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**Windows forms Application**

**Library System  
(Group 2 Project)**

Prepared by class SE1626, Group 2

November 10, 2022

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# Document description

This document describes solution version 1.0 for Library System. It is divided into the following sections:

* In section 2 an overview of the Library System will be provided, including a list of system users, use cases, use case diagrams, and activity diagrams that describe the most important use case scenarios.
* In section 3 an E-R diagram and all tables of the Library System in detail will be presented.
* In section 4 all classes organized in the layers and their behaviors (sequence diagrams) for the most important use cases will be presented.
* In section 5 the most screen prototypes will be presented.

# SRS overview

**2.1. List of system librarian**

1. Management: The librarian manager Library System

**2.2. List of use cases**

1. Login/Logout

2. Reservate Book

3. Return Book

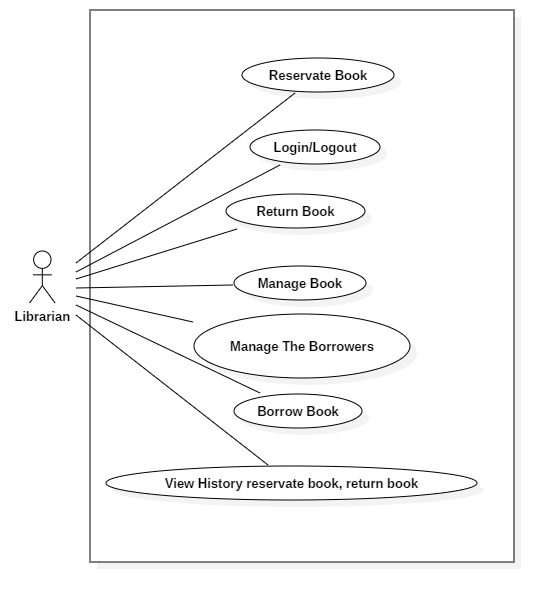
4. View History Reservate Book, return book

