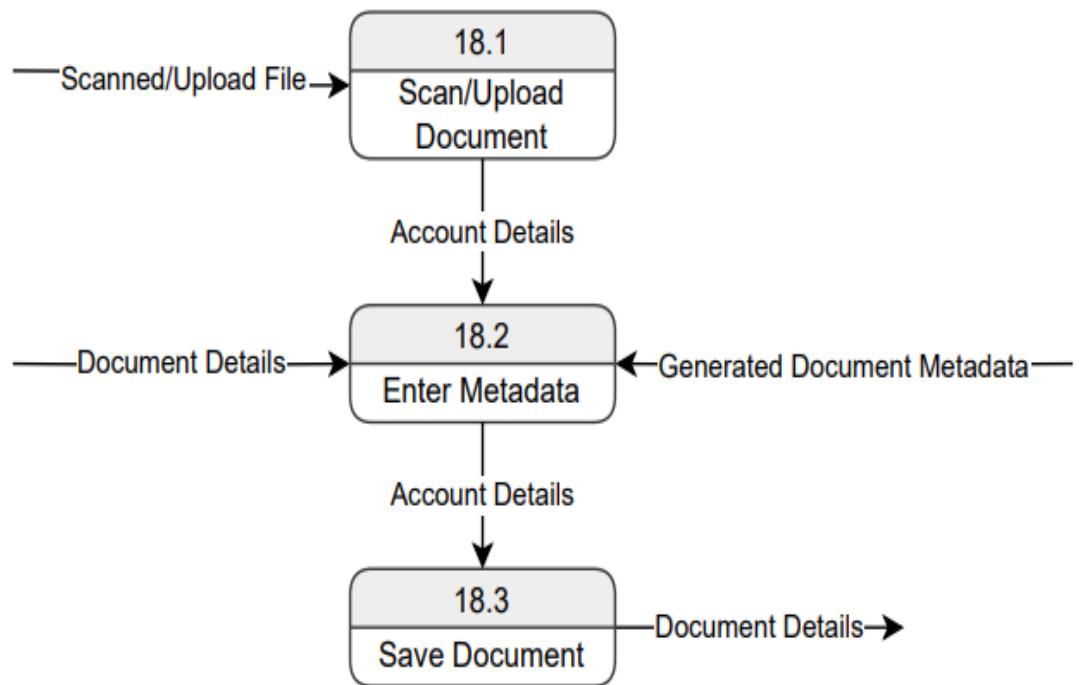


Figure 26. Level 1 - Dataflow Diagram for Upload/Scan Document

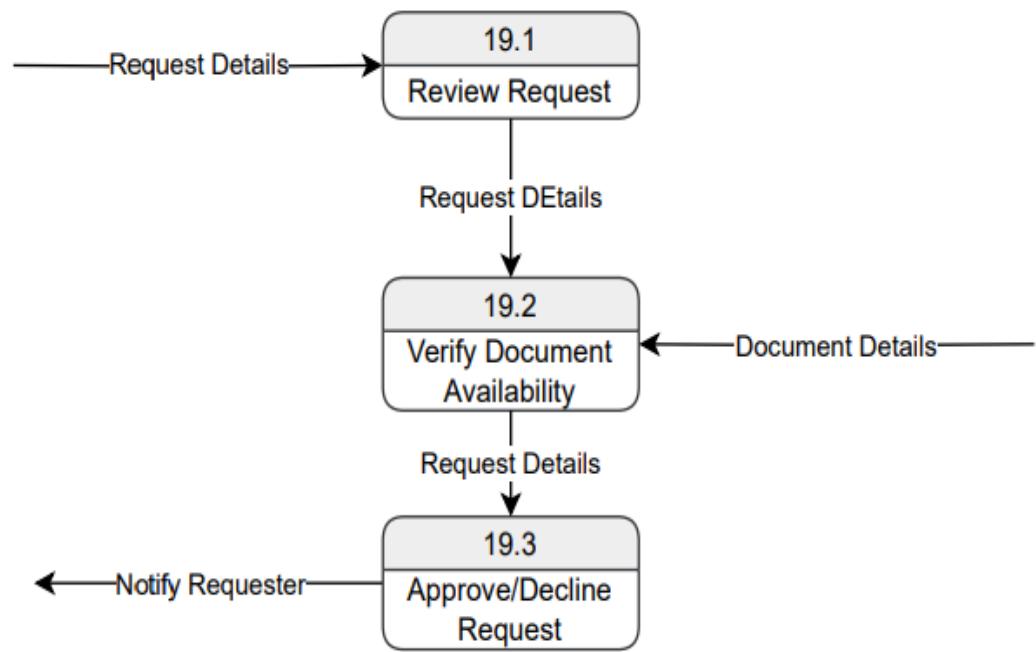


Figure 27. Level 1 - Dataflow Diagram for Process Document Requests

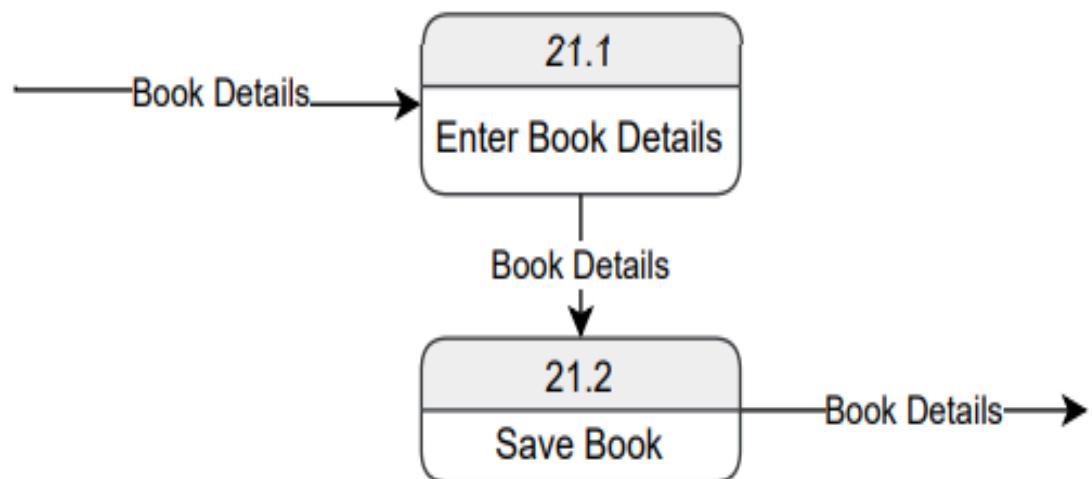


Figure 28. Level 1 - Dataflow Diagram for Upload Book Details

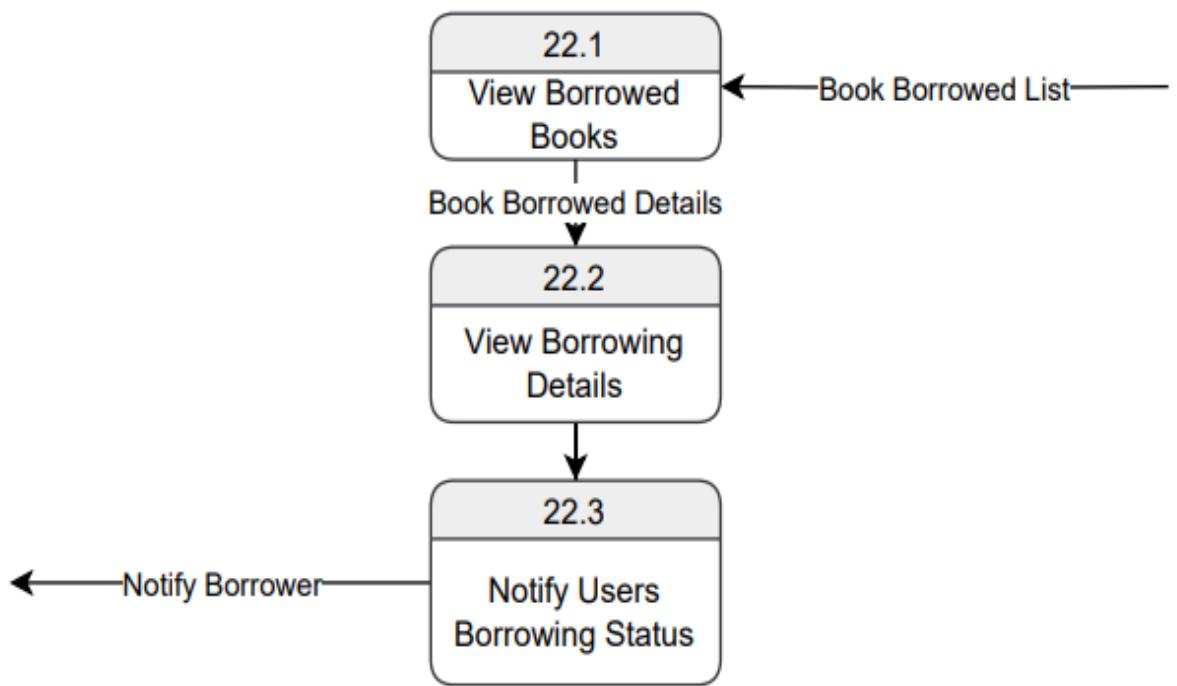


Figure 29. Level 1 - Dataflow Diagram for Track Book Borrowed

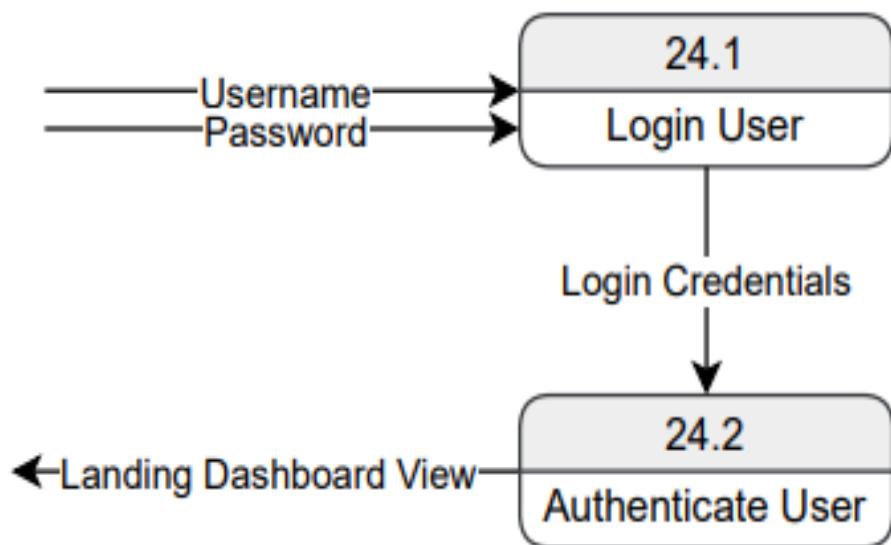


Figure 30. Level 1 - Dataflow Diagram for Researcher Login

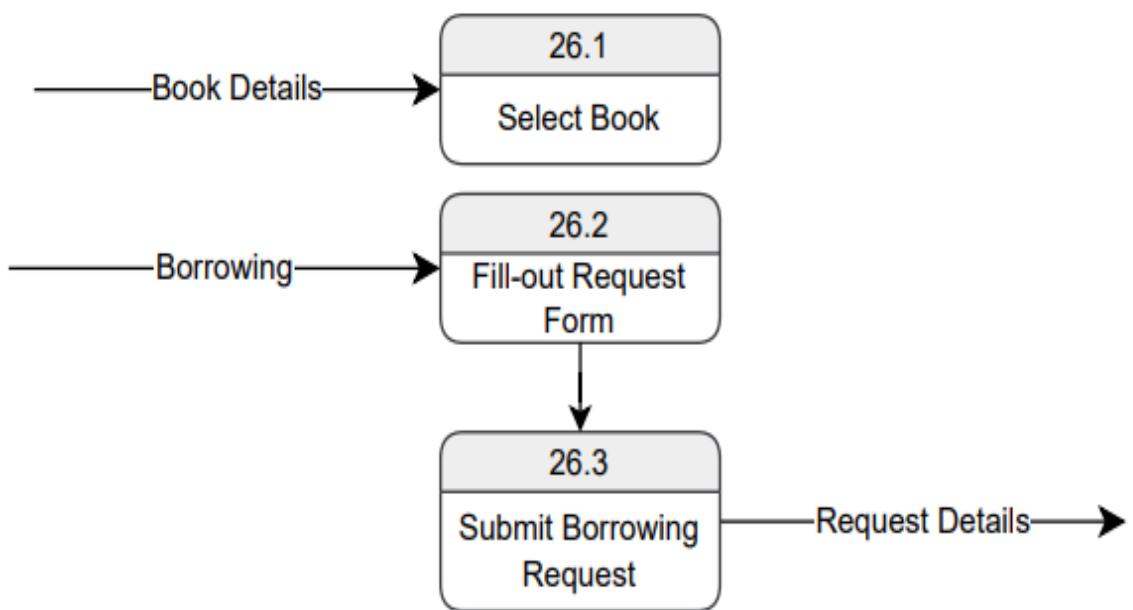


Figure 31. Level 1 - Dataflow Diagram for Request Book Borrowing

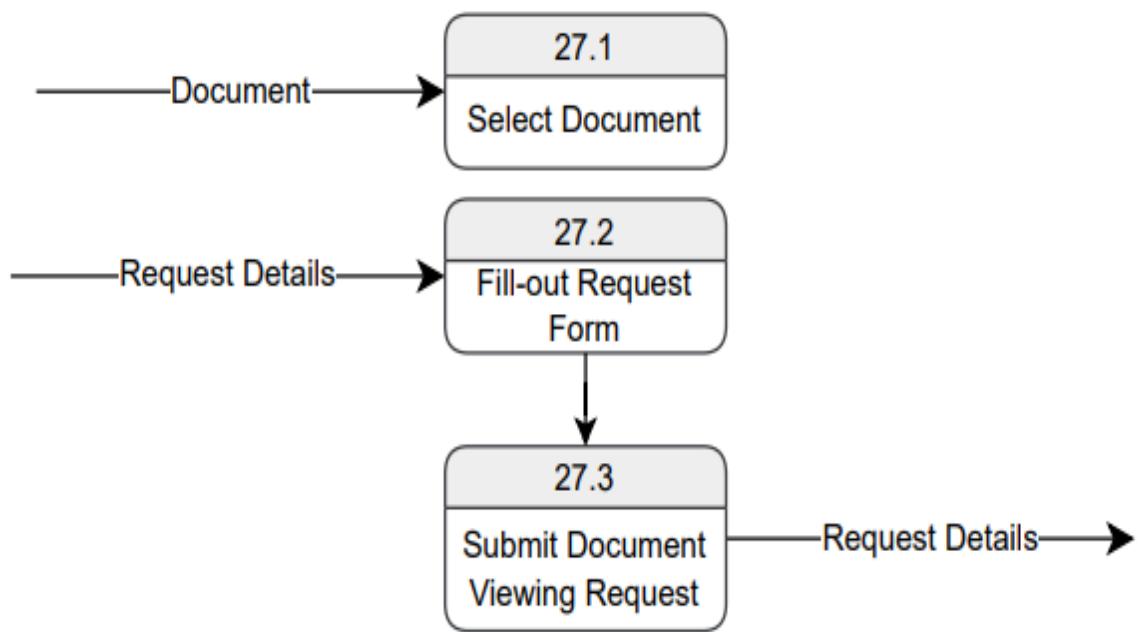


Figure 32. Level 1 - Dataflow Diagram for Request Document Viewing

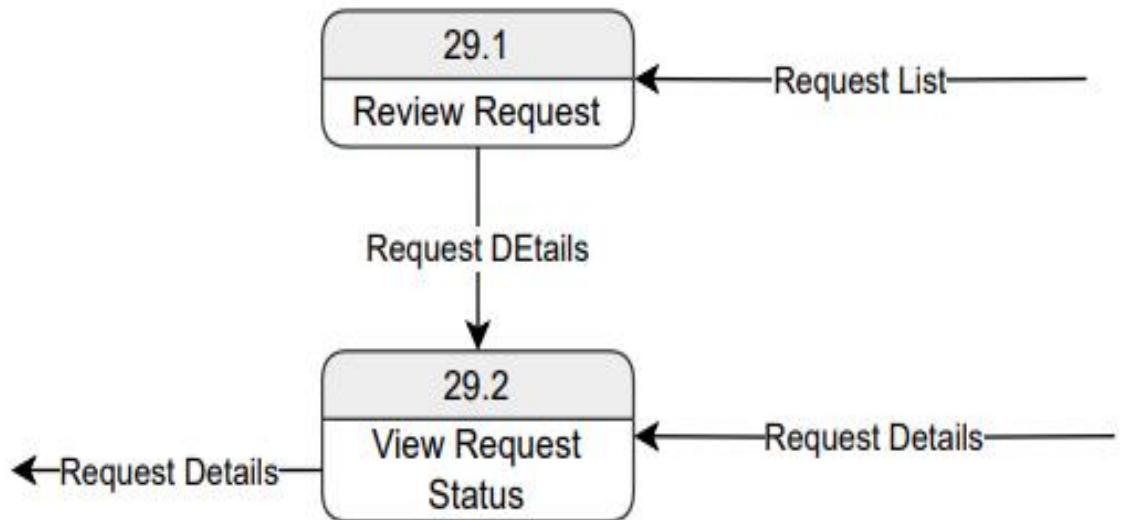


Figure 33. Level 1 - Dataflow Diagram for Track Document Request

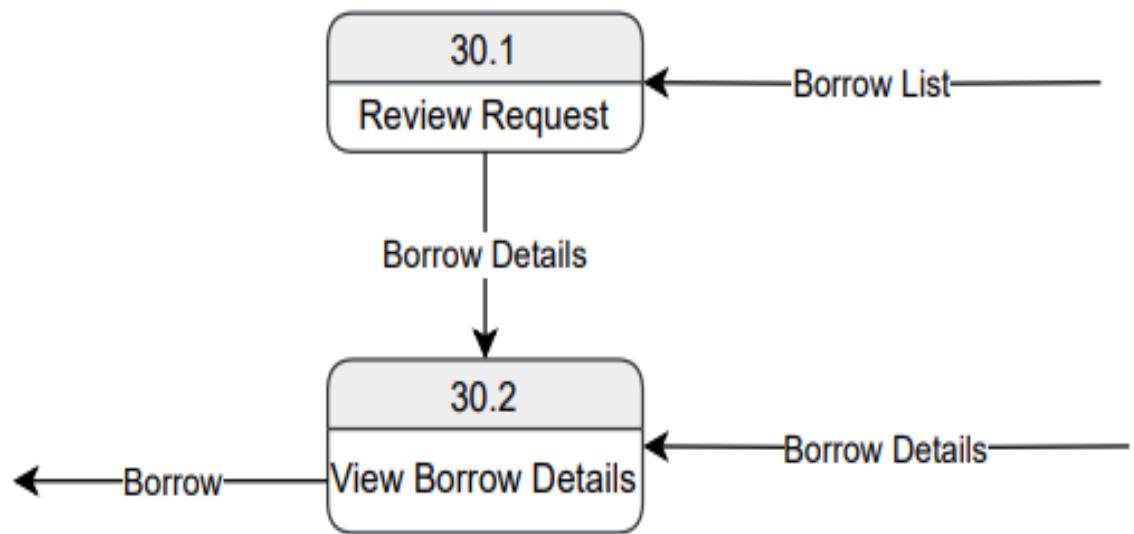


Figure 34. Level 1 - Dataflow Diagram for Track Borrowing Requests

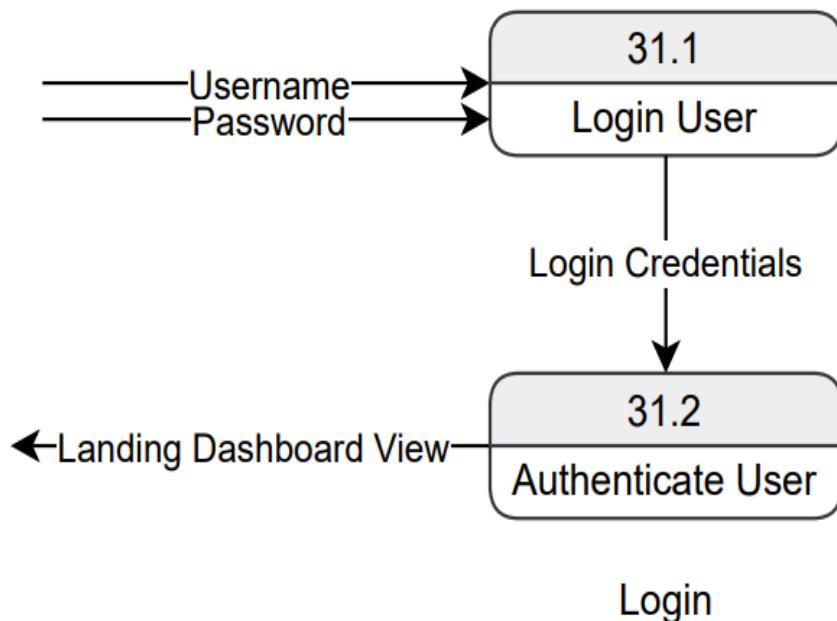


Figure 35. Level 1 - Dataflow Diagram for Government Agency Login

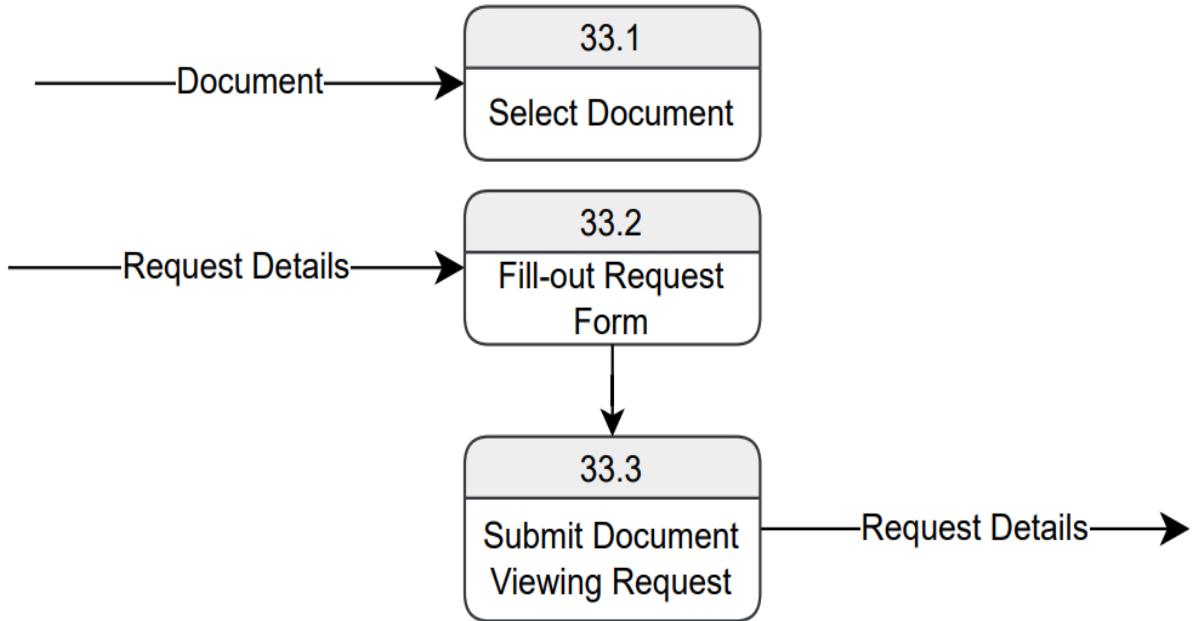


Figure 36. Level 1 - Dataflow Diagram for Request Document Viewing

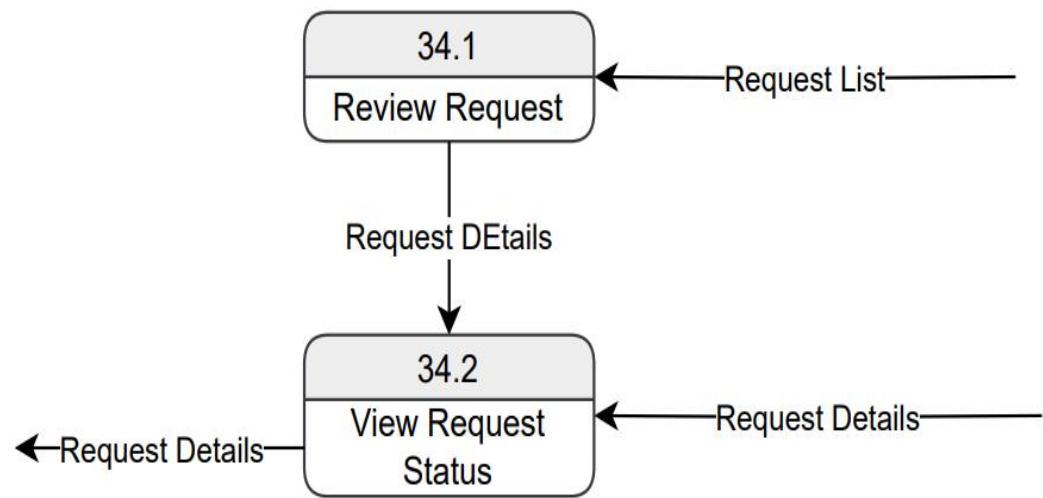


Figure 37. Level 1 - Dataflow Diagram for Track Document Request

Requirements Documentation

Requirements documentation outlines the software requirements of the project, including its intended use, features, and system design. It defines the system's expected behavior, performance, and both functional and non-functional requirements.

Functional Requirements

1.1.2 Librarian Functions

The process begins when a user enters their registered username and password on the login page to access the system. If the credentials are correct, the user is successfully logged in. If the user forgets their password, they can click on the "Forgot Password" link, enter their registered email address, and receive a verification link or code. After verifying their identity through the email, the user is allowed to create a new password, ensuring continued secure access to their account.

REQ001: Users shall be able to log in using their registered username and password.

A

LOGIN

USERNAME

PASSWORD

LOGIN

[Forgot password?](#)

B

LOGIN

USERNAME

JohnDoe

PASSWORD

.....

LOGIN

[Forgot password?](#)

C

LOGIN

Login Successful!

You have successfully logged in.

OK

LOGIN

[Forgot password?](#)

Figure 38 A –C: User Login

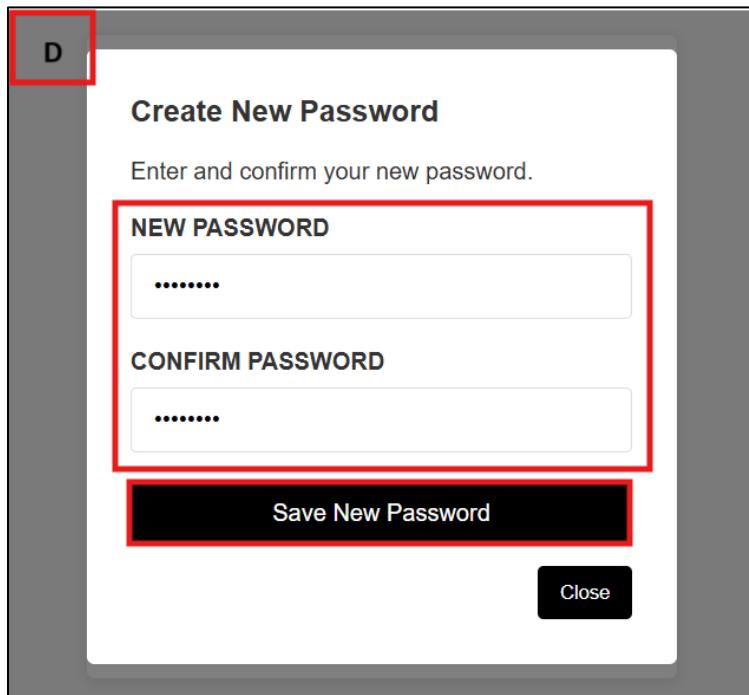
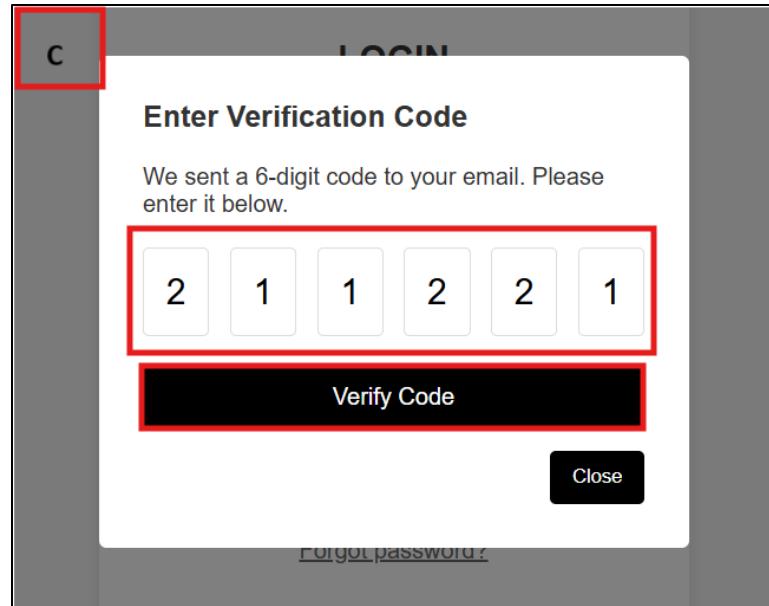
REQ002: Users shall be able to reset their password using a "Forgot Password" feature with email verification.

A

The image shows a login interface. At the top center is the word "LOGIN". Below it are two input fields: "USERNAME" containing "JohnDoe" and "PASSWORD" showing five dots. A large black "LOGIN" button is centered below the fields. At the bottom right of the form is a blue link labeled "Forgot password?". A red box highlights this link.

B

The image shows a modal dialog box titled "Reset Password". It contains the text: "Enter your email address and we'll send you a link to reset your password." Below this is an "EMAIL ADDRESS" field containing "johndoe@email.com". A large black "Send Reset Link" button is at the bottom. In the bottom right corner of the dialog is a small "Close" button. A red box highlights the "EMAIL ADDRESS" field and the "Send Reset Link" button.



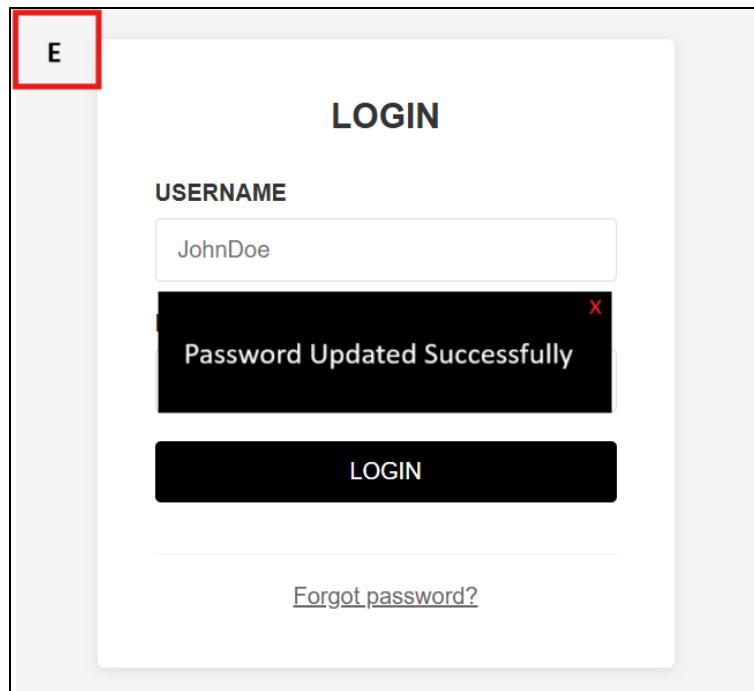


Figure 39 A–E: Reset Password

The library's book request processing system enables librarians to efficiently manage and regulate access to books by reviewing and approving or denying user requests. Librarians can examine pending requests, which display key details such as the borrowers information, requested titles, and submission dates.

REQ003: The Librarians shall process book requests by approving or denying user access

A

Dashboard

Book Request

Documents Request

Book Management

Documents Management

Book Requests

Document Title	Type	Category	Status	Requests	Last Updated	Actions
Library Policy Handbook	PDF	Administrative	Available	0	2023-10-15	<button style="border: 1px solid blue; border-radius: 2px; padding: 2px 5px; background-color: white; color: blue;">View</button>
Research Guidelines	DOCX	Academic	Available	3	2023-11-02	<button style="border: 1px solid blue; border-radius: 2px; padding: 2px 5px; background-color: white; color: blue;">View</button>
Annual Report 2022	PDF	Administrative	Pending Approval	5	2023-11-10	<button style="border: 1px solid blue; border-radius: 2px; padding: 2px 5px; background-color: white; color: blue;">View</button>
Citation Style Guide	PDF	Academic	Checked Out	12	2023-09-28	<button style="border: 1px solid blue; border-radius: 2px; padding: 2px 5px; background-color: white; color: blue;">View</button>
Library Event Calendar	XLSX	Events	Available	2	2023-11-15	<button style="border: 1px solid blue; border-radius: 2px; padding: 2px 5px; background-color: white; color: blue;">View</button>

B

Dashboard

Book Request

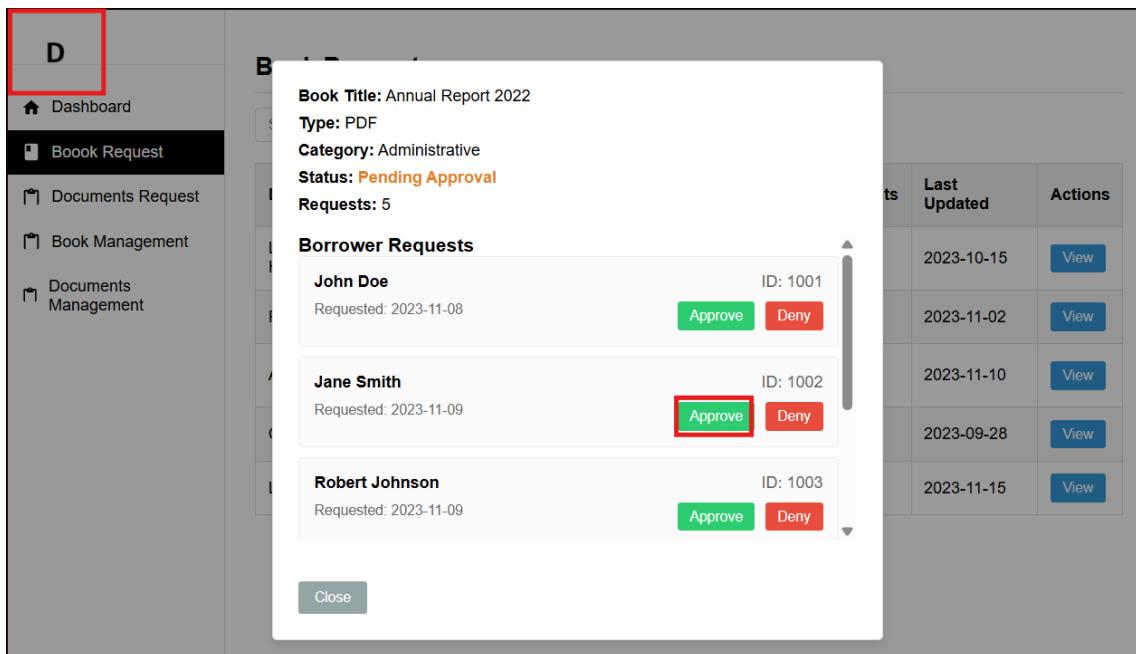
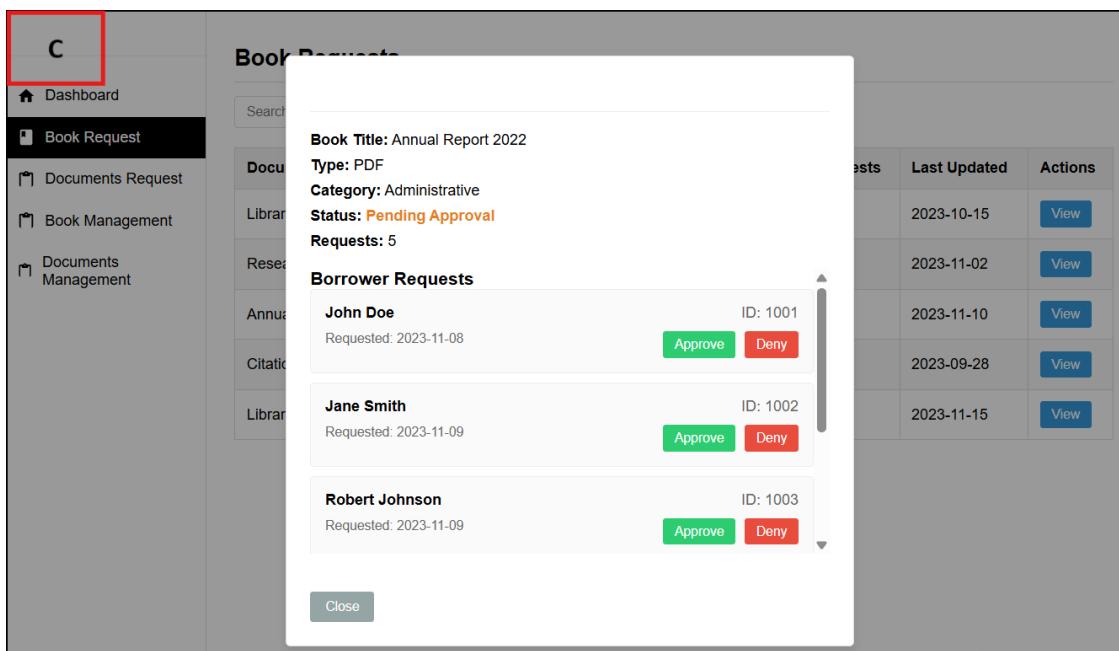
Documents Request

