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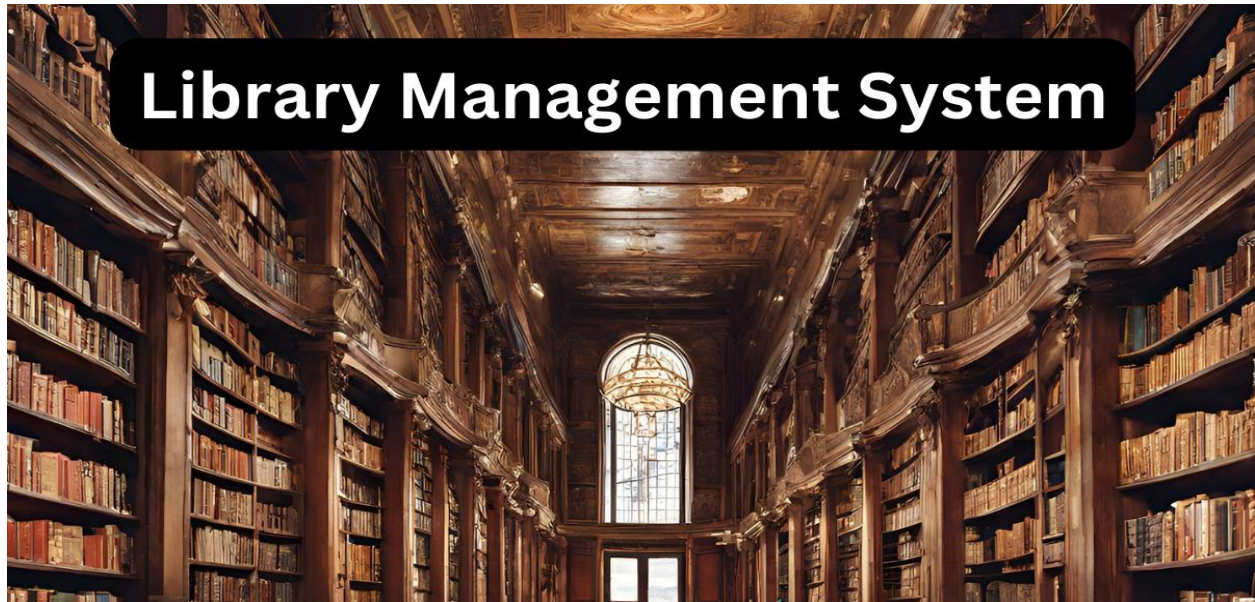
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This app is a comprehensive Library Management System, designed to streamline the various processes and workflows associated with managing a library. This application offers a centralized platform for librarians, staff, and library members to effectively handle tasks such as book cataloging, borrowing and returns, member management, and reporting. The Library Management System Power App presents users with a clean and intuitive interface, allowing them to navigate through the main sections of the application with ease. These key sections include "Authors," "Books," "Borrowings," and "Members," each providing specialized functionalities to address the unique needs of a library environment.

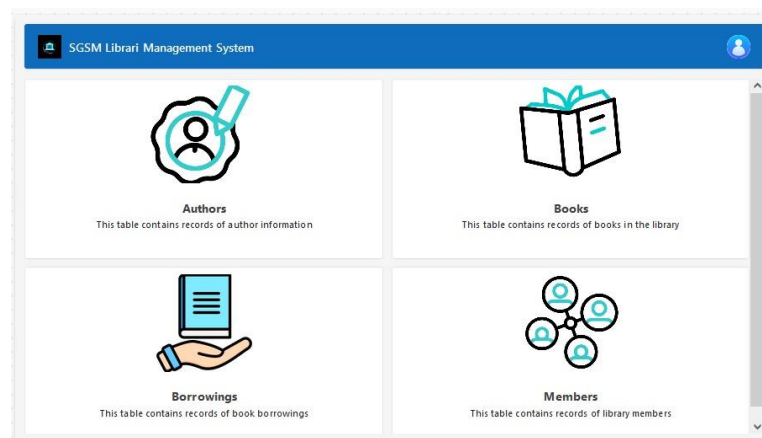
In the "Authors" section, users can access and manage information about the authors whose works are part of the library's collection. This may include details such as author biographies, bibliographies, and contact information, helping to maintain a comprehensive database of literary contributors. And also, the "Books" section is likely the core of the application, enabling users to catalog, search, and update the details of the books available in the library. This could include features like book descriptions, availability status, and location within the library, ensuring librarians have a clear overview of the collection. And then, the "Borrowings" section is crucial for tracking the lending and return of books, allowing users to monitor the circulation of library materials, set due dates, and manage overdue items. This helps maintain tight control over the library's inventory and ensures fair access to resources

for all members. Finally, the "Members" section provides functionalities for managing library patrons, including registration, membership status, and borrowing history. This allows librarians to keep detailed records of their user base and enforce policies around book lending and returns.

