



BOOKIFY - LIBRARY MANAGEMENT SYSTEM

DELIVERABLE 1 & 2 SUBMISSION

SYSC 5709 W – Software Development with C
WINTER 2020 TERM – CARLETON UNIVERSITY

Submitted on March 6th, 2020 by:
Group C

Name	Student Number	GitHub ID
Ramya Madhuri Bodapati	101158664, 300095628(uO)	Ramya-MB
Aisha Robinson	101175471	AishaSR
Mitali Patel	101183728	Mitali92
Pawanjit Kaur	101095832	PawanjitKaur

DELIVERABLE 1 - PROBLEM STATEMENT

PROBLEM

With the increasing size of libraries there is a demand for effective ways to organise and track the lending processes. Most of the currently maintained procedures are manual, time-consuming and inefficient.

Manual/Physical recording processes result in lots of tedious work, extreme amount of wasted paper and also occupies lot of physical space that will be difficult to maintain in long run. Additionally, they present challenges with retrieving and maintaining records.

PROPOSAL

Through this project we aim to build a library management system called **BOOKIFY**. BOOKIFY attempts to reduce the paper usage by utilizing software to manage library processes.

The process of developing and managing the BOOKIFY consists of three main activities:

1. Authorising the software to enter/modify the record information of books, and register users
2. Storage of this information in a database and
3. Authorising the software to track the book lending process

This software is intended to provide secure maintenance of the records by providing password protected access to the registered users.

FUNCTIONAL REQUIREMENTS:

BOOKIFY should support the following functional requirements:

(All the requirements are categorized below as per the release and listed by priority)

RELEASE 1:

1. New users can register by themselves in the Application and every registered user account will be provided with a USERNAME and PASSWORD for secure login access
2. Manager should have the provision to add a new book record, remove the existing book record and also modify the existing book records:

- a. During the new book entry, the application should display which fields are mandatory and which are optional
 - b. Every book entry should include the fields- Name of the Book, Serial number of the book, Author Name (Optional), Date of Publication, Entry date of the book, Category, Language, Status
3. User should have the provision to check for the availability status of any registered book
4. Manager should have the provision to view the entire list of registered books
5. Records to support the functions above will be stored and managed using text files. This is a prototype for the project. Moving to a externally accessible database is a future development goal.

RELEASE 2:

1. Manager should have the provision to update the status of any registered book to either 'Issued' or 'Available to pick'
2. Manager should have the provision to view all the registered user details
3. User should have the provision to search for the details of any registered book by using the search option

NON-FUNCTIONAL REQUIREMENTS:

When designing BOOKIFY, the following constraints will be taken into account:

1. User-friendly interface of the application
2. Performance of the application should be accurate
3. Any functionality included as part of developing this application must be platform independent

SYSTEM LIMITATIONS:

When designing BOOKIFY, the following will be true of the developed application:

1. The BOOKIFY application is a management system. Any use otherwise is not supported
2. No user should have the access to view other user account information

3. BOOKIFY will not be able to detect technical errors in the Book entry details. Therefore, any errors that existed prior to being entered into the application will still exist in the BOOKIFY system
4. The BOOKIFY application will run on desktop machines only

DEVELOPMENT ENVIRONMENT:

The development environment for this project requires the following:

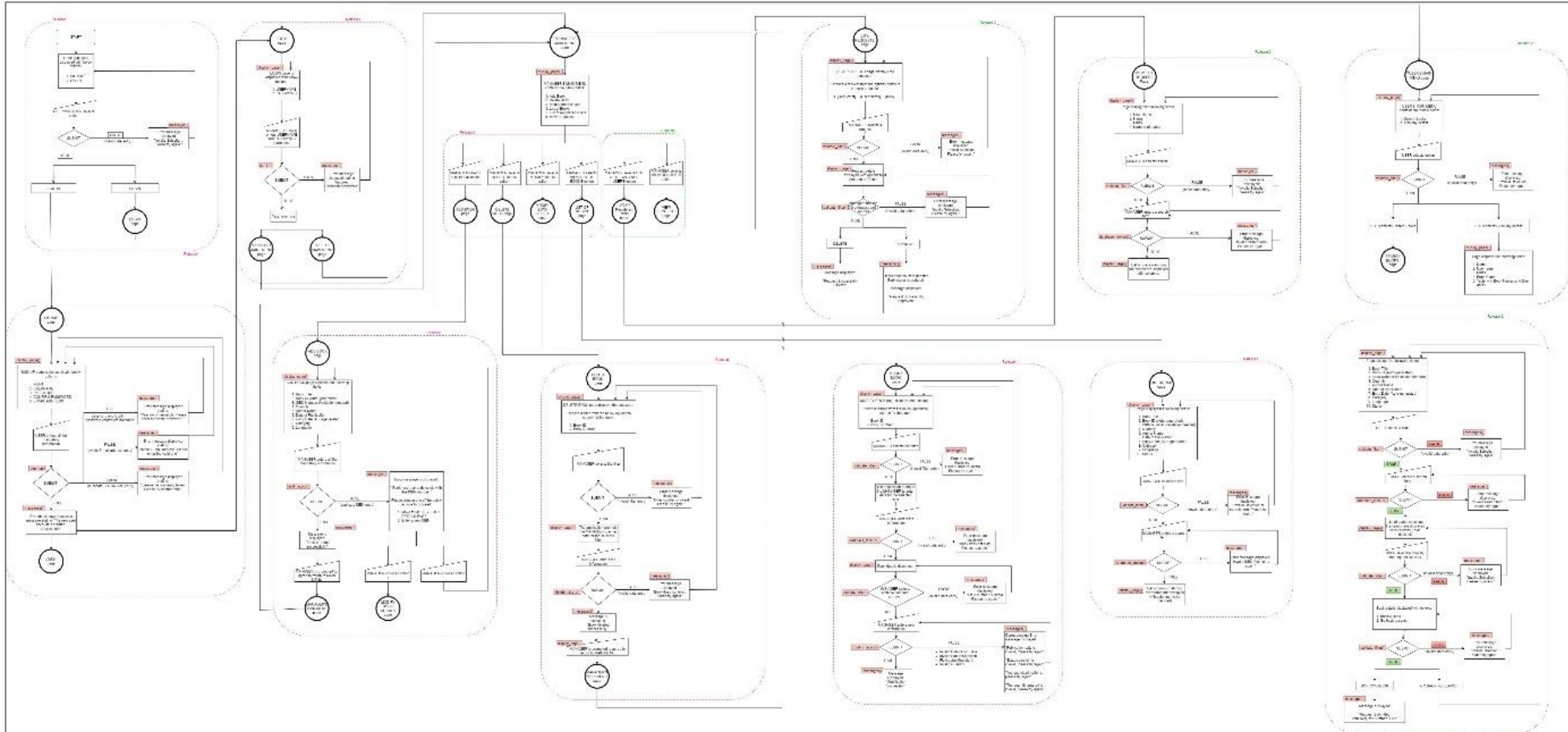
1. An Integrated Development Environment (IDE) – Code Blocks
2. Cygwin Compiler
3. Microsoft SQL server management studio

ACCEPTANCE TEST:

The BOOKIFY application in working status that covers all the functional and non-functional requirements that are mention in the above sections. Additional functionalities added in the design phase will also be considered as part of developing the application.

DELIVERABLE 2 - SOFTWARE DESIGN

FLOWCHART OF BOOKIFY:



NOTE 1: Please refer to this link [<https://github.com/AishaSR/SYSC5709W-Project/raw/development/BOOKIFY%20FLOWCHART.jpg>] for high-resolution picture. Additionally, each flow is broken down individually in this document.

NOTE 2: The USER/MANAGER will always have the option to return to the main menu by selecting a predefined key.

NOTE 3: The USER/MANAGER will also always have the option to exit the program. At this point a function will run to ensure all open files are closed properly to prevent loss of data.