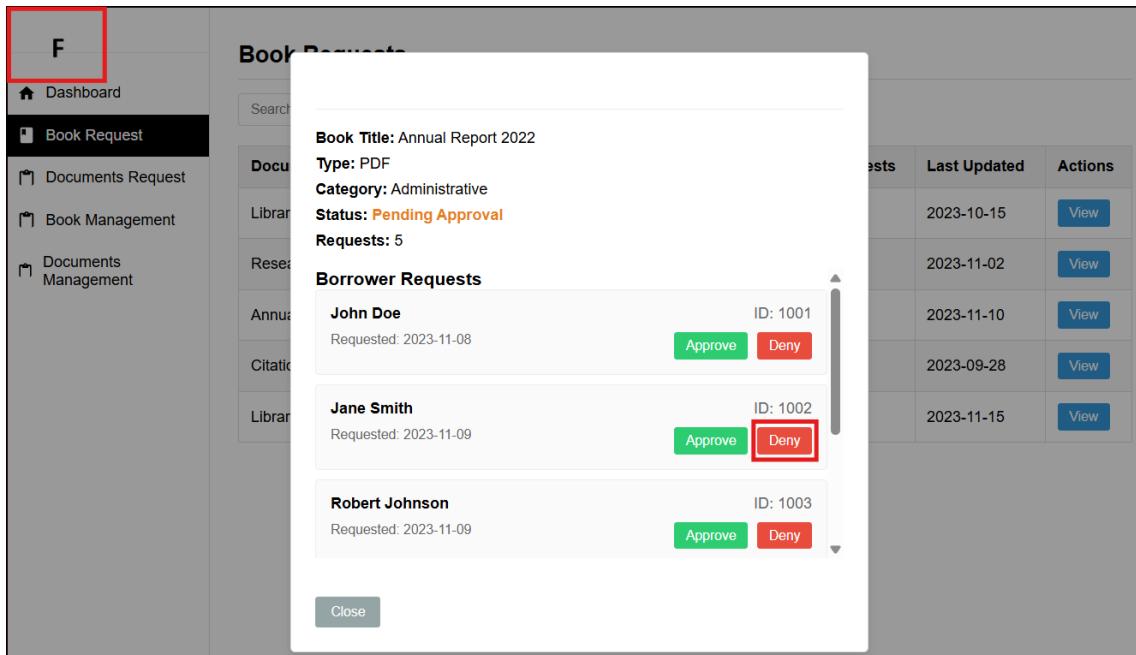
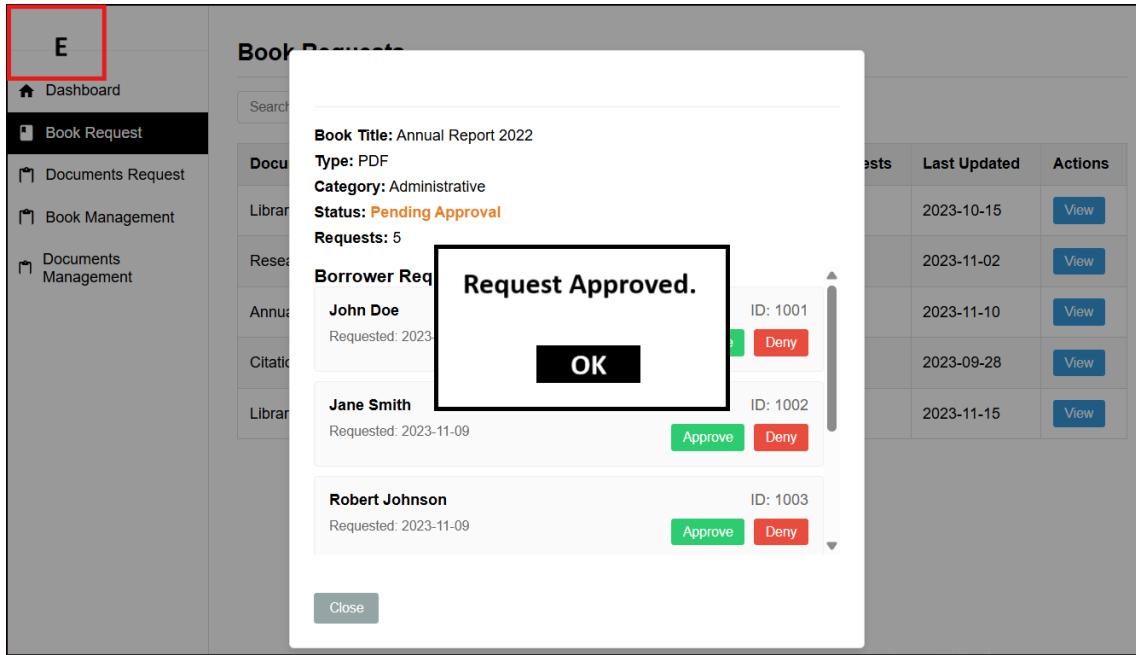
Book Management

Documents Management

Book Requests

Document Title	Type	Category	Status	Requests	Last Updated	Actions
Library Policy Handbook	PDF	Administrative	Available	0	2023-10-15	<button style="border: 1px solid blue; border-radius: 2px; padding: 2px 5px; background-color: white; color: blue;">View</button>
Research Guidelines	DOCX	Academic	Available	3	2023-11-02	<button style="border: 1px solid blue; border-radius: 2px; padding: 2px 5px; background-color: white; color: blue;">View</button>
Annual Report 2022	PDF	Administrative	Pending Approval	5	2023-11-10	<button style="border: 1px solid blue; border-radius: 2px; padding: 2px 5px; background-color: white; color: blue;">View</button>
Citation Style Guide	PDF	Academic	Checked Out	12	2023-09-28	<button style="border: 1px solid blue; border-radius: 2px; padding: 2px 5px; background-color: white; color: blue;">View</button>
Library Event Calendar	XLSX	Events	Available	2	2023-11-15	<button style="border: 1px solid blue; border-radius: 2px; padding: 2px 5px; background-color: white; color: blue;">View</button>





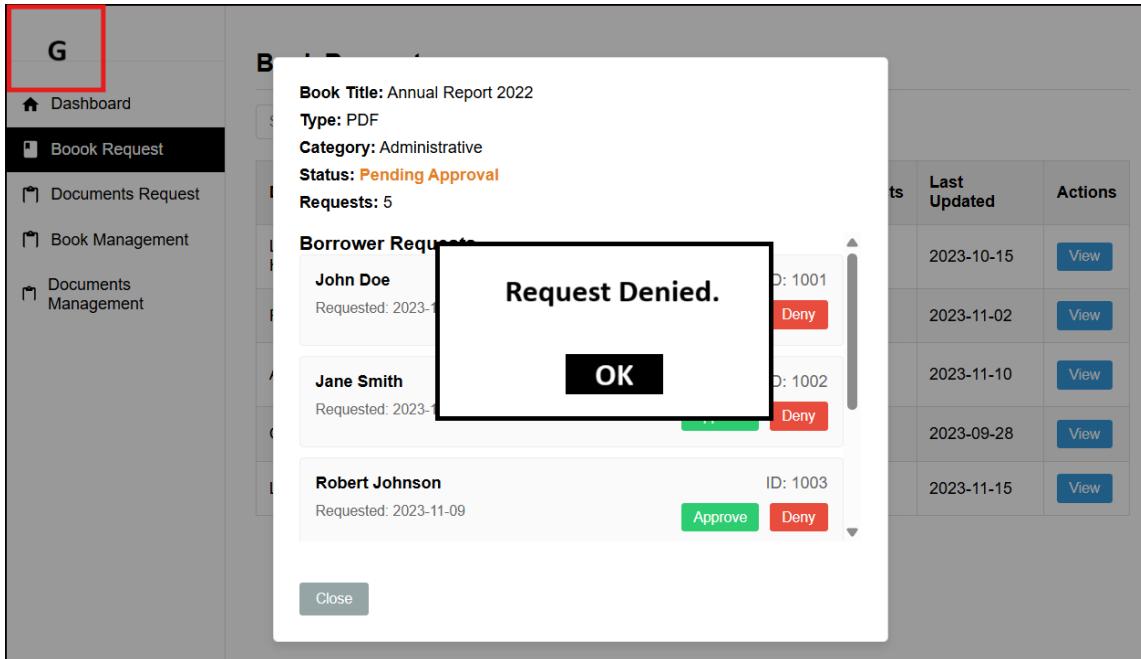


Figure 40 A–G. Book request processing by the Librarian

REQ004: The Librarians shall process documents requests by approving or denying user access

The screenshot shows a library management application interface. On the left is a sidebar with navigation links: Dashboard, Documents Request (highlighted with a red box), Book Request, Book Management, and Documents Management. The main content area (labeled A) displays a table titled 'Documents Requests' with a search bar above it. The table has columns: Document Title, Type, Category, Status, Requests, Last Updated, and Actions. The table data is as follows:

Document Title	Type	Category	Status	Requests	Last Updated	Actions
Library Policy Handbook	PDF	Administrative	Available	0	2023-10-15	View
Research Guidelines	DOCX	Academic	Available	3	2023-11-02	View
Annual Report 2022	PDF	Administrative	Pending Approval	5	2023-11-10	View
Citation Style Guide	PDF	Academic	Checked Out	12	2023-09-28	View
Library Event Calendar	XLSX	Events	Available	2	2023-11-15	View

B

Dashboard

Documents Request

- Book Request
- Book Management
- Documents Management

Documents Requests

Document Title	Type	Category	Status	Requests	Last Updated	Actions
Library Policy Handbook	PDF	Administrative	Available	0	2023-10-15	<button>View</button>
Research Guidelines	DOCX	Academic	Available	3	2023-11-02	<button>View</button>
Annual Report 2022	PDF	Administrative	Pending Approval	5	2023-11-10	<button>View</button>
Citation Style Guide	PDF	Academic	Checked Out	12	2023-09-28	<button>View</button>
Library Event Calendar	XLSX	Events	Available	2	2023-11-15	<button>View</button>

C

Dashboard

Documents Request

- Book Request
- Book Management
- Documents Management

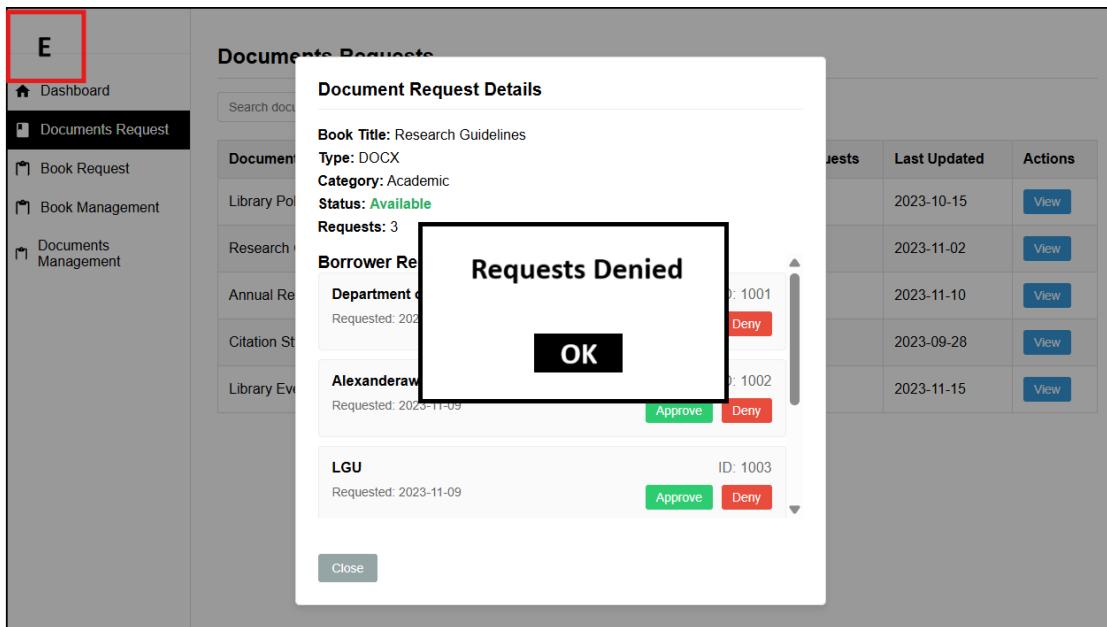
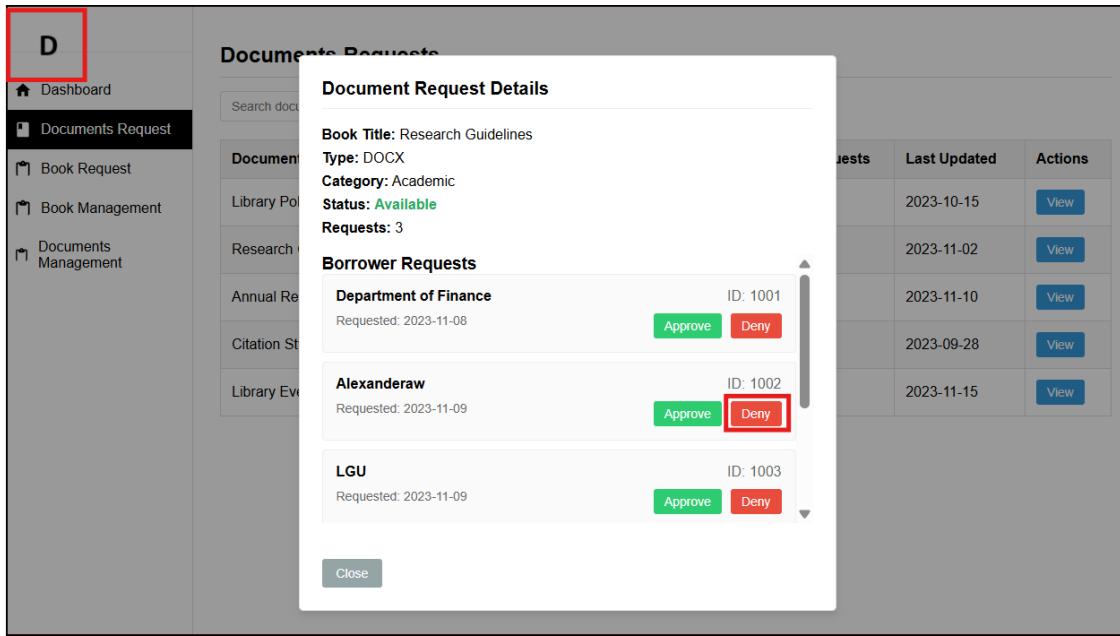
Document Request Details

Book Title: Research Guidelines
 Type: DOCX
 Category: Academic
 Status: Available
 Requests: 3

Borrower Requests

Borrower	Requested Date	ID	Actions
Department of Finance	2023-11-08	1001	<button>Approve</button> <button>Deny</button>
Alexanderaw	2023-11-09	1002	<button>Approve</button> <button>Deny</button>
LGU	2023-11-09	1003	<button>Approve</button> <button>Deny</button>

Close



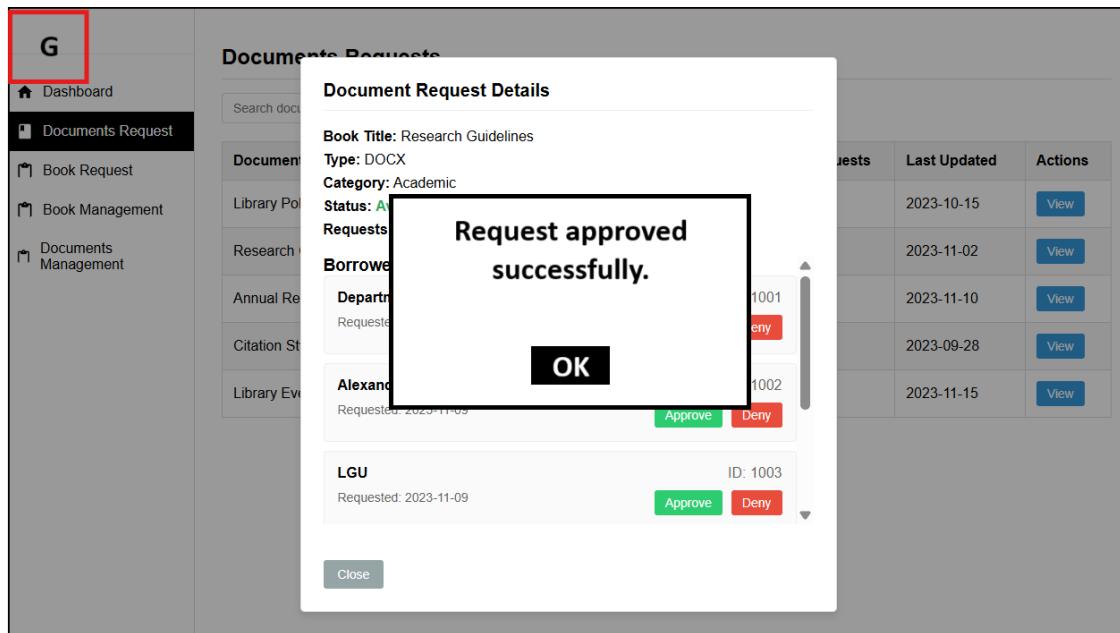
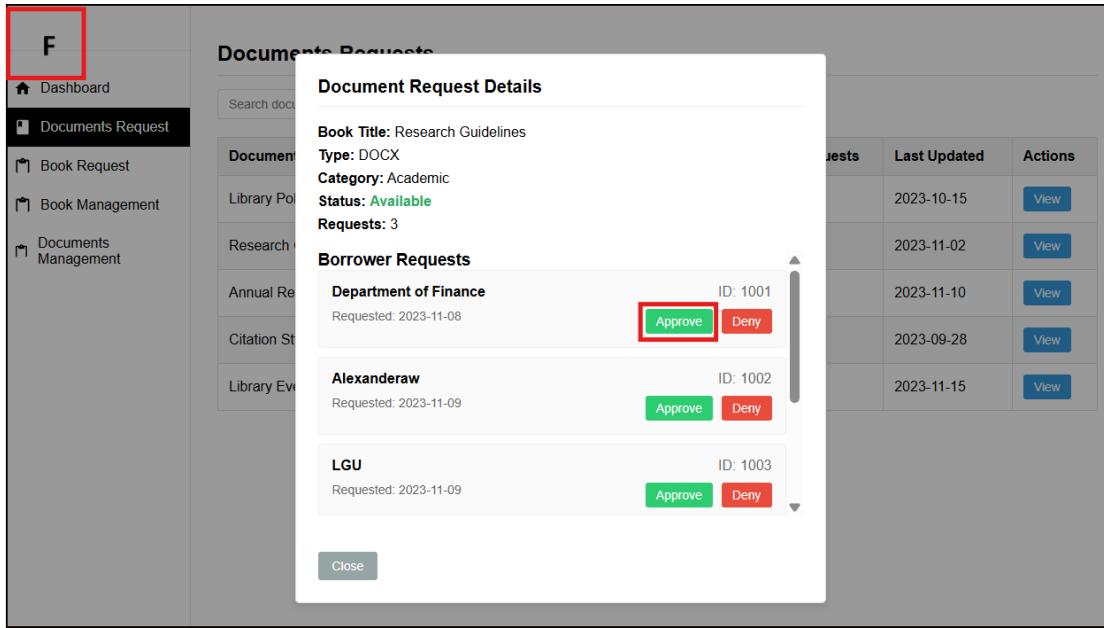
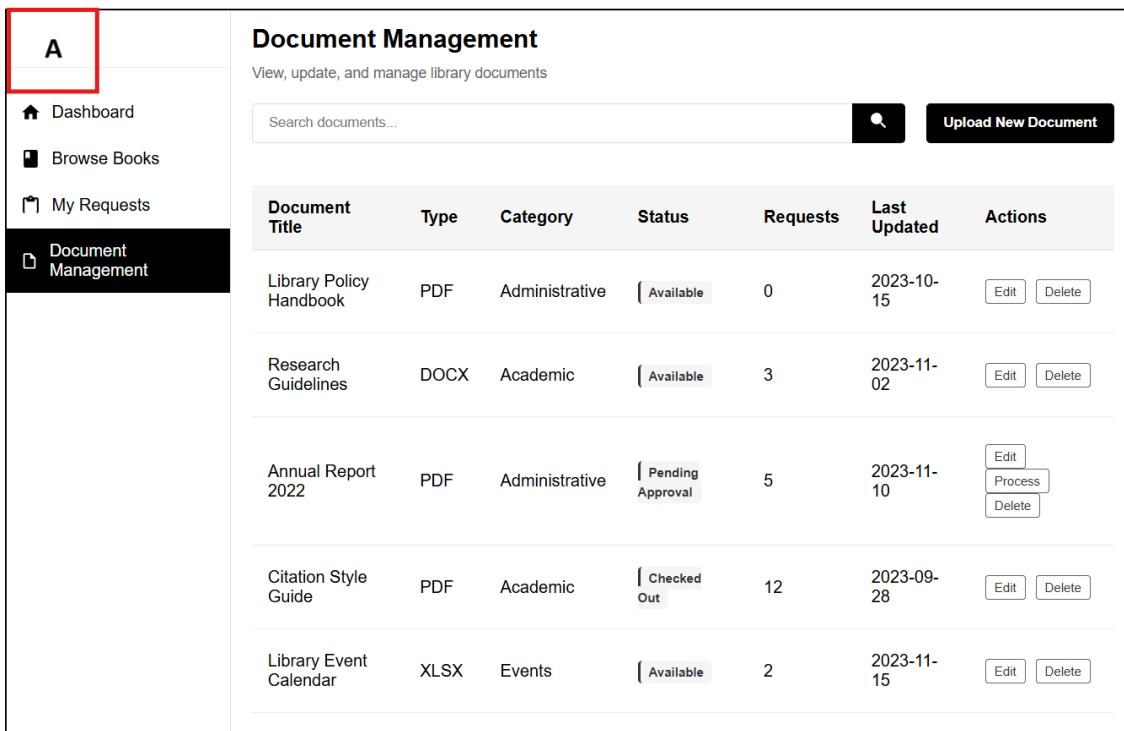


Figure 41 A–H: Document request processing by the Librarian

The system equips the librarian with comprehensive content and resource management functionalities. This includes full control over documents—such as viewing, updating, uploading, and processing requests—as well as managing the book inventory by viewing book listings, uploading book-related data including preservation status and storage location, and monitoring borrowed books. The librarian is also able to generate detailed reports to support administrative oversight and decision-making, specifically focusing on book borrowing, document requests, and preservation activities.

REQ005: The librarian shall manage documents, including viewing the document list, updating documents, uploading new documents.



A

Document Management
View, update, and manage library documents

Document Title	Type	Category	Status	Requests	Last Updated	Actions
Library Policy Handbook	PDF	Administrative	Available	0	2023-10-15	<button>Edit</button> <button>Delete</button>
Research Guidelines	DOCX	Academic	Available	3	2023-11-02	<button>Edit</button> <button>Delete</button>
Annual Report 2022	PDF	Administrative	Pending Approval	5	2023-11-10	<button>Edit</button> <button>Process</button> <button>Delete</button>
Citation Style Guide	PDF	Academic	Checked Out	12	2023-09-28	<button>Edit</button> <button>Delete</button>
Library Event Calendar	XLSX	Events	Available	2	2023-11-15	<button>Edit</button> <button>Delete</button>

B

Document Management							
View, update, and manage library documents							
<input type="text" value="Search documents..."/> 🔍 Upload New Document							
Document Title	Type	Category	Status	Requests	Last Updated	Actions	
Library Policy Handbook	PDF	Administrative	Available	0	2023-10-15	Edit	Delete
Research Guidelines	DOCX	Academic	Available	3	2023-11-02	Edit	Delete
Annual Report 2022	PDF	Administrative	Pending Approval	5	2023-11-10	Edit	Process
Citation Style Guide	PDF	Academic	Checked Out	12	2023-09-28	Edit	Delete
Library Event Calendar	XLSX	Events	Available	2	2023-11-15	Edit	Delete

C

Document Management							
View, update, and manage library documents							
<input type="text" value="Search documents..."/> 🔍 Upload New Document							
Document Title	Type	Category	Status	Last Updated	Actions		
Library Policy Handbook	PDF	Administrative	Available	2023-10-15	Edit	Delete	
Research Guidelines	DOCX	Academic	Available	2023-11-02	Edit	Delete	
Annual Report 2022	PDF	Administrative	Pending Approval	2023-11-10	Edit	Process	
Citation Style Guide	PDF	Academic	Checked Out	2023-09-28	Edit	Delete	
Library Event Calendar	XLSX	Events	Available	2023-11-15	Edit	Delete	

Edit Document

Document Title: Library Policy Handbook

Document Type: PDF

Category: Administrative

Description: Official library policies and procedures handbook

Cancel Save Changes

D

Document Management

View, update, and manage library documents

Document Title	Type	Category	Status	Requests	Last Updated	Actions
Library Policy Handbook	PDF	Administrative	Available	0	2023-10-15	<button>Edit</button> <button>Delete</button>
Research Guidelines	DOCX	Academic	Available	3	2023-11-02	<button>Edit</button> <button>Delete</button>
Annual Report 2022	PDF	Administrative	Pending Approval	5	2023-11-10	<button>Edit</button> <button>Process</button> <button>Delete</button>
Citation Style Guide	PDF	Academic	Checked Out	12	2023-09-28	<button>Edit</button> <button>Delete</button>
Library Event Calendar	XLSX	Events	Available	2	2023-11-15	<button>Edit</button> <button>Delete</button>

Document Updated Successfully

OK

E

Document Management

View, update, and manage library documents

Document Title	Type	Category	Status	Requests	Last Updated	Actions
Library Policy Handbook	PDF	Administrative	Available	0	2023-10-15	<button>Edit</button> <button>Delete</button>
Research Guidelines	DOCX	Academic	Available	3	2023-11-02	<button>Edit</button> <button>Delete</button>
Annual Report 2022	PDF	Administrative	Pending Approval	5	2023-11-10	<button>Edit</button> <button>Process</button> <button>Delete</button>
Citation Style Guide	PDF	Academic	Checked Out	12	2023-09-28	<button>Edit</button> <button>Delete</button>
Library Event Calendar	XLSX	Events	Available	2	2023-11-15	<button>Edit</button> <button>Delete</button>

F

Document Management

Upload New Document

Document Title

Document Type

Category

Description

Click to upload document file
No file selected

Cancel Upload Document

Last Updated	Actions
2023-10-15	Edit Delete
2023-11-02	Edit Delete
2023-11-10	Edit Process Delete
2023-09-28	Edit Delete
2023-11-15	Edit Delete

G

Document Management

Upload New Document

Document Title

CAPSTONE

Document Type

PDF

Category

Research

Description

Capstone 1

Click to upload document file
GROUP-4-ELECTRONIC-RECORDS-ARCHIVAL-REQUEST-AND-RETRIEVAL-SYSTEM-FOR-THE-CITY-LIBRARY-OF-KORONADAL-APRIL-24-1.docx

Cancel Upload Document

Last Updated	Actions
2023-10-15	Edit Delete
2023-11-02	Edit Delete
2023-11-10	Edit Process Delete
2023-09-28	Edit Delete
2023-11-15	Edit Delete

The screenshot shows a web-based document management system. On the left is a sidebar with icons for Dashboard, Browse Books, My Requests, and Document Management (which is selected). The main area has a title 'Document Management' with the subtitle 'View, update, and manage library documents'. It includes a search bar and a button to 'Upload New Document'. A table lists five documents:

Document Title	Type	Category	Status	Requests	Last Updated	Actions
Library Policy Handbook	PDF	Administrative	Available	0	2023-10-15	<button>Edit</button> <button>Delete</button>
Research Guidelines					2023-11-02	<button>Edit</button> <button>Delete</button>
Annual Report 2022					2023-11-10	<button>Edit</button> <button>Process</button> <button>Delete</button>
Citation Style Guide	PDF	Academic	Checked Out	12	2023-09-28	<button>Edit</button> <button>Delete</button>
Library Event Calendar	XLSX	Events	Available	2	2023-11-15	<button>Edit</button> <button>Delete</button>

A modal window is open in the center of the table, displaying the message 'Document uploaded successfully!' with an 'OK' button.

Figure 42 A–H: Document processing by the Librarian

The system provides functionality for the librarian to produce a Book Borrowing Report, which details all books borrowed by users along with relevant dates and borrower information; a Document Request Report, which summarizes user-submitted requests for specific documents or materials; and a Preservation Report, which outlines the status of archived materials, including preservation actions taken or needed. This feature ensures proper record-keeping, supports decision-making, and aids in tracking the library's operational and preservation activities.

REQ006: The librarian shall generate reports including the Book Borrowing Report, Document Request Report, and Preservation Report.

A	<h3>Library Reports</h3> <p>Generate and export system reports</p> <div style="display: flex; justify-content: space-around;"> <div style="width: 33%;"> Book Borrowing Report  <p>Track all book lending activity with detailed borrower information and loan periods.</p> <p>Report Period Last 7 days</p> <p>Loan Status All loans</p> <p>Book Category All categories</p> <p>Generate Report</p> <p>Report preview will appear here</p> </div> <div style="width: 33%;"> Document Request Report  <p>Analyze library usage patterns including popular items.</p> <p>Report Period Last 7 days</p> <p>Primary Metric Checkouts by item</p> <p>Group By Day</p> <p>Generate Report</p> <p>Report preview will appear here</p> </div> <div style="width: 33%;"> Preservation Report  <p>Monitor item conditions, preservation actions, and storage location changes.</p> <p>Report Period Last 7 days</p> <p>Item Status All items</p> <p>Action Type All actions</p> <p>Generate Report</p> <p>Report preview will appear here</p> </div> </div>		
----------	---	--	--

B

Library Reports
Generate and export system reports

Book Borrowing Report

Track all book lending activity with detailed borrower information and loan periods.

Report Period: Last 7 days

Loan Status: All loans

Book Category: All categories

Generate Report

Report preview will appear here

Document Request Report

Analyze library usage patterns including popular items.

Report Period: Last 7 days

Primary Metric: Checkouts by item

Group By: Day

Generate Report

Report preview will appear here

Preservation Report

Monitor item conditions, preservation actions, and storage location changes.

Report Period: Last 7 days

Item Status: All items

Action Type: All actions

Generate Report

Report preview will appear here

C

Library Reports
Generate and export system reports

Book Borrowing Report

Track all book lending activity with detailed borrower information and loan periods.

Report Period: Last 7 days

Loan Status: All loans

Book Category: All categories

Generate Report

Report preview will appear here

Document Request Report

Analyze library usage patterns.

Generate Report

Report preview will appear here

Preservation Report

Monitor item conditions, preservation actions, and storage location changes.

Report Period: Last 7 days

Item Status: All items

Action Type: All actions

Generate Report

Report preview will appear here

Report Generated Successfully

Your report has been generated with 42 records. Choose an export option below:

Report Details:
Type: Book Borrowing Report
Period: Last 30 days
Filters: All categories, All loans

Export Options:

-
-
-

Figure 43 A – C: Reports Generation

The system shall allow the librarian to manage user onboarding by creating accounts specifically for researchers, ensuring controlled and efficient user management within the system.

REQ007: The librarian shall be able to create researcher accounts.

A

User Account Management

Create, update, and deactivate user accounts

Search users...

Name	Username	Email	Department	Role	Status	Actions
John Smith	jsmith	john.smith@example.com	Library	Admin	Active	<input type="button" value="Edit"/> <input type="button" value="Deactivate"/>
Sarah Johnson	sjohnson	sarah.j@example.com	Library	Librarian	Active	<input type="button" value="Edit"/> <input type="button" value="Deactivate"/>
Michael Brown	mbrown	michael.b@example.com	Research	Researcher	Active	<input type="button" value="Edit"/> <input type="button" value="Deactivate"/>

B

User Account Management

Create, update, and deactivate user accounts

Search users...

Create New User

Full Name	<input type="text" value="John Smith"/>	Role	<input type="text" value="Admin"/>	Status	<input type="text" value="Active"/>	Actions
Username	<input type="text" value="jsmith"/>	Librarian	<input type="text" value="Librarian"/>	Edit	Deactivate	
Email	<input type="text" value="john.smith@example.com"/>	Researcher	<input type="text" value="Researcher"/>	Edit	Deactivate	
Role	<input type="text" value="Select role..."/>					
Department	<input type="text" value="Library"/>					

C

User Account Management

Create New User

Full Name
Piolo Pascual

Username
papaP

Email
piolopascual@123gmail.com

Role
Researcher

Department

Cancel **Save User**

Role	Status	Actions
Admin	Active	Edit Deactivate
Librarian	Active	Edit Deactivate
Researcher	Active	Edit Deactivate

D

User Account Management

Create, update, and deactivate user accounts

Search users...

Export User List **Create New User**

Name	User	Role	Status	Actions
John Smith	jsmith	Admin	Active	Edit Deactivate
Sarah Johnson	sjohn	Librarian	Active	Edit Deactivate
Michael Brown	mbro	Researcher	Active	Edit Deactivate

User Piolo Pascual has been successfully saved.

OK

Figure 44 A–D: Researcher account creation for Librarian

The system empowers the librarian with administrative capabilities by allowing access to a centralized dashboard for monitoring key system metrics and performance.

REQ008: The librarian shall access the dashboard to view system metrics.

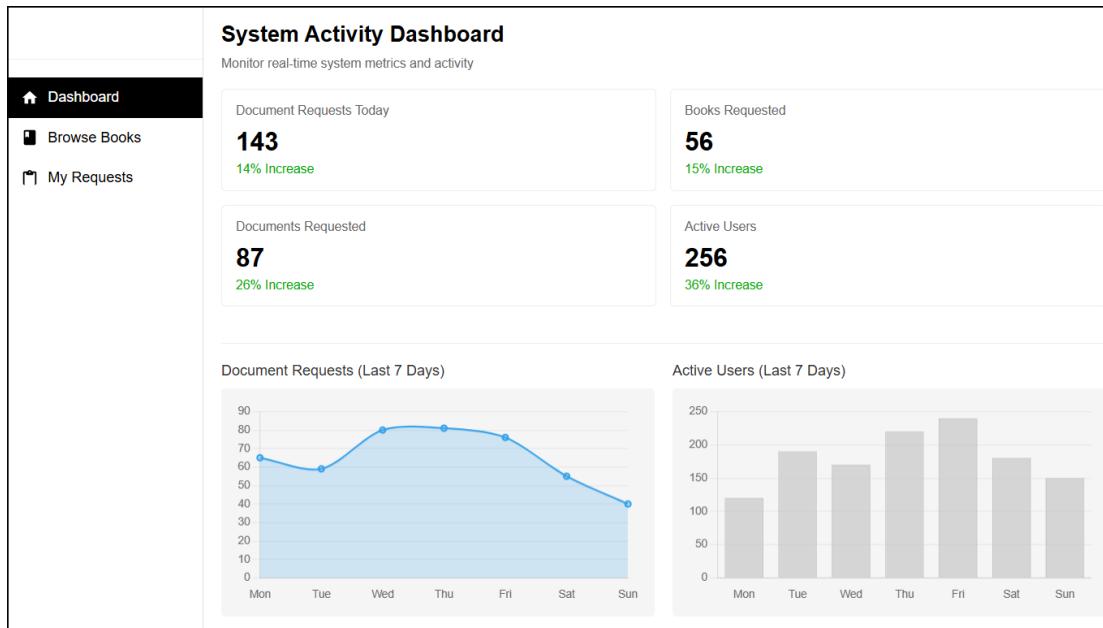


Figure 45. System activity dashboard for Librarian

The system sends alerts via email, SMS, and in-app notifications related to document and book management. Librarians receive automatic notifications for new document or book requests that require processing, as well as reminders for overdue returns and upcoming due dates. The system ensures that librarians can take timely action on pending requests and overdue materials, improving the efficiency of library operations and maintaining proper record circulation.

REQ009: Librarians receive automatic notifications for new document or book requests that require processing, as well as reminders for overdue returns and upcoming due dates.

The screenshot shows a mobile application interface for librarians. On the left is a vertical navigation menu with icons and labels: Dashboard, Book Management, Documents Management, Book Request, Documents Request, and Notifications (which is highlighted with a black background). To the right is a main content area titled "Notifications". It displays four types of notifications in cards:

- New Book Request**: Researcher John Smith has requested "Advanced Machine Learning" (ISBN: 978-0262035613). Includes a "Process" button.
- New Document Request**: Graduate student Sarah Johnson has requested access to "Annual Research Report 2022". Includes a "Review" button.
- Overdue Book**: "The Design of Everyday Things" checked out by Michael Brown is 5 days overdue. Includes "Send Reminder" and "View" buttons.
- Upcoming Due Date**: 3 books checked out by Emily Davis are due tomorrow. Includes a "View Items" button.

Figure 46. Notifications for Librarians

1.1.3 Administrator Functions

The Administrator serves as the central authority managing user access, content, roles, and system integrity within the application. Administrators can log in using secure credentials (REQ008) and recover access through email-verified password resets (REQ009). Once authenticated, they gain access to a comprehensive dashboard displaying essential system metrics (REQ010).

REQ010: Users shall be able to log in using their registered username and password.

