



NATIONAL SCHOOL OF BUSINESS MANAGEMENT

CS 107.3-Object Oriented Programming with C#

Group Assignment

(A software developed for a manual system using .Net framework (C#))

NSBM

Smart Library System

TEAM 04

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Team Members

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Acknowledgement

We would like to express our heartfelt gratitude to the Lecturer, Mrs. Sulari Fernando for giving us this group task as we gained more knowledge on the module “Object Oriented Programming with C#” through it.

Introduction

The target of the assignment is to computerize an existing manual system using Windows Forms (.NET framework) by connecting it to a SQL database. It should also contain the CRUD operations.

We planned in turning a manual library management system into a computerized one. Hence, we came up with “NSBM Smart Library System”. This project consists of two systems:

Operations of the systems

1. Librarian's system:

Where the librarian can

- Log in to the system
- Add members, Update member details and Delete members to/from the library database.
- Add books, Update book details and Delete books to/from the library database.
- Check who wants to borrow a book.
- Check whether the book is available in the library at the time of need.
- Get the location of the book (address of the book including the section, the shelf, the rack and the slot no.) in the library.
- Confirm lending the book.
- Notify the system of the return of a book where the system updates the necessary tables.

Unlike normal computerized library systems, we planned in introducing a system to the user (in this case a library member) as well.

2. Member's system:

Where the member or any user can

- Search for books by book title
- Search for books by author name
- Search for books by category
- Check the book's availability

Where only a registered member can

- Borrow a book
- Request the librarian to lend the book

Benefits achieved

- Like our university, the system follows the green concept which is developed to protect our environment. It reduces the usage of paper which is used when databases are handled manually.
- The librarian can get information by just moving his/her fingers.
- The librarian need not have drawers and boxes loaded with folders piled up in his/her office thus reducing the unnecessary usage of physical space.
- The librarian can get filtered results of member details and/or book details from the database.
- The librarian need not waste time rearranging the books as a responsible person or the librarian him/herself will be taking and returning the books from and back to the shelf him/herself.
- The member need not waste time searching for a book from shelf to shelf.
- The member can check the availability of a book.

- The books will not get worn away as quickly as when the system is manually managed as the books won't be touched by the members to read their description as the blurb can be viewed/read through the system.
- This system is the best way to use a library especially in situations like the covid-19 pandemic.

Characteristics of the system

1. Librarian's system

It contains 5 forms

- Log in form
- Menu form
- Member management form
- Book management form
- Borrow and Return management form

The interfaces of the Librarian's system are set with eye friendly, dark colours and with a simple arrangement of buttons and tools as he/she must work with it for almost the whole day.

2. Member's system

It contains 7 forms

- Welcome form
- Home form
- Search form
- Log in and Borrow form
- Category form
- Book details view form
- Help form

The interfaces of the Member's system are set with user friendly, eye catching, yet soothing colours and with a creative arrangement of buttons and tools as the member should not feel the complexity of the system.

About the database

We used Microsoft Access to build the database and we connected the forms to the database with the help of the System.Data.OleDb namespace. The users, both the librarian and members (when allowed) can create, update and delete data in the database via the forms (thus achieving the aim of having CRUD operations in our project).