FUNCTIONS TO BE DEVELOPED:

Functions	Brief Description
<code>int main (int argc, char*argv[])</code>	Contains the main flow of the program.
<code>int sign_up (char name[], char username[], char password[], char confirm_password[], char email_address[])</code>	Creates a new registered user with the data entered.
<code>int log_in (char username[], char password[])</code>	Validates User Name and Password to allow access to the program.
<code>void messages (int message_number)</code>	Prints common error and confirmation messages based on the number received.
<code>int add_record (struct new_entry, char table[])</code>	Adds a new record to the program's storage system. E.g. a new book or new user.
<code>int delete_record (char search_term[], char table[], char field[])</code>	Deletes a record from the program's storage system. E.g. Delete a book or request.

<code>int modify_record (char search_term[], char table[], char field[], char new_data[])</code>	Modifies a record in the program's storage system. E.g.. Change a book's quantity.
<code>void display_table (char *file_name, FILE **file_pointer)</code>	Service to the display_page function. It reads data from a file and prints to screen as a table.
<code>void display_page (struct display_data)</code>	Prints the program's interface (instructions etc.) to the console.
<code>FILE * database_lookup (char search_term[], char table[], char field[])</code>	Searches the program's storage and returns information as a file to be processed. E.g. Searches for and returns all books which have the status "issued"
<code>int validate_filter (int filter_entry)</code>	Checks if the user has selected a valid filter.
<code>_Noreturn void before_exit (void)</code>	Called before the program closes. It checks that all files that were opened have been closed successfully to prevent loss of data.

FLOWCHARTS EXPLAINED:

***All 'SUBMIT' steps require validation of the data entered by the USER or MANAGER. If the entered data is valid the program will move to the next step, if not, the USER/MANAGER will be notified and returned to a previous page.**

F1 – LANDING PAGE

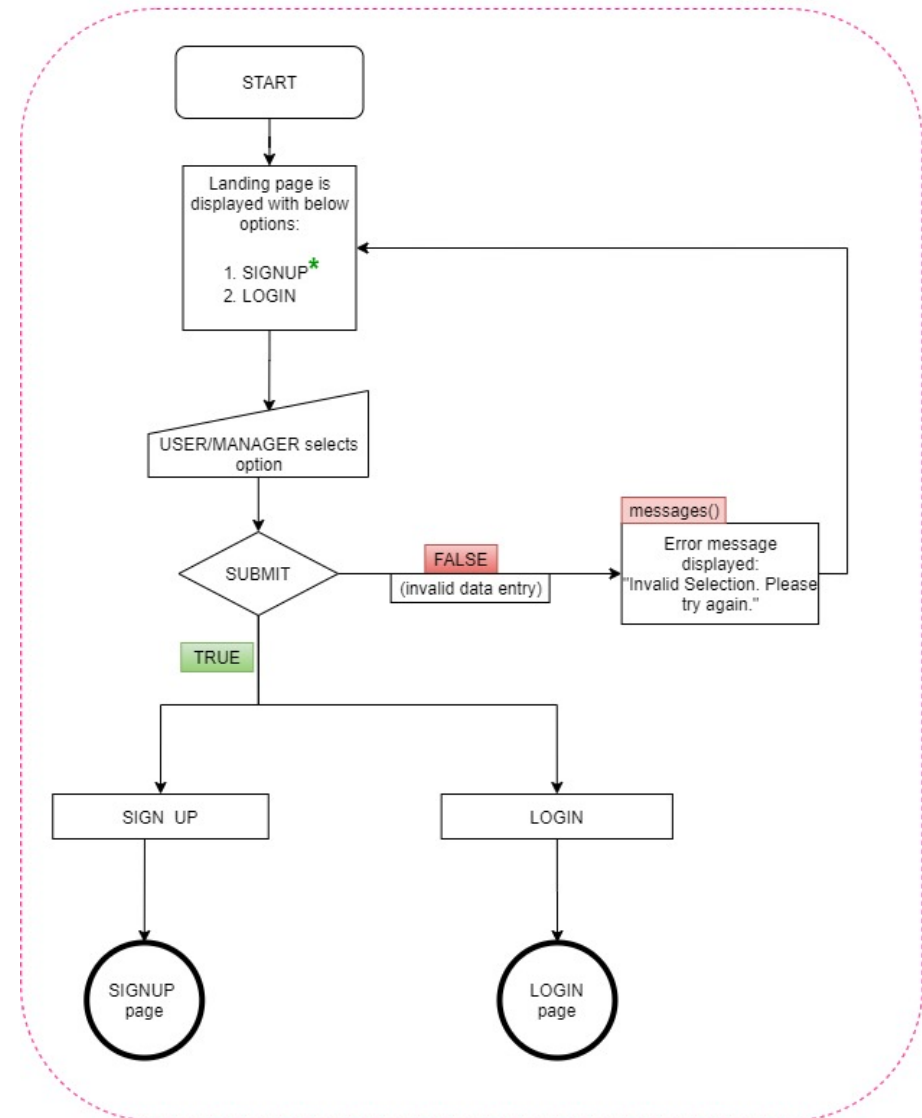
The landing page of the BOOKIFY application is displayed with the menu options SIGNUP and LOGIN for the user to choose from. The application is accessible by two kinds of users, MANAGER who takes charge of maintaining the library management system and REGISTERED USER who is ideally the person that can avail the library book lending facilities.

Assuming BOOKIFY is being accessed by:

1. **MANAGER** - The valid login credentials (username & password) of a Manager's account will always be given by the respective organisation's technical team to the MANAGER.
2. **NEW USER** - The user needs to create a new account to access the library facilities. For this, the NEW USER can select the SIGNUP option from the HOME page and he/she will be navigated to the SIGNUP page.
3. **REGISTERED USER** - The user who has already created an account using the SIGNUP option, he/she can select LOGIN option to access the BOOKIFY.

***A manager account cannot be created through signup. Manager will be provided by the authorities with valid login credentials.**