5. Borrow Book

6. Manage Book

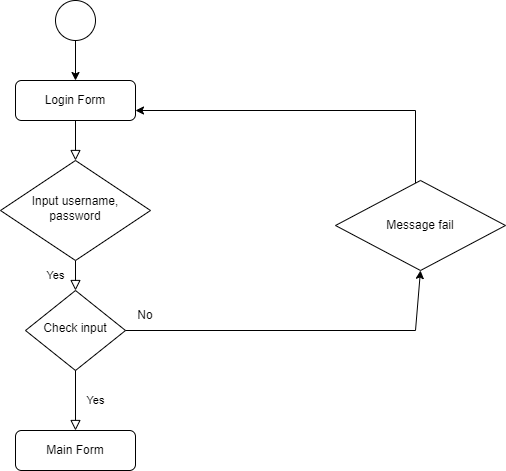
## 2.3. Use case diagram

**2.3.1. Preliminary use case diagram**

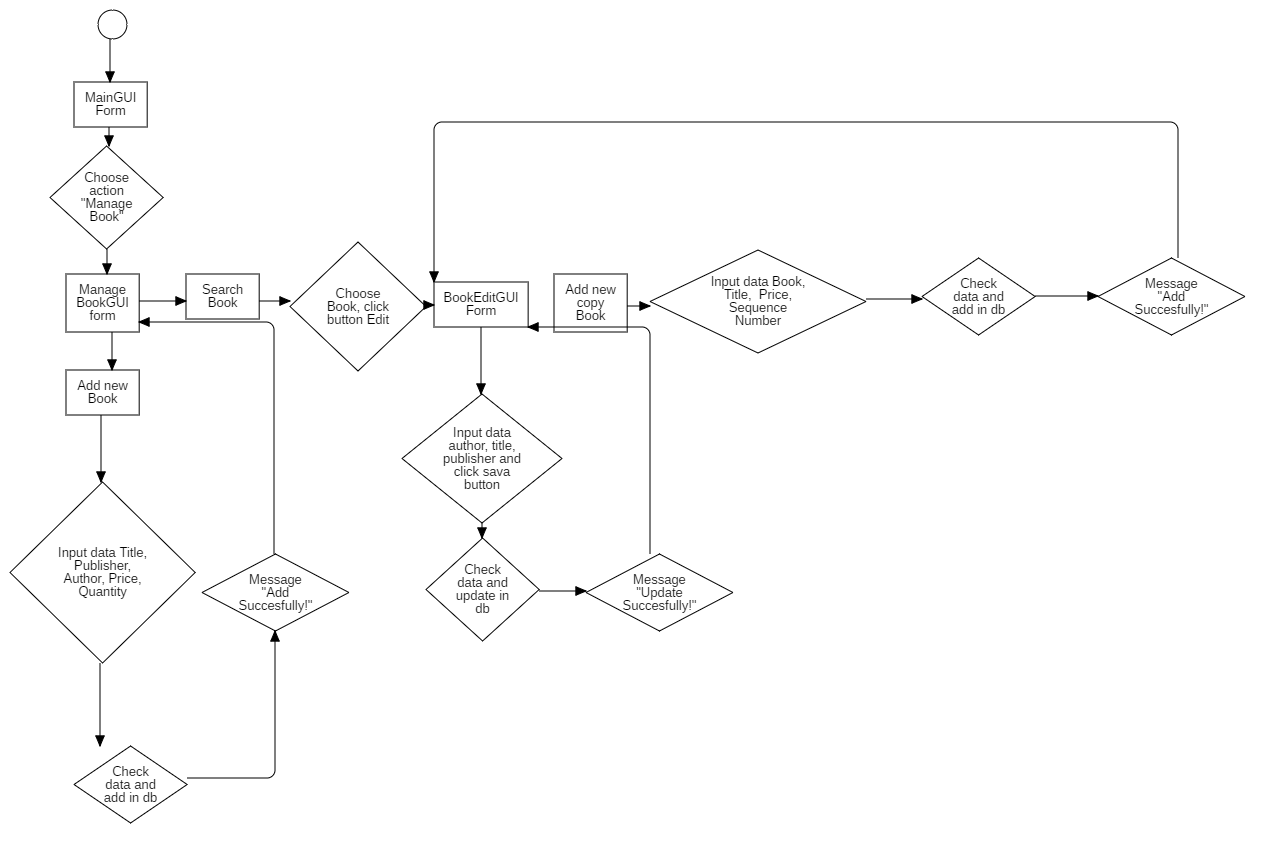


## 2.4. Activity diagrams of use case scenarios

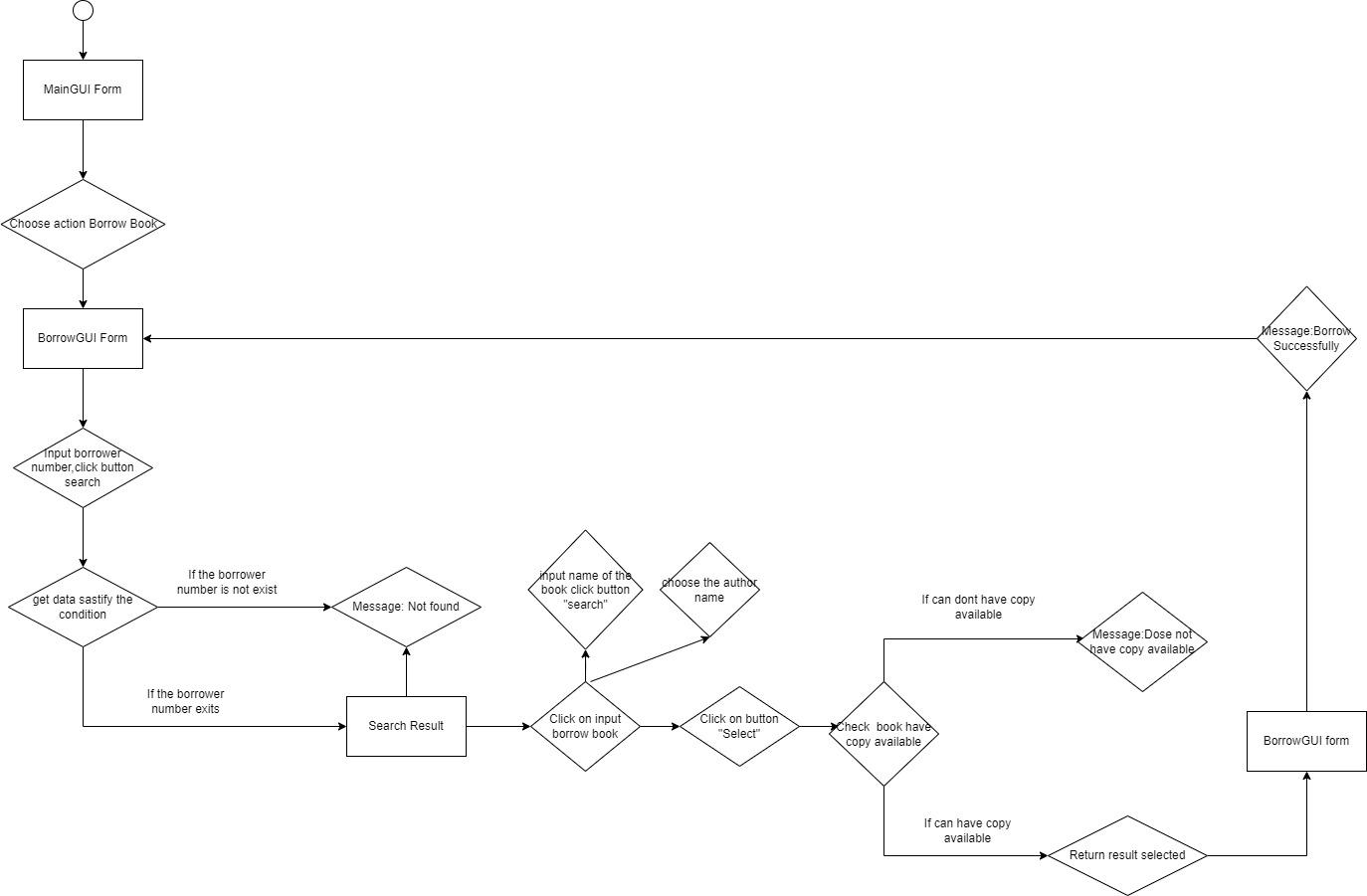
### 2.4.1. Activity diagram for use case “Login”