OOP concepts used

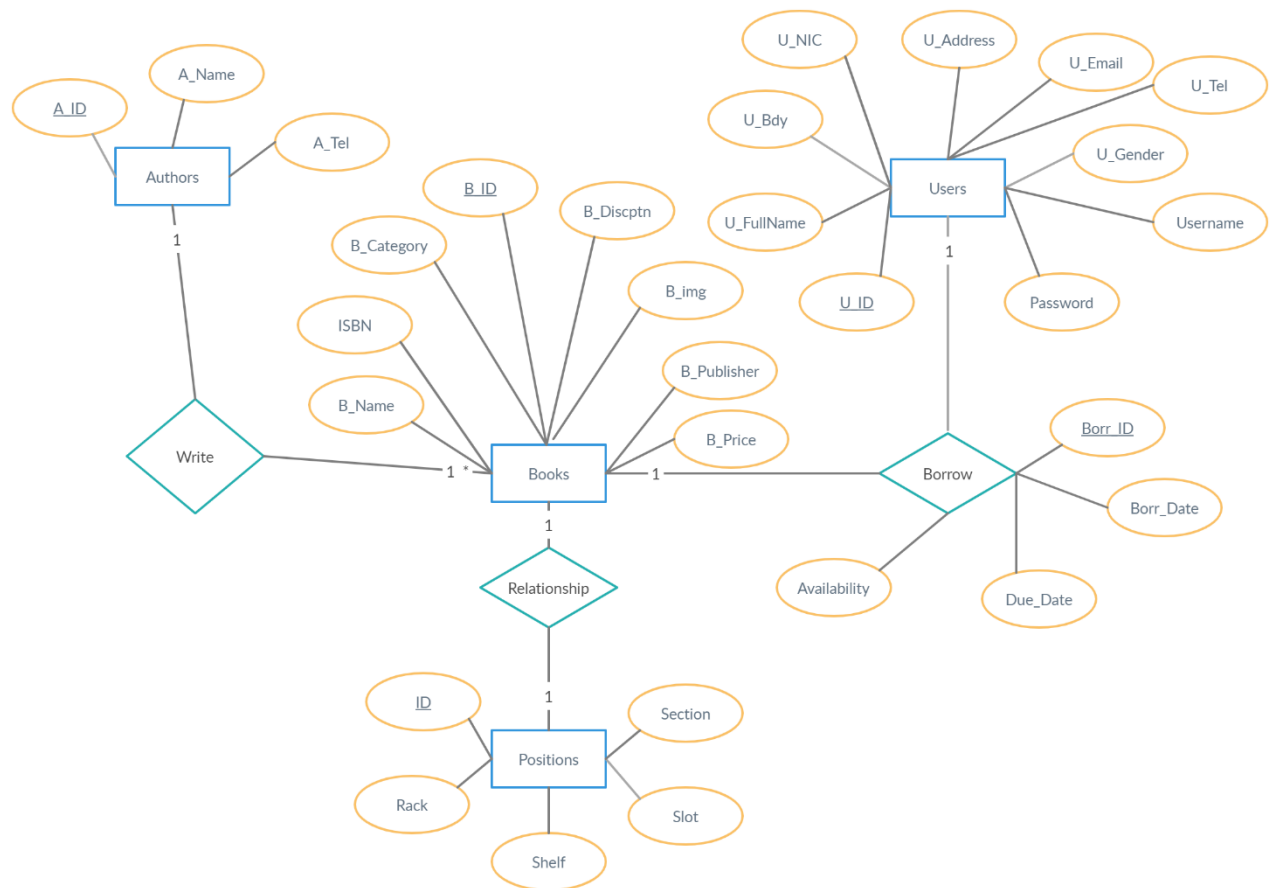
- Inheritance
- Encapsulation
- Exception handling
- Use of objects, methods, attributes and classes