Release1



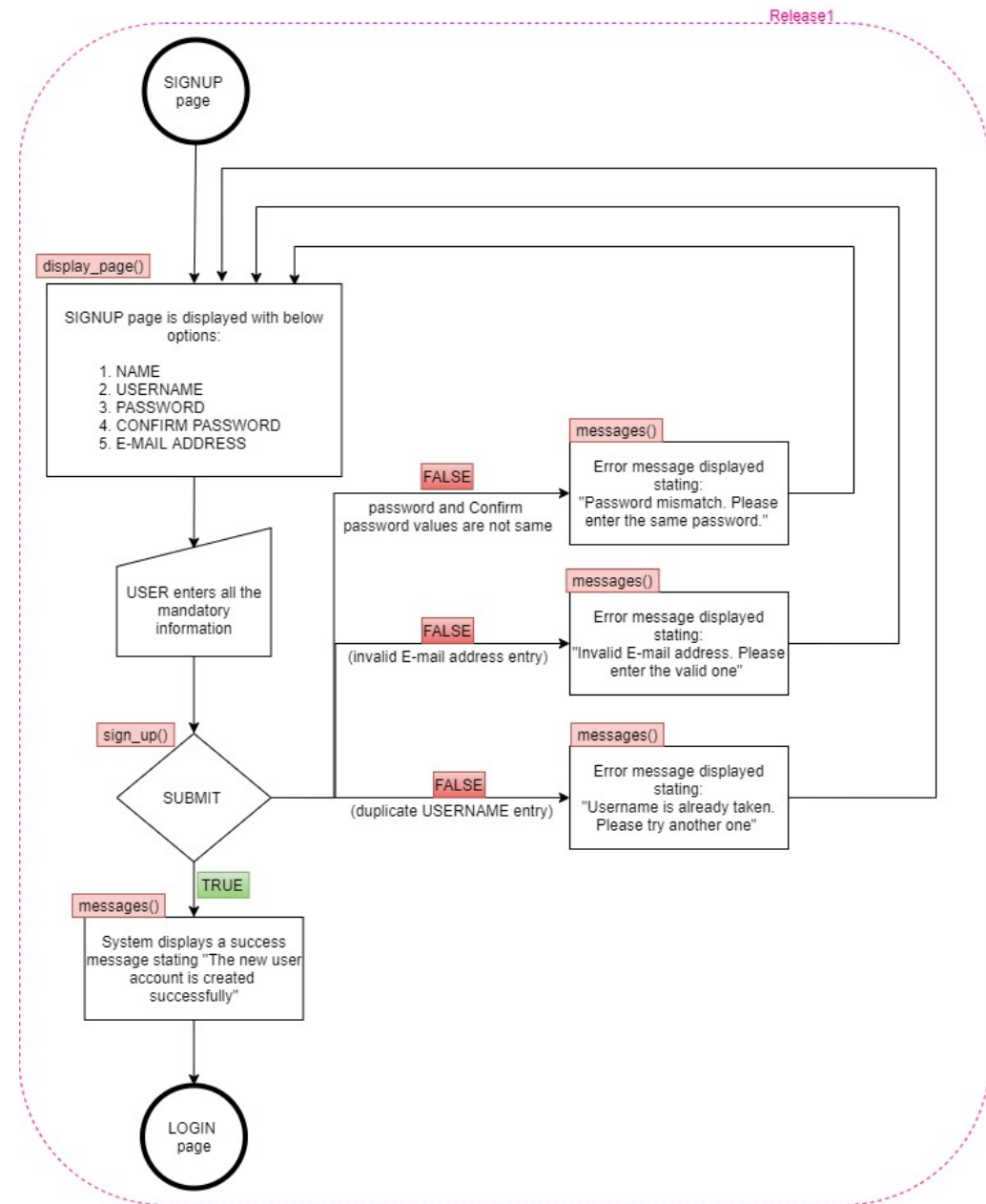
F2 – SIGNUP PAGE

When NEW USER selects the SIGNUP option in the HOME page, he/she will be displayed with the SIGNUP page.

The SIGNUP page is displayed with the following fields. All these fields are mandatory to be filled by the USER to complete the signup process:

1. **NAME** - USER can enter his formal name here
2. **USERNAME** - USER can choose the username to be any word of his choice. After entering all the details and choosing the SUBMIT option, the BOOKIFY validates if the USERNAME already exists or not. If USERNAME already exists, the BOOKIFY prompts the user with an error message stating "Username is already taken. Please try another one."
3. **PASSWORD** - USER can choose the password that meets the below criteria:
4. **CONFIRM PASSWORD** - USER is expected to enter the password again in this field. When the user fails to do so and submits the signup details, he/she will be prompted with the error message stating "Password mismatch. Please enter the same password."
5. **E-MAIL ADDRESS** – USERS should enter the email address in the valid form. The system validates for it in the back and if it is not valid, the system prompts the user with an error message stating "Invalid email address. Please enter a valid one."

After the user fills all the above fields with valid details and chooses SUBMIT option, the system confirms the user that the User account is created by displaying a success message stating "The new user account is created successfully". When a user chooses the OK option, the LOGIN page will be displayed.



F3 - LOGIN PAGE

When the MANAGER or REGISTERED USER selects LOGIN option from the HOME page, he/she will be displayed with the LOGIN page. The LOGIN page contains the below fields for the user to fill:

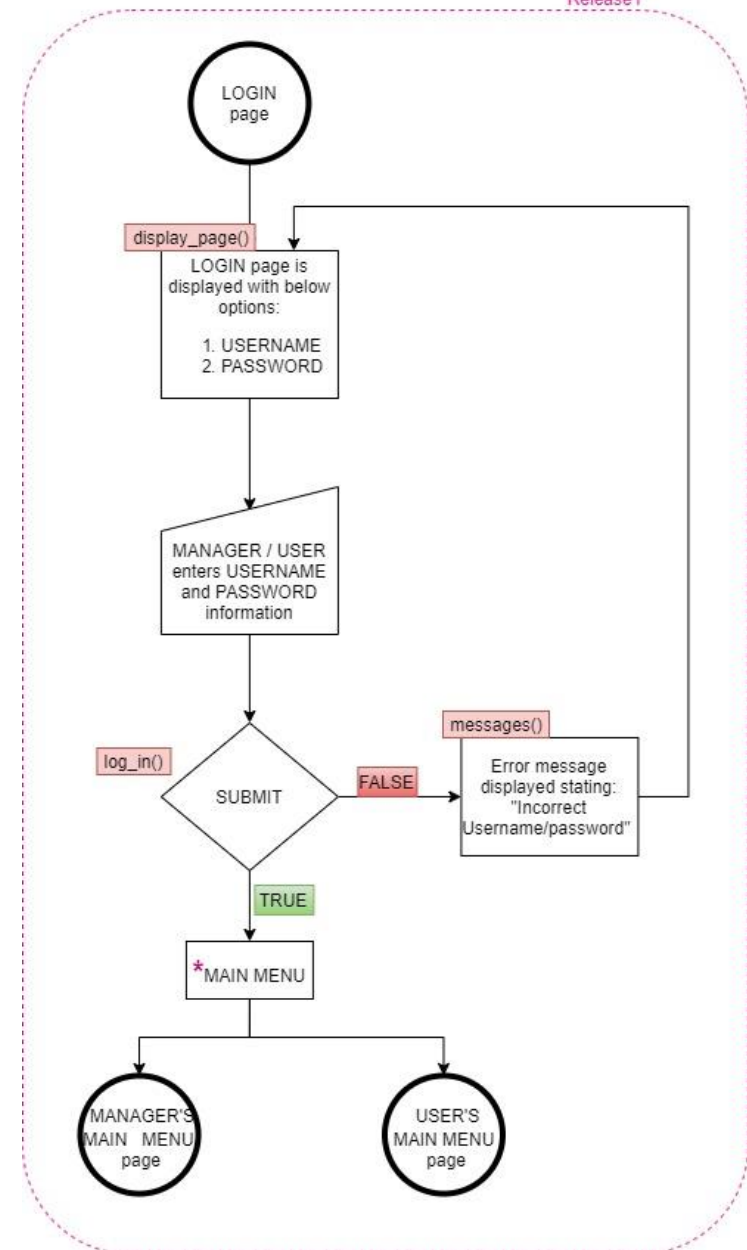
1. USERNAME - MANAGER/REGISTERED USER should enter the same value which he used during the signup process
2. PASSWORD - MANAGER/REGISTERED USER should enter the same value which he used during the signup process

When the user enters the above details and chooses the SUBMIT option, BOOKIFY will validate the entered details. If the entered username & password combination is not found in the database, BOOKIFY will prompt the user with an error message stating "Incorrect Username/Password." and the user will be displayed with the LOGIN screen again. But, if the username & password combination is found in the database, BOOKIFY directly displays the MAIN MENU page.

