- SYSTEM DESIGN -

This application was developed to function on minimum human labor, saving time and labor at libraries. Therefore, this system was designed to intake minimum amount of data input from the librarian and to calculate all the rest of the details with the aid of the data stored in the database. This can be seen clearly in the process of receiving books -as mentioned in an example earlier- when only a valid Book ID is entered, the system is able to find whether the book was lent or not, if lent, whether there any fines, if there are fines, calculates the fines and asks whether to receive the amount now or later.

In addition to that, a good automation system should be able to correct mistakes made by users whenever possible. Some mistakes, such as entering a non-number into price field of a book, entering blank values, entering an invalid date into date of birth or sometimes entering data with single quotes (‘) or double quotes (“) in the text can crash the software if directly fed into the system. Therefore, each of the user’s input is checked for null values, prohibited characters and invalid data types and necessary errors and warnings are shown or necessary corrections are made at each input errors, preventing the system from crashing.

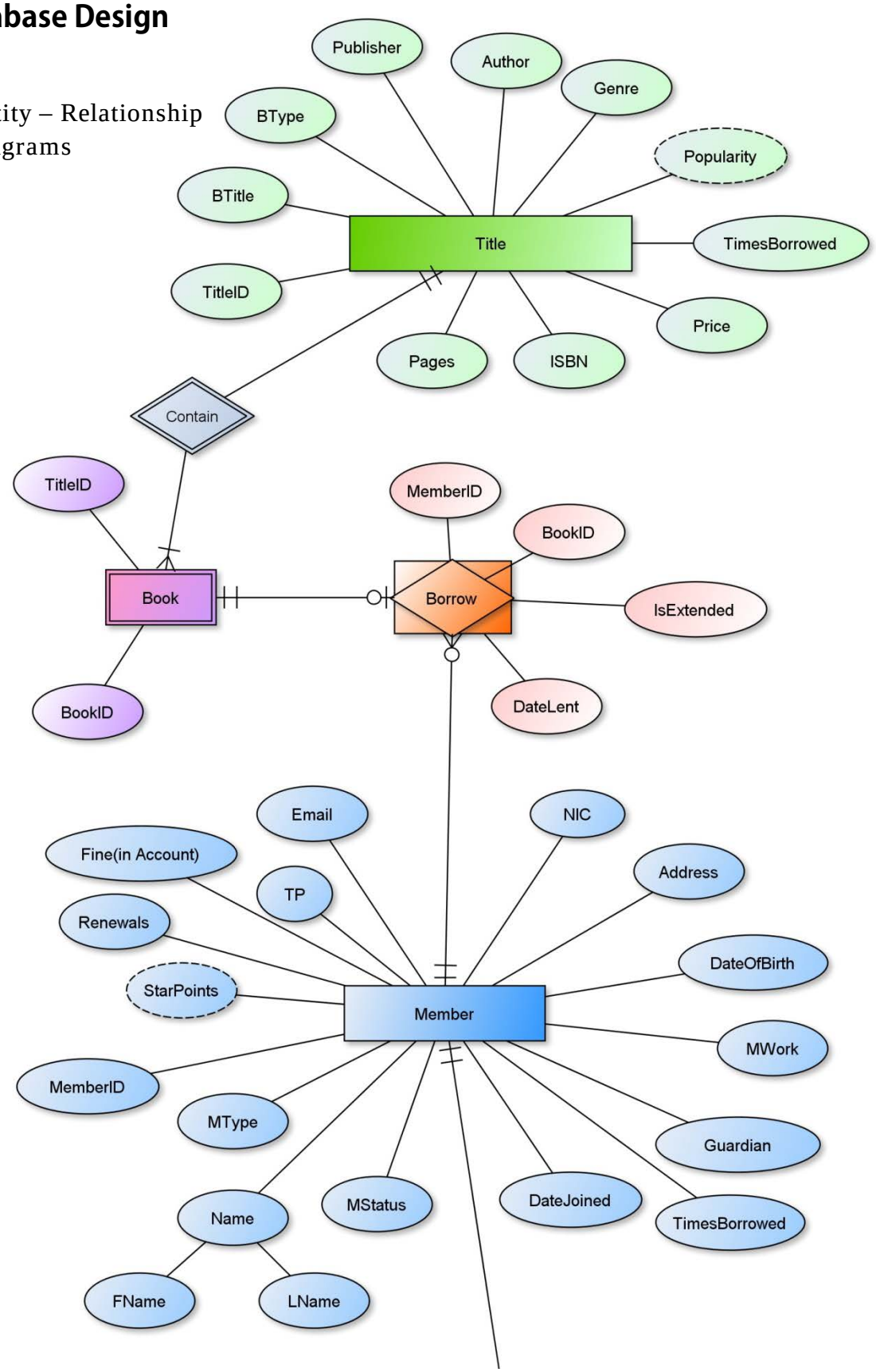
Therefore, it can be conclude that Alexandria is designed to look and feel simple and straightforward to a user, but built to perform complex, powerful calculations in the background, ensuring minimal data redundancy and minimal chances for software crashes when each of the processes are executed in the system.

Note on diagrams:

The following diagrams are the blueprints of Alexandria. The Entity Relationship diagram displays the Tables in the database and the relationships between them. Flowcharts show the processes take place when each activity is done in the application. These charts show how complicated the software is and how difficult it is to write all them into codes. Only the flowcharts for complicated processes are presented here. Since many of them are too large to be displayed clearly on papers, images with low resolution are given here. **For higher resolution images please check the ‘Documentation\System Design’ folder in the Project disk.**

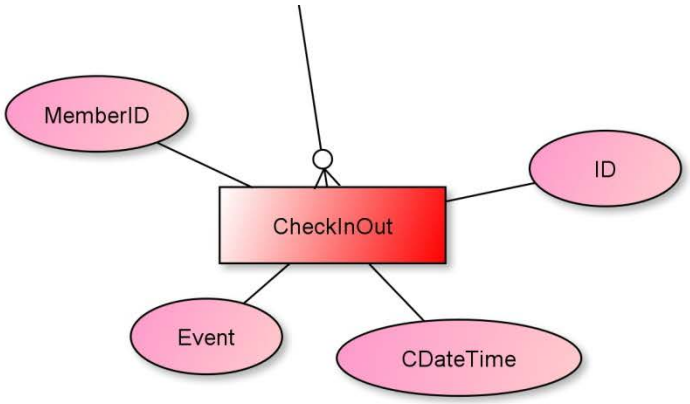
Database Design

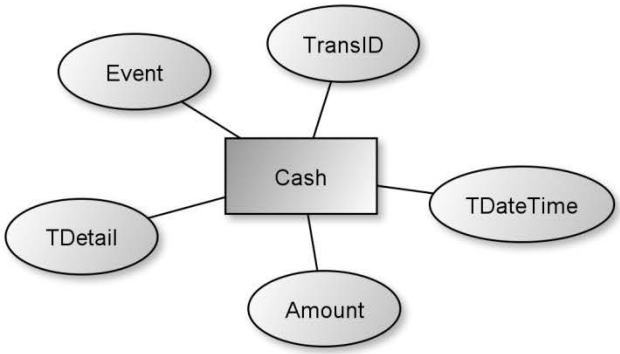
- Entity – Relationship Diagrams

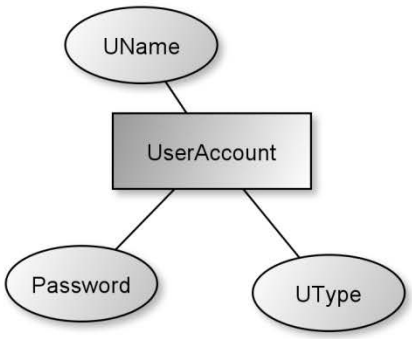


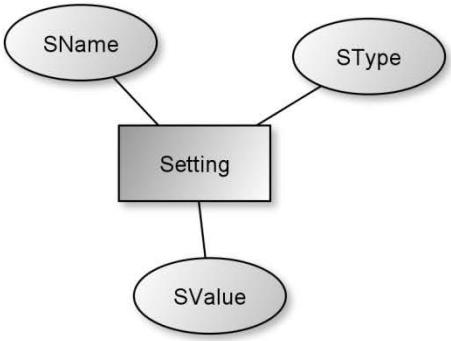
To: CheckInOut Entity
(next page)