A

LOGIN

USERNAME

PASSWORD

LOGIN

[Forgot password?](#)

B

LOGIN

USERNAME

JohnDoe

PASSWORD

LOGIN

[Forgot password?](#)

Figure 47 A-C: Administrator Login

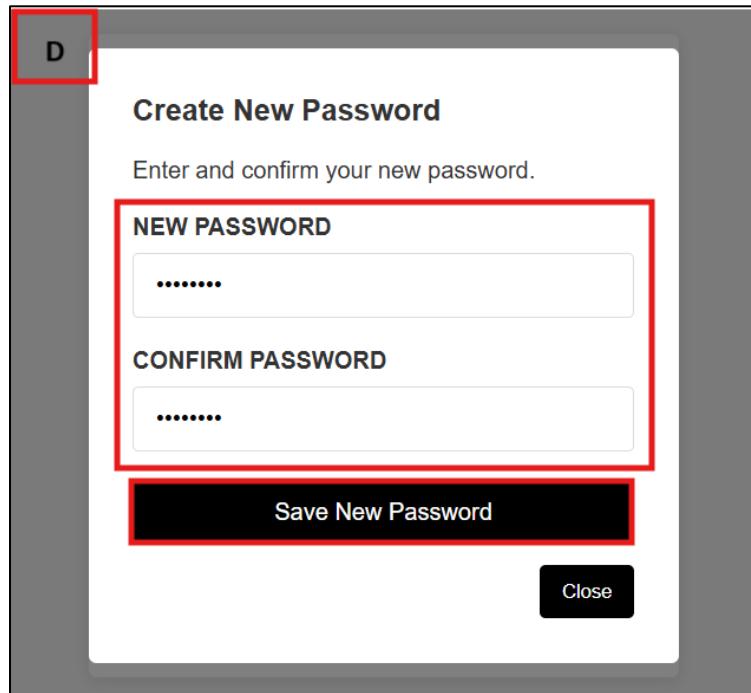
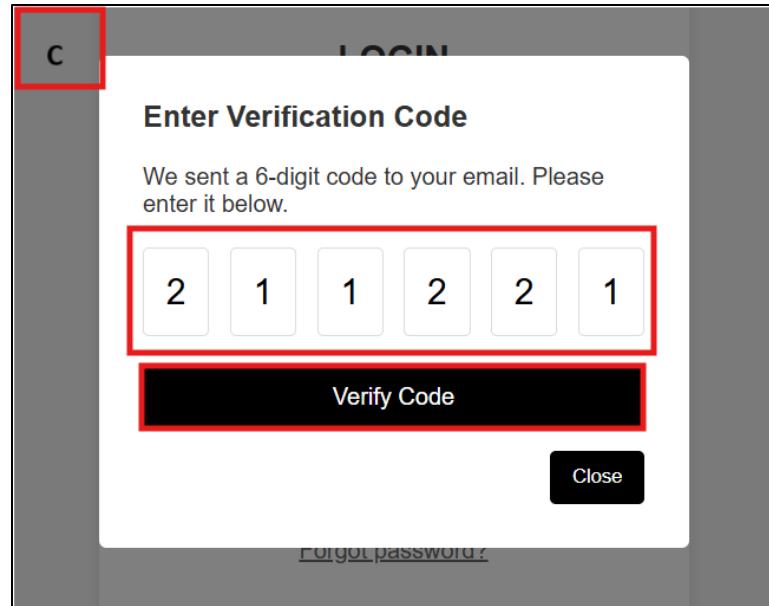
REQ0011: Users shall be able to reset their password using a "Forgot Password" feature with email verification.

A

The image shows a login interface. At the top center is the word "LOGIN". Below it are two input fields: "USERNAME" containing "JohnDoe" and "PASSWORD" showing five dots. A large black "LOGIN" button is centered below the fields. At the bottom right of the form is a link "Forgot password?" which is highlighted with a red rectangular box.

B

The image shows a "Reset Password" dialog box. At the top center is the title "Reset Password". Below it is a text instruction: "Enter your email address and we'll send you a link to reset your password." Underneath is an "EMAIL ADDRESS" label followed by an input field containing "johndoe@email.com". A large black "Send Reset Link" button is positioned below the input field. In the bottom right corner of the dialog is a "Close" button.



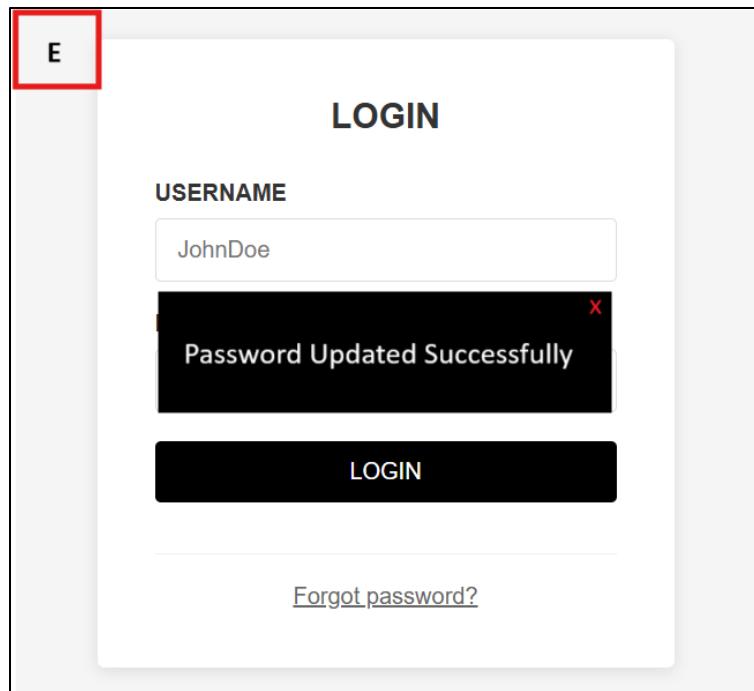


Figure 48 A-E: Reset Password

REQ012 The administrator shall access the dashboard to view system metrics.

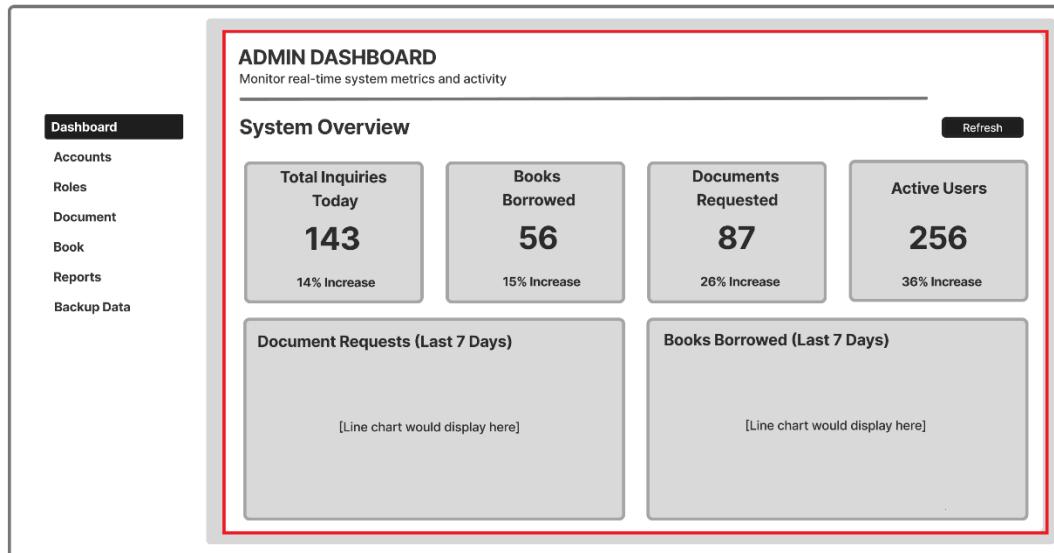


Figure 49: Admin Dashboard

Through the admin portal, the Administrator has full control over user management—including creating (REQ011), updating (REQ012), and deactivating accounts (REQ013). They also handle role-based access by viewing (REQ014), adding (REQ015), updating (REQ016), and deleting system roles (REQ017).

REQ013: The administrator shall create user accounts via the admin portal.

The figure shows a screenshot of the User Account Management interface. On the left is a sidebar with a 'Dashboard' button highlighted in black, and other options like Accounts, Roles, Document, Book, Reports, and Backup Data. The main area has a red border and is titled 'User Account Management' with the subtitle 'Create, update, and deactivate user accounts.' It features a search bar 'Search users' and a table with columns: Name, Username, Email, Role, Status, and Actions (Edit, Activate, Deactivate). Three rows are listed: John Doe (Administrator, Active), Melbet Bike (Librarian, Active), and Pang Noy (Researcher, Active). To the right is a 'Create/Update Account' form with fields for Full Name, Username, Email, and Role (set to Admin). Buttons for Clear and Save are at the bottom. The 'Edit' button in the table for Pang Noy is also highlighted with a red border.

B

User Account Management
Create, update, and deactivate user accounts.

Name	Username	Email	Role	Status	Actions
John Doe	jdoe23	johndoe@gmail.com	Administrator	Active	<button>Edit</button> <button>Activate</button> <button>Deactivate</button>
Melbet Bike	mBike	melbike@gmail.com	Librarian	Active	<button>Edit</button> <button>Activate</button> <button>Deactivate</button>
Pangs Noy	pangskie	panga123@gmail.com	Researcher	Active	<button>Edit</button> <button>Activate</button> <button>Deactivate</button>

Create/Update Account

Full Name

Username

Email

Role

Clear Save

C

User Account Management
Create, update, and deactivate user accounts.

Name	Username	Actions		
John Doe	jdoe23	<button>Edit</button> <button>Activate</button> <button>Deactivate</button>		
Melbet Bike	mBike	<button>Edit</button> <button>Activate</button> <button>Deactivate</button>		
Pangs Noy	pangskie	<button>Edit</button> <button>Activate</button> <button>Deactivate</button>		

User saved

User papaP has been successfully created.

Confirm

Create/Update Account

Full Name

Username

Email

Role

Clear Save

D

User Account Management
Create, update, and deactivate user accounts.

Name	Username	Email	Role	Status	Actions
John Doe	jdoe23	johndoe@gmail.com	Administrator	Active	<button>Edit</button> <button>Activate</button> <button>Deactivate</button>
Melbet Bike	mBike	melbike@gmail.com	Librarian	Active	<button>Edit</button> <button>Activate</button> <button>Deactivate</button>
Pangs Noy	pangskie	panga123@gmail.com	Researcher	Active	<button>Edit</button> <button>Activate</button> <button>Deactivate</button>
Piolo Pasc...	papaP	piopascual@gmail.com	Researcher	Active	<button>Edit</button> <button>Activate</button> <button>Deactivate</button>

Create/Update Account

Full Name

Username

Email

Role

Clear Save

Figure 50 A-D: Creating User Accounts

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REQ014: The administrator shall update user account details via the admin portal.

A

User Account Management

Create, update, and deactivate user accounts.

Name	Username	Email	Role	Status	Actions
John Doe	jdoe23	johndoe@gmail.com	Administrator	Active	Edit Activate Deactivate
Melbet Bike	mBike	melbike@gmail.com	Librarian	Active	Edit Activate Deactivate
Pangs Noy	pangskie	panga123@gmail.com	Researcher	Active	Edit Activate Deactivate
Piolo Pasc...	papaP	piopascual@gmail.com	Researcher	Active	Edit Activate Deactivate

Create/Update Account

Full Name:

Username:

Email:

Role:

Clear Save

B

User Account Management

Create, update, and deactivate user accounts.

Name	Username	Email	Role	Status	Actions
John Doe	jdoe23	johndoe@gmail.com	Administrator	Active	Edit Activate Deactivate
Melbet Bike	mBike	melbike@gmail.com	Librarian	Active	Edit Activate Deactivate
Pangs Noy	pangskie	panga123@gmail.com	Researcher	Active	Edit Activate Deactivate
Piolo Pasc...	papaP	piopascual@gmail.com	Researcher	Active	Edit Activate Deactivate

Create/Update Account

Full Name: John Doe

Username: jdoe23

Email:

Role:

Clear Save

C

User Account Management

Create, update, and deactivate user accounts.

Name	Username	Email	Role	Status	Actions
John Doe	jdoe23	johndoe@gmail.com	Administrator	Active	Edit Activate Deactivate
Melbet Bike	mBike	melbike@gmail.com	Librarian	Active	Edit Activate Deactivate
Pangs Noy	pangskie	panga123@gmail.com	Researcher	Active	Edit Activate Deactivate
Piolo Pasc...	papaP	piopascual@gmail.com	Researcher	Active	Edit Activate Deactivate

Create/Update Account

Full Name: John Doe

Username: jdoe23

Email: johndoe23@gmail.com

Role:

Clear Save

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D

The screenshot shows the 'User Account Management' page. A modal dialog titled 'Deactivate user' is open over the table, containing the message: 'Deactivating a user will revoke all of the user's application access.' Below the message is a 'Confirm' button. The table lists five users. In the 'Actions' column for the first user, the 'Deactivate' button is highlighted with a red border.

Name	Username	Email	Role	Status	Actions
John Doe	jdoe23	johndoe23@gmail.com	Administrator	Active	<button>Edit</button> <button>Activate</button> Deactivate
Melbet Bike	mBike	melbike@gmail.com	Librarian	Active	<button>Edit</button> <button>Activate</button> Deactivate
Pangs Noy	pangskie	panga123@gmail.com	Researcher	Active	<button>Edit</button> <button>Activate</button> Deactivate
Piolo Pasc...	papaP	piopascual@gmail.com	Researcher	Active	<button>Edit</button> Activate Deactivate

Figure 51 A-D: Updating User Accounts

REQ015: The administrator shall deactivate user accounts via the admin portal.

A

The screenshot shows the 'User Account Management' page. A modal dialog titled 'Deactivate user' is open over the table, containing the message: 'Deactivating a user will revoke all of the user's application access.' Below the message is a 'Confirm' button. The table lists five users. In the 'Actions' column for the first user, the 'Deactivate' button is highlighted with a red border.

Name	Username	Email	Role	Status	Actions
John Doe	jdoe23	johndoe23@gmail.com	Administrator	Active	<button>Edit</button> <button>Activate</button> Deactivate
Melbet Bike	mBike	melbike@gmail.com	Librarian	Active	<button>Edit</button> <button>Activate</button> Deactivate
Pangs Noy	pangskie	panga123@gmail.com	Researcher	Active	<button>Edit</button> Activate Deactivate
Piolo Pasc...	papaP	piopascual@gmail.com	Researcher	Active	<button>Edit</button> Activate Deactivate

B

The screenshot shows the 'User Account Management' page. A modal dialog titled 'Deactivate user' is open over the table, containing the message: 'Deactivating a user will revoke all of the user's application access.' Below the message is a 'Confirm' button. The table lists five users. In the 'Actions' column for the first user, the 'Deactivate' button is highlighted with a red border.

Name	Username	Email	Role	Status	Actions
John Doe	jdoe23	johndoe23@gmail.com	Administrator	Active	<button>Edit</button> <button>Activate</button> Deactivate
Melbet Bike	mBike	melbike@gmail.com	Librarian	Active	<button>Edit</button> <button>Activate</button> Deactivate
Pangs Noy	pangskie	panga123@gmail.com	Researcher	Active	<button>Edit</button> Activate Deactivate
Piolo Pasc...	papaP	piopascual@gmail.com	Researcher	Active	<button>Edit</button> Activate Deactivate

User Account Management
Create, update, and deactivate user accounts.

Name	Username	Email	Role	Status	Actions
John Doe	jdoe23	johndoe23@gmail.com	Administrator	Active	Edit Activate Deactivate
Melbet Bike	mBike	melbike@gmail.com	Librarian	Active	Edit Activate Deactivate
Pangs Noy	pangskie	panga123@gmail.com	Researcher	Inactive	Edit Activate Deactivate
Piolo Pasc...	papaP	piopascual@gmail.com	Researcher	Active	Edit Activate Deactivate

Figure 52 A-C. Deactivating User Accounts

REQ016. The administrator shall be able to view and manage roles in the system.

Roles Management
Configure roles and permissions

Roles & Permissions

Select Role
Administrator

Permission Matrix

Feature	View	Create	Edit	Delete
Document Submission	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Document Retrieval	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
User Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[Save Permission](#) [Create New Role](#) [Delete Role](#)

Figure 53: Roles Management Configuration

REQ017. The administrator shall be able to add new roles to the system.

A

Roles Management

Configure roles and permissions

Roles & Permissions

Select Role

Permission Matrix

Feature	View	Create	Edit	Delete
Document Submission	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Document Retrieval	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
User Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Save Permission **Create New Role** **Delete Role**

B

Roles Management

Configure roles and permissions

Roles & Permissions

Select Role

Permission Matrix

Create New Role

Role Name: Administrator

Confirm

Feature	View	Create	Edit	Delete
Document Submission	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Document Retrieval	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
User Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Save Permission **Create New Role** **Delete Role**

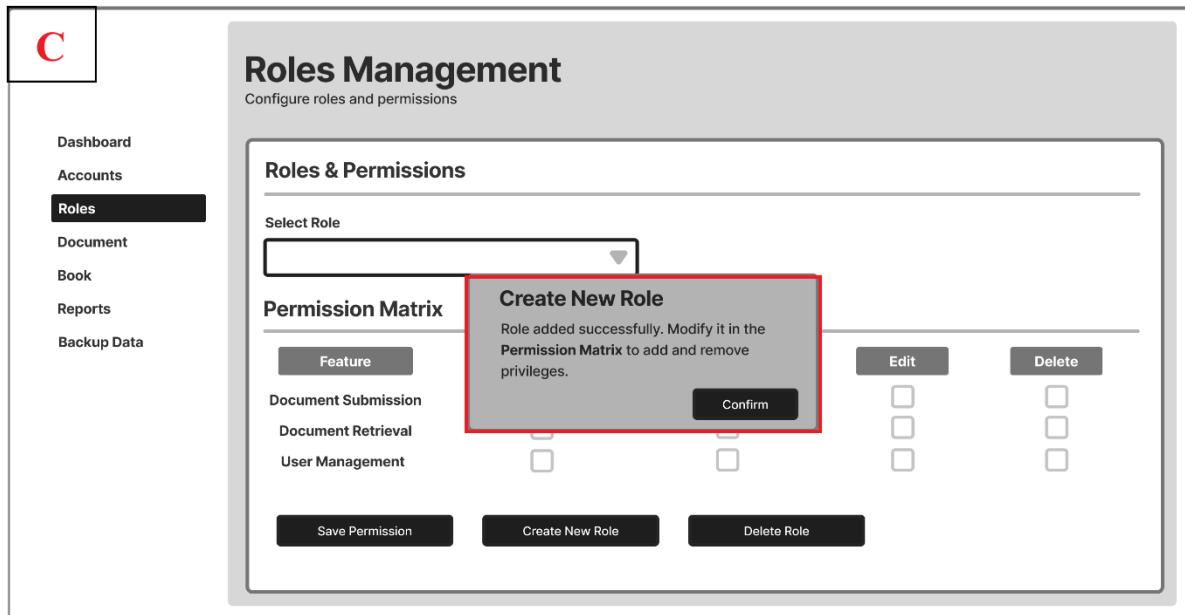
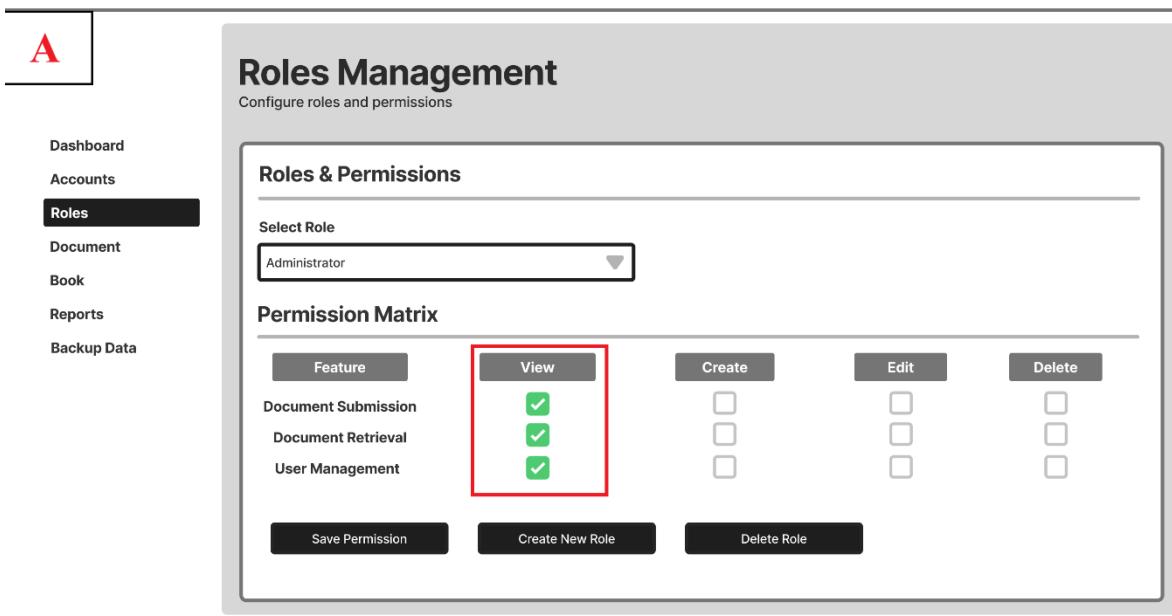


Figure 54: Creating new Roles

REQ018. The administrator shall be able to update existing roles in the system.



B

Roles Management

Configure roles and permissions

Roles & Permissions

Select Role
Administrator

Permission Matrix

Feature	View	Create	Edit	Delete
Document Submission	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Document Retrieval	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
User Management	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Save Permission **Create New Role** **Delete Role**

C

Roles Management

Configure roles and permissions

Roles & Permissions

Select Role
Administrator

Permission Matrix

Feature	View	Create	Edit	Delete
Document Submission	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Document Retrieval	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
User Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Save Permission **Create New Role** **Delete Role**

Update Role
Role updated successfully.

Confirm

Figure 55 A-C: Updating Roles

REQ019. The administrator shall be able to delete existing roles in the system.

A

Roles Management

Configure roles and permissions

Roles & Permissions

Select Role: Researcher

Feature	View	Accept	Edit	Delete
Document Submission	✓	✓	<input type="checkbox"/>	<input type="checkbox"/>
Document Retrieval	✓	✓	<input type="checkbox"/>	<input type="checkbox"/>
User Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Save Permission **Create New Role** **Delete Role**

B

Roles Management

Configure roles and permissions

Roles & Permissions

Select Role: Researcher

Delete Role

Are you sure you want to delete this role?
This process cannot be undone.

Confirm

Feature	View	Accept	Edit	Delete
Document Submission	✓	✓	<input type="checkbox"/>	<input type="checkbox"/>
Document Retrieval	✓	✓	<input type="checkbox"/>	<input type="checkbox"/>
User Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Save Permission **Create New Role** **Delete Role**

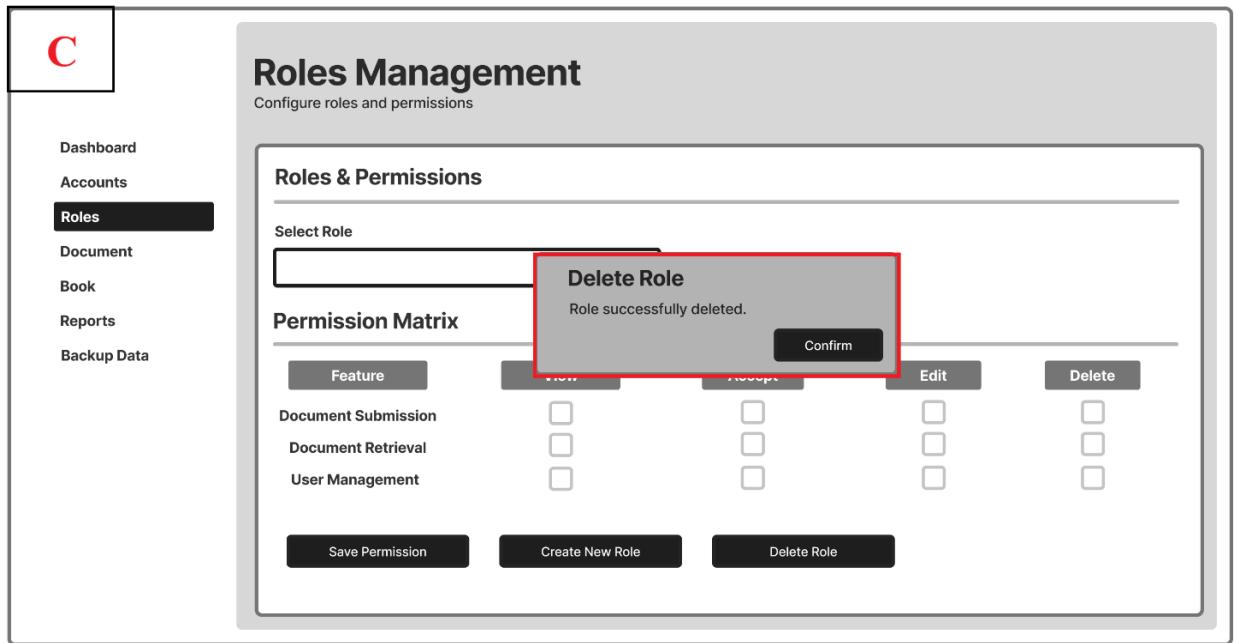


Figure 56 A-C: Deleting Existing Roles

Content organization is managed via document and book categorization. Administrators can view (REQ018), add (REQ019), or delete (REQ020) document categories; similarly, they can manage document entries (REQ021–REQ023) and book entries (REQ024–REQ026) with full CRUD capabilities.

REQ020: The administrator shall be able to access the list of categories in the system.

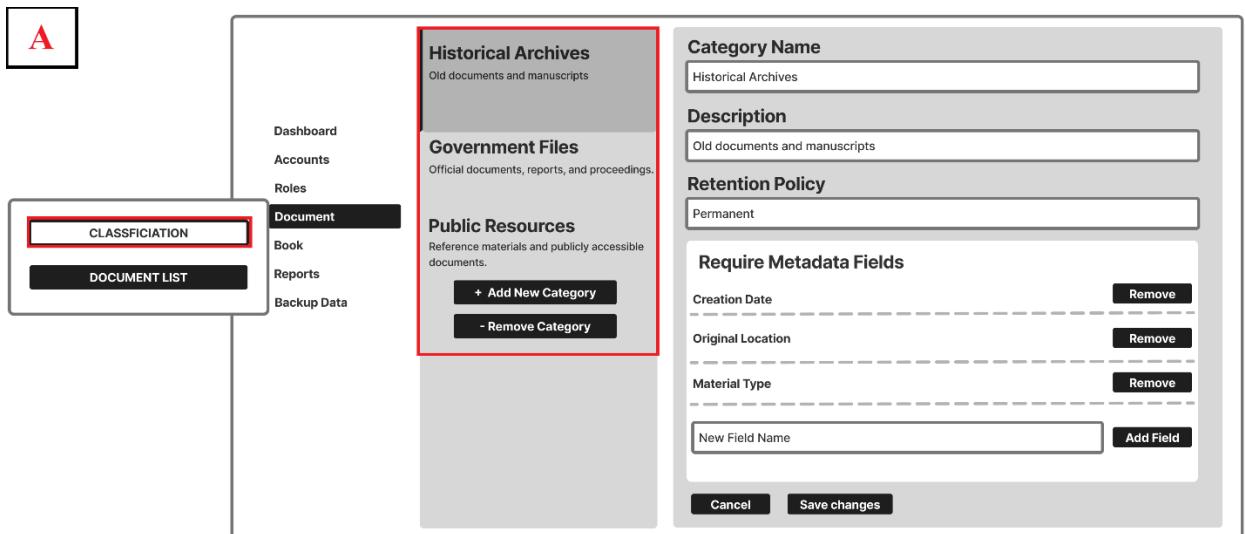
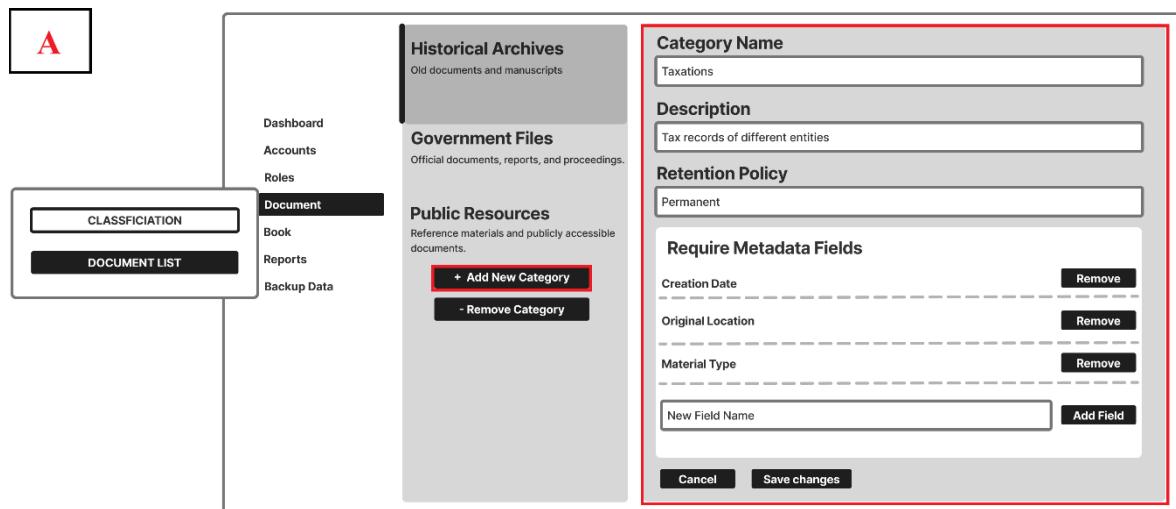


Figure 57: List of Document Categories

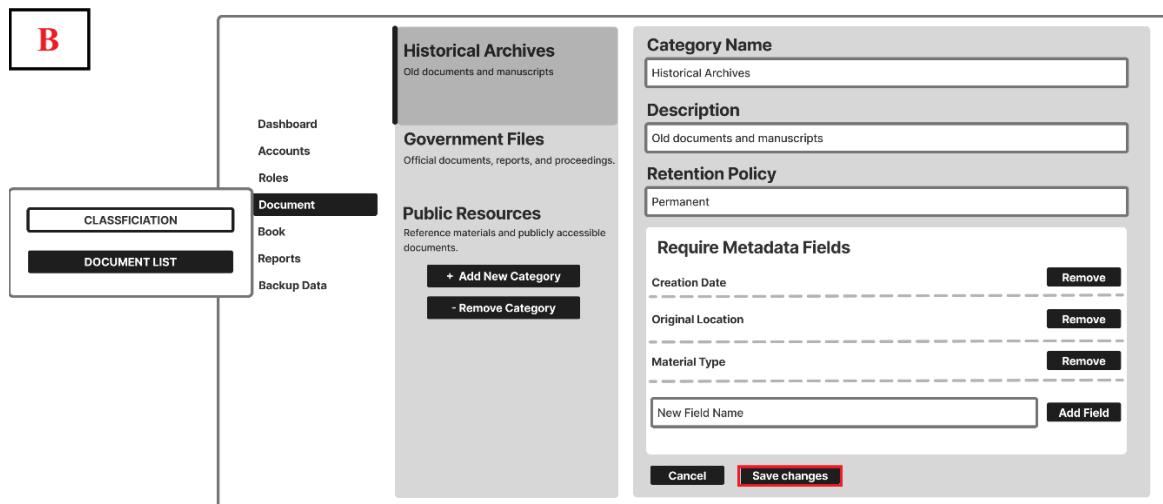
REQ021: The administrator shall be able to add new document categories to the system.

A



The screenshot shows a user interface for creating a new document category. On the left, there's a sidebar with 'CLASSIFICATION' and 'DOCUMENT LIST' buttons. The main area has tabs for 'Historical Archives', 'Government Files', and 'Public Resources'. Under 'Historical Archives', there's a sub-section for 'Old documents and manuscripts'. Below these tabs are buttons for '+ Add New Category' and '- Remove Category'. To the right is a large form with a red border. It contains fields for 'Category Name' (with 'Taxations' entered), 'Description' (with 'Tax records of different entities'), 'Retention Policy' (with 'Permanent'), and a 'Require Metadata Fields' section. This section includes fields for 'Creation Date', 'Original Location', and 'Material Type', each with a 'Remove' button. There's also a 'New Field Name' input field and an 'Add Field' button. At the bottom are 'Cancel' and 'Save changes' buttons.

B



The screenshot is identical to screenshot A, showing the same user interface for creating a new document category. The sidebar, tabs, and main content area are all the same, including the 'New Field Name' input field which now contains 'Historical Archives'.

C

Classification

DOCUMENT LIST

Dashboard

Accounts

Roles

Document

Book

Reports

Backup Data

Historical Archives
Old documents and manuscripts

Government Files
Official documents, reports, and proceedings.

Public Resources
Reference materials and publicly accessible documents.

+ Add New Category - Remove Category

Save Changes
Category added successfully.

Confirm Cancel Save changes

Category Name
Taxations

Description
Tax records of different entities

Retention Policy
Permanent

Remove Remove Remove

Original Location

Material Type

New Field Name

Add Field

D

Classification

DOCUMENT LIST

Dashboard

Accounts

Roles

Document

Book

Reports

Backup Data

Historical Archives
Old documents and manuscripts

Government Files
Official documents, reports, and proceedings.

Public Resources
Reference materials and publicly accessible documents.

Taxations
Tax records of different entities

+ Add New Category - Remove Category

Require Metadata Fields

Creation Date

Original Location

Material Type

New Field Name

Remove Remove Remove

Cancel **Save changes**

Figure 58 A-D: Adding New Document Category

REQ022: The administrator shall be able to delete document categories in the system.

A

The screenshot shows a user interface for managing document categories. On the left, there's a sidebar with 'CLASSIFICATION' and 'DOCUMENT LIST' buttons. The main area has a 'Document' section with 'Book', 'Reports', and 'Backup Data' options. To the right, there are three categories: 'Historical Archives' (selected), 'Government Files', and 'Public Resources'. Each category has a brief description and two buttons: '+ Add New Category' and '- Remove Category'. A red box highlights the '- Remove Category' button for the 'Historical Archives' category. To the right of the categories is a detailed configuration panel:

- Category Name:** Historical Archives
- Description:** Old documents and manuscripts
- Retention Policy:** Permanent
- Require Metadata Fields:** Creation Date, Original Location, Material Type
- New Field Name:** [Input field] Add Field
- Buttons:** Cancel, Save changes

B

This screenshot is similar to A, but it includes a confirmation dialog box over the configuration panel. The dialog is titled 'Delete Category' and asks: 'Are you sure you want to delete this category? This process cannot be undone.' It contains a 'Confirm' button. A red box highlights this 'Confirm' button. The rest of the interface elements are identical to screenshot A.

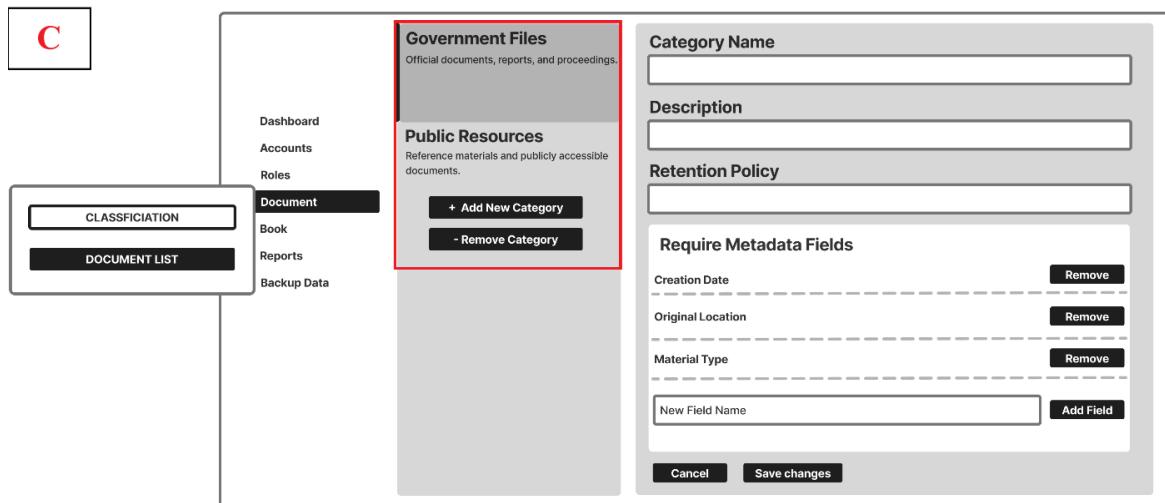


Figure 59 A-C: Deleting Document Category

REQ023: The administrator shall be able to view the list of documents in the system.

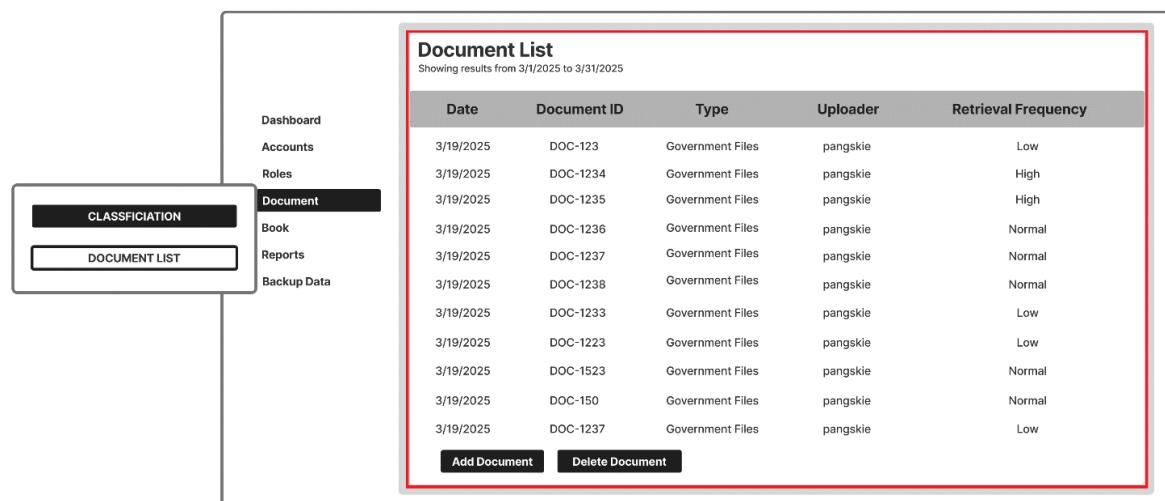


Figure 60: List of Documents

REQ024: The administrator shall be able to add documents to the system.

