

Level: 0

Name: ISRT Library Management System (LMS)

Primary Actor: User (Student, Teacher, Staff), Librarian, System

Secondary Actors: OTP Generator, Summary Generator, MFS (Mobile Financial Service), Email Generator, Book Purchase Committee (BPC)

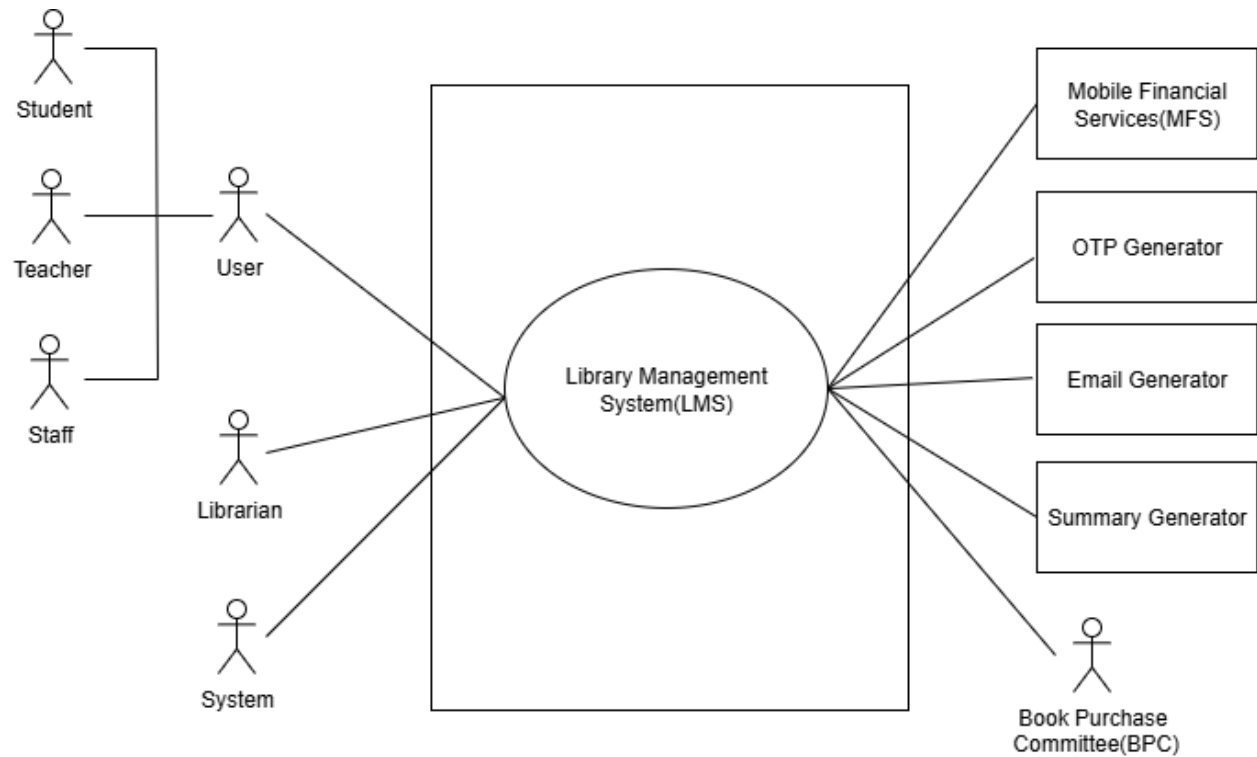


Figure 1: ISRT Library Management System (LMS) Use Case Diagram

Level: 1

Name: ISRT Library Management System (LMS)

Primary Actor: User (Student, Teacher, Staff), Librarian, System

Secondary Actors: OTP Generator, Summary Generator, MFS (Mobile Financial Service), Email Generator, Book Purchase Committee (BPC)