From: Member Entity
(previous page)





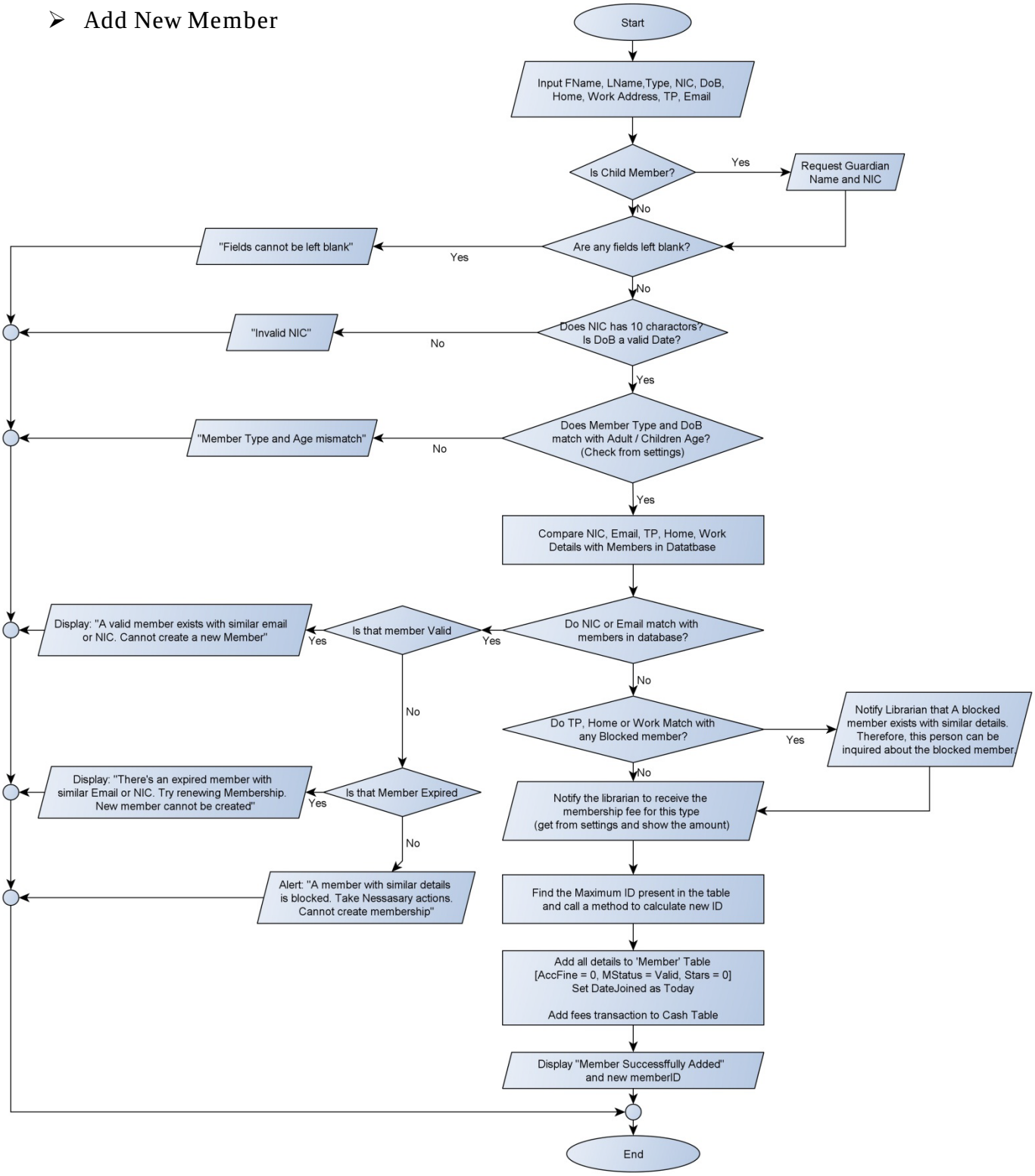




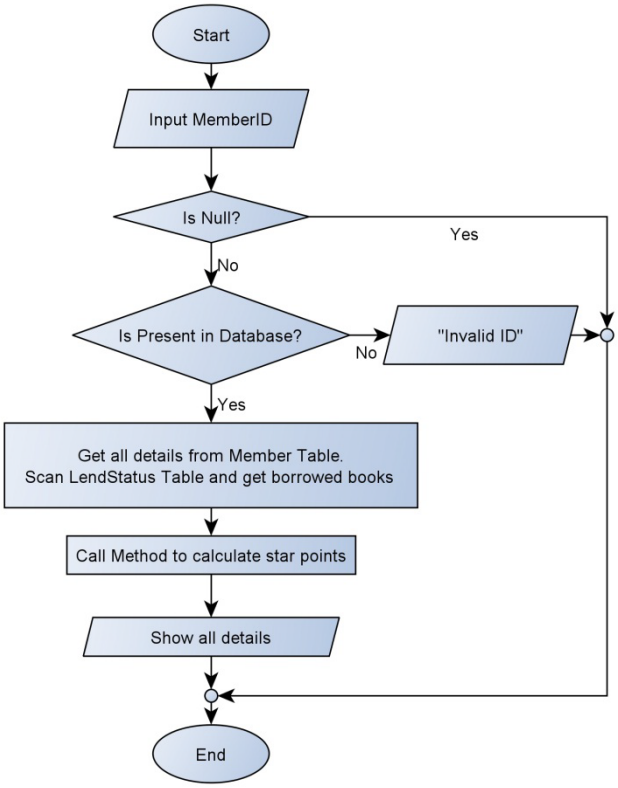
System Design: Flowcharts

- Managing Members -

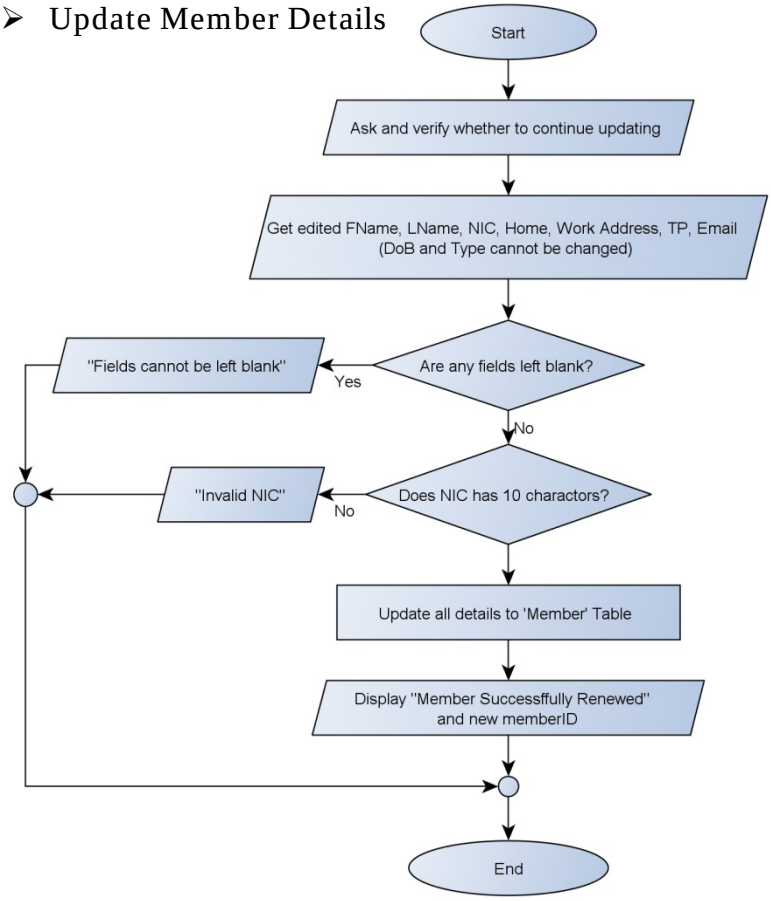
- Add New Member