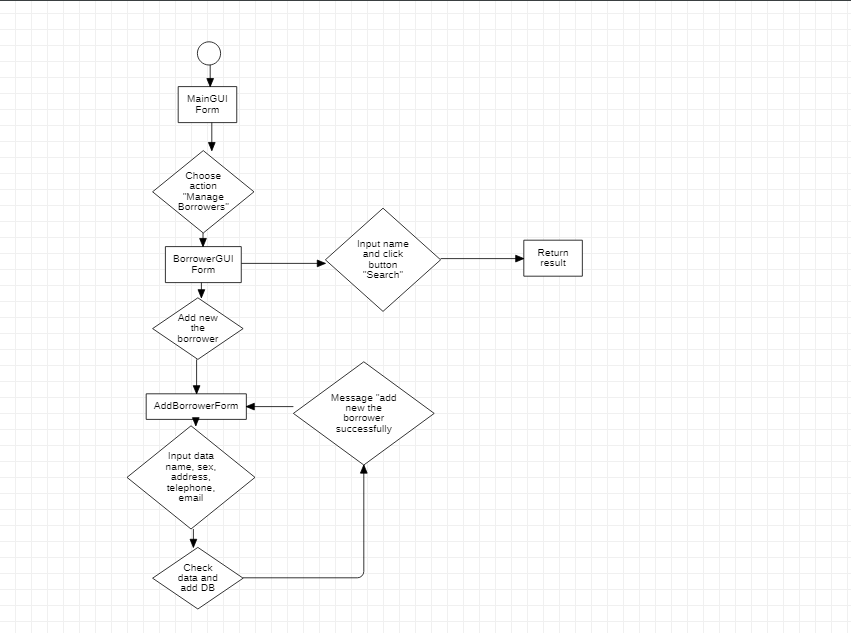
### 2.4.2. Activity diagram for use case “Manage the Book”

****

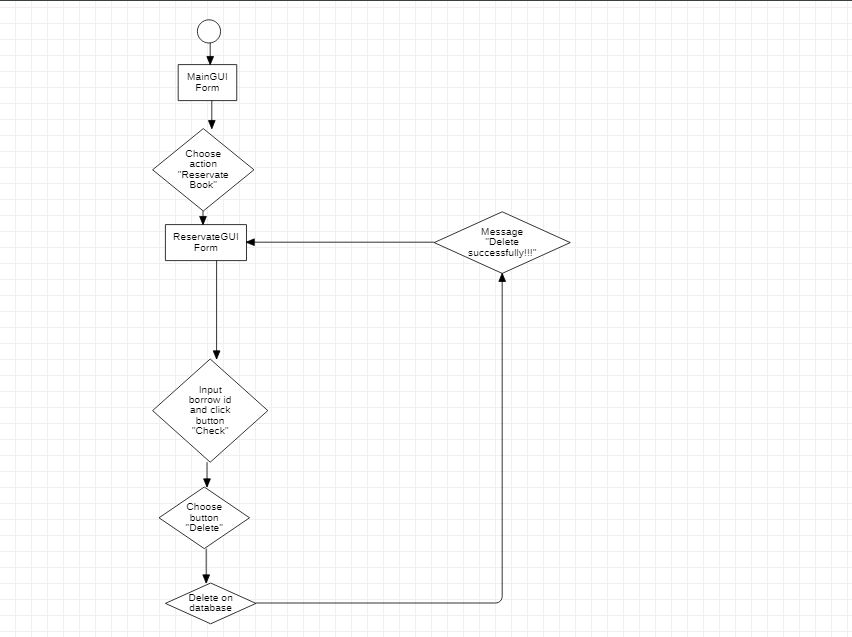
### 2.4.3. Activity diagram for use case “Borrow Book”

****

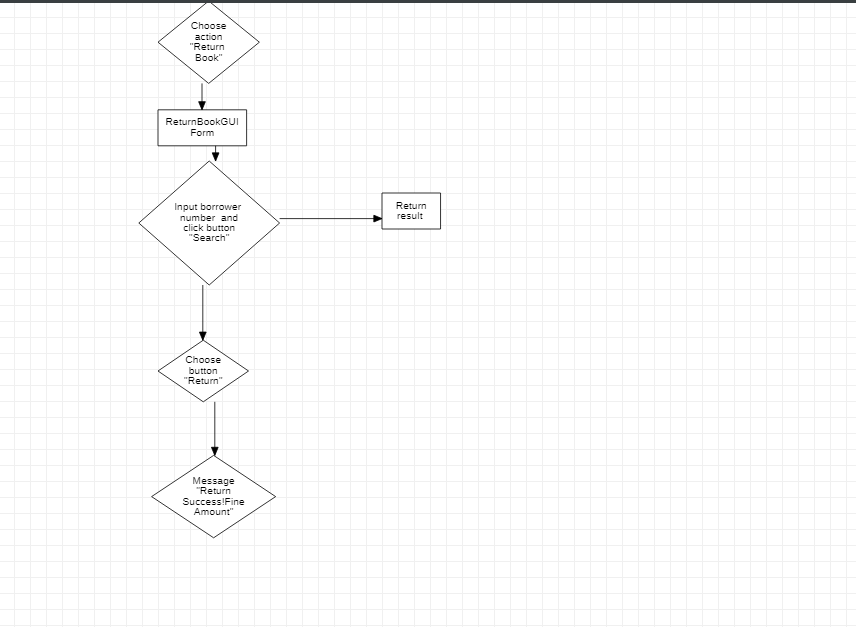
### 2.4.4. Activity diagram for use case “Manage the Borrowers”



