



BPMN MODELS

For Library Management System

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1. Introduction

1.1 Description:

Our business process engineering aim to streamline and optimize library operations through a comprehensive system that efficiently manages book records and patron information. This solution entails meticulous tracking of book availability, issuance, returns, renewals, and fine management. We engage stakeholders from various domains including librarians, students, faculty, developers, and administrators to ensure alignment with organizational goals and user requirements. Through detailed documentation encompassing user needs, system design, testing protocols, user guides, and support materials, we ensure seamless implementation and ongoing support. Our business process engineering approach emphasizes continuous improvement, leveraging data-driven insights to enhance library efficiency and user satisfaction.

2. Business Process

2.1 Registration process:

The registration process in a Library Management System (LMS) involves several activities. Below are the key activities involved in the registration process of an LMS.

1. Registration Fee:

The patron submits a registration fee.

2. Register Patron:

The patron submits a registration request to the library.

3. Select Patron Category:

The patron selects its category like student, researcher, teacher etc.

4. Information Collection activity:

The librarian collects necessary information from the patron for registration.

This may include:

2.1 Personal information: Name, address, contact details, date of birth.

2.2 Identification: Government-issued ID, student ID (if applicable).

2.3 Additional details: Email address.

5. Form Submission activity:

The patron submits the collected information through a registration interface.

6. Data Validation and Verification activity:

The system validates and verifies the submitted patron information for accuracy and completeness.

7. Approval Process activity:

The system reviews the submitted patron information and determines whether the registration request is approved or denied.

8. Account Creation activity:

The system creates a user account for the patron based on the approved registration request.

9. Issuance of Library Card activity:

The system issues a library card to the patron for accessing library services.

10. Confirmation of registration activity:

The system sends a confirmation message to the patron confirming successful registration.

11. Record Keeping and Reporting activity:

The system maintains records of registration details and generates reports on registration activities for administrative purposes

2.2 Book borrowing process:

The book borrowing process in a Library Management System (LMS) involves several activities. Below are the key activities involved in the book borrowing process of an LMS.

1. Search Book:

The patron searches the library catalog or shelves and selects desired materials for borrowing.

2. Check Availability activity:

The system checks the availability of selected materials in the library's collection.

3. Book Request activity:

The patron requests to borrow the selected book from the library.

4. User Authentication activity:

The system authenticates the patron's identity before proceeding with the borrowing process.

5. Book Checkout activity:

The patron checks out the requested book from the library's collection.

6. Due Date and Late Fine activity:

The system assigns a due date for the borrowed book and calculates any applicable late fines based on library policies.

7. Receipt or Confirmation activity:

The system generates a receipt or confirmation for providing details such as due date and borrowed item information.

8. Notification activity:

The system sends a notification to the patron, informing them about the successful borrowing and providing details such as due date and borrowed item information.

9. Book Borrowed:

The patron retrieves the borrowed book from the library's collection shelves or designated pickup area.

2.3 Cataloging and classification process

Cataloging in a Library Management System (LMS) involves several activities to organize and describe library materials in a systematic manner to facilitate easy access and retrieval. Here are the key activities involved in the cataloging process of an LMS:

1. Take Order:

Library staff take books order from supplier.

2. Check Quality:

Library staff check quality of books. If quality is okay, then proceed further otherwise contact the supplier.

3. Data Creation:

Library staff create descriptive metadata for newly acquired materials, including:

2.1 Title: The title of the item.

2.2 Author/Creator: The author, editor, or creator of the item.

2.3 Publisher: The name of the publisher or issuing body.

2.4 Publication Date: The date the item was published or issued.

2.5 Subject Headings: Keywords or phrases that describe the content of the item.

2.6 Description: A brief summary of the item's content.

2.7 Additional Fields activity: Genre, format, edition, language, and physical description of material.

4. Assign ISBN:

Library staff assign a unique identifier such as ISBN or bar-code to newly acquired books.

4. Select Category:

Library staff categorize newly acquired books according to a standardized categorization system:

4.1 Educational: English, Urdu, software, hacking, programming etc.

4.2 Novels: fictional, non-fictional etc.

4.3 Motivational: classic, modern etc.

5. Check Authenticity:

Library staff ensure consistency and accuracy in author names and subject headings.

6. Data Entry activity:

Library staff enter cataloging information, including data, categorization details, and subject headings, into the library catalog or bibliographic database.

7. Check Completeness and Correctness:

Library staff review cataloging records to ensure accuracy, completeness, and adherence to cataloging standards.