Therefore, by leveraging the capabilities of Microsoft Power Apps, this Library Management System aims to streamline the day-to-day operations of the library, improve data organization, and enhance the overall user experience for both staff and library members.

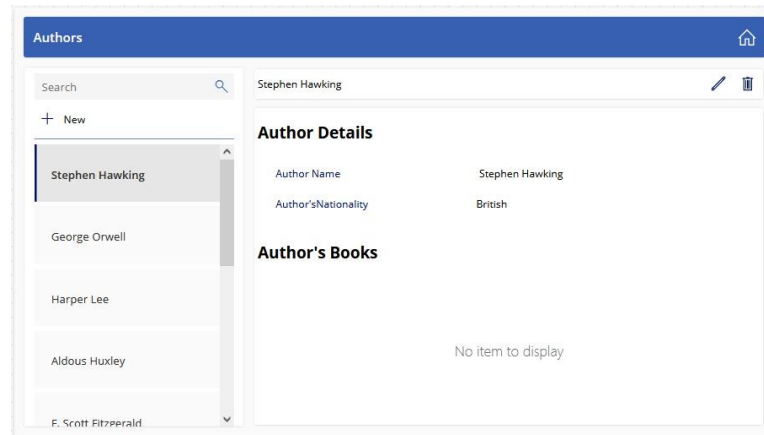
Pages

1. Home Page



This is the home screen of a Library Management System app, named "SGSM Library Management System". The screen is divided into four sections, each representing a key feature of the library management system. These are Author, Books, Borrowings and Members. The author table contains records of author information, The books table contains records of books in the library, The borrowing table contains records of book borrowings, The Members table contains records of library members. Each section likely serves as a clickable button, taking the user to a corresponding table or module for managing records.

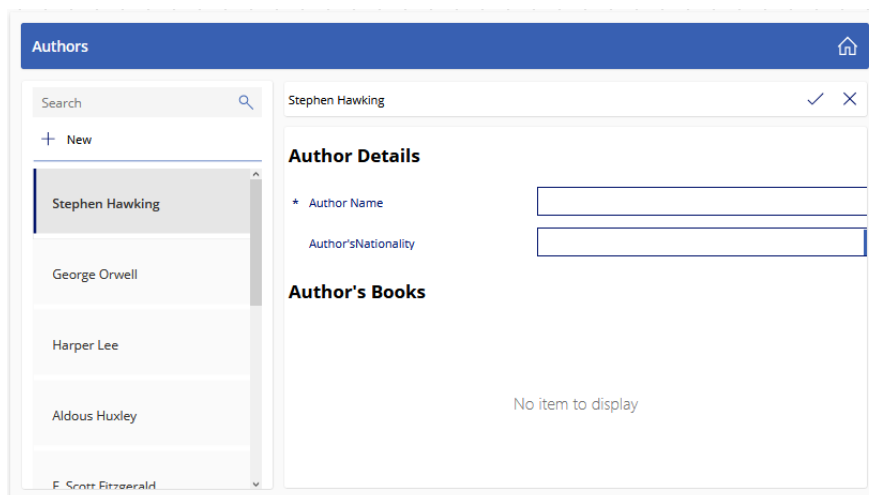
2. Author Page



This page is part of the "Authors" section in the Library Management System. Home Icon likely allows the user to navigate back to the app's home page. And then, Search Bar allows users to search for specific authors by typing their names. New Button (+ New) used to add a new author to the list. Author List shows a list of authors stored in the system. This page helps manage author details in the system. Users can;

- Search for authors.
- View an author's information, such as their name and nationality.
- Add new authors or delete/edit existing ones.
- See the books linked to the selected author.

This is how adding new author page looks like.