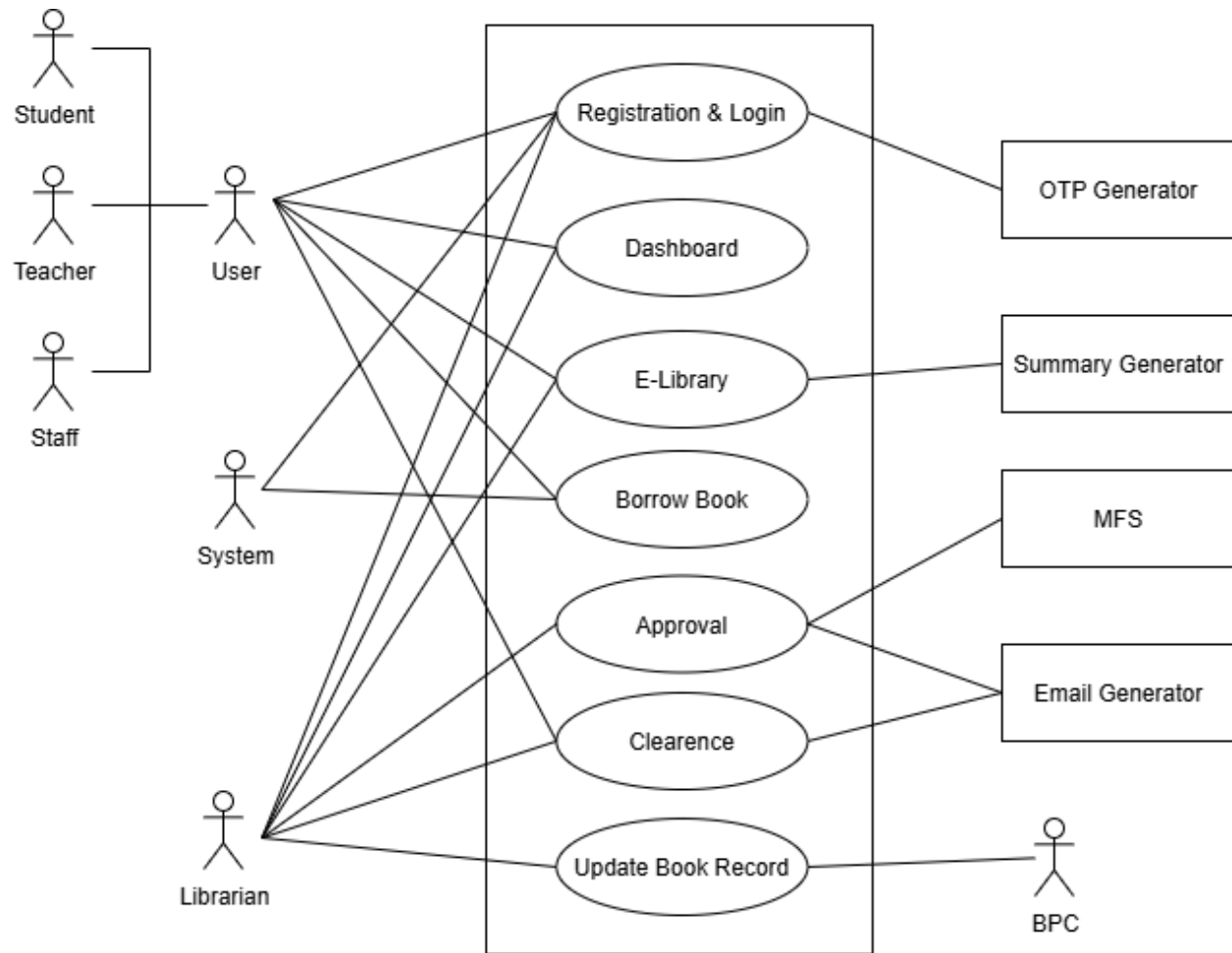


Figure 2: ISRT Library Management System (Detailed) Use Case Diagram

- 1. Registration and Login:** Manages the creation and secure access of user accounts. Users register by selecting their role (Student, Teacher, or Staff), providing personal and role-specific details, and verifying their identity via OTP. After validation, they create a unique User ID and Password. The subsystem also handles login and password recovery via OTP.

2. **Dashboard:** Provides a personalized interface for users and librarians to manage their library interactions. Users can view borrowed books, due dates, fines, clearance status, and notifications. The dashboard also provides quick access to features such as borrowing requests, clearance requests, and fine payments.
3. **E-Library:** Offers a digital space where book PDFs, research journals, and academic resources are stored and accessible. Users can search for or browse books, download full PDFs, generate summaries, read research publications, and leave reviews and ratings, all while supporting self-paced learning and research engagement.
4. **Borrow Book:** Allows users to request physical books via two methods: manually filling out a form or selecting a book from the catalog. The subsystem forwards requests to the librarian for processing while capturing essential book and user details for tracking.
5. **Approval:** Handles librarian-side operations for borrowing requests. It checks book availability and user eligibility (including unpaid fines, blacklist status, and demerit points) before granting approval. Upon approval, the system generates a confirmation PDF with due dates, fine policy, and an official seal, sending it to the user via email.
6. **Clearance:** Enables users to request clearance certificates when needed (e.g., certificate, marksheet, or pension-related). The system verifies that there are no pending books, fines, or blacklist issues before generating and emailing a PDF clearance certificate. If requirements are not met, a cancellation notice is sent.
7. **Update Book Record:** Supports the management and growth of the library collection. The system analyzes borrowing trends and user demand to suggest books for purchase. A book purchase committee reviews these suggestions, makes final decisions, and manually verifies bills. The librarian then updates the system's records to keep the catalog accurate and up to date.