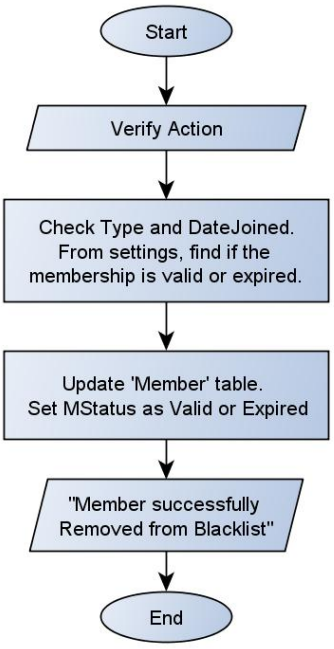
- Show Member Details



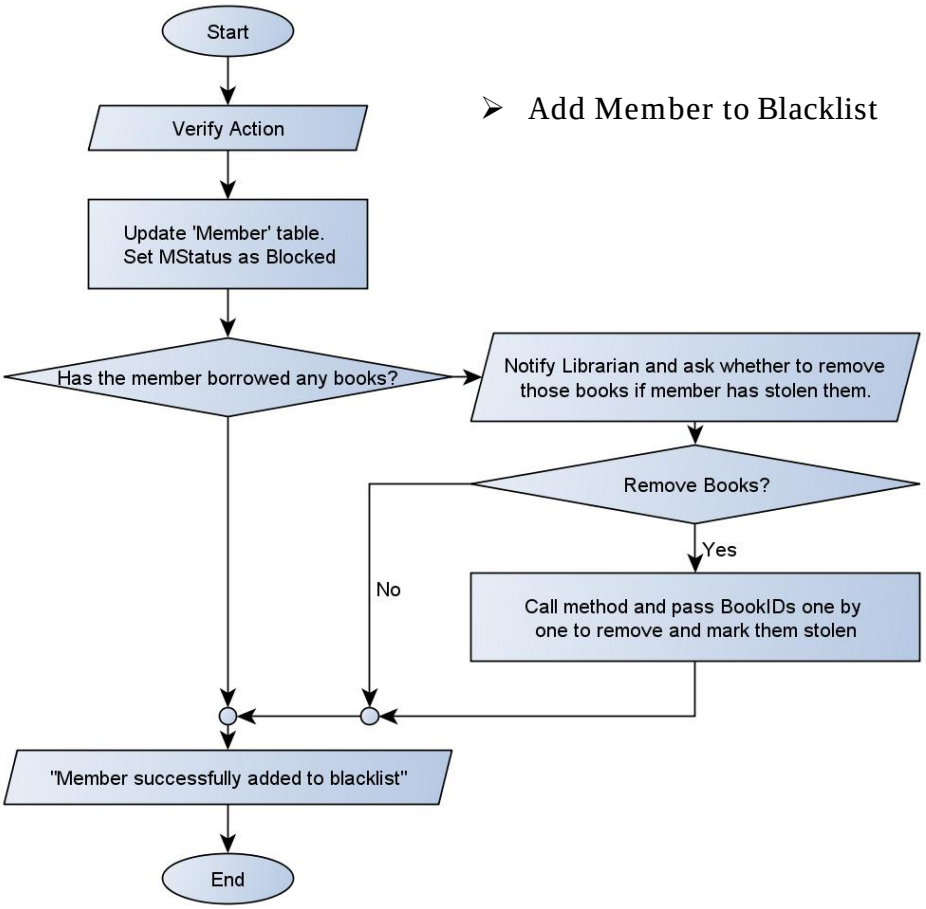
- Update Member Details



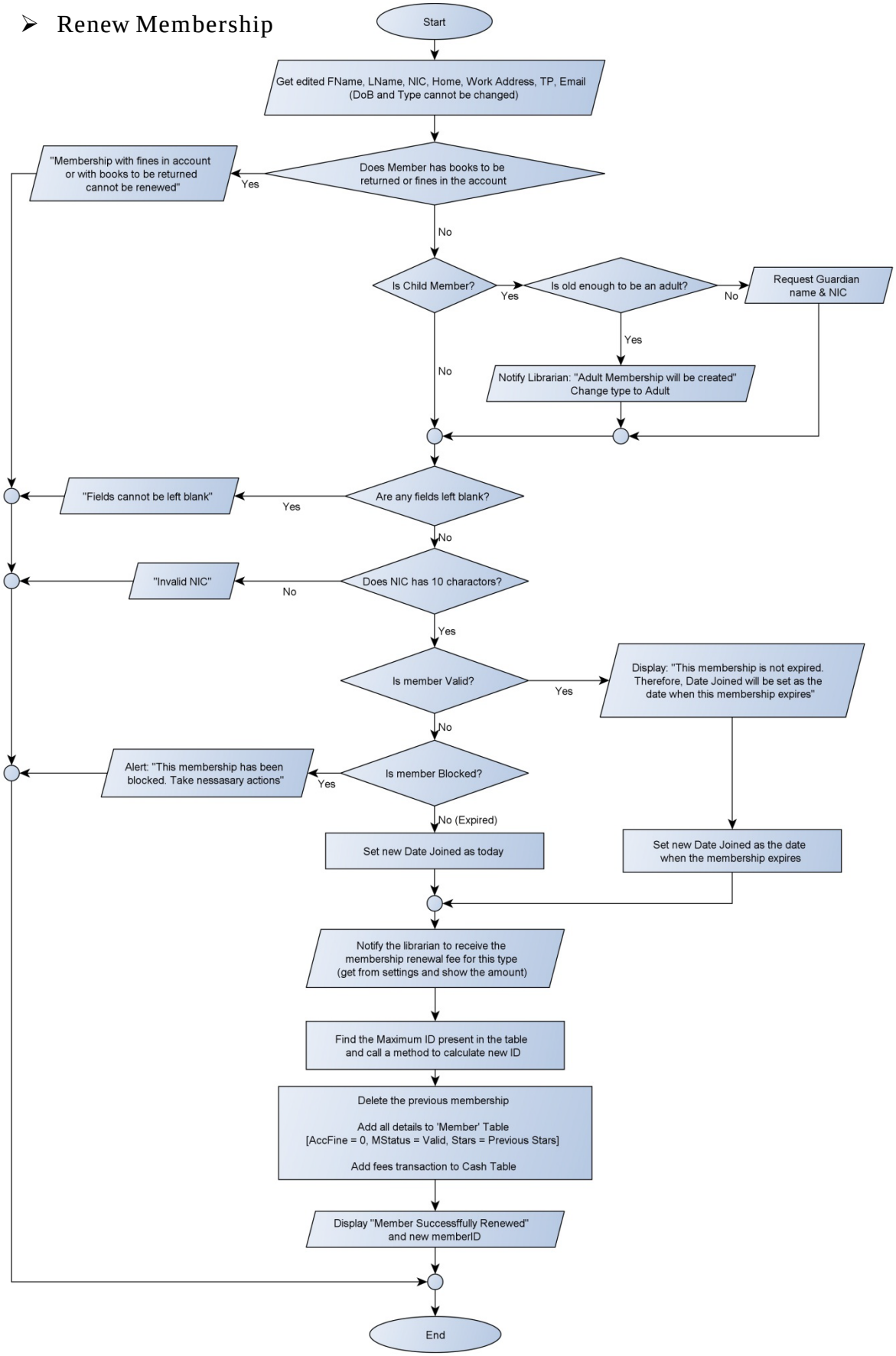
- Remove Member from Blacklist



- Add Member to Blacklist

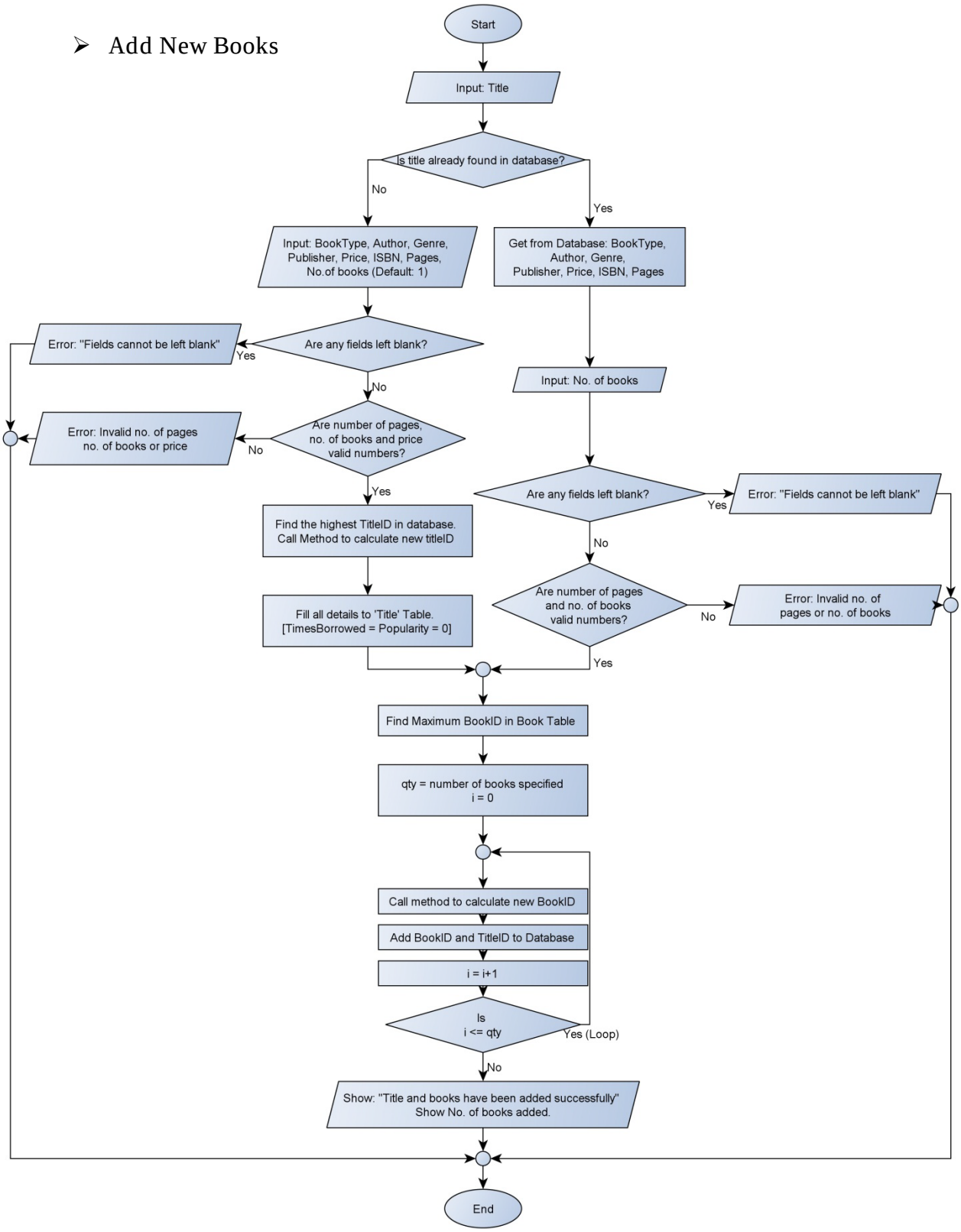