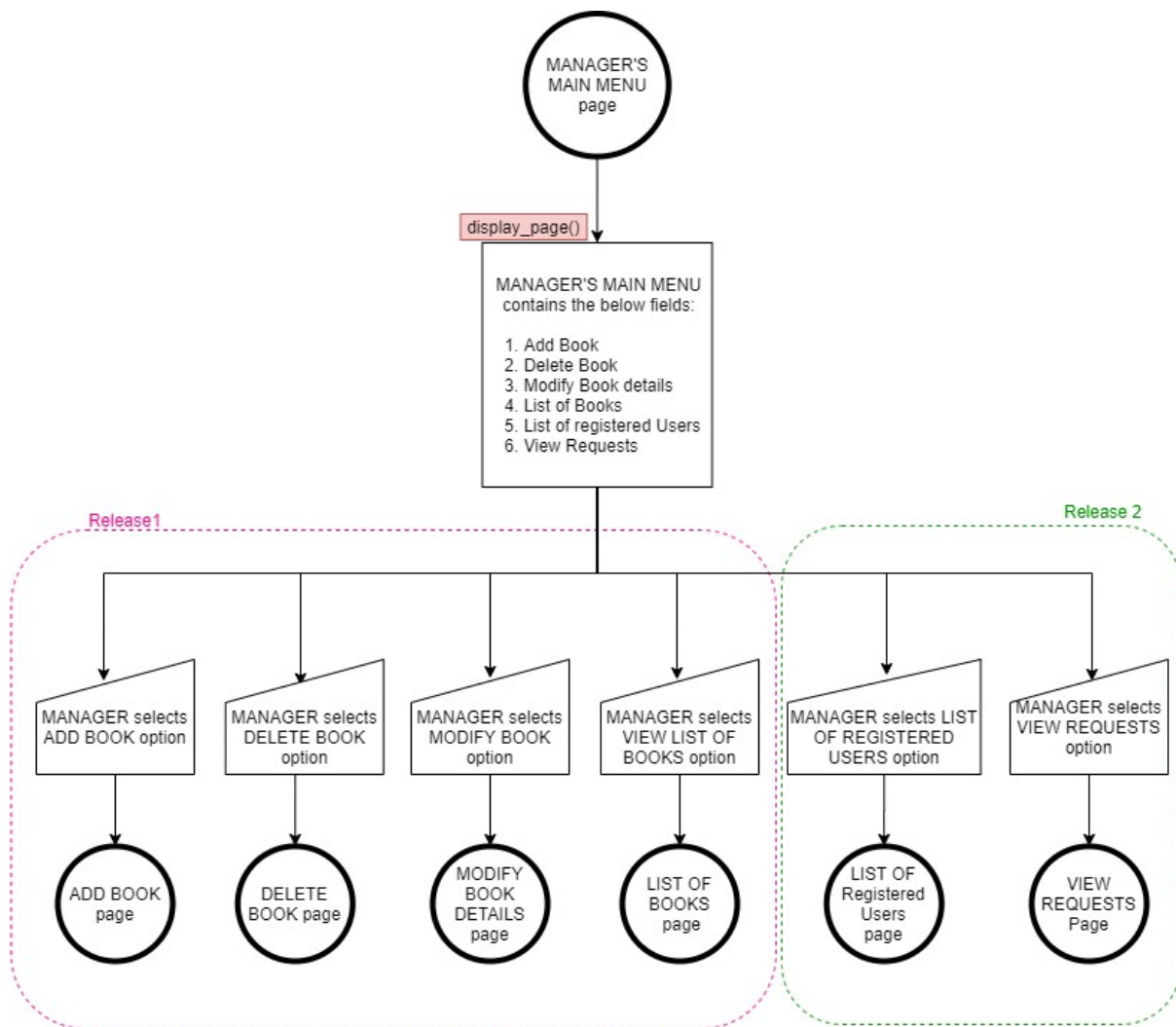
NOTE: As MANAGER and REGISTERED USER will have different set of account rights and different options to choose in every page, a different MAIN MENU page will be displayed for the MANAGER and the REGISTERED USER. For convenience, they will be addressed as MANAGER'S MAIN MENU page and USER'S MAIN MENU page respectively.

*Based on login information, Manager and Registered User will be displayed with different Main Menu pages

Release1



F4 - MANAGER'S MAIN MENU PAGE



If MANAGER Login is successful he/she will be directed to MANAGER'S MAIN MENU page. The page will display the following options:

1. **ADD BOOK**: MANAGER can add a book to the system by filling out some mandatory fields.
2. **DELETE BOOK**: MANAGER can delete a book which is already in the system. The MANAGER can search by entering BOOK ID or ISBN Number for a specific book to be deleted.
3. **MODIFY BOOK** : MANAGER can modify details of a book in the library. The MANAGER can search by entering BOOK ID or ISBN Number for specific book to be modified.
4. **LIST OF BOOKS** : Displays a list of books available in the library.
5. **LIST OF REGISTERD USERS** : Displays a list of registered users in the library.

Only the MANAGER has the right to access the above mentioned options. If any of this option is selected, it will be navigated to its respective pages.

F5 - ADD BOOK PAGE

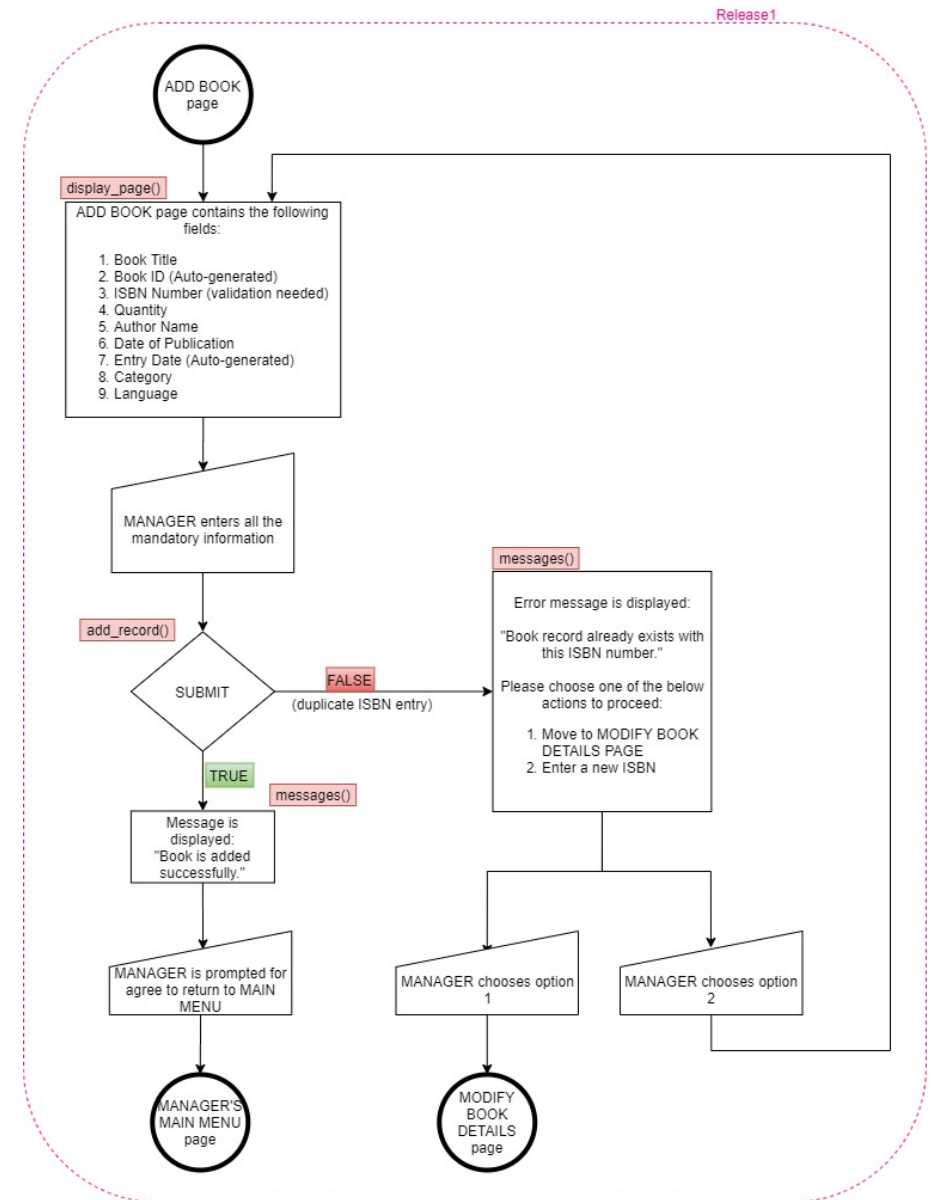
The ADD BOOK PAGE is accessed from the MANAGER'S MAIN MENU. The ADD Book page contains the below fields for the MANAGER to fill:

1. BOOK TITLE
2. BOOK ID (Auto generated)
3. ISBN NUMBER (validation needed)
4. QUANTITY
5. AUTHOR NAME
6. DATE OF PUBLICATION
7. ENTRY DATE (Auto generated)
8. CATEGORY
9. LANGUAGE

When the MANAGER enters the above details and chooses the SUBMIT option, BOOKIFY will validate the entered details. If the entered ISBN is already in the database, BOOKIFY will prompt the MANAGER with an error message stating "Book record already exists with this ISBN number" and the MANAGER will get an option to choose the following:

1. Return to MODIFY BOOK DETAILS PAGE : By choosing this option the navigated to the MODIFY BOOK DETAILS PAGE.
2. Enter a new ISBN : By choosing this option they will be returned to the ADD BOOK page.