Level: 1.1

Name: Registration & Login

Primary Actor: User (Student, Teacher, Staff), Librarian, System

Secondary Actors: OTP Generator, Email Generator

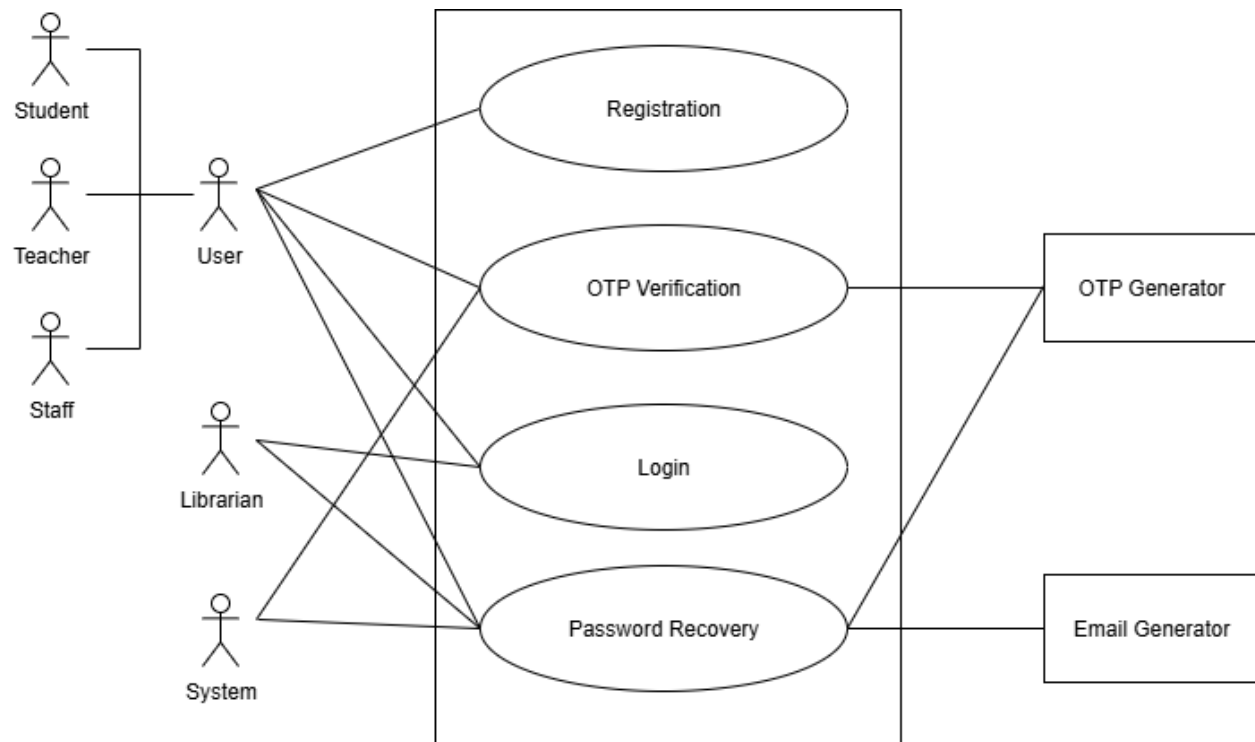


Figure 3: Registration & Login Use Case Diagram

Description:

Registration: New users, including students, teachers, and staff, begin by selecting their user type and providing their phone number along with required role-specific details, such as roll number, registration number, session, hall name, institutional email, and address for students, or designation, official email, and address for teachers and staff.

OTP Verification: An OTP is sent via the OTP Generator to the user's registered phone number to confirm their identity; this process is used both during initial registration and for password recovery to ensure that only authorized users can access or modify their accounts. Successful verification allows the process to continue.

Login: After successful registration, users log in using their User ID and password. The system validates credentials and grants access to the role-specific dashboard.

Password Recovery: If a user forgets their password, they can enter their username and registered phone number to receive an OTP for identity verification. After verifying the OTP, they can set a new password, and the Email Generator sends a confirmation email to ensure account security.

Level: 1.2

Name: Dashboard

Primary Actor: User (Student, Teacher, Staff), Librarian

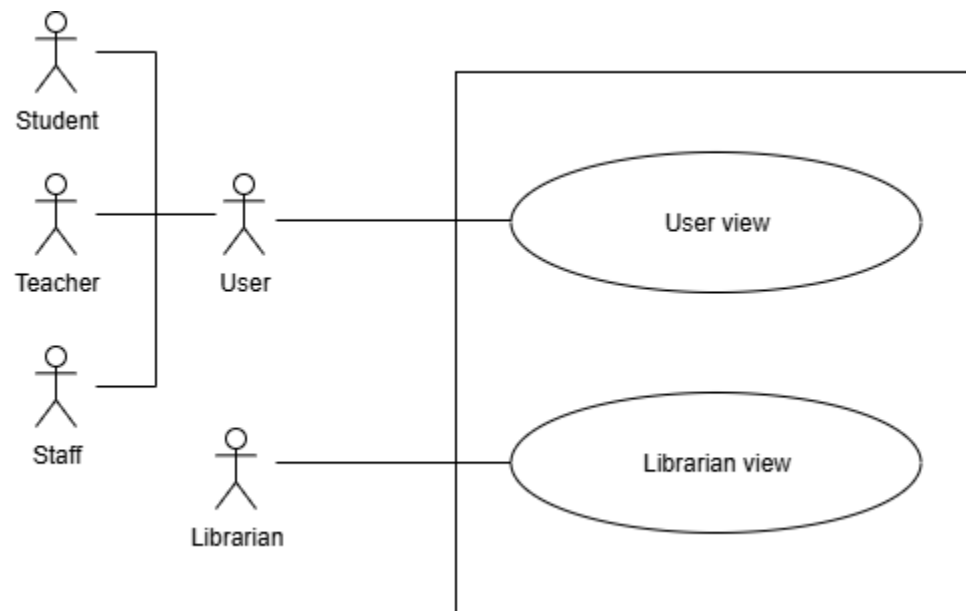


Figure 4: Dashboard Use Case Diagram

Description:

Upon successful login, users are redirected to a personalized dashboard interface tailored to their specific roles.