A

Document List
Showing results from 3/1/2025 to 3/31/2025

Date	Document ID	Type	Uploader	Retrieval Frequency
3/19/2025	DOC-123	Government Files	pangskie	Low
3/19/2025	DOC-1234	Government Files	pangskie	High
3/19/2025	DOC-1235	Government Files	pangskie	High
3/19/2025	DOC-1236	Government Files	pangskie	Normal
3/19/2025	DOC-1237	Government Files	pangskie	Normal
3/19/2025	DOC-1238	Government Files	pangskie	Normal
3/19/2025	DOC-1233	Government Files	pangskie	Low
3/19/2025	DOC-1223	Government Files	pangskie	Low
3/19/2025	DOC-1523	Government Files	pangskie	Normal
3/19/2025	DOC-150	Government Files	pangskie	Normal
3/19/2025	DOC-1237	Government Files	pangskie	Low

Add Document **Delete Document**

B

Document List
Showing results from 3/1/2025 to 3/31/2025

Date	Document ID	Type	Uploader	Retrieval Frequency
3/19/2025	DOC-123	Government Files	pangskie	Low
3/19/2025	DOC-1234	Government Files	pangskie	High
3/19/2025	DOC-1235	Government Files	pangskie	High
3/19/2025	DOC-1236	Government Files	pangskie	Normal
3/19/2025	DOC-1237	Government Files	pangskie	Normal
3/19/2025	DOC-1238	Government Files	pangskie	Normal
3/19/2025	DOC-1233	Government Files	pangskie	Low
3/19/2025	DOC-1223	Government Files	pangskie	Low
3/19/2025	DOC-1523	Government Files	pangskie	Normal
3/19/2025	DOC-150	Government Files	pangskie	Normal
3/19/2025	DOC-1237	Government Files	pangskie	Low

Add Document

Date: mm/dd/yyyy
Type: Government Files
Attachments:

Confirm

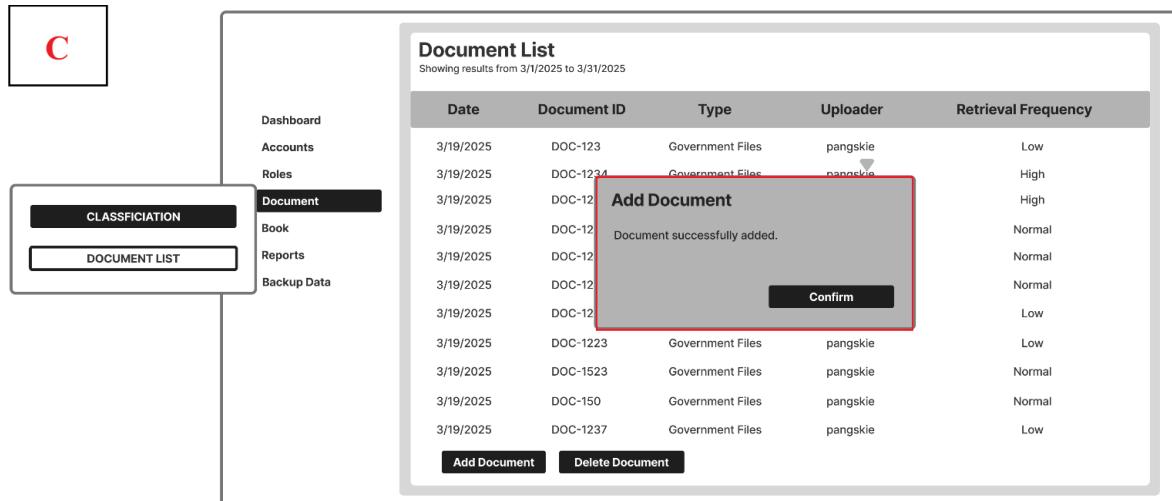
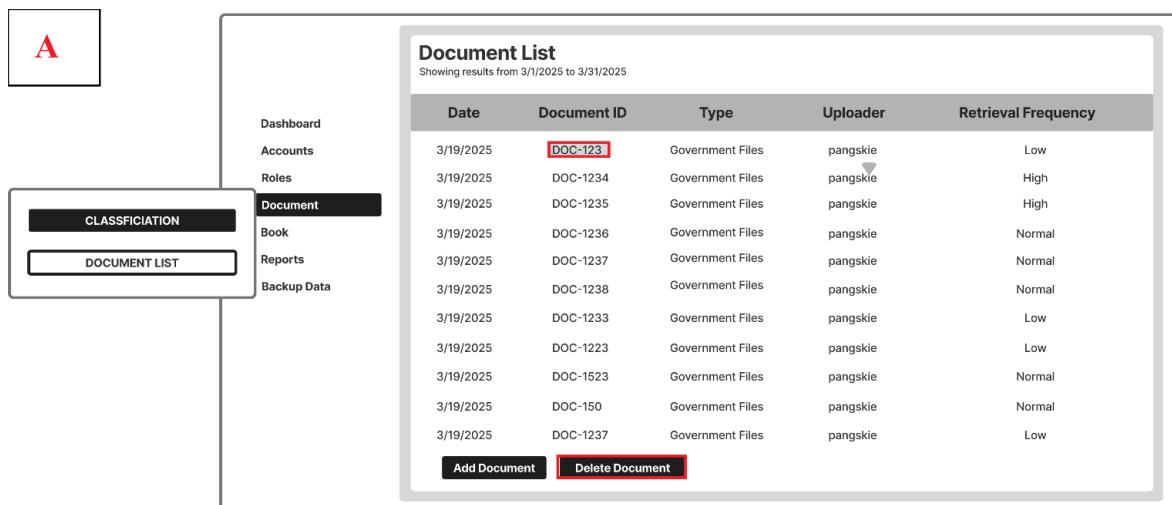


Figure 61 A-C: Adding of Documents

REQ025: The administrator shall be able to delete documents to the system.



B

The screenshot shows a 'Document List' page with a table of documents. A row for document 'DOC-123' has been selected, and a red box highlights the 'Delete Document' button in a modal dialog. The dialog asks, 'Are you sure you want to delete DOC-123? This process cannot be undone.' with 'Confirm' and 'Cancel' buttons.

Date	Document ID	Type	Uploader	Retrieval Frequency
3/19/2025	DOC-123	Government Files	pangskie	Low
3/19/2025	DOC-124	Government Files	pangskie	High
3/19/2025	DOC-125	Government Files	pangskie	High
3/19/2025	DOC-126	Government Files	pangskie	Normal
3/19/2025	DOC-127	Government Files	pangskie	Normal
3/19/2025	DOC-128	Government Files	pangskie	Low
3/19/2025	DOC-129	Government Files	pangskie	Low
3/19/2025	DOC-1523	Government Files	pangskie	Normal
3/19/2025	DOC-150	Government Files	pangskie	Normal
3/19/2025	DOC-1237	Government Files	pangskie	Low

Document List
Showing results from 3/1/2025 to 3/31/2025

Add Document Delete Document

C

The screenshot shows the same 'Document List' page as in B. The 'Delete Document' dialog is now closed, and its position is highlighted with a red box. The message 'Document deleted successfully.' is displayed in the center of the dialog area.

Date	Document ID	Type	Uploader	Retrieval Frequency
3/19/2025	DOC-123	Government Files	pangskie	Low
3/19/2025	DOC-124	Government Files	pangskie	High
3/19/2025	DOC-125	Government Files	pangskie	High
3/19/2025	DOC-126	Government Files	pangskie	Normal
3/19/2025	DOC-127	Government Files	pangskie	Normal
3/19/2025	DOC-128	Government Files	pangskie	Normal
3/19/2025	DOC-129	Government Files	pangskie	Low
3/19/2025	DOC-1233	Government Files	pangskie	Low
3/19/2025	DOC-1223	Government Files	pangskie	Low
3/19/2025	DOC-1523	Government Files	pangskie	Normal
3/19/2025	DOC-150	Government Files	pangskie	Normal
3/19/2025	DOC-1237	Government Files	pangskie	Low

Document List
Showing results from 3/1/2025 to 3/31/2025

Add Document Delete Document

Figure 62 A-C: Deleting of Documents

REQ026: The administrator shall be able to view the list of books in the system.

Book List
Showing results from 3/1/2025 to 3/31/2025

	Title	Author	Publication Date	Status	Return Date
Dashboard	Art of Biking	Alfrancis Limo	3/19/2025	Available	
Accounts	Art of Biking	Alfrancis Limo	3/19/2025	Available	
Roles	Art of Biking	Alfrancis Limo	3/19/2025	Available	
Document	Art of Biking	Alfrancis Limo	3/19/2025	Available	
Book	Art of Biking	Alfrancis Limo	3/19/2025	Available	
Reports	Art of Biking	Alfrancis Limo	3/19/2025	Available	
Backup Data	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Unavailable	4/19/2025
	Art of Biking	Alfrancis Limo	3/19/2025	Unavailable	4/19/2025
	Art of Biking	Alfrancis Limo	3/19/2025	Unavailable	4/19/2025

Add Book **Remove Book**

Figure 63: List of Books

REQ027: The administrator shall be able to add books to the system.

Book List
Showing results from 3/1/2025 to 3/31/2025

	Title	Author	Publication Date	Status	Return Date
Dashboard	Art of Biking	Alfrancis Limo	3/19/2025	Available	
Accounts	Art of Biking	Alfrancis Limo	3/19/2025	Available	
Roles	Art of Biking	Alfrancis Limo	3/19/2025	Available	
Document	Art of Biking	Alfrancis Limo	3/19/2025	Available	
Book	Art of Biking	Alfrancis Limo	3/19/2025	Available	
Reports	Art of Biking	Alfrancis Limo	3/19/2025	Available	
Backup Data	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Unavailable	4/19/2025
	Art of Biking	Alfrancis Limo	3/19/2025	Unavailable	4/19/2025
	Art of Biking	Alfrancis Limo	3/19/2025	Unavailable	4/19/2025

Add Book **Remove Book**

B

Date	Document ID	Type	Uploader	Retrieval Frequency
3/19/2025	DOC-123	Government Files	pangskie	Low
3/19/2025	DOC-1234	Government Files	pangskie	High
3/19/2025	DOC-1235	Government Files	pangskie	High
3/19/2025	DOC-1236	Government Files	pangskie	Normal
3/19/2025	DOC-1237	Government Files	pangskie	Normal
3/19/2025	DOC-1238	Government Files	pangskie	Normal
3/19/2025	DOC-1233	Government Files	pangskie	Low
3/19/2025	DOC-1223	Government Files	pangskie	Low
3/19/2025	DOC-1523	Government Files	pangskie	Normal
3/19/2025	DOC-150	Government Files	pangskie	Normal
3/19/2025	DOC-1237	Government Files	pangskie	Low

Add Book

Title:

Author:

Publication Date:

Confirm

Add Document **Delete Document**

C

Date	Document ID	Type	Uploader	Retrieval Frequency
3/19/2025	DOC-123	Government Files	pangskie	Low
3/19/2025	DOC-124	Government Files	pangskie	High
3/19/2025	DOC-125	Government Files	pangskie	High
3/19/2025	DOC-126	Government Files	pangskie	Normal
3/19/2025	DOC-127	Government Files	pangskie	Normal
3/19/2025	DOC-128	Government Files	pangskie	Normal
3/19/2025	DOC-1233	Government Files	pangskie	Low
3/19/2025	DOC-1223	Government Files	pangskie	Low
3/19/2025	DOC-1523	Government Files	pangskie	Normal
3/19/2025	DOC-150	Government Files	pangskie	Normal
3/19/2025	DOC-1237	Government Files	pangskie	Low

Add Book

Book added successfully.

Confirm

Add Document **Delete Document**

Figure 64 A-C: Adding of Books

REQ028: The administrator shall be able to remove books to the system.

A

Book List

Showing results from 3/1/2025 to 3/31/2025

	Title	Author	Publication Date	Status	Return Date
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Unavailable	4/19/2025
	Art of Biking	Alfrancis Limo	3/19/2025	Unavailable	4/19/2025
	Art of Biking	Alfrancis Limo	3/19/2025	Unavailable	4/19/2025

Add Book **Remove Book**

B

Book List

Showing results from 3/1/2025 to 3/31/2025

	Title	Author	Publication Date	Status	Return Date
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Available	
	Art of Biking	Alfrancis Limo	3/19/2025	Unavailable	4/19/2025
	Art of Biking	Alfrancis Limo	3/19/2025	Unavailable	4/19/2025
	Art of Biking	Alfrancis Limo	3/19/2025	Unavailable	4/19/2025

Remove Book

Are you sure you want to remove the book Art of Biking? This process cannot be undone.

Confirm

Add Book **Remove Book**

The screenshot shows a user interface for managing books. On the left is a sidebar with a red 'C' logo at the top. Below it are several menu items: Dashboard, Accounts, Roles, Document, Book (which is highlighted in black), Reports, and Backup Data. The main area is titled 'Book List' and displays a table of books from March 1, 2025, to March 31, 2025. The table columns are Title, Author, Publication Date, Status, and Return Date. Most books listed have the title 'Art of Biking' and author 'Alfrancis Limo', with publication dates ranging from 3/19/2025 to 3/29/2025. The status for most books is 'Available'. A modal dialog box is overlaid on the table, centered over the second row. The dialog has a gray background and contains the text 'Remove Book' at the top, followed by 'Book removed successfully.' in the center, and a 'Confirm' button at the bottom right. The entire modal is enclosed in a red rectangular border.

Title	Author	Publication Date	Status	Return Date
Art of Biking	Alfrancis Limo	3/19/2025	Available	
Art of Biking	Alfrancis Limo	3/19/2025	Available	
Art of Biking	Alfrancis Limo	3/19/2025	Available	
Art of Biking	Alfrancis Limo	3/19/2025	Available	
Art of Biking	Alfrancis Limo	3/19/2025	Available	
Art of Biking	Alfrancis Limo	3/19/2025	Available	
Art of Biking	Alfrancis Limo	3/19/2025	Unavailable	4/19/2025
Art of Biking	Alfrancis Limo	3/19/2025	Unavailable	4/19/2025
Art of Biking	Alfrancis Limo	3/19/2025	Unavailable	4/19/2025

Add Book **Remove Book**

Figure 65 A-C: Removing of Books

To support operational oversight, Administrators can generate detailed reports on user activities, system usage trends, and performance metrics (REQ027). Finally, to safeguard against data loss, they are responsible for managing regular data backups and restoring data when needed (REQ028).

REQ029: The administrator shall generate reports on user activities, borrowing trends, and system performance.

The screenshot shows a user interface for generating a 'Document Requests Report'. On the left, a sidebar menu includes 'Dashboard', 'Accounts', 'Tracking', 'Classification', 'Reports' (which is selected), 'Alerts', and 'System Configuration'. The main area has three sections: 'Document Request' (with a red border), 'Retrieval Times', and 'User Activity'. The 'Document Request' section contains a description: 'Generate reports on document requests including status, requester, and dates.' Below this is a form for the 'Document Requests Report' with 'Start Date' set to '01/03/2025' and 'End Date' set to '31/03/2025'. A 'Document Type' dropdown menu lists 'Contracts', 'Agreements', and 'Reports...', with a note 'Hold ctrl/cmd to select multiple'. At the bottom are buttons for 'Include Detailed Records' and a large red 'Generate Report' button.

The screenshot shows a 'Report Preview' interface. The sidebar menu is identical to the one above. The main area displays a table titled 'Report Preview' with the subtitle 'Showing results from 3/1/2025 to 3/31/2025'. The table has columns: Date, Document ID, Requester, Type, Status, and Time. The data shows ten entries from March 19 to March 29, 2025, all for requester 'jsmith' and type 'Historical Archive', all in 'Pending' status at 7:42:58 am. At the bottom are buttons for 'Export as PDF', 'Export as CSV', and 'Print Report'.

Date	Document ID	Requester	Type	Status	Time
3/19/2025	DOC-123	jsmith	Historical Archive	Pending	7:42:58 am
3/20/2025	DOC-1234	jsmith	Historical Archive	Pending	7:42:58 am
3/21/2025	DOC-1232	jsmith	Historical Archive	Pending	7:42:58 am
3/22/2025	DOC-1231	jsmith	Historical Archive	Pending	7:42:58 am
3/23/2025	DOC-1236	jsmith	Historical Archive	Pending	7:42:58 am
3/24/2025	DOC-1237	jsmith	Historical Archive	Pending	7:42:58 am
3/25/2025	DOC-1230	jsmith	Historical Archive	Pending	7:42:58 am
3/26/2025	DOC-1239	jsmith	Historical Archive	Pending	7:42:58 am
3/27/2025	DOC-1237	jsmith	Historical Archive	Pending	7:42:58 am
3/28/2025	DOC-1238	jsmith	Historical Archive	Pending	7:42:58 am
3/29/2025	DOC-1234	jsmith	Historical Archive	Pending	7:42:58 am

Figure 66 A-B: Document Request Report

[Dashboard](#)
[Accounts](#)
[Tracking](#)
[Classification](#)
[Reports](#) Reports
[Alerts](#)
[System Configuration](#)

Document Request
Retrieval Times
User Activity

Generate reports on document requests including status, requester, and dates.

Analyze document retrieval performance and processing times.

Review user login activity and system interactions.

Retrieval Time Report

Start Date
End Date

Group by

Day...

Include Detailed Records

Generate Report

Report Preview

Showing results from 3/1/2025 to 3/31/2025

Date	Document ID	Times Retrieved	Type	Retrieval Frequency
3/19/2025	DOC-123	9	Historical Archive	Low
3/20/2025	DOC-1234	10	Historical Archive	Low
3/21/2025	DOC-1232	12	Historical Archive	Low
3/22/2025	DOC-1231	11	Historical Archive	Low
3/23/2025	DOC-1236	15	Historical Archive	Normal
3/24/2025	DOC-1237	20	Historical Archive	Normal
3/25/2025	DOC-1230	23	Historical Archive	Normal
3/26/2025	DOC-1239	27	Historical Archive	Normal
3/27/2025	DOC-1237	31	Historical Archive	High
3/28/2025	DOC-1238	1	Historical Archive	Low
3/29/2025	DOC-1234	5	Historical Archive	Low

Export as PDF
Export as CSV
Print Report

Figure 67 A-B: Retrieval Times Report

The screenshot shows a user interface for document management. On the left, a sidebar menu includes: Dashboard, Accounts, Tracking, Classification, Reports (which is selected), Alerts, and System Configuration. The main area has three cards: 'Document Request' (generate reports on document requests), 'Retrieval Times' (analyze document retrieval performance), and 'User Activity' (review user login activity and system interactions). The 'User Activity' card is highlighted with a red border.

The screenshot shows a report preview for user activity from March 1, 2025, to March 31, 2025. The table has columns: Date, User, Recent Activity, Activity History, and Session start time. All entries show the same user ('jsmith') performing a 'View' action on various documents ('DOC-123', 'DOC-...', etc.) at 7:42:56 pm every day. The 'Reports' option in the sidebar is selected.

Date	User	Recent Activity	Activity History	Session start time
3/19/2025	jsmith	Viewed DOC-123	View	7:42:56 pm
3/20/2025	jsmith	Requested DOC-...	View	7:42:56 pm
3/21/2025	jsmith	Requested DOC-...	View	7:42:56 pm
3/22/2025	jsmith	Requested DOC-...	View	7:42:56 pm
3/23/2025	jsmith	Requested DOC-...	View	7:42:56 pm
3/24/2025	jsmith	Requested DOC-...	View	7:42:56 pm
3/25/2025	jsmith	Requested DOC-...	View	7:42:56 pm
3/26/2025	jsmith	Requested DOC-...	View	7:42:56 pm
3/27/2025	jsmith	Requested DOC-...	View	7:42:56 pm
3/28/2025	jsmith	Requested DOC-...	View	7:42:56 pm
3/29/2025	jsmith	Requested DOC-...	View	7:42:56 pm

Report Preview
Showing results from 3/1/2025 to 3/31/2025

Export as PDF Export as CSV Print Report

Figure 68 A-B: User Activity Report

REQ030: The administrator shall manage data backups, ensuring the ability to restore data in case of system failure.

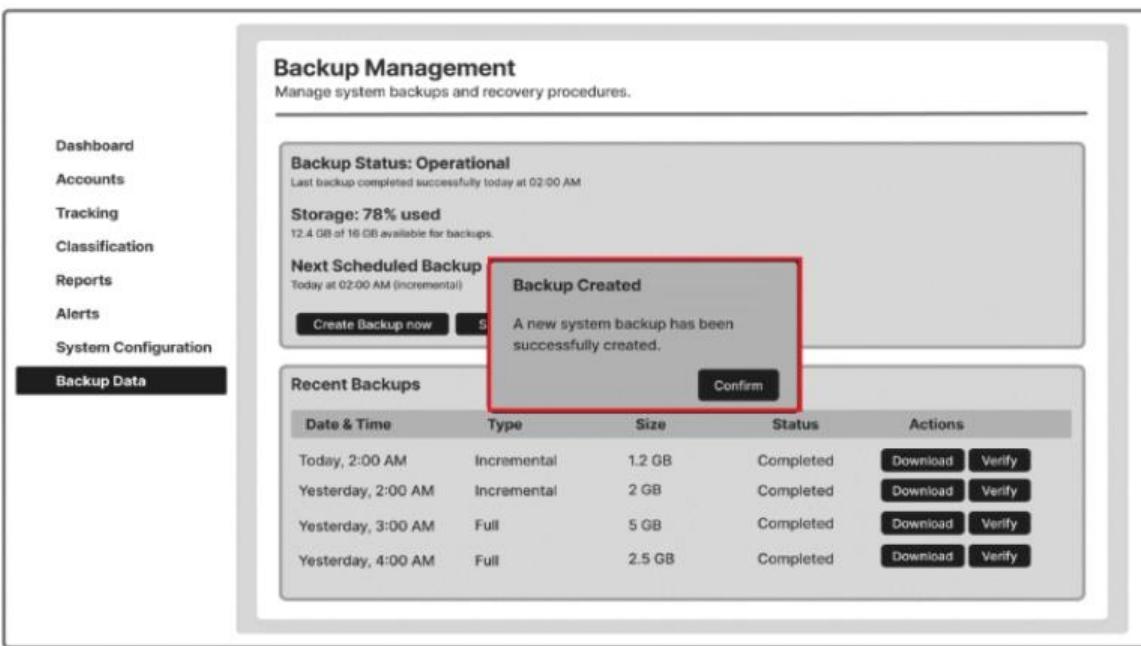
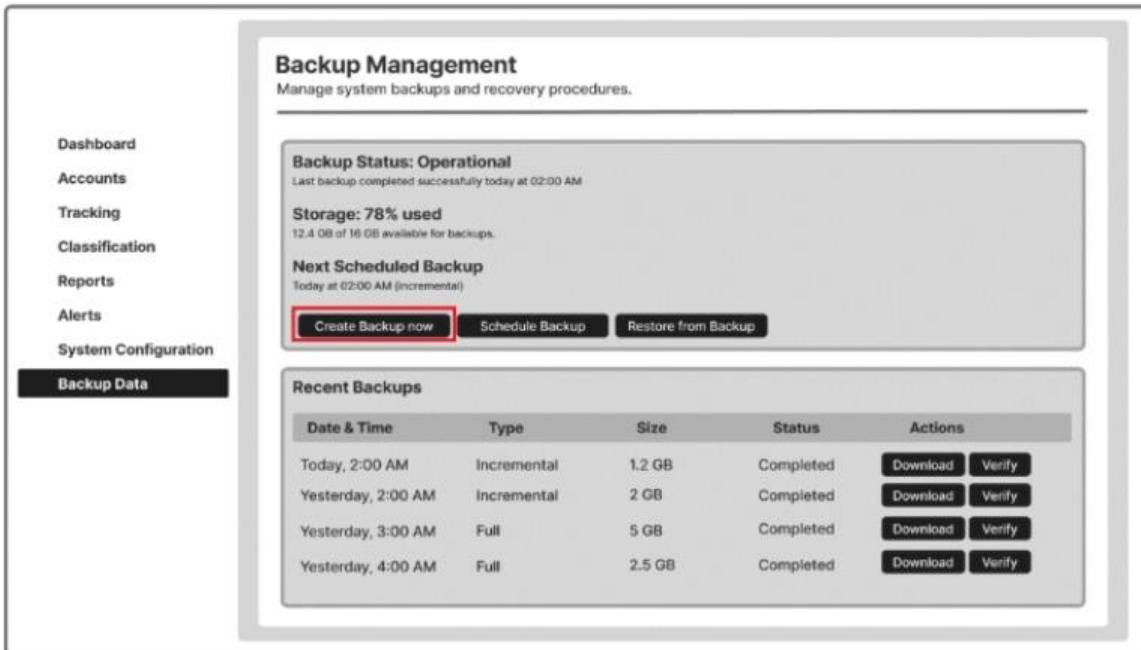


Figure 69 A-B: Backup Data

1.1.4 Researcher Functions

REQ031: Users shall be able to log in using their registered username and password.

A

LOGIN

USERNAME

PASSWORD

LOGIN

[Forgot password?](#)

B

LOGIN

USERNAME

JohnDoe

PASSWORD

.....

LOGIN

[Forgot password?](#)

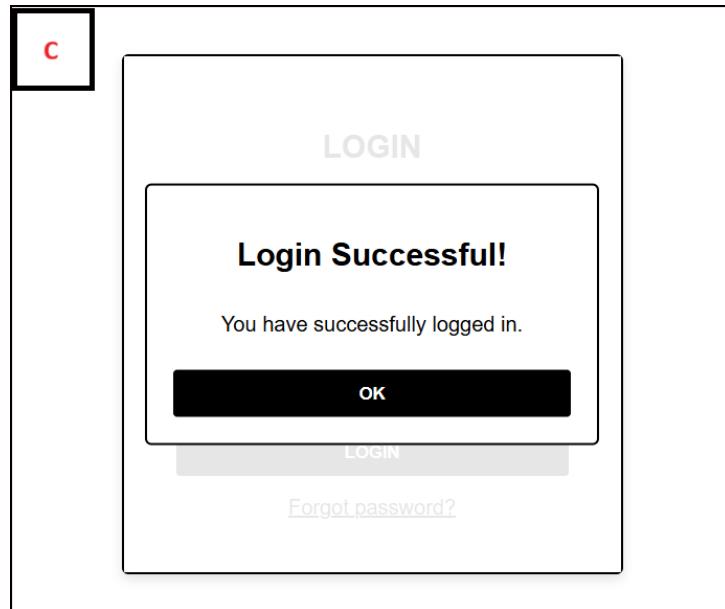
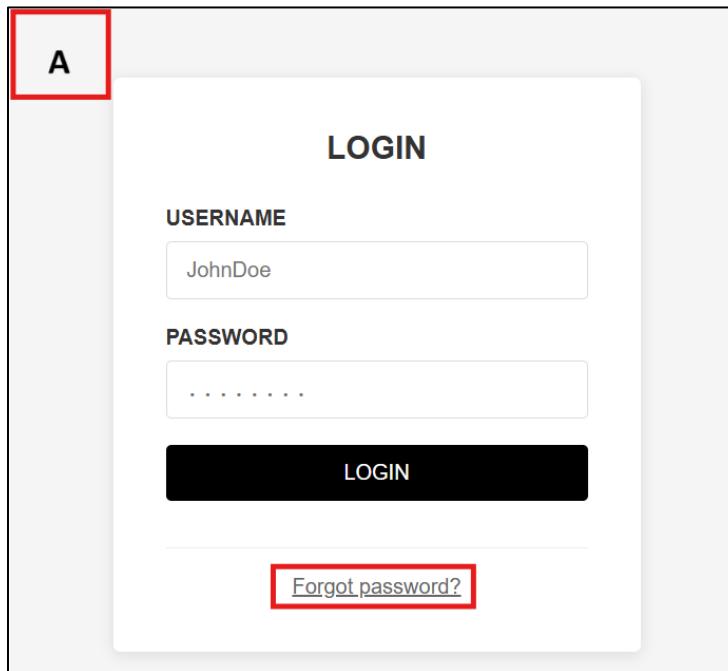
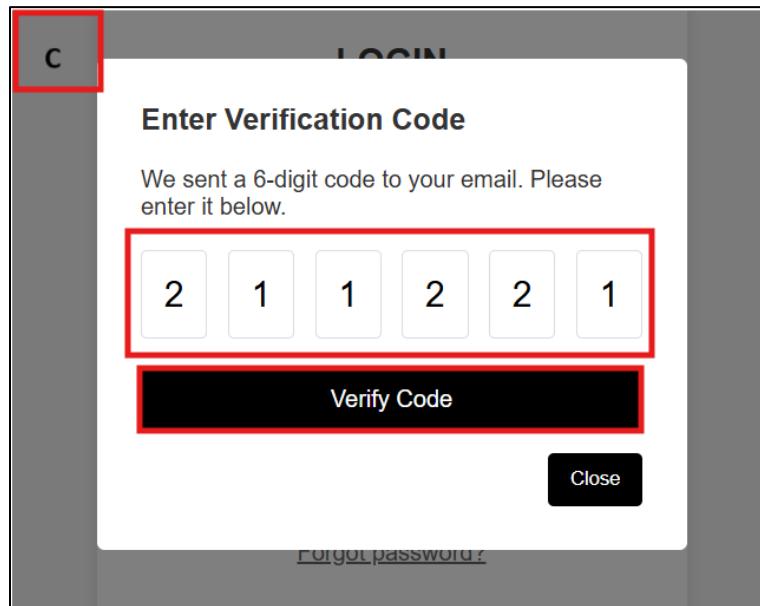
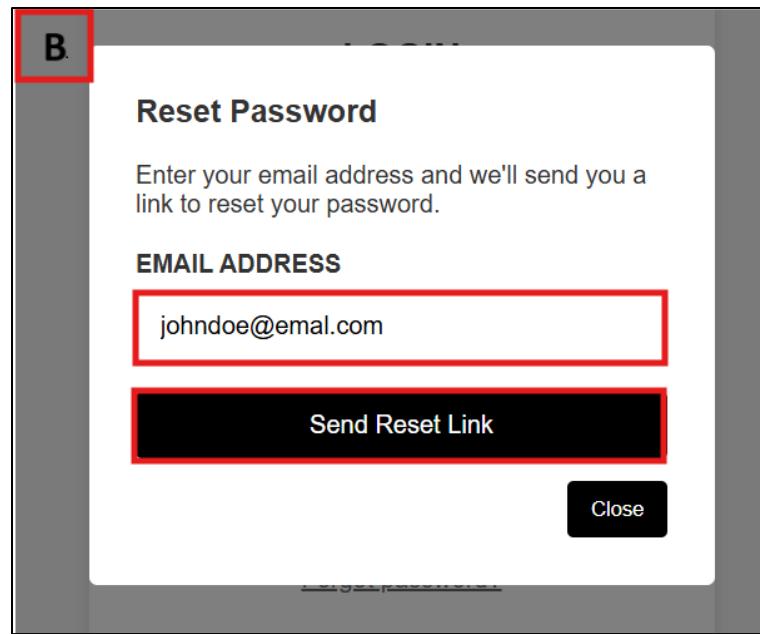


Figure 70 A – C: Researcher Login

REQ032: Users shall be able to reset their password using a "Forgot Password" feature with email verification.





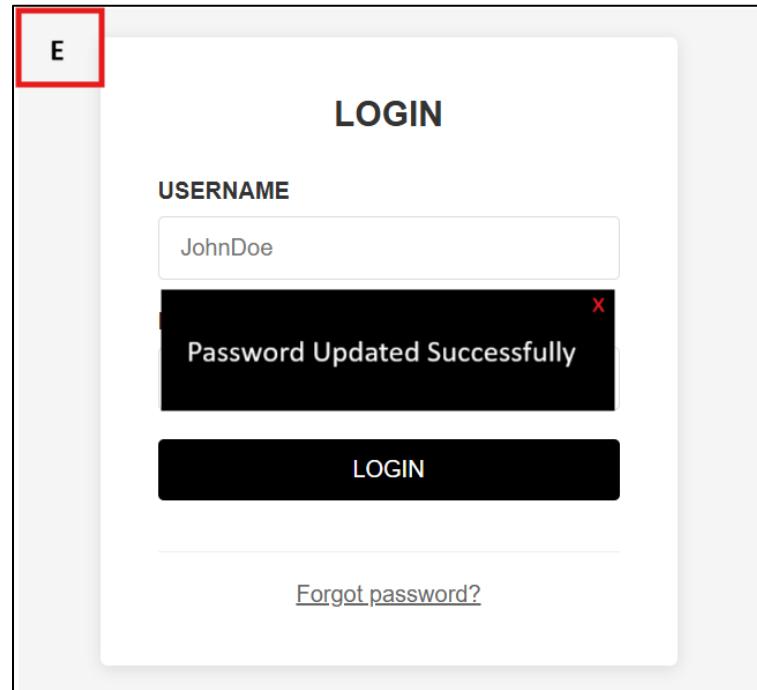
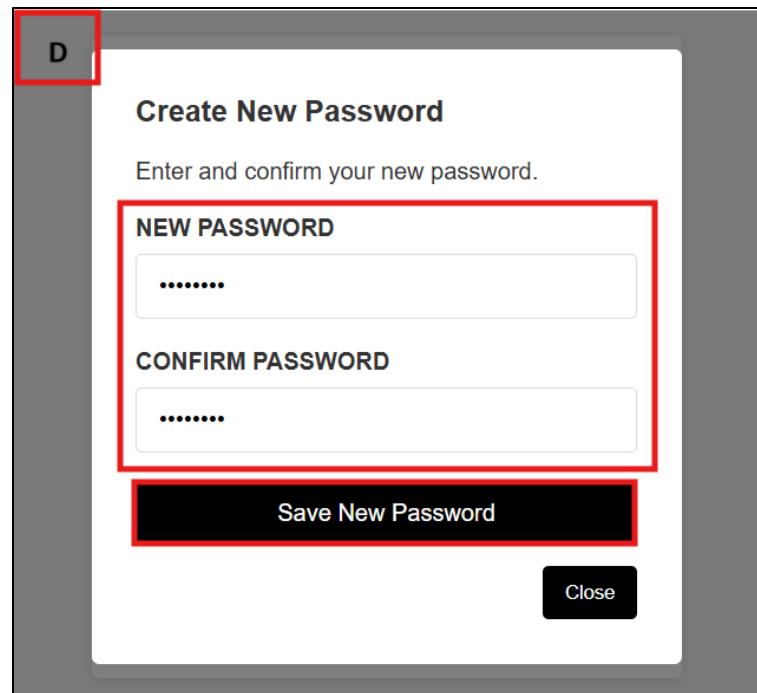


Figure 71 A – E: Reset Password

The system enhances the user experience for researchers by offering features that promote transparency, accessibility, and real-time updates. Researchers can receive notifications concerning the status of documents and books, ensuring they remain informed throughout the request and borrowing processes. They can also browse available resources, request to borrow books or access documents for online viewing, and monitor the progress of both their document access requests and book borrowings through a dedicated tracking feature.

REQ033: Researchers shall receive notifications regarding document and book statuses.

The screenshot displays a user interface titled "Research Notifications" which provides updates about document and book requests. On the left, there is a sidebar with icons for Dashboard, Browse Resources, and Notifications, where Notifications is currently selected. The main area shows five notification cards:

- New Document Added to Your Field**: Document ID: DOC-2023-0520, Type: Research Paper. Last updated Just now. Action button: View.
- Document Request Approved: Climate Data 2023**: Request ID: DOC-2023-0456, Type: Research Data. Last updated Today, 10:45 AM. Action button: Download.
- Book Available: "Advanced Neural Networks"**: Book ID: BK-2023-0482, Author: Patel, Johnson, Lee. Last updated Yesterday, 3:22 PM. Action button: View Details.
- Document Access Extended**: Document ID: DOC-2023-0391, Title: Census Data Analysis 2022. Last updated Jun 15, 2023. Action button: View Document.
- Book Return Reminder**: Book ID: BK-2023-0423, Title: "Quantum Computing Basics". Last updated Jun 22, 2023. Action button: Renew.

Figure 72: Document and Book status notification for Researchers

REQ034: Researchers shall view the list of available books and request to borrow books.