But, if the entered ISBN number is new and successfully verified, MANAGER will then be prompted with "Book is added successfully". When MANAGER chooses the OK option, the MANAGER'S MAIN MENU PAGE will be displayed.



F6 - DELETE BOOK

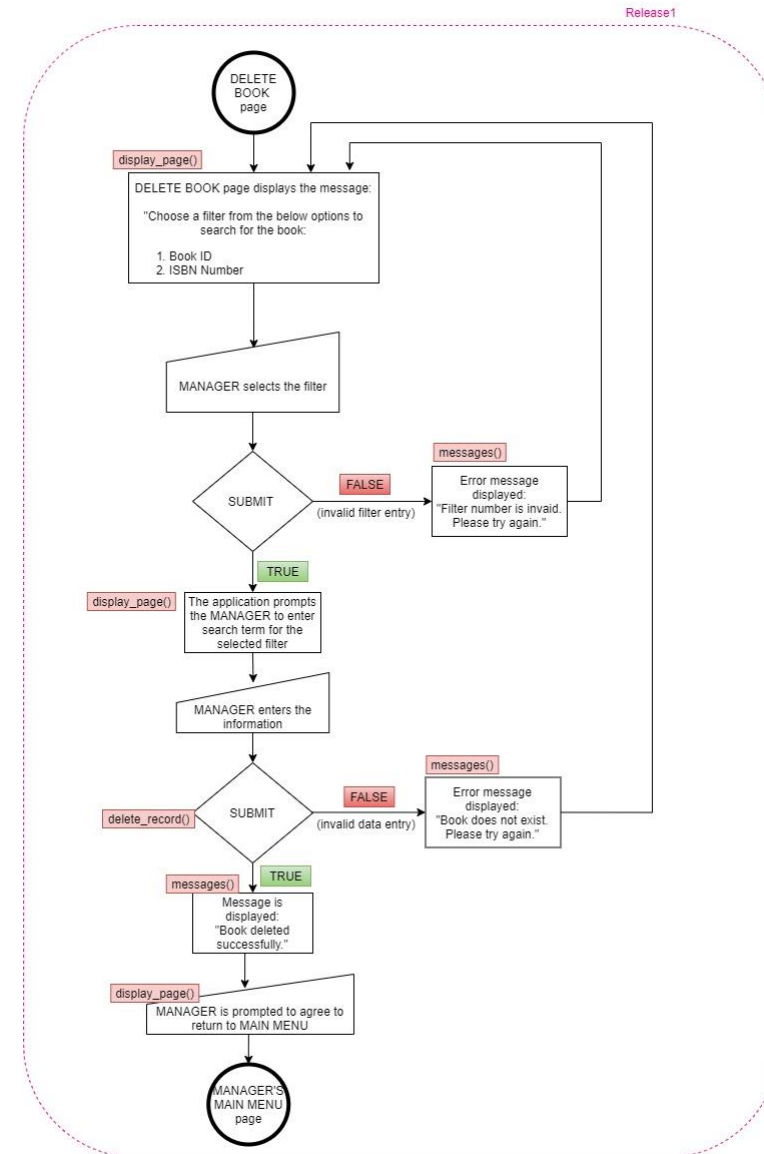
The DELETE BOOK PAGE is accessed from the MANAGER'S MAIN MENU. The MANAGER will get a message on the prompt to choose a filter from the below options to search for the specific book:

1. BOOK ID
2. ISBN Number

The MANAGER needs to select the filter from the above options. If any invalid filter is selected, the manager will get an error message prompt such as "Filter number is invalid. Please try again". But, if the proper option is selected then the manager will be asked to enter the data for the selected filter option.

After the proper data is entered and upon submitting, data will be validated using the database. If data entered to search a book in the library does not match with the database, the manager will get an error prompt message of "Book does not exist. Please try again". But if the data is valid, the manager gets a successful prompt message "Book deleted successfully".

The MANAGER will be giving the option to return to the MANAGER'S MAIN MENU PAGE.



F7- MODIFY BOOK page

The MODIFY BOOK page is accessed by the MANAGER who can make changes if any of the book information entered is incorrect. The MODIFY BOOK page will prompt the MANAGER to choose a filter from the following options:

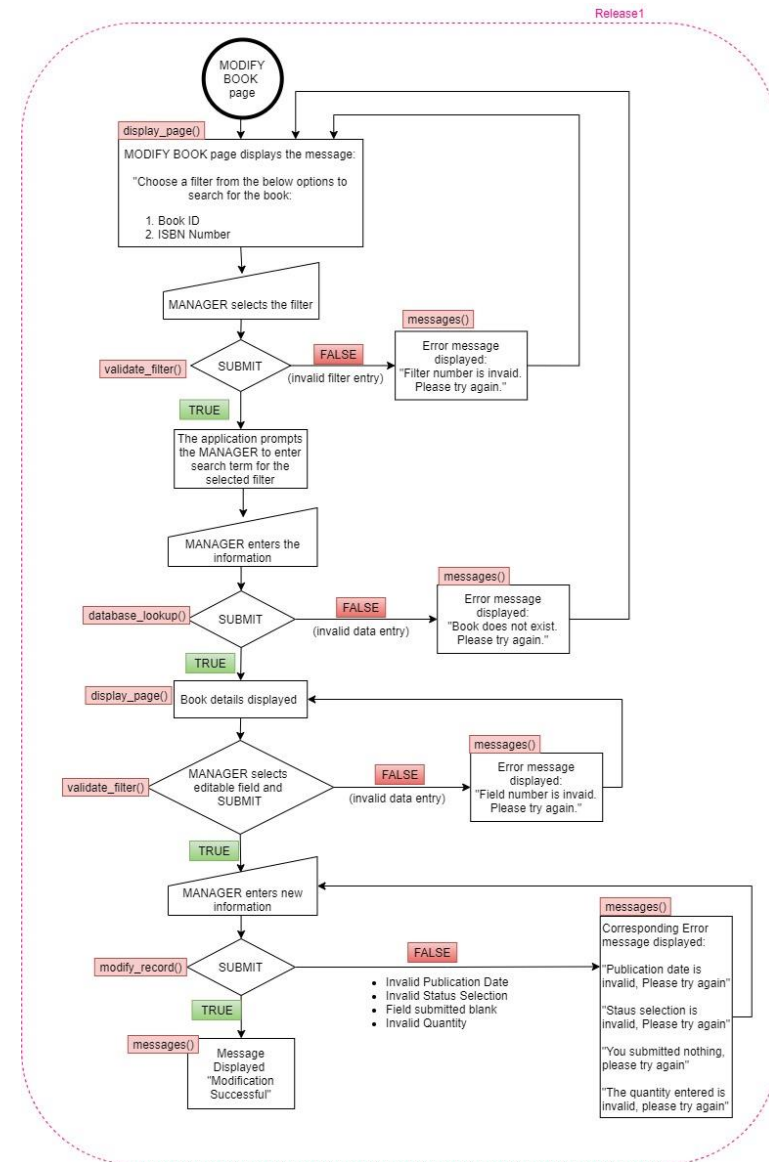
1. Book ID
2. ISBN Number.