User View: Students, teachers, and staff access the User View, where they can manage personal library activities such as borrowing books, viewing catalogs, accessing the e-library, submitting clearance requests, and logging out.

Librarian View: The librarian accesses the Librarian View, which provides administrative control over borrowing requests, availability and eligibility management, waitlists, fine processing, renewals, and clearance approvals.

Level: 1.2.1

Name: User View

Primary Actor: User (Student, Teacher, Staff)

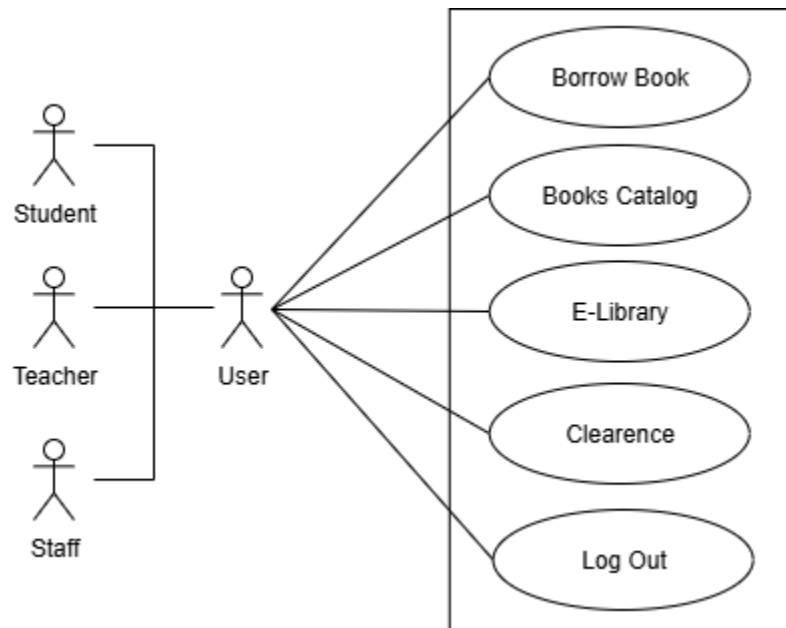


Figure 5: User View Use Case Diagram

Description:

The **User View** within the dashboard provides role-specific functionalities that empower users to manage their library interactions:

Borrow Book: Users can request to borrow books either by manually filling out a borrowing form or selecting a book from the catalog, which auto-fills the form.

Books Catalog: Users can browse or search through the library's physical book listings using smart filters, keywords, or voice input. They can view availability, classification, and initiate borrowing.

E-Library: A digital library space that allows users to search and download available book PDFs, access auto-generated summaries, and participate in a review and rating system.

Clearance: Users can submit clearance requests through a guided form. Students may request certificate/marksheet clearance, while teachers and staff may apply for pension-related clearance.

Log Out: Securely logs the user out of the system and ends the session.

Level: 1.2.2

Name: Librarian View

Primary Actor: Librarian

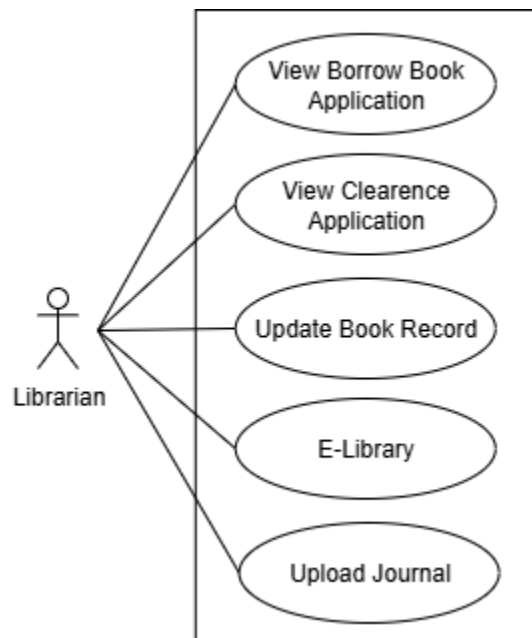


Figure 6: Librarian View Use Case Diagram

Description:

The Librarian View allows the librarian to manage all key administrative tasks related to the ISRT Library Management System.

View Borrow Book Application: The librarian receives and processes borrowing requests. The system automatically checks book availability and user eligibility. If approved, a confirmation PDF with return details is generated and emailed. If rejected, a cancellation notice is sent with reasons.

View Clearance Application: Librarians review clearance requests from students, teachers, and staff. The system checks for any pending books, unpaid fines, or blacklist status. If eligible, a clearance certificate with the library seal is generated and sent. Ineligible requests are rejected with an explanation.

Update Book Record: The librarian can add newly purchased books to the catalog and archive outdated or damaged ones. Archiving retains metadata and borrowing history for reference and audit.

E-Library: The librarian manages digital books by uploading new PDFs, editing details like title and author, and monitoring user reviews and ratings.

Upload Journal: Librarians upload approved research works to the institutional journal section, supporting ISRT faculty and researchers in academic publishing.