Improvements

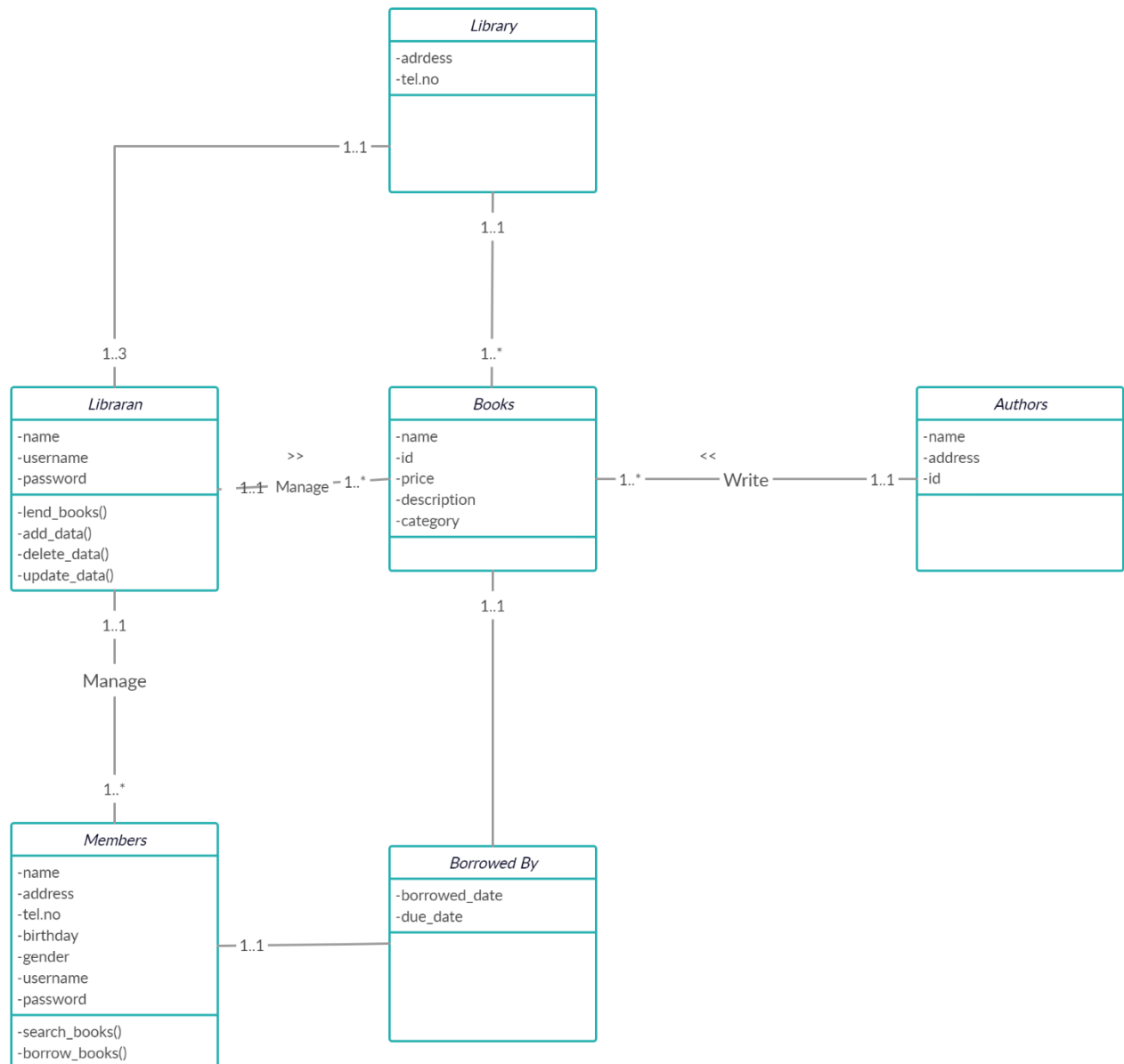
- The system can be improved to generate the nearest available empty slot, so that once a book is returned you don't have to always go to the relevant slot (which could be far away) and instead put it into the nearest empty slot where the system will remember it's location.
- This system, with minor improvements can also be installed in a book shop to fulfill similar tasks which comes in very handy during situations like covid-19.