### 2.4.5. Activity diagram for use case “Reservate Book”

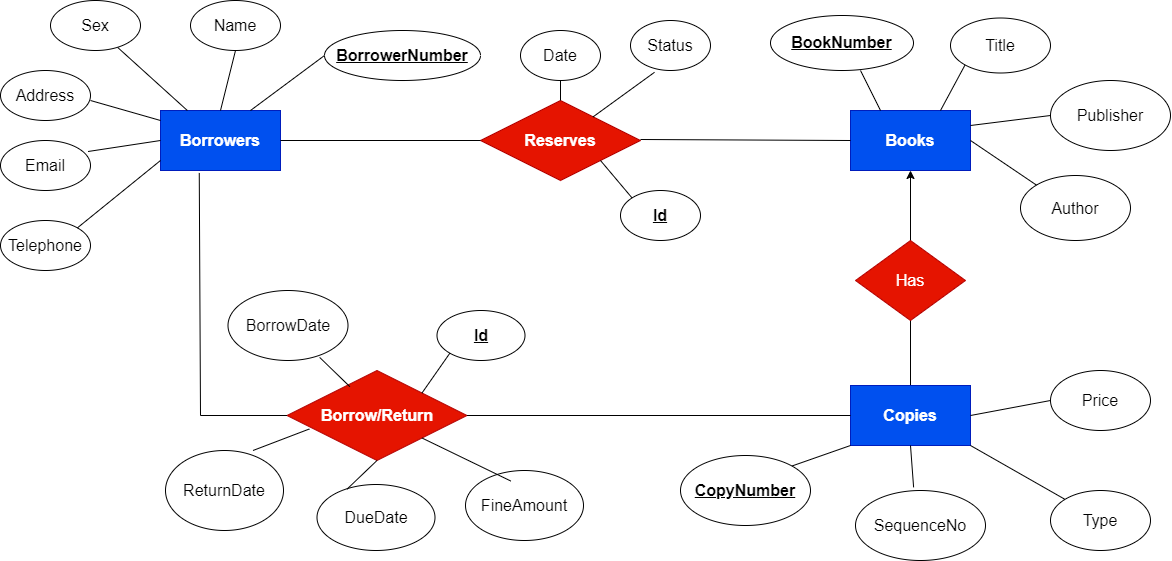


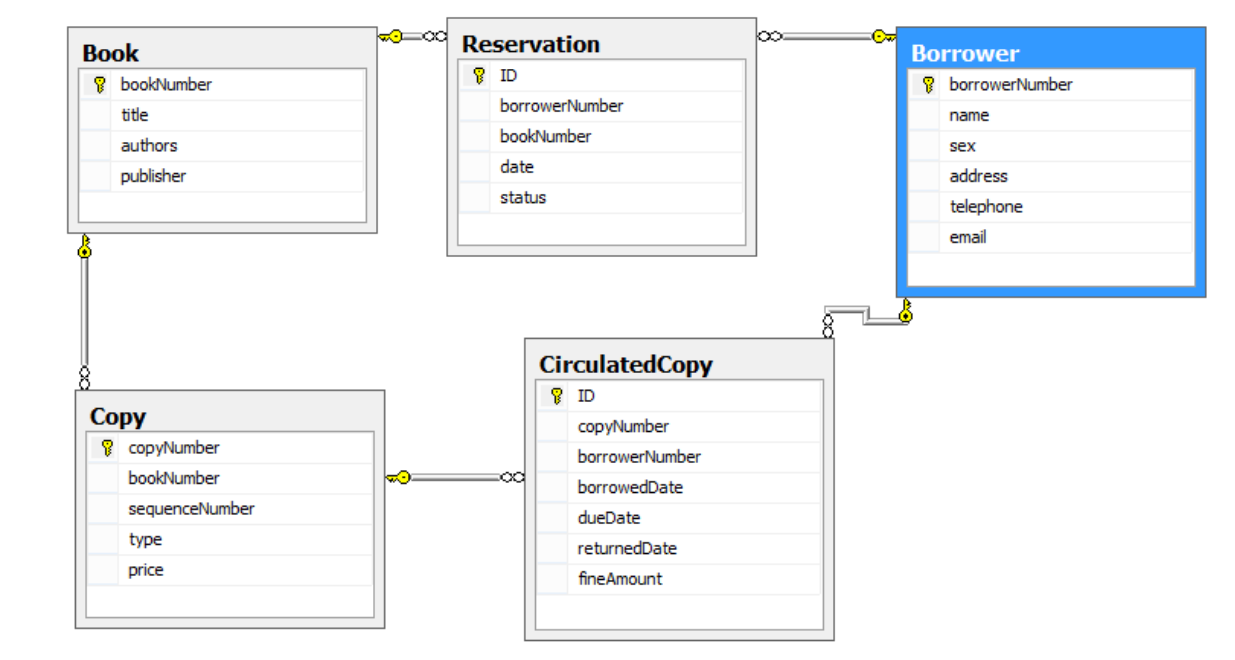
### 2.4.4. Activity diagram for use case “Return Book”



# Data model

## Entity Relationship Diagram

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### 3.2 Class Diagram

### Table name: Book

| **Field name** | **Type** | **Size** | **Note** |
| --- | --- | --- | --- |
| bookNumber | Integer | 10 | Primary key |
| title | String | 40 | Not null |
| authors | Integer | 40 | Not null |
| publisher | Integer | 10 | Not null |

### Table name: Copy

| **Field name** | **Type** | **Size** | **Note** |
| --- | --- | --- | --- |
| copyNumber | Integer | 10 | Primary key |
| sequenceNumber | Integer | 10 | Not null |
| type | String | 100 | Not null |
| bookNumber | Integer | 10 | Foreign key, refers to Book table |

### Table name: Borrower

| **Field name** | **Type** | **Size** | **Note** |
| --- | --- | --- | --- |
| borrowerNumber | Integer | 10 | Primary key |
| name | String | 100 | Not null |
| sex | bit | 1 | Not null |
| address | String | 100 | Not null |
| telephone | String | 100 | Not null |
| email | String | 100 | Not null |