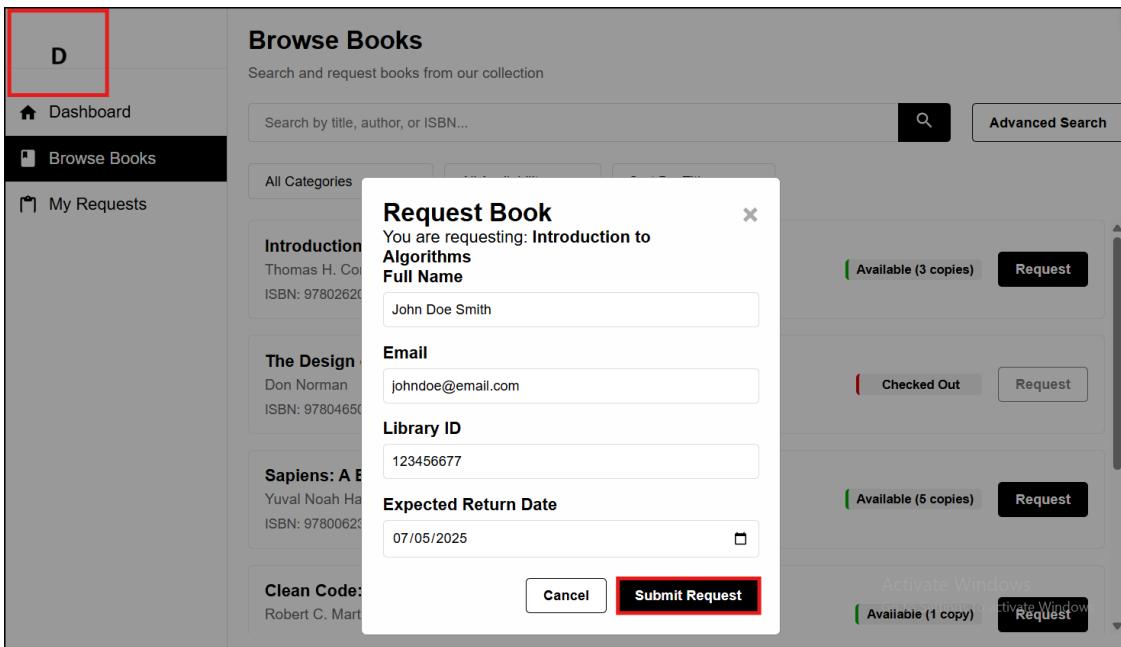
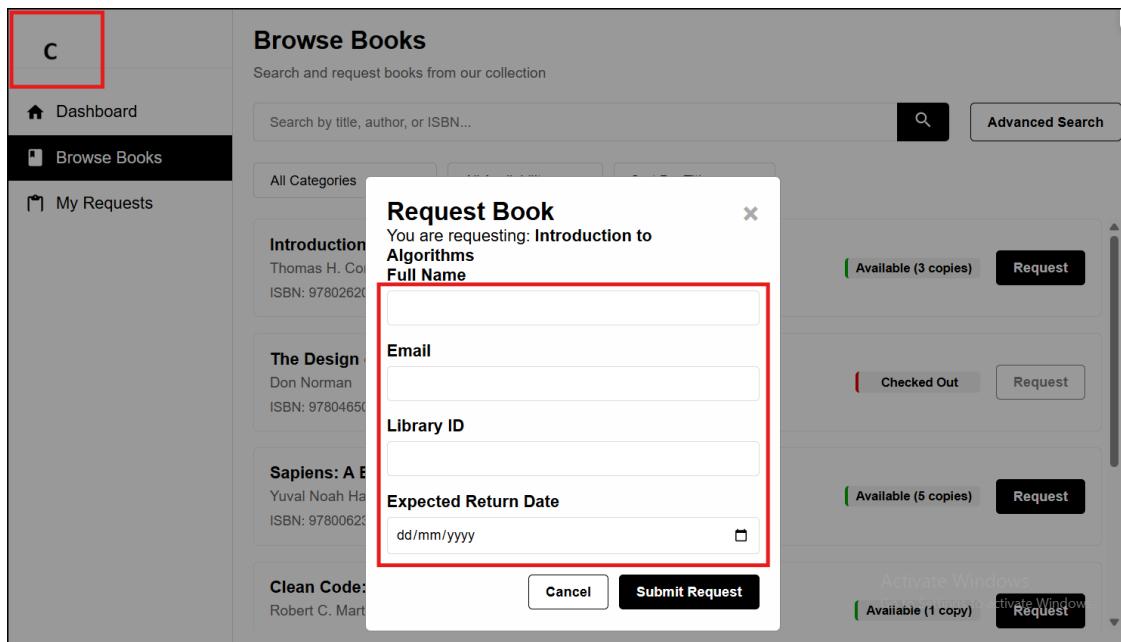
A

The screenshot shows a 'Browse Books' page with a sidebar on the left containing 'Dashboard', 'Browse Books' (which is selected and highlighted in black), and 'My Requests'. The main area displays four book entries:

- Introduction to Algorithms** by Thomas H. Cormen (ISBN: 9780262033848) - Available (3 copies). Status: Available. Buttons: Request.
- The Design of Everyday Things** by Don Norman (ISBN: 9780465050659) - Checked Out. Status: Checked Out. Buttons: Request.
- Sapiens: A Brief History of Humankind** by Yuval Noah Harari (ISBN: 9780062316097) - Available (5 copies). Status: Available. Buttons: Request.
- Clean Code: A Handbook of Agile Software Craftsmanship** by Robert C. Martin (ISBN: 9780132350884) - Available (1 copy). Status: Available. Buttons: Request.

B

The screenshot shows the same 'Browse Books' page as in screenshot A, but with a red box highlighting the 'Request' button for the first book entry ('Introduction to Algorithms'). The main area displays the same four book entries as in screenshot A, with identical status indicators and buttons.



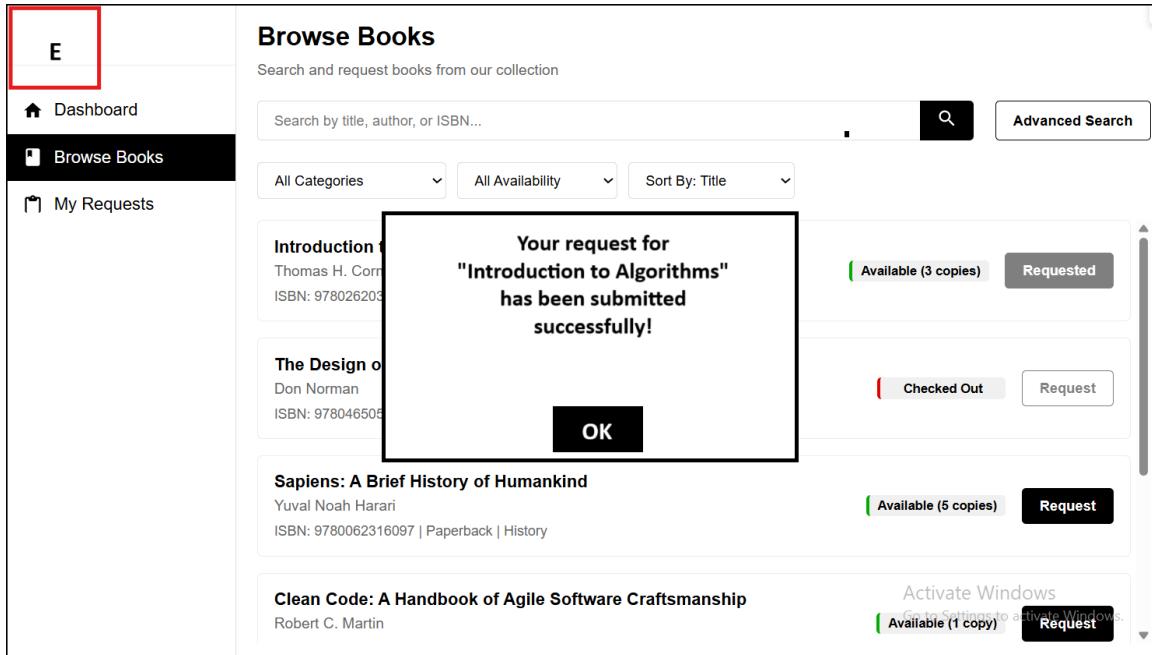
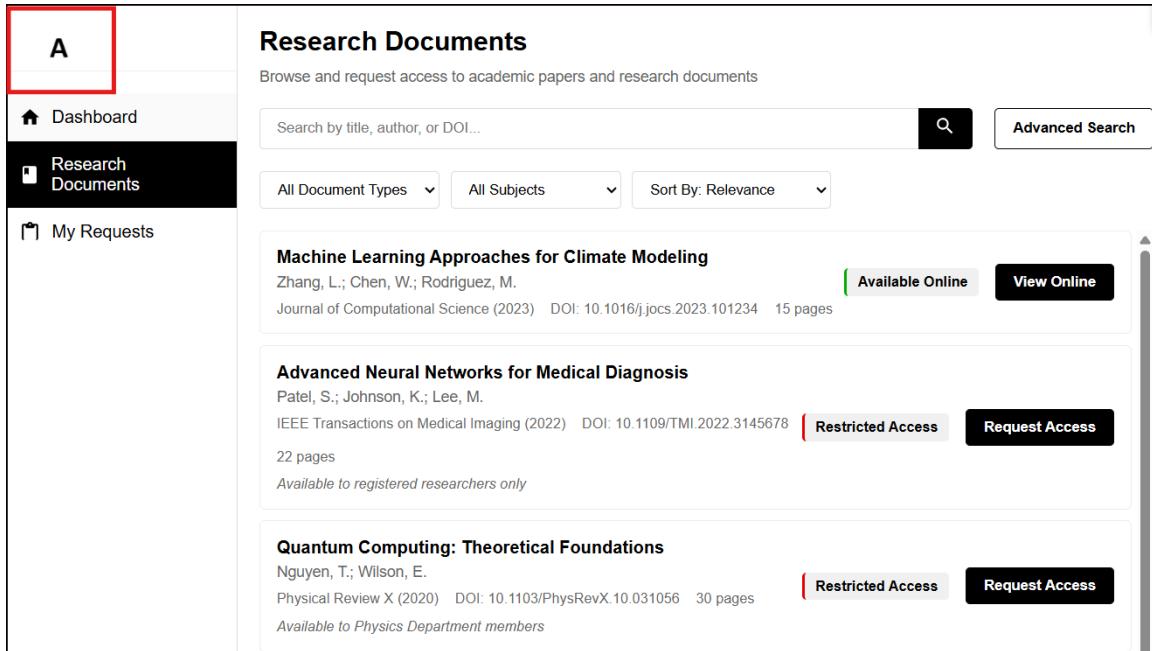


Figure 73 A – E: View and Request for Borrowing Books

REQ035: Researchers shall view the list of available documents and request access to documents for viewing online.



B

Research Documents

Browse and request access to academic papers and research documents

Search by title, author, or DOI... Advanced Search

All Document Types Sort By: Relevance

Machine Learning Approaches for Climate Modeling
Zhang, L.; Chen, W.; Rodriguez, M.
Journal of Computational Science (2023) DOI: 10.1016/j.jocs.2023.101234 15 pages

Advanced Neural Networks for Medical Diagnosis
Patel, S.; Johnson, K.; Lee, M.
IEEE Transactions on Medical Imaging (2022) DOI: 10.1109/TMI.2022.3145678

22 pages
Available to registered researchers only

Quantum Computing: Theoretical Foundations
Nguyen, T.; Wilson, E.
Physical Review X (2020) DOI: 10.1103/PhysRevX.10.031056 30 pages

Available to Physics Department members

C

Research Documents

Browse and request access to academic papers and research documents

Search by title, author, or DOI... Advanced Search

All Document Types Sort By: Relevance

Machine Learning Approaches for Climate Modeling
Zhang, L.; Chen, W.; Rodriguez, M.
Journal of Computational Science (2023) DOI: 10.1016/j.jocs.2023.101234 15 pages

Advanced Neural Networks for Medical Diagnosis
Patel, S.; Johnson, K.; Lee, M.
IEEE Transactions on Medical Imaging (2022) DOI: 10.1109/TMI.2022.3145678

22 pages
Available to registered researchers only

Quantum Computing: Theoretical Foundations
Nguyen, T.; Wilson, E.
Physical Review X (2020) DOI: 10.1103/PhysRevX.10.031056 30 pages

Available to Physics Department members

Request Document Access

You are requesting access to: Advanced Neural Networks for Medical Diagnosis
Document ID: DOC-2022-045

Purpose of Access

Select purpose...

Required Access Duration

Select duration...

Additional Notes

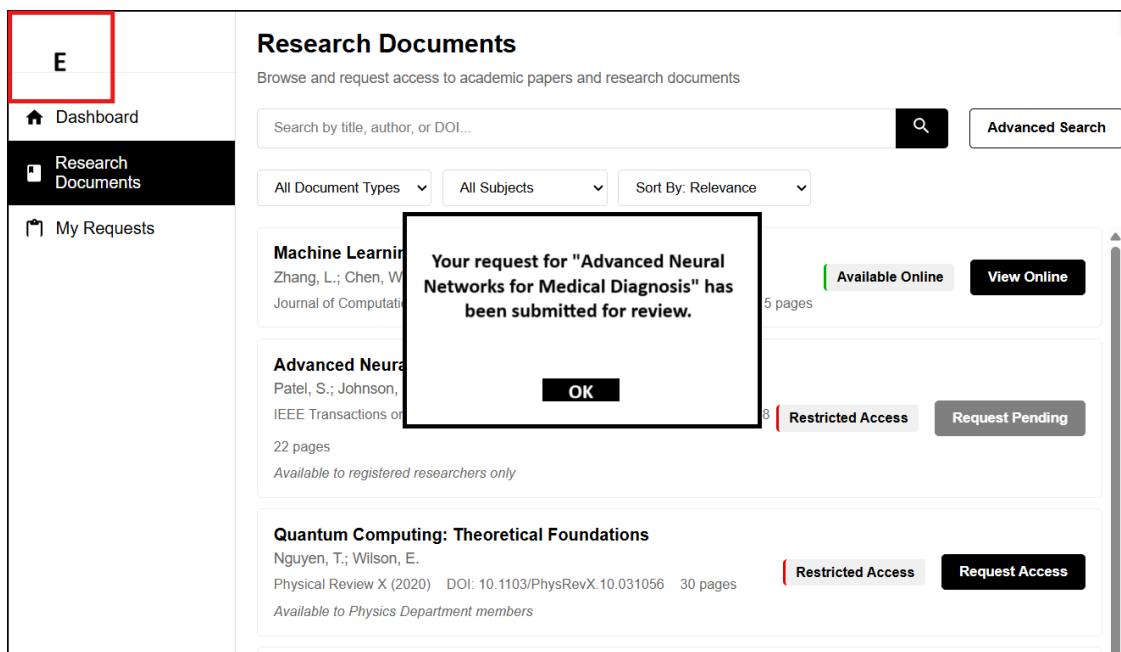
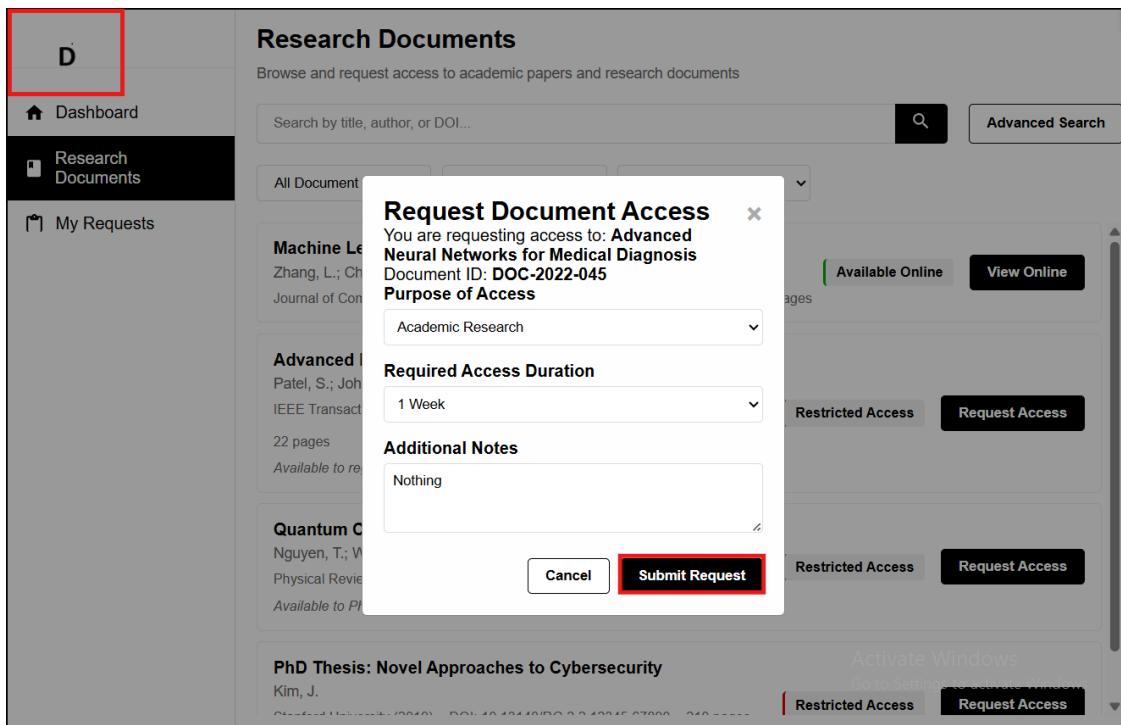


Figure 74 A – E: Request Access for Online Viewing

REQ036: Researchers shall track the status of their document requests.

The screenshot shows a user interface for tracking document requests. On the left, a sidebar menu includes 'Dashboard', 'Search', and 'My Requests' (which is highlighted). The main area is titled 'My Document Requests' with the subtitle 'Track the status of your digital document requests'. It features a navigation bar with tabs: 'All Requests' (selected), 'Pending', 'Approved', and 'Completed'. Below this, there are two entries:

Clinical Trial Data 2023 (PDF)
Req #D-4712

Request Type	Submitted On	Access Duration
Digital Document Access	2023-11-15 09:42	7 days

Request status timeline: Submitted (black dot), Reviewed (black dot), Approved (black dot), Access Granted (white circle).

Historical Archives (1945-1950) (Digitized)
Req #D-3895

Request Type	Submitted On	Access Duration
Special Collection Access	2023-11-10 14:15	14 days

Request status timeline: Submitted (black dot), Under Review (black dot), Approved (white circle), Access Granted (white circle).

Figure 75: Document Request Status Tracking for Researchers

REQ037: Researchers shall track the status of their borrowed books.

The screenshot shows a user interface for tracking borrowed books. On the left, a sidebar menu includes 'Dashboard', 'Browse Books', and 'My Borrowed Books' (which is highlighted). The main area is titled 'My Borrowed Books' with the subtitle 'Track the status of your current and past loans'. It features a navigation bar with tabs: 'All' (selected), 'Active', 'Overdue', 'Pending', and 'History'.

Introduction to Algorithms
Thomas H. Cormen
ISBN: 9780262033848 Borrowed: 15 May 2023 Loan ID: LN20230515-001

Status: Active (green bar) Due: 15 June 2023
Action: Renew

Clean Code: A Handbook of Agile Software Craftsmanship
Robert C. Martin
ISBN: 9780132350884 Borrowed: 1 June 2023 Loan ID: LN20230601-005

Status: Overdue (red bar) Was due: 1 July 2023
Action: Renewal Requested

The Pragmatic Programmer
Andrew Hunt, David Thomas
ISBN: 9780201616224 Requested: 10 June 2023 Request ID: RQ20230610-002

Status: Pending Approval (yellow bar) Estimated availability: 20 June 2023
Action: Cancel Request

Design Patterns: Elements of Reusable Object-Oriented Software
Erich Gamma, Richard Helm
ISBN: 9780201633610 Returned: 30 April 2023 Loan ID: LN20230401-003

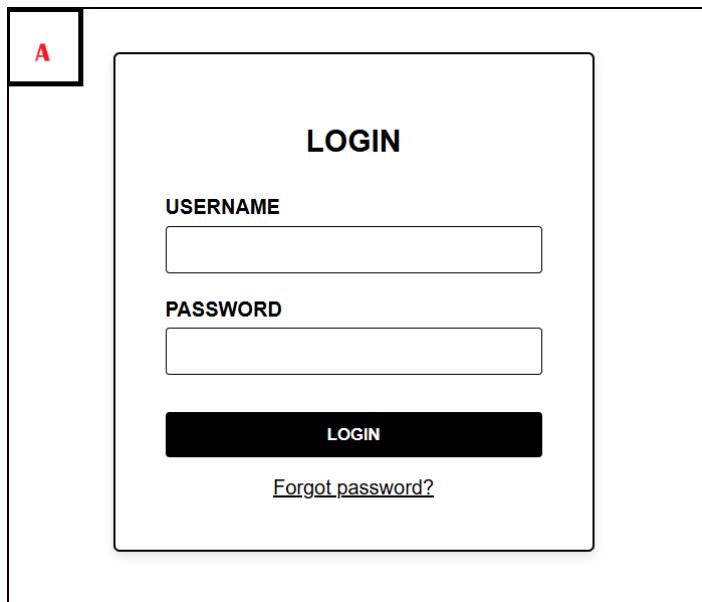
Status: Returned (grey bar) Borrowed: 1 Apr - 30 Apr 2023
Action: Borrow Again

Figure 76: Status Tracking for Researchers

1.1.5 Government Office Functions

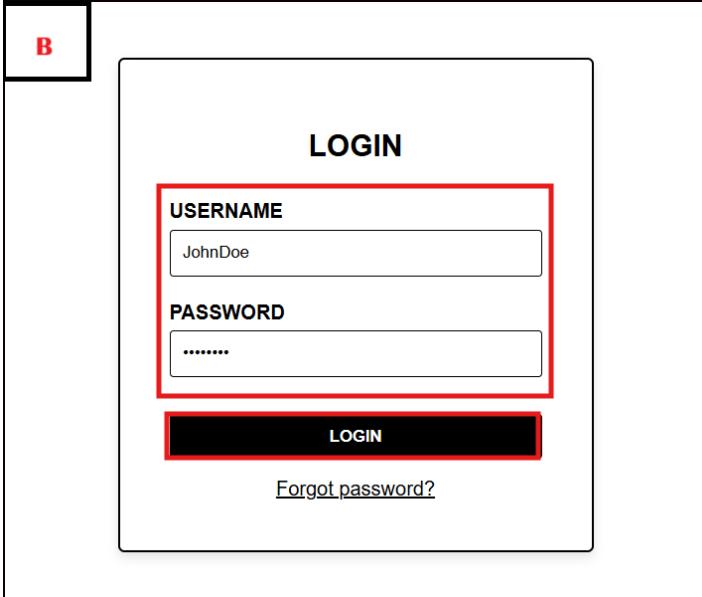
REQ038: Users shall be able to log in using their registered username and password.

A



The image shows a simple login interface. It features a central rectangular box with a thin black border. At the top center of this box is the word "LOGIN" in a bold, black, sans-serif font. Below it, there are two input fields: one labeled "USERNAME" and another labeled "PASSWORD", both in bold black capital letters. Each label is followed by a horizontal input box. At the bottom of the box is a solid black rectangular button with the word "LOGIN" in white. Below this button is a small, underlined link "Forgot password?".

B



This image shows the same login interface as above, but with specific fields highlighted. The "USERNAME" field and the "PASSWORD" field are both enclosed in a thick red rectangular border. The rest of the interface remains the same, including the "LOGIN" button and the "Forgot password?" link.

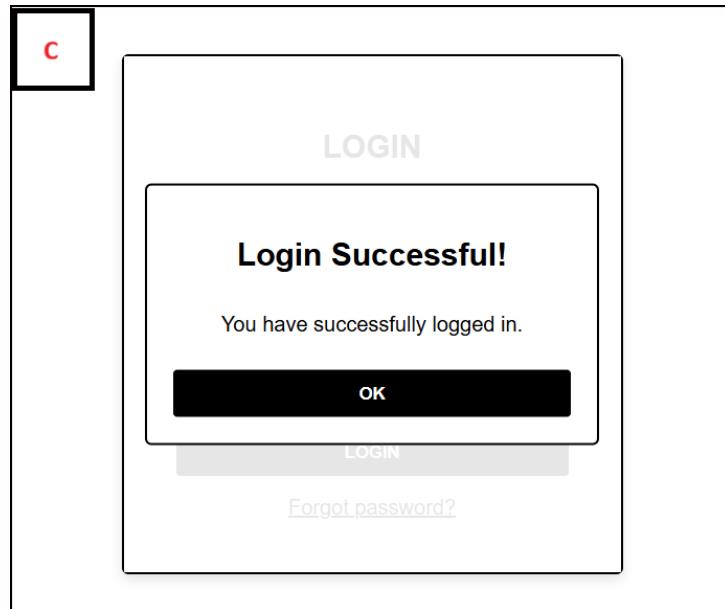
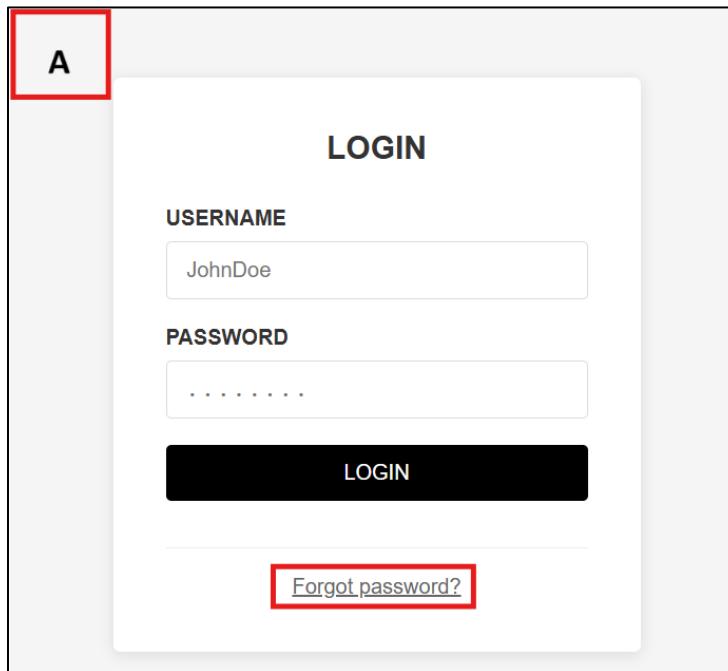
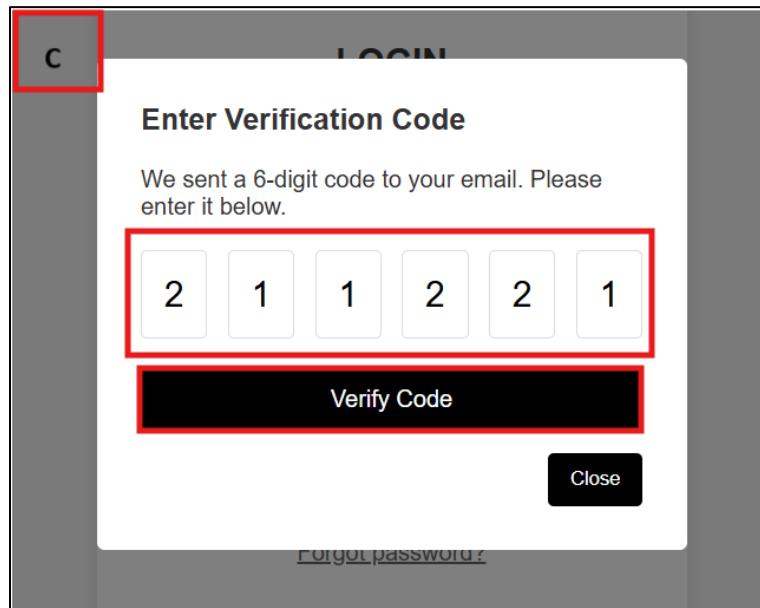
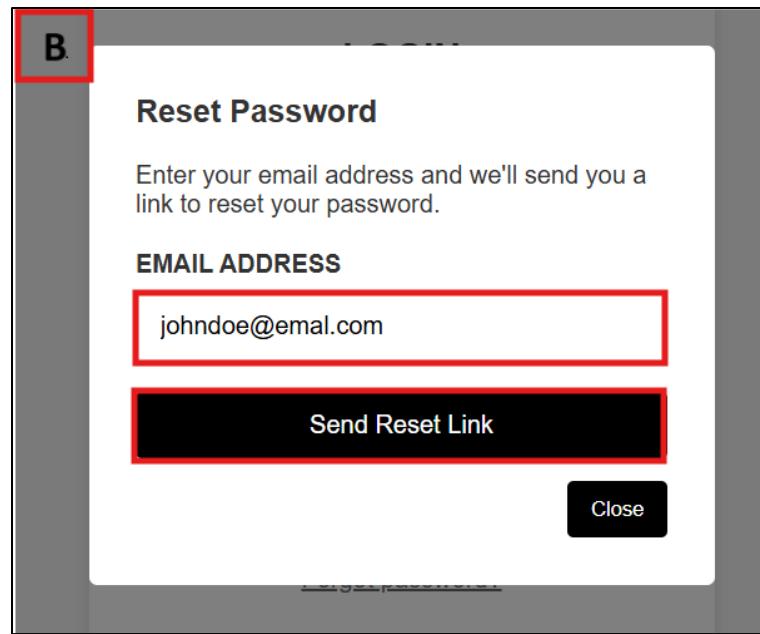


Figure 77 A – C: Government Login

REQ039: Users shall be able to reset their password using a "Forgot Password" feature with email verification.





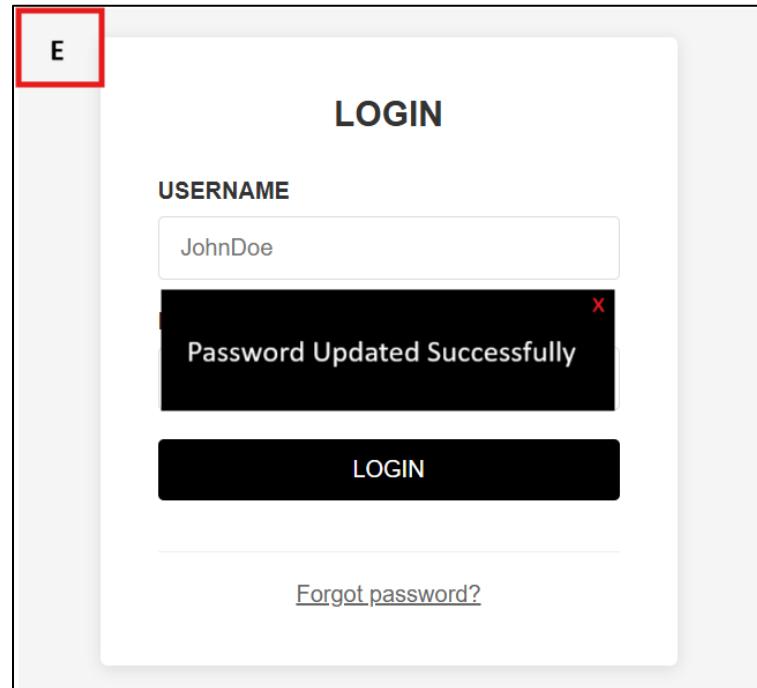
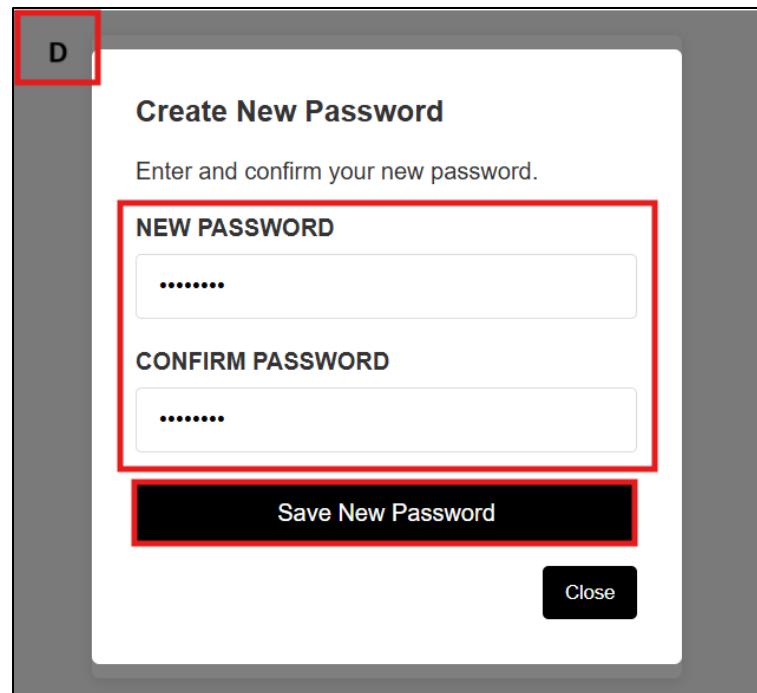


Figure 78 A – E: Reset Password

The system facilitates efficient interaction with government agencies by providing them access to essential document-related features. These include receiving timely notifications about the status of their document requests, viewing the list of available documents, and submitting access requests along with necessary request details and attachments for verification purposes. Additionally, agencies can track the progress of their submitted requests to stay informed and ensure transparency in the documentation process.

REQ040: Government agencies shall receive notifications regarding document request statuses.

The screenshot shows a user interface for 'Document Request Notifications'. On the left is a sidebar with 'Dashboard', 'Document Requests' (selected), and 'Notifications'. The main area has a title 'Document Request Notifications' and a subtitle 'Status updates for government document requests'. It includes tabs for 'All', 'Unread', 'Approvals', 'Rejections', and 'Updates'. Four notifications are listed:

- Request Approved: Climate Research Data 2023**
Request ID: REQ-2023-0456 Agency: Environmental Protection Document Type: Research Data
Your request for climate research data has been approved. The documents are now available for download in your agency portal.
Today, 10:45 AM [View Documents](#)
- Request Requires Additional Information**
Request ID: REQ-2023-0482 Agency: Health Department Document Type: Medical Reports
Your request for medical reports cannot be processed without additional authorization. Please upload the required clearance form.
Yesterday, 3:22 PM [Provide Information](#)
- Request Processed: Census Data 2022**
Request ID: REQ-2023-0391 Agency: Statistics Bureau Document Type: Census Data
Your requested census data has been processed and is available for download. The access will expire in 30 days.
Jun 15, 2023 [View](#)
- Request Rejected: Classified Defense Documents**
Request ID: REQ-2023-0423 Agency: Defense Department Document Type: Classified
Your request has been rejected due to insufficient clearance level. Please contact security office for clearance upgrade procedures.
Jun 10, 2023 [Appeal Decision](#)

Figure 79: Document Request Status In-System Notification

REQ041: Government agencies shall view the list of available documents and request access to documents, providing request details and adding attachments for validation.

A

The screenshot shows a user interface for browsing government documents. On the left, a sidebar menu includes 'Dashboard' (selected), 'Documents' (highlighted with a red box), and 'Requests'. The main area is titled 'Government Documents' with the sub-instruction 'Browse and request access to official government documents'. It features a search bar and filters for 'All Document Types', 'All Agencies', 'All Security Levels', and 'Sort By: Relevance'. Three document cards are listed:

- Annual Public Health Report 2023**
Health Department
Ref: HD-2023-AR-015 Published: 15 May 2023 Pages: 142
Buttons: Public Access (green), Download (black)
- Environmental Impact Assessment Guidelines**
Environment Agency
Ref: EA-2023-GL-007 Published: 1 April 2023 Pages: 89
Text: Available to authorized agencies only
Buttons: Restricted Access (red), Request Access (black)
- Infrastructure Security Protocols**
National Security
Ref: NS-2023-SP-042 Published: 15 March 2023 Pages: 56
Text: Classified - Top Secret clearance required
Buttons: Classified (blue), Request Access (black)

B

This screenshot is identical to Screenshot A, showing the same 'Government Documents' interface with the 'Documents' menu item highlighted by a red box. The three document cards are displayed with their respective titles, agency names, publication details, and access control buttons.

C

Government Documents

Title: Environmental Impact Assessment Guidelines
Agency: Environment Agency
Reference: EA-2023-GL-007

Requesting Agency	Requestor Name
<input type="text"/>	<input type="text"/>
Position/Title	Email
<input type="text"/>	<input type="text"/>
Purpose of Request	
Select purpose...	
Justification	
<input type="text"/>	
Required Attachments	
Click to upload authorization documents	
Request.html (11.41 KB) X	
Urgency Level	
Routine (5-10 business days)	
Cancel Submit Request	

D

Government Documents

Title: Environmental Impact Assessment Guidelines
Agency: Environment Agency
Reference: EA-2023-GL-007

Requesting Agency	Requestor Name
Department of Finance	John Smith
Position/Title	Email
Secretary	JohnSmith@email.com
Purpose of Request	
Regulatory Compliance	
Justification	
To assess the earning capacity or profitability of the firm. To assess the operational efficiency and managerial effectiveness.	
Required Attachments	
Click to upload authorization documents	
Request.html (11.41 KB) X	
Cancel Submit Request	

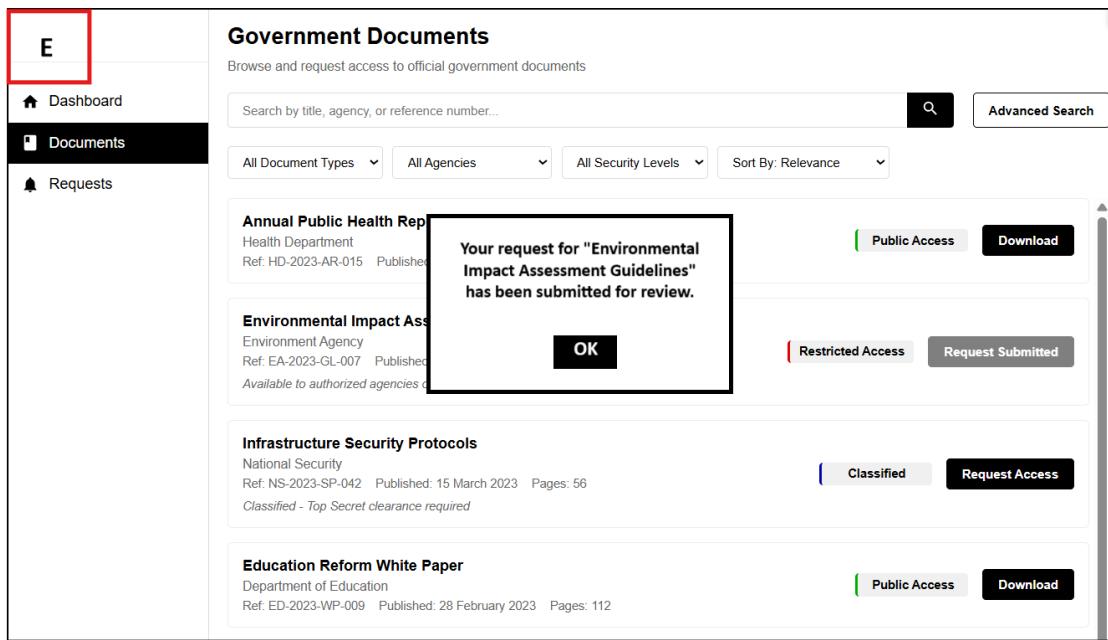


Figure 80 A – E: Viewing and Document requests for Government Agencies

REQ042: Government agencies shall track the status of their document requests.