Diagrams

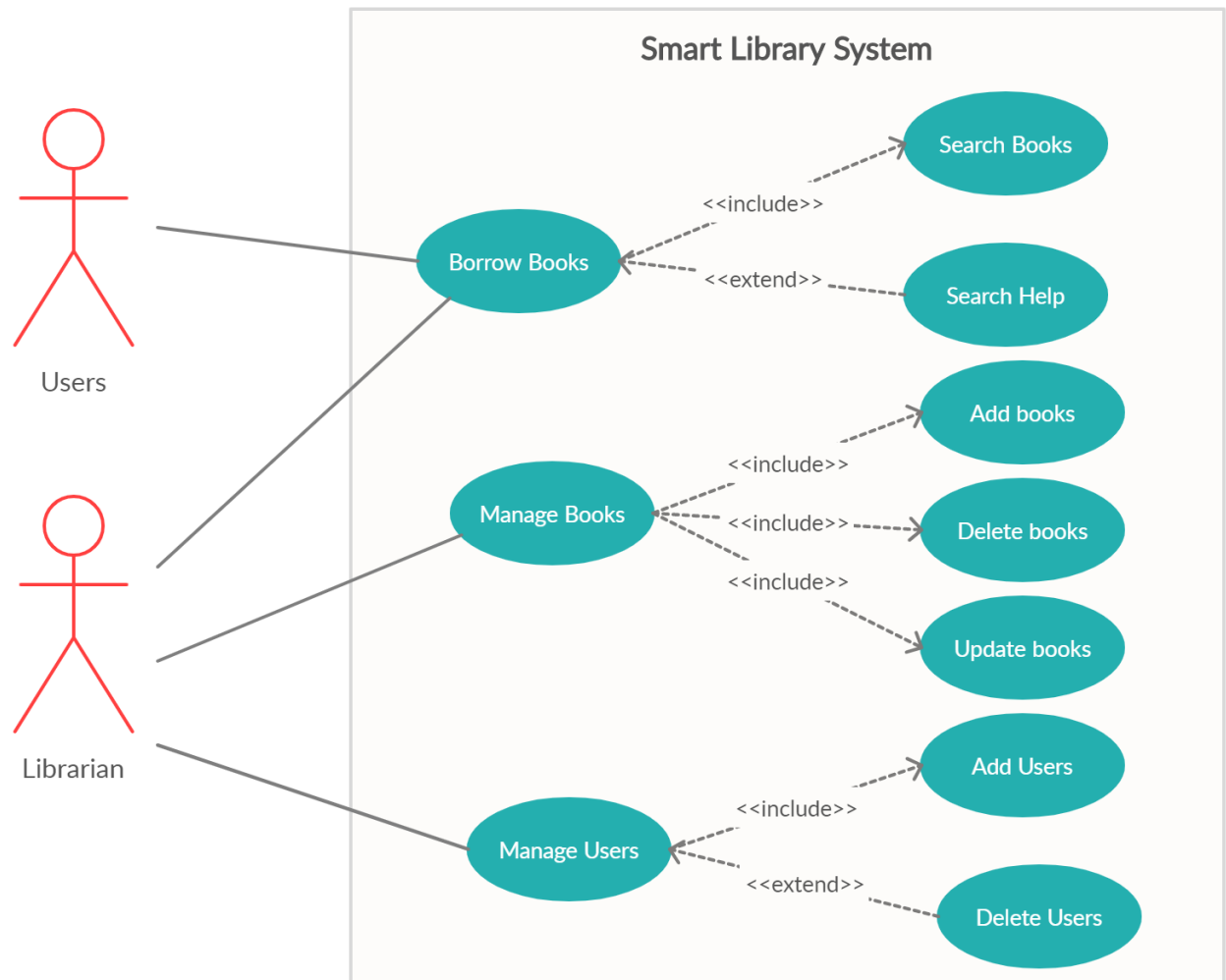
1. Entity Relationship Diagram



2. Class Diagram



3. Use Case Diagram

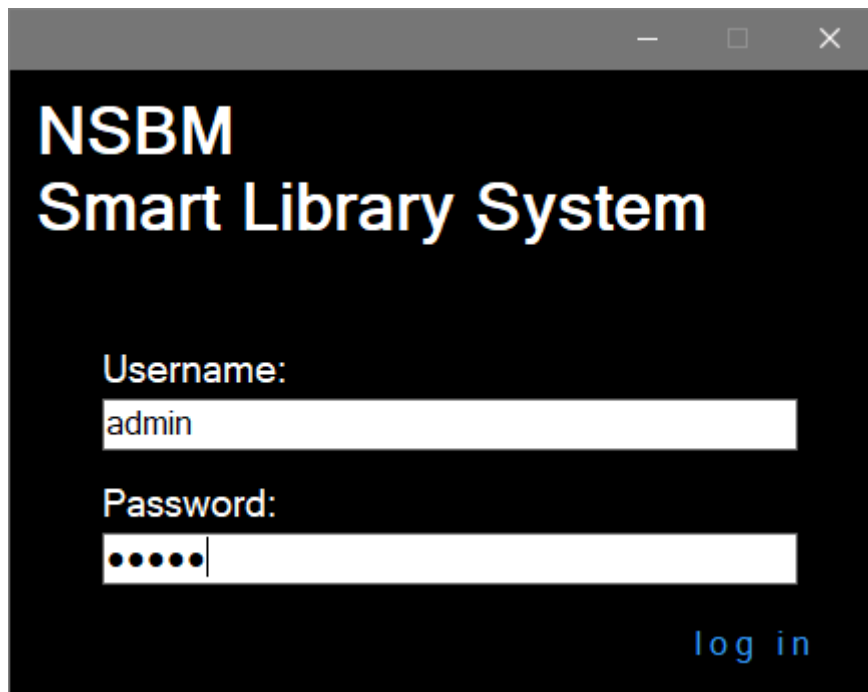


Samples of the developed system

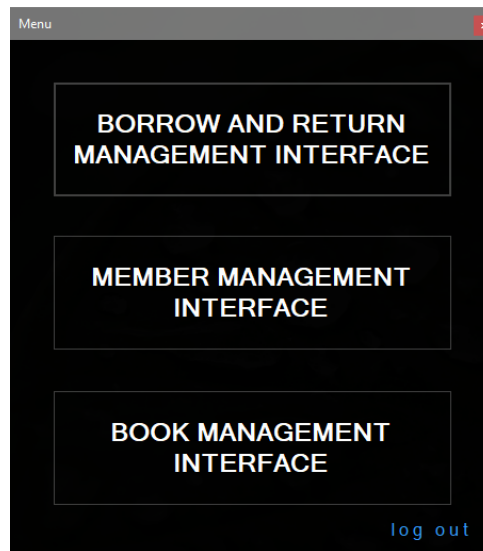
1. Librarian's system

It contains 5 forms

- Log in form: the form validates whether the entered username and password are equal to the hard-coded values and it heads to the menu form if “true” else display a message asking to correct the mistake. (used if condition)

A screenshot of a web application window titled "NSBM Smart Library System". The window has a dark background. At the top, the title "NSBM Smart Library System" is displayed in a large, bold, white font. Below the title, there are two input fields. The first is labeled "Username:" and contains the text "admin". The second is labeled "Password:" and contains five dots, indicating a masked password. To the right of the password field, there is a "log in" button with the text "log in" in a blue font. The window has standard window controls (minimize, maximize, close) in the top right corner.

- Menu form



- Member management form – As mentioned in detail before this interface grants the librarian access to add and delete members and also he/she can update a required value by entering the member ID and then selecting the field name from the dropdown list containing the value to be updated and finally mentioning the new value.

 A screenshot of the "Member Management Interface" for the "NSBM Smart Library System". The interface has a dark theme with white text. It features three main sections:

- Add Member:** Contains input fields for Full Name, Residential Address, Email Address, Date of Birth (with a calendar icon), Contact no., National Identity no., Gender (dropdown), Username, and Password. An "ADD" button is on the right.