If the filter selection is invalid the MANAGER will be redirected to try again.

After a valid submission, the application will prompt the MANAGER to enter the search term for the selected filter. If a matching book is not found the MANAGER will be redirected.

If a matching book is found the details will be displayed. In this case the MANAGER will be prompted to select an editable field and submit the new information to store in it.

If this submission is valid the modification will be done and a message confirming this displayed. If not an error will be displayed and the MANAGER redirected.



F8 - VIEW REQUESTS

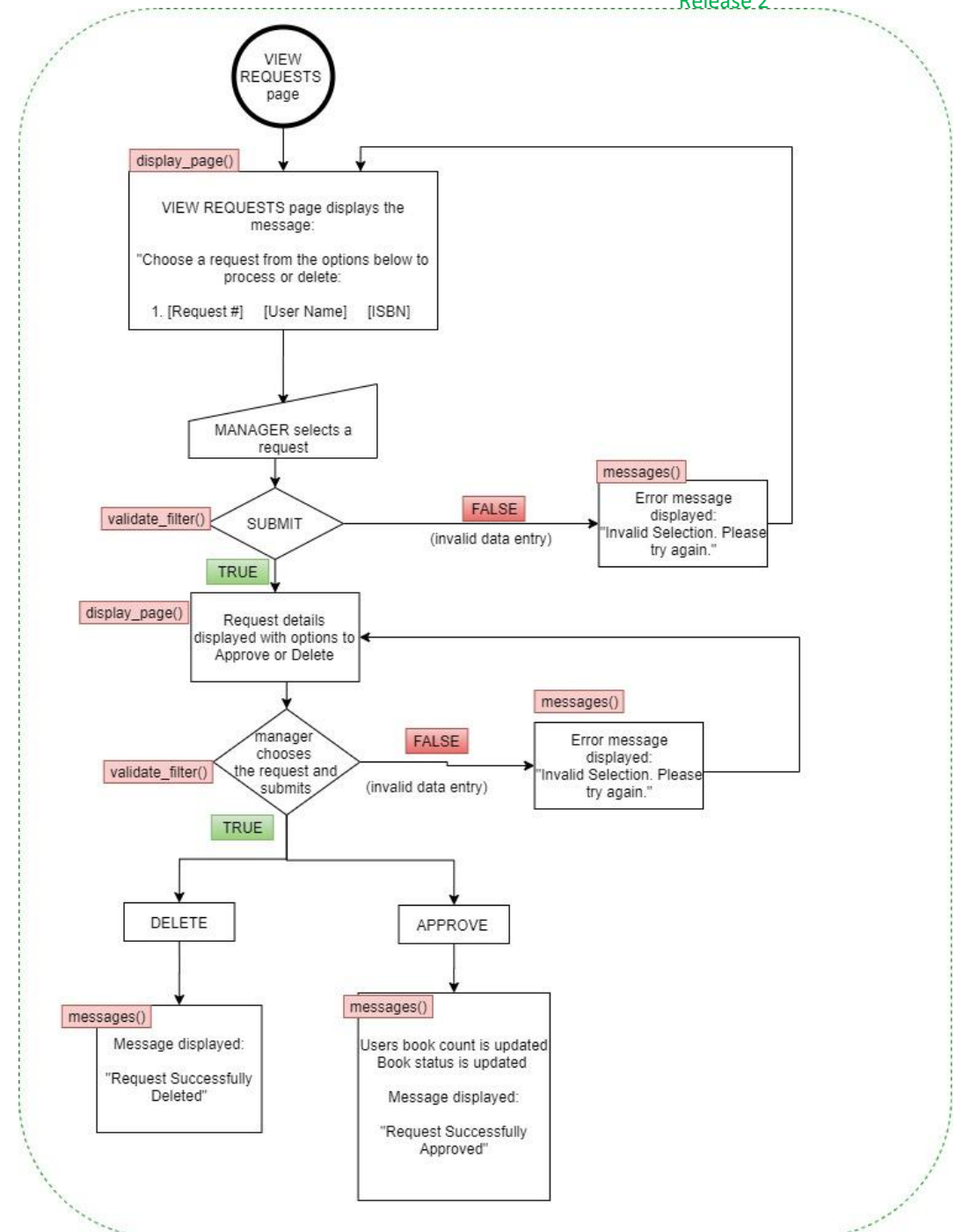
The VIEW REQUESTS page is used by the MANAGER. This page displays prompts the manager to review the list of requests and choose one to process.

If a valid selection is made the MANAGER will be prompted to 'Approve' or 'Delete' the request. If not, the MANAGER will be redirected to try again.

If a request is approved the book count of the USER who made the request will be updated and also the status of that book will updated.

A message will be displayed to confirm that the approval was successful.

If the MANAGER wishes to delete a request and it is successful, a message will also confirm this.

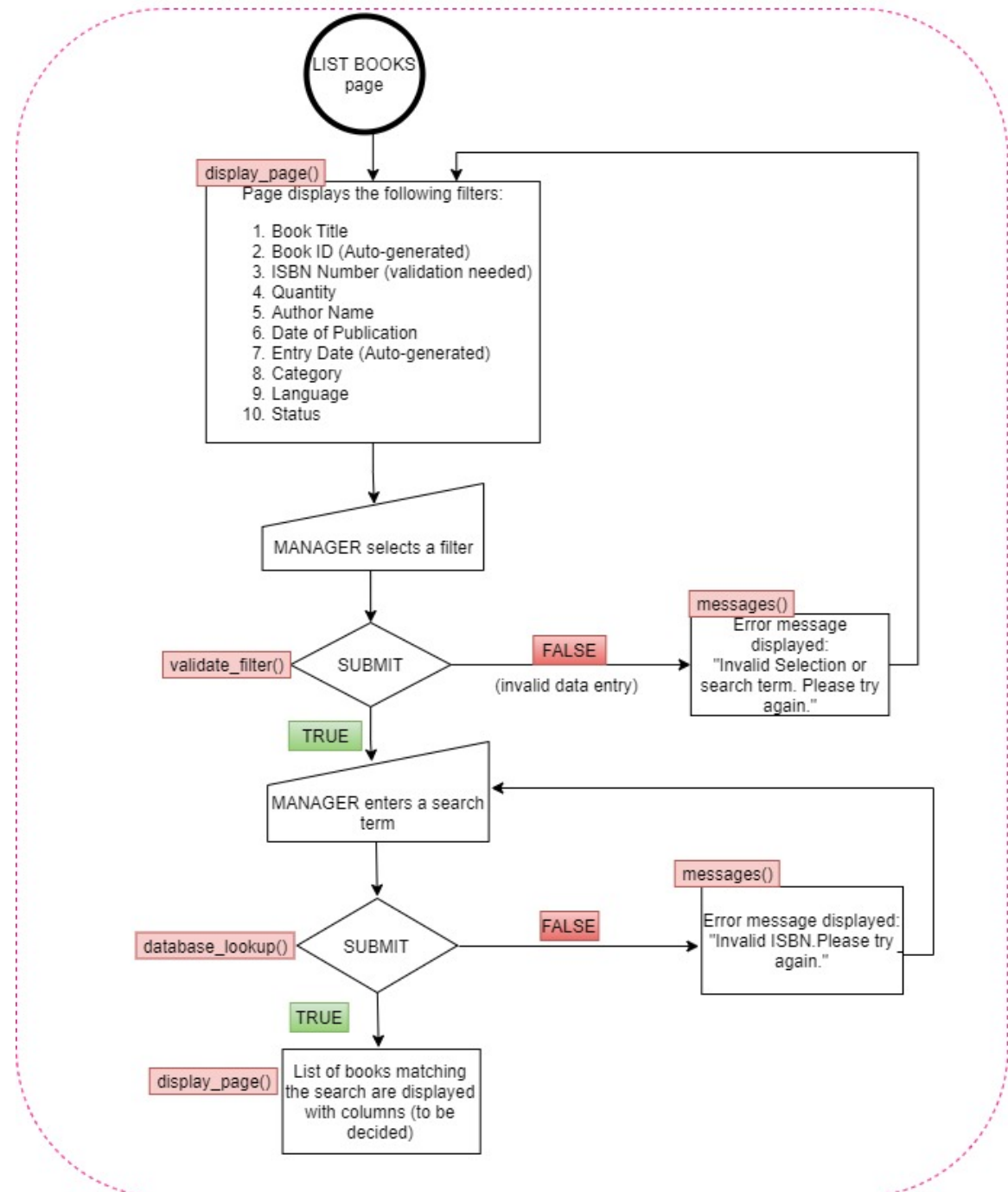


F9 - VIEW LIST OF BOOKS

The VIEW LIST OF BOOKS page displays following filters:

1. Book Title
2. Book Id (Auto generated)
3. ISBN Number (validation needed)
4. Quantity
5. Author Name
6. Date of Publication
7. Entry Date (Auto generated)
8. Category
9. Language
10. Status

The MANAGER will be prompted to select a filter and enter a search term. On submitting, if data entered is invalid an error message is displayed and the MANAGER will be redirected to try again. If valid, the list of books matching the search is displayed with columns.



The SEARCH BOOKS PAGE is accessed from the USER'S MAIN MENU and allows the books available on the library to be displayed and filtered.

The page first displays the following list of filters and prompts the USER to choose a filter and enter a search term.

1. Book Title
2. Book ID
3. ISBN Number
4. Quantity
5. Author Name
6. Date of Publication
7. Entry Date
8. Category
9. Language
10. Status

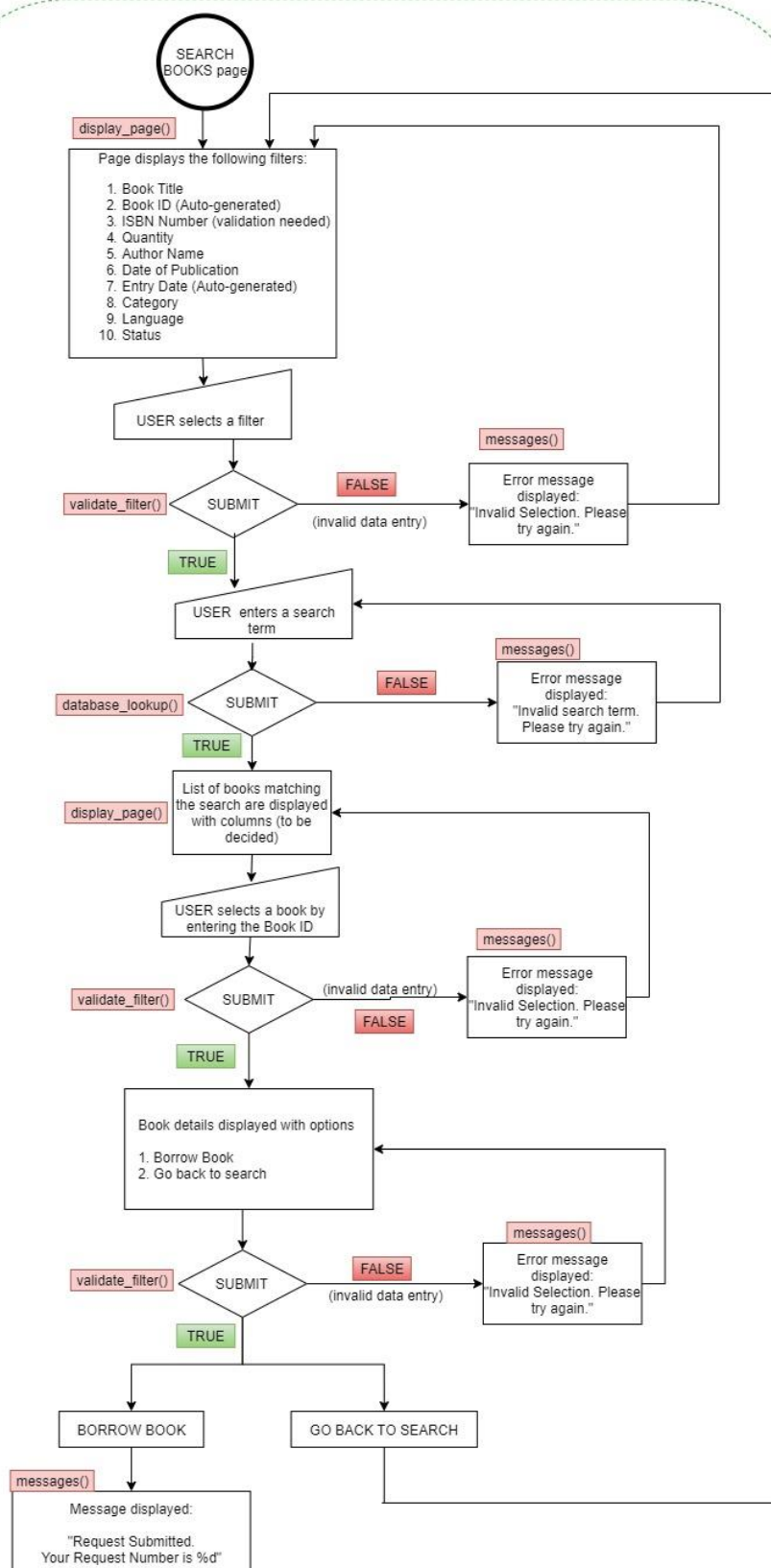
On submitting the filter and term a list will be returned with the details of the books which match this search term and filter.

The user is then prompted to select a book by entering the Book ID (which will be displayed). Upon submitting this they will be presented with two options: "Borrow book" or "Go back to search". The USER will again be prompted to make a selection.

If the USER selects 'Go back to search' they will be redirected to the initial page of filters.