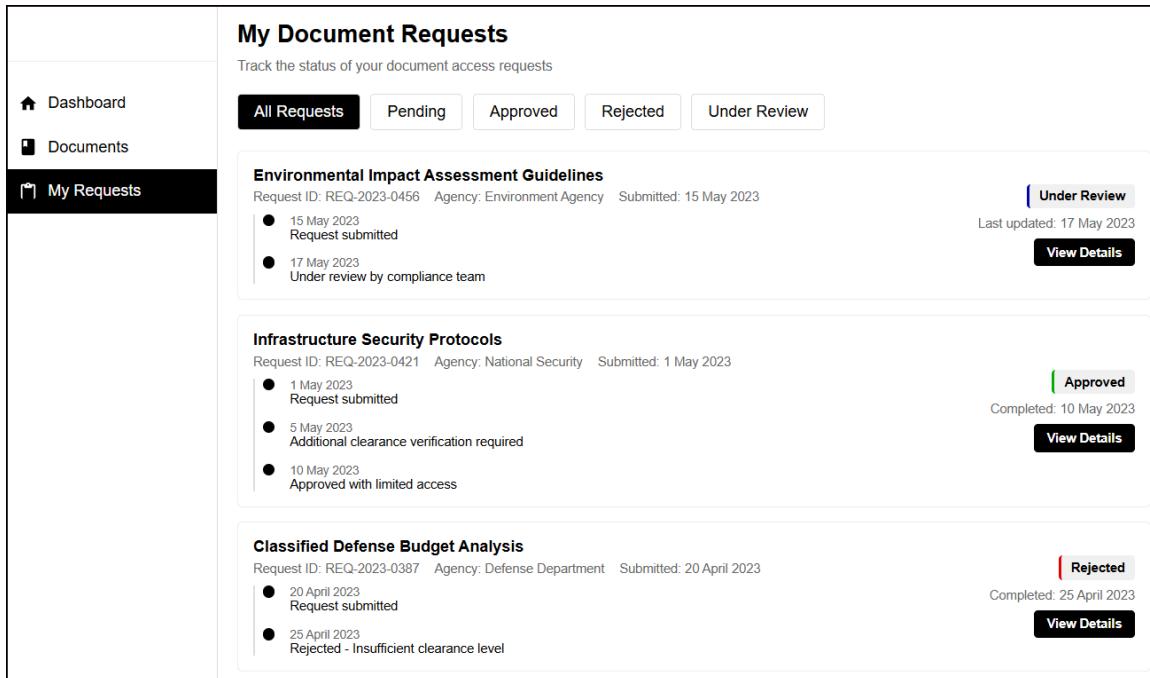


Figure 81: Document request tracking for Government Agencies

Non-Functional Requirements

1.2.1 Operational Requirements

REQ043: The system shall provide web-based access for government offices and researchers.

REQ044: The system shall integrate with cloud storage to securely store all archived data including documents and books.

REQ045: The system shall support integration with printers for generating physical copies.

REQ046: The system must allow offline functionality for librarians during network outages.

1.2.2 Performance Requirements

REQ047: The system shall retrieve requested books or documents within 5 seconds of a search query.

REQ048: The system dashboard shall display real-time updates on request status and processed records within 2 seconds.

REQ049: The system's response time for uploading new books or documents shall not exceed 10 seconds per batch.

1.2.3 Security Requirements

REQ050: Only authorized users (e.g., librarians and administrators) shall access restricted government records or confidential book data.

REQ051: All user accounts must follow secure password protocols with a minimum of 8 characters, including alphanumeric combinations.

REQ052: Confidential materials must be encrypted during storage and transmission.

REQ053: The system must maintain an audit trail of all user activities for accountability.

1.2.4 Cultural Requirements

REQ054: The system interface will use English as the primary language.

REQ055: All timestamps will follow Philippine Standard Time (PST).

Module 1 – Login and Authentication Module

REQ056: Users shall be able to log in using their registered username and password.

REQ057: Users shall be able to reset their password using a "Forgot Password" feature with email verification.

REQ058: The system shall enforce secure password policies, requiring a minimum of 8 characters with alphanumeric combinations.

REQ059: The system shall support multi-factor authentication (MFA) for administrator and librarian accounts.

Module 2 – Search and Retrieval Module

REQ060: Users shall be able to search for books and documents using filters such as title, author, category, department, and date range.

REQ061: The system shall return search results within 5 seconds.

REQ062: Users shall be able to view metadata (e.g., title, author, date, category) before requesting or borrowing.

REQ063: Authorized users shall be able to access non-restricted digital books and records without librarian intervention.

Module 3 – Request Tracking Module

REQ064: Users shall be able to submit book or document requests online.

REQ065: Users shall be able to track the status of their book or document requests in real time.

REQ066: The system shall send automated notifications regarding request and borrowing status.

REQ067: Librarians and administrators shall be able to approve or reject book and document requests.

Module 4 – User Management Module (Administrator Only)

REQ068: Administrators shall be able to create, update, and deactivate user accounts.

REQ069: Administrators shall assign role-based access permissions.

REQ070: The system shall support automatic account deactivation for inactive users.

REQ071: Administrators shall generate user activity reports.

Module 5 – Digital Archiving and Cataloging Module (Librarian & Administrator)

REQ072: Librarians shall be able to upload new documents and books with metadata.

REQ073: The system shall support batch uploads of documents and book files.

REQ074: Librarians shall be able to edit and update metadata.

REQ075: The system shall support OCR for scanned documents and book pages.

Module 6 – Preservation and Backup Module

REQ076: The system shall support automated daily backups of all records and book data.

REQ077: Librarians shall update the preservation status of fragile documents and books.

REQ078: Administrators shall be able to restore backups in case of failure.

Module 7 – Reports Generation Module

REQ079: The system shall generate reports on document retrieval, book borrowings, pending requests, usage, and preservation status.

Module 8 – Online Request Module (Government Offices & Researchers)

REQ080: Government offices and researchers shall be able to submit requests for both books and documents online.

REQ081: The system shall allow bulk requests for documents or multiple book borrowings.

Module 9 – Notification Module

REQ082: The system shall send email notifications and in-system alerts for request approvals, borrow due dates, and overdue reminders.

Design of Software, System, Product, and/or Processes

System Architecture

The proposed **KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION** is built on a three-tier architecture consisting of the presentation tier, application tier, and database tier. The **presentation tier** handles the user interface, enabling easy interaction between users such as librarians, administrators, government officials, and researchers. The **application tier** executes core functions like processing document requests, managing metadata, facilitating document retrieval, and automating notifications. It also handles user authentication and role-based access control. The **database tier** manages the storage and retrieval of archived documents and metadata, ensuring data security and integrity. It utilizes scalable solutions like **MariaDB** for structured data supporting efficient data indexing, querying, and retrieval. This architecture ensures a scalable, efficient, and secure solution for managing electronic records in the long term.

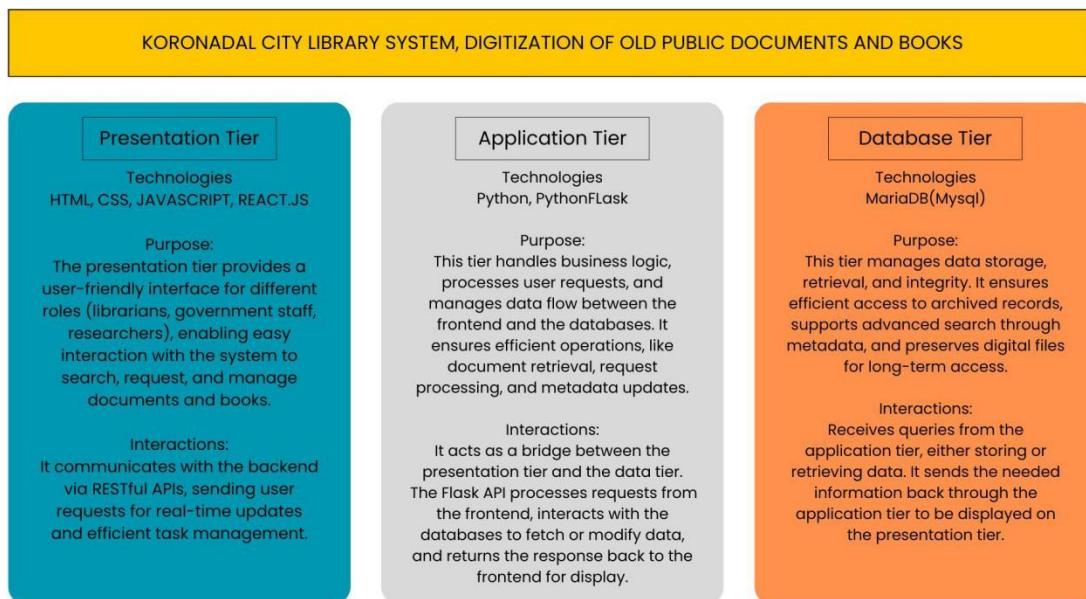


Figure 82: System Architecture

Object Modeling, Use Case Diagrams, Activity Diagrams

This section provides an overview of the use-case models and event decomposition designed for the proposed system. These models and diagrams serve as essential components in illustrating the system's functionality, user interactions, and overall workflow, ensuring efficient document management, retrieval, and secure access for various user roles such as librarians, administrators, government officials, and researchers.

Login and Authentication Module

Use case	Description	User/Actor (Roles)
User login	Users log in using registered username and password	All users
Reset password	Users reset password via email verification	All users
Validate password	System enforces secure password policies	System
Authenticate account	System supports MFA for admin/librarian accounts	Administrators, Librarians

Table 4: Login and Authentication Event Decomposition

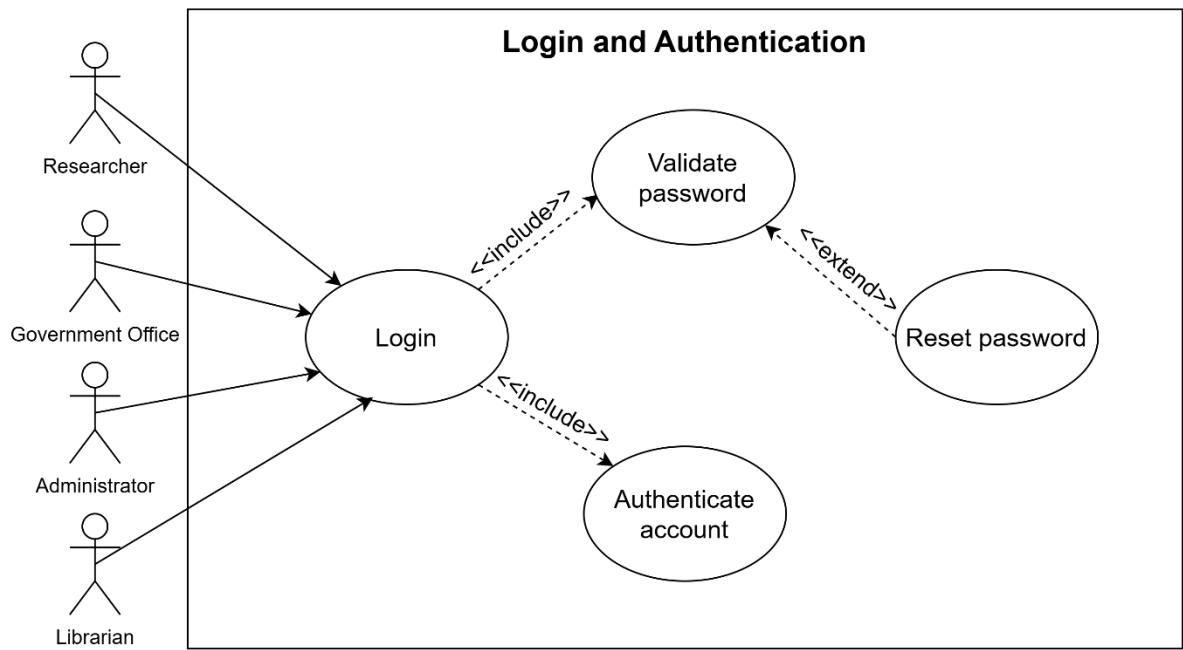


Figure 83: Login and Authentication Use Case

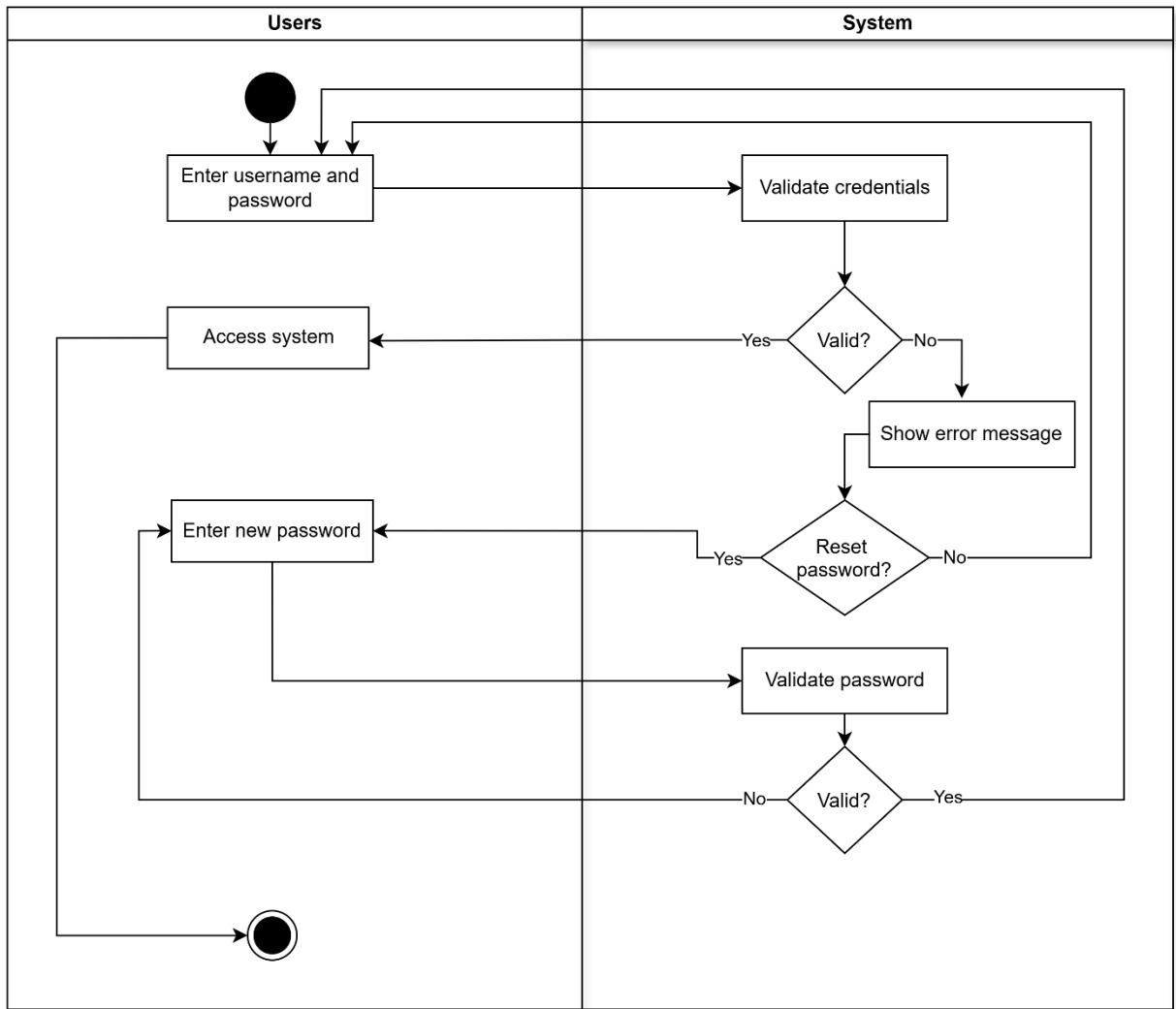


Figure 84: Login and Authentication Activity Diagram

Digital Archiving and Cataloging Module

Use case	Description	User/Actor (Roles)
Upload documents	Librarians upload new documents with metadata	Librarians/Administrator
Batch upload	System supports batch uploads	Librarians/Administrator
Edit metadata	Librarians edit/update metadata	Librarians/Administrator

Table 5: Digital Archiving and Cataloging Event Decomposition

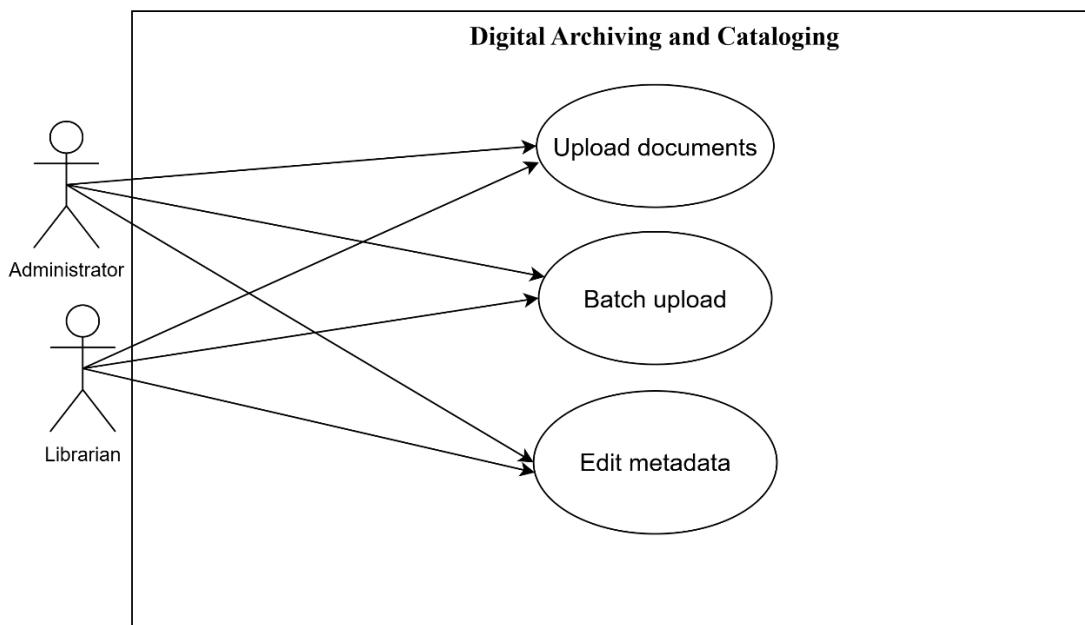


Figure 85: Digital Archiving and Cataloging Use Case Diagram

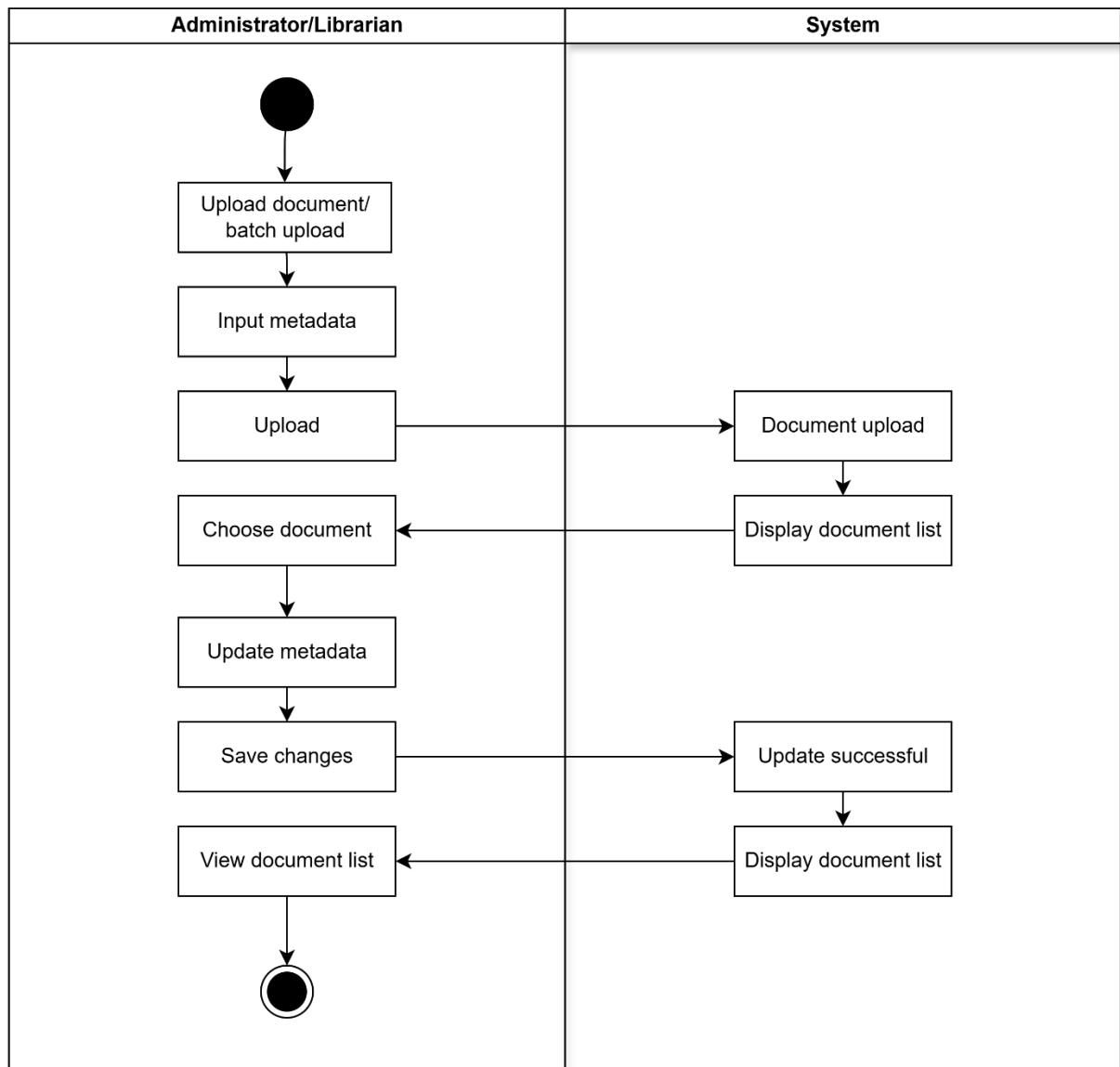


Figure 86: Digital Archiving and Cataloging Activity Diagram

Optical Character Recognition (OCR) Module

Use Case	Description	User/Actor (Roles)
Upload scanned document/books	Upload scanned government documents and books	Librarians, Administrators
Run OCR process	Convert scanned text to machine-readable format using OCR engine	System
Validate OCR output	Review and correct converted text where necessary	Librarians
Index OCR content	Index validated text for full-text search and retrieval	System

Table 6: Optical Character Recognition Event Decomposition

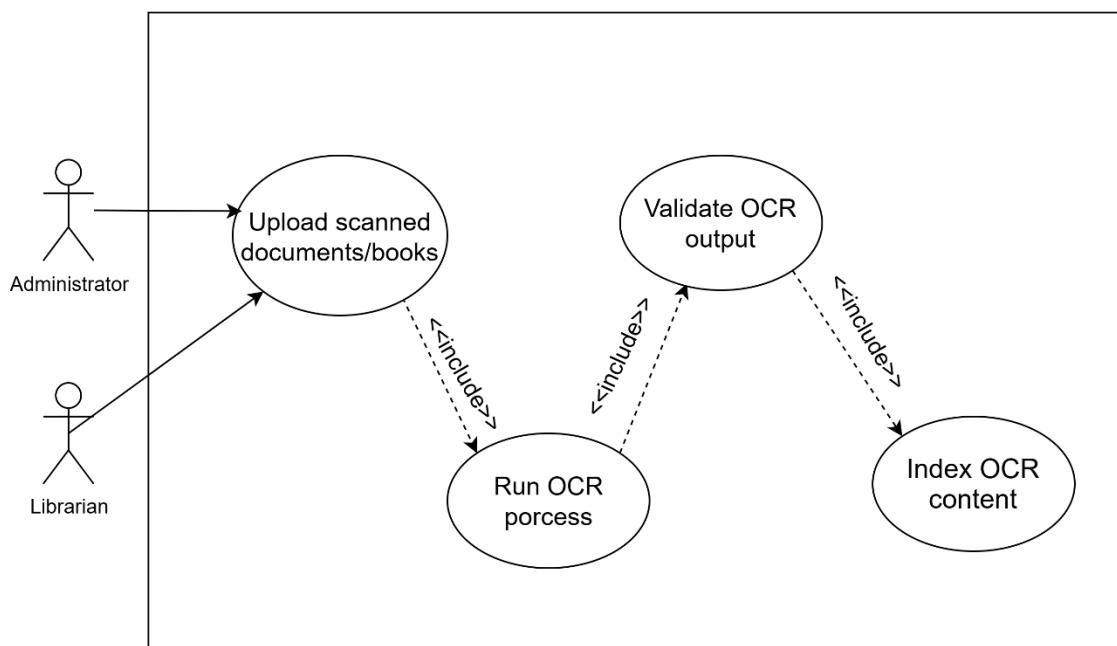


Figure 87: Optical Character Recognition Use Case

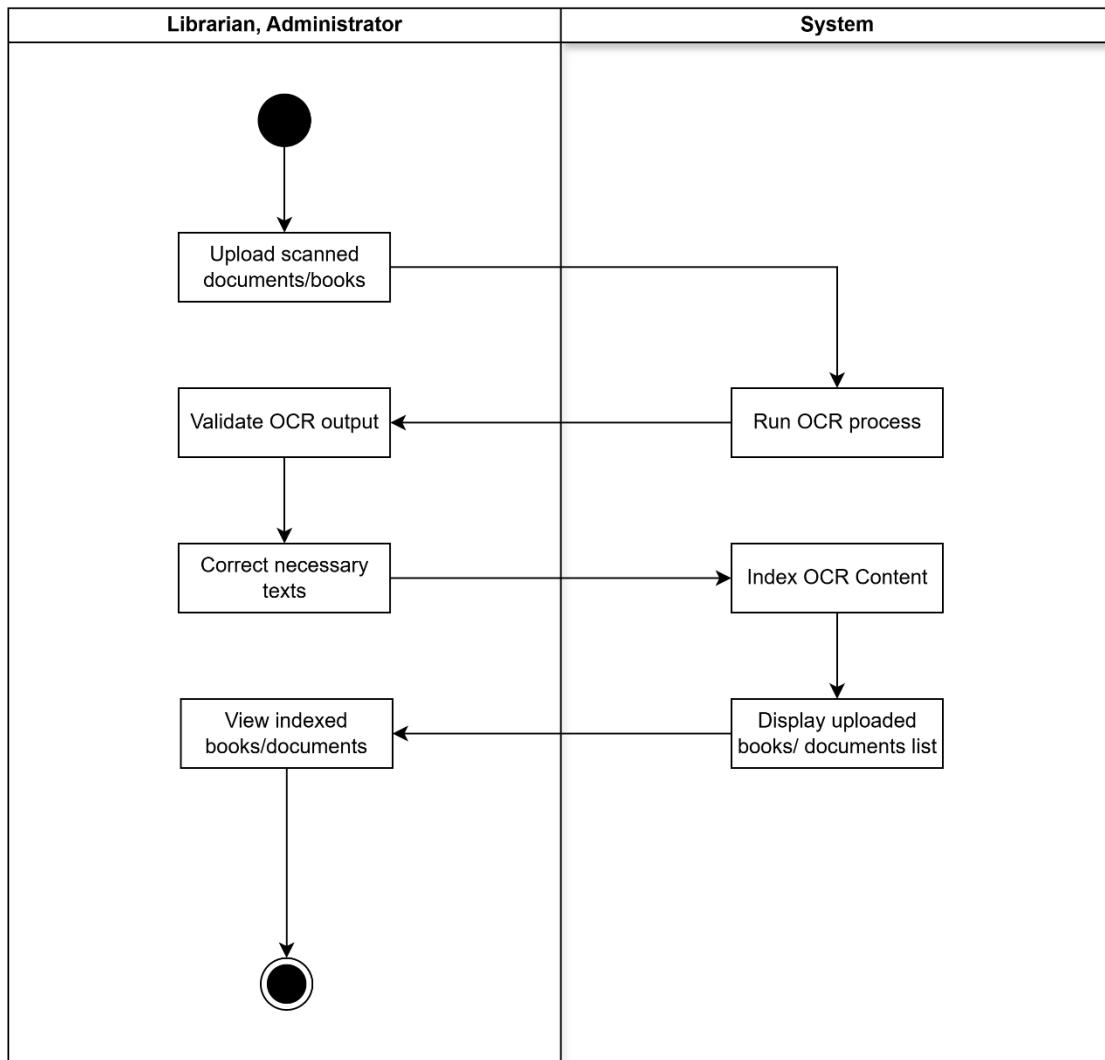


Figure 88: Optical Character Recognition Activity Diagram

Backup and Recovery Module

Use Case	Description	User/Actor (Roles)
Initiate Manual Backup	Administrator manually triggers a backup when needed, such as before updates	Administrator
Restore from Backup	Administrator restores the system using the most recent valid backup point	Administrator
View Backup Logs	Administrator checks backup status, schedule, and history of successful/failed backups	Administrator

Table 7: Backup and Recovery Event Decomposition

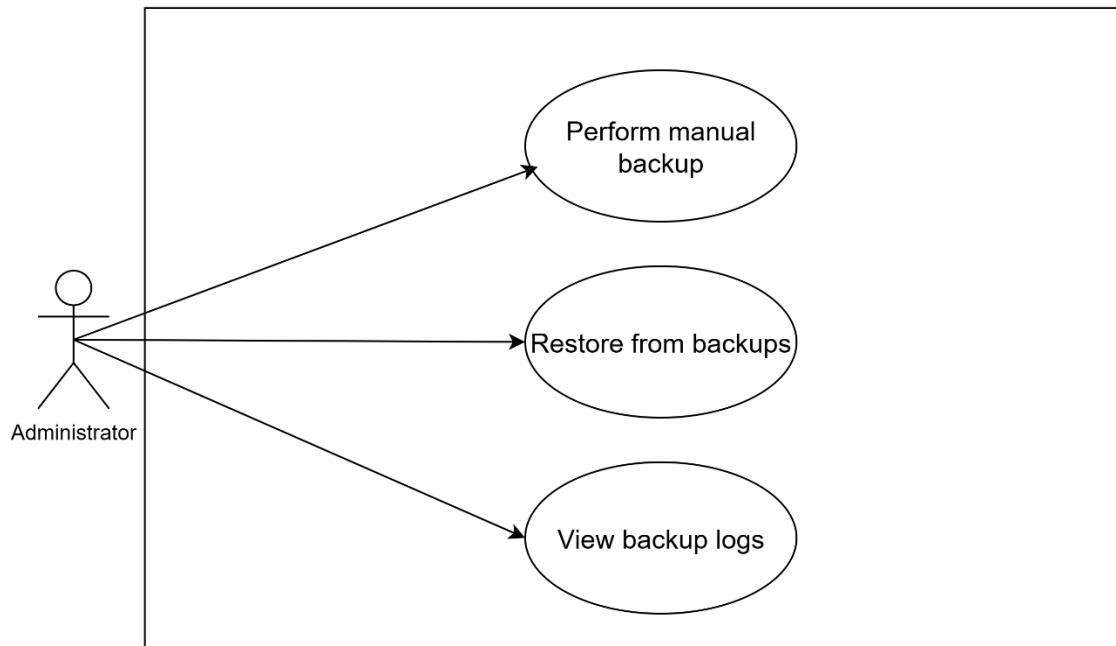


Figure 89: Backup and Recovery Use Case

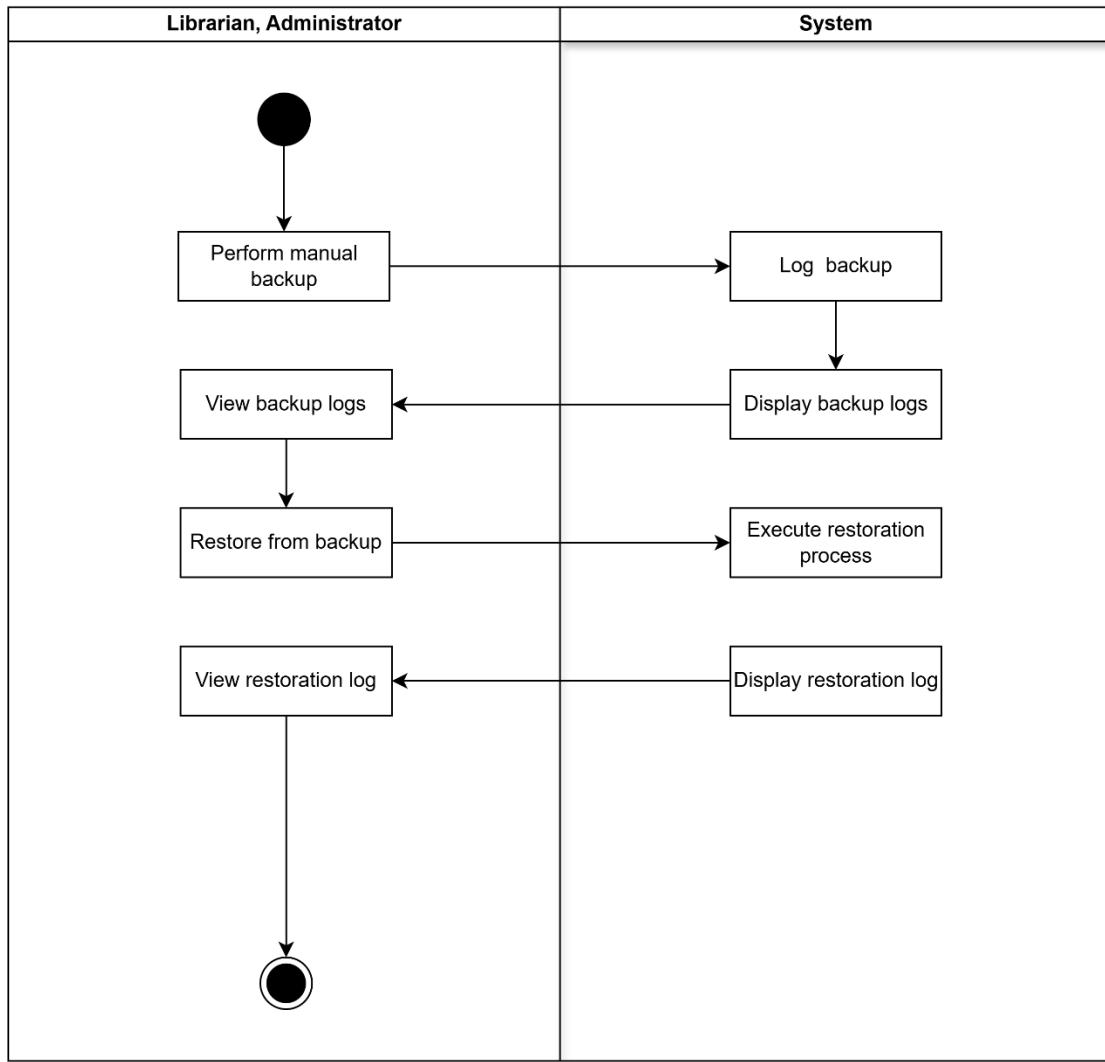


Figure 90: Backup and Recovery Activity Diagram

Request Tracking Module

Use case	Description	User/Actor (Roles)
Submit request	Users submit book/document requests online	Researcher/Government Offices
Track request status	Users track request status in real time	Researcher/Government Offices
Approve/reject request	Librarians/admins approve or reject requests	Librarians, Administrators