Level: 1.3

Name: E-library

Primary Actor: User (Student, Teacher, Staff), Librarian

Secondary Actor: Summary Generator

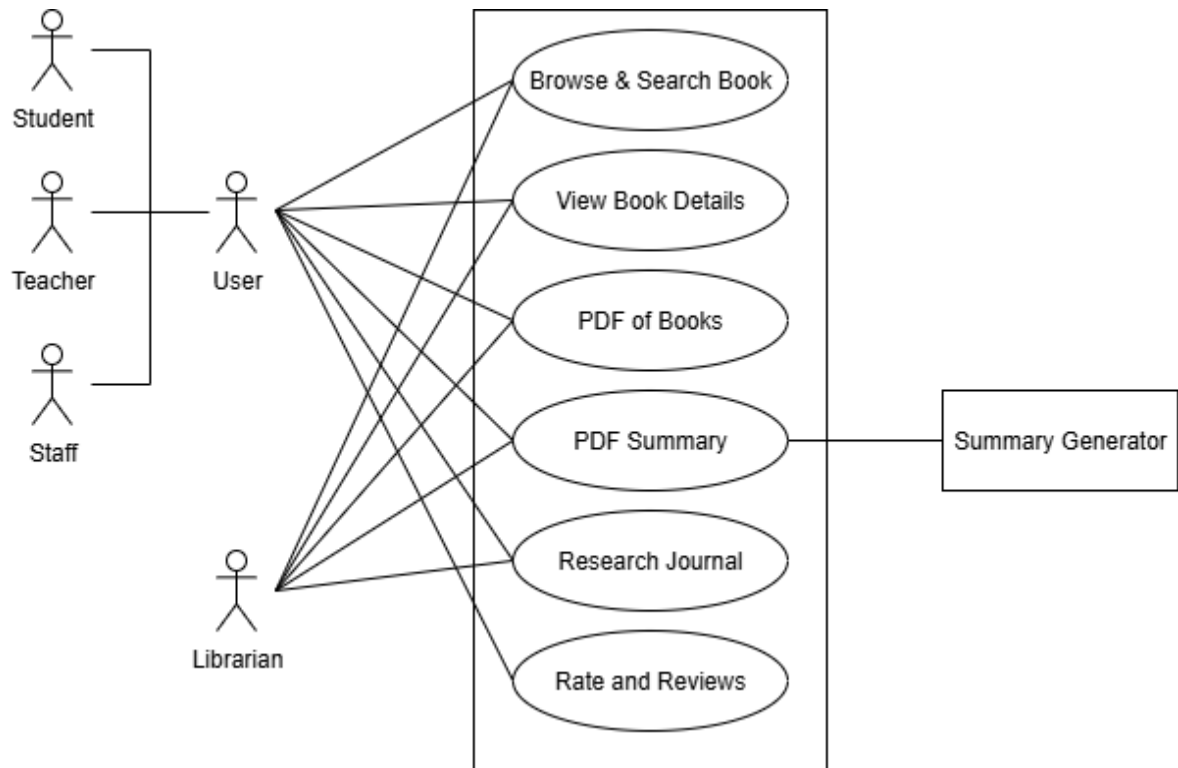


Figure 7: E-library Use Case Diagram

Description:

Browse & Search Book: Users and librarians can browse the library catalog or use smart search to find books by title, author, subject, etc., with filtering options.

View Book Details: Displays complete metadata and information about a selected book (e.g., title, subject, classification number, description). Available to users and librarians.

PDF of Books: Users and librarians can access and download full digital copies of available books in PDF format from the E-Library.

PDF Summary: Allows users and librarians to download AI-generated summaries of books. The Summary Generator component powers this process.

Research Journal: It enables students, teachers, staff, and librarians to access published research journals authored by ISRT faculty and researchers. The librarian is responsible for uploading research journal PDFs to the system, ensuring that new publications are regularly added and made accessible to all authorized users for reading and reference

Rate and Reviews: Users (students, teachers, staff) can provide star ratings and write reviews on books they've read. Librarians may view these for quality assurance.