3. Book Page

The screenshot shows a web application interface for a library management system. The main header is 'Books' with a home icon. On the left, there is a search bar and a '+ New' button. Below these is a list of books: 'The Great Gatsby', 'The Art of War', 'The Catcher in the Rye', '1984', and 'Brave New World'. The 'The Great Gatsby' book is selected, and its details are shown on the right. The details include: Title (The Great Gatsby), Published Year (1925), Genre (Fiction), Genre1 (Rock), and Author (F. Scott Fitzgerald). There are edit and delete icons at the top right of the details section.

The Great Gatsby	
Title	The Great Gatsby
Published Year	1925
Genre	Fiction
Genre1	Rock
Author	F. Scott Fitzgerald

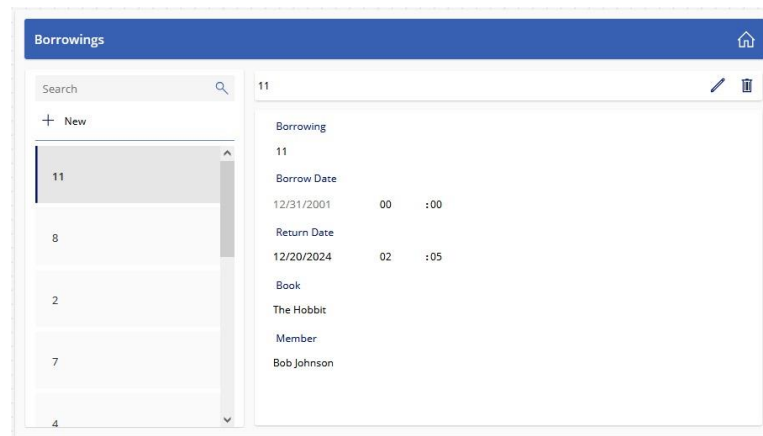
This page is part of the "Books" section in the Library Management System. Allowing users to browse, search, and view details about the books in their collection. And also, this allows the user to search for specific books within the application for search bar. This button (+ New) likely allows the user to add a new book to their collection.

This is how adding new Book page looks like.

The screenshot shows the same web application interface, but the 'The Great Gatsby' book is now in a form to be added. The left sidebar is the same. The right panel has a title bar 'The Great Gatsby' with a checkmark and a close button. Below the title bar, there are input fields for: Title, Published Year, Genre, Genre1 (with a 'Find Items' button), and Author (with a 'Find Items' button).

The Great Gatsby	
Title	<input type="text"/>
Published Year	<input type="text"/>
Genre	<input type="text"/>
Genre1	<input type="text"/> Find Items
Author	<input type="text"/> Find Items

4. Borrowing Books Page

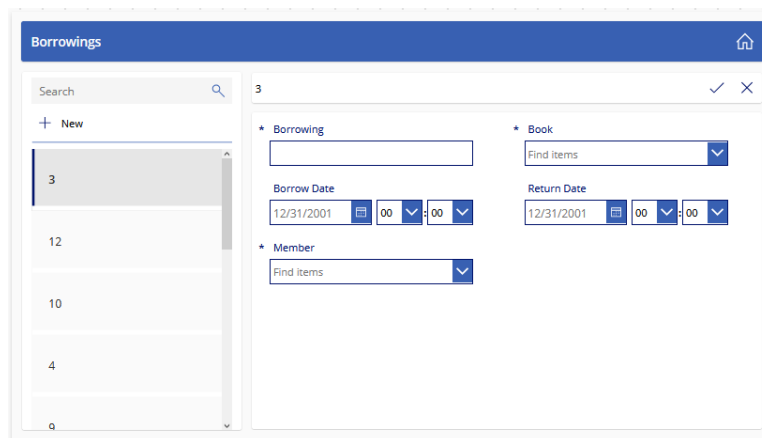


The screenshot shows the 'Borrowings' page. On the left, there is a search bar and a '+ New' button. Below these is a list of borrowing records with IDs 11, 8, 2, 7, and 4. The record with ID 11 is selected. On the right, the details for borrowing 11 are displayed:

Borrowing		
11		
Borrow Date	12/31/2001	00 :00
Return Date	12/20/2024	02 :05
Book	The Hobbit	
Member	Bob Johnson	

This page is part of the "Borrowing" section in the Library Management System. This is the main section of the application, focused on managing book borrowings. allowing users to track and manage the borrowing of books. Search bar allows the user to search for specific borrowing records within the application. This button (+ New) likely allows the user to add a new borrowing record.