Table 8: Request Tracking Module Event Decomposition

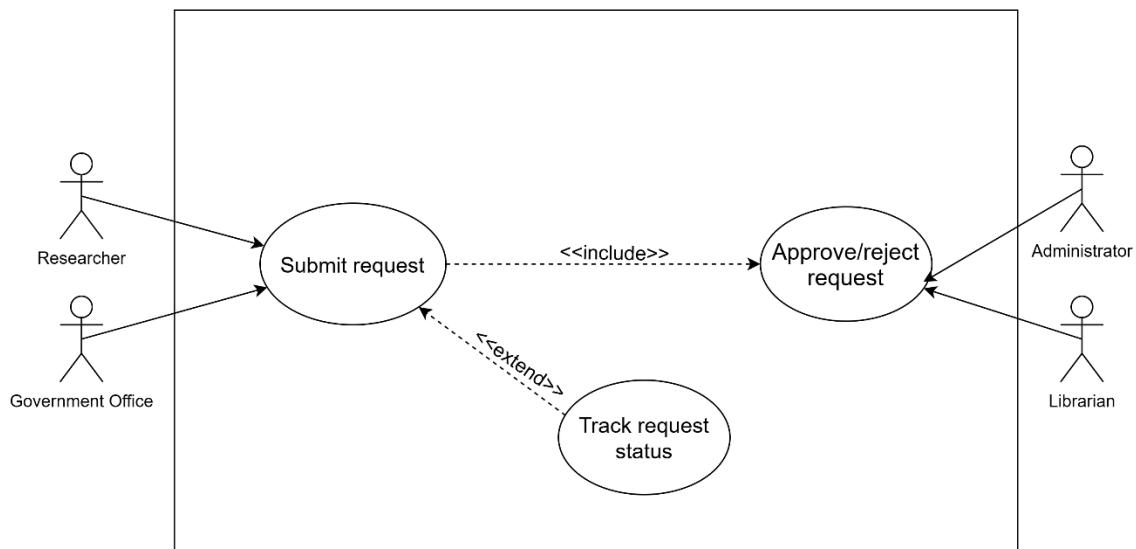


Figure 91: Request Tracking Use Case

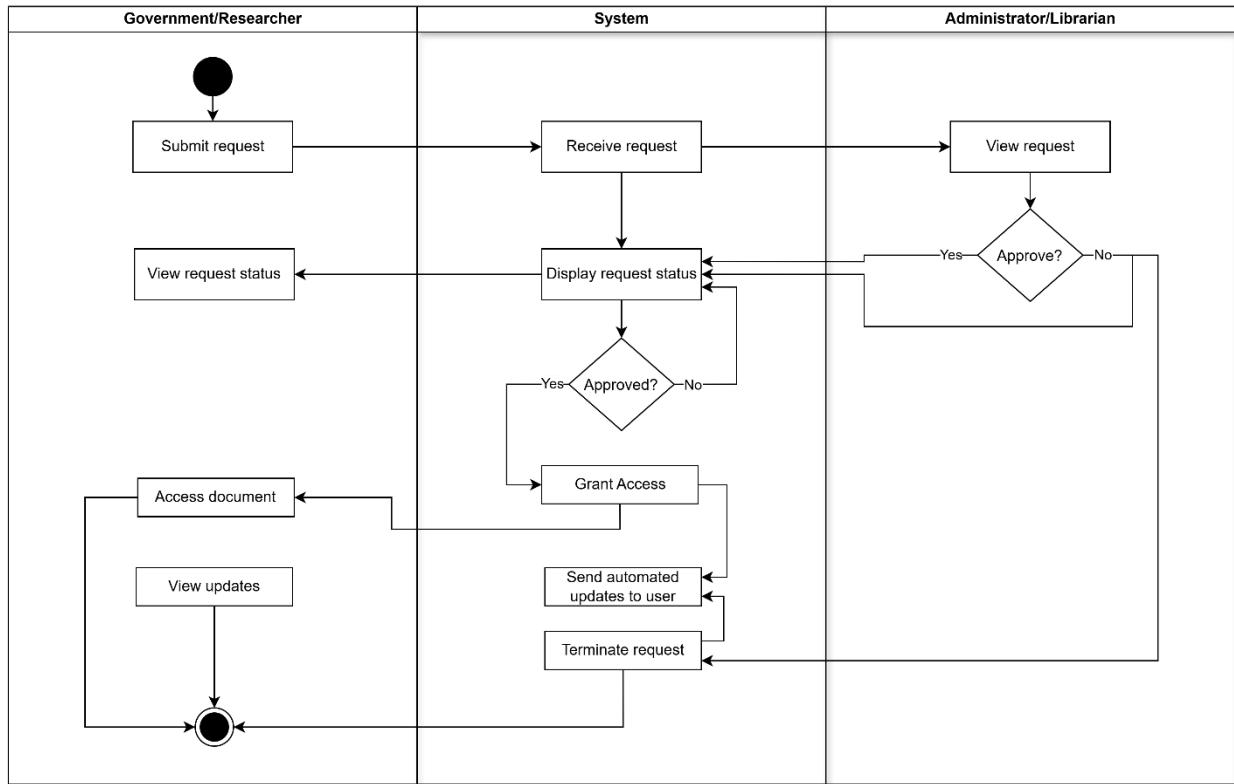


Figure 92: Request Tracking Activity Diagram

Manage Accessible Archives and Book Collection Module

Use Case	Description	User/Actor (Roles)
Access Public Records	Researcher and Government Agencies views or downloads approved digital books and public documents	Researcher, Government Agencies
View digital books	Researcher and Government Agencies views digital books.	Researcher, Government Agencies
View public documents	Researcher and Government Agencies views public documents.	Researcher, Government Agencies
Download public documents	Researcher and Government Agencies or downloads public documents.	Researcher, Government Agencies
Download digital books	Researcher and Government Agencies or downloads approved digital books.	Researcher, Government Agencies

Table 9: Manage Accessible Archives and Book Collection Event Decomposition

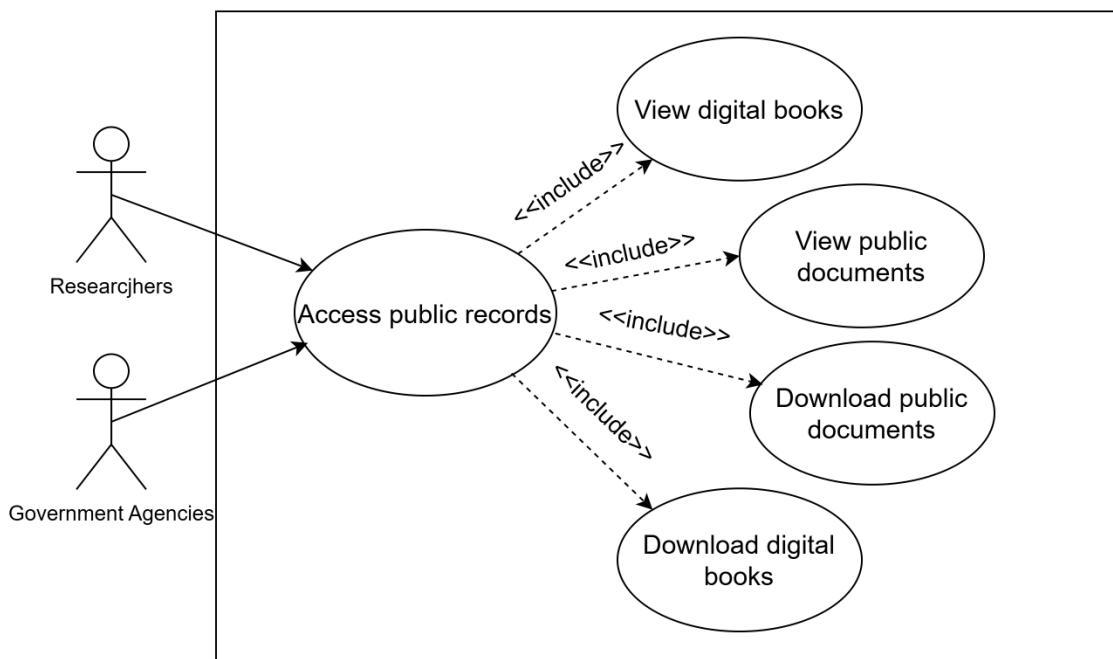


Figure 93: Manage Accessible Archives and Book Collection Use Case

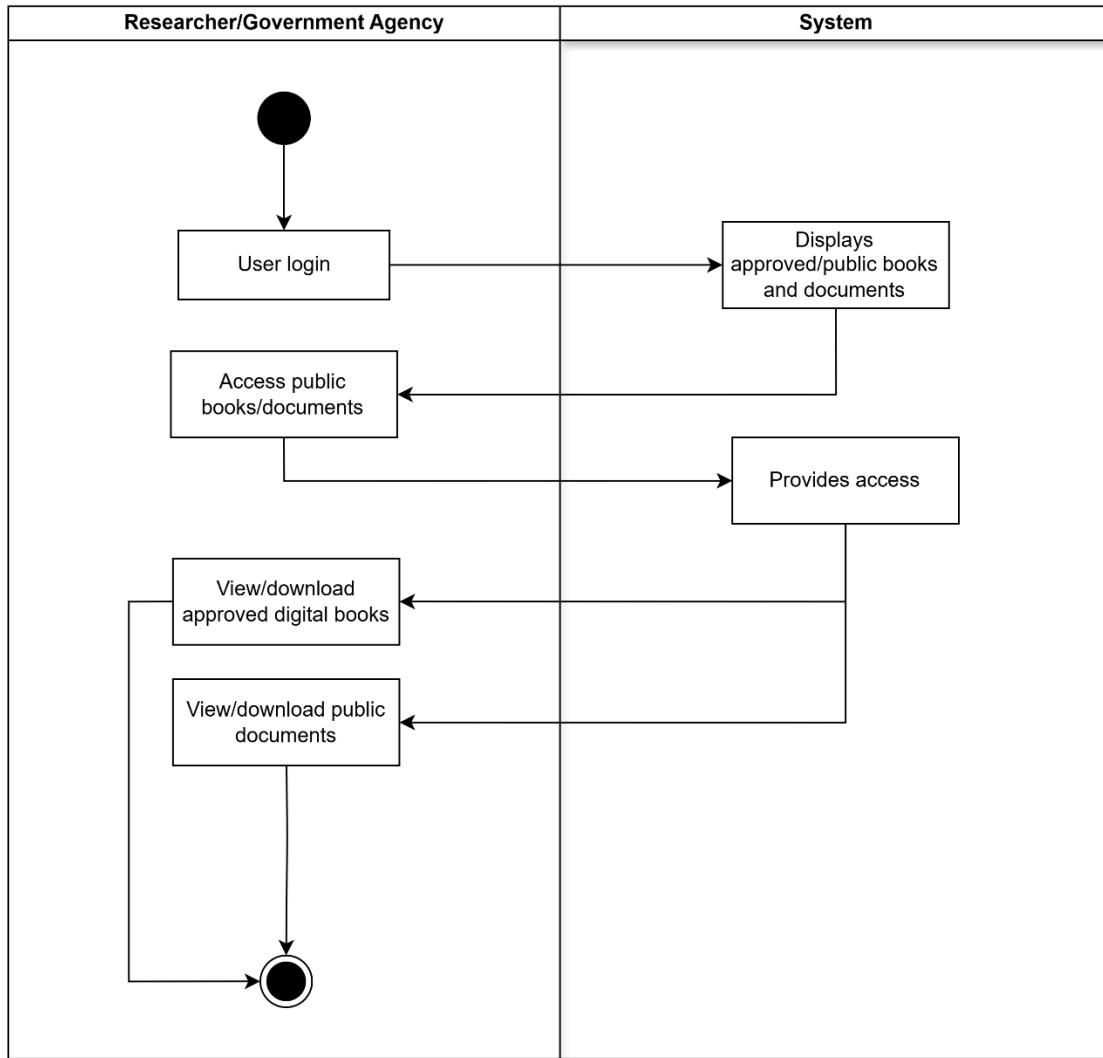


Figure 94: Manage Accessible Archives and Book Collection Activity Diagram

Reports Generation Module

Use case	Description	User/Actor (Roles)
Generate reports	System generates reports on usage, requests, etc.	Administrators, Librarians
Print report	Administrators and Librarians prints the report generated by the system.	Administrators, Librarians
Download report	Administrators and Librarians downloads reports generated by the system.	Administrators, Librarians
View report	Administrators and Librarians views the reports generated by the system.	Administrators, Librarians

Table 10: Reports Generation Event Decomposition

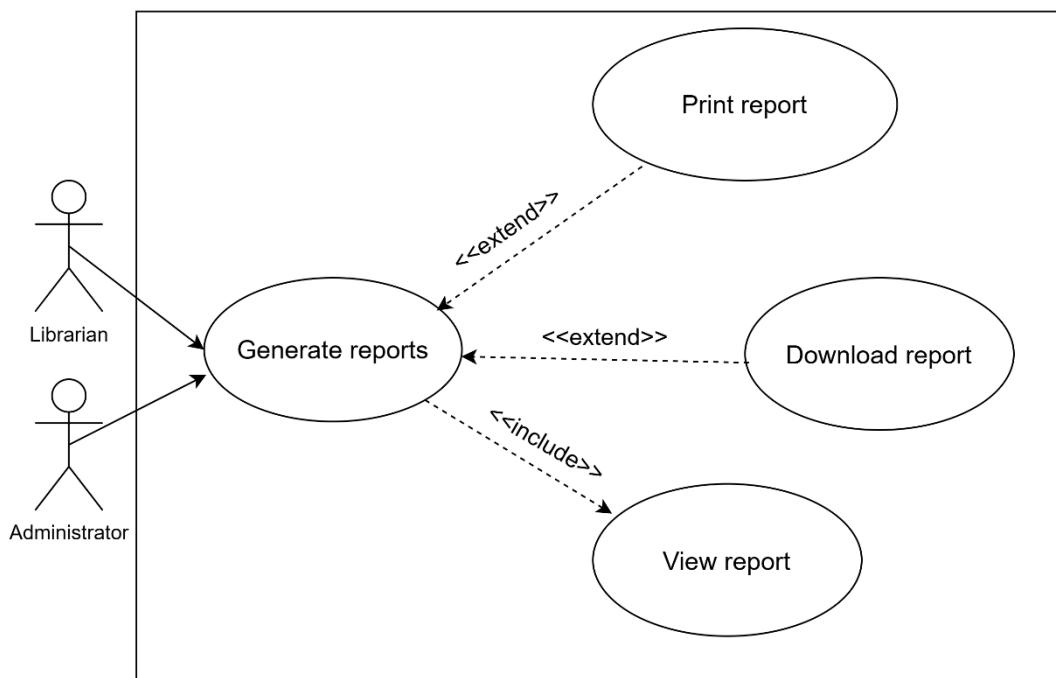


Figure 95: Reports Generation Use Case Diagram

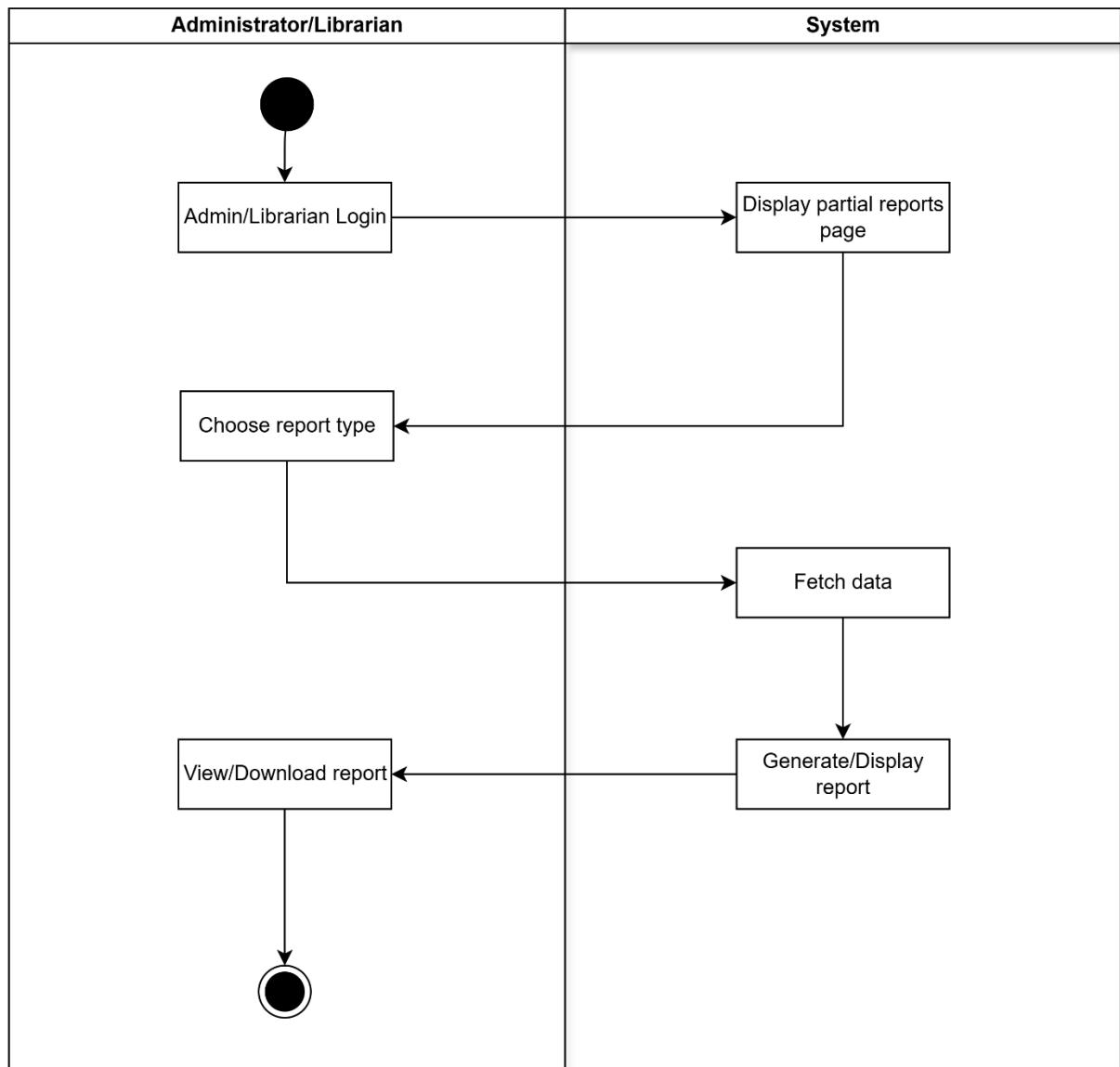


Figure 96: Reports Generation Activity Diagram

Audit and Activity Logs Module

Use case	Description	User/Actor (Roles)
Request books/documents	Users submit book/document requests online	Researcher/Government
Review books/documents	Users review book/documents online	Researcher/Government
Maintain audit trail	System logs all user actions	System

Table 11: Audit and Activity Logs Event Decomposition

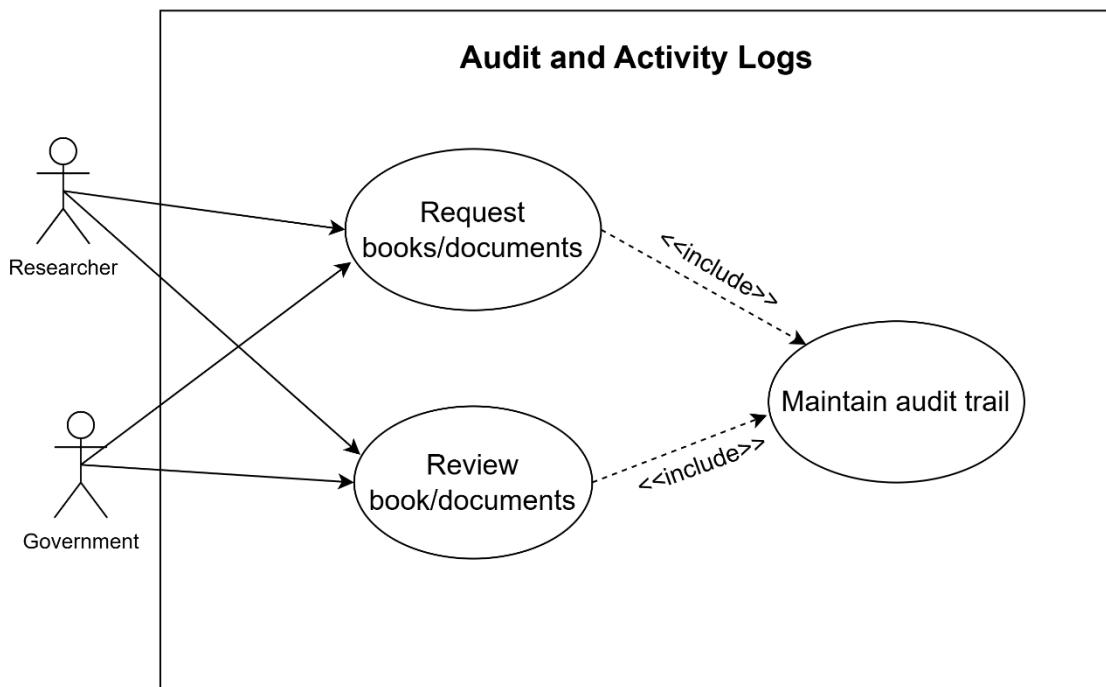


Figure 97: Audit and Activity Logs

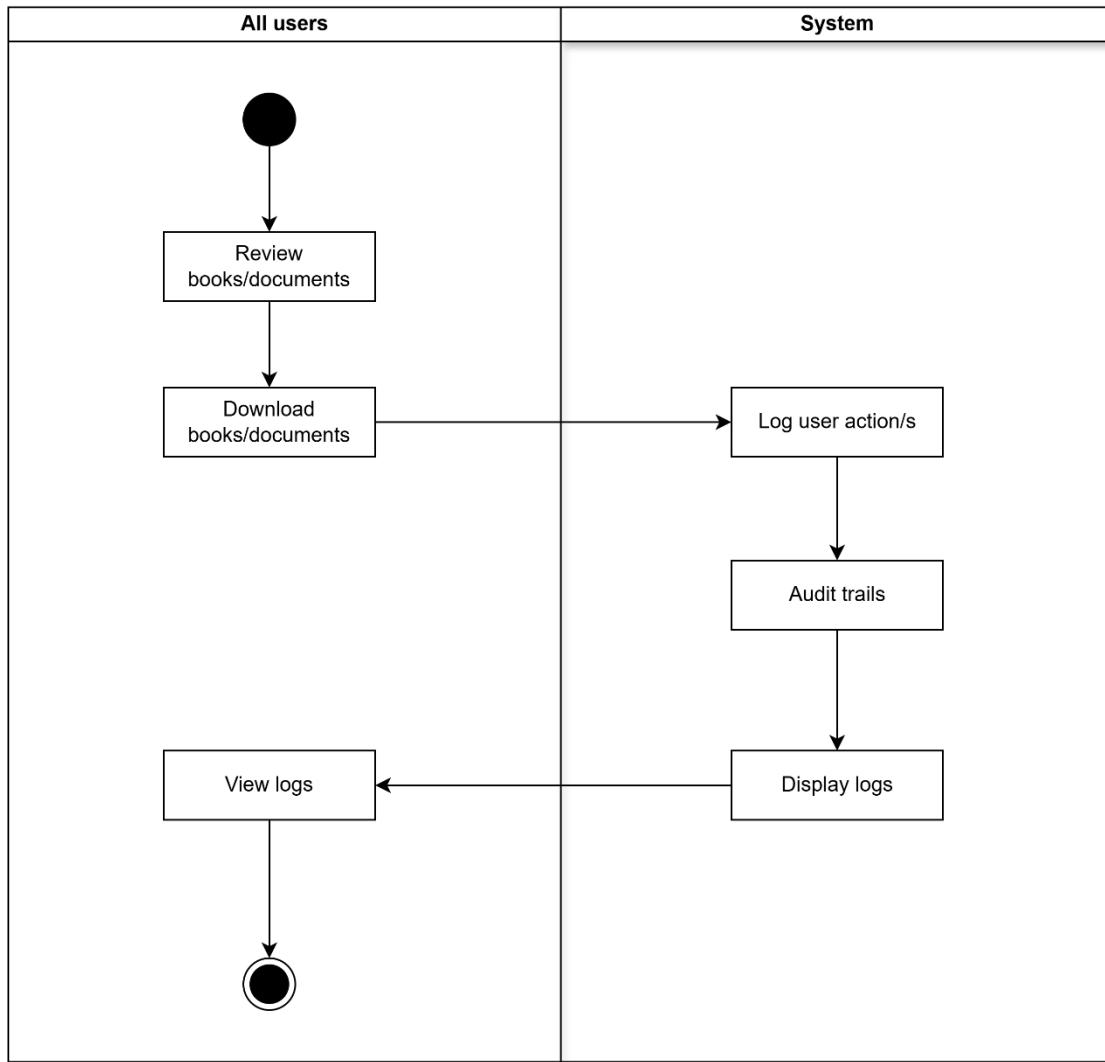


Figure 98: Audit and Activity Logs

Automated Document and Book Classification Module

Use Case	Description	User/Actor (Roles)
Upload Document/Book	Upload files that will be automatically classified based on metadata	Librarian, Administrator
Classify File	System assigns uploaded files to predefined categories using rules and metadata	System (automated process)
Review Classified Entries	View and confirm or adjust automatic classifications if needed	Librarian, Administrator

Table 12: Automated Document and Book Classification Event Decomposition

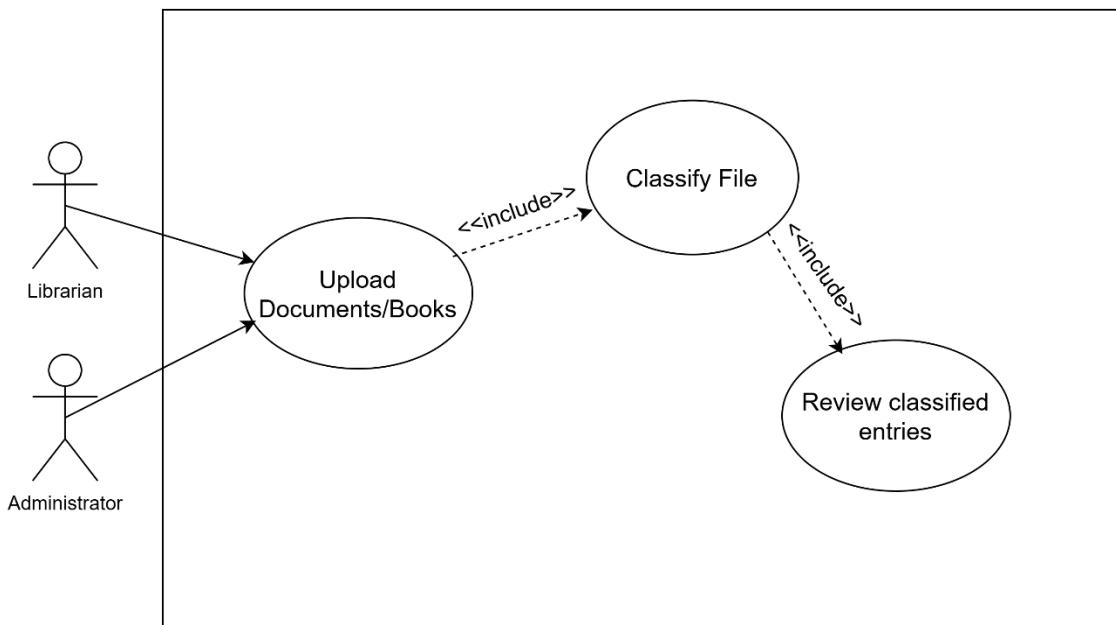


Figure 99: Automated Document and Book Classification Use Case

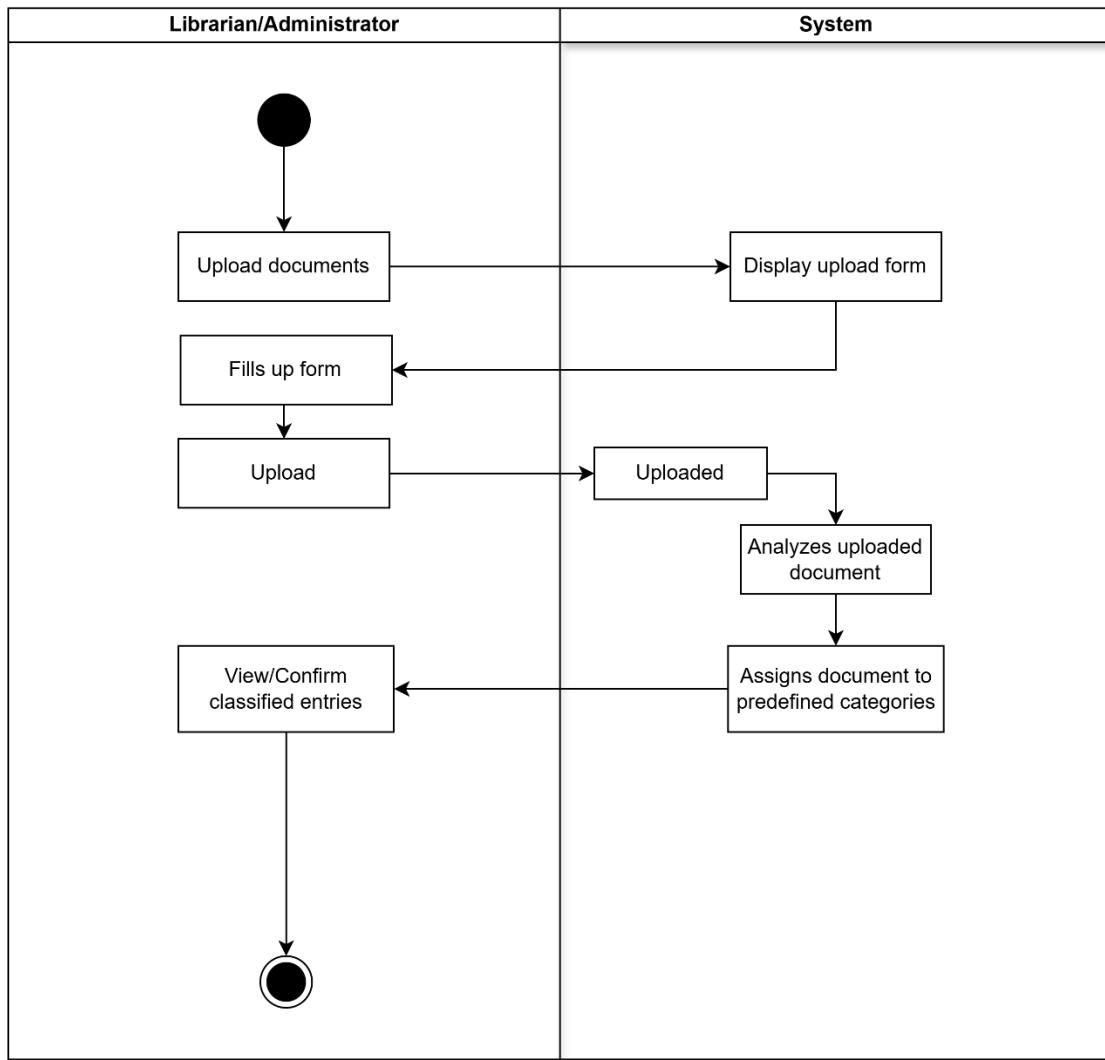


Figure 100: Automated Document and Book Classification Activity Diagram

Preservation and Storage Location Module

Use Case	Description	User/Actor (Roles)
Record Storage Location	Input and update the physical location of books and documents	Librarian, Administrator
Monitor Item Condition	Log the condition of physical items, flagging those that need special handling	Librarian
Flag Item for Digitization	Mark fragile or rare items for priority digitization	Librarian
View Digital Inventory Map	Access a visual or list-based map of item storage locations	Librarian, Administrator

Table 13: Preservation and Storage Location Event Decomposition

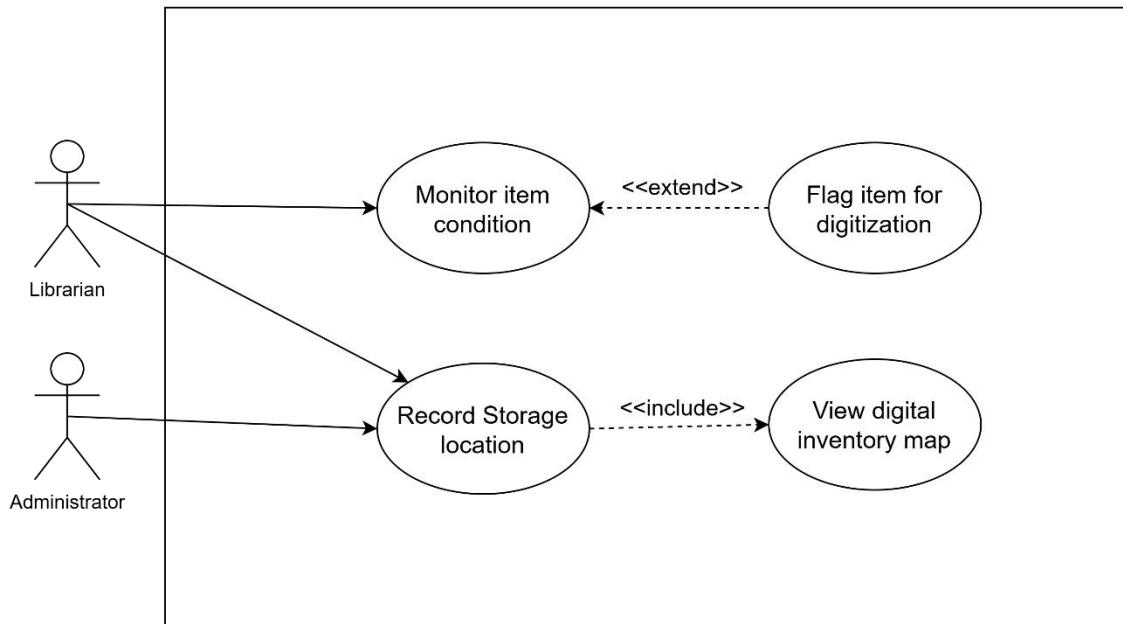


Figure 101: Preservation and Storage Location Use Case

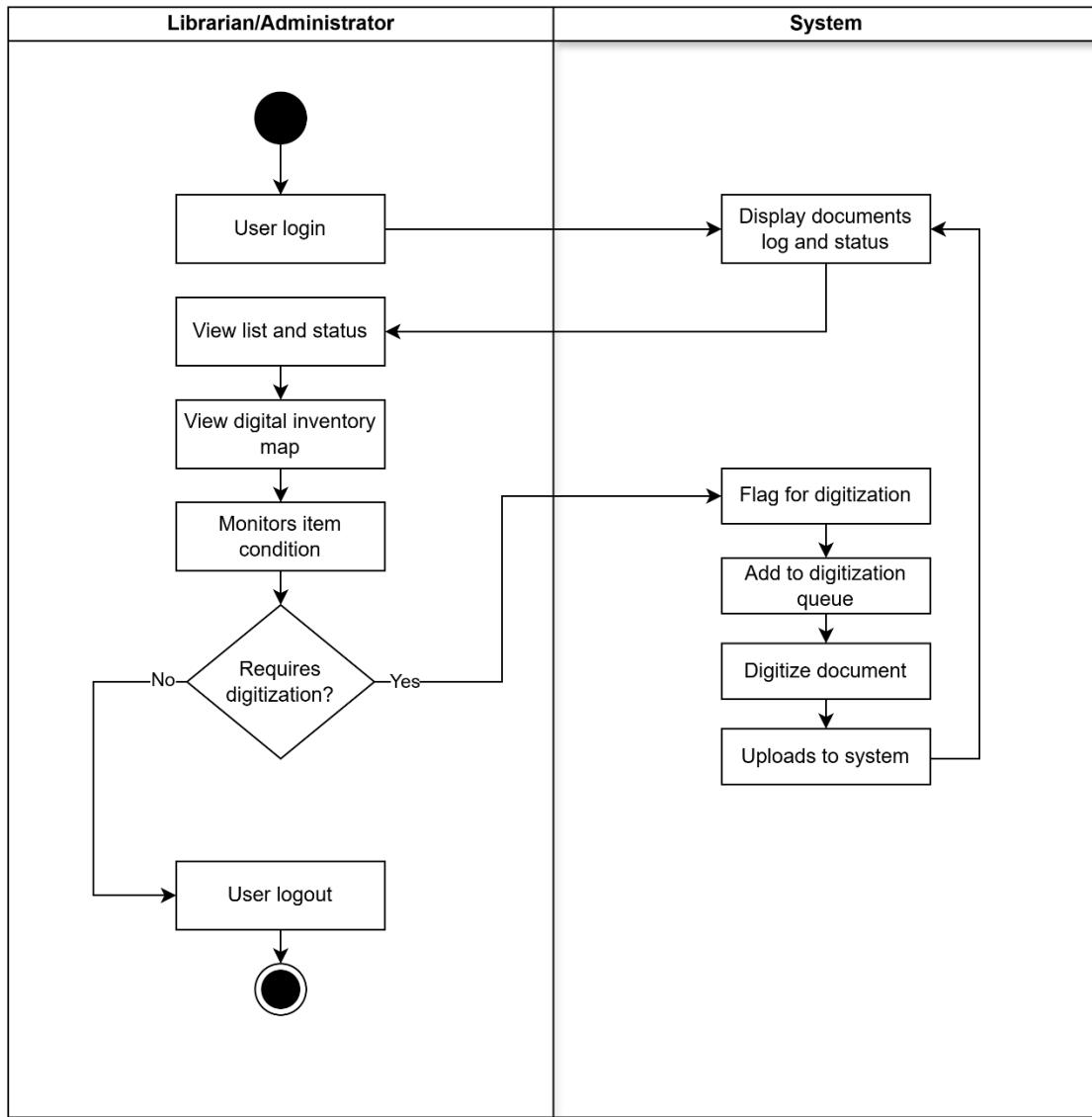


Figure 102: Preservation and Storage Location Activity

Automated Notification System Module

Use case	Description	User/Actor (Roles)
Receive notifications/alerts	System sends email/in-system alerts for requests, due dates, overdue reminders	All users
View notifications/alerts	Users can view email/in-system alerts for requests, due dates, overdue reminders	All users

Table 14: Automated Notification Event Decomposition

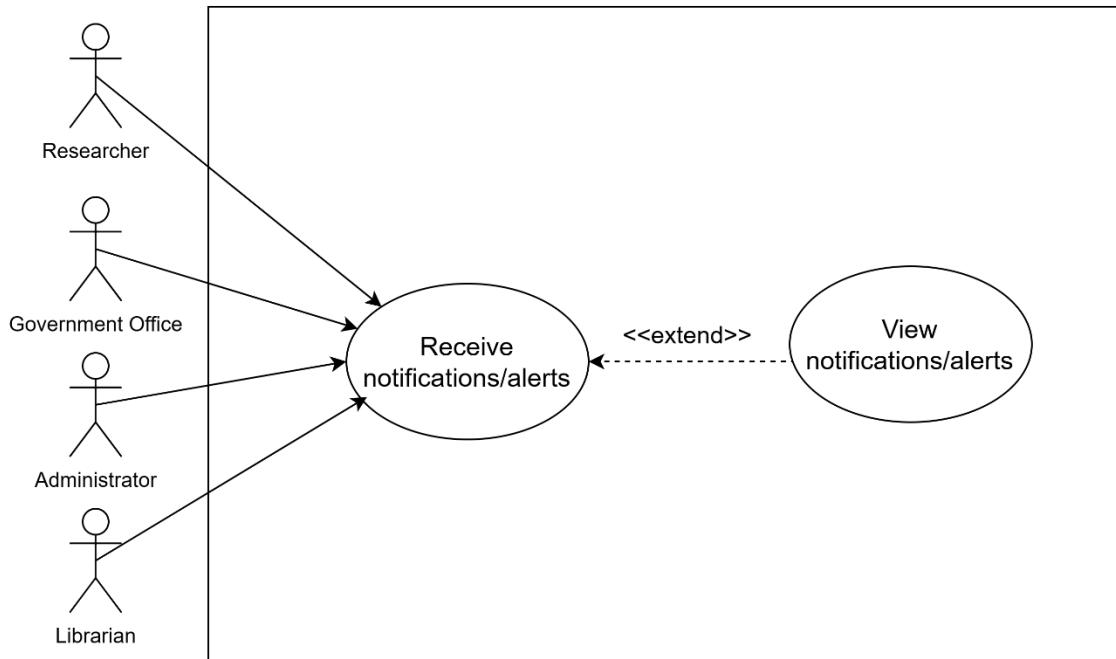


Figure 103: Automated Notification Use Case

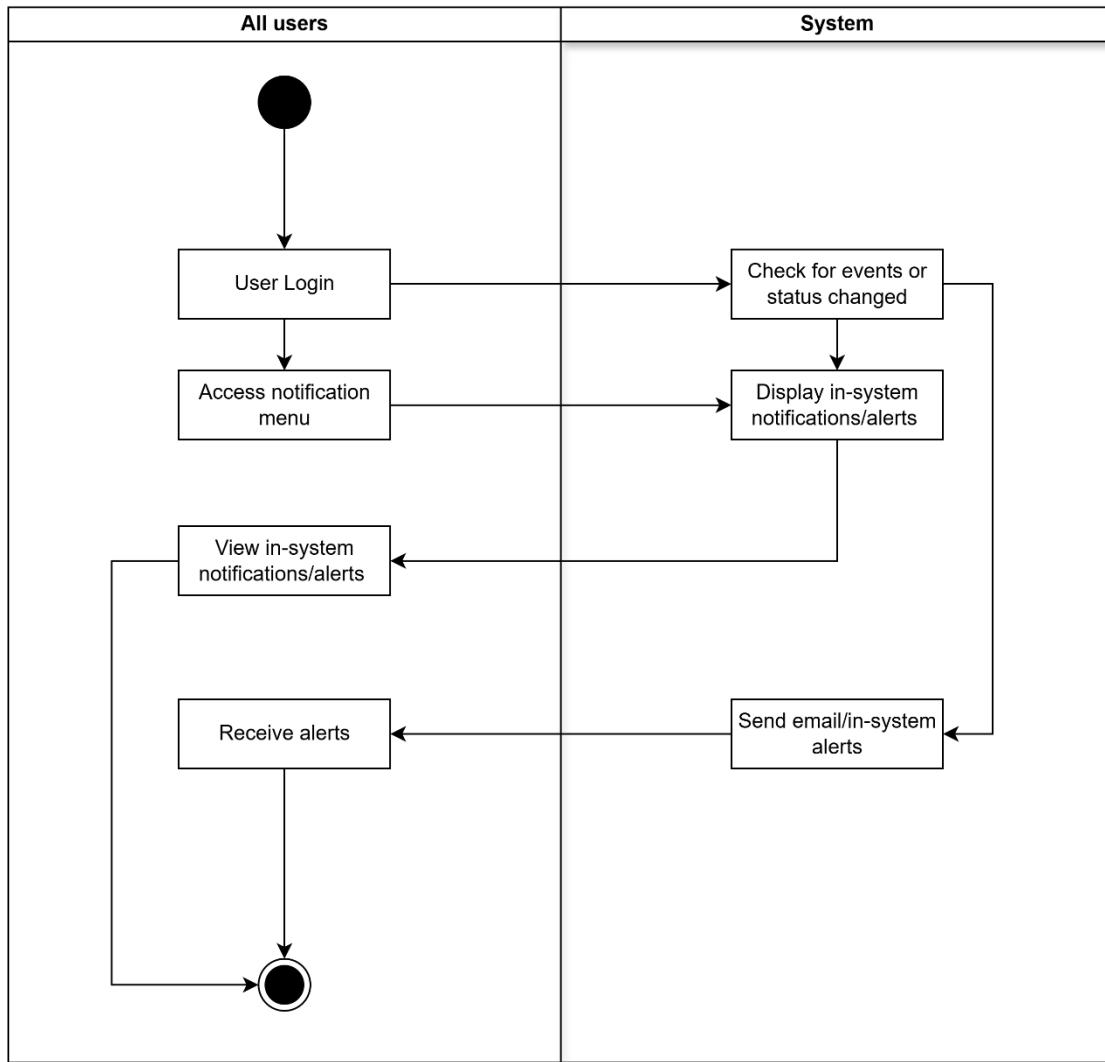


Figure 104: Automated Notification Activity Diagram

Database Design

The database design of the KORONADAL CITY LIBRARY: MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION is structured to support the efficient management of digital and physical records within the Koronadal City Library. It includes well-defined entities to represent users, documents, requests, roles, permissions, and archival metadata. By organizing information into relational tables for structured data and a document-based store for scanned files and digital archives, the system ensures both data integrity and scalability. The database facilitates secure user access, accurate tracking of document requests and retrievals, and proper classification and preservation of government and historical records. This robust design lays the foundation for streamlined workflows, fast searchability, and improved accountability across the library's operations.