Level: 1.4

Name: Borrow Book

Primary Actor: User (Student, Teacher, Staff), System

Secondary Actor: Email Generator

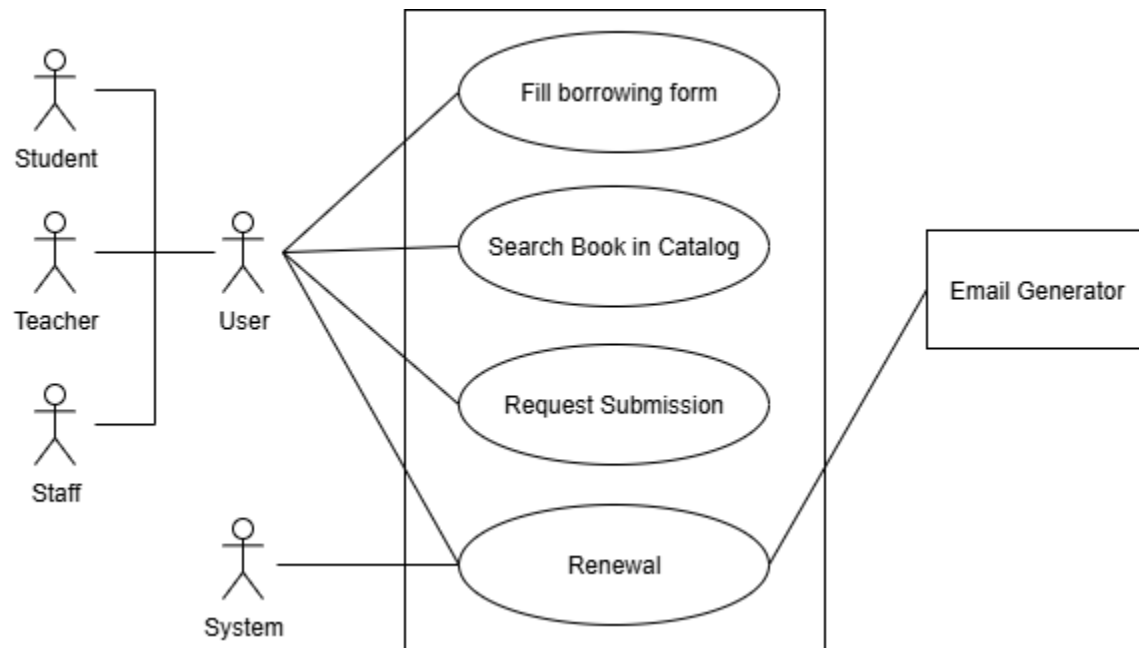


Figure 8: Borrow Book Use Case Diagram

Description:

Fill Borrowing Form: Users (students, teachers, staff) can manually fill out a borrowing request form by entering key book details such as title, author, and classification number. Alternatively, if a user selects a book from the catalog, the system auto-fills this form with the relevant data.

Search Book in Catalog: Users can search for books using the library catalog, including a smart search feature that allows queries by title, author, classification number, or subject through text or voice input. The system also suggests books if the user enters nearly correct or partial information, helping to refine the search. Results can be further filtered for more precise browsing. Once users find a desired book, they can proceed to borrow it directly from its detail page.

Request Submission: After completing the borrowing form either manually or via catalog auto-fill, users submit the request for processing. The system forwards the request to the librarian's admin panel.

Renewal: Users can request to extend the return deadline of a borrowed book from their dashboard. The request is sent to the librarian for review. If approved, the system updates the due date and sends a new confirmation PDF to the user. Each user may renew a book up to two consecutive times. If no renewal is granted and the due date passes, the system automatically adds a demerit point.

Level: 1.5

Name: Approval

Primary Actor: User (Student, Teacher, Staff), Librarian

Secondary Actor: Email Generator, MFS

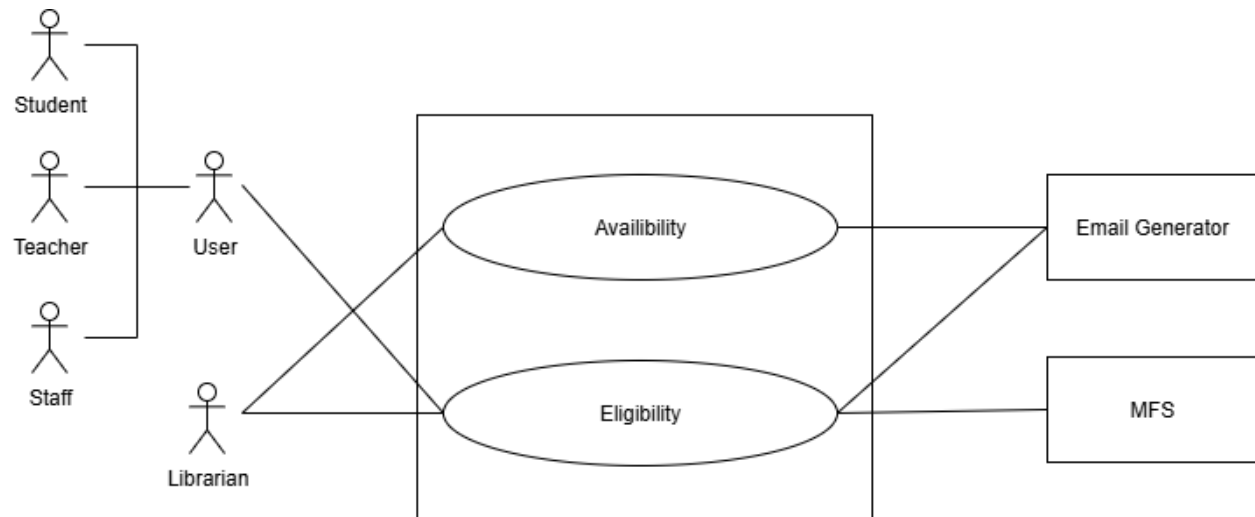


Figure 9: Approval Use Case Diagram

Description:

This use case manages the approval process for book borrowing. After a user submits a borrow request, the librarian initiates checks through the Availability and Eligibility subsystems. If books are available and the user meets all criteria (no fines, not blacklisted), the librarian approves the request and sets a custom return date. A confirmation PDF is generated and sent via email. If the request is denied, a cancellation notice is sent with the reason. Fines and penalties are handled through MFS integration.