- Update Member Detail:** Contains a "Member ID:" field with a dropdown set to "UID", a "Change:" dropdown, and a "To:" input field. An "UPDATE" button is on the right.
- Delete Member:** Contains a "Member ID:" field with a dropdown set to "UID". A "DELETE" button is on the right.

- Book management form – the processes are like that of member management

Book Management Interface

NSBM Smart Library System

Add Book

Book Title:	Section:	Price:	Publisher:
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
ISBN:	Description:		
<input type="text"/>	<input type="text"/>		
Author:			
<input type="text"/>			

ADD

Update Book Detail

Book ID:	Change:	To:
<input type="text"/>	<input type="text"/>	<input type="text"/>
BID		

UPDATE

Delete Book

Book ID:
<input type="text"/>
BID

DELETE

- Borrow and Return management form – the top gridview of this form displays the borrow requests from the members. By entering the book ID (B_ID) we can get the position/location of the book displayed in the bottom gridview. When we enter the book ID at the bottom textbox and enter lent the “Availability” filed value of the relevant book turns from ‘In Library’ to ‘Lent’. And finally, when a book is returned and after the entering and submitting the book id the record with that field gets deleted from the Borrowed table (top gridview). The refresh button refreshes the top gridview to display the updated/new requests.

Borrow and Return Management Interface

NSBM Smart Library System

U_Email	B_ID	BorrowedID	Borr_Date	Due_date	U_ID	Availability
viparous@g...	BID0001	2	8/6/2020	8/20/2020	UID006	In Library

BOOK RETURN

Book ID:

BID

BOOK RETURNED

BID0001

ID	Rack	Shelf	Slot	B_ID	Section
1	A	top	1	BID0001	Non Fiction

Enter the book ID and click Lent to confirm that the book is lent to the borrower: BID