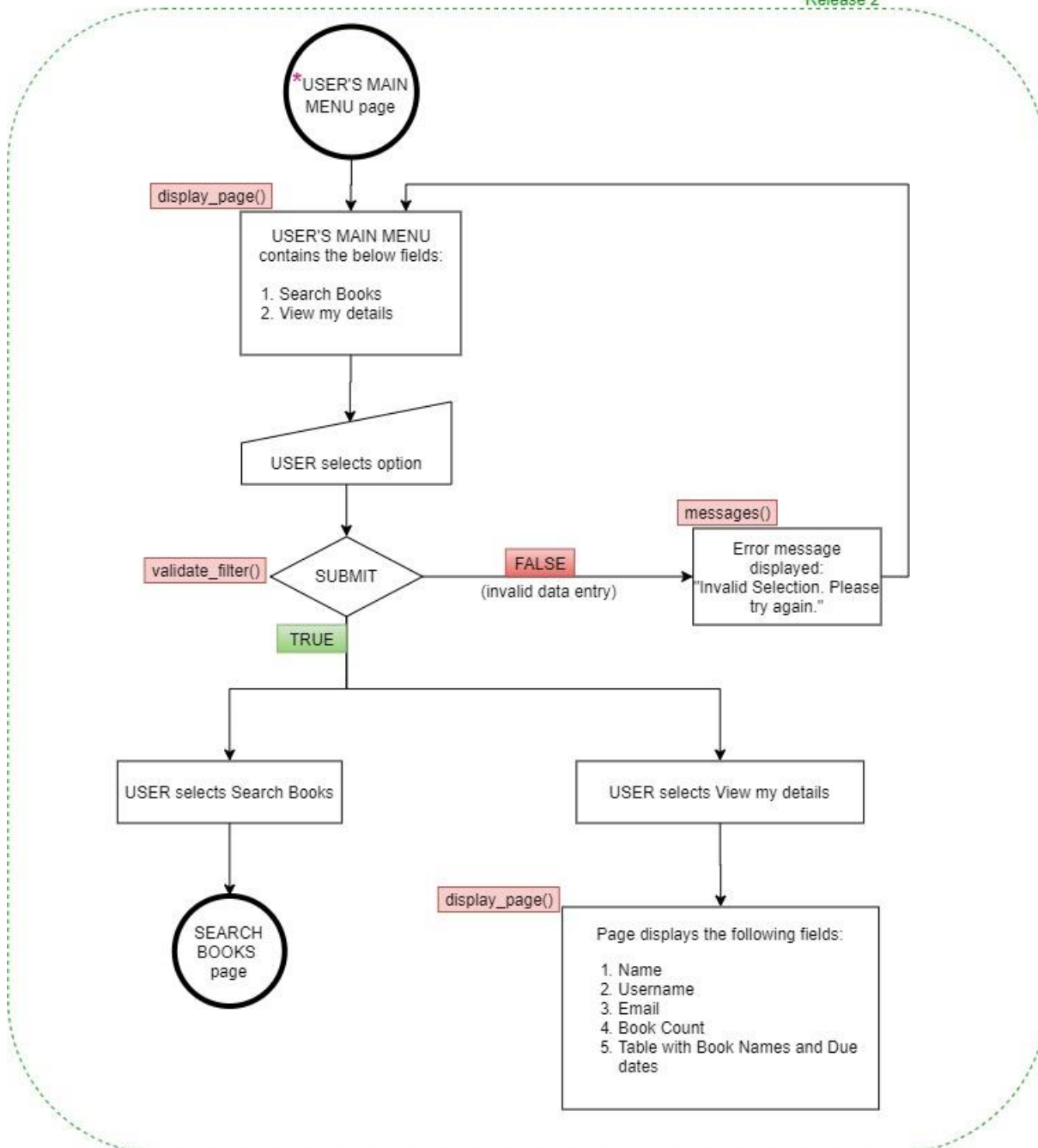
If the USER selects 'Borrow Book', they will be presented with a message of confirmation and a reference number for their request. This request will be sent to the MANAGERS list of requests to review (See F8).

At all stages where a selection is required, if the user enters invalid information they will be redirected to the previous page.



F11 - USER MAIN MENU

Release 2



The USER MAIN MENU is accessed directly after login of a registered user. It displays 2 options: Search books and View my details. The USER will be prompted to select a menu item.

If the USER selects the Search books option, they will be directed to the Search books page (See F10).

If the USER selects the View my details option, the page will display the following details associated with that user:

1. Name
2. Username
3. Email
4. Book Count (how many books they currently have on loan)
5. A Table with Book Names and Due dates

If the USER selected an invalid menu item they will be notified and returned to the USER MAIN MENU to try again.

F12 - VIEW LIST OF USERS

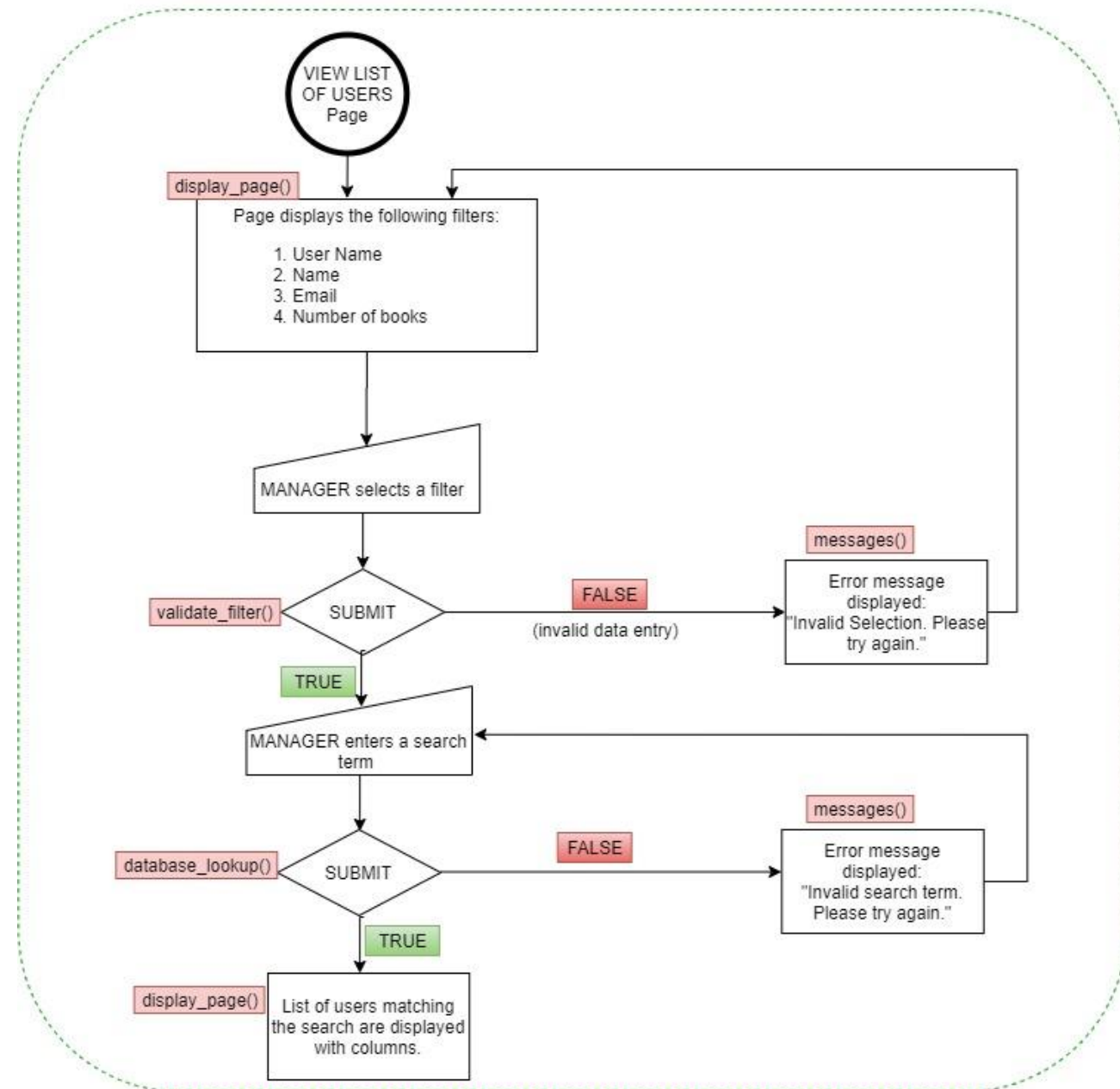
The VIEW LIST OF USERS PAGE is accessed from the MANAGER'S MAIN MENU and allows the registered users of the platform to be displayed and filtered.

The page first displays a list of filters which can be chosen:

1. Name
2. User Name
3. Email
4. Number of books

The MANAGER will be prompted to choose a filter and enter a search term. On submitting this a list will be returned with the details of the registered users which match this search term and filter.

If the search term or filter selection is invalid the MANAGER will be notified and returned to the list of filters to try again.



TASK ALLOCATION (as seen in Github):

Function	Assignee	Release
main()	Pawanjit	Release 1 – Updated in Release 2
sign_up()	Ramya	Release 1
log_in()	Ramya	Release 1
messages()	Ramya	Release 1 – Updated in Release 2
add_record()	Mitali	Release 1
delete_record()	Mitali	Release 1
modify_record()	Mitali	Release 1 – Updated in Release 2
display_table()	Aisha	Release 1
display_page()	Aisha	Release 1 – Updated in Release 2
database_lookup()	Aisha	Release 1 – Updated in Release 2
validate_filter()	Pawanjit	Release 1 – Updated in Release 2
before_exit()	Pawanjit	Release 1