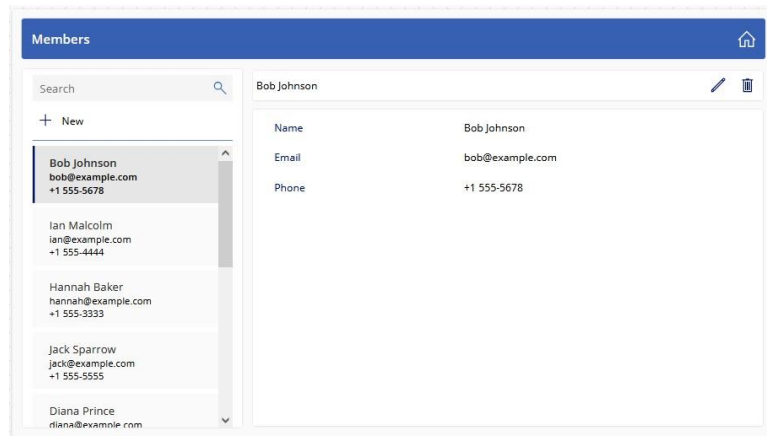
This is how adding new Borrowing page looks like.



The screenshot shows the 'Borrowings' page with the 'Add New' form. The left sidebar shows a list of borrowing records with IDs 3, 12, 10, 4, and 9. The record with ID 3 is selected. The main area contains the following fields:

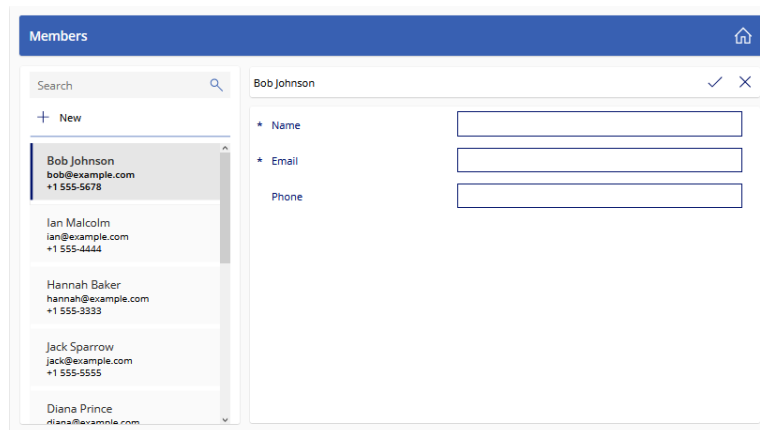
- Borrowing**: A text input field.
- Book**: A dropdown menu with 'Find Items' selected.
- Borrow Date**: A date picker set to 12/31/2001, with time set to 00:00.
- Return Date**: A date picker set to 12/31/2001, with time set to 00:00.
- Member**: A dropdown menu with 'Find Items' selected.

5. Member Page



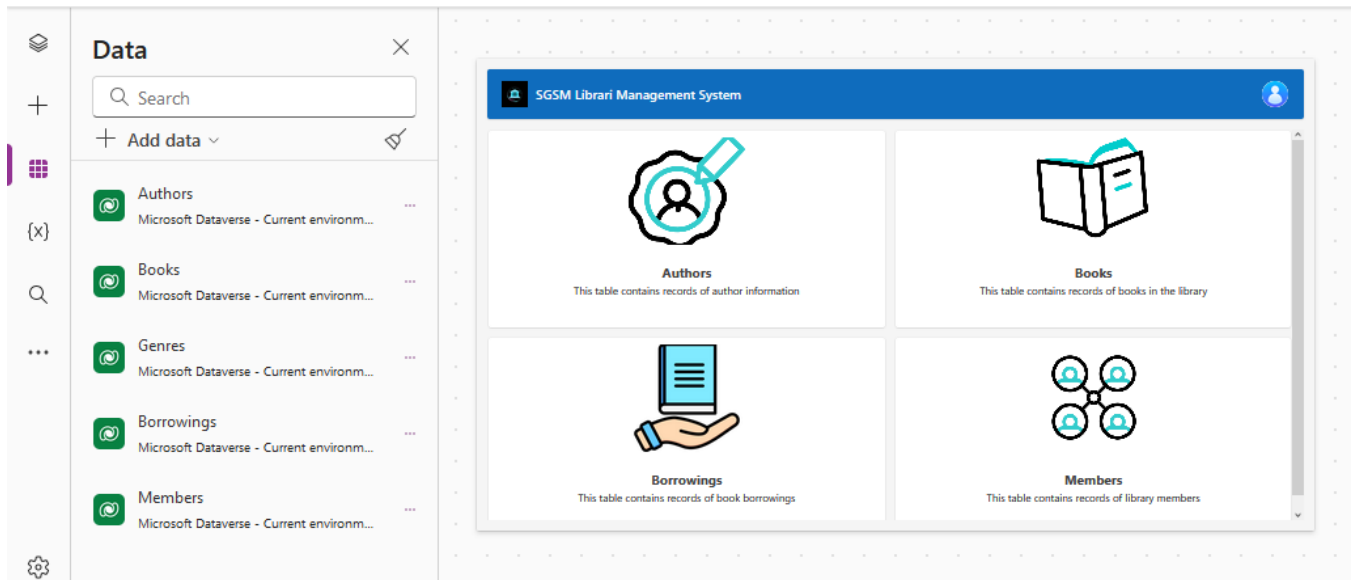
This page is part of the "Members" section in the Library Management System. This is the main page of the application, focused on managing member information. Search bar allows the user to search for specific member records within the application. This button (+ New) likely allows the user to add a new member record. And also, allowing users to browse, search, and view details about the members in the system.