### 

### Table name: Reservation

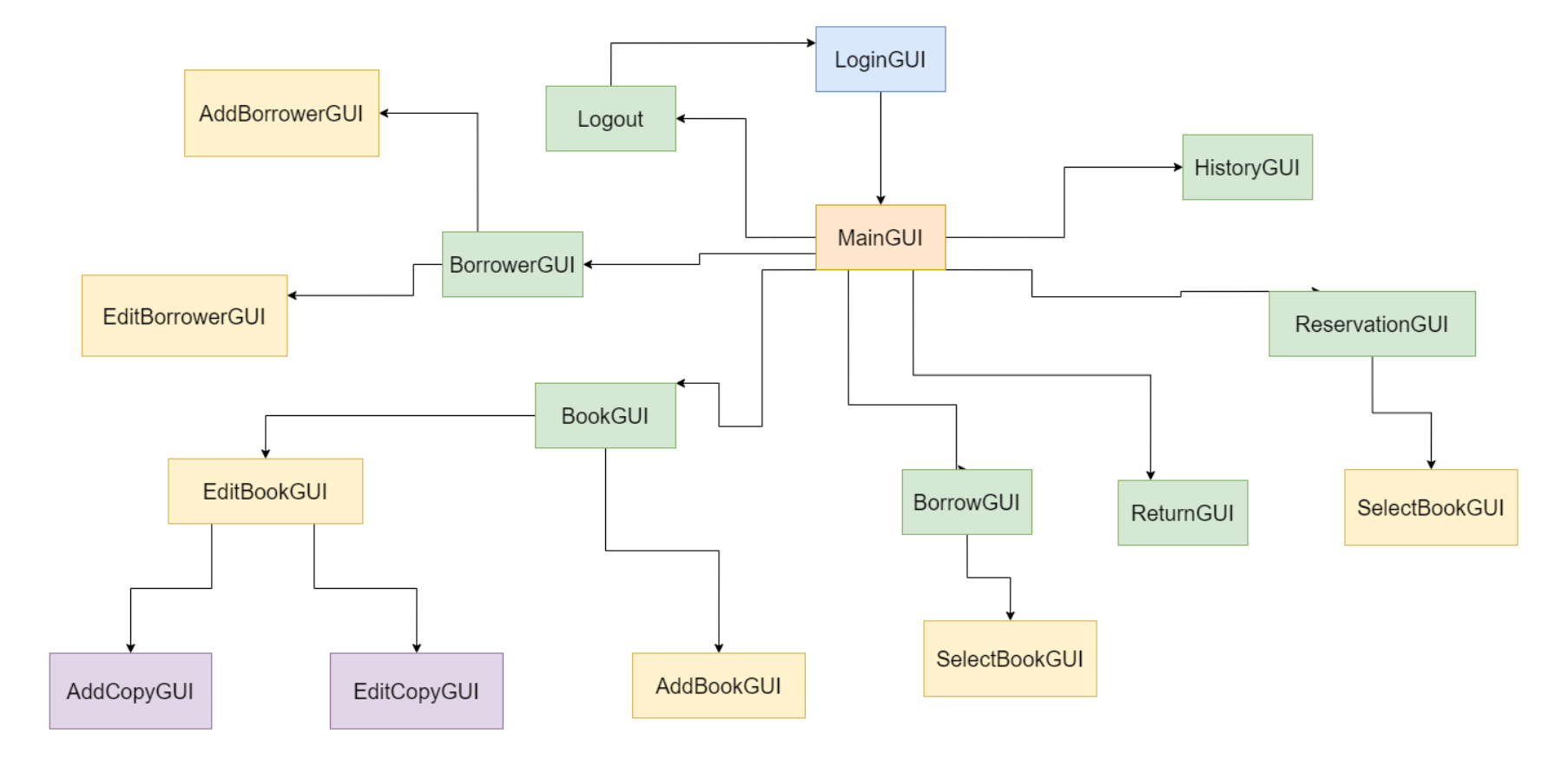
| **Field name** | **Type** | **Size** | **Note** |
| --- | --- | --- | --- |
| ID | Integer | 10 | Primary key |
| date | DATE |  | Null |
| status | bit | 40 | Null |
| borrowerNumber | Integer | 10 | Foreign key, refers to Borrower table |
| bookNumber | Integer | 10 | Foreign key, refers to Book table |

### Table name: CirculatedCopy

| **Field name** | **Type** | **Size** | **Note** |
| --- | --- | --- | --- |
| ID | Integer | 10 | Primary key |
| copyNumber | Integer | 10 | Null |
| borrowedDate | DATE |  | Null |
| dueDate | DATE |  | Null |
| returnedDate | DATE |  | Null |
| fineAmount | Integer | 10 | Null |
| borrowerNumber | Integer | 10 | Foreign key, refers to Borrower table |