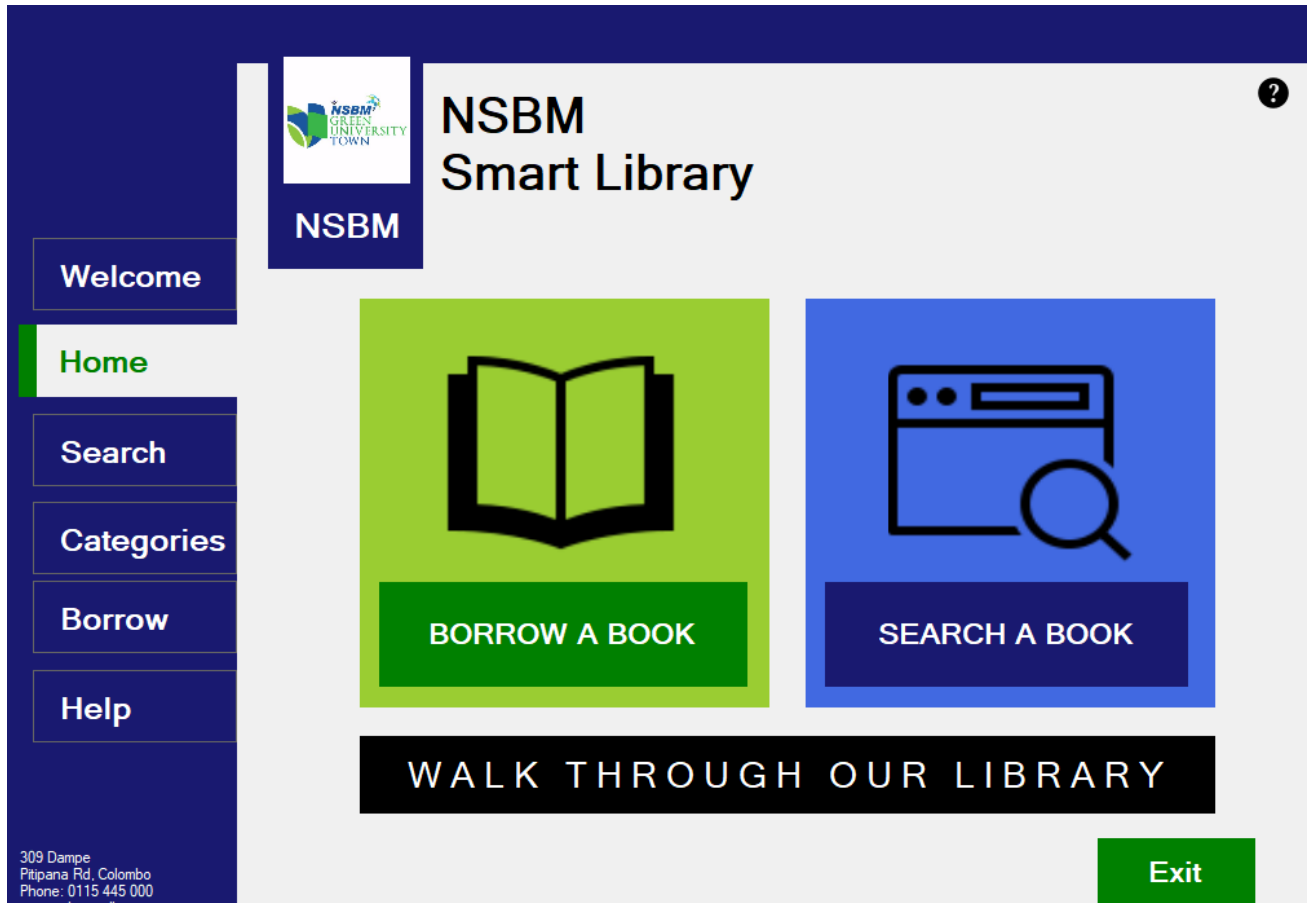
2. Member's system

It contains 7 forms

- Welcome form



- Home form : the “Borrow a Book” button directs the user to the borrow form, the “Search a Book” button directs the user to the search form, the “Walk through our library” button directs the user to the category form whereas the “?” button directs the user to the Help form.



- Search form – this form allows users to browse the books by either author name or book name via the gridview below. If the user finds the book, he/she was searching for he/she can enter the relevant book ID in the relevant textbox and click borrow where he/she would be directed to the borrow page to confirm the act. If the user is unable to find a book the button below the gridview directs the user to the category form.

The screenshot displays the NSBM Smart Library web application. On the left is a dark blue sidebar with navigation links: Welcome, Home, Search (highlighted in green), Categories, Borrow, and Help. At the bottom of the sidebar is contact information: 309 Dampe, Pitipana Rd, Colombo, Phone: 0115 445 000, and the website URL www.celbsa.lk. The main content area has a light gray background. At the top left of this area is the NSBM logo and the text 'NSBM Smart Library'. A small question mark icon is in the top right corner. Below the header, there are two search sections. The first section is labeled 'Search By Author Name :' and has a light green input field followed by a magnifying glass icon. The second section is labeled 'Search By Book Name :' and also has a light green input field followed by a magnifying glass icon. Below these is a large, empty light green rectangular box. Underneath this box is a blue banner with the text 'CANT'T FIND THE BOOK YOU ARE LOOKING FOR? CLICK HERE TO CHECK OUT OUR BOOK COLLECTION'. Below the banner, there is a section titled 'To borrow a book enter Book ID and click Borrow :'. It contains a light green input field for the Book ID and a black button with the word 'BORROW' in white. In the bottom right corner of the main area is a green button with the word 'Exit' in white.