Level: 1.5.1

Name: Availability

Primary Actor: Librarian

Secondary Actor: Email Generator

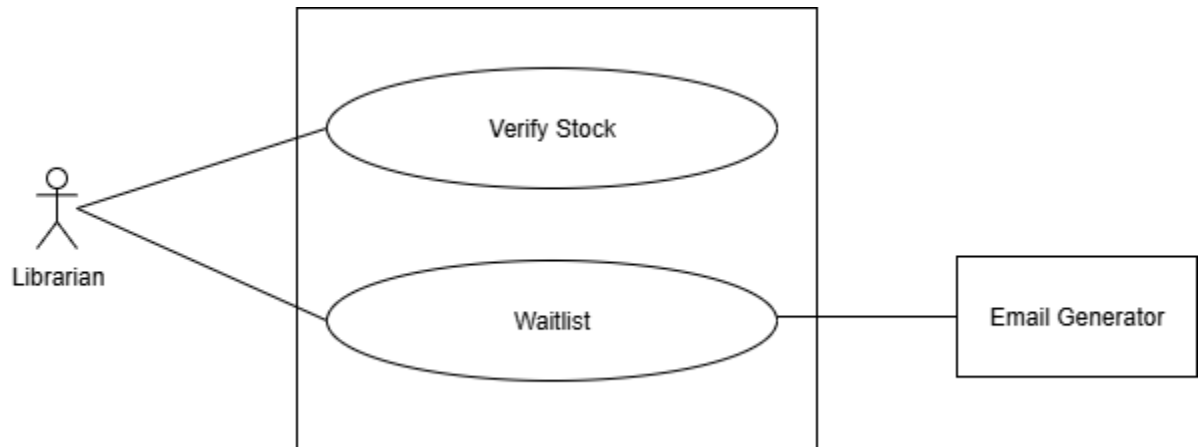


Figure 10: Availability Use Case Diagram

Description:

This subsystem verifies the real-time stock of requested books. The librarian can check whether copies are available or if the book is already on hold. If unavailable, the system adds the user to a waitlist queue, prioritizing teachers first, then others by request time. The Email Generator notifies users about status updates or waitlist placement.

Level: 1.5.2

Name: Eligibility

Primary Actor: User (Student, Teacher, Staff), Librarian

Secondary Actor: Email Generator, MFS

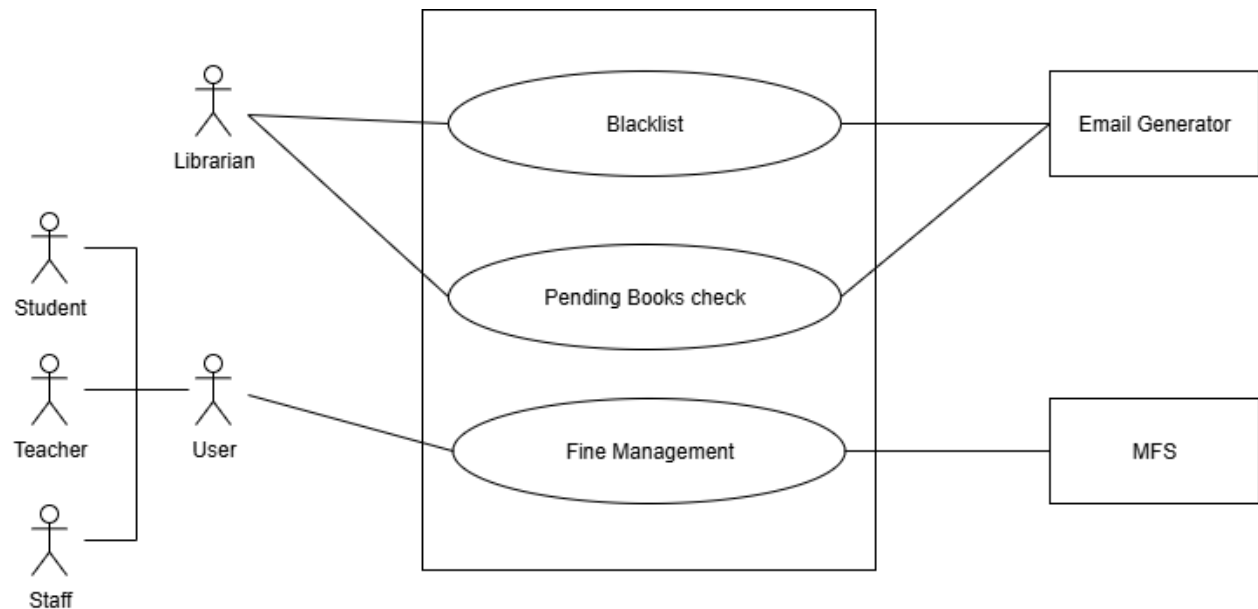


Figure 11: Eligibility Use Case Diagram

Description:

This use case verifies whether a user is eligible to borrow a book. It checks for unpaid fines, demerit points, or blacklist status. If the user fails any of these checks, the request is automatically rejected and a cancellation email is sent. Fine calculations and status updates are handled through MFS. Eligible users proceed to the final approval step.