8. Authority Record Creation activity:

Library staff create authority records for authors, subjects, and other entities to provide standardized access points and cross-references for catalog users.

9. Indexing activity:

Library staff create indexes or search tools to facilitate access to cataloging records by keyword, title, author and subject.

10. Record Maintenance activity:

Library staff regularly update and maintain cataloging records to reflect changes such as item status, corrections, or enhancements.

3. Business Process Exception

3.1 Registration process

The diagram represents a comprehensive process for handling course registration. Here is a step-by-step description of the process:

1. Receive Application

The process begins with receiving an application.

2. Sent Application

The application is sent to the system.

3. Applicant Eligibility Check

3.1 The system checks if the applicant is eligible.

3.2 If the applicant is not eligible, a rejection notification is sent, and the process ends for this application.

3.3 If the applicant is eligible, they proceed to the next step.

4. Handle Course Registration

4.1 Assign Student ID

4.2 A student ID is assigned to the eligible applicant.

4.3 An acceptance letter is sent to the applicant.

5. Handle Enrollment Fee

5.1 The applicant is required to pay the enrollment fee.

5.2 If the fee is not paid within the deadline, a reminder is sent. If the fee remains unpaid, the applicant's access to the portal is denied, and the process moves to unrolling the course.

5.3 If the fee is paid within the deadline, the applicant gains access to the portal.

6. Course Selection and Form Submission

6.1 The applicant selects their course.

6.2 If the course selection is complete, the registration form is submitted.

6.3 If the course selection is not complete, the system waits until it is completed.

7. Review Registration Form:

7.1 The submitted registration form is reviewed.

7.2 If the form is incomplete or incorrect, a notification to resubmit the correct form is sent.

7.3 The applicant resubmits the correct registration form.

7.4 If the form is complete and correct, the student is enrolled in the course, and a confirmation is sent.

8. Course Unenrollment Handling

8.1 If a course unenrollment is received, the system handles it.

8.2 The student is unenrolled from the course, and a confirmation is sent.

9. Charge Fine for Unenrollment

9.1 If a course is to be unenrolled, a fine is determined.

9.2 The fine is notified to the student.

9.3 If the student requests to continue within 15 days, the course is not unenrolled.

9.4 If the student requests to stop, the course is unenrolled.

10. Change Contact Information

If change contact information is received, the system updates the contact information, and a confirmation is sent.

11. End

The process ends.

3.2 Book Borrowing process

The diagram represents a detailed process for handling book borrowing in a library system. Here is a step-by-step description of the process:

1. Start:

The process begins with the initiation of a book search.

2. Search Book:

The user searches for the desired book.

2.1 If the book is not available: a notification is sent, and the process ends for this book.

2.2 If the book is available: the process proceeds to the next step.

3. Request Book:

The user requests the available book.

4. Check User Authentication:

The system checks the authenticity of the user.

4.1 If the user is not authentic: a notification is sent, and the process ends.

4.2 If the user is authentic: the process proceeds to the next step.

5. Checkout Book:

The system checks out the book to the user. A due date and any applicable fine are assigned.

6. Patron Information Update:

6.1 If there is a change in patron information received, the system updates the patron's information.

6.2 A notification is sent confirming the update.

7. Receipt Generation:

A receipt is generated for the book checkout.

8. Confirmation Notification:

8.1 A confirmation notification is sent to the user.

8.2 The book is successfully borrowed, and the process ends.

9. Handle Cancellation

9.1 If the book borrowing is to be canceled, the system handles the cancellation.

9.2 A notification is sent to the user, and a fine may be charged.

9.3 The process ends with the cancellation.

10. Update Inventory:

After handling the cancellation, the system updates the inventory.

11. Notify Patron:

The user is notified about the cancellation and inventory update.

3.3 Cataloging and classification process

A book cataloging process begins when an order is taken. The process is as follows:

1. Take Order:

The process starts with the initiation of taking an order.

2. Check Quality:

The quality of the received data is checked.

2.1 If Book Quality is Not Satisfiable:

Contact the supplier and handle the issue.

2.2 If Book Quality is Satisfiable:

Proceed to data creation.

Loop start:

3. Data Creation:

Create the necessary data for cataloging.

Contact Supplier: If incorrect or incomplete data is received, contact the supplier to rectify the issue. **Assign ISBN, Select Category, Check Authenticity:** In parallel, the following are carried out:

4. Assign ISBN:

Assign an ISBN to the book.