# 4.User Interface Model Design

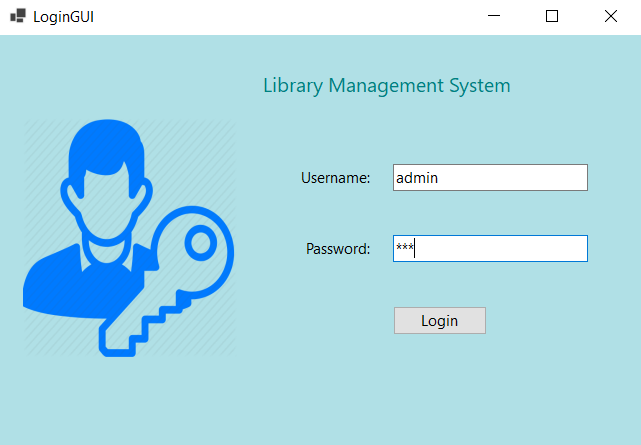
# 4.1 Flow of forms

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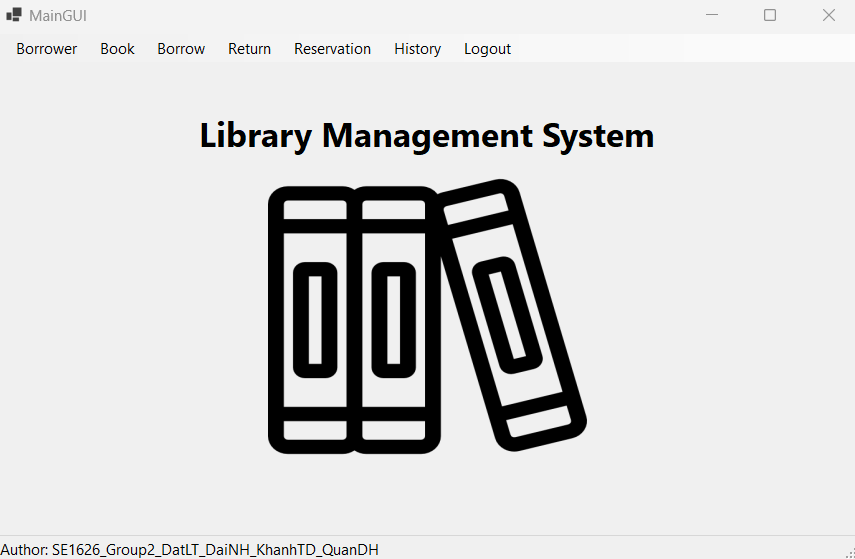
## 4.2 User interface model design

### 4.2.1. Screen “LoginGUI Form”

* Enter user name and password.
* Click the button “Login” and the system will check the account in the json file.
* If Username and password are correct the system will go to main form.

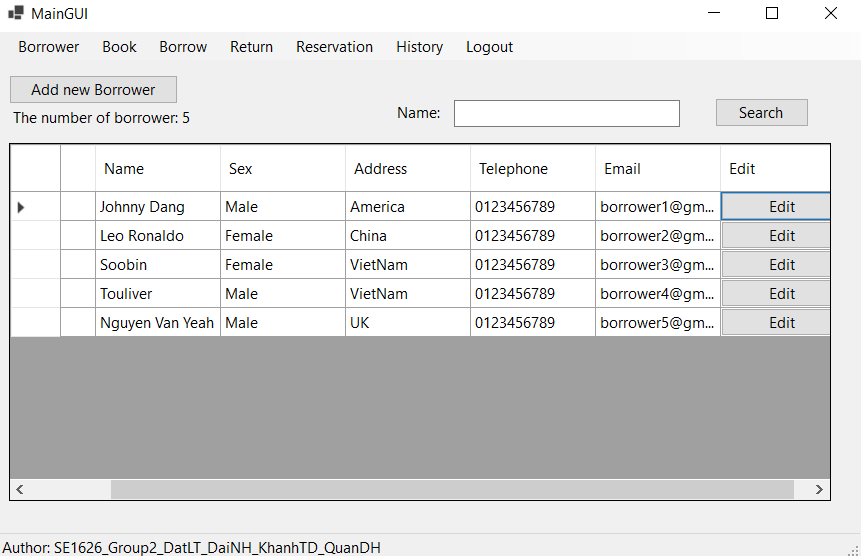
   
*Login form mockup*

### 4.2.2. Screen “MainGUI Form”

* Display All Menu of the system in the taskbar. Introduction about the system.  
    
   *Main form mockup*

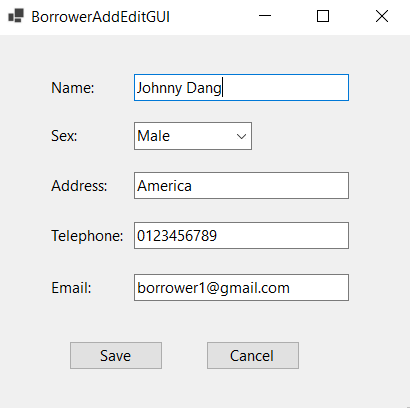
### 4.2.3. Screen “BorrowerGUI Form”

* This form will display all borrowers in the system.



*Borrower form mockup*

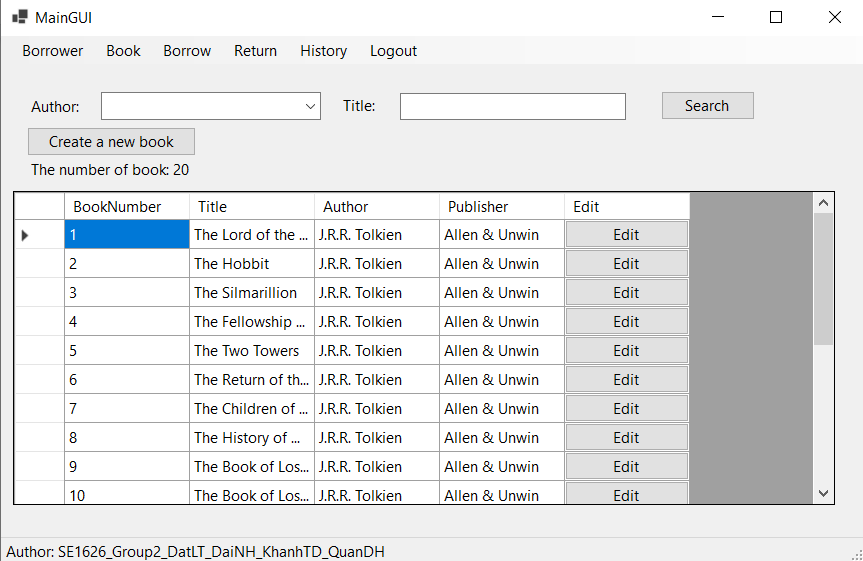
* The librarian can Edit/Add new borrowers.