Conceptual Diagram

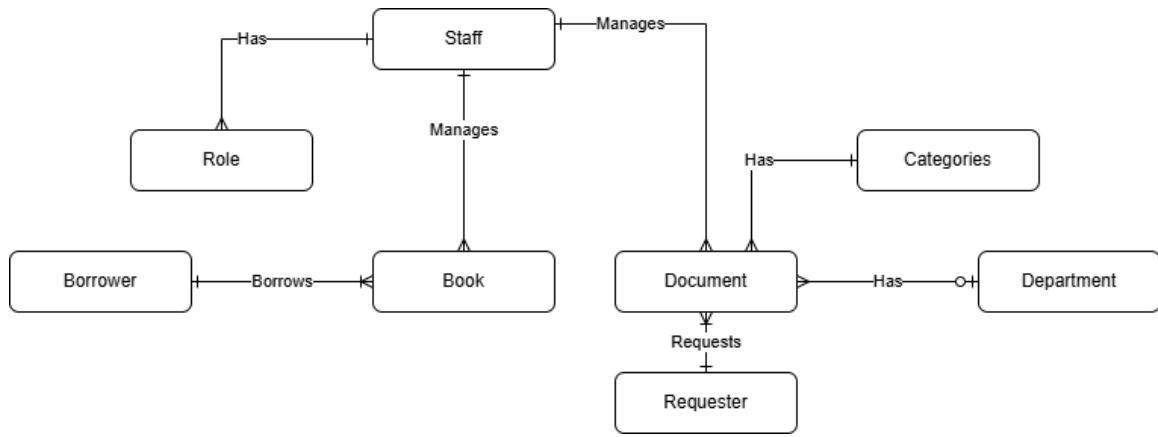


Figure 105: Conceptual Diagram

Database Normalization

Documents

Documents											
Title	Category	Department	Classification Level	Submission Date	Author/Preparer	Year	Availability Status	Physical Copy Status	Sensitivity Flag	Preservation Status	Storage Location
City Ordinance No. 2023-05	Ordinance	City Legal Office	Government Document	15/05/2023	Atty. Maria Santos	2023	Available	In Storage	Restricted	Stable	Cabinet A, Shelf 3, Box 7
2022 Tax Declaration	Report	City Treasurer	Public Resource	10/04/2022	Engr. Juan Dela Cruz	2022	Borrowed	Borrowed	Public	Fragile	Cabinet B, Shelf 1, Box 2

Table 15: UNF - Documents

In **Table 15**, all document attributes are stored on a single flat table with redundant or repeating data. For example, fields like Category, Department, and Classification Level are stored as raw text entries, leading to duplication. This structure lacks atomicity, as fields like Author/Preparer or Storage Location might contain composite values. There is no primary key, and the table is prone to inconsistencies, such as misspelled department names or conflicting classification levels.

Documents												
DocumentID	Title	Category	Department	Classification Level	Submission Date	Author/Preparer	Year	Availability Status	PhysicalCopyStatus	SensitivityFlag	PreservationStatus	StorageLocation
101	City Ordinance No. 2023-05	Ordinance	City Legal Office	Government Document	15/05/2023	Atty. Maria Santos	2023	Available	In Storage	Restricted	Stable	Cabinet A, Shelf 3, Box 7
102	2022 Tax Declaration	Report	City Treasurer	Public Resource	10/04/2022	Engr. Juan Dela Cruz	2022	Borrowed	Borrowed	Public	Fragile	Cabinet B, Shelf 1, Box 2

Table 16: 1NF – Documents

In **Table 16**, The First Normal Form for the Documents table requires that each field hold atomic data, meaning no multiple values or sets should exist within a single field. For example, fields like category, department, and classification level should not contain multiple values. These attributes should be separate columns, ensuring that each data point in the table is indivisible. Each document must have a unique identifier, which guarantees that each document can be retrieved or referenced without ambiguity.

Documents											
DocumentID	Title	CategoryID	DepartmentID	SubmissionDate	Author	Year	AvailabilityStatus	PhysicalCopyStatus	SensitivityFlag	PreservationStatus	StorageLocation
101	City Ordinance No. 2023-05	1	1	15/05/2023	Atty. Maria Santos	2023	Available	In Storage	Restricted	Stable	Cabinet A, Shelf 3, Box 7
102	2022 Tax Declaration	2	2	10/04/2022	Engr. Juan Dela Cruz	2022	Borrowed	Borrowed	Public	Fragile	Cabinet B, Shelf 1, Box 2

Table 17: 2NF - Documents

In **Table 17**, In Second Normal Form the table is further refined by eliminating partial dependencies, which occur when non-key attributes depend only on part of the primary key. For instance, if the primary key for the document table is a composite of DocumentID, any attributes like category or department will be moved to separate lookup tables. This ensures that all non-key attributes are fully dependent on the primary key, making the system more efficient and less prone to inconsistencies.

Documents											
DocumentID	Title	CategoryID	DepartmentID	SubmissionDate	Author	Year	AvailabilityStatus	PhysicalCopyStatus	SensitivityFlag	PreservationStatus	StorageLocation
101	City Ordinance No. 2023-05	1	1	15/05/2023	Atty. Maria Santos	2023	Available	In Storage	Restricted	Stable	Cabinet A, Shelf 3, Box 7
102	2022 Tax Declaration	2	2	10/04/2022	Engr. Juan Dela Cruz	2022	Borrowed	Borrowed	Public	Fragile	Cabinet B, Shelf 1, Box 2

Table 18: 3NF – Documents Table

Category		
CategoryID	CategoryName	Classification
1	Ordinance	Government Document
2	Report	Public Resource

Table 19: Category Lookup Table

Department	
DepartmentID	DepartmentName
1	City Legal Office
2	City Treasurer

Table 20: Departments Lookup Table

In **Table 18, 19 and 20**, Third Normal Form the goal is to remove transitive dependencies, where a non-key attribute depends on another non-key attribute rather than on the primary key. This approach ensures that each piece of data is stored in the most appropriate place, minimizing redundancy and improving the efficiency of data retrieval.

Books

Books												
Title	Author	Publisher	Publication Year	Category	Subject	Language	BookType	AvailabilityStatus	PhysicalCopyStatus	PreservationCondition	StorageLocation	
Database Systems	John Doe	Tech Pub	2020	Reference	Computer Science	English	Printed	Available	In Storage	Good	Shelf A1	
History of Art	Jane Smith	Art Books Inc	2018	Non-Fiction	Art History	English	eBook	Borrowed	Borrowed	Fragile	Digital	

Table 21: UNF – Books

In **Table 21**, the initial un-normalized Form, all book-related attributes are stored in a single table with redundant or composite data. Fields like Category and Publisher repeat across entries, leading to duplication. There is no primary key, and data integrity is compromised by inconsistencies.

Books													
BookID	Title	Author	Publisher	PublicationYear	Category	Subject	Language	BookType	AvailabilityStatus	PhysicalCopyStatus	PreservationCondition	StorageLocation	
1	Database Systems	John Doe	Tech Pub	2020	Reference	Computer Science	English	Printed	Available	In Storage	Good	Shelf A1	
2	History of Art	Jane Smith	Art Books Inc	2018	Non-Fiction	Art History	English	eBook	Borrowed	Borrowed	Fragile	Digital	

Table 22: 1NF – Books

In **Table 22**, For the First Normal Form in the Books table, the structure must be designed so that each field contains only atomic data, ensuring there are no repeating groups or composite fields. These attributes should be separated into distinct columns or tables. Additionally, each book record should have a unique identifier (BookID) to guarantee that each record is distinguishable from others.

Books													
BookID	Title	Author	Publisher	PublicationYear	ISBN	Category	Subject	Language	AvailabilityStatus	PhysicalCopyStatus	PreservationCondition	StorageLocation	
1	Database Systems	John Doe	Tech Pub	2020	123-456789	Reference	Computer Science	English	Available	In Storage	Good	Shelf A1	
2	History of Art	Jane Smith	Art Books Inc	2018	987-654321	Non-Fiction	Art History	English	Borrowed	Borrowed	Fragile	Digital	

Table 23: 2NF - Books

In **Table 23**, when the table progresses to Second Normal Form, partial dependencies are addressed. In cases where the primary key is composite. This normalization ensures that each non-key attribute is fully dependent on the primary key, reducing duplication and enhancing the integrity of the database.

Books												
BookID	Title	Author	Publisher	Publication Year	Category	Subject	Language	AvailabilityStatus	PhysicalCopyStatus	PreservationCondition	StorageLocation	
1	Database Systems	John Doe	Tech Pub	2020	Reference	Computer Science	English	Available	In Storage	Good	Shelf A1	
2	History of Art	Jane Smith	Art Books Inc	2018	Non-Fiction	Art History	English	Borrowed	Borrowed	Fragile	Digital	

Table 24: 3NF - Books Table

In **Table 24**, By the time the Books table reaches Third Normal Form, any transitive dependencies will be eliminated. This normalization step ensures that each attribute is stored in the most appropriate table, reducing unnecessary data repetition and making the database more efficient to query.

Requests

Requests									
Item	Requester	RequestDate	Purpose	ApprovalStatus	ApprovedBy	DateApproved	RetrievalStatus	Remarks	
History of Art	User_123	05/10/2023	Research	Approved	Maria Santos	06/10/2023	Retrieved	Urgent	
City Ordinance No. 2023-05	User_456	07/10/2023	Legal	Pending	NULL	NULL	In Queue	NULL	

Table 25: UNF – Requests

In **Table 25**, the Request table initially contains all attributes in a single structure. Composite dependencies may exist, such as RetrievalStatus relying on ApprovalStatus leading to potential inconsistencies. Attributes like Requester and Item are stored as raw values without referencing external tables, risking duplication and update anomalies.

Requests										
RequestID	Item	Requester	RequestDate	Purpose	ApprovalStatus	ApprovedBy	DateApproved	RetrievalStatus	Remarks	
1	History of Art	User_123	05/10/2023	Research	Approved	Maria Santos	06/10/2023	Retrieved	Urgent	
2	City Ordinance No. 2023-05	User_456	07/10/2023	Legal	Pending	NULL	NULL	In Queue	NULL	

Table 26: 1NF – Requests

In **Table 26**, In First Normal Form, the Requests table ensures that all fields contain atomic values. For instance, the request type (borrow or view), requester name, and item details must be broken down into discrete columns, avoiding any grouping of multiple values in one field. The table also ensures that each request is uniquely identifiable, likely using a RequestID as the primary key, to ensure that every request can be tracked without ambiguity.

Requests										
RequestID	ItemID	RequesterID	RequestDate	Purpose	ApprovalStatus	ApprovedByStaffID	DateApproved	RetrievalStatus	Remarks	
1	101	123	05/10/2023	Research	Approved	1	06/10/2023	Retrieved	Urgent	
2	202	456	07/10/2023	Legal	Pending	NULL	NULL	In Queue	NULL	

Table 27: 2NF – Requests

In **Table 27**, For Second Normal Form, partial dependencies are eliminated. In cases where the primary key is a composite of RequestID and ItemID, attributes such as item type or request status, which depend solely on ItemID, will be separated into different tables. This ensures that the Requests table only contains data directly related to the request and not redundant information that could be stored elsewhere, such as the type of item being requested or the status of the request

Requests									
RequestID	ItemID	RequesterID	RequestDate	Purpose	ApprovalStatus	ApprovedByStaffID	DateApproved	RetrievalStatus	Remarks
1	101	123	05/10/2023	Research	Approved	1	06/10/2023	Retrieved	Urgent
2	202	456	07/10/2023	Legal	Pending	NULL	NULL	In Queue	NULL

Table 28: 3NF - Requests Table

In **Table 28**, By reaching Third Normal Form, the Requests table is further normalized to remove any transitive dependencies. This normalization step ensures that all dependencies are direct and relevant to the table's primary key, improving both the structure and performance of the database

Users

Users									
FullName	Username	Password	Email	ContactNumber	Role	Department	AccountStatus	DateRegistered	LastLoginDate
Maria Santos	msantos	*****	maria@lib.ph	9171234567	Librarian	City Legal Office	Active	15/01/2023	10/10/2023
Juan Dela Cruz	jrcruz	*****	juan@treasury.ph	9179876543	Govt. Agency	City Treasurer	Active	20/05/2022	11/10/2023

Table 29: UNF – Users

In **Table 29**, the User table stores all attributes such as Role, Department, and AccountStatus as raw text within a single structure. This leads to redundancy, as repeated entries like "Librarian" or "City Legal Office" appear across rows. Composite dependencies are absent, but the lack of atomicity in fields like FullName (if split into first/last names) or inconsistent formatting (e.g., "Admin" vs. "Administrator") risks data ambiguity. A primary key (UserID) is introduced to uniquely identify users, but partial dependencies persist, such as Role and Department being tied to user entries rather than independent entities.

Users												
UserID	Firstname	Lastname	Username	Password	Email	ContactNum	Role	Department	AccountStat	DateRegister	LastLoginDat	
101	Maria	Santos	msantos	*****	maria@lib.ph	9171234567	Librarian	City Legal Office	Active	15/01/2023	10/10/2023	
102	Juan	Dela Cruz	jcruz	*****	juan@treasury.ph	9179876543	Govt. Agency	City Treasurer	Active	20/05/2022	11/10/2023	

Table 30: 1NF – Users

In **Table 30**, In the First Normal Form, the Users table is designed to ensure that each column holds atomic values, meaning no column should contain multiple values or lists. For example, the user's full name should be split into two separate columns first name and last name to avoid combining multiple pieces of information in one field. Additionally, each record must be unique, so each user must have a distinct identifier (such as UserID). This normalization ensures that the table is free from repeating groups, where data is stored in an inefficient, non-atomic format.

Users												
UserID	Firstname	Lastname	Username	Password	Email	ContactNumber	RoleID	DepartmentID	AccountStatus	DateRegistered	LastLoginDate	
101	Maria	Santos	msantos	*****	maria@lib.ph	9171234567	1	1	Active	15/01/2023	10/10/2023	
102	Juan	Dela Cruz	jrcruz	*****	juan@treasury.ph	9179876543	2	2	Active	20/05/2022	11/10/2023	

Table 31: 2NF – Users

In **Table 31**, For Second Normal Form, the focus is on removing partial dependencies, which occur when non-key attributes depend only on a part of the primary key. In a Users table, if the primary key is composite (such as combining UserID and Role), attributes like department or position, which depend solely on the role and not on the full key, would be moved to separate tables. This ensures that each non-key attribute is fully dependent on the primary key, reducing redundancy and improving data integrity.

Users												
UserID	Firstname	Lastname	Username	Password	Email	ContactNumber	RoleID	DepartmentID	AccountStatus	DateRegistered	LastLoginDate	

101	Maria	Santos	msantos	*****	<u>maria@lib.p</u> h	9171234567	1	1	Active	15/01/2023	10/10/2023
102	Juan	Dela Cruz	jcruz	*****	<u>juan@treasu</u> ry.ph	9179876543	2	2	Active	20/05/2022	11/10/2023

Table 32: 3NF – Users Table

Role	
RoleID	
1	Librarian
2	Govt. Agency
3	Researcher
4	Administrator

Table 33: Role Lookup Table

In **Table 32**, In the Third Normal Form, the objective is to eliminate transitive dependencies, which happen when one non-key attribute depends on another non-key attribute rather than directly on the primary key. For instance, in a Users table, if the department's contact number depends on the department name, the department table should be created, storing the contact number and the department name. The Users table would then only reference the department through a foreign key. This step further normalizes the data by ensuring that attributes are stored in the most efficient table, preventing unnecessary duplication of information.

Borrowing

Borrowing									
Item	BorrowerName	BorrowDate	DueDate	ReturnDate	Status	OverdueFlag	BorrowedByLibrarian	ReceivedByLibrarian	Remarks
History of Art	Maria Santos	01/10/2023	15/10/2023	14/10/2023	Returned	No	Maria Santos	Maria Santos	None
City Ordinance No. 2023-05	Juan Dela Cruz	05/10/2023	19/10/2023	NULL	Overdue	Yes	Maria Santos	NULL	Damaged

Table 34: UNF – Borrowing

In **Table 34**, the Unnormalized Form (UNF), the Borrowing table consolidates all transactional details into a single structure, including attributes like Borrower Name, Status, and Storage Location. Redundancy arises as repeated entries (e.g., the same librarian appearing for multiple transactions) and composite dependencies (e.g., OverdueFlag derived from DueDate and ReturnDate) create inefficiencies. For instance, manually tracking "Overdue" statuses or recalculating penalties for late returns risks inconsistencies.

Borrowing										
BorrowingID	Item	BorrowerName	BorrowDate	DueDate	ReturnDate	Status	OverdueFlag	BorrowedByLibrarianID	ReceivedByLibrarianID	Remarks
1	History of Art	Maria Santos	01/10/2023	15/10/2023	14/10/2023	Returned	No	500	501	None
2	City Ordinance No. 2023-05	Juan Dela Cruz	05/10/2023	19/10/2023	NULL	Overdue	Yes	500	NULL	Damaged

Table 35: 1NF – Borrowing

In **Table 35**, In First Normal Form, the Borrowing table must be designed so that each field contains atomic data. Fields like borrower's name, item details, and due dates should not be stored together in a composite field. Each piece of information should be stored separately, and the table must use a unique primary key (BorrowingID) for each transaction to avoid any confusion or duplication.

Borrowing											
BorrowingID	ItemID	BorrowerID	BorrowDate	DueDate	ReturnDate	Status	OverdueFlag	BorrowedByLibrarianID	ReceivedByLibrarianID	Remarks	
1	101	123	01/10/2023	15/10/2023	14/10/2023	Returned	No	500	501	None	
2	202	456	05/10/2023	19/10/2023	NULL	Overdue	Yes	500	NULL	Damaged	

Table 36: 2NF - Borrowing

In **Table 36**, When the Borrowing table is normalized to Second Normal Form, partial dependencies are addressed. If the primary key consists of BorrowingID and ItemID, any non-key attributes such as borrower name or librarian name, which depend only on the BorrowerID or LibrarianID, will be placed in separate tables. This ensures that the Borrowing table remains efficient by linking out to other tables where necessary, rather than storing redundant data.

Borrowing											
BorrowingID	ItemID	BorrowerID	BorrowDate	DueDate	ReturnDate	Status	OverdueFlag	BorrowedByLibrarianID	ReceivedByLibrarianID	Remarks	
1	101	123	01/10/2023	15/10/2023	14/10/2023	Returned	No	500	501	None	
2	202	456	05/10/2023	19/10/2023	NULL	Overdue	Yes	500	NULL	Damaged	

Table 37: 3NF - Borrowing Table

In **Table 37**, In Third Normal Form, any transitive dependencies are eliminated. This ensures that the Borrowing table only contains direct dependencies related to the borrowing transaction, improving the overall structure and efficiency of the database.

Final Relations

Entities	Attributes
Users	<u>User ID</u> , <u>Department ID</u> , <u>Role ID</u> , Firstname, Lastname, Username, Email, Contact Number, Password Hash, Address, Date Registered, Last Login, Account Status
Roles	<u>Role ID</u> , Role Name
Departments	<u>Department ID</u> , Department Name
Books	<u>Book ID</u> , Title, Author, Publisher, Publication Year, Category, Subject, Language, Availability Status, Physical Copy Status, Preservation Status, Storage Location
Documents	<u>Document ID</u> , <u>Category ID</u> , <u>Department ID</u> , Title, Author, Year, Availability Status, Physical Copy Status, Sensitivity Flag, Preservation Status, Submission Date, Storage Location
Categories	<u>Category ID</u> , Category Name, Classification Level

Requests	<u>Request ID</u> , <u>Item ID</u> , <u>Requester ID</u> , ApprovingByStaff ID, Request Date, Date Approved, Purpose, Approval Status, Retrieval Status, Remarks
Borrowings	<u>Borrowing ID</u> , <u>Item ID</u> , <u>Borrower ID</u> , Borrow Date, Due Date, Return Date, Status, Overdue Flag, Fine, <u>BorrowedByLibrarianID</u> , <u>ReceivedByLibrarianID</u> , Remarks

Table 38: Final Relations

Logical Database Design

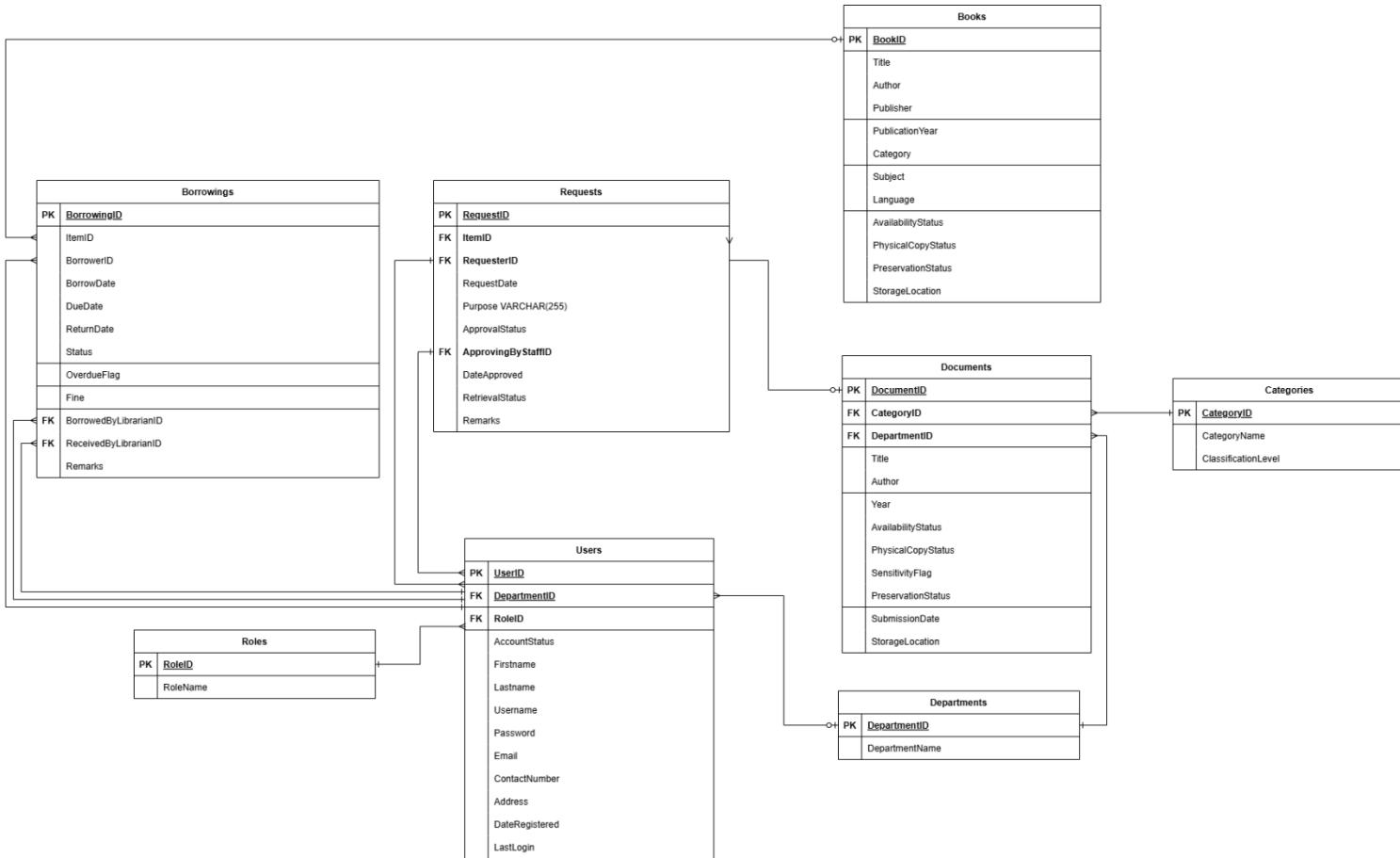


Figure 106. Logical Database Design

Physical Database Design



Figure 107. Physical Database Design

Data Dictionary

The tables below present the data dictionary for the KORONADAL CITY LIBRARY:
MODERNIZING ACCESS AND PRESERVING HISTORY THROUGH DIGITIZATION.
These tables offer a comprehensive view of the structure and purpose of each table.

Table Name		USERS						
Description		This table stores users data						
Alias		Users						
Attribute Name	Description	Data Type	Default Value	Primary Key	Example	Constraints	Validation Rule	
UserID	Unique ID for user	INT	AUTO_INCREMENT	Yes	101	NOT NULL	Positive integer	
DepartmentID	User's department ID	INT		No	5	FK to Departments	Must exist in Departments table	
RoleID	User's role ID	INT		No	2	FK to Roles	Must exist in Roles table	
AccountStatus	User's account status	VARCHAR(20)		No	Active	NOT NULL	One of: Active, Inactive, Suspended	
Firstname	User's first name	VARCHAR(100)		No	John	NOT NULL	Text only	
Lastname	User's last name	VARCHAR(100)		No	Doe	NOT NULL	Text only	
Username	Login username	VARCHAR(50)		No	johndoe123	NOT NULL, UNIQUE	Alphanumeric, min length: 4	
PasswordHash	Encrypted password	VARCHAR(255)		No	hashed_pwd_123	NOT NULL	Must be securely hashed	
Email	User email	VARCHAR(100)		No	john@example.com	NOT NULL, UNIQUE	Must be valid email format	
ContactNumber	User contact	VARCHAR(20)		No	09171234567		Must match phone format	
Address	User address	VARCHAR(20)		No	Brgy. Example			
DateRegistered	Registration date	DATE TIME	CURRENT_TIMESTAMP	No	2024-03-01 10:00			
LastLogin	Last login timestamp	DATE TIME		No	2024-03-20 15:00			

Table 39: Users Data Dictionary

Table Name		ROLES						
Description		This table stores roles for users						
Alias		Roles						
Attribute Name	Description	Data Type	Default Value	Primary Key	Example	Constraints	Validation Rule	
RoleID	Role ID	INT	AUTO_INCREMENT	Yes	1	NOT NULL	Unique, positive int	
RoleName	Name of the role	VARCHAR(50)		No	Librarian	NOT NULL, UNIQUE	Must be descriptive	

Table 40: Roles Data Dictionary

**Table
Name**

DEPARTMENTS

Description

This table stores users and documents department

Alias

Departments

Attribute Name	Description	Data Type	Default Value	Primary Key	Example	Constraints	Validation Rule
DepartmentID	Department ID	INT	AUTO_INCREMENT	Yes	3	NOT NULL	Unique
DepartmentName	Name of department	VARCHAR(100)		No	Archives	NOT NULL	Descriptive name

Table 41: Departments Data Dictionary

Table Name		CATEGORIES						
Description		This table stores document categories						
Alias		Categories						
Attribute Name	Description	Data Type	Default Value	Primary Key	Example	Constraints	Validation Rule	
CategoryID	Unique category ID	INT	AUTO_INCREMENT	Yes	2	NOT NULL	Unique	
CategoryName	Name of category	VARCHAR(50)		No	Legal Docs	NOT NULL		
ClassificationLevel	Sensitivity level	VARCHAR(50)		No	Confidential		E.g., Public, Confidential, Top Secret	

Table 42: Categories Data Dictionary

Table Name	DOCUMENTS						
Description	This table stores document data						
Alias	Documents						

Attribute Name	Description	Data Type	Default Value	Primary Key	Example	Constraints	Validation Rule
DocumentID	Unique document ID	INT	AUTO_INCREMENT	Yes	25	NOT NULL	Unique
CategoryID	Document category	INT		No	2	FK to Categories	Must exist in Categories
DepartmentID	Department that owns the doc	INT		No	3	FK to Departments	Must exist in Departments
Title	Title of the document	VARCHAR(255)		No	Archives Act	NOT NULL	
Author	Author of document	VARCHAR(100)		No	Jane Doe		
Year	Year published/created	INT		No	2023		
AvailabilityStatus	Current availability	VARCHAR(20)		No	Available		
PhysicalCopyStatus	Status of physical version	VARCHAR(20)		No	Good		
SensitivityFlag	Sensitive document flag	BOOLEAN	FALSE	No	TRUE		
PreservationStatus	Current preservation state	VARCHAR(20)		No	Preserved		
SubmissionDate	Date of submission	DATE		No	2023-05-20	NOT NULL	
StorageLocation	Where it is stored	VARCHAR(20)		No	Shelf A-3		

Table 43: Documents Data Dictionary

Table Name	BOOKS						
Description	This table stores book data						
Alias	Books						

Attribute Name	Description	Data Type	Default Value	Primary Key	Example	Constraints	Validation Rule
BookID	Unique book ID	INT	AUTO_INCREMENT	Yes	101	NOT NULL	Unique identifier
Title	Title of the book	VARCHAR(255)		No	History of Archives	NOT NULL	Text only
Author	Author of the book	VARCHAR(255)		No	Jane Doe	NOT NULL	Text only
Publisher	Book publisher	VARCHAR(50)		No	Archive Press		
PublicationYear	Year of publication	INT		No	2022		Must be a valid year
ISBN	Book ISBN number	VARCHAR(20)		No	978-3-16-148410-0	UNIQUE	Must be valid ISBN format
Category	Book category	VARCHAR(20)		No	Reference		
Subject	Subject of the book	VARCHAR(20)		No	History		
Language	Language of the book	VARCHAR(20)		No	English		
AvailabilityStatus	Book availability	VARCHAR(20)		No	Available		
PhysicalCopyStatus	Physical condition	VARCHAR(20)		No	Good		
PreservationStatus	Preservation condition	VARCHAR(20)		No	Preserved		
StorageLocation	Storage location	VARCHAR(20)		No	Shelf B-1		

Table 44: Books Data Dictionary

**Table
Name**

REQUESTS

Description

This table stores all request for document or book

Alias

Requests

Attribute Name	Description	Data Type	Default Value	Primary Key	Example	Constraints	Validation Rule
RequestID	Unique request ID	INT	AUTO_INCREMENT	Yes	2001	NOT NULL	Unique
RequestTypeID	Type of request	VARCHAR(20)		No	Borrow		
ItemID	Requested item ID	INT		No	25	FK to Books/Documents	Must exist
ItemType	Type of item requested	VARCHAR(255)		No	Document		
RequesterID	User who requested	INT		No	101	FK to Users	Must exist in Users
RequestDate	Date requested	DATETIME	CURRENT_TIMESTAMP	No	2024-04-01 10:30		
Purpose	Purpose of the request	VARCHAR(255)		No	Research		
ApprovalStatus	Approval status	VARCHAR(20)		No	Pending		
ApprovedByStaffID	Staff who approved	INT		No	102	FK to Users	Optional
DateApproved	Date approved	DATETIME		No	2024-04-02 11:00		
RetrievalStatus	Retrieval status	VARCHAR(20)		No	In progress		
Remarks	Additional notes	TEXT		No	Handle with care		

Table 45: Requests Data Dictionary

BORROWINGS							
Table Name	Description	This table stores data about borrowing of book or document					
Alias	Borrowings						
Attribute Name	Description	Data Type	Default Value	Primary Key	Example	Constraints	Validation Rule
Borrowing ID	Unique borrowing ID	INT	AUTO_INCREMENT	Yes	3001	NOT NULL	Unique
RequestID	Related request ID	INT		No	2001	FK to Requests	Must exist
ItemID	Borrowed item ID	INT		No	25	FK to Books/Documents	Must exist
BorrowedByID	User who borrowed	INT		No	101	FK to Users	Must exist
BorrowDate	Date borrowed	DATE TIME	CURRENT_TIMESTAMP	No	2024-04-02 12:00	NOT NULL	
DueDate	Due date for return	DATE TIME		No	2024-04-09	NOT NULL	
ReturnDate	Date returned	DATE TIME		No	2024-04-08		
Status	Status of the borrow	VARCHAR(20)		No	Returned		
OverdueFlag	Flag for overdue items	VARCHAR(20)		No	No		Yes or No
BorrowedByLibrarianID	Librarian who facilitated	INT		No	102	FK to Users	Must exist
ReceivedByLibrarianID	Librarian who received item	INT		No	103	FK to Users	Optional
Remarks	Additional remarks	TEXT		No	Returned in good condition		

Table 46: Borrowings Data Dictionary

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APPENDICES

APPENDIX A. Resource Persons

Name: Hernanie G. Ferrer, RL, MLIS

Position: Librarian 1

Location: Carpenter Hill