5. Select Category:

Select the appropriate category for the book.

6. Check Authenticity:

Verify the authenticity of the book.

7. Data Entry:

Enter the data into the system.

8. Data Verification:

Verify the entered data.

Loop End:

If the data is correct and complete: Proceed to authority record creation.

If the data is incorrect or incomplete: Send a notification for missing information and wait for the missing information to be received.

9. Authority Record Creation:

Create the authority record.

10. Indexing:

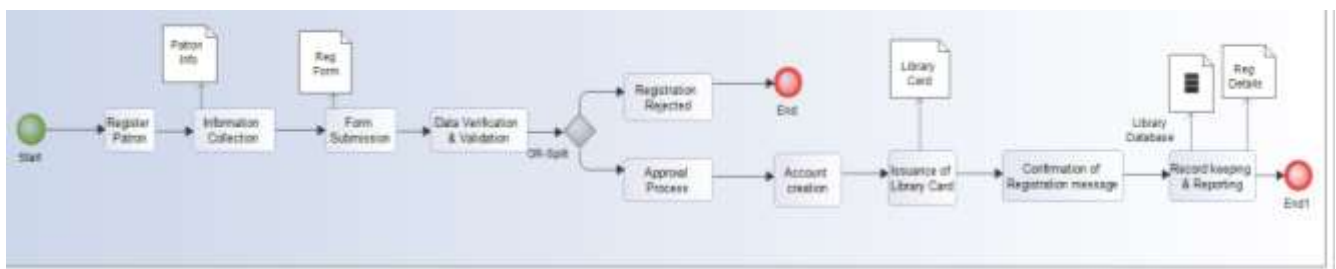
Index the book records.

11. Record Maintenance:

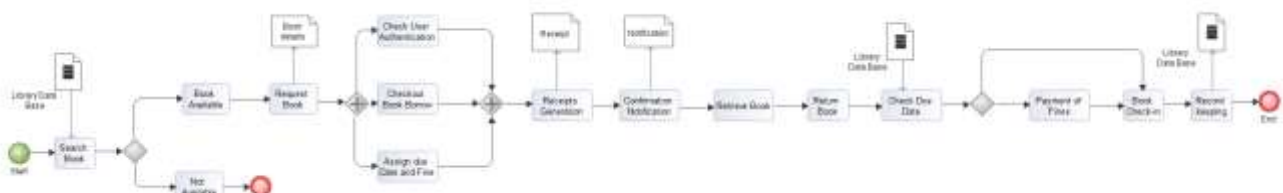
Maintain the records as necessary.

4. Business Process Models

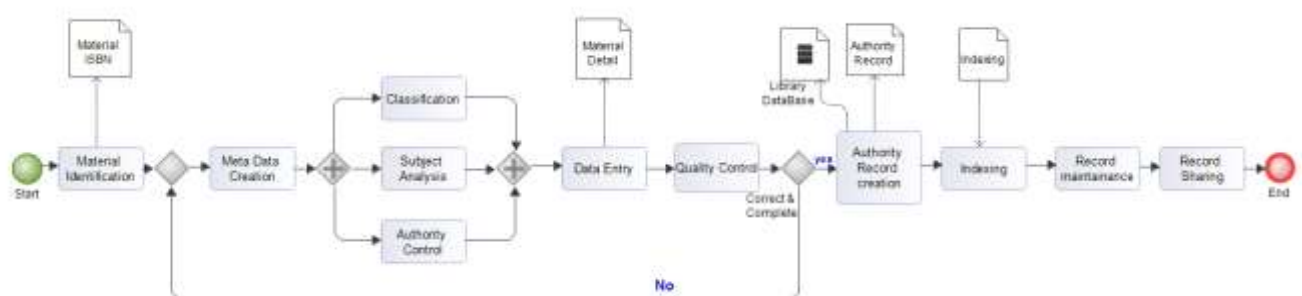
4.1 Registration process:



4.2 Book borrowing process:

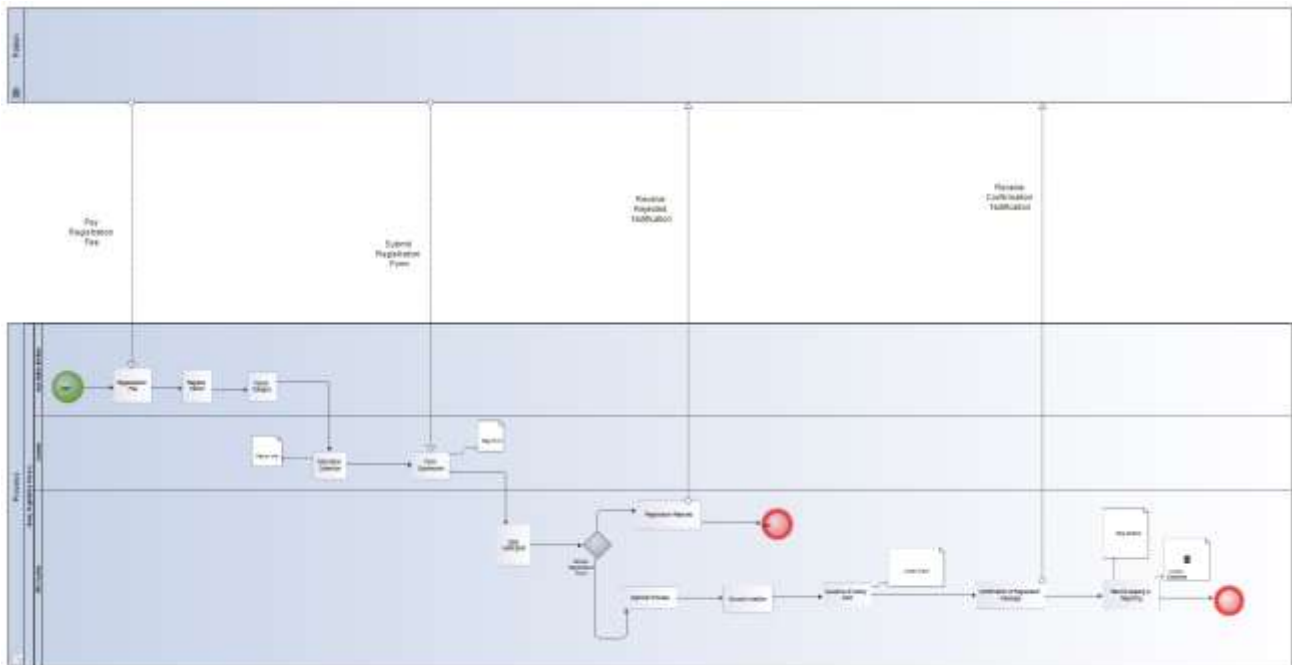


4.3 Cataloging and classification process:

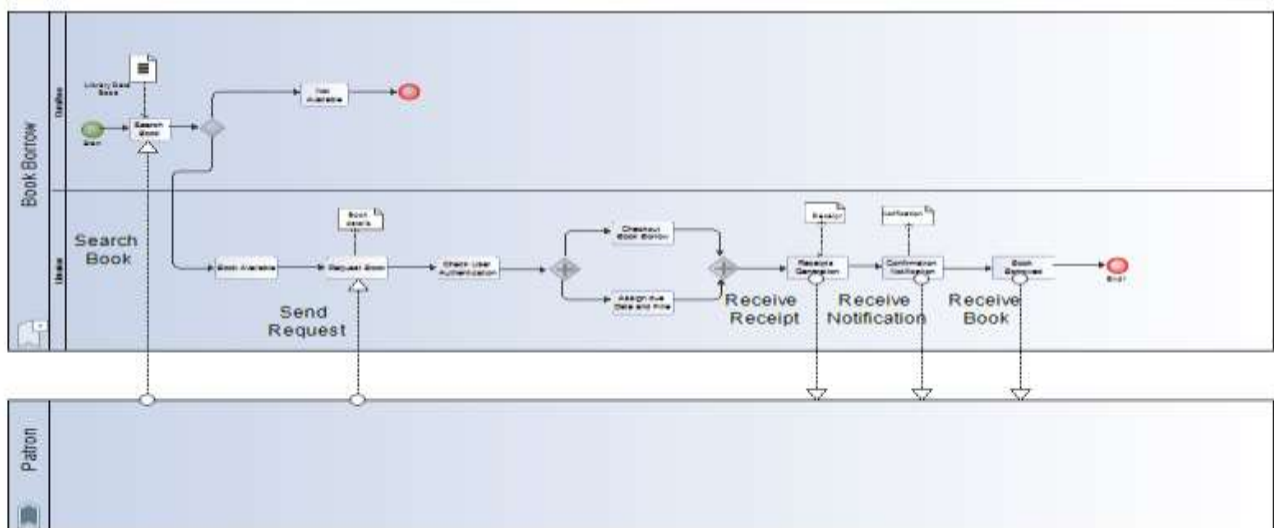


5. Business Process Collaboration Models