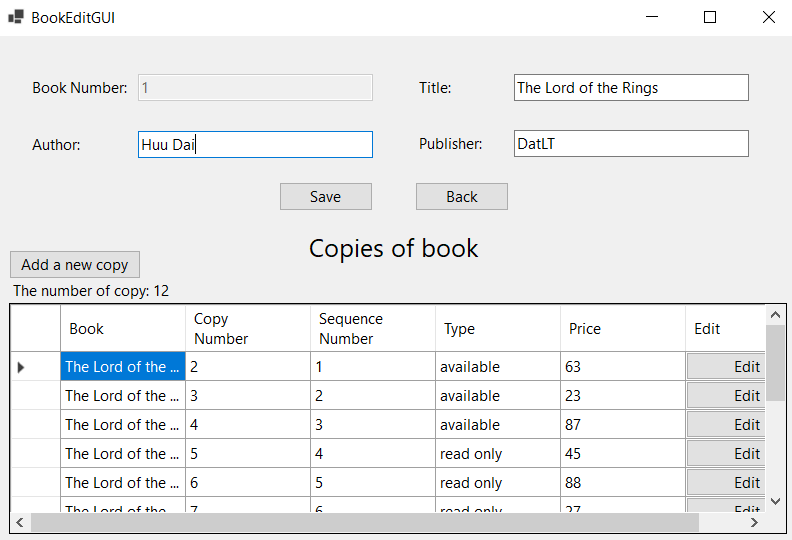
*BorrowerAddEdit form mockup*

### 4.2.4. Screen “BookGUI Form”

* View all books in the system

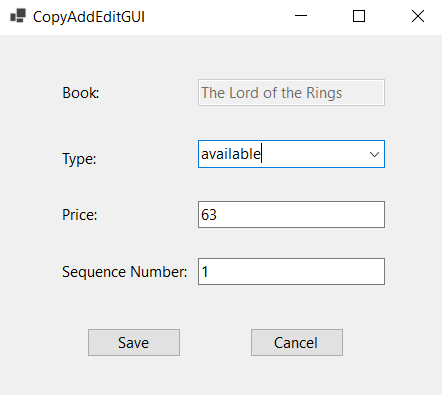
  
*Book form mockup*

- Edit details of each book, books copied when click on edit button.

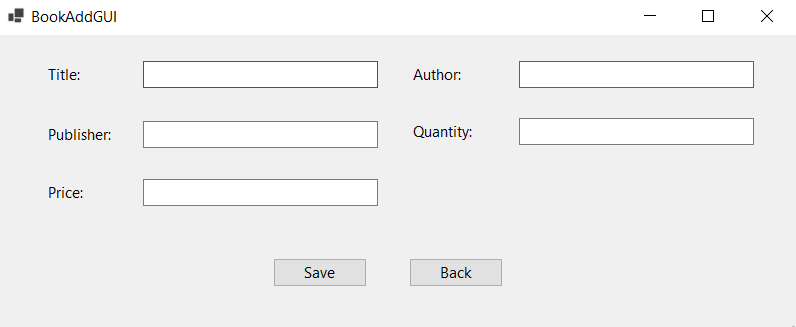


*Book Edit form mockup*

* Can Edit/Add a copy.



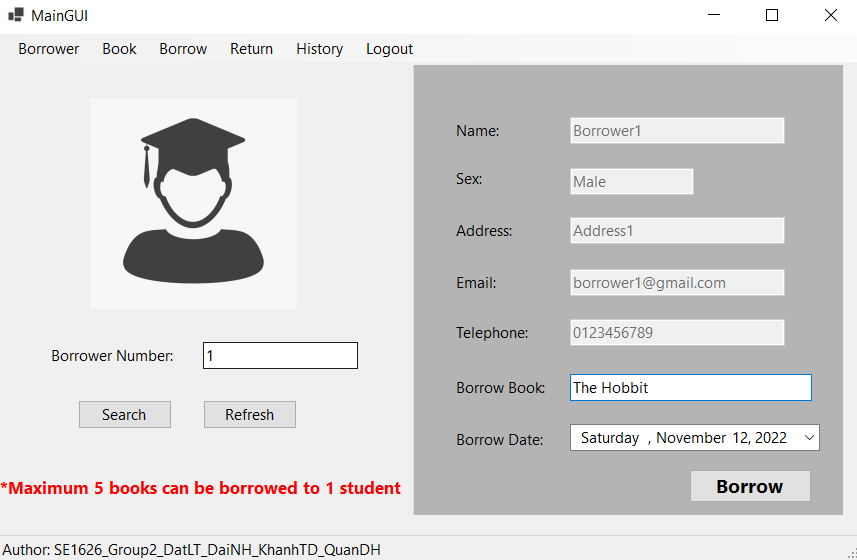
*CopyAddEdit form mockup*

* Can Add a new book or a new copy of the book.
* 

*Add book form mockup*

### 4.2.5. Screen “BorrowGUI Form”

* System will confirm the borrower and book details. If book status is available The librarian will then take the reserved copy and loan it out to the borrower.