➢ Renew Membership

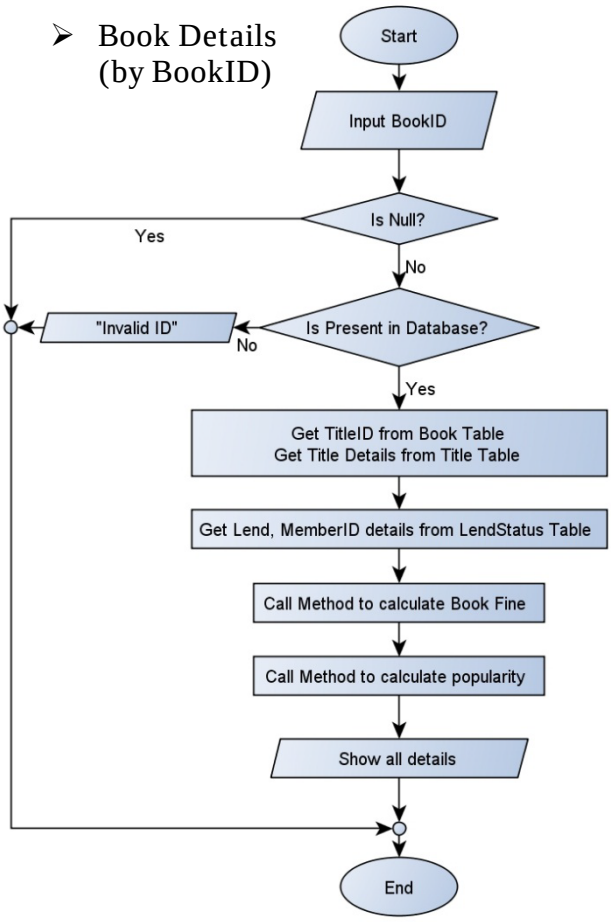


- Managing Boooks -

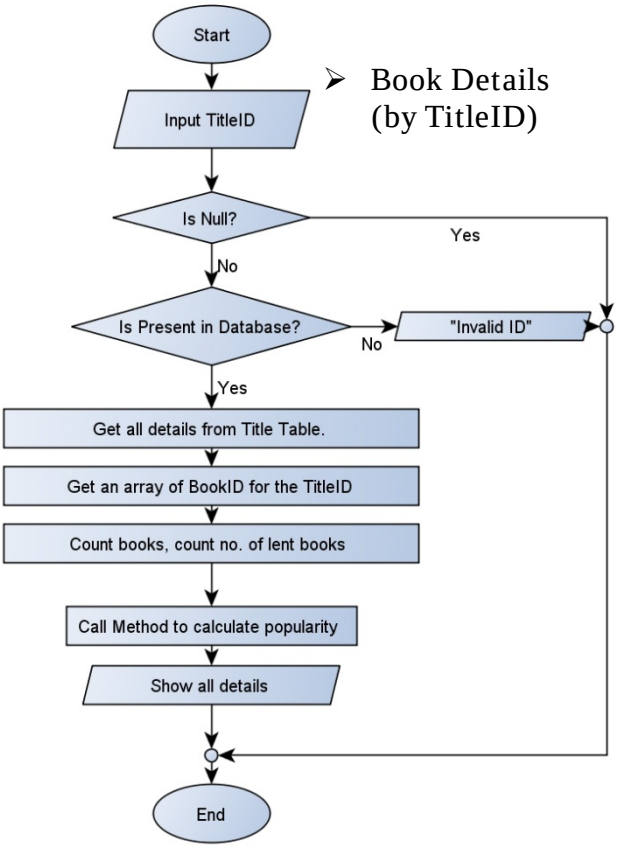
- Add New Books



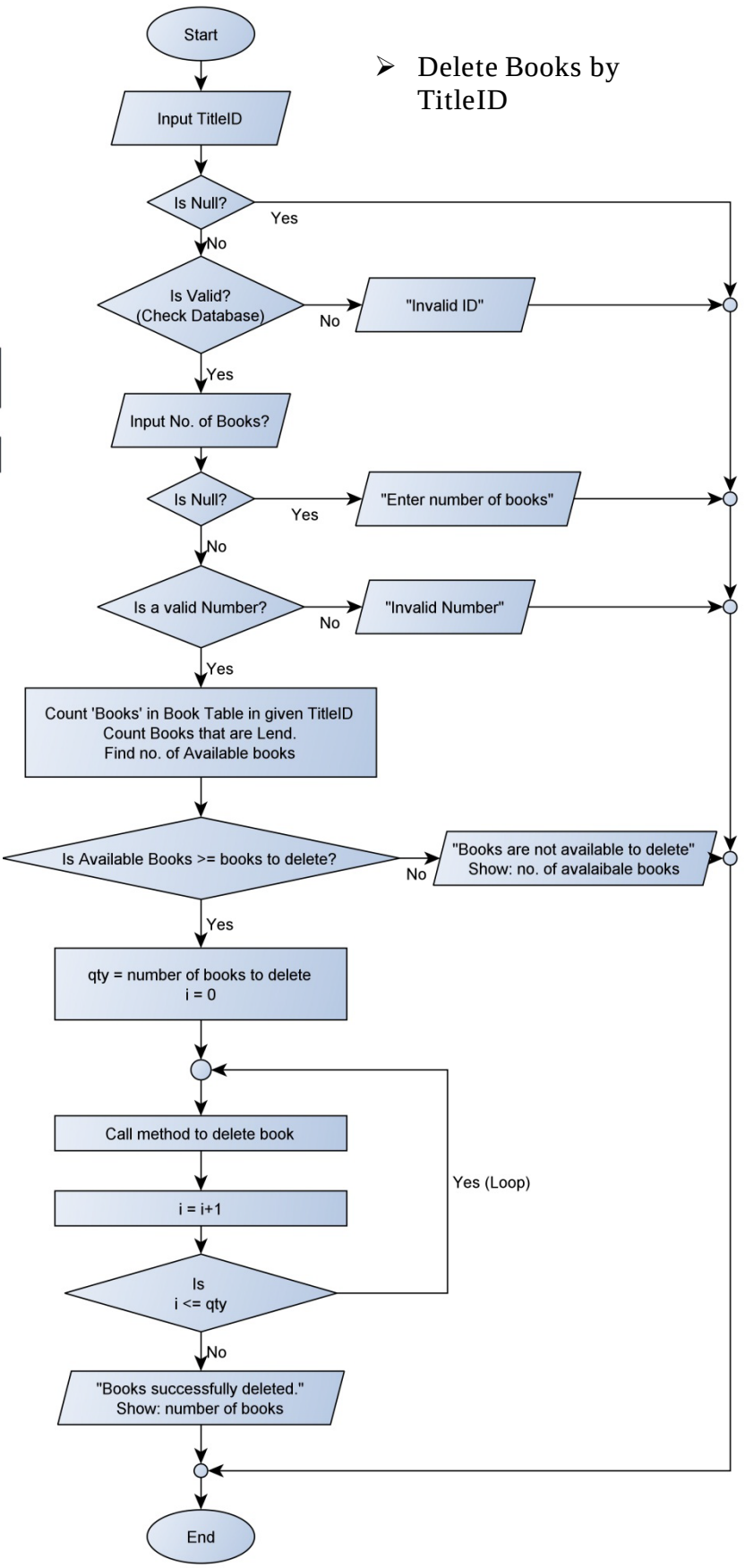
- Book Details (by BookID)



- Book Details (by TitleID)