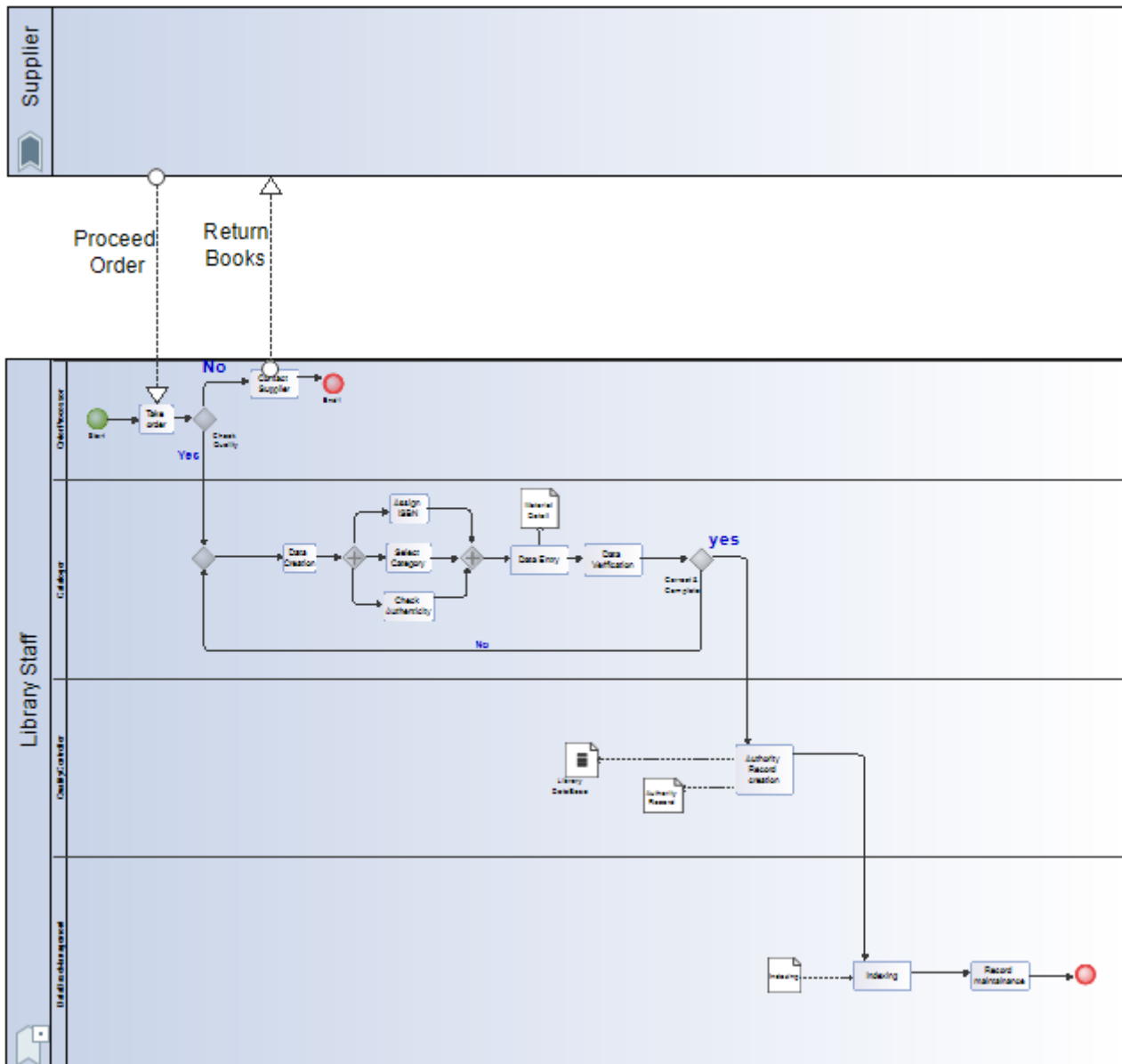
5.1 Registration process



5.2 Book Borrowing process

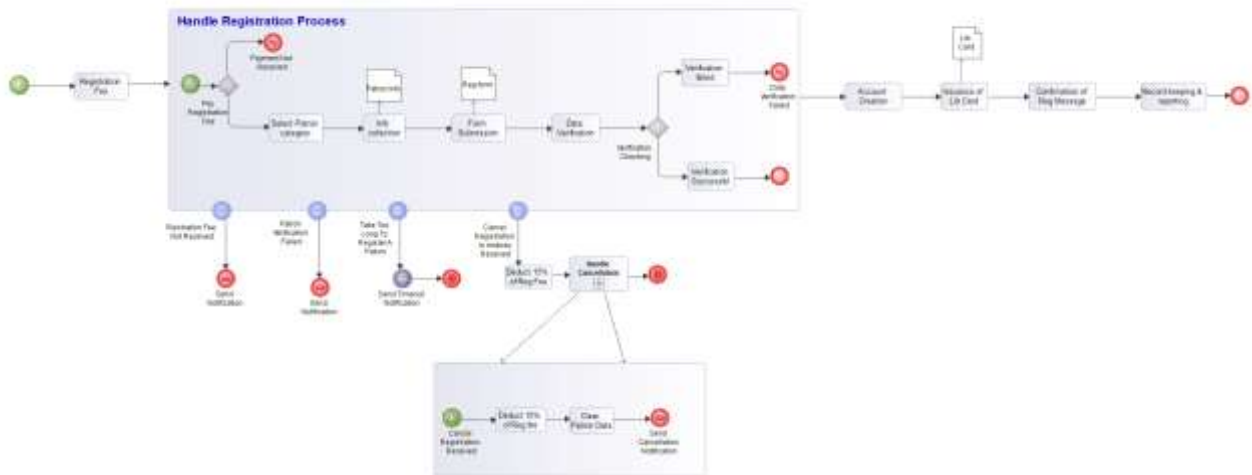


5.3 Cataloging and classification process