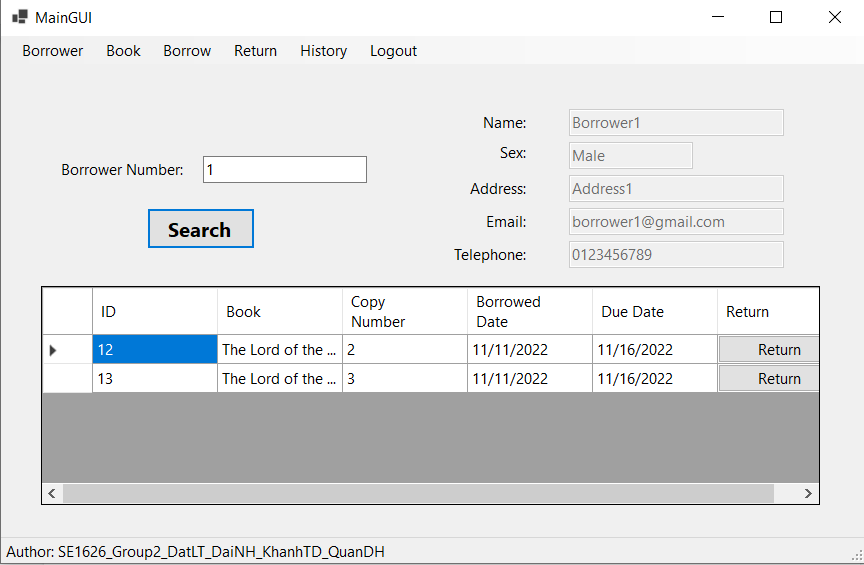


*Borrow form mockup*

* 1 Borrower can only take 5 books.
* A 2 week loan period is allowed per book
* If all available copies are out, the reservation will be created.

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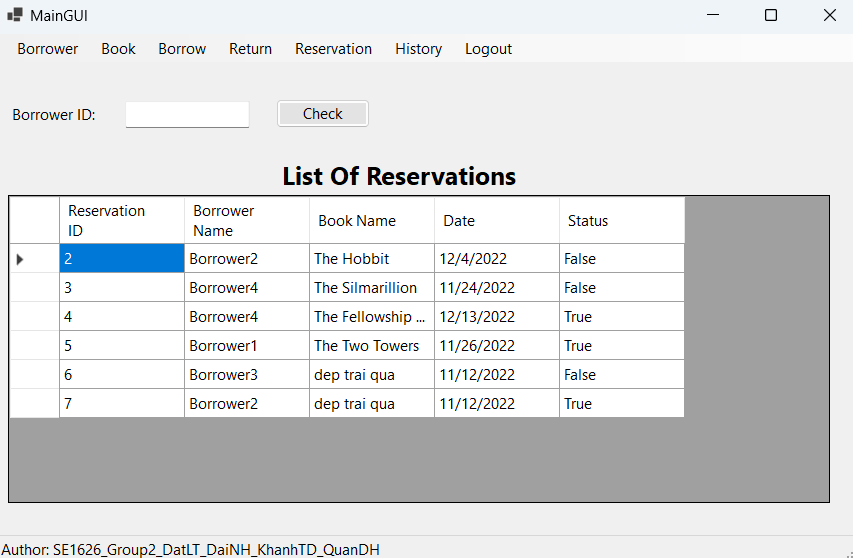
### 4.2.6. Screen “ReturnGUI Form”



*Return form mockup*

* The librarian will check the book details. if the book is overdue, the borrower will have to pay a fine of 1 USD per day.
* The librarian will keep the copy if there is a reservation waiting for a copy and, a first come first served basis is used to assign to the borrower.

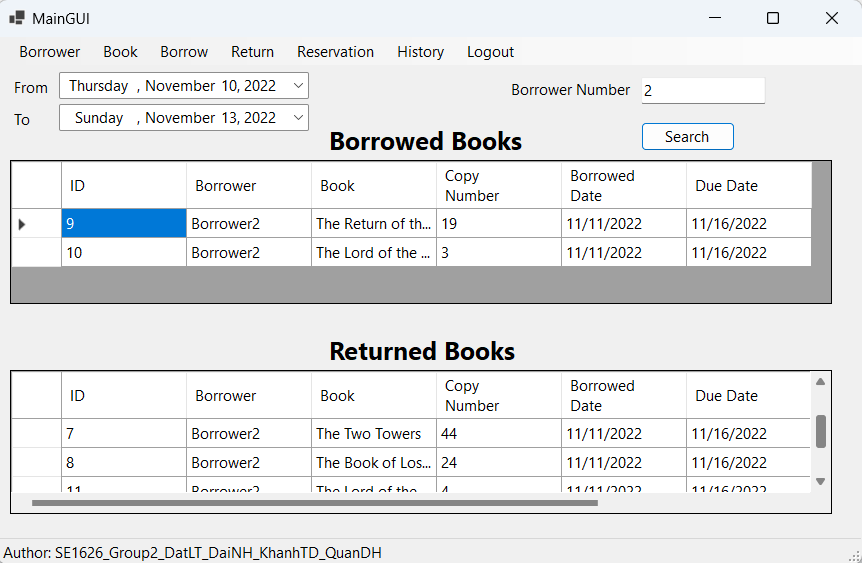
# 4.2.7. Screen “ReservationGUI Form”



*Reservation form Mockup*

* The librarian will check the borrower, if the borrower reserved, he can not borrow more. If the borrower did not reserve, book select will show to create a reservation.
* If the other borrower returns a book that is reserved, the status of that reservation will change to false. The borrower making the reservation will borrow that book.

# 4.2.8. Screen “HistoryGUI Form”



*History form mockup*

* The librarian can check history of borrowed and returned book