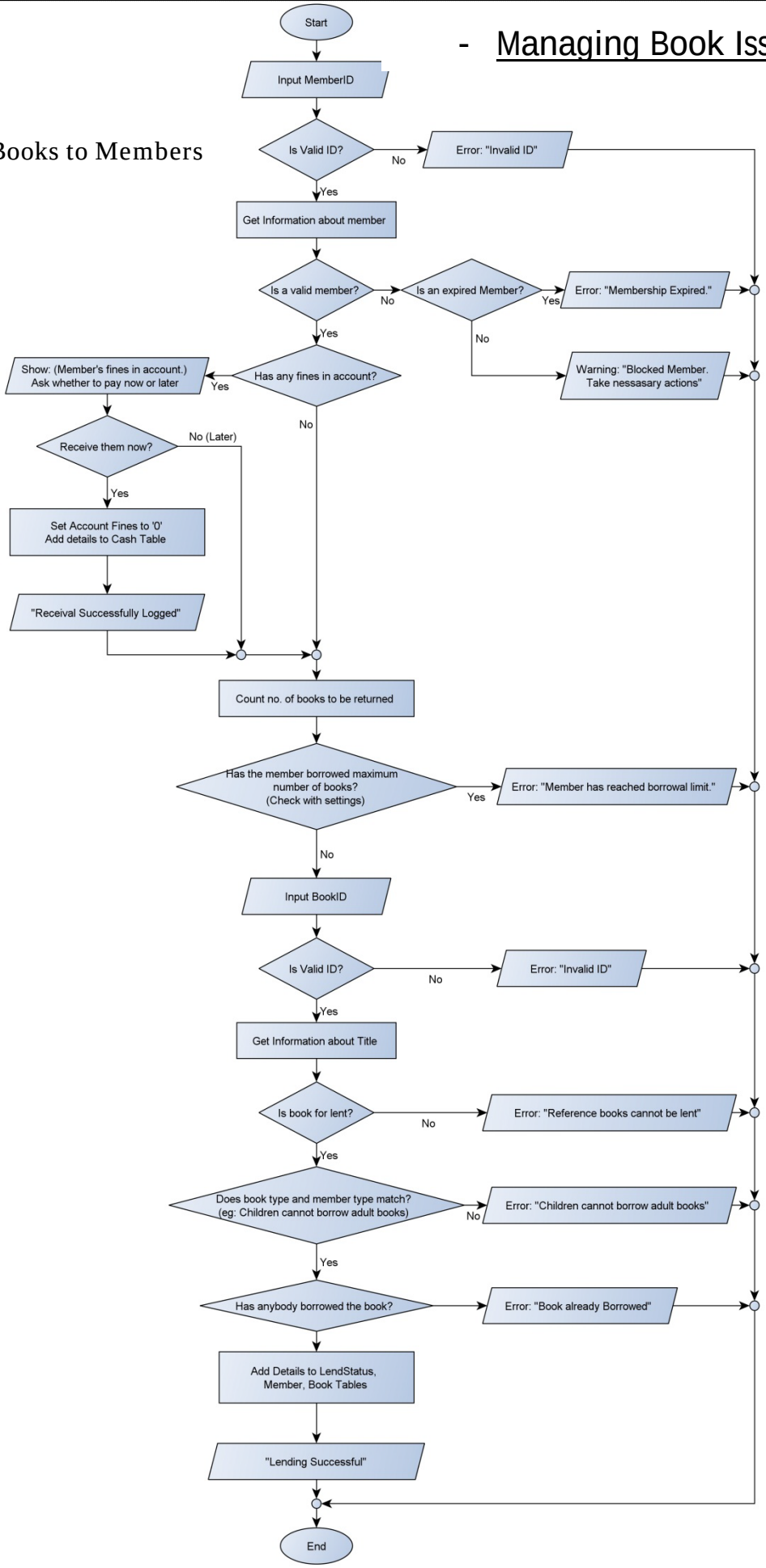


- Delete Books by TitleID

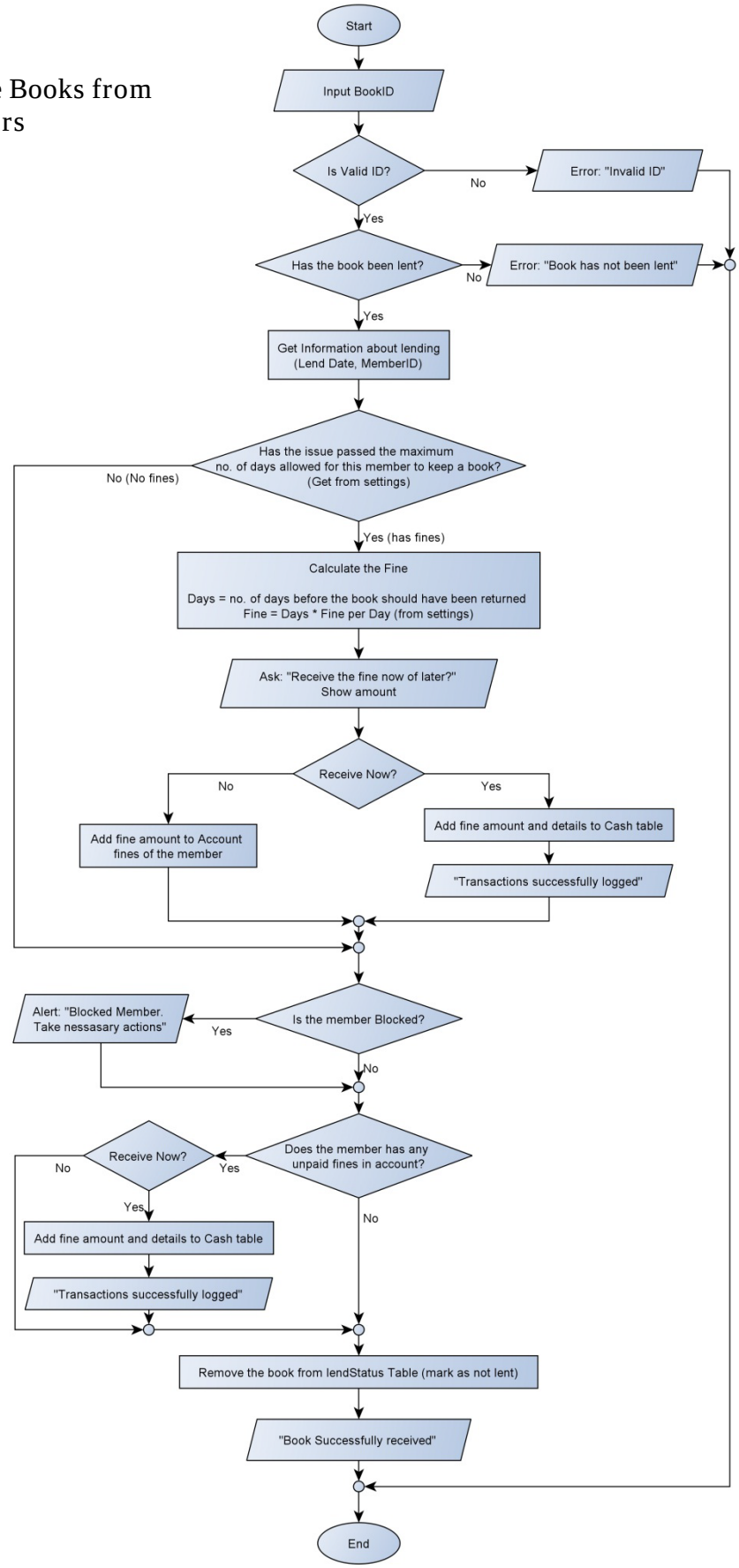


- Managing Book Issues -

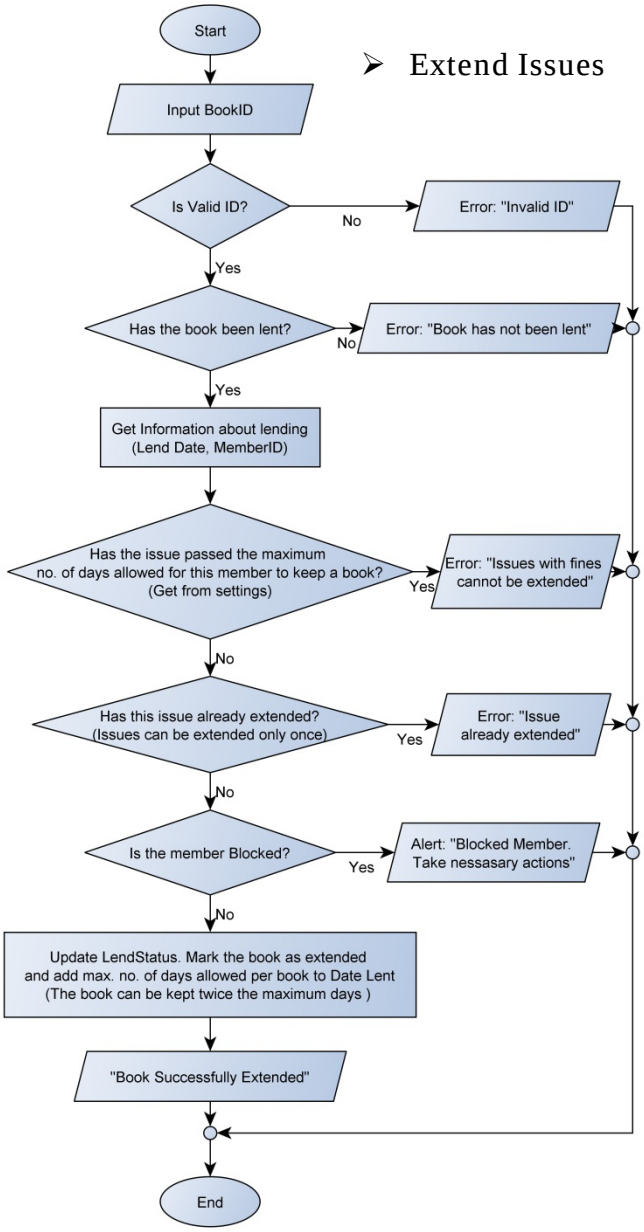
- Lend Books to Members



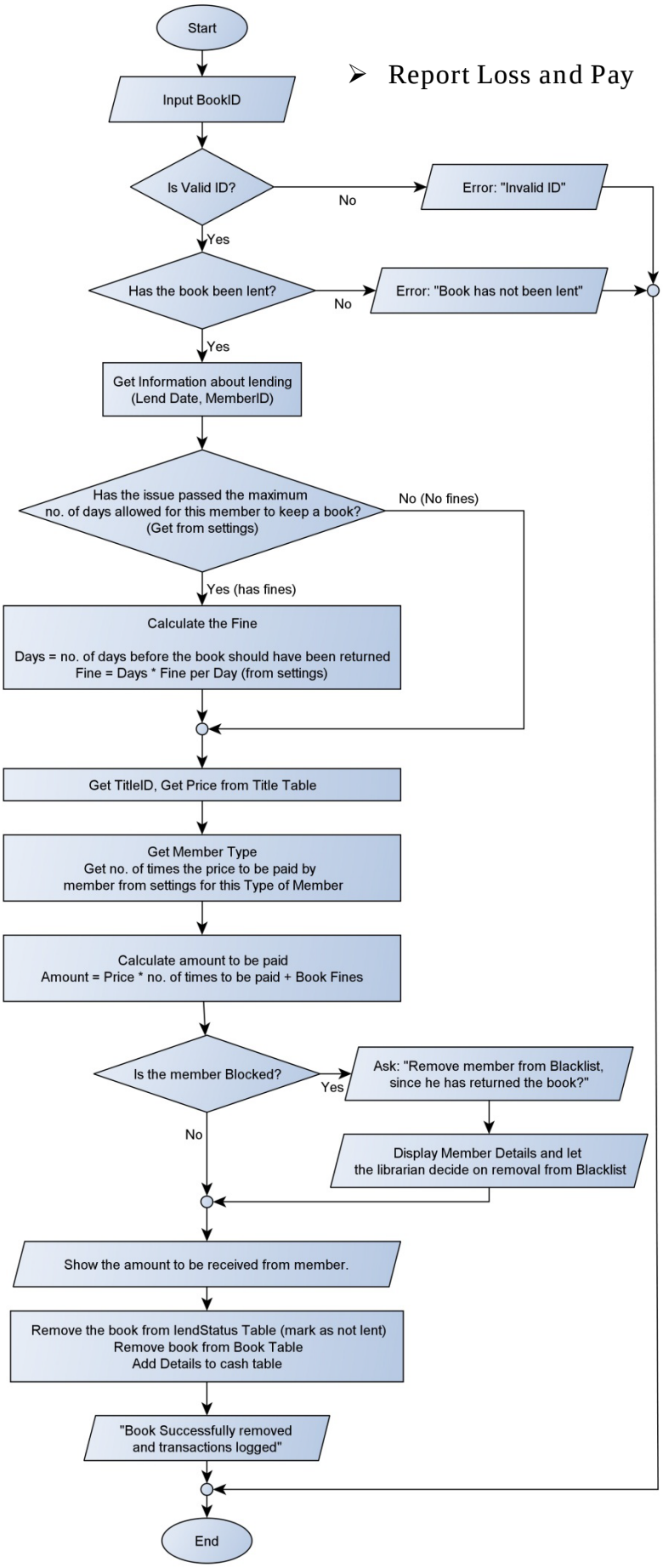
- Receive Books from Members



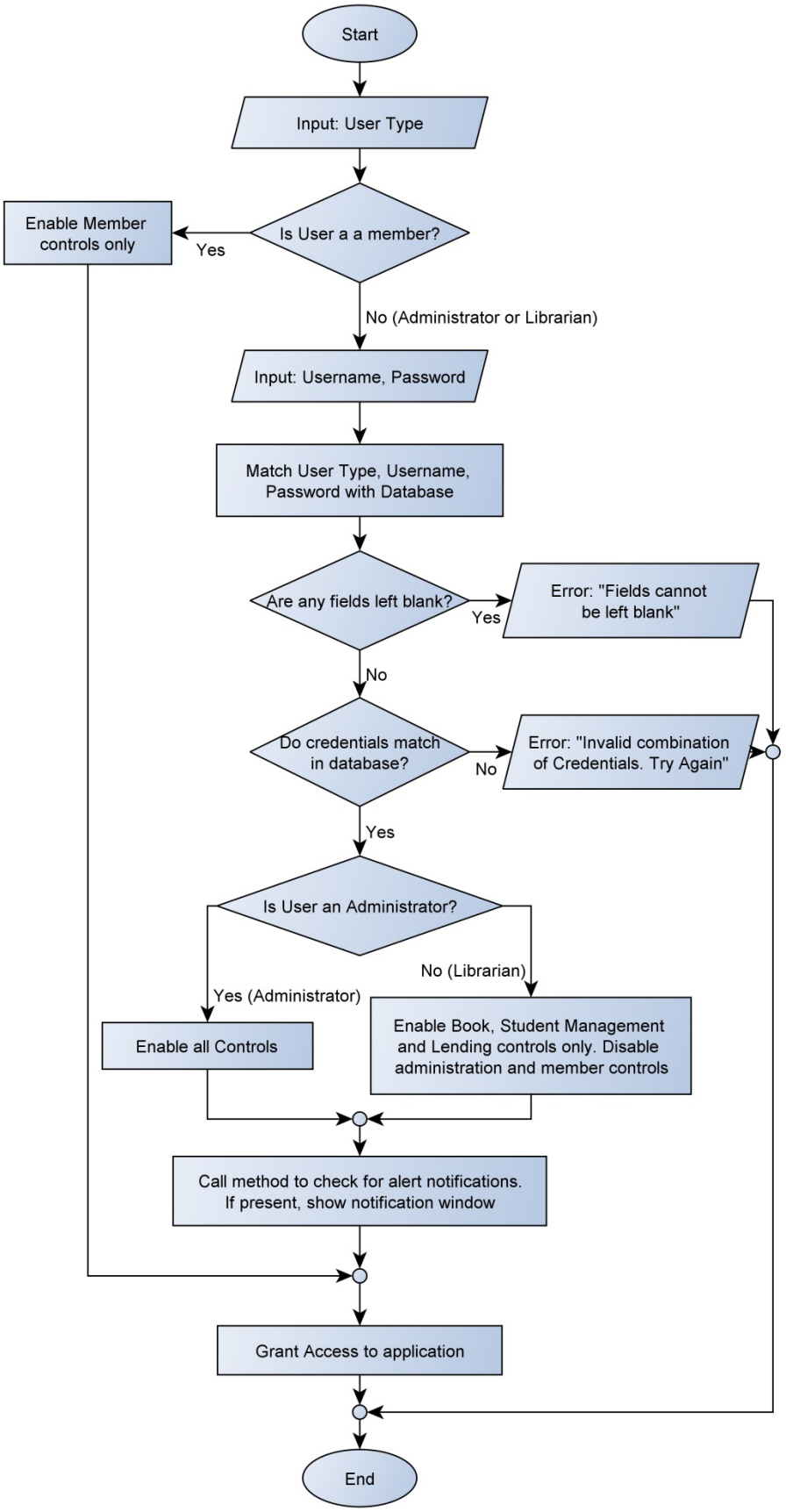
➢ Extend Issues



➢ Report Loss and Pay