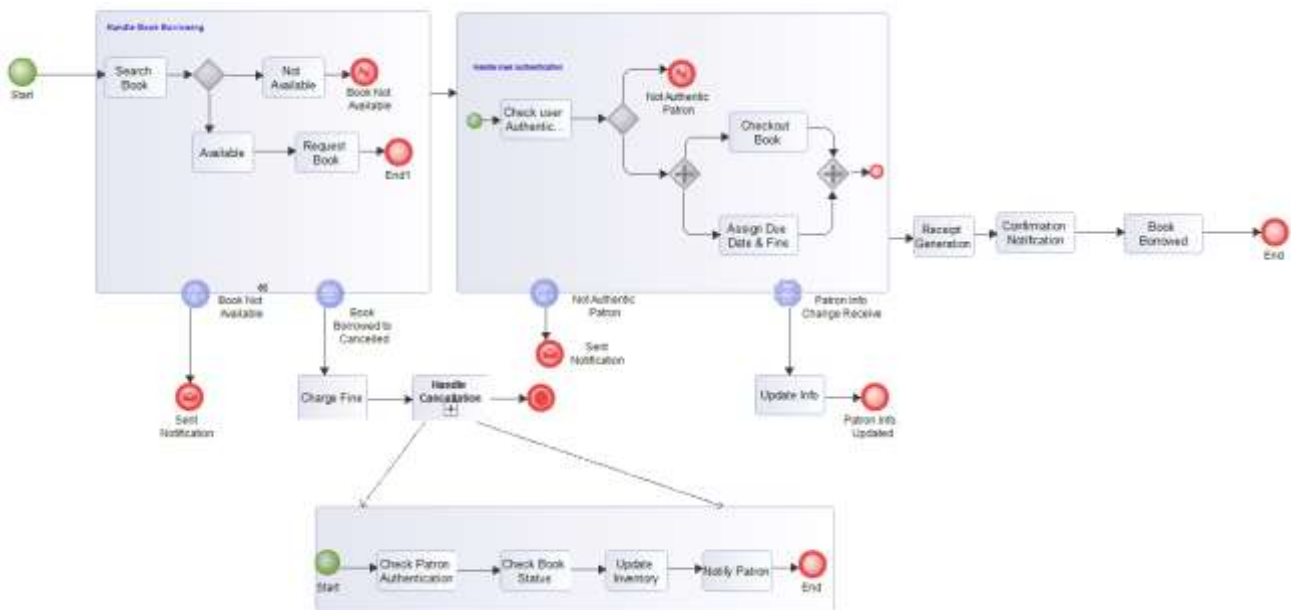


6. Business Process Exception Models

6.1 Registration process



6.2 Book Borrowing process



6.3 Cataloging and classification process