NSBM Smart Library

Welcome

Home

Search

Categories

Borrow

Help

309 Dampe
Pitipana Rd, Colombo
Phone: 0115 445 000
www.celbsa.lk

Search By Author Name :

Search By Book Name :

To borrow a book enter Book ID and click Borrow :

BORROW

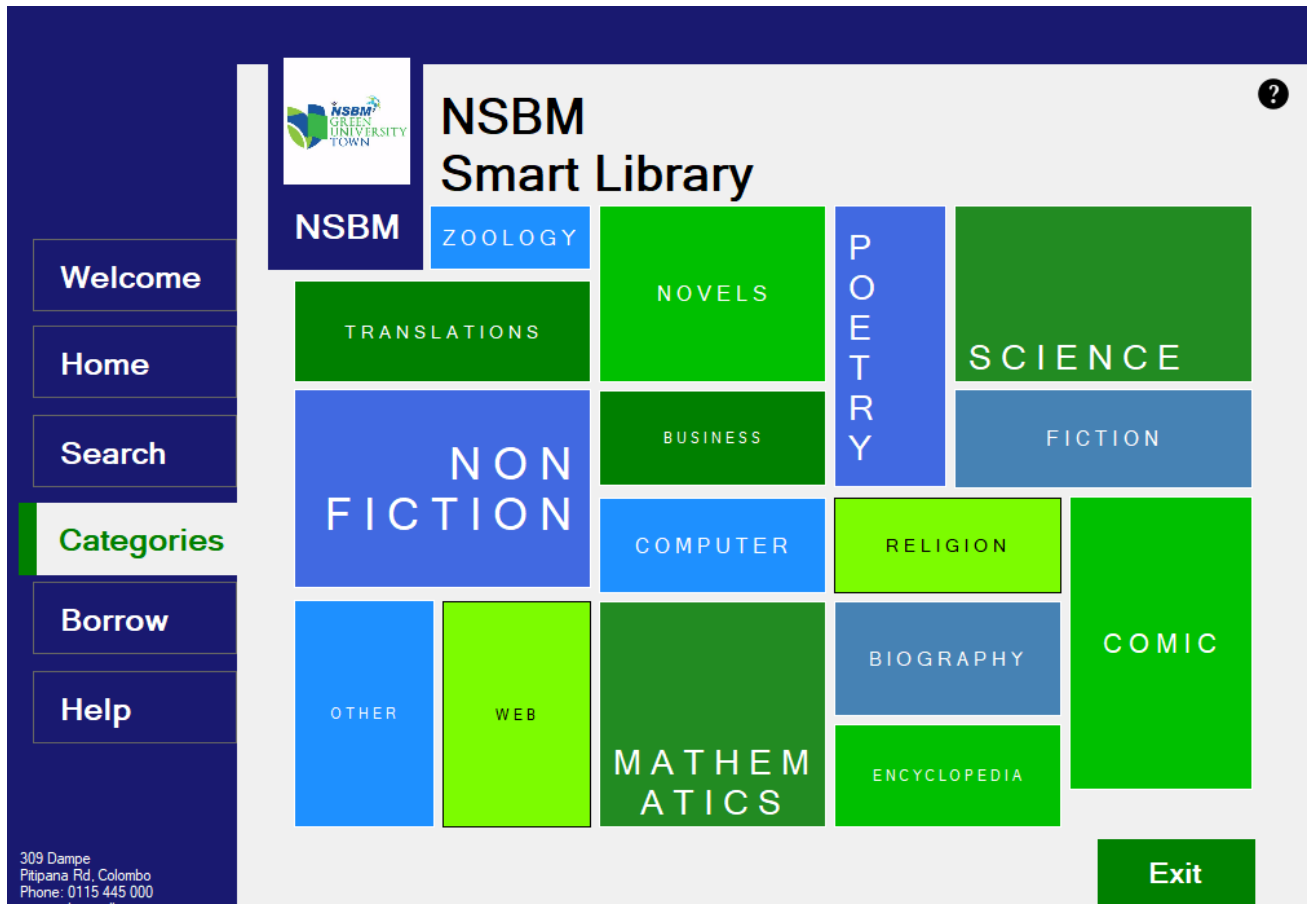
Exit

CANT'T FIND THE BOOK YOU ARE LOOKING FOR? CLICK HERE TO CHECK OUT OUR BOOK COLLECTION

- Log in and Borrow form – this form sees to it that only members can borrow books by asking the member to enter his/her username and password. The form is coded so that the Book ID field will automatically contain the Book ID entered in the search form. When the required fields are filled and the borrow button is clicked the system checks the validity and if the data are true the system updates the borrow table and finally directs the user back to the “Welcome” form.

The screenshot displays the NSBM Smart Library web application. On the left is a dark blue sidebar with navigation links: Welcome, Home, Search, Categories, Borrow (highlighted in green), and Help. At the bottom of the sidebar is contact information: 309 Dampe, Pitipana Rd, Colombo, Phone: 0115 445 000, and the website URL www.nsbm.ac.lk. The main content area has a light gray background. At the top left of this area is the NSBM logo and the text 'NSBM Smart Library'. A red rectangular form is centered on the page, containing three input fields labeled 'Book ID :', 'Username :', and 'Parssword :'. A dark blue 'BORROW' button is positioned at the bottom right of this form. To the right of the form is a green rectangular button labeled 'Exit'. A small question mark icon is visible in the top right corner of the main content area.

- Category form – all the books in the library fall under at least one of the below shown categories. Thus this form contain buttons named after the categories so that when you click a button (say Translations button) all the books in the database that come under this category (Translations) will be displayed in the “Book details view form” ‘s gridview.



- Book details view form – this is the form mentioned above. As you can see it's a pop-up form. The top textbox is coded to contain the category name and the gridview as mentioned above shows the details of the books (including the availability of the book; whether it is “In Library” or “Lent”) with the category as “Translation”.