This is how adding new Member page looks like.



Technical Design

We had used 4 tables called **Author**, **Books**, **Borrowings** and **Members** from Microsoft Dataverse were utilized to develop this app.



1. Author Table

Edit table

+ New row + New column Refresh Edit table properties

Authors

Author Name* ↑	Author *	Created On	+17 more +
Aldous Huxley	bcd30d23-b13c-4225-81a1-27bc...	12/13/2024 1:43 PM	
F. Scott Fitzgerald	4a10e7fb-9dda-447b-a6a8-28dc...	12/13/2024 1:43 PM	
George Orwell	378ae673-8195-4627-93d6-214...	12/13/2024 1:43 PM	
Harper Lee	bb54cc9c-4892-4c3b-bf30-2568...	12/13/2024 1:43 PM	
J.D. Salinger	6c7a1ad6-35e4-4fbc-a216-4979e...	12/13/2024 1:43 PM	
J.R.R. Tolkien	f7347f30-5a57-4f51-87d3-e795c...	12/13/2024 1:43 PM	
Ray Bradbury	7b4bfb44-738e-457d-99e2-5ef4...	12/13/2024 1:43 PM	
Stephen Hawking	cda31000-26a4-4b44-93ef-1d58...	12/13/2024 1:43 PM	

Close

Purpose: Stores information about authors, including their names and other relevant details.

Key Columns:

- Author Name
- Author(Primary Key)

2. Books Table

Edit table

+ New row + New column Refresh Edit table properties

Books

Title	Author	Genre	Genre1	Published ...
1984	George Orwell	Fiction	Pop	1,949
A Brief History of Time	Stephen Hawking	Science	Jazz	1,988
Brave New World	Aldous Huxley	Fiction	Hip Hop	1,932
Fahrenheit 451	Ray Bradbury	Fiction	Classical	1,953
Sapiens	Yuval Noah Harari	Non-Fiction	Classical	2,011
The Art of War	Sun Tzu	History	Hip Hop	-,500
The Catcher in the Rye	J.D. Salinger	Fiction	Rock	1,951
The Great Gatsby	F. Scott Fitzgerald	Fiction	Rock	1,925

+18 more

Close

Purpose: Maintains the details of all books in the library collection.

Key Columns:

- Title
- Author
- Genre
- Genre1
- Published year
- Book(PPrimary key)

3. Borrowings Table

Edit table

+ New row + New column Refresh Edit table properties

Borrowings

Borrowing	Book	Borrow Date	Member	Return Date	Borrowing
1	The Great Gatsby	1/8/2023	Alice Smith	1/18/2023	750144d2-1ec7-4aa5-bf78-fb9f7...
10	The Hobbit	6/29/2023	Hannah Baker		973a3d9a-4d86-4234-bc4d-35c4...
11	Fahrenheit 451	7/13/2023	Ian Malcolm		a7ba56f7-4a2-43b3-5588-e74ff2...
12	The Catcher in the Rye	12/13/2024	Hannah Baker	12/20/2024	9a11ccd-7cb9-ef11-b8e8-000d3...
2	Brave New World	7/30/2023	Jack Sparrow	8/7/2024	979aa33c-1d8f-40e9-b806-db38f...
3	The Hobbit	12/12/2024	Bob Johnson	12/20/2024	c22b8774-2bb9-ef11-b8e8-000d...
4	1984	2/13/2023	Bob Johnson	2/23/2023	c8962784-adc6-482e-a478-3f1db...
5	A Brief History of Time	2/27/2023	Charlie Brown	3/8/2023	92bef795-f336-443d-99e7-6d899...
6	Sapiens	4/3/2023	Diana Prince		939c3759-0fab-4f68-b5e4-68614...
7	The Art of War	5/10/2023	Ethan Hunt		71e7f00a-8988-42b5-ab5a-978a9...
8	The Catcher in the Rye	5/30/2023	Fiona Gallagher		85e55194-8d94-4a89-a81c-fb55f...
9	The Great Gatsby	6/19/2023	James Cameron		f10b6e8-830f-400c-b1e6-8703d...