Level: 1.6

Name: Clearance

Primary Actor: User (Student, Teacher, Staff), Librarian

Secondary Actor: Email Generator

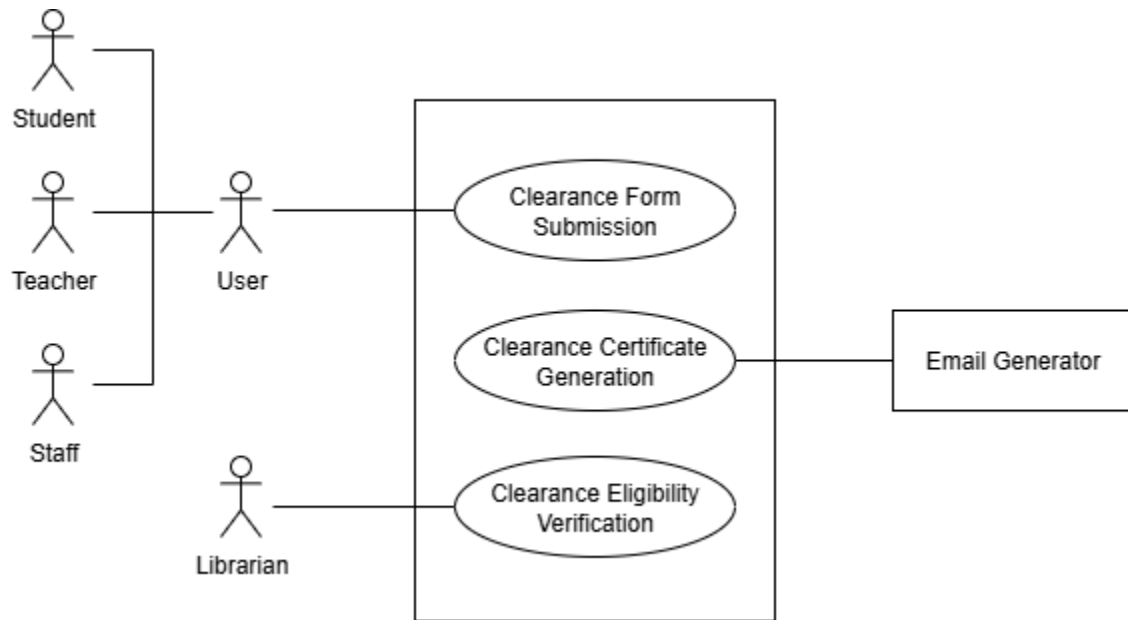


Figure 12: Clearance Use Case Diagram

Description:

Clearance Form Submission: Users (students, teachers, staff) submit a role-specific clearance form via their dashboard, providing necessary personal and institutional details. The request is forwarded for verification.

Clearance Eligibility Verification: The librarian checks if the user has pending books, unpaid fines, or blacklist status. Eligible users proceed; ineligible ones receive a rejection with reasons.

Clearance Certificate Generation: For eligible users, the system generates a PDF clearance certificate with user details and a library seal. It is emailed to the user via the Email Generator and added to their dashboard.

Level: 1.7

Name: Update Book Record

Primary Actor: Librarian

Secondary Actor: BPC(Book Purchase Committee)

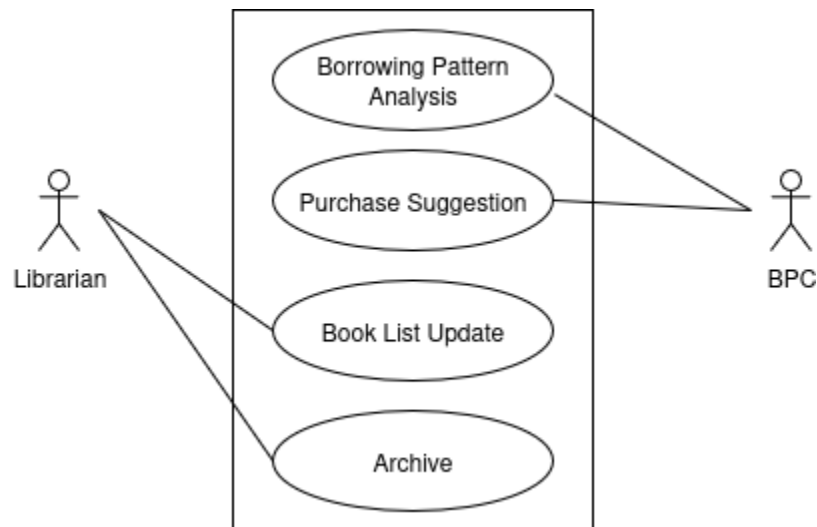


Figure 13: Update Book Record Use Case Diagram

Description:

Borrowing Pattern Analysis: Matches the LMS functionality, where the system analyzes borrowing trends to suggest future acquisitions.

Purchase Suggestion: Matches the data-driven recommendation system that supports the faculty book purchase committee.

Book List Update: The admin manually adds newly purchased books to the book list, entering all relevant details to make them available for users in the catalog. Similarly, any books that are damaged or no longer usable are deleted from the list to prevent future borrowing requests. This process maintains the reliability and quality of the library's available resources.

Archive: Allows librarians to store records of removed or outdated books for internal reference and auditing, without displaying them in the active catalog.