The screenshot displays the NSBM Smart Library interface. A pop-up form is centered on the screen, showing a list of books under the 'Translation' category. The form includes a table with columns for book details and an 'Enter Book ID' field with a 'BORROW' button.

scptn	B_img	B_Price(Rs)	A_Name	B_Category	B_Publisher	Availability
		0.0000	H. Jayarat...	Translation		In Library
		0.0000	Siril Chnad...	Translation		In Library
		0.0000	Nihal De Si...	Translation		In Library
		0.0000	Nirupa Ro...	Translation		In Library
		0.0000	Gunatilake...	Translation		In Library
		0.0000	T. Andradi	Translation		In Library
		0.0000	Somasiri Li...	Translation		In Library

Enter Book ID:

Navigation buttons: OTHER, WEB, MATHEMATICS, ENCYCLOPEDIA, Exit


Footer: 309 Dampé, Pitipana Rd, Colombo, Phone: 0115 445 000, www.nsbm.ac.lk

- Help form – this form contains instructions on how to use the system (note that the given image in the form is a dummy image)



NSBM

NSBM Smart Library



Welcome


Home

Search


Categories

Borrow


Help



1. Find the book you want to share



2. View the book's details page



3. Click the embedded link



4. Complete the required text

Your lending details

email address: *

recipient name: *

from: *

personal message: *

5. Send the book to your friend

send now

HOME

309 Dampé
Pitipana Rd, Colombo
Phone: 0115 445 000
www.nsbm.ac.lk

Workload Matrix

Name	Student Id no.	Assigned Task	
		System	Report
WWSRWWMDDP Samaranayaka	21013228	<ul style="list-style-type: none"> • Database creation • Linking database with forms • Writing query 	<ul style="list-style-type: none"> • Use case diagram • ER diagram • Class diagram • Introduction
RV Abeykoon	21006199	<ul style="list-style-type: none"> • Created user interfaces • Linked forms • Added data to databases 	<ul style="list-style-type: none"> • Use case diagram • Introduction
TMDK Tennakoon	21009439	<ul style="list-style-type: none"> • Database creation • Linking database with forms • Writing query • Created user interfaces • Linked forms 	<ul style="list-style-type: none"> • Introduction • Samples of the developed system
AKRP Arsakulasooriya	21010128	<ul style="list-style-type: none"> • Linking database with forms • Writing query • Created user interfaces 	<ul style="list-style-type: none"> • Introduction