+17 more

Close

Purpose: Tracks the borrowing and returning of books by members.

Key Columns:

- Borrowing

- Book (Lookup to **Books** table)
- Borrow Date
- Member (Lookup to **Members** table) Return Date
- Borrowing ID (Primary key)

4. Member Table

Name * ↑	Email *	Phone
Alice Smith	alice@example.com	+1 555-1234
Bob Johnson	bob@example.com	+1 555-5678
Charlie Brown	charlie@example.com	+1 555-8765
Diana Prince	diana@example.com	+1 555-4321
Ethan Hunt	ethan@example.com	+1 555-0000
Fiona Gallagher	fiona@example.com	+1 555-1111
George Costanza	george@example.com	+1 555-2222
Hannah Baker	hannah@example.com	+1 555-3333

Purpose: Manages the details of library members who borrow books.

Key Columns:

- **Name (Primary Column)**
- **Email**
- **Phone**

Benefits

- **One-Stop Solution:** Combines all library administration duties into a single, intuitive interface, including member tracking, borrowing, and cataloguing.
- **Effortless Navigation:** A clean and intuitive interface allows users to find books or manage records with minimal training.
- **Quick Search and Filters:** Locate books or authors instantly using dynamic search options and advanced filters.
- **Personalized Recommendations:** Enable librarians to suggest books based on borrowing history or preferences.
- **Real-Time Updates:** Members can view their borrowing status and due dates instantly, reducing communication gaps
- **Inventory Management:** Tracks availability and condition of books to facilitate timely replacements or repairs.

Challenges

- Dynamic filtering - Complex filtering logic was needed to implement features like dynamically displaying library borrowings by a particular member or books by a chosen author.
- Limited PowerApps experience: We weren't familiar with the Microsoft PowerApps platform at first because we were beginners. It required a significant amount of time and effort to understand and use the interface, components, and features effectively.
- Time constraints: Rapid learning and debugging were required due to the added pressure to complete the product within a certain amount of time while balancing other commitments.
- Testing and debugging - Troubleshooting issues like inaccurate calculations of borrow and return dates and resolving lookup-related errors proved to be a lengthy process.
- Integration with Dataverse - Ensuring seamless integration between Dataverse tables and the app, including proper data synchronization and handling live updates, was a challenging task.

Conclusion

The Library Management System app is an innovative solution that optimizes library operations by seamlessly integrating essential modules—Authors, Books, Borrowings, and Members—within a centralized platform built on Microsoft Power Apps and Dataverse. Overcoming challenges such as implementing advanced filtering, achieving smooth data integration, and navigating initial learning curves with Power Apps, the project successfully delivered a user-centric and efficient system. By simplifying processes like book cataloging, member administration, and borrowing management, the app ensures real-time access to information and provides a streamlined experience. This versatile tool transforms traditional library management, offering a cutting-edge solution tailored to the needs of both staff and users.

App link :

<https://apps.powerapps.com/play/e/c40cd82f-b798-eba4-a058-e4280c1f9902/a/f2bd1db2-aa5d-482f-9d44-ba7fa94689a2?tenantId=22426826-dc4c-401a-8d0e-7f97e64c0f99&sourcetime=1734178969045>

References

- https://youtu.be/2RzCbd5XgJg?si=Y5A0Whhl_s0yjcr3
- <https://www.youtube.com/live/PN880zIZ-BM?si=UK3CvRx-cY7rN-VK>
- https://youtu.be/J_PwNnaomq4?si=FOtlcNaNVqvUseqR
- <https://youtu.be/TUF2Rg691Qw?si=Gsl4Zzlzg3JgPPwP>