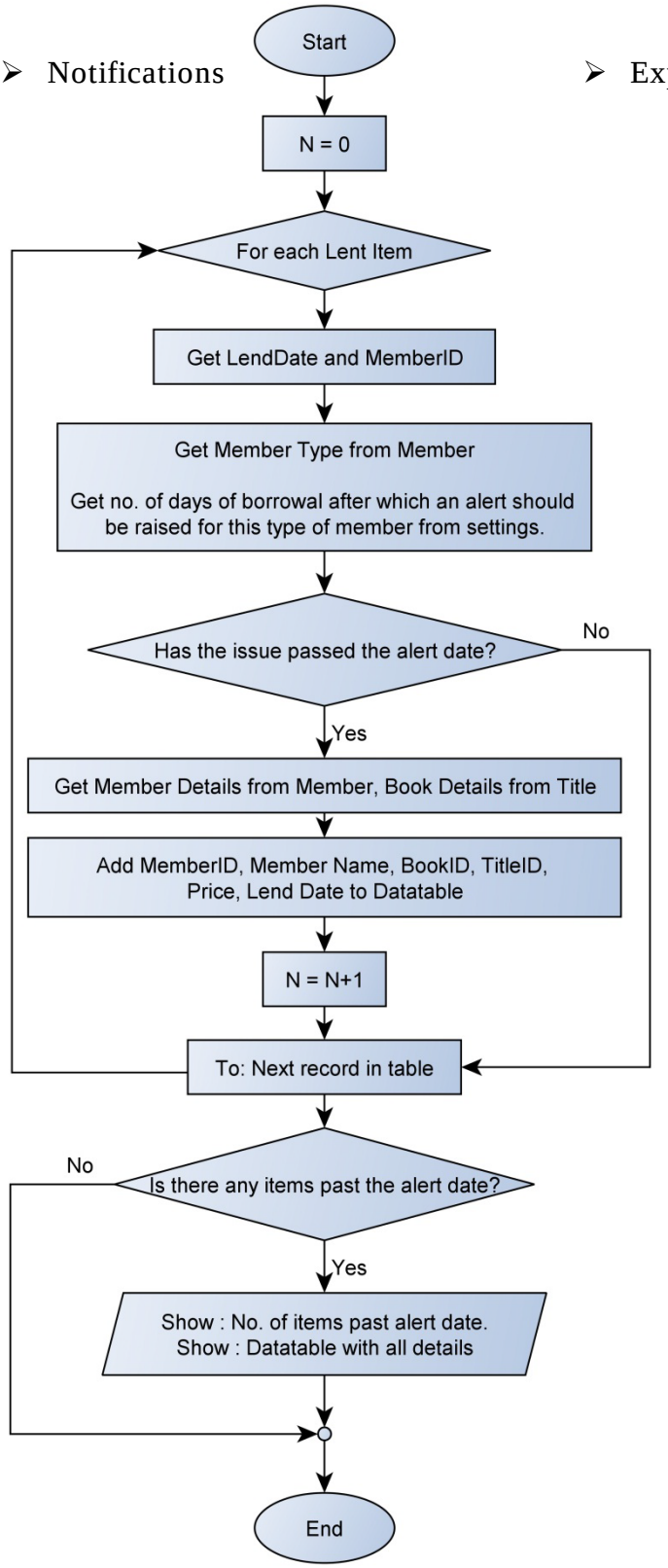


- User Login -

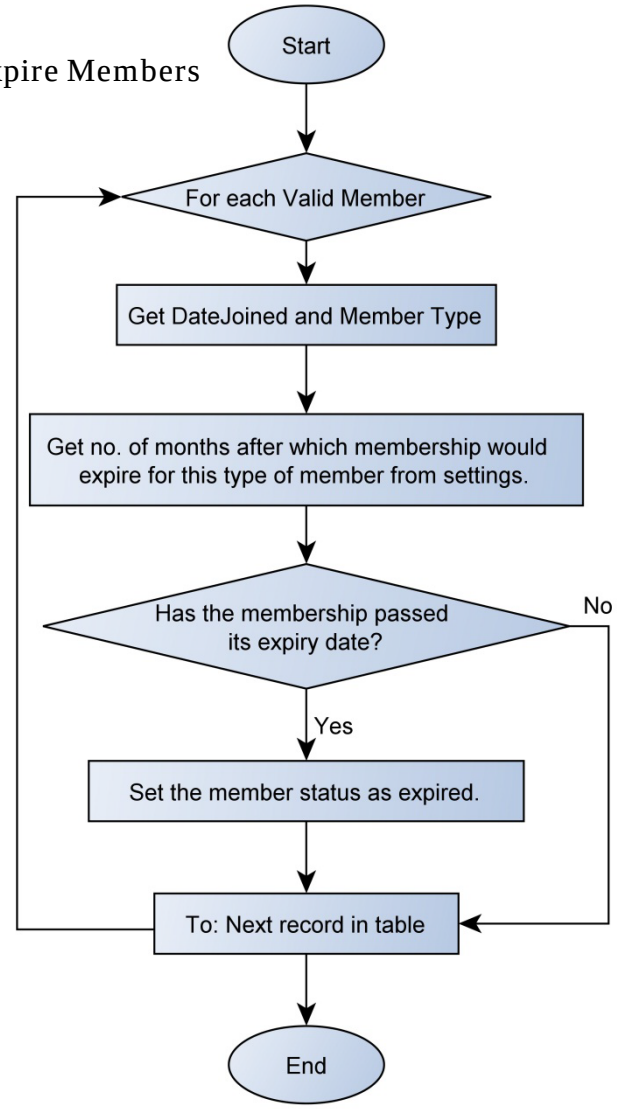

Start
Input: User Type
Is User a a member?
Yes
Enable Member controls only
No (Administrator or Librarian)
Input: Username, Password
Match User Type, Username, Password with Database
Are any fields left blank?
Yes
Error: "Fields cannot be left blank"
No
Do credentials match in database?
No
Error: "Invalid combination of Credentials. Try Again"
Yes
Is User an Administrator?
Yes (Administrator)
No (Librarian)
Enable all Controls
Enable Book, Student Management and Lending controls only. Disable administration and member controls
Call method to check for alert notifications. If present, show notification window
Grant Access to application
End

- Common Methods for Automatic tasks -

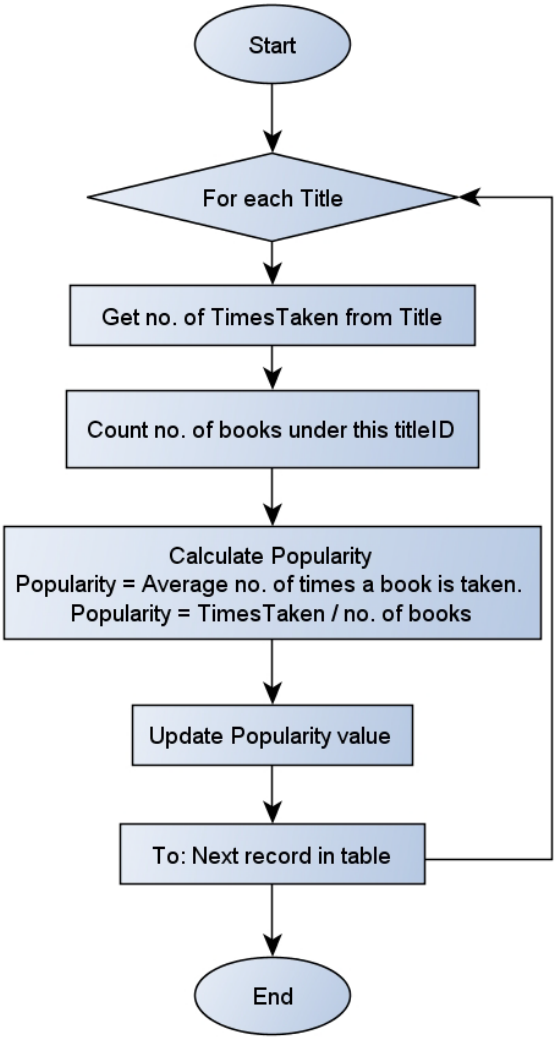
- Notifications



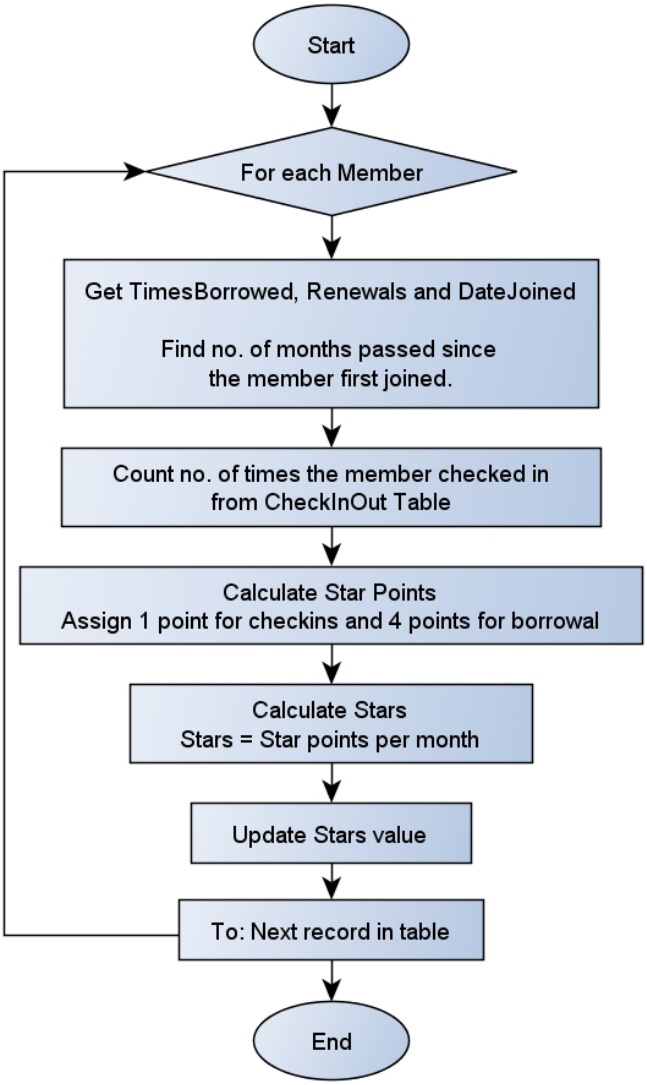
- Expire Members



- Calculate & Update Popularity of Titles



- Calculate & Update Star Points of Members



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